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

Part 9: Service and network information (TPEG2-SNI)

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

Partie 9: Information de service et de reseau (TPEG2-SNI)

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

The committee responsible for this document is ISO/TC 204 *Intelligent transport systems*, in cooperation with the Traveller Information Services Association (TISA), TPEG Applications Working Group through Category A Liaison status.

ISO/TS 21219 consists of the following parts, under the general title *Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2):*

— *Part 1: Introduction, numbering and versions*

— *Part 2: UML modelling rules*

— *Part 3: UML to binary conversion rules*

— *Part 4: UML to XML conversion rules*

— *Part 5: Service framework*

— *Part 6: Message management container*

— *Part 9: Service and network information*

— *Part 10: Conditional access information*

— *Part 14: Parking information application*

— *Part 15: Traffic event compact*

— *Part 18: Traffic flow and prediction application*

— *Part 19: Weather information*

The following parts are under preparation:

— *Part 16: Fuel price information and availability application*

The following parts are planned:

— *Part 7: Location referencing container*

— *Part 20: Extended TMC location referencing*

— *Part 21: Geographic location referencing*

— *Part 22: OpenLR location referencing*

— *Part 23: Roads and multi-modal routes application*

— *Part 24: Light encryption*

— *Part 25: Electromobility information*

Introduction

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 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 parts of the ISO/TS 18234 series to provide location referencing.

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

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/TS 24530 series (now superseded) had a greater significance than previously foreseen; especially in the content-generation segment and that keeping two physical formats in synchronism, 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/TS 21219 series and it comprises many parts that cover 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 Parts 2, 3, 4 and the conversion to two current physical formats: binary and XML; others could 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, to minimize drafting errors, that forms the Annex for each physical format.

TPEG2 has a three container conceptual structure: Message Management (Part 6), Application (many Parts) and Location Referencing (Part 7). This structure has flexible capability and can accommodate many differing use cases that have been proposed within the TTI sector and wider 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:

— Toolkit parts: TPEG2-INV (part 1), TPEG2-UML (part 2), TPEG2-UBCR (part 3), TPEG2-UXCR (part 4), TPEG2-SFW (part 5), TPEG2-MMC (part 6), TPEG2-LRC (part 7);

— Special applications: TPEG2-SNI (part 9), TPEG2-CAI (part 10);

— Location referencing: TPEG2-ULR (part 11), TPEG2-ETL (part 20), TPEG2-GLR (part 21), TPEG2-OLR (part 22);

— Applications: TPEG2-PKI (part 14), TPEG2-TEC (part 15), TPEG2-FPI (part 16), TPEG2-TFP (part 18), TPEG2-WEA (part 19), TPEG2-RMR (part 23).

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 having both long-term, unchanging content and highly dynamic content, such as Parking Information.

This Technical Specification is based on the TISA specification technical/editorial version reference:

SP13006/3.2/001

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iBiquity Digital Corporation

6711 Columbia Gateway Drive, Suite 500

Columbia, MD 21046

USA

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

Part 9:
Service and network information (TPEG2-SNI)

1 Scope

This part of ISO/TS 21219 establishes the method of delivering service and network information within a TPEG service. The TPEG-SNI application is designed to allow the efficient and language independent delivery of information about the availability of the same service on another bearer channel or similar service data from another service provider, directly from service provider to end-users.

NOTE A number of tables of information are described, which provide comprehensive options for describing services, their timing, content, geographical coverage, etc. In all TPEG streams, it is mandatory to deliver to so-called GST. Additionally, it is possible to signal linkage of content between different bearers and services.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 21219-3, *Intelligent transport systems - Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 3: UML to binary conversion rules*

ETSI EN 300 401, *Radio broadcasting systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers*

ETSI/TS 101 759, *Digital Audio Broadcasting (DAB); Data Broadcasting — Transparent Data Channel*

IETF RFC 1738, Uniform Resource Locators (URL)[1)]

3 Terms and definitions

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

3.1
guide to the service tables
GST
basic *service* (3.10) information such as service structure, service timing and *content description* (3.4), etc.

3.2
fast tuning GST
FT-GST
directory of the *applications* (3.11) and *content* (3.12) of the *service* (3.10) that indicates in which components the relevant information can be found

Note 1 to entry: This contains the minimum set of information required for the acquisition of application data.

