TECHNICAL SPECIFICATION

ISO/TS 18234-2

Second edition
2013-10-15

Corrected version
2013-11-01

Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format —

Part 2: Syntax, semantics and framing structure (TPEG1-SSF)

Systèmes intelligents de transport — Informations sur le trafic et le tourisme via les données de format binaire du groupe d'experts du protocole de transport, génération 1 (TPEG1)

Partie 2: Structure de syntaxe, de sémantique et de cadrage (TPEG1-SSF)

Reference number
ISO/TS 18234-2:2013(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 18234-2 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 278, *Road transport and traffic telematics,* in collaboration with ISO Technical Committee ISO/TC 204, *Intelligent transport systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO/TS 18234-2:2006). Clauses 5, 6 and 7 have been technically revised.

ISO/TS 18234 consists of the following parts, under the general title *Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format*:

— *Part 1: Introduction, numbering and versions (TPEG1-INV)*

— *Part 2: Syntax, semantics and framing structure (TPEG1-SSF)*

— *Part 3: Service and network information(TPEG1-SNI)*

— *Part 4: Road Traffic Message application (TPEG1-RTM)*

— *Part 5: Public Transport Information (PTI) application*

— *Part 6: Location referencing applications*

— *Part 7: Parking information (TPEG1-PK1)*

— *Part 8: Congestion and travel-time application (TPEG1-CTT)*

— *Part 9: Traffic event compact (TPEG1-TEC)*

— *Part 10: Conditional access information (TPEG1-CAI)*

— *Part 11: Location Referencing Container (TPEG1-LRC)*

This corrected version of ISO 18234-2:2013 incorporates the following corrections:

— The quality of Figures 4 and 5 has been improved for legibility.

Introduction

TPEG technology uses a byte-oriented data stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer. TPEG messages are delivered from service providers to end-users, and are used to transfer application data from the database of a service provider to a user's equipment.

This Technical Specification describes the Service and Network Information Application, which provides a means of informing end-users about all possible services and their content which are considered relevant by a service provider to either provide continuity of his services or inform the end-user about other related services. As stated in the design criteria, TPEG is a bearer independent system. Therefore some rules are established for the relation of information contents of the same service on different bearers. Also the mechanisms for following a certain service on one single bearer have to be defined. For the receiver it is essential to find an adjacent or similar service if it leaves the current reception area. Nonetheless, basic information describing the service itself is necessary. For the ease of the user, e.g. the service name, the service provider name, the operating time and many other hints are delivered by the TPEG-SNI application.

General models for the hand-over and the referencing of services are developed and shown in detail. It is important to note that this Technical Specification is closely related to ISO/TS 18234-3 and thus they are dependent upon each other and must be used together.

The brief history of TPEG technology development dates back to the European Broadcasting Union (EBU) Broadcast Management Committee establishing the B/TPEG project group in autumn 1997 with the mandate to develop, as soon as possible, a new protocol for broadcasting traffic and travel-related information in the multimedia environment. TPEG technology, its applications and service features are designed to enable travel-related messages to be coded, decoded, filtered and understood by humans (visually and/or audibly in the user's language) and by agent systems.

One year later in December 1998, the B/TPEG group produced its first EBU specifications. Two Technical Specifications were released. ISO/TS 18234-2, this document, described the Syntax, Semantics and Framing Structure, which is used for all TPEG applications. ISO/TS 18234-4 (TPEG-RTM) described the first application, for Road Traffic Messages.

Subsequently, CEN/TC 278/WG 4, in conjunction with ISO/TC 204, established a project group comprising the members of B/TPEG and they have continued the work concurrently since March 1999. Since then two further parts were developed to make the initial complete set of four parts, enabling the implementation of a consistent service. ISO/TS 18234-3 (TPEG-SNI) describes the Service and Network Information Application, which should be used by all service implementations to ensure appropriate referencing from one service source to another. ISO/TS 18234-1 (TPEG-INV), completes the series, by describing the other parts and their relationship; it also contains the application IDs used within the other parts.

In April 2000, the B/TPEG group released revised Parts 1 to 4, all four parts having been reviewed and updated in the light of initial implementation results. Thus a consistent suite of specifications, ready for wide scale implementation, was submitted to the CEN/ISO commenting process.

