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Intelligentni transportni sistemi - Globalno enotna identifikacija (ISO/DIS 17419:2024)

Intelligent transport systems - Globally unique identification (ISO/DIS 17419:2024)

Intelligente Verkehrssysteme - Global eindeutige Identifikation (ISO/DIS 17419:2024)

Systèmes de transport intelligents - Identification unique au niveau global (ISO/DIS 17419:2024)

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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 second edition cancels and replaces ISO 17419:2018, which has been technically revised to

- remove the second title to align with the unchanged scope;
- perform editorial improvements;
- update titles of references;
- implement ISO 17419:2018-Amd1;
- provide the ASN.1 modules in machine-readable files as electronic attachments for publication on the ISO maintenance portal;
- update [Annex A](#) to enable ASN.1 minorVersion, and to provide SHA-256 cryptographic hash digests for the files of the electronic attachments;
- fix bugs in the ASN.1 modules – technical change of `ITS-MsgSetID`;
- update the data dictionary.

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Introduction

Classification and management of ITS applications in a global context covers more than just the ITS applications themselves. It also covers elements of the environment in which ITS applications are instantiated.

Intelligent Transport Systems (ITS) provide ITS services to users by execution of ITS applications which typically requires communications between ITS station application processes residing in ITS station units (ITS-SU). Communications includes messages dedicated to ITS applications, and messages from ITS message sets.

Following the definition in ETSI TS 102 860,^[20] ITS applications and ITS application classes are referred to as ITS application objects. ITS application objects are uniquely identified by the registered “ITS Application Identifier” (ITS-AID) specified in this document.

NOTE 1 An ITS application class groups ITS applications together that provide the same type of service, e.g. “Electronic Fee Collection” (EFC), but operate in different contexts. Prior to start of service provisioning the applicable context is negotiated. The definition of ITS application classes is based on the concept of the DSRC Application entity as introduced in ISO 15628,^[7] which is identified by a DSRCApplicationEntityID; negotiation of the applicable context is performed by BST/VST exchange.

In ETSI TS 102 860,^[20] ITS message sets were referred to as ITS application objects. This definition is not adopted in this document due to the very different nature of ITS message sets and ITS application objects. ITS message sets are uniquely identified by the registered “ITS Message Set Identifier” (ITS-MsgSetID) specified in this document.

This document is an extension towards more general and global applicability of ETSI TS 102 860.^[20] This document introduces the term “ITS-S object” as a general reference to ITS application objects, ITS message sets and other objects which may require globally unique identification and registration.

NOTE 2 Examples of other ITS-S objects are ITS-S communication protocols and ITS-S security protocols.

Management of ITS-S objects is specified in the ISO 24102 series (all parts)^{[9]–[12][14]} and in ISO 17423.^[2] This document focuses on some management aspects related to authorized and controlled operation of ITS-S objects, which requires considerations of ITS-S object identifiers, e.g. ITS-AID, ITS-MsgSetID, ITS-SUID, ITS-SCUID, addresses and protocol identifiers used in the communication protocol stack of an ITS-S, and others.

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Intelligent transport systems — Globally unique identification

1 Scope

This document

- describes and specifies globally unique addresses and identifiers (ITS-S object identifiers) which are both internal and external to ITS stations and are used for ITS station management,
- describes how ITS-S object identifiers and related technical parameters are used for classification, registration and management of ITS applications and ITS application classes,
- describes how ITS-S object identifiers are used in the ITS communication protocol stack,
- introduces an organizational framework for registration and management of ITS-S objects,
- defines and specifies management procedures at a high functional level,
- is based on the architecture of an ITS station specified in ISO 21217 as a Bounded Secured Managed Domain (BSMD),
- specifies an ASN.1 module for the identifiers, addresses, and registry records identified in this document, and
- specifies an ASN.1 module for a C-ITS Data Dictionary containing ASN.1 type definitions of general interest.

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

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

ITU-T X.911, (10/2001), *Information technology — Open Distributed Processing — Reference Model — Enterprise Language*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21217, in 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>

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3.1

ITS application class

ITS application designed for operation in different contexts involving real-time negotiation of the appropriate context

Note 1 to entry: The functional concepts of “application class” and “application context” were introduced in ISO 15628. ITS application class is used, e.g. in ISO 22418. An example of an application class can be found in ISO 14906.