1) RFC 1738 can be found at http://www.ietf.org/rfc/rfc1738.txt

3.3
time schedule GST
TS-GST
indicates the operation times of selected *service components* (3.16)

3.4
content description GST
CD-GST
optional table that gives the textual descriptions of selected *service components* (3.16)

3.5
geographical coverage GST
GC-GST
optional table that defines the spatial range of selected *service components* (3.16)

3.6
service component reset GST
SCR-GST
optional table that is used by the *service provider* (3.14) to delete application-specific data older than a certain moment

3.7
conditional access information reference GST
CAI-GST
optional table that is used by the *service provider* (3.14) to indicate which *service component* (3.16) carries the CAI application data required to decode encrypted service components

3.8
versioning of TPEG applications GST
VER-GST
mandatory table that is used by the *service provider* (3.14) to indicate which version of the application specification the *service component* (3.16) complies to

3.9
number of messages within a TPEG service component
NOM-SIT
optional table that is used to transmit the number of messages currently available for each *service component* (3.16)

3.10
service
collection of different information streams [*applications* (3.11)] logically bound together and delivered from a *service provider* (3.14) to the end user

3.11
application
stream of information that by itself provides a benefit to (i.e. can be “applied by”) the end user

3.12
content
information inside an *application* (3.11)

Note 1 to entry: A *service* (3.10) may contain several instances of the same application type, each containing different content. Within an application, different content is labelled with a unique content ID (COID) specified by the originator of the content.

3.13
application instance
actual data stream containing *content* (3.12) as defined by an *application* (3.11)

3.14
service provider
organization that provides information a [*service* (3.10)] to end users and manages the *content* (3.12) of its service and decides whether a service is encrypted or not

Note 1 to entry: A service provider that generates the content of a service is called a service originator. A service provider that carries content generated by another originator is called the carrier. There is only one service originator of content, but there may be more than one service carrier.

3.15
content originator
original provider of an *application instance* (3.13)

Note 1 to entry: The content originator may distribute the *application* (3.11) data to different *service providers* (3.14). In some cases, the service provider generates its own application data and is therefore also the content originator.

3.16
service component
information stream [*application* (3.11)] that is part of a *service* (3.10)

Note 1 to entry: A TPEG stream is logically divided into parts known as service components. Each service component carries an *application instance* (3.13). 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 COID and AID in the TPEG2-SNI application.

3.17
service identification
worldwide unique identifier for a *service* (3.10)

Note 1 to entry: It consists of three elements called SID A, SID-B, SID-C (cf. subclause 0). These are allocated as described in ISO/TS 18234-2.

3.18
content identification
COID
identifier that is unique within a given *application* (3.11) and used to specify its *content* (3.12)

Note 1 to entry: The COID is defined by the originator of the content and is unique within a specific application. It is used for labelling the content of a component.

3.19
application and content identification
ACID
worldwide unique identifier that defines the *content* (3.12) of a *service* (3.10)

Note 1 to entry: The ACID is composed of the originator *service identification* (SID-A, SID-B, SID-C) (3.17), the *content identification (COID)* (3.18) and the *application identification (AID)* (3.20).

3.20
application identification
AID
identifier that specifies how to process TPEG *content* (3.12) and route information to the appropriate application decoder

Note 1 to entry: Each TPEG application has a unique number, which identifies the *application* (3.11) according to Clause 5. The application identification is part of the TPEG specification and is defined as and when new applications are developed.

3.21
service component identification
SCID
unique identifier that defines a service component within a *service* (3.10)

Note 1 to entry: The SCID is chosen by the carrier service provider and identifies a component, which itself has an ACID comprising originator SID, COID and AID. The same number may be used in a different service or, in the same service at a later time to identify a completely different combination of originator SID, COID and AID.

3.22
service table
table containing basic service information, such as service structure, service timing and *content description* (3.4), etc.