In November 2001, after extensive response to the comments received and from many internally suggested improvements, all four parts were completed for the next stage: the Parallel Formal Vote in CEN and ISO. But a major step forward has been to develop the so-called TPEG-Loc location referencing method, which enables both map-based TPEG-decoders and non map-based ones to deliver either map-based location referencing or human readable information. ISO/TS 18234-6 is now a separate specification and is used in association with the other parts of ISO/TS 18234 to provide comprehensive location referencing. Additionally, ISO/TS 18234-5, has been developed and been through the commenting process.

This Technical Specification provides a full specification to the primitives used, framing, time calculation, numbers and to specific rules such as CRC calculation.

During the development of the TPEG technology a number of versions have been documented and various trials implemented using various versions of the specifications. At the time of the publication of this Technical Specification, all parts are fully inter-workable and no specific dependencies exist.

This Technical Specification has the technical version number TPEG-SSF_3.0/003.

Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format —

Part 2:
Syntax, semantics and framing structure (TPEG1-SSF)

1 Scope

This Technical Specification establishes the method of referencing used within a TPEG data-stream to allow a service provider to signal availability of the same service on another bearer channel or similar service data from another service.

TPEG is a byte-oriented stream format, which may be carried on almost any digital bearer with an appropriate adaptation layer. TPEG messages are delivered from service providers to end-users, and are used to transfer application data from the database of a service provider to a user's equipment.

The protocol is structured in a layered manner and employs a general purpose framing system which is adaptable and extensible, and which carries frames of variable length. This has been designed with the capability of explicit frame length identification at nearly all levels, giving greater flexibility and integrity, and permitting the modification of the protocol and the addition of new features without disturbing the operation of earlier client decoder models.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO/IEC 7498-1, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 8859-2, *Information technology — 8-bit single-byte coded graphic character sets — Part 2: Latin alphabet No. 2*

ISO/IEC 8859-3, *Information technology — 8-bit single-byte coded graphic character sets — Part 3: Latin alphabet No. 3*

ISO/IEC 8859-4, *Information technology — 8-bit single-byte coded graphic character sets — Part 4: Latin alphabet No. 4*

ISO/IEC 8859-5, *Information technology — 8-bit single-byte coded graphic character sets — Part 5: Latin/Cyrillic alphabet*

ISO/IEC 8859-6, *Information technology — 8-bit single-byte coded graphic character sets — Part 6: Latin/Arabic alphabet*

ISO/IEC 8859-7, *Information technology — 8-bit single-byte coded graphic character sets — Part 7: Latin/Greek alphabet*

ISO/IEC 8859-8, *Information technology —8-bit single-byte coded graphic character sets — Part 8: Latin/Hebrew alphabet*

ISO/IEC 8859-9, *Information technology — 8-bit single-byte coded graphic character sets — Part 9: Latin alphabet No. 5*

ISO/IEC 8859-10, *Information technology — 8-bit single-byte coded graphic character sets — Part 10: Latin alphabet No. 6*

ISO/IEC 8859-13, *Information technology — 8-bit single-byte coded graphic character sets — Part 13: Latin alphabet No. 7*

ISO/IEC 8859-14, *Information technology — 8-bit single-byte coded graphic character sets — Part 14: Latin alphabet No. 8 (Celtic)*

ISO/IEC 8859-15, *Information technology — 8-bit single-byte coded graphic character sets — Part 15: Latin alphabet No. 9*

ISO/IEC 10646, *Information technology — Universal Coded Character Set (UCS)*

3 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply:

AID	Application Identification
BPN	Broadcast, Production and Networks (an EBU document publishing number system)
B/TPEG	Broadcast/TPEG (the EBU project group name for the specification drafting group)
CEN	Comité Européen de Normalisation
DAB	Digital Audio Broadcasting
DARC	Data Radio Channel - an FM sub-carrier system for data transmission
DVB	Digital Video Broadcasting
EBU	European Broadcasting Union
INV	Introduction, Numbering and Versions (see ISO/TS 18234-1)
IPR	Intellectual Property Right(s)
ISO	International Organization for Standardization
ITU-T	International Telecommunication Union - Telecom
OSI	Open Systems Interconnection
RTM	Road Traffic Message application (see ISO/TS 18234-4)

SNI	Service and Network Information application (see ISO/TS 18234-3)
SSF	Syntax, Semantics and Framing Structure (this Technical Specification)
TPEG	Transport Protocol Expert Group
TTI	Traffic and Travel Information
UAV	unassigned value
UTC	Coordinated Universal Time

