

PD ISO/TR 17427-4:2015



BSI Standards Publication

Intelligent transport systems — Cooperative ITS

Part 4: Minimum system requirements
and behaviour for core systems

bsi.

...making excellence a habit.™

National foreword

This Published Document is the UK implementation of ISO/TR 17427-4:2015.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2015.

Published by BSI Standards Limited 2015

ISBN 978 0 580 87421 5

ICS 03.220.01; 35.240.60

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2015.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

ISO/TR
17427-4

First edition
2015-11-01

Intelligent transport systems — Cooperative ITS —

Part 4: Minimum system requirements and behaviour for core systems

*Systèmes intelligents de transport — Systèmes intelligents de
transport coopératifs —*

*Partie 4: Exigences minimales du système et comportement des
systèmes principaux*



Reference number
ISO/TR 17427-4:2015(E)

© ISO 2015



COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, Published in Switzerland

All rights reserved. Unless otherwise specified, 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
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

Contents

Page

Foreword	iv
Introduction	vi
1 Scope	1
2 Terms and definitions	1
3 Abbreviated terms	5
4 How to use this Technical Report	7
4.1 Acknowledgements	7
4.2 Guidance	7
4.3 Stakeholders	7
5 C-ITS and 'minimum system requirements and behaviour for core systems'	8
5.1 Overview	8
5.2 Subsystem features of the 'Core System'	11
5.2.1 Core2Core subsystem	11
5.2.2 Data distribution subsystem	12
5.2.3 Misbehaviour management subsystem	13
5.2.4 Network services subsystem	13
5.2.5 System service monitor subsystem	13
5.2.6 Time synchronization subsystem	14
5.2.7 User permissions subsystem	14
5.2.8 User trust management subsystem	14
6 What are the key minimum system requirements and behaviour for core systems issues	15
6.1 Core system requirements	15
6.2 Core System subsystem functional requirements	19
6.2.1 Core to Core subsystem requirements	19
6.2.2 Data distribution subsystem requirements	23
6.2.3 Data provision request	24
6.2.4 Geo-casts	24
6.2.5 Field node configuration	24
6.2.6 Misbehaviour subsystem requirements	25
6.2.7 Networking services subsystem requirements	25
6.2.8 Network protocol	26
6.2.9 System service monitoring subsystem requirements	26
6.2.10 Time synchronization subsystem requirements	27
6.2.11 State/Mode/Status requirements	28
6.2.12 External interface requirements	28
6.2.13 User permission subsystem requirements	28
6.2.14 User trust management requirements	29
6.2.15 System performance subsystem requirements	31
6.2.16 System interface subsystem requirements	31
6.3 Core system - other requirements	31
6.3.1 Physical security	31
6.3.2 Environmental features	31
6.3.3 Backup power	32
6.3.4 Maintainability	32
6.3.5 Constraints	32
7 Internet-based communications standards	32
8 Internal interfaces	39
9 5,9 GHz security credential requirements	40
Bibliography	41

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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

ISO 17427 consists of the following parts, under the general title *Intelligent transport systems — Cooperative ITS*:

- *Part 2: Framework Overview [Technical Report]*
- *Part 3: Concept of operations (ConOps) for 'core' systems [Technical Report]*
- *Part 4: Minimum system requirements and behaviour for core systems [Technical Report]*
- *Part 6: 'Core system' risk assessment methodology [Technical Report]*
- *Part 7: Privacy aspects [Technical Report]*
- *Part 8: Liability aspects [Technical Report]*
- *Part 9: Compliance and enforcement aspects [Technical Report]*
- *Part 10: Driver distraction and information display [Technical Report]*

The following parts are under preparation:

- *Part 1: Roles and responsibilities in the context of co-operative ITS architecture(s)*
- *Part 5: Common approaches to security [Technical Report]*
- *Part 11: Compliance and enforcement aspects [Technical Report]*
- *Part 12: Release processes [Technical Report]*
- *Part 13: Use case test cases [Technical Report]*
- *Part 14: Maintenance requirements and processes [Technical Report]*

