



**Intelligent Transport Systems (ITS);
Facilities layer function;
Part 1: Services Announcement (SA) specification**

Standard Pre-View
Full standard/catalog/standards/etsi-en-302-890-1-v1-2-0-07
<https://standards.iteh.ai/catalog/standards/etsi-en-302-890-1-v1-2-0-07>
4e27-ac21-ceb6187f1186/etsi-en-302-890-1-v1-2-0-07

ReferenceREN/ITS-002180

Keywordsinteroperability, ITS, service, validation

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document is part 1 of a multi-part deliverable covering Intelligent Transport Systems; Facilities layer function, as identified below:

Part 1: "Services Announcement (SA) specification";

Part 2: "Position and time facility specification";

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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Introduction

Some of the applications of the Basic Set of Applications (see ETSI TR 102 638 [i.1]) require ITS stations (Service Users) to have knowledge of a certain service of interest that is provided by other ITS stations (Service Providers) via defined communication access technologies.

The C-ITS protocol stack supports push and pull mechanisms in order to allow an ITS station to identify the availability of ITS services. The push mechanism is named "ITS service announcement" which is also known as "ITS service advertisement" (see ETSI EN 302 665 [i.2]). Throughout the present document this service is referred to as service announcement service (SA service).

The ITS SA service is a functionality agnostic to the medium and the announced service that can be used by specific services to provide the push functionality mentioned above. In this sense, each specification of an ITS service will tailor the ITS service announcement to its needs. This means that ITS service definitions (e.g. in other standards or technical specifications) should make use of the provisions of the present document to define its service-specific use of ITS service announcement, i.e. to profile the ITS service announcement appropriately (for example the use of service announcement in a Platooning service). The present document defines therefore a general framework which needs to be followed whenever a specific service is specified. Compliance should be tested according to this service specification that defines the application-specific requirements for the service announcement.

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1 Scope

The present document provides the specification of the Services Announcement (SA) service, including its protocol functions, based on ISO/TS 16460 [1].

The definition of the interface between Service Provider and Service Announcer ITS stations (ITS-S) as well as of the communication steps following the service announcement protocol procedure and related protocol details between Service Announcer and Service User ITS-S are application-specific and are not covered by the present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

- [1] ISO/TS 16460:2016: "Intelligent transport systems -- Communication access for land mobiles (CALM) -- Communications protocol messages for global usage".
- [2] ETSI TS 102 894-2: "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionary".
- [3] ETSI EN 302 636-4-1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 1: Media-Independent Functionality".
- [4] ETSI TS 103 097: "Intelligent Transport Systems (ITS); Security; Security header and certificate formats".
- [5] ETSI EN 302 931: "Intelligent Transport Systems (ITS); Vehicular Communications; Geographical Area Definition".
- [6] Recommendation ITU-T X.691/ISO/IEC 8825-2 (2015): "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".
- [7] ETSI TS 102 965: "Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration".
- [8] ETSI TS 103 248: "Intelligent Transport Systems (ITS); GeoNetworking; Port Numbers for the Basic Transport Protocol (BTP)".
- [9] IEEE 1609.3™ - 2016: "IEEE Standard for Wireless Access in Vehicular Environments (WAVE) - Networking Services".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI TR 102 638 (V1.1.1): "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Definitions".
- [i.2] ETSI EN 302 665 (V1.1.1): "Intelligent Transport Systems (ITS); Communications Architecture".
- [i.3] ISO/TS 17423:2014: "Intelligent transport systems -- Cooperative systems -- ITS application requirements and objectives for selection of communication profiles".
- [i.4] ETSI TS 102 723-11: "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 11: Interface between networking and transport layer and facilities layer".
- [i.5] ETSI TS 102 723-5 (V1.1.1): "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 5: Interface between management entity and facilities layer".
- [i.6] ETSI EN 302 636-5-1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 5: Transport Protocols; Sub-part 1: Basic Transport Protocol".
- [i.7] ETSI TS 103 301: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Facilities layer protocols and communication requirements for infrastructure services".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

ITS application: association of two or more complementary ITS-S applications

ITS-S application: fragment of an ITS application available at an ITS-S that uses ITS-S services to connect to one or more other fragments of the same ITS application

ITS-S gateway: gateway functionality based on the ITS-S reference architecture

ITS-S router: routing functionality based on the ITS-S reference architecture

ITS service: service provided by an ITS application to the user of ITS

ITS-S service: communication functionality offered by an ITS-S to an ITS-S application

Services Announcement (SA): provision, via an ITS communication functionality, of information about an ITS service

NOTE: Such information can include the ITS service identity, availability and communication details.

