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Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) —

Part 1: **Introduction, numbering and versions (TPEG2-INV)**

Systèmes intelligents de transport — Informations sur le trafic et le tourisme via le groupe expert du protocole de transport, génération 2 (TPEG2) —

Partie 1: Introduction, numérotage et versions (TPEG2-INV)

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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 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 www.iso.org/iso/foreword.html.

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

This first edition cancels and replaces the first edition (ISO/TS 21219-1:2016), which has been technically revised.

The main changes are as follows:

— the document status has been changed from Technical Specification (TS) to International Standard (IS);

— the content has been updated to reflect new TPEG2 specifications and corresponding Application Identifications (AID), e.g. TPEG2-VLI, TPEG2-WEA, etc.

A list of all parts in the ISO 21219 series can be found on the ISO website.

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 www.iso.org/members.html.

Introduction

0.1 History

TPEG technology was originally proposed by the European Broadcasting Union (EBU) Broadcast Management Committee, who established the B/TPEG project group in the autumn of 1997 with a brief 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 were 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. Originally, a byte-oriented data stream format, which can be carried on almost any digital bearer with an appropriate adaptation layer, was developed. Hierarchically structured TPEG messages from service providers to end-users were designed to transfer information from the service provider database to an end-user's equipment.

One year later, in December 1998, the B/TPEG group produced its first EBU specifications. Two documents were released. Part 2 (TPEG-SSF, which became ISO/TS 18234-2) described the syntax, semantics, and framing structure which was used for all TPEG applications. Meanwhile, Part 4 (TPEG-RTM, which became ISO/TS 18234-4) described the first application for road traffic messages.

Subsequently, in March 1999, CEN/TC 278, in conjunction with ISO/TC 204, established a group comprising members of the former EBU B/TPEG and this working group continued development work. Further parts were developed to make the initial set of four parts, enabling the implementation of a consistent service. Part 3 (TPEG-SNI, ISO/TS 18234-3) described the service and network information (SNI) application used by all service implementations to ensure appropriate referencing from one service source to another.

Part 1 (TPEG-INV, ISO/TS 18234-1) completed the series by describing the other parts and their relationship. It also contained the application IDs used within the other parts. Additionally, Part 5, the public transport information application (TPEG-PTI, ISO/TS 18234-5), was developed. The so-called TPEG-LOC location referencing method, which enabled both map-based TPEG-decoders and non-map-based ones to deliver either map-based location referencing or human readable text information, was issued as ISO/TS 18234-6 to be used in association with the other applications of parts of the ISO/TS 18234 series to provide location referencing.

The ISO 18234 series has become known as TPEG Generation 1.

0.2 TPEG Generation 2

When the Traveller Information Services Association (TISA), derived from former forums, was inaugurated in December 2007, TPEG development was taken over by TISA and continued in the TPEG applications working group.

It was about this time that the (then) new Unified Modelling Language (UML) was seen as having major advantages for the development of new TPEG applications in communities who would not necessarily have binary physical format skills required to extend the original TPEG TS work. It was also realized that the XML format for TPEG described within the ISO 24530 series (now superseded) had a greater significance than previously foreseen, especially in the content-generation segment, and that keeping two physical formats synchronised, in different standards series, would be rather difficult.

As a result, TISA set about the development of a new TPEG structure that would be UML-based. This has subsequently become known as TPEG Generation 2.

TPEG2 is embodied in the ISO 21219 series and it comprises many parts covering the introduction, rules, toolkit and application components. TPEG2 is built around UML modelling and has a core of rules that contain the modelling strategy covered in ISO 21219-2, ISO 21219-3 and ISO 21219-4 and the conversion to two current physical formats: binary and XML; others can be added in the future. TISA uses an automated tool to convert from the agreed UML model XMI file directly into an MS Word document file that forms the annex for each physical format.

TPEG2 has a three-container conceptual structure: message management (ISO 21219-6), application (several parts) and location referencing (ISO/TS 21219-7). This structure has flexible capability and can accommodate many differing use cases that have been proposed within the TTI sector and more broadly for hierarchical message content.

