

Public transport - Interoperable fare management
system - Part 1: Architecture (ISO 24014-1:2021)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 24014-1:2021 sisaldab Euroopa standardi EN ISO 24014-1:2021 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 24014-1:2021 consists of the English text of the European standard EN ISO 24014-1:2021.
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English Version

**Public transport - Interoperable fare management system -
Part 1: Architecture (ISO 24014-1:2021)**

Transport public - Système de gestion tarifaire
interopérable - Partie 1: Architecture (ISO 24014-
1:2021)

Öffentlicher Verkehr - Interoperables
Fahrgeldmanagement System - Teil 1: Architektur (ISO
24014-1:2021)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN ISO 24014-1:2021) has been prepared by Technical Committee ISO/TC 204 "Intelligent transport systems" in collaboration with Technical Committee CEN/TC 278 "Intelligent transport systems" the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by July 2021, and conflicting national standards shall be withdrawn at the latest by July 2021.

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 supersedes EN ISO 24014-1:2015.

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

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Endorsement notice

The text of ISO 24014-1:2021 has been approved by CEN as EN ISO 24014-1:2021 without any modification.

Contents

	Page
Foreword.....	vi
Introduction.....	vii
1 Scope.....	1
2 Normative references.....	2
3 Terms and definitions.....	2
4 Abbreviated terms.....	6
5 Requirements.....	6
6 System environment for IFMS.....	7
6.1 General.....	7
6.2 Mobility platforms.....	7
7 Conceptual framework for IFMS.....	7
7.1 General.....	7
7.2 Description of IFM roles and external roles.....	8
7.3 Basic framework of the generic IFM functional model.....	12
8 Use case description for the IFM functional model.....	13
8.1 Description of IFM-roles and external roles.....	13
8.2 Define set of rules.....	14
8.2.1 General.....	14
8.2.2 Define set of rules for Customer accounts.....	14
8.2.3 Define set of rules for media.....	14
8.2.4 Define set of rules for ID services.....	15
8.2.5 Define set of rules for payment services.....	15
8.3 Certification.....	15
8.3.1 General.....	15
8.3.2 Certification of organizations.....	16
8.3.3 Certification of components.....	16
8.3.4 Certification of media.....	16
8.3.5 Certification of ID services.....	16
8.3.6 Certification of payment services.....	17
8.3.7 Certification of application specifications and templates.....	17
8.3.8 Certification of product specifications and templates.....	17
8.4 Interaction with external objects.....	18
8.4.1 General.....	18
8.4.2 Interaction with external media.....	18
8.4.3 Interaction with external applications.....	19
8.4.4 Interaction with external ID services.....	20
8.4.5 Interaction with external payment services.....	21
8.5 Registration.....	22
8.5.1 General.....	22
8.5.2 Registration of organizations.....	22
8.5.3 Registration of components.....	22
8.5.4 Registration of ID services.....	22
8.5.5 Registration of customer accounts.....	23
8.5.6 Registration of payment services.....	24
8.5.7 Registration of media.....	24
8.5.8 Registration of customer media.....	24
8.5.9 Registration of application templates.....	25
8.5.10 Registration of applications.....	25
8.5.11 Registration of product templates.....	25
8.5.12 Registration of products.....	25
8.6 Managing ID services.....	26

8.6.1	General	26
8.6.2	Enrolment and update of Customer ID data via an application form	26
8.6.3	Enrolment and update of Customer ID data via an external ID service	27
8.6.4	Update of Customer ID data via an online account	27
8.6.5	Re-use of incumbent Customer ID data	28
8.6.6	Management and maintenance of Customer ID data	28
8.6.7	Providing the ID service to IFMS internal and external organizations	29
8.7	Management of customer accounts	29
8.7.1	General	29
8.7.2	Secure login to customer online accounts	30
8.7.3	Connect/disconnect customer media to/from the customer online account	30
8.7.4	Transfer of products between connected customer media	31
8.7.5	Connect system generated account with a customer account	32
8.7.6	Termination of customer accounts	32
8.8	Management of customer media	33
8.8.1	General	33
8.8.2	Provisioning of media	33
8.8.3	Termination of customer media	34
8.9	Management of applications	35
8.9.1	General	35
8.9.2	Dissemination of application templates	35
8.9.3	Acquisition of applications	36
8.9.4	Termination of application templates	36
8.9.5	Termination of applications	37
8.10	Management of products	38
8.10.1	Dissemination of product templates	38
8.10.2	Termination of product templates	39
8.10.3	Management of action lists	40
8.10.4	Acquisition of products	40
8.10.5	Modification of product parameters	40
8.10.6	Termination of products	41
8.10.7	Use and inspection of products	41
8.10.8	Collection of data	42
8.10.9	Forwarding data	43
8.10.10	Generation and distribution of clearing reports	43
8.11	Security management	44
8.11.1	General	44
8.11.2	Monitoring of IFM processes and IFM data life cycle	44
8.11.3	Management of IFM security keys	45
8.11.4	Management of security lists	45
8.12	Customer Service management (optional)	48
9	System interface identification	48
10	Identification	48
10.1	General	48
10.2	Numbering scheme	48
10.3	Prerequisites	49
10.3.1	There is one Registrar within the IFMS.	49
10.3.2	All objects, e.g. templates and components, have an owner who is one of the actors in the IFMS.	49
10.3.3	The identification of the application and product shall be as short and compact as possible due to the minimization of the transaction time between the customer medium and the MAD.	49
11	Security in IFMSs	49
11.1	General	49
11.2	Protection of the interests of the public	49
11.3	Assets to be protected	50
11.4	General IFM security requirements	50

Annex A (informative) Mobility Platform – German example	52
Annex B (informative) Pay-As-You-Go (PAYG) roles and relationships in an IFMS	57
Annex C (informative) Mobility ID service example	63
Annex D (informative) Examples of IFMS implementations	73
Annex E (informative) Media centric management and back-office centric management	79
Bibliography	81

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).