3.2

ITS application identifier

globally unique, registered number identifying an ITS application object

3.3

ITS application object

ITS application or ITS application class

3.4

ITS message

message designed for an ITS-related purpose

3.5

ITS message set

collection of one or more uniquely identified ITS messages

3.6

ITS message set identifier

globally unique, registered identifier of an ITS message set

3.7

ITS protocol stack identifier

globally unique, registered identifier of a non-parameterized communications protocol stack

3.8

ITS registration authority

entity authorized to register ITS-S object identifiers

3.9

ITS trusted authority

entity authorized to issue ITS-S object security credentials

3.10

ITS-S application process provisioner

functionality in an ITS-SU offering ITS-S application processes for download and installation to other ITS-SUs

3.11

ITS-SCU configuration management centre

entity that retains information about capabilities of ITS-SCUs, status of objects in ITS-SCUs, and supports management and update of this information

3.12

ITS-S object

entity used in ITS related to ITS-S management that may require a globally unique identifier

Note 1 to entry: Examples of ITS-S objects include ITS-SU, ITS-SCU, ITS application object, ITS message set, ITS-S communication protocol, ITS flow type.

3.13

ITS-S object identifier

identifier of an ITS-S object

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3.14

ITS-S object owner

entity responsible for the specification (design), maintenance and registration of an ITS-S object

Note 1 to entry: ISO 14812^[30] has modified this definition to "performance of one or more tasks to fulfil an ITS-S user need for an ITS-S user".

3.15

regulation

<document> written instrument containing rules having the force of law

3.16

regulation

<process> process of the promulgation, monitoring, and enforcement of rules defined in 'regulation (document)', established by primary and/or delegated legislation

3.17

regulator

agency responsible for exercising autonomous authority over some area of human activity

4 Symbols and abbreviated terms

ARCP Application Requirements for selection of Communication Profiles

BSMD Bounded Secured Managed Domain

BST Beacon Service Table

CEN Commission Européenne de Normalization

C-ITS Co-operative Intelligent Transport Systems

ETSI European Telecommunications Standards Institute

GCMA Global Classification and Management of ITS Applications

IANA Internet Assigned Numbers Authority

IEEE Institute of Electrical and Electronics Engineers

IETF Internet Engineering Task Force

ISO International Standards Organization

ITS Intelligent Transport Systems

ITS-ACID ITS Application Context Identifier

ITS-AID ITS Application Identifier

ITS-AOOD Application Object Owner (designer) Identifier

ITS-ATT ITS Access Technology Type

ITS-FlowTypeID ITS Flow Type Identifier

ITS-LCH ITS Logical Channel

ITS-LCHID ITS Logical Channel Identifier

ITS-MsgSetID ITS Message Set Identifier

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ITS-MSOID	ITS Message Set Owner Identifier
ITS-NTSDU	ITS Station Networking and Transport layer Service Data Unit
ITS-PN	ITS Port Number
ITS-PR	ITS policy region
ITS-PRID	ITS-PR Identifier
ITS-ProtID	ITS Protocol Identifier
ITS-ProtStckID	ITS Protocol Stack Identifier
ITS-RR	ITS Regulatory Region
ITS-RRID	ITS Regulatory Region Identifier
ITS-S	ITS Station
ITS-SAPID	ITS-S Application Process Identifier
ITS-SAPIID	ITS-S Application Process Instance Identifier
ITS-S-APDID	ITS-S Application Process Developer Identifier
ITS-S-APP	ITS-S application Process Provisioner
ITS-S-APPID	ITS-S Application Process Provider Identifier
ITS-SAPSSID	ITS-S Application Process Sink Source Identifier
ITS-SCU	ITS Station Communication Unit
ITS-SCU-CMC	ITS-SCU Configuration Management Centre
ITS-SCU-CMCID	ITS-SCU-CMD Identifier
ITS-SCUID	ITS-SCU Identifier
ITS-SecAlgID	ITS Security Algorithm Identifier
ITS-SEMID	ITS Station Equipment Manufacturer Identifier
ITS-S-FSID	ITS-S Facilities layer Service Identifier
ITS-SU	ITS Station Unit
ITS-SUID	ITS-SU Identifier
ITS-SU-UID	ITS-SU User Identifier
LDM	Local dynamic map
RITSI	Registry of Intelligent Transport System Items
VST	Vehicle Service Table

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5 Management issues

5.1 General

In this document, application management refers to objects and procedures, both internal and external to the platforms on which the applications are installed, which are used to ensure the efficacy and authenticity of these applications and these platforms. Platforms in this context are ITS station communication units¹⁾ (ITS-SCUs) and applications are ITS-S application processes as specified in ISO 21217. Application management procedures involve protocols for exchanging information between the various entities involved in application management, and these procedures are described at a functional level in this document. These procedures are to be used for authorizing and authenticating the use of ITS-S application entities over communication networks as described in ISO 21217 and in [5.2](#).

Entities related to ITS application management in the global context and their roles identified and / or specified in this document are listed in [Table 1](#).