TPEG2 also has many location referencing options as required by the service provider community, any of which may be delivered by vectoring data included in the location referencing container.

The following classification provides a helpful grouping of the different TPEG2 parts according to their intended purpose. Note that the list below is potentially incomplete, as it is possible that new TPEG2 parts will be introduced after the publication of this document.

— Toolkit parts: TPEG2-INV (ISO 21219-1), TPEG2-UML (ISO 21219-2), TPEG2-UBCR (ISO 21219-3), TPEG2-UXCR (ISO 21219-4), TPEG2-SFW (ISO 21219-5), TPEG2-MMC (ISO 21219-6), TPEG2-LRC (ISO/TS 21219-7).

— Special applications: TPEG2-SNI (ISO 21219-9[1)]), TPEG2-CAI (ISO 21219-10[2)]), TPEG2-LTE (ISO/TS 21219-24).

— Location referencing: TPEG2-OLR (ISO/TS 21219-22), TPEG2-GLR (ISO/TS 21219-21), TPEG2-TLR (ISO 17572-2), TPEG2-DLR (ISO 17572-3).

— Applications: TPEG2-PKI (ISO 21219-14[3)]), TPEG2-TEC (ISO 21219-15[4)]), TPEG2-FPI (ISO 21219-16[5)]), TPEG2-TFP (ISO 21219-18), TPEG2-WEA (ISO 21219-19[6)]), TPEG2-RMR (ISO/TS 21219-23), TPEG2-EMI (ISO/TS 21219-25), TPEG2-VLI (ISO/TS 21219-26).

TPEG2 has been developed to be broadly (but not totally) backward compatible with TPEG1 to assist in transitions from earlier implementations, while not hindering the TPEG2 innovative approach and being able to support many new features, such as dealing with applications with both long-term, unchanging content and highly dynamic content, such as parking information.

This document is based on the TISA specification technical/editorial version reference: SP20008 version 205.

1) Under preparation. Stage at the time of publication: ISO/PRF 21219-9:2023.

2) Under preparation. Stage at the time of publication: ISO/PRF 21219-10:2023.

3) Under preparation. Stage at the time of publication: ISO/PRF 21219-14:2023.

4) Under preparation. Stage at the time of publication: ISO/PRF 21219-15:2023.

5) Under preparation. Stage at the time of publication: ISO/DIS 21219-16:2023.

6) Under preparation. Stage at the time of publication: ISO/DIS 21219-19:2023.

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1 Scope

This document defines an index to the complete set of TPEG Generation 2 toolkit components and applications. New applications are enumerated with an application identification (AID) as they are added to the TPEG applications family.

NOTE 1 This document will be updated when new applications occur in order to indicate the latest status and the inter-working of the various TPEG specifications. This document will be revised as a new edition every time a new issue of any other specification is issued.

NOTE 2 Preliminary AIDs are allocated and managed by TISA and are listed at Reference [10].

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
service
collection of different information streams (applications) logically bound together and delivered from a service provider to the end user

3.2
service component
information stream (application) that is part of a *service* (3.1)

Note 1 to entry: A TPEG stream is logically divided into parts known as service components. Each service component carries an application instance. A service component is effectively a “channel” within the multiplex of a TPEG stream. Each stream comprises a number of these “channels” which are identified by the component identifier in TPEG2-SFW and linked to the content identification (COID) and application identification (AID) in the TPEG2-SNI application.

4 Abbreviated terms

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

AID	application identification
ARIB	Association of Radio Industries and Businesses (Japan)
ATSC	Advanced Television Systems Committee, Inc. (USA)
B/TPEG	broadcast/TPEG (the EBU project group name for the TPEG specification drafting group)
CAI	conditional access information
CEN	Comité Européen de Normalisation
COID	content identification
CTT	congestion and travel time
DAB	digital audio broadcasting
DMB	digital multimedia broadcasting
DVB	digital video broadcasting
EBU	European Broadcasting Union
EMI	electromobility information
FPI	fuel price information and availability
GLR	geographic location referencing
INV	introduction, numbering and versions (this document)
ISO	International Organization for Standardization
LRC	location referencing container
LTE	light encryption
MMC	message management container
OLR	OpenLR location referencing
PKI	parking information
PTI	public transport information
PTS	public transport information service
RDS-TMC	radio data system – traffic message channel
RMR	road and multimodal routes
RTM	road traffic message
SFW	TPEG service framework
SID	TPEG service Identifier
SNI	service and network information
SPI	speed information