4 Abbreviated terms

AID	Application Identification
ACID	Application and Content Identifier
ADC	Application Data Container
CAI	Conditional Access Information
CEN	Comité Européen de Normalization
COID	Content Identification
DAB	Digital Audio Broadcasting
DARC	Data Radio Channel - an FM sub-carrier system for data transmission
DVB	Digital Video Broadcasting
EBU	European Broadcasting Union
ETSI	European Telecommunications Standards Institute
GST	Guide to Service Tables
INV	Introduction, Numbering and Versions (see TPEG2-INV - ISO/TS 21219-1)
IPR	Intellectual Property Right(s)
ISO	International Organization for Standardization
LHW	Local Hazard Warning
LRC	Location Reference Container
MMC	Message Management Container
OSI	Open Systems Interconnection
PTI	TPEG1-PTI Public Transport Information (see ISO 18234-5)
RTM	TPEG1-RTM Road Traffic Message application (see ISO 18234-4)
SCID	Service Component Identification
SFW	TPEG Service Framework: Modelling and Conversion Rules
SID	Service Identification
SIT	Service Information Table
SNI	Service and Network Information application (this Technical Specification)
STI	Status and Travel-time Information (proposed TPEG application)
tba	to be announced
TEC	Traffic Event Compact
TISA	Traveller Information Services Association
TPEG	Transport Protocol Expert Group
TTI	Traffic and Traveller Information

UML	Unified Modelling Language
UTC	Coordinated Universal Time
WEA	Weather Information Application

5 Application specific constraints

5.1 Application identification

The word “application” is used in the TPEG specifications to describe specific subsets of the TPEG structure. An application defines a limited vocabulary for a certain type of messages, for example, parking information or road traffic information. Each TPEG application is assigned a unique number, called the Application Identification (AID). An AID is defined whenever a new application is developed and these are all listed in TPEG2-INV.

The application identification number is used within the TPEG2-SNI application to indicate how to process TPEG content and facilitates the routing of information to the appropriate application decoder.

5.2 Version number signalling

Version numbering is used to track the separate versions of an application through its development and deployment. The differences between these versions may have an impact on client devices.

The version numbering principle is defined in TPEG2-SNI.

Table 1 shows the current version numbers for signalling SNI within the SNI application.

Table 1 — Current version numbers for signalling of SNI

Major version number	3
Minor version number	2

5.3 TPEG 1 binary compatibility of SNI

The UML model for this application has been modelled according to TPEG2-UBR. The XML physical format complies with the UXCR Specification TPEG2-UXCR and is hence fully TPEG2 compliant. For the binary physical format, the TPEG1 compliance was mandatory, to allow coexistence of TPEG1 and TPEG2 level applications within a single service. So it was not possible to completely follow the binary conversion rules specified in TPEG2-UBCR. Details are stated in Annex A.

5.4 TPEG Service Component Frame

SNI makes use of the “Service Component Frame with dataCRC and messageCount” according to TPEG2-SNI.

Each SNI component should appear only at most once in the SNI component frame.

5.5 Conceptual model — Multiplexed applications and services

Figure 1 illustrates the conceptual model of the SNI application.