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).

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.

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 24014-1:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

- in order to prepare compatibility of Interoperable Fare Management (IFM) systems with mobility platforms encompassing the entire mobility service chain, functions and roles known from IFM are expanded; and
- new roles are introduced to operate mobility platforms.

A list of all parts in the ISO 24014 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.

Introduction

Fare management (FM) encompasses all the processes designed to manage the distribution and use of fare products in a public transport environment.

Fare management is called interoperable (IFM) when it enables the customer to use a portable electronic medium (e.g. a contact/contactless smart card or a Near Field Communications mobile device) 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.

There are two main changes in this edition of this document compared to the previous edition. Firstly, in order to prepare compatibility of IFM systems with mobility platforms encompassing the entire mobility service chain, functions and roles known from IFM are expanded. Secondly, new roles are introduced to operate mobility platforms. These new roles should act with the roles defined in the IFM and enter into interface relations.

With the introduction of so-called mobility platforms, which can integrate various IFM systems and additional modes of transportation and deliver the travel information across these integrated domains, the customer can benefit from seamless and well-guided multi- or inter-modal travel.

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 also requires 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 document, which recognizes the need for legal and commercial agreements between members of an IFMS, 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 IFMS. Individual operators, consortia of operators, public authorities, and private companies can manage and/or participate in IFMSs. An IFMS can span country boundaries and can be combined with other IFMSs. Implementations of IFMSs require security and registration functionalities. This document allows for the distribution of these functions to enable the coordination/convergence of existing IFMSs to work together.

This document intends to provide the following benefits:

- a) It defines a common definition of terms and roles that shall constitute the basis for the other parts of ISO 24014 and technical specifications and technical reports from ISO/TC 204 which address mobility platforms, fare management and interoperability between IFM and other systems.
- b) It provides a framework for an interoperable fare management implementation with minimum complexity.
- c) It provides guidance on how IFM Managers can benefit from external devices and services and how interoperability and appropriate security level can be established in cooperation with systems from other markets.
- d) It aims to shorten the time and lower the cost of IFMS 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.
- e) It aims to simplify interoperability between IFMSs to the benefit of all stakeholders.

In [Annex A](#), this document provides a framework for mobility platforms that integrate fare management and travel information for inter- and multimodal travel. This document also contains other informative

annexes, which elaborate on some specific subjects of the document and offer some national examples with regard to IFMS implementations (see [Annex B](#), [Annex C](#), [Annex D](#) and [Annex E](#)).

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Public transport — Interoperable fare management system —

Part 1: Architecture

1 Scope

This document gives guidelines 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 document is applicable to bodies in public transport and related services which agree that their systems need to interoperate.

This document defines a conceptual framework which is independent of organizational and physical implementation. Any reference within this document to organizational or physical implementation is purely informative.

This document defines a reference functional architecture for IFMSs and establishes the requirements that are relevant for ensuring 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 media,
- management of applications,
- management of products,
- security management, and
- certification, registration, and identification.

This document defines the following main elements:

- identification of the different sets of functions in relation to the overall IFMS and services and media from non-transport systems which interact with fare management systems;
- a generic model of an IFMS describing the logical and functional architecture and the interfaces within the system, with other IFMSs and with services and media from non-transport systems;
- use cases describing the interactions and data flows between the different sets of functions;
- security requirements.

In its annexes, this document provides a framework for mobility platforms that integrate fare management and travel information for inter- and multimodal travel (see [Annex A](#)). It also elaborates on specific subjects covered in document and offers some national examples with regard to IFMS implementations (see [Annex B](#), [Annex C](#), [Annex D](#) and [Annex E](#)).

This document does not define:

- 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 standardization committees.

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

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 account-based ticketing ABT

architectural approach that stores *products* (3.30) in the *IFM* (3.19) system's back-office (i.e. the customer's personal account or a temporary account) and not in the *customer medium* (3.12)

Note 1 to entry: The customer medium carries authentication credentials and an *application* (3.7) that contains references to the account-based products in the back-office.

3.2 action list

list of items related to *IFM* (3.19) *applications* (3.7) or *products* (3.30) downloaded to *medium access devices* (3.24) (MADs) processed by the MAD if and when a specific IFM application or product referenced in the list is encountered by that MAD

3.3 actor

person, *organization* (3.25), or another (sub)system playing a coherent set of functions when interacting with the *IFM system* (3.20) within a particular *use case* (3.36)

3.4 application rules

specification of rules in the *application* (3.7) contract for the use of the application with the Customer as defined by the application owner

3.5 application specification

specification of functions, data elements, and security scheme according to the *application rules* (3.4)

3.6 application template

executable technical pattern of the *application specification* (3.5)