SLOVENSKI STANDARD
oSIST prEN ISO 22418:2019

01-oktober-2019

Inteligentni transportni sistemi - Protokol objave hitre storitve (FSAP) za splošne namene v ITS (ISO/DIS 22418:2019)

Intelligent transport systems - Fast service announcement protocol (FSAP) for general purposes in ITS (ISO/DIS 22418:2019)

Intelligente Verkehrssysteme - Protokoll zur schnellen Bekanntgabe von Diensten (FSAP) (ISO/DIS 22418:2019)

Systèmes de transport intelligents - Protocole d'annonce de service rapide (FSAP) (ISO/DIS 22418:2019)

Ta slovenski standard je istoveten z: **prEN ISO 22418**

ICS:

03.220.01	Transport na splošno	Transport in general
35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport

oSIST prEN ISO 22418:2019 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 22418

ISO/TC **204**

Secretariat: **ANSI**

Voting begins on:
2019-08-13

Voting terminates on:
2019-11-05

Intelligent transport systems — Fast service announcement protocol (FSAP) for general purposes in ITS

ICS: 03.220.01; 35.240.60

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 22418:2019(E)

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Published in Switzerland

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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 on 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 the following URL: www.iso.org/iso/foreword.html.

This second edition cancels and replaces ISO 22418:2018 which has been editorially aligned with draft ETSI EN 302 890-1 in order to make these two standards complement each other such that both can be published as European Norms. In addition, one minor technical detail of the ASN.1 code related to a specific extension element was harmonized with ETSI.

Introduction

Provisioning of ITS services at specific locations on the road network requires awareness of the availability and the purpose of such services in order to allow a road network user deciding on the potential consumption of such a service. Awareness of services can be achieved by pull and push mechanisms. Whilst pull mechanisms are well understood and deployed for non-time-critical usage, several use cases depend on a push mechanism. Whilst pull mechanisms require a-priori knowledge of an intended service, push mechanisms support also "mandatory services" that may be locally and dynamically applicable and defined by local policies rather than global regulations.

This document illustrates and specifies the features of the cooperative push mechanism "Service Announcement" based on the internationally harmonized message formats specified in ISO/TS 16460:2016, and builds on top of any localized ITS-S communications protocol stack (ITS-SCPS), one of which is FNTP specified in ISO 29281-1[9] on top of the ITS-M5 access technology specified in ISO 21215 [6]. It is to be noted that the terms "service announcement" and "service advertisement" are used synonymously.

This document complements service announcement specifications at IEEE ("WAVE Service Advertisement" (WSA) specified in IEEE 1609.3[3]) and at ETSI ("Service Announcement Essential Message" (SAEM) specified in draft ETSI EN 302 890-1 [16]):

— The WSA requires normatively only a subset of the functionality specified in ISO/TS 16460:2016. WAVE is designed for the IEEE 802.11 OCB localized communications access technology operated in the 5,9 GHz frequency bands allocated in the United States of America, also referred to as "US-DSRC".

— The SAEM, also using the message formats specified in ISO/TS 16460:2016, is tailored in support of a limited ITS service domain identified in ETSI as "Basic Set of Applications", using only a small sub-set of functionality specified in ISO/TS 16460:2016 and in this document. So far, ETSI requires usage of the ITS-S communication protocol stack constituted by ITS-G5, GeoNetworking, the Basic Transport Protocol, and the common ETSI message header.

Using the same ITS-SCPS for transmission of the service announcement message and the same limited subset of service announcement functionality, FSAP, WSA, and SAEM are binary compatible with respect of the shared service announcement features.

Understanding service advertisement and the related protocol specified in this document requires understanding of ISO/TS 16460:2016.

Requirements are specified in the following clauses of this document.

— Clause 5 specifies general requirements.

— Clause 6 presents a tutorial on architectural issues related to FSAP.

— Clause 7 specifies protocol elements of FSAP.

— Clause 8 specifies protocol procedures of FSAP.

— Clause 9 specifies conformance declaration.

— Clause 10 specifies test methods.

— Annex A specifies the ASN.1 module for FSAP.

— Annex B specifies details of the optional support of presenting communication requirements of FSAP to the ITS station management compliant with ISO 17423:2018.

— Annex C specifies details of the optional support of path and flow management for FSAP compliant with ISO 24102-6:2018.

— Annex D presents the implementation conformance statement proforma.

Intelligent transport systems — Fast service announcement protocol (FSAP) for general purposes in ITS

1 Scope

This document specifies the "Fast Service Announcement Protocol" (FSAP) for general purposes in ITS by reference to ISO/TS 16460:2016, supporting all features of ISO/TS 16460:2016, especially supporting also the Service Response Message (SRM) and related features in addition to the Service Announcement Message (SAM) that enables only very basic features.

FSAP is in support of locally advertised ITS services uniquely identified by an ITS application identifier (ITS-AID).

This document specifies message formats and related basic protocol procedures by reference to ISO/TS 16460:2016, and further related protocol requirements for operation of FSAP in the context of an ITS station specified in ISO 21217:2014.

This document illustrates its relations to service announcement protocols specified by ETSI TC ITS and IEEE WG 1609.

