SLOVENSKI STANDARD
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Inteligentni transportni sistemi - Zahteve in cilji (ISO/DIS 17423:2024)

Intelligent transport systems - Application requirements and objectives (ISO/DIS 17423:2024)

Intelligente Verkehrssysteme - Anwendungsanforderungen und Grundsätze (ISO/DIS 17423:2024)

Systèmes de transport intelligents - Exigences d'application et objectifs (ISO/DIS 17423:2024)

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35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

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Intelligent transport systems — Application requirements and objectives

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 on 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 the following URL: www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces ISO 17423:2018, which has been technically revised to

— remove the second title to align with the unchanged scope;

— editorially improve the last title;

— perform editorial improvements;

— update references;

— align the ASN.1 module with latest developments of other ASN.1 modules – this alignment does not introduce technical changes in the module

Introduction

Abstracting applications from communications is a useful basic architectural principle of Intelligent Transport Systems[1)] (ITS) embodied in the ITS station and communication architecture presented in ISO 21217.

Applications and communications are linked together using the concepts of flows and paths and communication profiles described in ISO 21217 with related flow and path management procedures specified in ISO 24102-6.[11] The ITS station management uses communication requirements and objectives of applications together with the capabilities of the ITS station (status of available communication protocol stacks) and sets of decision rules (regulations and policies) to select suitable parameterized ITS-S communication protocol stacks, also referred to as "ITS-S Communication Profiles" (ITS-SCP), for each source of a potential flow as illustrated in Figure 1. A set of communication requirements is referred to as a Flow Type in ISO 24102-6.[11] There may be well-known registered Flow Types as specified in ISO 17419.

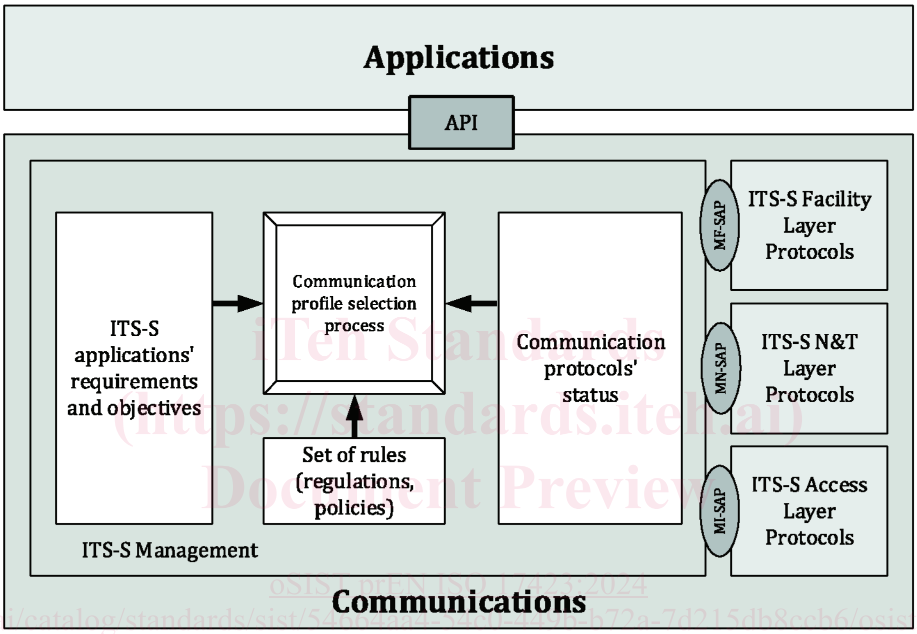

Figure 1 — ITS-S communication profile selection process

An ITS-S communication profile is independent of any destination address. However, an instantiation of a communication profile includes the address of the next hop recipient, and a path includes address information of the next hop recipient, the anchor and the destination as specified in ISO 24102-6[11].

A user of an ITS station unit may be able to influence the selection of ITS-S communication profiles by providing his own policies.

