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Intelligentni transportni sistemi - Kooperativni sistem - 1.del: Vloge in odgovornosti v okviru kooperativnega ITS, osnovanega na arhitekturi za kooperativne sisteme (ISO/DIS 17427-1:2016)

Intelligent transport systems - Cooperative ITS - Part 1: Roles and responsibilities in the context of co-operative ITS architecture(s) (ISO/DIS 17427-1)

Systèmes intelligents de transport - Systèmes intelligents de transport coopératifs - Partie 1: Rôles et responsabilités dans le contexte des ITS fondés sur l'architecture (ISO/DIS 17427-1:2016)

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Intelligent transport systems — Cooperative ITS —

Part 1:

Roles and responsibilities in the context of co-operative ITS architecture(s)

Systèmes intelligents de transport — Systèmes intelligents de transport coopératifs —

Partie 1: Rôles et responsabilités dans le contexte des ITS fondés sur l'architecture

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

- *Part 1: Roles and responsibilities in the context of co-operative ITS architecture(s)*
- *Part 2: Framework overview*
- *Part 3: Concept of operations (ConOps) for 'core' systems*

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 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.

The committee responsible for this document is ISO/XXX

This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

ISO XXXX consists of the following parts. [Add information as necessary.]

- *Part 5: Common approaches for security*
- *Part 6: 'Core system' risk assessment methodology*
- *Part 7: Privacy aspects*
- *Part 8: Liability aspects*
- *Part 9: Compliance and performance aspects*
- *Part 10: Driver distraction and information display*
- *Part 12: Release processes*
- *Part 13: Use case test cases*
- *Part 14: Maintenance requirements and processes*

Introduction

‘Cooperative Intelligent Transport Systems’ (*C-ITS*) (3.8) are a promising advancement of Intelligent Transport Systems (ITS). Numerous applications, made possible only, or most efficiently, by the cooperation of *actors* (3.2) (other vehicles, the *infrastructure* (3.12), service (3.25) providers, even bystanders), are being devised that open up new possibilities to make traffic safer, more efficient and smarter. Technologies are being developed and improved to realize and support those new *services* and *applications* (3.3). But, to finally implement *C-ITS* and to achieve the benefits of greater safety and better mobility, multiple *actors* will have to cooperate with each other in a completely new way. *Actors* that have to date worked in isolation – in so called ‘silos’ - will have to find a way to achieve these possibilities. New *actors* may also be required for the provision of some *services*. This requires a clear definition and assignment of *behaviours*, *responsibilities* and liabilities. Therefore a general, abstract organizational architecture with the description of the single *roles* (3.22), their *behaviour* (3.4), and the corresponding *responsibilities* (3.21), is an essential prerequisite for the deployment of *C-ITS*.

The organizational relationships, with the description of roles and responsibilities, is a crucial part of the whole *C-ITS* architecture. *C-ITS* is not an objective in itself, it is a means to achieve the potential of service provision through the cooperation of *actors* involved in the ITS sector. The architectural viewpoint comprising the organizational architecture has extensive influences on the deployment and implementation of *C-ITS*.

This document describes the high level *roles* and *responsibilities* of a *C-ITS* ‘Service Provider’ and aligns it with other *C-ITS* standards and specifications.

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Intelligent transport systems — Cooperative ITS —

Part 1:

Roles and responsibilities in the context of co-operative ITS architecture(s)

1 Scope

This International Standard contains a detailed description of the (actor invariant) ‘Roles and Responsibilities’ required to deploy and operate Cooperative-ITS (C-ITS). The organization / organization of actors / roles described in this document are designed to be appropriate for any fully operational system that uses the *C-ITS* concepts and techniques in order to achieve its service provision. This International Standard is presented in terms of an ‘Organizational’ or ‘Enterprise’ Viewpoint as defined in ISO/IEC 10746 Open Distributed Processing.

This International Standard, “Roles and Responsibilities in the context of Cooperative-ITS based on architecture(s) for cooperative systems” is for all types of road traffic of all classes, and for any other actors involved in the provision of applications and services which use *C-ITS* (3.8) techniques to achieve service provision. The description of roles is technology agnostic and, in terms of Cooperative-ITS, agnostic in respect of communication modes and embraces vehicle-vehicle communications, vehicle-infrastructure communications and infrastructure-infrastructure communications.

