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Transport information and control systems — Data interfaces between centres for transport information and control systems —

Part 3: **Data interfaces between centres for intelligent transport sytems (ITS)** (stusing XML (Profile A)

Systèmes de commande et d'information des transports — Interfaces de données entre les centres pour systèmes de commande et d'information des transports —

Partie 3: Interfaces de données entre centres pour systèmes intelligents de transport (ITS) utilisant XML



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Page

Contents

Foreword			
Intro	oductio	n	v
1	Scop	e	
2	Normative references		
3	Terms and definitions		
4	Svm	bols and abbreviated terms	4
5	Conf	formance	5
6	Mose	saging rulos	5
0	6.1 Conoral		ס ב
	6.2	Duch	
	0.2	621 Conoral	
		6.2.1 General message structure	
		6.2.2 Subscription message structure	0 7
		6.2.4 Publication message structure	
		625 Receipt message structure	8
	63	Pull with SOAP	8
	010	6.3.1 General	8
		6.3.2 General message structure	8
		6.3.3 Request message structure D PREVIEW	9
		6.3.4 Response message structure	9
	6.4	Pull without SOAP standards.iteh.ai)	
		6.4.1 General	
		6.4.2 General message structure, 20010	
		6.4.3 http: Request message structure size/de0026have4ch+4ac1+8056+	
		6.4.4 Response message structure 827-3-2019	
Anno	ex A (no	ormative) Functional Exchange Profile (FEP)	
Ann	ex B (no	ormative) Tag scripts for composing XML messages	
Anno	ex C (no	ormative) Protocol usage methods	
Annex D (informative) Message structures			
Bibliography			

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 <u>www.iso</u> .org/iso/foreword.html. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 204, Intelligent transport systems.

A list of all parts in the ISOh14827 series can be found on the ISO websiteb-4ac1-8056-

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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 <u>www.iso.org/members.html</u>.

Introduction

The relationship between this document and other standards in the ISO 14827 series is as follows.

ISO 14827-1 defines fundamental requirements of messages exchanged among centres. ISO 14827-2 defines ASN.1 formats to implement messages over ASN.1 platform. This document conforms to the fundamental requirements defined in ISO 14827-1 and defines requirements on XML messages to implement messages using XML. There is no compatibility between ASN.1 messages defined by ISO 14827-2 and XML messages defined by this document.

This document is not intended to conflict with existing standards on interfaces of data exchange among ITS centres.

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Transport information and control systems — Data interfaces between centres for transport information and control systems —

Part 3: Data interfaces between centres for intelligent transport sytems (ITS) using XML (Profile A)

1 Scope

This document is applicable to data exchange between different systems. This document defines the message rules and procedures for communication between transport information and control systems using XML. This document clarifies how to package end-application messages and relevant data. This document defines the mechanism to request end-application data from the client and to deliver the requested data from the supplier. Several profiles are defined, however only Profile A is defined in this document. Other profiles will be defined in future parts of the ISO 14827 series of standards. A system can be both a client and a supplier of another system simultaneously, using multiple sessions.



Figure 1 — Relationship between related documents

Rules and procedures for exchanging data-packets in lower layers are out of scope of this document. These functionalities can be implemented using generic protocols defined in the industrial standards. However this document defines how to use these protocols.

Data definition used in specific end-applications is out of scope in this document.

A network following this document comprises multiple kinds of systems. Each system can be viewed as an element including databases and interfaces, as shown in Figure 2:



Key

- 1 application interface
- 2 operator interface
- 3 communication interface
- 4 database interface
- 5 communications cloud
- 6 system that makes a "subscription" or a "publication"
- 7 database

iTeh STANDARD PREVIEW Figure 2 m System interfacesai)

This document is applicable to "communication <u>interface"</u> only. It is specified to meet the requirements of communication between <u>ITS</u> centres. However, it is designed in a generic fashion and thus can be used for data exchanges in other parts of the ITS field as welf-3-2019

The framework for communication between centres using XML and the area that is prescribed by this document is shown in Figure 3. This document defines message rules and procedures for communication utilizing XML. In addition, this document explains how to use these protocols.