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.

<std>ISO/IEC 8825-2, *Information technology — ASN.1 encoding rules — Part 2: Specification of Packed Encoding Rules (PER) — Part 2*</std>

<std>ISO/IEC 8825-7, *Information technology — ASN.1 encoding rules — Part 7: Specification of Octet Encoding Rules (OER)*</std>

<std>ISO/TS 16460:2016, *Intelligent transport systems — Communications access for land mobiles (CALM) — Communication protocol messages for global usage*</std>

<std>ISO 17419, *Intelligent Transport Systems — Cooperative ITS — Globally unique identification*</std>

<std>ISO 17423:2018, *Intelligent Transport Systems — Cooperative ITS — Application requirements for selection of communication profiles*</std>

<std>ISO 21217:2014, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*</std>

<std>ISO 21218, *Intelligent Transport Systems — Hybrid communications — Access technology support*</std>

<std>ISO 24102-3, *Intelligent Transport Systems — ITS station management — Part3: Service access points*</std>

<std>ISO 24102-4, *Intelligent Transport Systems — ITS station management — Part 4: Station-internal management communications*</std>

<std>ISO 24102-6:2018, *Intelligent Transport Systems — ITS station management — Part 6: Path and flow management*</std>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21217:2014 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

4 Symbols and abbreviated terms

SAEM	Service announcement essential message
FSAM	Fast service advertisement message
FSAP	Fast service announcement protocol
FSRM	Fast service response message
ITS-SCPS	ITS station communication protocol stack
REQN	Request message PDU, no response message PDU expected
REQRES	Request or response message PDU out of the set REQW, REQN, RES
REQW	Request message PDU, response message PDU expected
RES	Response message PDU, acknowledging a REQW
S-FSAM	Secured FSAM
S-FSRM	Secured FSRM
SrvIniP	Service initialization phase
SrvOpP	Service operation phase

5 General requirements

The normative part of the specification of the "Service Advertisement messages" in ISO/TS 16460:2016 is a normative part of this document.

The "Fast Service Announcement Protocol" (FSAP) specified in this document shall be identified in FSAP application protocol data units (APDUs) by the version number three.

APDUs specified in this document are the "Fast Service Advertisement Message" (FSAM) and the "Fast Service Response Message" (FSRM).

The messages FSAM and FSRM shall be encapsulated by a security frame, resulting in a Secured FSAM (S-FSAM) and a Secured FSRM (S-FSRM).

Fragmented transmission of FSRMs and FSAMs is prohibited, thus the maximum size of S-FSAMs and S-FSRMs is limited by the capabilities of the protocol stack used for transmission.

FSAP is identified at the ITS-S networking & transport layer by

— the well-known registered ITS port number (ITS-PN) PORT_SAM = 1 = 0x00.01 published on [10], identifying the FSAP port that is receiving groupcasted S-FSAMs, and

— dynamically assigned ITS-PNs:

  — PORT_DYN_FSAM identifying the FSAP port that is receiving unicast S-FSAMs. The dynamic assignment is done in the ITS-SU that is transmitting S-FSRMs;

  — PORT_DYN_FSRM identifying the FSAP port that is receiving unicast S-FSRMs. The dynamic assignment is done in the ITS-SU that is transmitting S-FSAMs;

as illustrated in Table 1; see also 7.3 on ITS port numbers.

Table 1 — FSAP ITS port numbers

Direction	Source ITS-PN	Destination ITS-PN	MAC mode
From service advertiser to service user	PORT_DYN_FSRM	PORT_SAM	Groupcast (broadcast or multicast)
		PORT_DYN_FSAM	Unicast
From service user to service advertiser	PORT_SAM	PORT_DYN_FSRM	
	PORT_DYN_FSAM		

NOTE Procedures on how to perform multicast transmission of S-FSAMs are not specified in this document.

Unicast transmissions of S-FSRMs and S-FSAMs may be repeated, e.g. after timeout for a respective acknowledgement, as defined by implementation.

Further on the FSAP is identified by

— the ITS application identifier (ITS-AID) 2.113.664 published on [10]; see also 7.4. The p-encoded (ASN.1 unaligned packed encoding rules) presentation of this number of ASN.1 type `ITSaid` specified in ISO 17419 is 0pE0.00.00.00, i.e. fits into a four octet field.

An implementation supporting path and flow management shall be compliant with ISO 24102-6:2018.

An implementation for a distributed ITS-SU, i.e. an ITS-SU consisting of several ITS-SCUs interconnected with an ITS station-internal network, shall be compliant with ISO 24102-4.

As

— identical message formats for service advertisement are used in IEEE 1609.3[2] (WAVE SAM) and ETSI TS 102 890[16] (SAEM), and

— the features specifications in IEEE 1609.3[2] and ETSI TS 102 890[16] are sub-sets of the specification in this document,

an implementation of FSAP optionally may support the service advertisement from IEEE WAVE devices and the service announcement from ETSI ITS stations by considering the following:

— WSM support

  1) The only supported access technology is IEEE 802.11 OCB mode specified in IEEE 802.11[4] (ISO 21215[6] with US frequency allocation and WAVE-specific details).