This International Standard provides a methodology for the identification of service specific roles and their corresponding responsibilities based on a process oriented approach. Additionally, the methodology is used to identify the roles and responsibilities for Cooperative-ITS (3.8) in general. Both the methodology as well as the roles and responsibilities for Cooperative-ITS are deduced from ISO/IEC 10746, the reference model of ‘Open Distributed Processing’. Open Distributed Processing offers five viewpoints of which the *Enterprise Viewpoint* (3.10) corresponds with the ‘Organizational Architecture’ – and its roles and responsibilities.

To limit the scope of the document to the core of Cooperative-ITS, the roles are separated into ‘external’ and ‘internal’. Considered to be internal are all roles that are highly relevant for the purpose of achieving service provision by means of Cooperative-ITS. Considered to be external are all roles involved in Cooperative-ITS, but not set up *only* for the purpose of Cooperative-ITS.

This International Standard provides a description of a high-level architectural viewpoint on Cooperative-ITS. It is designed to be used as a blueprint when implementing service provision systems that use Cooperative-ITS, and the corresponding organizational structures. The characteristics of Cooperative-ITS entail a huge number of data / information exchanges – therefore the implementation stringently needs to respect privacy and data protection as it is defined in ISO/TR 12859 and in national laws and regulations (where instantiated). Privacy and data protection affects all roles defined in this International Standard due to these characteristics and all actors occupying roles in Cooperative-ITS need to respect the corresponding standards and regulations.

2 Normative references

The following referenced documents are indispensable for the application 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 10746-1:1998, *Information technology — Open Distributed Processing — Reference model: Overview — Part 1*

ISO/DIS 17427-1:2016(E)

ISO/IEC 10746-2:2009, *Information technology — Open distributed processing — Reference model: Foundations — Part 2*

ISO/IEC 10746-3:2009, *Information technology — Open distributed processing — Reference model: Architecture — Part 3*

ISO/TR 12859:2009, *Intelligent transport systems — System architecture — Privacy aspects in ITS standards and systems*

ISO 14817-2:2015, *Intelligent transport systems — ITS central data dictionaries — Part 2: Governance of the Central ITS Data Concept Registry*

ISO/TS 17419:2014, *Intelligent transport systems — Cooperative systems — Classification and management of ITS applications in a global context*

ISO/TR 17427-2:2015, *Intelligent transport systems — Cooperative ITS — Part 2: Framework overview*

ISO/TR 17427-3:2015, *Intelligent transport systems — Cooperative ITS — Part 3: Concept of operations (ConOps) for 'core' systems*

ISO/TR 17427-4:2015, *Intelligent transport systems — Cooperative ITS — Part 4: Minimum system requirements and behaviour for core systems*

ISO/TR 17427-6:2015, *Intelligent transport systems — Cooperative ITS — Part 6: 'Core system' risk assessment methodology*

ISO/TR 17427-7:2015, *Intelligent transport systems — Cooperative ITS — Part 7: Privacy aspects*

ISO/TR 17427-8:2015, *Intelligent transport systems — Cooperative ITS — Part 8: Liability aspects*

ISO/TR 17427-9:2015, *Intelligent transport systems — Cooperative ITS — Part 9: Compliance and enforcement aspects*

ISO/TR 17427-10:2015, *Intelligent transport systems — Cooperative ITS — Part 10: Driver distraction and information display*

ISO/TR 17427-11:2015, *Intelligent transport systems — C-ITS — Compliance and enforcement aspects*

ISO/TR 17465-1:2014, *Intelligent transport systems — Cooperative ITS — Part 1: Terms and definitions*

ISO/IEC 19501:2005, *Information technology — Open Distributed Processing — Unified Modeling Language (UML) Version 1.4.2*

ISO/IEC 19793, *Information technology — Open Distributed Processing — Use of UML for ODP system specifications*

3 Terms and definitions

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

3.1 action

something which happens; the fact or *process* (3.18) of doing something, typically to achieve an aim