Figure 3 — Framework for transmissions between centres using XML and the standardization area

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This document defines a Platform Specific Model (PSM) for exchange, which specifically uses XML. A PSM is an actual implementation of a Platform Independent Model (PIM) for exchange. A PIM is defined in another standard. When implementing a specific PSM, a Functional Exchange Profile (FEP), which is a selection of data exchange features, is identified <u>3 This</u> document provides a FEP in <u>Annex A</u>.

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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.

NTCIP 2306, National Transportation Communications for ITS Protocol, Application Profile for XML Message Encoding and Transport in ITS Center-to-Center Communications, v01.69r, December 2008

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:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at http://www.electropedia.org/

3.1

centre

computer or network that meets the requirements of a standardized communications interface over a fixed-point communications network, regardless of whether the centre is the only system within the building or just one of many, or even if the centre is in a remote location

Note 1 to entry: "Centres" include both government and private sector publishers and users of data.

3.2

client

computer or application that requests and accepts data from a supplier computer or application using a protocol

3.3

message

data structure that is associated with a specific meaning and, when properly sent, an instance which can convey information between systems

Note 1 to entry: For example, a data structure might include a list of speeds from detector stations. This single data structure could be used to specify the content of several messages (e.g. the list of speeds currently being detected, the list of stored speeds that will trigger a congestion warning if current values fall below the indicated level, or a request for a list of locations where the current speed is less than the indicated speed). An instance of the message would then contain the actual values.

3.4

publication

data which has been prepared by a supplier, and made available

3.5

receipt

data which is prepared by the receiver of the subscription or publication in order to acknowledge the order

3.6

subscription data which is prepared by a client in order to request current or future publication(s) (standards.iteh.ai)

3.7

supplier

computer or application that receives and responds to 3 requests for data from client computers or applications using a protocobs://standards.iteh.ai/catalog/standards/sist/dc9926ba-c4cb-4ac1-8056-5554ea918caf/iso-14827-3-2019

4 Symbols and abbreviated terms

Functional Exchange Profile FEP GNU **GNU is Not UNIX GZIP GNU** Zip HTTP Hyper Text Transfer Protocol ITS Intelligent Transport Systems PIM Platform Independent Model **PSM Platform Specific Model** SOAP Simple Object Access Protocol UCS Universal Multi-octet Coded Character Set UTF **UCS Transformation Format Extensible Markup Language** XML

5 Conformance

There are no explicit conformance tests in this document. Conformance is achieved if the exchange data conform to the messaging rules of this document.

6 Messaging rules

6.1 General

This document provides requirements for creating XML messages exchanged between centres. These XML messages do not apply to a specific application, but can be used by various applications. This document deals with two methods for exchanging XML messages: "Push" and "Pull".

Using SOAP is mandatory when exchanging information with Push. The formats of XML messages for exchanging information by Push are described in <u>6.2</u>. Using SOAP is optional when exchanging information with Pull. The formats of XML messages for exchanging information by Pull with SOAP are described in <u>6.3</u>. The formats of XML messages for exchanging information by Pull without SOAP are described in <u>6.4</u>.

In creating XML messages, one XML tag profile shall be selected. Profile A supposes interconnection to a centre conforming to NTCIP 2306. Details of Profile A are described in normative <u>Annex B</u>.

XML messages described in this clause are supposed to be transmitted over generic protocols for communication (see normative Annex C).

6.2 Push

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6.2.1 General

<u>ISO 14827-3:2019</u>

This subclause describes XML messages for exchanging information by Push. When centres exchange information, a client subscribes for a supplier beforehand, and the supplier publishes messages to the client periodically or on occurrence according to the subscription. A sequence diagram of subscription is shown in Figure 4, a sequence diagram of publication on occurrence is shown in Figure 5, and a sequence diagram of periodic publication is shown in Figure 6.

<u>Subclause 6.2.2</u> describes common requirements for XML messages used for subscription, publication, and receipt. Following that, <u>6.2.3</u> describes specific requirements for subscription messages, <u>6.2.4</u> for publication messages, and <u>6.2.5</u> for receipt messages as well.



Figure 4 — Sequence diagram of Push subscription



Figure 5 — Sequence diagram of Push publication on occurrence



Figure 6 — Sequence diagram of Push periodic publication

6.2.2 General message structure

6.2.2.1 Introduction

This subclause describes common requirements for XML messages used for subscription, publication, and receipt.

6.2.2.2 XML version and character encoding scheme

An XML message shall begin with a header specifying XML version and character encoding scheme.