Information from a Local Dynamic Map (LDM), see ISO 18750,[4] on neighbouring stations offering certain communication capabilities may also be useful for the ITS-S communication profile selection process, although not indispensable.

1) The term “Cooperative ITS” (C-ITS) indicates specific features of ITS[4]. For the purpose of this document, no distinction between ITS and C-ITS is needed.

Intelligent transport systems — Application requirements and objectives

1 Scope

This document

— specifies communication service parameters presented by ITS station (ITS-S) application processes to the ITS-S management in support of automatic selection of ITS-S communication profiles in an ITS station unit (ITS-SU),

— specifies related procedures for the static and dynamic ITS-S communication profile selection processes at a high functional level,

— provides an illustration of objectives used to estimate an optimum ITS-S communication profile.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 4217, *Codes for the representation of currencies*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation*

ISO 17419, *Intelligent transport systems — Globally unique identification*

ISO 21217, *Intelligent transport systems — Station and communication architecture*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21217, ISO 17419, ITU-T X.911, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
ITS-S application process RX/TX interface
sink or source of an ITS-S application process

3.2
permission
rule that a particular behaviour is allowed to occur

Note 1 to entry: From ITU-T X.911[14].

4 Symbols and abbreviated terms

BSME	Bounded Secured Managed Entity, see ISO 21217
CPSP	Communication Profile Selection Process
CRO	Communication Requirements and Objectives
CSP	Communication Service Parameter
CSP_AvgADUrate	Communication service parameter “Average ADU generation rate”
CSP_CommDistance	Communication service parameter “Communication distance”
CSP_DataConfidentiality	Communication service parameter “Need for data confidentiality”
CSP_DataIntegrity	Communication service parameter “Need for data integrity”
CSP_DestinationDomain	Communication service parameter “Destination domain”
CSP_DestinationType	Communication service parameter “Destination type”
CSP_Directivity	Communication service parameter “Directivity”
CSP_ExpFlowLifetime	Communication service parameter “Expected flow lifetime”
CSP_FlowType	Communication service parameter “Flow type”
CSP_LogicalChannelType	Communication service parameter “Logical channel”
CSP_MaxADU	Communication service parameter “Maximum ADU size”
CSP_MaxLat	Communication service parameter “Maximum allowed latency”
CSP_MaxPrio	Communication service parameter “Maximum priority”
CSP_MinThP	Communication service parameter “Minimum throughput”
CSP_NonRepudiation	Communication service parameter “Need for non-repudiation”
CSP_PortNo	Communication service parameter “Port Number”
CSP_Protocol	Communication service parameter “Protocol requirements”
CSP_Resilience	Communication service parameter “Resilience”
CSP_SessionCont	Communication service parameter “Session continuity”
CSP_SourceAuthentication	Communication service parameter “Source authentication”
CSP_SpecificCommsProts	Communication service parameter “Specific communications protocols”
ITS-S-FlowID	Flow Identifier, see ISO 24102-6[11]
IICP	ITS station-internal management communications protocol, see ISO 24102-4[9]
ITS-S	ITS station, see ISO 21217
ITS-SCP	ITS station communication profile
ITS-SCPS	ITS station communication protocol stack

ITS-SCU	ITS station communication unit, see ISO 21217
ITS-SU	ITS station unit, see ISO 21217
R_ConnectRate	“Maximum rate per connection” rule
R_ConnectTimeRate	“Maximum rate per connection time” rule
R_DataUnitRate	“Maximum rate per data unit” rule
R_FlatRate	“Flat Rate” rule
R_StationAnonymity	“Need for station anonymity” rule
R_StationAuthentication	“Support of station authentication” rule
R_StationLocationPrivacy	“Need for station location privacy” rule
ITS-S-FlowTypeID	ITS-S flow type identifier (from ISO 24102-6)