TEC	traffic event compact
TFP	traffic flow and prediction
TISA	Traveller Information Services Association
TMC	traffic message channel
TPEG	Transport Protocol Expert Group
TPEG1	Transport Protocol Expert Group – Generation 1 (ISO 18234 series and ISO 24530 series)
TPEG2	Transport Protocol Expert Group – Generation 2 (ISO 21219 series)
TTI	traffic and traveller information
UBCR	UML to Binary Conversion Rules
UML	Unified Modelling Language
UMR	Unified Modelling Rules
UXCR	UML to XML Conversion Rules
VLI	vigilance location information
WEA	weather information

5 Application identification

In order to allow service providers to test new applications within an existing service multiplex, a Test AID is allocated for every application. All client devices shall ignore content flagged by a Test AID. The Test AID is calculated by setting the most significant bit, resulting in an addition of hex 8 000 to the AID. Service components signalled with an AID above 8 000 have, thus, to be ignored by production level devices and shall be used for technical tests only.

In TPEG2, the same application IDs are used, as within TPEG1, but not all applications that are existing as TPEG1 specifications are available as TPEG2 level specifications and vice versa. If there are specifications for applications within both series, the version numbers indicate which specification is applicable. For example, for TPEG-TEC version 3.0, ISO 18234 series version applies, but starting with version 3.2, ISO 21219-15 is applicable (see Annex A).

Table 1 shows AID numbers currently allocated.

Table 1 — Currently allocated AID numbers

AID number (hex)	AID number (decimal)	Application	Defined in TPEG 2 series
0000	0000	SNI application	yes
0001	0001	(historically allocated, reserved value)	no
0002	0002	(historically allocated, reserved value)	no
0003	0003	PKI application	yes
0004	0004	(historically allocated, reserved value)	no

Table 1 *(continued)*

AID number (hex)	AID number (decimal)	Application	Defined in TPEG 2 series
0005	0005	TEC application	yes
0006	0006	CAI application	yes
0007	0007	TFP application	yes
0008	0008	FPI application	yes
0009	0009	RMR application	yes
000A	0010	WEA application	yes
000B	0011	EMI application	yes
000C	0012	VLI application	yes
000D	0013	PTS application	yes
000E	0014	SPI application	yes
AID number (hex)		**Test application**	
8001		(historically allocated, reserved value)	
8002		(historically allocated, reserved value)	
8003		TEST: PKI application	
8004		(historically allocated, reserved value)	
8005		TEST: TEC application	
8006		TEST: CAI application	
8007		TEST: TFP application	
8008		TEST: FPI application	
8009		TEST: RMR application	
800A		TEST: WEA application	
800B		TEST: EMI application	
800C		TEST: VLI application	
800D		TEST: PTS application	
800E		TEST: SPI application	

6 Applications and bearers

The work item for the development of TPEG technology reflected the knowledge at that time about data bearer potential. As a result, the term “high data rate bearers” was used, but no specific definition was placed upon the words “high data rate”. However, by comparison with RDS-TMC running at approximately 80 bits/sec, TPEG technology was indeed aimed at much higher data rate bearers (around 8 kbits/s or higher). The “position” of TPEG technology in relation to data bearers is now better understood. Adaptation layer requirements for both DAB and the internet were described and successfully implemented for technical tests. The current development of TPEG technology will be excellently matched both technically and economically to DAB, DMB, HD radio and internet bearers.

Other bearers such as ARIB, ATSC and DVB can offer much higher data rates with economic and technical utility. However, these bearers are highly structured (layered) in their ability to handle transparent data services and they include mechanisms suitable for carousel delivery, which can require a different TPEG data structure before real transparency could be achieved.