4 Design principles

The following principles have been assumed in the development of the TPEG protocol, structure and semantics:

— TPEG is unidirectional;

— TPEG is byte-oriented, where a byte is represented by eight bits;

— TPEG provides a protocol structure, which employs asynchronous framing;

— TPEG includes a CRC error detection capability applicable on a variety of different levels;

— TPEG assumes the use of a transparent data channel;

— TPEG assumes that underlying systems will have an appropriate level of reliability;

— TPEG assumes that underlying systems may employ error correction;

— TPEG has a hierarchical data frame structure;

— TPEG is used to transport information from database to database;

— TPEG provides service provider name, service name and network information;

— TPEG permits the use of encryption mechanisms, if required by an application.

4.1 TPEG transmission

TPEG is intended to operate via almost any simple digital data channel, and it assumes nothing of the channel other than the ability to convey a stream of bytes. To this end, the concept of transmission via a “piece of wire” is envisaged, in which the bearer has no additional service features.

In Figure 1, a variety of possible transmission channels are shown. The only requirement of the channel is that a sequence of bytes may be carried between the TPEG generator and the TPEG decoder. This requirement is described as “transparency”. However it is recognized that data channels may introduce errors. Bytes may be omitted from a sequence, bytes may become corrupted or additional and erroneous data could be received. Therefore TPEG incorporates error detection features at appropriate points and levels. It is assumed that bearer systems will introduce an appropriate level of error correction.

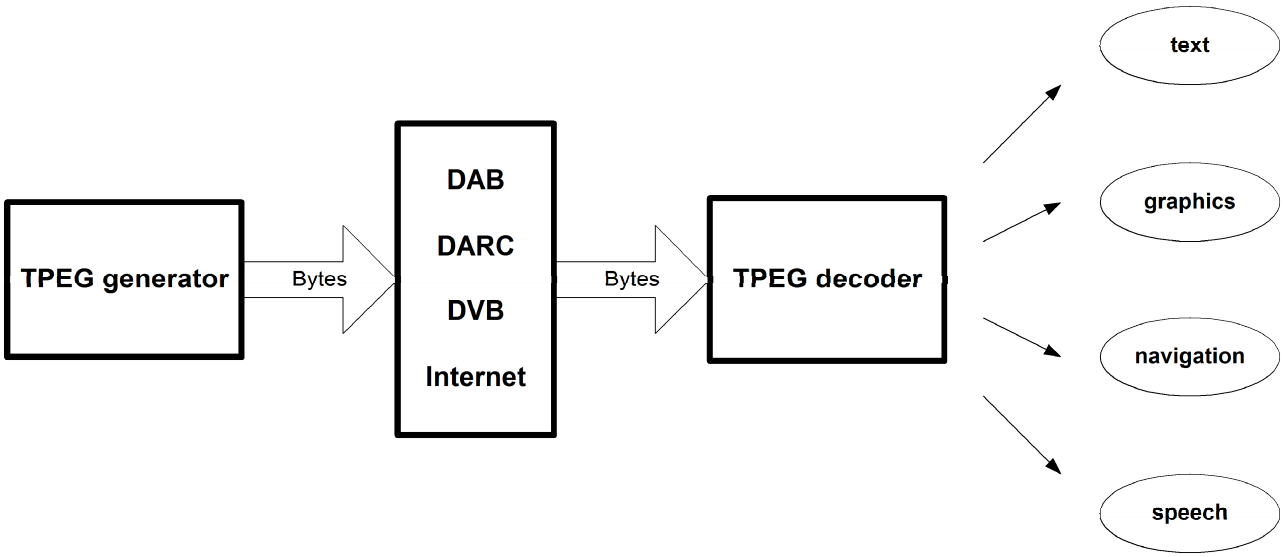

Figure 1 — TPEG data may be delivered simultaneously via different bearer channels

4.2 TPEG layer model

In Figure 2, the different layers of the TPEG protocol are identified in accordance with the ISO/OSI model (ISO/IEC 7498-1).