5 Communication service parameters

5.1 Abstraction of application processes from communications

The ITS station (ITS-S) reference architecture presented in Figure 2 and specified in ISO 21217 distinguishes two main blocks, i.e. "Applications" and "Communications". ITS-S application processes in "Applications" access communication services in "Communications" through an API. Portability of ITS-S application processes, which leads to the creation of ITS application process repositories as described in ISO 17419, is enabled by

— abstraction of ITS-S application processes (e.g. in "Applications") from communication protocols (in "Facilities", "Networking & Transport", "Access") and supporting management and security functionality (in "Management", "Security") introduced as an essential basics of an ITS station in ISO 21217,

— procedures by which instances of ITS-S application processes running in an ITS station unit (ITS-SU) specified in ISO 21217 can present requirements for communication services in an abstract and standardized way to the ITS station management as specified in this document,

— procedures for automatic selection of optimum communication profiles by the ITS station management for each set of required communication services.

Communication service requirements are presented by means of "Communication Service Parameters" (CSP) as identified in this document. These parameters are used to identify sets of possible choices of ITS-S communication profiles as well as selecting the "optimal" ITS-S communication profile out of each set. The selection of the "optimal" ITS-S communication profile is implementation dependent and generally involves the formulation of a cost function based on objectives. The cost function needs to be extremized (maximized or minimized) as discussed in Annex C.

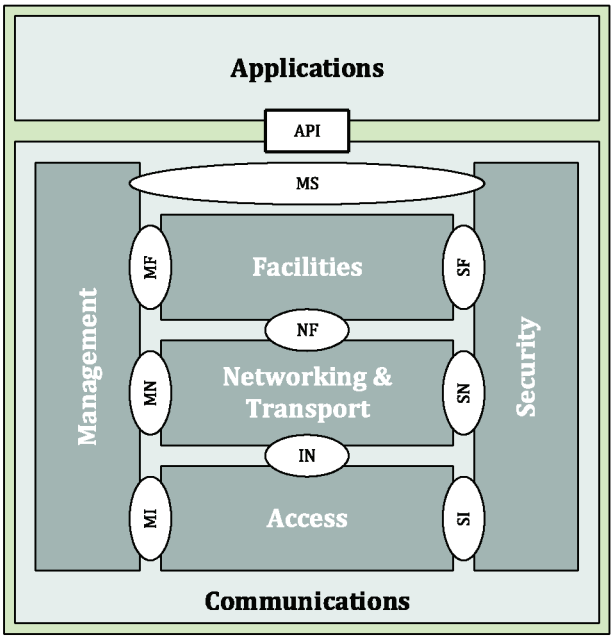

Figure 2 — ITS station architecture [ISO 21217]

The same approach to present communication requirements and objectives also applies to

— ITS-S application processes located in the ITS-S facilities layer (e.g. CAM source, specified in ETSI EN 302 637-2[15]),

— ITS-S application processes located in the ITS-S management entity (e.g. SAM and SRM sources specified in ISO 16460[1] and ISO 22418[10]),

— ITS-S application processes located in the ITS-S security entity,

— ITS-S application processes located somewhere else in an ITS station.

There are also other application processes that can get access to the communication services of an ITS-SU. Such other application processes are not certified to be installed in an ITS-SU implemented as a BSME as described in ISO 21217 and ISO 17419, but may use selected functionality from it, especially communication functionality.

Figure 3 illustrates a simplified version of Figure 2 to be applied to the process illustrated in Figure 1 considering ITS-S application processes in general.

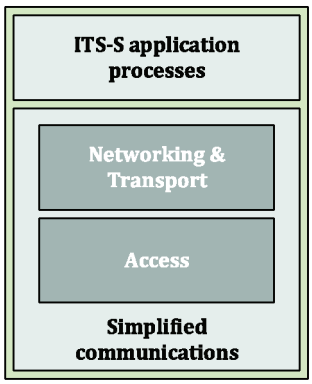

Figure 3 — Simplified architecture