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Cooperative intelligent transport systems (C-ITS) — Guidelines on the usage of standards —

Part 3: Security

Systèmes de transport intelligents coopératifs (C-ITS) - Lignes directrices pour l'utilisation des normes —

Partie 3: Sécurité

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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).

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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Intelligent transport systems,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 21186 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document provides informative material of interest to implementers deploying secure systems to carry out ITS applications. ITS stations are rapidly maturing with regards to specification, use and security conformance standards. In support of the ITS station ecosystem new standards have been developed, such as ISO/TS 21177, which provide a framework for device-to-device secure sessions and resource access authorization. Common criteria protection profiles have been developed and adopted for use in distinctive European ITS service domains, such as automotive V2X safety services, as well as a narrow set of infrastructure messaging based services.

NOTE ITS services are provided by means of ITS applications.

Given the diversity of anticipated ITS services and potential data sensitivities, this document was constructed to provide ITS stakeholders with a holistic analysis and indication of possible extensions to the ITS station security ecosystem.

This document includes the following sections:

1) An overview of security considerations for application specification and deployment in ITS. This overview also provides a detailed rationale for the following sections.

2) A use-case driven threat model based roughly on common criteria processes in establishment of threats, security objectives and SFR relative to three genericized ITS station data sensitivity and access control scenarios. Each scenario can be used by security practitioners as a starting point to baseline ITS station platform protection profiles of varying application types and data sensitivities. The genericized protection profile security requirements are then compared to several existing (or under development) protection profiles established for automotive use cases to determine possible gaps in security controls that should be addressed when tailoring subsequent security targets or related protection profiles.

3) An implementation example of the development of an access control policy implementation for an ISO/TS 21177 conformant ITS station unit. The example access control policy is application-specific and depends on many factors, including the type of ITS station unit on which the access control policy is used. Consequently, this access control policy implementation example is not suitable for being copy-pasted to the context of other ITS applications. Rather, the process described in this example can be considered as a suitable template for a process aimed at creating an access control policy for any ITS application running in an ISO/TS 21177 conformant unit.

4) Inputs for the development of a CP governing the issuance of certificates for ITS station units. A CP is necessary for the deployment of a system to ensure consistent behaviour of different CAs (or, more generally, credential issuance actors) within the system. This consistent behaviour enables receiving devices to trust all received messages to the appropriate level, knowing that those devices have been through the same certificate-issuing process no matter where the certificates were obtained. In early 2019, the European Commission published a CP for use for "Day 1" ITS applications, to be enforced by a top-level root of trust implemented in an entity called the TLM. This document concludes with a set of high-level gaps and potential mitigations for ITS PKI participants and implementers.

5) A description of additional functionality that extends the functionality of ISO/TS 21177. This material is written in a manner which will enable it to be inserted into a future revision of ISO/TS 21177.

These five areas of content significantly ease the process of deploying new ITS applications securely.

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This document is forms part of the ISO 21186 series on "Guidelines on the usage of standards," which is comprised of the following Parts:

1) Standardization landscape and releases;

2) Hybrid communications;

3) Security (this document).

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Cooperative intelligent transport systems (C-ITS) — Guidelines on the usage of standards —

Part 3: Security

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1 Scope

This document provides guidelines on security applicable in Intelligent Transport Systems (ITS) related to communications and data access.

In particular, this document provides analyses and best practice content for secure ITS connectivity using ISO/TS 21177.

This document analyses and identifies issues related to application security, access control, device security and PKI for a secure ITS ecosystem.

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 27000, *Information technology — Security techniques — Information security management — Overview and vocabulary*

ISO/IEC 27032, *Information technology — Security techniques — Guidelines for cybersecurity*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 27000 and ISO/IEC 27032 and the following apply.

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

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

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

3.1
attack vector
extensible program-code-template for creating objects, providing initial values for state (member variables) and implementations of behaviour (member functions or methods) in object-oriented programming

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