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Javni prevoz – Interoperabilni sistem vodenja (pre)voznin – 1. del: Arhitektura (ISO 24014-1:2007)

Public transport - Interoperable fare management system - Part 1: Architecture (ISO 24014-1:2007)

Öffentlicher Verkehr - Interoperables Fahrgeldmanagement System - Teil 1: Architektur (ISO 24014-1:2007)

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Transport public - Systeme de gestion tarifaire interoperable - Partie 1: Architecture (ISO 24014-1:2007)

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ICS 35.240.60; 03.220.01

English Version

Public transport - Interoperable fare management system - Part
1: Architecture (ISO 24014-1:2007)

Transport public - Système de gestion tarifaire
interopérable - Partie 1: Architecture (ISO 24014-1:2007)

Öffentlicher Verkehr - Interoperables Fahrgeldmanagement
System - Teil 1: Architektur (ISO 24014-1:2007)

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 24014-1:2007) has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", the secretariat of which is held by NEN, in collaboration with Technical Committee ISO/TC 204 "Transport information and control systems".

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of an identical text or by endorsement, at the latest by January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

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**Public transport — Interoperable fare
management system —**

**Part 1:
Architecture**

Transport public — Système de gestion tarifaire interopérable —

Partie 1: Architecture

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 24014-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Road transport and traffic telematics*, in collaboration with Technical Committee ISO/TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 24014 consists of the following parts, under the general title *Public transport — Interoperable fare management system*:

- *Part 1: Architecture* <https://standards.iteh.ai/catalog/standards/sist/b362232d-7314-4094-bfe1-2bf48a7168b7/sist-en-iso-24014-1-2008>

Introduction

Interoperable fare management (IFM) encompasses all systems and processes designed to manage the distribution and use of fare products in an interoperable public transport environment.

Such systems are called interoperable when they enable the customer to use a portable electronic medium (e.g. a contact/contactless smart card) with compatible equipment (e.g. at stops, with retail systems, at platform entry points or on board vehicles). IFM concepts can also be applied to fare management systems not using electronic media.

Potential benefits for the customer include reductions in queuing, special and combined fares, one Medium for multiple applications, loyalty programmes and seamless journeys.

Interoperability of fare management systems also provides benefits to operators and the other parties involved. However, it requires an overall system architecture that defines the system functionalities, the Actors involved and their roles, the relationships and the interfaces between them.

Interoperability requires also the definition of a security scheme to protect privacy, integrity and confidentiality between the Actors to ensure fair and secure data flow within the IFM system (IFMS).

The overall architecture is the subject of this part of ISO 24014, which recognizes the need for legal and commercial agreements between members of an IFM, but does not specify their form. The technical specifications of the Component parts, and particularly the standards for Customer Media (e.g. smart cards), are not included.

Note that there is not one single IFM. Individual operators, consortia of operators, public authorities and private companies can manage and/or participate in IFMs. An IFM can span country boundaries, and can be combined with other IFMs. Implementations of IFMSs require security and registration functionalities. This part of ISO 24014 allows for the distribution of these functions to enable the coordination/convergence of existing IFMSs to work together.

This part of ISO 24014 is intended to assist the managers of new and existing fare management systems to find a way conveniently to establish Interoperability for the benefit of their customers.

This part of ISO 24014 intends to provide three main benefits.

- a) It provides a framework for an interoperable fare management implementation with a minimum of complexity.
- b) It aims to shorten the time and lower the cost of IFM procurement, as both suppliers and purchasers understand what is being purchased. Procurement against an open standard reduces cost, as it avoids the need for expensive bespoke system development and provides for second sourcing.
- c) It aims to simplify Interoperability between IFMs to the benefit of all stakeholders.

The work has benefited from the architecture work done in Electronic Fee Collection (CEN/TC 278/WG 1) and other domains, including the following:

- ISO/TS 14904, *Road transport and traffic telematics — Electronic fee collection (EFC) — Interface specification for clearing between operators*;
- ISO/TS 17573, *Road Transport and Traffic Telematics — Electronic Fee Collection (EFC) — Systems architecture for vehicle related transport services*;
- existing international data security standards.

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Public transport — Interoperable fare management system —

Part 1: Architecture

1 Scope

This part of ISO 24014 provides the basis for the development of multi-operator/multi-service Interoperable public surface (including subways) transport Fare Management Systems (IFMSs) on a national and international level.

This part of ISO 24014 is applicable to bodies in public transport and related services which agree that their systems need to interoperate.

While this part of ISO 24014 does not imply that existing interoperable fare management systems need to be changed, it applies, so far as it is practically possible, to extensions of these.

This part of ISO 24014 covers the definition of a conceptual framework, which is independent of organisational and physical implementation. Any reference within this part of ISO 24014 to organisational or physical implementation is purely informative.

The objective of this part of ISO 24014 is to define a reference functional architecture for IFMSs and to identify the requirements that are relevant to ensure interoperability between several Actors in the context of the use of electronic tickets.

The IFMS includes all the functions involved in the fare management process, such as

- management of Application;
- management of Products;
- security management;
- certification, registration and identification.

This part of ISO 24014 defines the following main elements:

- identification of the different functional entities in relation to the overall fare management system;
- a generic model of IFMS describing the logical and functional architecture and the interfaces within the system and with other IFMSs;
- Use Cases describing the interactions and data flows between the different functional entities;
- security requirements.

This part of ISO 24014 excludes consideration of

- the physical Medium and its management;
- the technical aspects of the interface between the Medium and the Medium Access Device;

— the data exchanges between the Medium and the Medium Access Device;

NOTE The data exchanges between the Medium and the Medium Access Device are proposed by other standardisation committees.

