INTERNATIONAL STANDARD

ISO 17427-1

First edition
2018-06

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

Reference number
ISO 17427-1:2018(E)

© ISO 2018



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **2**

4 Abbreviated terms **5**

5 Compliance **5**

6 How to use this document **5**
6.1 Roles and responsibilities in the context of Cooperative-ITS 5
6.2 Guidance for developers and implementers of ***C-ITS*** application standards 6

7 Introduction and theoretical framework **6**
7.1 Use of ODP 6
7.2 Transferring ODP to roles and responsibilities for C-ITS 7
7.3 External enterprise objects 9
7.4 Internal enterprise objects 10

8 Roles and responsibilities **10**
8.1 Introduction 10
8.2 Generic description of organizational architecture 10
8.2.1 System operation 10
8.2.2 Functional operation 11
8.2.3 System management 11
8.2.4 Policy framework 11
8.3 General responsibilities of actors involved in C-ITS 11
8.3.1 Registration and authorization 11
8.3.2 Privacy and data protection 12
8.4 Role — Functional operation 12
8.4.1 General 12
8.4.2 Sub-role — Generic functional operation 13
8.4.3 Sub-role — Specific functional operation 14
8.5 Role — System management 16
8.5.1 Sub-role — Service catalogue manager 16
8.5.2 Sub-role — C-ITS architect 16
8.5.3 Sub-role — Change manager 16
8.5.4 Sub-role — Test manager 16
8.5.5 Sub-role — Service level manager 16
8.5.6 Sub-role — Homologation manager 16
8.5.7 Sub-role — Compliance manager 16
8.5.8 Sub-role — Financial manager 16
8.5.9 Sub-role — Service owner 17
8.5.10 Sub-role — Project manager 17
8.5.11 Sub-role — Information security manager 17
8.5.12 Sub-role — Privacy manager 17
8.6 Role — System operation 17
8.6.1 Sub-role — Capacity manager 17
8.6.2 Sub-role — Availability manager 17
8.6.3 Sub-role — Technical analyst 17
8.6.4 Sub-role — Configuration manager 17
8.6.5 Sub-role — IT-operations manager 17
8.6.6 Sub-role — Access manager 17
8.7 Role — Policy framework 18
8.7.1 Sub-role — Non-regulatory policy institution 18

© ISO 2018 – All rights reserved

8.7.2 Sub-role —Cooperative ITS Credential Management system (CCMS) 18
8.7.3 Privacy body 18
8.7.4 Information security body 18
8.7.5 Sub-role — Authority 18
8.8 Profiles 18
Annex A (informative) **Methodology and its sample application** **19**
Annex B (informative) **Profiles** **30**
Bibliography **43**

© ISO 2018 – All rights reserved

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 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/TC 204, *Intelligent transport*.

This first edition cancels and replaces ISO/TS 17427:2014 which has been technically revised.

A list of all the parts in the ISO 17427 series can be found on the ISO website.

© ISO 2018 – All rights reserved

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, i.e. 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* (3.4), *responsibilities* (3.21) and liabilities. Therefore a general, abstract organizational architecture with the description of the single *roles* (3.22), their *behaviour*, and the corresponding *responsibilities*, 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.

© ISO 2018 – All rights reserved

Intelligent transport systems — Cooperative ITS —

Part 1:
Roles and responsibilities in the context of co-operative ITS architecture(s)

1 Scope

This document contains a detailed description of the (actor invariant) *roles* (3.22) and *responsibilities* (3.21) required to deploy and operate *Cooperative-ITS (C-ITS)* (3.8). 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 document is presented in terms of an organizational or *enterprise viewpoint* (3.10) as defined in ISO/IEC 10746-1.

This document 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* techniques to achieve service provision. The description of roles is technology agnostic and, in terms of *C-ITS*, agnostic in respect of communication modes and embraces vehicle-vehicle communications, vehicle-infrastructure communications and infrastructure-infrastructure communications.

This document 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 *C-ITS* in general. Both the methodology as well as the roles and responsibilities for *C-ITS* are deduced from ISO/IEC 10746-1, ISO/IEC 10746-2, ISO/IEC 10746-3, the reference model of Open Distributed Processing. Open Distributed Processing offers five viewpoints of which the *enterprise viewpoint* corresponds with the organizational architecture and its *roles* and *responsibilities*.

To limit the scope of the document to the core of *C-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 *C-ITS*. Considered to be external are all roles involved in *C-ITS*, but not set up only for the purpose of *C-ITS*.

This document provides a description of a high-level architectural viewpoint on *C-ITS*. It is designed to be used as a blueprint when implementing service provision systems that use *C-ITS*, and the corresponding organizational structures. The characteristics of *C-ITS* entail a huge number of data/information exchanges. Therefore the implementation stringently respects 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 document due to these characteristics and all actors occupying roles in C-ITS respects the corresponding standards and regulations.

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

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

© ISO 2018 – All rights reserved

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:

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

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

3.1
action
something which happens; the fact or *process* (3.18) of doing something

EXAMPLE Typically to achieve an aim.

[SOURCE: ISO/IEC 10746-2, 8.3]

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, 2.2]

3.3
application
app
software based mechanism of delivering some or all parts of a *service* (3.25)

[SOURCE: ISO 14813-1, 3.2]

3.4
behaviour
collection of *actions* (3.1) with a set of constraints on when they may occur

[SOURCE: ISO/IEC 10746-2, 8.7]

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

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 10746-3, 5.1.1]

© ISO 2018 – All rights reserved

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, 2.1]

3.9
enterprise object
object (3.17) in enterprise *viewpoint* (3.10)

3.10
enterprise viewpoint
viewpoint on an open distributed processing (ODP) system and its environment that focuses on the purpose, scope and policies for that system

[SOURCE: ISO/IEC 10746-3, 4.1.1.1]

3.11
external enterprise object
enterprise object (3.9) involved in C-ITS but not set up for the only purpose of C-ITS

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).

[SOURCE: ISO 9000:2015, 3.5.2]

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)

3.16
data lifecycle process
process (3.18) based on data element transformation

3.17
object
model of an entity, characterized by its *behaviour* (3.4) and dually by its state, distinct from any other object, 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, 8.1]

© ISO 2018 – All rights reserved

3.18
process
sequence of *tasks* (3.32) or set of interrelated tasks which transform inputs into outputs

[SOURCE: ISO 9000:2015, 3.4.1]

3.19
process chain
sequence of processes (3.18) that wait in the background for an event, with some of these processes triggering a separate event that can start other processes in turn

[SOURCE: SAP Help Portal]

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
state of 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).

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
user
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

© ISO 2018 – All rights reserved

3.30
sub-role
subordinate *role* (3.22) consisting of a defined fragment of the superior *role* (3.22)

3.31
system
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
action that is fulfilled by a role

4 Abbreviated terms

C-ITS	Cooperative ITS
GNSS	Global Navigation Satellite System
HMI	Human Machine Interface
ITS	Intelligent Transport Systems
ITS-S	ITS Station
LDM	Local Dynamic Map
PKI	Public Key Infrastructure
ODP	Open Distributed Processing

5 Compliance

It is recommended that any implementation of an organizational architecture for *C-ITS* (3.8) should comply with this document. Compliance with this document is achieved when all *role*s (3.22) and *sub-roles* (3.30) described in Clause 8 are assigned to corresponding *actor*s (3.2) in *C-ITS*.

6 How to use this document

6.1 Roles and responsibilities in the context of Cooperative-ITS

In order for *C-ITS* (3.8) to work cohesively and interoperably, it shall 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

© ISO 2018 – All rights reserved