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Intelligent transport systems — Common Transport Service Account Systems —

Part 1: Framework and use cases

Partie 1: Cadre et cas d'utilisation

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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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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.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

A list of all parts in the ISO 21724 series can be found on the ISO website.

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.

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Introduction

Many transportation services (e.g. public transport, tolled roads, parking, city bike rental etc.) require payment for use. This has previously caused each service provider (e.g. public transport authorities, toll authorities, public and private parking providers, etc.) to develop independent, stand-alone payment systems to enable users to pay for access to their service. Consequently, a traveller who traverses multiple transport modes had to purchase services at more than one point of sales location. If the payment systems are integrated, then the transport service user may possess more than one payment/ticketing media, application, and/or account. However, in public transport there have for many years been products that enable a traveller to benefit from a seamless journey from A to B using several transport means, modes and operators. These products have been available through cooperation between operators and regional and national tariff schemes.

The transportation industry has seen an evolution in the collection of fares and fees throughout its history. The main drivers of that evolution have been the pursuit of increases in customer convenience and system efficiencies. Automated Fare Collection has progressed from use of magnetic technology to contactless smart cards, and recently to open financial payments and mobile payment applications.

Automated Toll Collection began with the use of simple read-only tags and is now looking to new approaches and technologies for future payment system advancements. Examples are open road tolling, vehicle miles travelled methods, and technologies such as Dedicated Short Range Communications (DSRC), Global Navigation Satellite System (GNSS), and Cellular Networks (e.g., GSM). Agencies have used these high-technology systems not only to enable automated payment and speed throughput, but to capture data, improve system reliability, and perhaps most important, to improve customer service.

Historically, transportation payment systems have covered only one service provider. Therefore, public transport ticketing/payment systems have not typically been technically integrated with charging/payment systems for tolls or parking and vice-versa. The reasons for this isolated nature are twofold. The first is that the individual service providers had little interest, from a business case standpoint, in integrating their purpose-built ticketing-, charging- and payment systems. The second is that technically this is a difficult and costly exercise, owing to the fact that the systems are typically proprietary and were designed to enable payment for one transportation service. However, in public transport, more and more electronic ticketing systems are supporting communication in conformance with ISO/IEC 14443 or ISO/IEC 18092. This implies physical and technical interoperability, but also that the ticketing applications have to be interoperable as well, as there has to be a contractual interoperability.

Some integration has occurred, for example between commuter or urban rail and parking. A traveller can often pay for both parking and their train ride with a common medium. But these examples usually occur only when there is one transport service provider for both the parking and public transport.

Other examples exist for purpose-built integrations of payment systems across two or more transportation modes. In some Asian countries like Japan and Korea there are several implementations of integrated payment systems for public transport and tolling. Examples include the use of a toll transponder that allows the insertion of a public transport card. The integrated payment systems are mostly based on a common payment media, i.e., smartcard with stored electronic value on the card.

In the past 5 to 10 years, the public transport industry in particular has embraced the development of Common Transport Service Account systems. In this approach, transportation products are stored in a central account rather than on the payment media. This architecture allows the system front end to be very flexible to enable customers to use contactless credit and debit cards and contactless mobile payment and ticketing applications alongside transport smart cards.

The subject of this document is to study the convergence of toll fee collection and payment and public transport fare collection and payment through the integration of the systems' accounts rather than their fee/fare payment media. This concept is flexible and can also include payment systems for other transport services, such as parking, electric charging stations, rideshare, bikeshare, and other disruptive transportation modes. Using an account-based backoffice architecture (prevalent in the toll

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industry), is becoming increasingly common in public transport and other transport service payment systems in the United States and Europe.

The technical approach is to link accounts used in multiple transportation modes to create a common transport service user account. For customers, this creates a seamless, end-to-end experience where they can easily access and pay for all transport modes for which they opt-in: public transport fares, toll fees, rideshare, etc. For operators, this common or linked account allows for additional customer benefits such as incentives, discounts or loyalty points strategies, and can add valuable customer usage data to inform their planning and operations, enhance mobility and reduce congestion in regions.

This document examines the concept, functional requirements, and benefits of converging payment systems for tolling, public transport and other transport services through a central account linkage. Readers interested in how this can be achieved by use of a common media are advised to access ISO/TR 19639.

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Intelligent transport systems — Common Transport Service Account Systems —

Part 1: Framework and use cases

1 Scope

This document describes the characteristics of a Common Transport Service Account System (CTSA). It presents the common transport service account framework and associated use cases. The objective of the CTSA role model is to cover relevant transport services, the payment methods, the account types where the user of the service is charged for the service and that requires a more overall role and responsibilities model. The model also defines external stakeholders that impact and border the model, that is, the general financial (banking) system. The framework assumes an account-based system where charges for services are calculated and charged in the account system. The main idea behind the CTSA framework is to provide a transport service user with the benefit of seamless acquisition of access rights to multiple transport services by multiple service / operator managers through a common transport account. This framework assumes a technology-agnostic front end with respect to the payment media and reading equipment. The focus of this framework is the back-office / account management system as a vehicle to integrate multiple transport services and managers.

A new set of terms are introduced in this document to distinguish the convergence of a common approach for payment for transportation services from more traditional models using “smart cards” or electronic tickets. The model describes a move towards common or linked mobility accounts for all traveller payment needs, whether for parking, tolls, public transport and other disruptive mode options (e.g., bikeshare, carshare, microtransit, micromobility), inclusive of commercial payment and benefit models.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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/

3.1
actor
user playing a coherent set of roles when interacting with the system within a particular *use case* (3.6)

Note 1 to entry: A user can, for instance, be a human, an Organisation or another (sub)system.

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3.2
secureID
evidence that a transport service user (customer) is entitled, at the Point of Entry (POE) to the transport service, to benefit from a transport service provided by a transport service manager

Note 1 to entry: A secureID may consist of a set of data elements defined in a standardized format stored on an electronic media, e.g. a smartphone, used for a secure storage of the information and a secure communication of the information to the media accepting devices installed either at the POE or at the Point of Sales (POS). The set of data elements and their content (values) can vary depending on the type of payment method, type of media and electronic identification application stored on the media and the type of transport service provided.

Note 2 to entry: A secureID may consist of a simple vehicle ID as given by the vehicle number plate and read by the roadside equipment (RSE) by means of Automatic Number Plate Recognition (ANPR).

Note 3 to entry: A secureID may also consist of a biometric identification, e.g. finger-print or facial recognition of the transport service user.

3.3
open interface
public standard (or generally accepted specification) for connecting hardware to hardware and software to software

[SOURCE: https://encyclopedia2.thefreedictionary.com/open+interface, 22 March 2016]

3.4
open payment
use of open industry interface standards and specifications for the electronic remuneration and provision of transport services

Note 1 to entry: See Reference [7] for more information on open payment architecture.

3.5
payment method
timing and location of remuneration for services including whether the payment is required prior to, at the time of, or post access to transport or related services

3.6
use case
description of typical interactions between the *actors* (3.1) and the (sub)system itself, capturing the functional requirements of the (sub)system by defining a sequence of actions performed by one or more actors and the system

4 Abbreviated terms

ANPR automatic number plate recognition

EFC electronic fee collection

IFMS integrated fare management system

IFMSA integrated fare management system architecture

PAYG pay as you go

POE point of entry

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