— the financial aspects of fare management systems (e.g. customer payments, method of payment, settlement, apportionment, reconciliation).

2 Terms and definitions

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

2.1

Action List

list of items related to IFM Applications or Products, downloaded to Medium Access Devices (MADs), actioned by the MAD if and when a specific IFM Application or Product referenced in the list is encountered by that MAD

2.2

Actor

user playing a coherent set of roles when interacting with the system within a particular Use Case

NOTE A user can, for instance, be a human, an Organisation or another (sub)system.

2.3

Application Rules

Application Owner requirements

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2.4

Application Specification

specification of functions, data elements and security scheme according to the Application Rules

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2.5

Application Template

technical master of the Application Specification for implementation

2.6

Application

implemented and initialised Application Template on a Customer Medium

NOTE 1 The Application is identified by a unique identifier.

NOTE 2 The Application houses Products and other optional Customer information (Customer details, Customer preferences).

2.7

Commercial Rules

rules defining the settlement and commission within the IFMS

2.8

Contract

agreement between two or more Entities

2.9

Component

any piece of hardware and/or software that performs one or more functions in the IFM

2.10**Component Provider**

anyone who wants to bring a Component to the IFMS

2.11**Entity**

abstract object performing a set of functions within the IFM

NOTE An entity can exist in the real world (e.g. a service operator), in which case it is called a "legal entity". It can also be a model of this real world object ("abstract entity"). This part of ISO 24014 deals with the second kind of entity (collection of technical functions). It covers the following sets of functions: Application Owner, Application Retailer, Product Owner, Product Retailer, Service Operator, Collection and Forwarding, Security Manager, Registrar and Customer.

2.12**IFM Policies**

commercial, technical and security objectives of IFM

2.13**Interoperability**

ability of systems to provide services to, and accept services from, other systems

2.14**Medium**

physical carrier of Applications

2.15**Message**

set of data elements transferred between two Entities

2.16**Customer Medium**

Medium initialised with an Application through an Application Contract

2.17**Medium Access Device****MAD**

device with the necessary facilities (hardware and software) to communicate with a Customer Medium

2.18**Organisation**

legal entity covering the functions and implied responsibilities of one or more of the following operational entities: Application Owner, Application Retailer, Product Owner, Product Retailer, Service Operator, and Collection and Forwarding

2.19**Pricing Rules**

rules defining the price and payment relationships to the customer

2.20**Product Rules**

set of Usage, Pricing and Commercial Rules defined by the Product Owner

2.21**Product Specification**

complete specification of functions, data elements and security scheme according to the Product Rules

2.22**Product Template**

technical master of the Product Specification for creating Products

NOTE The Product Template is identified by a unique identifier.

2.23

Product

instance of a Product Template on a Medium stored in an Application

NOTE It is identified by a unique identifier and enables the customer to benefit from a service provided by a Service Operator.

2.24

Seamless Travel

opportunity for customers to move between one part of an IFMS to any other part of the same or another IFMS with the minimum of inconvenience, according to their own journey plan using any combination of transport mode and Service Operator using a single Medium

2.25

Security Policy

security objectives within the IFM Policies

2.26

Set of Rules

regulations for achieving IFM Policies expressed as technical, commercial, security and legal requirements and standards relevant only to the IFMS

2.27

Trigger

event that causes the execution of a Use Case

2.28

Usage Rules

rules defining the usage time, the usage area, the personal status and the type of service

2.29

Use Case

description of typical interactions between the Actors 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

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3 Abbreviated terms

- IFM interoperable fare management
- IFMS interoperable fare management system
- IFMSA interoperable fare management system architecture
- PP protection profile
- PT public transport
- SSS security subsystem
- TOE target of evaluation

4 Requirements

The purpose of ISO 24014 is to achieve Interoperability throughout fare management systems, while making sure that participating companies in public transport remain as commercially free as possible to design their own implementation in pursuing their own business strategies.

Specific requirements of the IFMS model are as follows.

- A Customer shall be able to travel with all participating operators (the seamless journey) using a single Medium.
- There shall be a capability to extract data appropriate to the revenue-sharing and statistical requirements of the transport operators.
- The same Medium may carry additional Applications; conversely, other media may carry the IFM Application.
- The ticketing methods associated with the Application shall offer the opportunity to reduce the current time taken to enter/exit the public transport system and may reduce payment handling costs significantly.
- The IFMS model shall comply with data protection and financial services laws/regulations (e.g. privacy).
- The IFMS model shall provide the capability to accommodate new Product Specifications as required, regardless of those already in existence.
- The IFMS model shall recognise and prevent internal or external fraud attacks.
- The IFMS model shall identify the customer while protecting their privacy as appropriate.
- The IFMS model shall protect the privacy of the Customer.
- The IFMS model shall assure the integrity of exchanged data.
- The IFMS model shall enable the implementation of additional services: loyalty programmes, car sharing, park and ride, bike and ride, etc.
- The IFMS model shall provide interface definitions between identified functions within public transport to enable different operator networks to interoperate.
- The IFMS model shall describe interfaces which are essential to enable data-forwarding functions between different operator networks, allowing revenue-sharing agreements to be met.
- The IFMS model shall provide a framework from which commercial agreements may be developed.
- The IFMS model shall be neutral with regard to different technologies which may be deployed [e.g. contact Medium, contactless Medium (short range, wide range), independent of access technologies].
- The IFMS model shall be functionally neutral regarding specific transport Organisation structures.

5 Conceptual framework

The IFMS may be run by a single transport undertaking, a transport authority, an association of public and private companies, or other groups.

An IFM Manager establishes and manages the IFM Policies on behalf of the IFMS. These policies are embedded in the Set of Rules.