[SOURCE: ISO/IEC 10746-2]

3.2 actor

person or organizational unit playing a coherent set of *roles* (3.22) when interacting with the system within a particular use case

[SOURCE: ISO 24014-1:2015]

3.3**application, app**

software based mechanism of delivering some or all parts of a *service* (3.25)

[SOURCE: ISO/TR 17465-1]

3.4**behaviour**

collection of *actions* (3.1) with a set of constraints on when they may occur

[SOURCE: ISO/IEC 10746-2]

3.5**bounded secure managed domain (BSMD)**

ITS-S (3.15) *application* (3.3) *processes* (3.18) which function within a controlled environment comprised of an *ITS-S* facilities layer, *ITS-S* networking & transport layer, *ITS-S* access layer, *ITS-S* management entity and *ITS-S* security entity, which adhere to a minimum set of security principles and procedures so as to establish a level of trust between itself and other similar *ITS stations* (3.15) with which it communicates (ISO 21217:2013)

3.6**client**

party which instigates/authorizes the provision of an *ITS service* (3.14)

3.7**community**

configuration of *objects* (3.17) formed to meet an objective

[SOURCE: ISO/IEC 10746-3]

3.8**Cooperative-ITS, C-ITS**

subset of overall ITS that communicates and shares information between *ITS stations* (3.15) to provide, exchange, or receive, data, give advice or facilitate actions; with the objective of improving safety, sustainability, efficiency and comfort beyond the scope of stand-alone systems

Note 1 to entry: As an alternative to a “subset”, Cooperative-ITS could be viewed as a “paradigm” in overall ITS.

[SOURCE: ISO/TR 17465-1]

3.9**enterprise object**

object (3.17) in *enterprise viewpoint* (3.10)

3.10**enterprise viewpoint**

viewpoint on an ODP system and its environment that focuses on the purpose, scope and policies for that system

[SOURCE: ISO/IEC 10746-3]

3.11**external enterprise object**

enterprise object (3.9) involved in C-ITS but not set up for the only purpose of C-ITS

[SOURCE: ISO/TS 17574:2009]

3.12**infrastructure**

system of facilities, equipment and *services* (3.25) needed for the operation of an organization

Note 1 to entry: C-ITS specific: static part of C-ITS incorporating sensors, actuators, static *ITS Station(s)* (3.15).

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[SOURCE: ISO 9000:2005]

3.13

internal enterprise object

enterprise object (3.9) within C-ITS set up only as an internal C-ITS mechanism to enable or support the provision of an *ITS service* (3.14) via C-ITS

3.14

ITS Service

provides benefits to its *service recipient* (3.28)

3.15

ITS Station, ITS-S

entity in a communication network, comprised of *applications* (3.3), facilities, networking and access layer components that operate using regular wireless communications interface security, or may operate within a *bounded secure management domain* (3.5)

[SOURCE: ISO 21217:2010]

3.16

(data) lifecycle process

process (3.18) based on data element transformation

3.17

object

model of an entity; an object is characterized by its *behaviour* (3.4) and dually by its state; an object is distinct from any other object.; an object is encapsulated, i.e. any change in its state can only occur as a result of an internal *action* (3.1) or as a result of an interaction with its environment

[SOURCE: ISO/IEC 10746-2]

3.18

process

sequence of *tasks* (3.32) or set of interrelated tasks which transform inputs into outputs

[SOURCE: ISO 9000:2005]

3.19

process chain

sequence of processes (3.18) that wait in the background for an event. Some of these processes trigger a separate event that can start other processes in turn

[SOURCE: SAP Help Portal, see Bibliography reference [18]]

3.20

public key infrastructure/PKI

hierarchy of “certification authorities” to allow individuals and organizations to identify each other for the purpose of doing business electronically

3.21

responsible/responsibility/responsibilities

being accountable or answerable, as for an entity, function, system, security service or obligation

Note 1 to entry: A responsibility might be a legally backed assignment of *actions* (3.1) to a *role* (3.22).