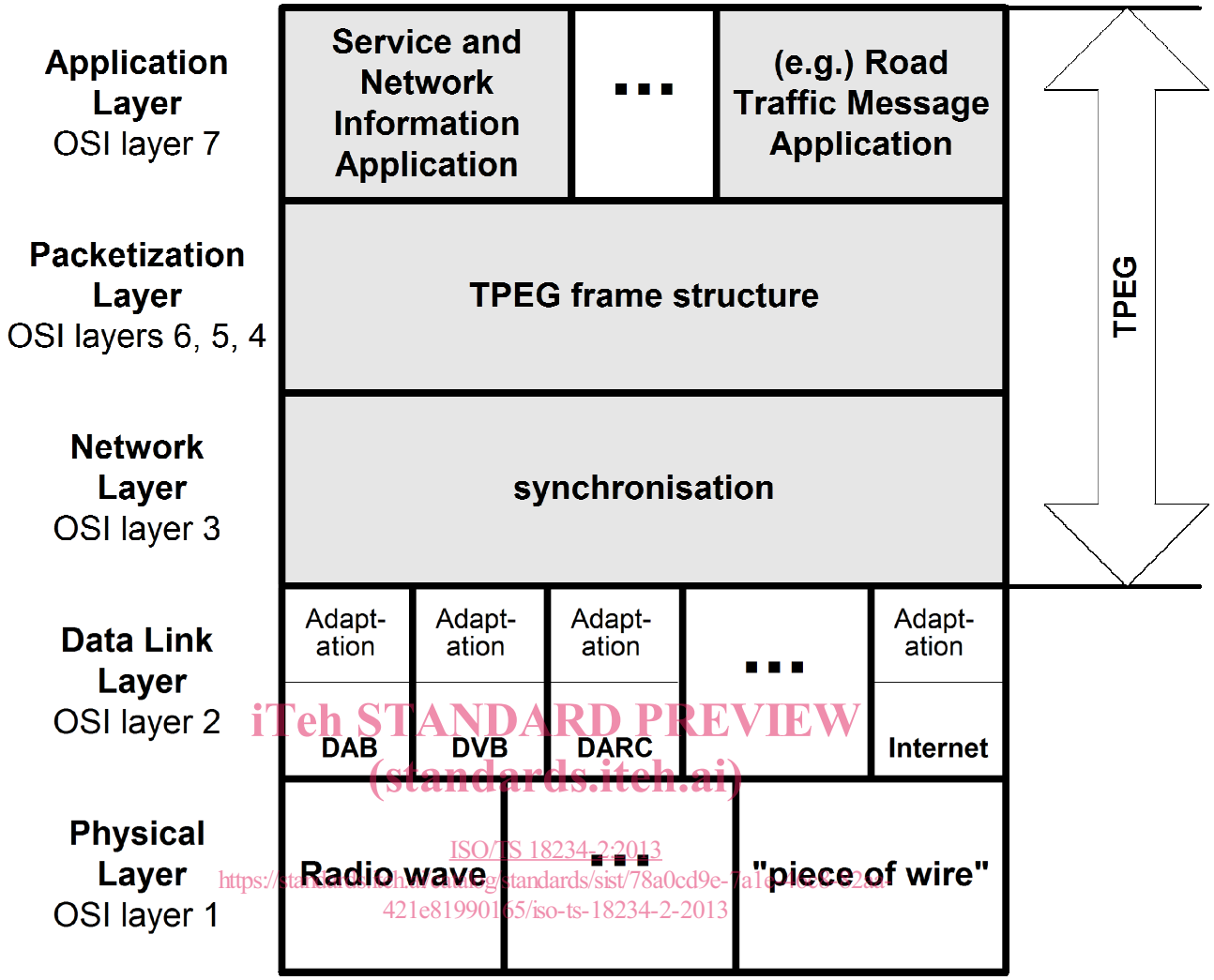

Figure 2 — TPEG in relation to the ISO/OSI Layer Model via different bearer channels

Layer 7 is the top level and referred to in TPEG as the application layer. Initially the following applications were defined:

— TPEG specifications - Part 3: Service and Network Information Application (Service provider name, logo, hand-over information, etc.) (CEN ISO/TS 18234-3);

— TPEG specifications - Part 4: Road Traffic Message application (Event description, location description, etc.) (CEN ISO/TS 18234-4).

Layer 4 is the packetization layer. Components are merged into a single stream and encrypted and/or compressed.

Layer 3 is the network layer. This layer defines the means for synchronization and routing. This is the lowest layer of the TPEG protocol.

Layer 2 is the datalink layer. This layer consists of a wide range of different bearers, which are suitable carriers for the TPEG protocol. An adaptation layer may be required in order to map the TPEG stream onto that bearer.