This Technical Report provides an informative ‘minimum system requirements and behaviour for core systems’ for Cooperative Intelligent Transport Systems (*C-ITS*). It is intended to be used alongside ISO 17427-1, ISO/TR 17465-1 and other parts of ISO 17465, and ISO 21217. Detailed specifications for the application context will be provided by other ISO, CEN and SAE deliverables, and communications specifications will be provided by ISO, IEEE and ETSI.

Introduction

Intelligent transport systems (ITS) are transport systems in which advanced information, communication, sensor and control technologies, including the Internet, are applied to increase safety, sustainability, efficiency, and comfort.

A distinguishing feature of '*ITS*' is its communication with outside entities.

Some *ITS* systems operate autonomously, for example, 'adaptive cruise control' uses radar/lidar and/or video to characterize the behaviour of the vehicle in front and adjust its vehicle speed accordingly. Some *ITS* systems are informative, for example, 'variable message signs' at the roadside or transmitted into the vehicle, provide information and advice to the driver. Some *ITS* systems are semi-autonomous in that they are largely autonomous but rely on 'static' or 'broadcast' data, for example, *GNSS* ([2.22](#)) based 'SatNav' systems operate autonomously within a vehicle but are dependent on receiving data broadcast from satellites in order to calculate the location of the vehicle.

Cooperative Intelligent transport systems (C-ITS) are a group of *ITS* technologies where service provision is enabled by, or enhanced by, the use of 'live', present situation related, dynamic data/information from other entities of similar *functionality* [for example, from one vehicle to other vehicle(s)], and/or between different elements of the transport network, including vehicles and infrastructure [for example, from the vehicle to an infrastructure managed system or from an infrastructure managed system to vehicle(s)]. Effectively, these systems allow vehicles to 'talk' to each other and to the infrastructure. These systems have significant potential to improve the transport network.

A distinguishing feature of '*C-ITS*' is that data is used across *application/service* boundaries.

This Technical Report is a 'living document' and as our experience with *C-ITS* develops, it is intended that it will be updated from time to time, as and when we see opportunities to improve this Technical Report.

Intelligent transport systems — Cooperative ITS —

Part 4:

Minimum system requirements and behaviour for core systems

1 Scope

The scope of this Technical Report is, as an informative document, to identify potential critical minimum system requirements and behaviour for core systems issues that *C-ITS* service provision may face or introduce, to consider strategies for how to identify, control, limit or mitigate such issues. The objective of this Technical Report is to raise awareness of and consideration of such issues and to give pointers, where appropriate, to subject areas and, where available, to existing standards deliverables that provide specifications for all or some of these aspects. This Technical Report does not provide specifications for solutions of these issues.

2 Terms and definitions

2.1

anonymity

lacking individuality, distinction, and recognizability within message exchanges

2.2

anonymous certificates

certificate which contains a pseudonym of the system user instead of their real identity in the subject of the certificate and thus preventing other system service recipients from identifying the certificate owner when the certificate is used to sign or encrypt a message in the connected vehicle/highway system (C-ITS, connected vehicle)

Note 1 to entry: The real identity of the anonymous certificates can be traced by authorized system operators by using the services of a registration authority and/or certification authority.

2.3

application

‘app’

software application

2.4

application service

service provided, for example, by a service provider accessing data from the IVS within the vehicle in the case of C-ITS, via a wireless communications network, or provided on-board the vehicle as the result of software (and potentially also hardware and firmware) installed by a service provider or to a service provider’s instruction

2.5

authenticity

property of being of undisputed origin and not a copy, authenticated, and having the origin supported by unquestionable evidence

Note 1 to entry: Something that has had its authenticity confirmed could be described as “authenticated” or “verified”.