

ETSI EN 302 636-5-1 V2.1.1 (2017-08)



**Intelligent Transport Systems (ITS);
Vehicular Communications;
GeoNetworking;
Part 5: Transport Protocols;
Sub-part 1: Basic Transport Protocol**

ITih 3T1VNA3 PREVIEW
https://standards.iteh.ai/catalog/standards/sis/5230918-849b-402a-a8de-137cc4c559a9/etsi-en-302-636-5-1-2017-08

Reference

REN/ITS-00356

Keywords

addressing, autonomic networking, ITS, network,
protocol

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2017.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M logo is protected for the benefit of its Members.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	4
Foreword.....	4
Modal verbs terminology.....	4
Introduction	5
1 Scope	6
2 References	6
2.1 Normative references	6
2.2 Informative references.....	6
3 Definitions and abbreviations.....	7
3.1 Definitions.....	7
3.2 Abbreviations	7
4 Services provided by the Basic Transport Protocol	8
5 Format convention.....	9
6 BTP packet structure	9
7 BTP header	10
7.1 Overview	10
7.2 BTP-A header.....	10
7.2.1 Structure of the BTP-A header	10
7.2.2 Fields of the BTP-A header	10
7.3 BTP-B header.....	11
7.3.1 Structure of the BTP-B header.....	11
7.3.2 Fields of the BTP-B header	11
8 Protocol operations.....	11
8.1 General	11
8.2 Source operations	11
8.3 Destination operations.....	12
Annex A (informative): BTP data services.....	14
A.1 General	14
A.2 BTP-Data.request	14
A.3 BTP-Data.indication.....	15
Annex B (informative): Bibliography.....	17
History	18

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Intelligent Transport Systems (ITS).

The present document is part 5, sub-part 1 of a multi-part deliverable. Full details of the entire series can be found in part 1 [2].

National transposition dates	
Date of adoption of this EN:	21 August 2017
Date of latest announcement of this EN (doa):	30 November 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 May 2018
Date of withdrawal of any conflicting National Standard (dow):	31 May 2018

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).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The Basic Transport Protocol (BTP) provides an end-to-end, connection-less transport service in the ITS ad hoc network. Its main purpose is the multiplexing of messages from different processes at the ITS facilities layer, e.g. CAM and DENM from the cooperative awareness basic service and the distributed environmental notification basic service, for the transmission of packets via the GeoNetworking protocol as well as the de-multiplexing at the destination. BTP enables protocol entities at the ITS facilities layer to access services of the GeoNetworking protocol and to pass protocol control information between the ITS facilities layer and the GeoNetworking protocol.

Message multiplexing/demultiplexing is based on ports, an ITS station-internal 16 bit address. A port represents a communication endpoint that identifies the ITS station protocol entity at the source (source port) or the destination (destination port). The usage of ports is similar to the two-stage packet transport in the IP protocol suite, where the IP provides the routing of packets from source to destination and the transport protocol, such as UDP, multiplexes/demultiplexes messages from/to application processes. In the case of BTP, the GeoNetworking protocol transports the packets among the ITS stations and the BTP protocol delivers the packets to the entities at the ITS facilities layer. BTP also adopts the concept of "well-known ports" from the IP protocol suite that assigns fixed ports to specific ITS facilities layer protocols. The definition of the ports, however, is beyond the scope of the present document.

BTP is a lightweight protocol: it has a 4-byte protocol header and requires minimal processing. It provides an unreliable transport of packets, i.e. packets can arrive out-of-order, appear duplicated or can be lost. The design of BTP assumes that entities using the protocol are either tolerant against the unreliable packet transport or provide appropriate mechanisms for reliable communication in their protocols.

ITeH STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/52ede9f8-849b-402a-a8de-137cc4c559a9/etsi-en-302-636-5-1-v2.1.1-2017-08>

1 Scope

The present document specifies the Basic Transport Protocol (BTP) for the transport of packets among ITS stations. It resides on top of the GeoNetworking protocol specified in ETSI EN 302 636-4-1 [5] and ETSI TS 102 636-4-2 [i.2] and below the ITS-S facilities layer. It provides an end-to-end, connection-less and unreliable transport service.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

- [1] ETSI EN 302 665: "Intelligent Transport Systems (ITS); Communications Architecture".
- [2] ETSI EN 302 636-1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 1: Requirements".
- [3] ETSI EN 302 636-2: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 2: Scenarios".
- [4] ETSI EN 302 636-3: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network architecture".
- [5] 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".
- [6] ETSI TS 103 248: "Intelligent Transport Systems (ITS); GeoNetworking; Port Numbers for the Basic Transport Protocol (BTP)".

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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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 EN 302 663: "Intelligent Transport Systems (ITS); Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band".
- [i.2] ETSI TS 102 636-4-2: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 4: Geographical addressing and forwarding for point-to-point and point-to-multipoint communications; Sub-part 2: Media-dependent functionalities for ITS-G5".

- [i.3] ETSI EN 302 637-2: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 2: Specification of Cooperative Awareness Basic Service".
- [i.4] ETSI EN 302 637-3: "Intelligent Transport Systems (ITS); Vehicular Communications; Basic Set of Applications; Part 3: Specifications of Decentralized Environmental Notification Basic Service".
- [i.5] IETF RFC 768: "User Datagram Protocol".
- [i.6] ISO/IEC 8802-2: "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements; Part 2: Logical Link Control".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 302 665 [1], ETSI EN 302 636-3 [4] and the following apply:

BTP-PDU: PDU exchanged between BTP peer entities

destination: receiving BTP entity in the ITS station

destination port: port identifying the destination's protocol entity at the ITS facilities layer

NOTE: Facilities layer services that do not expect replies either do not include a source port number in the header, or they set it to a default (usually 0) to indicate no reply port available. For session-based services (client-server or peer-to-peer), the source port is often set to a value from an ephemeral (dynamically assigned) subspace of the space of all port numbers.