Service announcer ITS-S: ITS-S that announces services on behalf of the service provider ITS-S by transmitting SAEM

Service provider ITS-S: ITS-S that provides remote or local ITS services

Service user ITS-S: consumer of ITS services monitoring SAEM for an announced ITS service opportunity of interest

NOTE: These definitions are in line with ETSI EN 302 665 [i.2].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

<i>changeCount</i>	Component of <i>samBody</i>
<i>channelIndex</i>	Component of <i>ServiceInfo</i> pointer to <i>ChannelInfo</i>
<i>ChannelInfo</i>	Datatype of <i>channelInfos</i> list entry
<i>channelInfos</i>	Component of <i>samBody</i>
<i>chOptions</i>	Component of <i>ServiceInfo</i>
<i>contentCount</i>	Component of <i>changeCount</i>
<i>defaultGateway</i>	Component of <i>routingAdvertisement</i>
<i>ExtendedChannelInfos</i>	Component of <i>extensions</i> of <i>samBody</i>
<i>extensions</i>	Component of <i>samBody</i>
<i>GatewayMACAddress</i>	Component of <i>routingAdvertisement</i>
<i>IPv6Address</i>	Component of <i>chOptions</i>
<i>ItsPduHeader</i>	Header component of the SAEM
<i>messageID</i>	Component of the <i>ItsPduHeader</i>
<i>protocolType</i>	Component of <i>chOptions</i>
<i>protocolVersion</i>	Component of the <i>ItsPduHeader</i>
<i>ProviderMACAddress</i>	Component of <i>chOptions</i>
<i>routingAdvertisement</i>	Component of <i>samBody</i>
<i>saID</i>	Component of <i>changeCount</i>
<i>sam</i>	Component of the SAEM
<i>Sam</i>	Datatype specified in ISO/TS 16460 [1]
<i>samBody</i>	Component of <i>sam</i>
<i>serviceID</i>	Component of <i>ServiceInfo</i>
<i>ServiceInfo</i>	Datatype of <i>serviceInfos</i> list entry
<i>serviceInfos</i>	Component of <i>samBody</i>
<i>serviceProviderPort</i>	Unused component of <i>chOptions</i>
<i>SrvAdvChangeCount</i>	Datatype of <i>changeCount</i>
<i>stationID</i>	Component of the <i>ItsPduHeader</i>
<i>systemService</i>	Unused component of <i>chOptions</i>

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AID	Application Identifier
API	Application Programming Interface
ASN	Abstract Syntax Notation
BTP	Basic Transport Protocol
C-ITS	Cooperative ITS
GN	GeoNetworking
ID	Identifier
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPv6	Internet Protocol Version 6
ISO	International Organization for Standardization
ITS	Intelligent Transport System
ITS-S	ITS Station
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
MAC	Medium Access Control
MA-SAP	Management to Application Service Access Point
MDA	Minimum Dissemination Area
MF	Management to Facilities

MF-SAP	Management to Facilities Service Access Point
NF	Networking & transport to Facilities
NF-SAP	Networking & transport to Facilities Service Access Point
PER	Packed Encoding Rules
RX	Reception
SA	Services Announcement
SAEM	Services Announcement Extended Message
SAM	Service Announcement
SAP	Service Access Point
SfCH	Safety Channel (logical)
SSP	Service Specific Permissions
TX	Transmission

4 SA functional description

4.1 SA functional architecture

The Services Announcement (SA) service is a protocol service that is distributed over the facilities layer and the management entity of the ITS-S reference architecture as defined in ETSI EN 302 665 [i.2]. The SA service provides information on available services, applying the Services Announcement protocol with the following functions:

- The SA message processing function of the facility layer is responsible for the periodic transmission and/or reception of SAEM. It shall offer the following functionalities:
 - For the SAEM transmission (TX) service:
 - message encoding;
 - transmission management.
 - For the SAEM reception (RX) service:
 - message decoding;
 - reception management.
- The SA management function of the management entity is responsible for the registration/update/deregistration of applications.

The SA service is implemented in a Service Provider, Service Announcer, or Service User ITS-S.

Figure 1 presents the SA service in the context of the ITS-S reference architecture and its logical interfaces with other entities and layers.

The SA service supports different configurations with respect of the Service Provider role and the Service Announcer role, such as:

- Service Provider and Service Announcer functionality are implemented in the same ITS-S;
- Service Provider and Service Announcer functionality are implemented in separate ITS-S and
- other configurations.