Table 1 — Entities and their roles

Entity	Role
ITS-S object	Entity used in ITS related to ITS-S management that may be identified by a globally unique identifier. EXAMPLE ITS application objects, ITS message sets, ITS-S communication protocols, ITS-S units, ITS-S communication units.
ITS-S object owner	Entity which is responsible for the specification (design), maintenance and registration of ITS-S objects. EXAMPLE Standards development organizations, industry special interest groups such as the “Society of Automotive Engineers” (SAE).
ITS application object	Entity that provides an ITS service to the user as specified in ISO 21217. EXAMPLE ITS applications and ITS application classes.
ITS message set	Set of ITS messages designed for an ITS-related purpose as specified in ISO 21217.
ITS-S communication protocol	Protocol used in a communication protocol stack of an ITS-S
ITS-S unit (ITS-SU)	Physical instantiation of an ITS station specified in ISO 21217. An ITS-SU may consist of one single ITS-SCU, or several ITS-SCUs interconnected via an ITS station internal network. An ITS-SU is also referred to as “Bounded Secured Managed Entity” as specified in ISO 21217.
ITS-S communication unit (ITS-SCU)	Physical unit in an ITS-SU containing a part or all of the functionality of an ITS-S as specified in ISO 21217.
ITS-S equipment manufacturer	Manufacturer of ITS-SUs or ITS-SCUs.
ITS-S application process developer	Developer (manufacturer) of ITS-S application processes for usage in ITS-SUs.
ITS-S application process provisioner	Entity that offers ITS-S application processes for download to an ITS-SCU.
ITS-SCU configuration management centre	Entity that retains information about the capabilities of ITS-SUs, status of objects in ITS-SUs, and supports management and update of this information.
Certification authority (Certification laboratory)	Entity in charge of checking ITS-SCUs, implementations of ITS-S communication protocols, and ITS-S application processes for compliance to standards or specifications defined in an ITS release.
ITS registration authority	Entity in charge of registering ITS-S objects referenced by globally unique identifiers.
ITS trusted authority	Entity in charge of providing ITS-S object security credentials such as keys and certificates for hardware and software.

1) An ITS-SU may consist of several physical units called ITS-SCUs as specified in ISO 21217.

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5.2 ITS communications architecture

As illustrated in [Figure 1](#), regardless of the complexity of the networks employed, communication between “ITS station units” (ITS-SUs), and between ITS-SUs and other types of ITS communication nodes, is on a peer-to-peer basis. The distinguishing feature of ITS-SUs is that of trust and authentication as discussed in [5.5.1](#). The need for trust and authentication arises from the deployment of critical safety-of-life and property applications. This leads to the definition of an ITS station as a “Bounded Secured Managed Domain” (BSMD) as specified in ISO 21217, and the requirement for a “Public Key Infrastructure” (PKI) for trust assertion and certificate management.

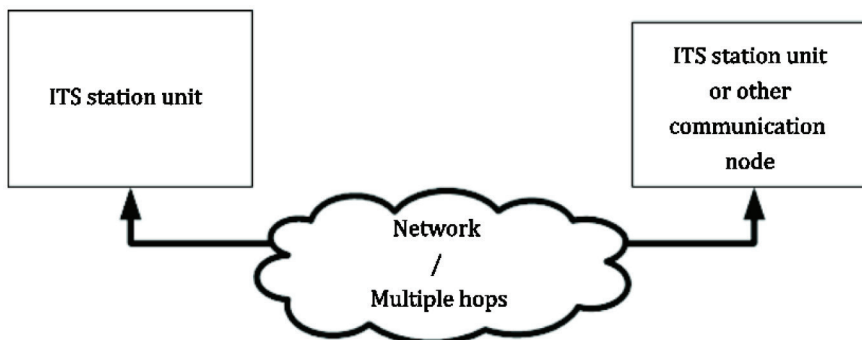


Figure 1 — Simplified ITS peer-to-peer communication architecture

5.3 PKI architecture

A public-key infrastructure (PKI) is a system for the creation, storage, distribution, and revocation of digital certificates which are used to verify that a particular public key and associated rights belong to a certain entity. The PKI creates digital certificates which map public keys to entities and their rights, securely stores these certificates in a central repository, and revokes them if needed.

5.4 Regulations and policies

Application management procedures shall comply with applicable regulation and use applicable policies. A policy is a set of rules related to a particular purpose. Such a rule can be expressed as an obligation, an authorization, a permission, or a prohibition. A regulation is an enforceable policy. Regulations apply for a specific regulatory domain and are produced and maintained by regulators. Policies apply for a specific policy domain.

The need and applicability for regulations and policies in ITS is identified in this document for the following purposes:

- radio frequency allocation and usage;
- privacy issues;
- traffic operations and management.

A regulatory region is uniquely identified by an ITS Regulatory Region Identifier ITS-RRID.

A policy region is uniquely identified by an ITS Policy Region Identifier ITS-PRID.

5.5 ITS station

5.5.1 ITS station architecture

The architecture of the ITS station (ITS-S) specified in ISO 21217 is illustrated in [Figure 2](#).