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Intelligent transport systems — Reference model architecture(s) for the ITS sector —

Part 5: Requirements for architecture description in ITS standards

Systèmes intelligents de transport (ITS) — Architecture(s) de modèle de référence pour le secteur ITS —

Partie 5: Exigences pour la description d'architecture dans les normes ITS

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 14813-5:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

— clarifies the scope of standards to which this document applies;

— clarifies and renames the types of architectures used within the ITS community and their relationships with each other;

— removes details related to planning and deployment architectures;

— clarifies requirements and provides examples of text that should be included within ITS interface standards.

A list of all parts in the ISO 14813 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

"Architecture" is implicit in any construction, be it of a physical entity (such as a building), an operational entity (such as a company or organisation), a system entity (such as a software system), or a business entity (such as a commercial business operation). While it may be stated that every entity has an architecture, that architecture may be an explicit construction as a result of a deliberate design process, or it may be the implicit result of an unplanned series of events, and sometimes the combination of both.

In the "system" domain, "architecture" can be defined as "fundamental concepts or properties of a system in its environment embodied in its elements, relationships, and in the principles of its design and evolution (ISO/IEC/IEEE 42010:2011, 3.2). In order for this definition to be successful there needs to be a standard way of describing the system concepts and properties.

Intelligent transport systems (ITS) are systems deployed in transportation environments to improve both the driving experience, and the safety and security of drivers, passengers and pedestrians. ITS can also assist in the labour, energy, environmental, and cost efficiency of transportation systems. It is a feature of most ITS that their architecture involves the collection, use and exchange of information/data within and between software systems which affect or control the behaviour of physical equipment in order to provide a service to the actors involved in, or interacting with, the transport sector.

ITS services are developing and changing rapidly and have to make provision not only for interaction with other services, but with migration from one technology generation to later iterations. In order to support this and to obtain compatibility and/or interoperability and to eliminate contention, the systems need to co-exist and operate within a known and supportive architectural framework. This document is designed to aid these objectives and to enable maximum interoperability, efficiency, and migration capability by defining an explicit process for describing ITS reference architectures for use within ITS International Standards using an explicit process.

The word “architecture” has been used in an informal manner to mean a variety of different concepts, and in formal architecture design there are differing methodologies and opinions as to their suitability for use in ITS itself and standards design. This has limited the effective communication in the ITS sector by causing uncertainty as to the meaning of the word “architecture” when it is used. A second function of this document is to provide consistent terminology to be used in describing architectural aspects of ITS standards and provide a consistent form for describing an ITS reference architecture in standards in the ITS sector.

This document does not give preference to any one methodology for architecture development and description, it assumes that the consideration of architecture is an explicit process that takes into account the interrelationships and interoperability of ITS and that an architecture description is provided within ITS standards. It also assumes that the architecture aspects of ITS standards are described explicitly in each and every ITS standard and that all standards are related to one or more ITS service(s) that they are designed to enable or support.

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Intelligent transport systems — Reference model architecture(s) for the ITS sector —

Part 5: Requirements for architecture description in ITS standards

1 Scope

An intelligent transport system (ITS) reference architecture is a tool that describes how an ITS delivers one or more ITS services. It includes a high-level description of the major elements and the interconnections among them that are needed for the service(s) to be provided to stakeholders. It provides the framework around which the interfaces, specifications, and detailed ITS designs can be standardized within ITS standards.

By contrast, ITS standards are often focused on design details. While the development of these standards may be initiated by a single ITS user need, they are often (and properly) written in a generic format that allows for application in a broad array of contexts. However, this can present a challenge to the reader in understanding the original purpose of a standard and whether the standard is intended for other environments.

This document defines documentation rules for standards that define interfaces between or among system elements of an ITS reference architecture. This includes:

a) requirements for documenting aspects of the ITS reference architecture;

b) terminology to be used when documenting or referencing aspects of the ITS reference architecture.

In compiling this document, the authors have assumed that contemporary systems engineering practices are used. Such practices are not defined within this document.

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): Specification of basic notation — Part 1*

ISO/IEC 9834-1, *Information technology — Procedures for the operation of object identifier registration authorities: General procedures and top arcs of the international object identifier tree — Part 1*

ISO/IEC 11179-3, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

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

ISO/IEC/IEEE 42010:2011, *Systems and software engineering — Architecture description*

3 Terms and definitions

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

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