[SOURCE: ISO/TS 17574:2009]

3.22

role

described by *tasks* (3.32), a *behaviour* (3.4) and *responsibilities* (3.21) and to be associated with an actor

3.23**scenario**

general description of activities between (possible) participating *actors* (3.2)

3.24**sequential process**

process (3.18) based on sequence of *actions* (3.1) executed

3.25**service**

defined functionality to the system which requires a defined set of data as input, processes this data and delivers a defined output

3.26**service in pull mode**

ITS service (3.14) actively requesting the data that is required for the service operation

3.27**service in push mode**

ITS service (3.14) operating on data delivered without request by an actor or its system

3.28**service recipient**

actor (3.2) who receives a *service* (3.25)

3.29**stakeholder**

individual or organisation having a right, share, claim or interest in a system or in its possession of characteristics that meet their needs and expectations

[SOURCE: ISO/IEC 12207:2008]

3.30**sub-role**

subordinate *role* (3.22) consisting of a defined fragment of the superior *role* (3.22)

3.31**system**

a system is a set of interacting or interdependent components forming an integrated whole

Note 1 to entry: Every system is delineated by its organizational and/or spatial and/or temporal boundaries, surrounded and influenced by its environment, described by its structure and purpose and expressed in its functioning.

3.32**task**

describes actions and is fulfilled by a role

3.33**user**

see *service recipient* (3.28)

4 Symbols (and abbreviated terms)

C-ITS Cooperative ITS

GNSS Global Navigation Satellite System

HMI Human Machine Interface

ISO/DIS 17427-1:2016(E)

ITS	Intelligent Transport Systems
ITS-S	ITS Station
LDM	Local Dynamic Map
PKI	Public Key Infrastructure
ODP	Open Distributed Processing

5 How to use this Standard

5.1 Roles and responsibilities in the context of Cooperative-ITS

In order for Cooperative-ITS (C-ITS) to work cohesively and interoperable it needs to be specified and implemented consistently.

The instantiations of *C-ITS* that will appear over the coming years and decades will vary according to their specific applications and requirements, and will vary in their technology, particularly over time, as the capabilities for these technologies evolve and develop.

While it is not possible today to predetermine future applications in precise detail, it is important that such applications will operate, and most importantly for *C-ITS*, interoperate, within a collaborative environment.

It is therefore necessary, and desirable, to understand the *roles* (3.22) and *responsibilities* (3.21) of *C-ITS* at a general ‘abstracted’ level, (above that for any particular application) in order to be able to achieve such consistency of approach, and by so doing, achieve interoperability and indeed, achieve the basic elements required for successful ‘cooperation’.

[Clauses 6 – 7](#) provide explanation of the methodology in “*C-ITS – the roles and responsibilities in the context of Cooperative-ITS based on architecture(s) for cooperative systems*” (this deliverable). This is achieved using an architecture description and analysis technique known as ODP (the reasons for which are explained at the beginning of [clause 6](#)).

[Annexes A and B](#) provide informative examples of methodology and its sample application ([Annex A](#)), and profiles ([Annex B](#)) for different implementation *scenarios* (3.23) for the identified *roles* (3.22) and *responsibilities* (3.21).

This Standard should be read in concert with CEN/ISO/TR 17427-2 - 17427-14, which are a series of complementary Technical Reports which explain and debate the context of many specific aspects of C-ITS such as the ‘Core System’, liability, privacy, risk management etc. These aspects are therefore not defined or explained in detail within this International Standard

The following [subclause 5.2](#) is using the context and roles and responsibilities determined in this Standards deliverable, provide checklists that are recommended to be used when developing *C-ITS* Standards deliverables, or when implementing a *C-ITS* application.

5.2 Guidance for developers and implementers of *C-ITS* application standards

When developing *C-ITS* application standards or implementing *C-ITS* applications and systems an architecture should be prepared to ensure that all of the relevant *roles* (3.22) and *responsibilities* (3.21) involved in *C-ITS*, relevant to the application standards deliverable or the system under development have been considered, and, where appropriate, specified.

Such a process / recommendation does not imply or require any particular form or format to be imposed on a *C-ITS* application standard, *C-ITS* application or system, but is designed to ensure that all of the relevant aspects of *roles* (3.22) and *responsibilities* (3.21) have been considered, and where