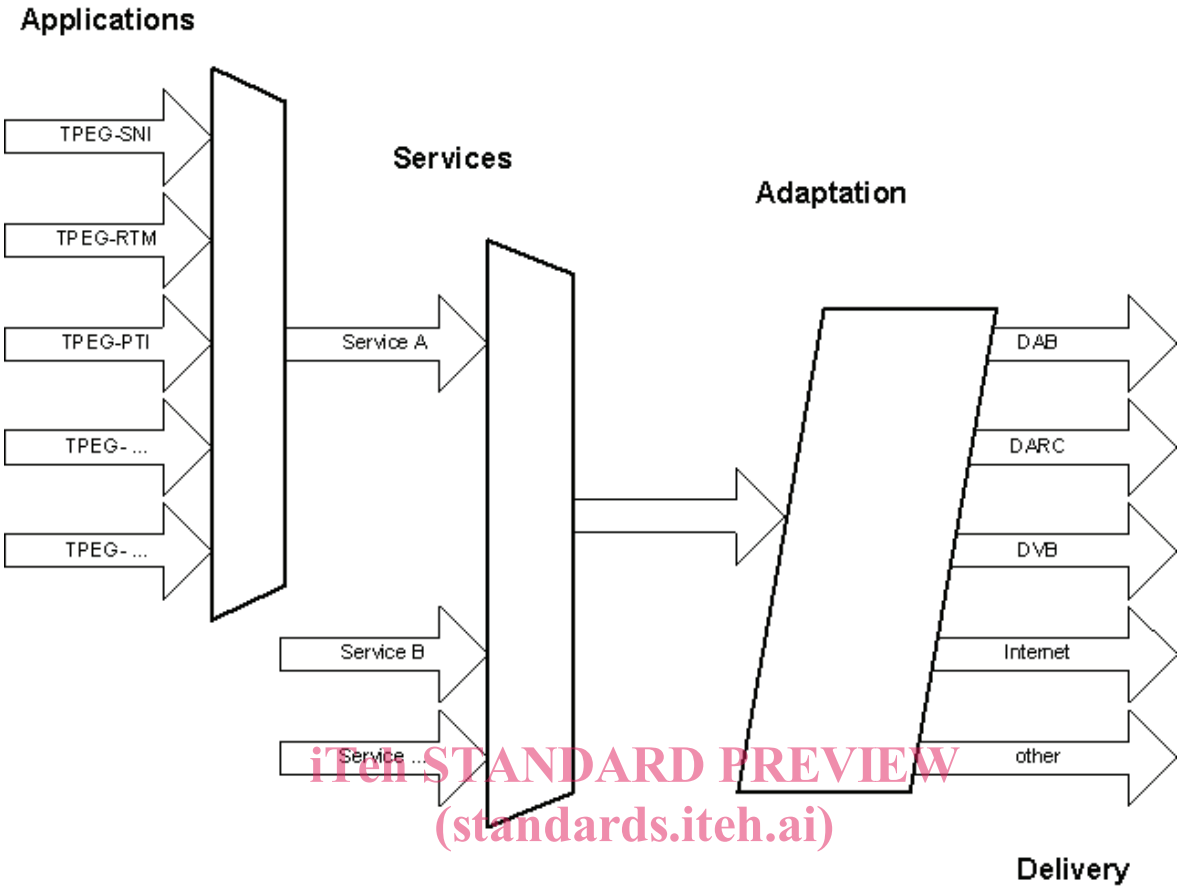
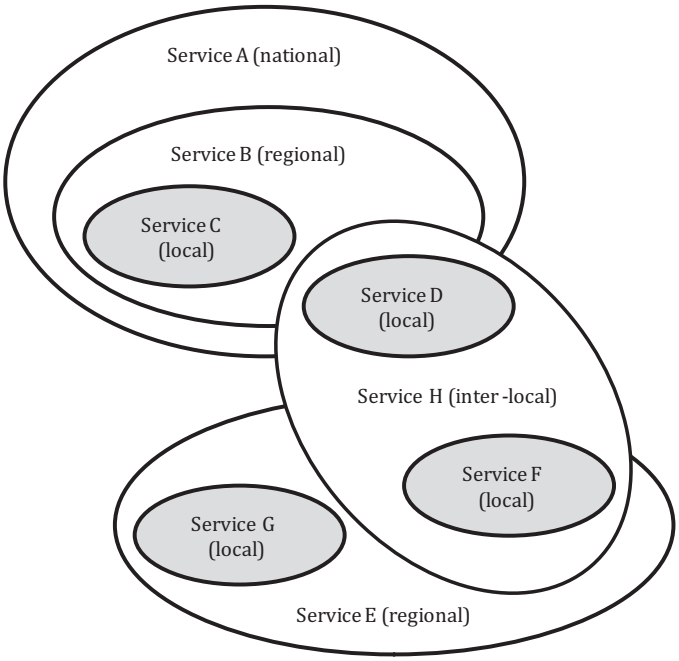


Figure 1 — Multiplexed applications and services

6 Design principle

6.1 Variable content referencing

Figure 2 contains a diagrammatic representation of the use of SCIDs in related services.



Key

Service A (national):	SCID: 02, 03, 04, 05	Bearer: ii and iii
Service B (regional):	SCID: 02, 03, 04	Bearer: iii
Service C (local):	SCID: 02	Bearer: i
Service D (local):	SCID: 03	Bearer: i
Service E (regional):	SCID: 06, 07, 08	Bearer: ii
Service F (local):	SCID: 06	Bearer: i
Service G (local):	SCID: 07	Bearer: i
Service H (inter-local):	SCID: 03, 06	Bearer: ii

Figure 2 — Diagrammatic representation of the use of SCIDs in related services

6.2 Example of the TPEG-SNI application in a TPEG data-stream

Figure 3 gives an example of the TPEG-SNI application in a TPEG data-stream.