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Intelligent transport systems - Urban ITS - Mixed vendor environments, methodologies & translators

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Intelligente Verkehrssysteme - Städtische IVS - Gemischte Anbieterumgebungen Methodologien & Übersetzer

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European foreword

This document (CEN/TS 17400:2020) has been prepared by Technical Committee CEN/TC 278 “Intelligent Transport Systems”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Commission Implementing Decision (M/546) given to CEN by the European Commission and the European Free Trade Association [1], and supports essential requirements of the EU ITS Directive [2]. It fulfils part of the workplan identified in CEN/TR 17143:2017, Intelligent transport systems - Standards and actions necessary to enable urban infrastructure coordination to support urban-ITS [3].

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

This suite of standards ([4], [5] and the present document) assist stakeholders to implement urban-ITS systems in a mixed vendor environment.

This suite of standards deliverables will support the family of existent standards, and others under development, referencing both common communications protocols and data definitions, that, in combinations, enable Urban-ITS (and ITS in general) to function and be managed, and will reference application standards, and their interdependencies and relationships.

Urban authorities use an increasing array of intelligent transport systems (ITS) to deliver their services. Historically, urban ITS have tended to be single solutions provided to a clear requirements specification by a single supplier. Increasingly, as ITS opportunities become more complex and varied. They involve the integration of multiple products from different vendors, procured at different times and integrated by the urban authority.

The need for a mixture of systems provided by different manufacturers to so-called Mixed Vendor Environments (MVEs) is a growing paradigm, which results primarily from the demand for the introduction of competition in the context of public tenders, and the increasing networking of existing stand-alone solutions to address complex traffic management systems.

The mix of systems of different manufacturers is also, in part, a result from technological change. Established companies are suddenly in competition with new companies that exploit technological changes and offer exclusively, or at a reasonable price, new or improved functionality for sub systems.

However, ITS design is often proprietary and, as a consequence, integration and interoperability can be difficult, time-consuming, and expensive, limiting the ability of urban authorities to deploy innovative solutions to transport problems. In some Member States, national/regional solutions to this problem have been created, and there are also some solutions in specific domains, which have been very beneficial. However, these are not uniform across Europe, compromising the efficiency of the single market.

This document provides the methodologies and translators to avoid vendor lock-in, introducing suitable methodologies for system architecture design, making appropriate use of standards, and specifications to be used when translator systems are adopted.

This specification is designed to enable ITS architects to develop concrete architectural concepts for mixed-manufacturer systems in order to achieve the migration of existing monolithic single-manufacturer systems, by creating and delivering EU-wide MVE communication specifications designed to actively support the implementation of distributed and open system structures for regionally and nationally networked systems in the transport sector throughout the EU.

This document should be read together with [4], which provides a 'Guide' giving a high level introduction into the concept of operations (CONOPS) for a mixed vendor environment (MVE); provides a high-level architectural context explanation of an MVE and its operational requirements, and describes the problems and effects are associated with vendor lock-in. It also provides a systematic approach for many aspects of Urban-ITS implementation, and indeed almost all ITS MVE implementation; and provides a methodical guideline with a procedural model, in order to provide assistance to implementers and managers involved with the structure of an MVE and/or with the removal of vendor lock-in.

This document should also be considered together with [5], which focuses specifically on the area of traffic management systems in an MVE, identifies appropriate standards to use to enable an MVE, and addresses aspects associated with the accommodation of regional traffic standards (RTS) in such mixed vendor environments (RTS-MVE), with particular emphasis on the centre/field systems context. The document also provides information regarding MVE provisions in the public transport domain.

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1 Scope

This document focuses on the principal aspects of urban ITS where vendor lock-in is recognized as a technical and financial problem: primarily centre-to-field communications and traffic management systems. It will cover the following scope:

— approaches to the management of MVEs by urban authorities, including mitigation and migration options;

— procedural and operational protocols to achieve interworking, using product/interface adaptation, translation products, replacement/reengineering, and other migration strategies;

— technical options for interworking multiple vendors' products;

— mechanisms to enable interoperability through automated translation between specifications, frameworks and product interfaces;

— review of principal approaches taken to date to implement these options in community frameworks and specifications.

2 Normative references

There are no normative references in this document.

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 http://www.electropedia.org/

• ISO Online browsing platform: available at http://www.iso.org/obp

3.1
central system
collection of ITS products and services maintained and managed at one or more control centres, in a sheltered environment

3.2
field device
ITS device that is intended for location within the public realm, whose primary mode of operation does not involve control by a human operator

Note 1 to entry: Field devices may operate in a standalone mode; these are not subject to significant MVE issues. Generally in this document, therefore, the term will refer to field devices which are connected to a central system by an operational communications link, over which the communication (in real time) is essential to their designed operation.

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