



BSI Standards Publication

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

Part 2: UML modelling rules

National foreword

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

**Part 2:
UML modelling rules**

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

Partie 2: Règles de modelage UML



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Foreword

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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).

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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 expert group, generation 2 (TPEG2)*:

- *Part 2: UML modelling rules* [Technical Specification]
- *Part 3: UML to binary conversion rule* [Technical Specification]
- *Part 4: UML to XML conversion rules* [Technical Specification]
- *Part 5: Service framework* [Technical Specification]
- *Part 6: Message manager container* [Technical Specification]
- *Part 7: Location referencing container* [Technical Specification]
- *Part 18: Traffic flow and prediction application* [Technical Specification]

The following parts are planned:

- *Part 8: Introduction, numbering and version* [Technical Specification]
- *Part 9: Service and network information* [Technical Specification]
- *Part 10: Conditional access information* [Technical Specification]
- *Part 14: Parking information application* [Technical Specification]
- *Part 15: Traffic event compact application* [Technical Specification]
- *Part 16: Fuel price information application* [Technical Specification]

- *Part 19: Weather information for travellers application* [Technical Specification]
- *Part 20: Extended TMC locations for applications* [Technical Specification]
- *Part 21: Geographic location referencing* [Technical Specification]
- *Part 22: OpenLR-location-reference* [Technical Specification]

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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 may 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/WG 4, in conjunction with ISO/TC 201/WG 10, established a project group comprising members of the former EBU B/TPEG and they continued the work concurrently. 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

With the inauguration of the Traffic Information Services Association (TISA) in December 2007 derived from former Forums and the CEN/ISO development project group, the TPEG Applications Working Group took over development work for TPEG technology.

It was about this time that the (then) new Unified Modeling 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 realised 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 minimise 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.

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-FEP (Part 18), TPEG2-WEA (Part 19), TPEG2-RMR (Part 23)

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.

TPEG2 has been developed to be broadly (but not totally) backward compatible with TPEG1 to assist in transitions from earlier implementations, whilst 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.

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

Part 2: UML modelling rules

1 Scope

This Technical Specification specifies rules for the creation and extending of TPEG application UML models. The rules are intended to ensure that TPEG application UML models can be interpreted unambiguously for conversion to physical format representations. TPEG application UML models that are defined according to these rules may be used for automatic generation of TPEG standards and for automatic generation of TPEG application physical format descriptions.

This Technical Specification also specifies the preferred structure of TPEG application specifications.

The TPEG abstract data types and the set of TPEG tables of common use are specified in the annexes.

2 Terms, definitions and abbreviated terms

2.1 Terms and definitions

2.1.1

abstract data type

data type of atomic nature

2.1.2

attribute compartment

graphical section of a UML class box positioned directly under the class name compartment

2.1.3

class name compartment

top most graphical section of a class box defining the name of the class and optionally a stereotype, inherited class and package scope

2.1.4

data structure

data type being composed of other data types being either of abstract or complex data type, not having a component header, stereotyped as <<DataStructure>>

2.1.5

component

revisable, named, complex data type, not stereotyped as <<DataStructure>>

2.1.6

component header

data structure consisting of a component identifier, component length indicator and attribute length indicator