GN-PDU: PDU exchanged between peer entities of the GeoNetworking protocol

ITS-FPCI: control information passed from the ITS Facilities layer to the BTP

port: ITS station-internal address that identifies a protocol entity at the ITS facilities layer and represents an endpoint of a logical connection

source: originating BTP entity in the ITS station

source port: port number to be used by a facilities layer entity as the destination port in a subsequent reply to the originator

NOTE: Such an entity may be listening for a reply BTP packet.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 302 665 [1], ETSI EN 302 636-3 [4] and the following apply:

BTP	Basic Transport Protocol
BTP-PDU	Basic Transport Protocol Protocol Data Unit
BTP-SAP	Basic Transport Protocol Service Access Point
GN-PDU	GeoNetworking protocol PDU exchanged between peer entities of the GeoNetworking protocol
GN-SAP	GeoNetworking Service Access Point
ITS-FPCI	ITS Facilities layer Protocol Control Information
ITS-FPDU	ITS Facilities layer Protocol Data Unit
ITS-FSDU	ITS Facilities layer Service Data Unit
LL	Link Layer
LLC	Logical Link Control
PCI	Protocol Control Information

PDU	Protocol Data Unit
SHB	Single Hop Broadcast
TSB	Topologically Scoped Broadcast

4 Services provided by the Basic Transport Protocol

The Basic Transport Protocol (BTP) provides an end-to-end, connection-less transport service in the ITS ad hoc network (ETSI EN 302 636-3 [4]). Similar to UDP (IETF RFC 768 [i.5]), it offers a minimal transport service, i.e. the non-guaranteed delivery of BTP-PDUs among BTP entities. It also allows protocol entities at the ITS facilities layer to directly access the services provided by the GeoNetworking protocol.

The BTP shall meet the requirements specified in ETSI EN 302 665 [1] and ETSI EN 302 636-1 [2] and support the use cases defined in ETSI EN 302 636-2 [3].

The BTP provides services to ITS facilities layer protocol entities (figure 1), such as cooperative awareness basic service (ETSI EN 302 637-2 [i.3]) and DEN basic service (ETSI EN 302 637-3 [i.4]). The services are provided via the BTP-SAP using service primitives of different types that carry parameters, i.e. Protocol Control Information (ITS-FPCI), and the PDU of the upper protocol entity, i.e. ITS-FPDU. In order to provide its packet transport services, BTP uses the services of the GeoNetworking protocol (ETSI EN 302 636-4-1 [5]).

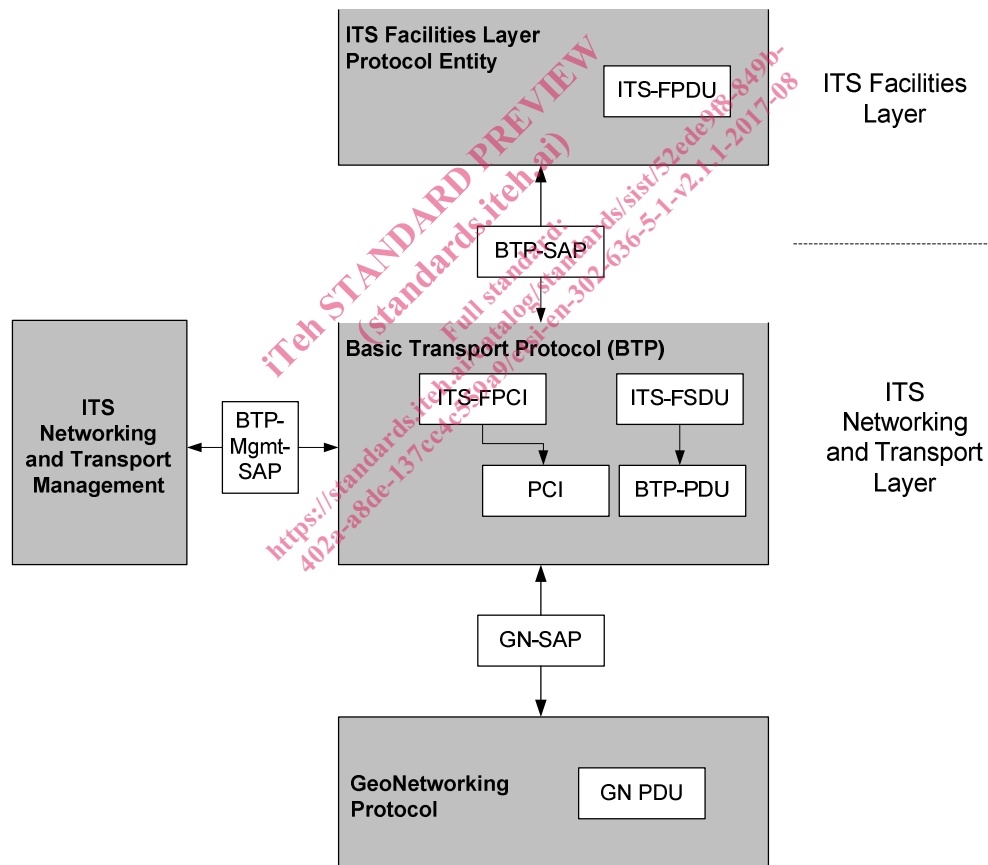


Figure 1: SAPs, SDUs and PDUs relevant for the BTP

The present document specifies the following SAPs:

- BTP-SAP between BTP and the ITS facilities layer; and
- BTP-Mgmt-SAP between the BTP and the ITS Network and Transport Management.

