TECHNICAL SPECIFICATION

ISO/TS 18234-5

First edition
2006-06-01

Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams —

Part 5: Public Transport Information (PTI) application

Informations sur le trafic et le tourisme (TTI) — Messages TTI via les flux de données du groupe d'experts du protocole de transport (TPEG) —

Partie 5: Application d'information de transport public

Reference number
ISO/TS 18234-5:2006(E)

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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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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 18234-5 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

ISO/TS 18234 consists of the following parts, under the general title *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams:*

— *Part 1: Introduction, numbering and versions*

— *Part 2: Syntax, Semantics and Framing Structure (SSF)*

— *Part 3: Service and Network Information (SNI) application*

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

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

— *Part 6: Location referencing applications*

Introduction

The TPEG technology uses 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 information from the database of a service provider to an end-user's equipment.

This CEN ISO Technical Specification describes the Public Transport Information Application, its underlying data structure as well as the means of encoding and decoding hierarchically structured messages containing public (i.e. collective) transport information. This application is intended to provide service providers, including broadcasters, with a means to transmit to an end-user public transport related travel news. The scope of TPEG is intended to cover content as diverse as network disruption, cancellations and even aspects of timetable information.

Messages generated can be classified to fit into user perceived categories. The underlying data elements used for these classifications are taken from a superset that, the designers believe, is a complete set of elements needed to fully describe the broadest range of public transport information.

The Broadcast Management Committee of the European Broadcast Union (EBU) established 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. The 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 public specifications. Two documents were released. Part 2 (TPEG-SSF, CEN ISO/TS 18234-2) described the Syntax, Semantics and Framing structure, which will be used for all TPEG applications. Part 4 (TPEG-RTM, CEN ISO/TS 18234-4) described the *first* application, for Road Traffic Messages.

CEN/TC 278/WG 4, in conjunction with ISO/TC 204/WG 10, 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 have been developed to make the initial complete set of four parts, enabling the implementation of a consistent service. Part 3 (TPEG-SNI, CEN ISO/TS 18234-3)) describes the Service and Network Information Application, which is likely to be used by all service implementations to ensure appropriate referencing from one service source to another. Part 1 (TPEG-INV, CEN ISO/TS 18234-1) completed the work, by describing the other parts and their relationships; 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. Part 6 (TPEG-Loc, CEN ISO/TS 18234-6) is now a separate specification and is used in association with the other parts of CEN ISO/TS 18234 to provide comprehensive location referencing. Additionally Part 5, the Public Transport Information Application (TPEG-PTI, CEN ISO/TS 18234-5), has been developed and been through the commenting process.

This Technical Specification, CEN ISO/TS 18234-5, provides a full specification for the public (i.e. collective) transport information application. This document has been prepared by CEN/TC 278, *Road Transport and Traffic Telematics* in co-operation with ISO/TC 204, *Intelligent Transport Systems*.

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-PTI_3.0/001.

Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams —

Part 5:
Public Transport Information (PTI) application

1 Scope

This Technical Specification describes the Public Transport Information (PTI) Application, which is intended to cover all modes of public (i.e. collective) transport as well as inter-urban and intra-urban travel. The application is designed to allow the efficient and language independent delivery of public transport information directly from service provider to end-users.

The term “application” is used in TPEG specifications to describe specific applications, such as in this case the public transport information application, which comprises three information containers: the message management container, the application event container and the TPEG-location container. The first two containers are fully described herein and the TPEG-location container is described in CEN ISO/TS 18234-6.

Each TPEG Application (e.g. TPEG-PTI) is assigned a unique number that is called the Application IDentification (AID). An AID is defined whenever a new application is developed. The AID is used within the TPEG-Service and Network Information Application (CEN ISO/TS 18234-3) to indicate how to process TPEG content and allows routing of data to an appropriate Application decoder.

AID = 0002 (hex) is assigned to the TPEG-PTI application, described in this specification.

The TPEG-PTI application aims at describing “legs” of a journey also described as “rides” by other methodologies. However, it is important to note that TPEG-PTI is not limited to describing single services, because it also allows the more general description of route, service and area-wide problems.

Public (or collective) transport information is usually consumed in one of four principle ways as follows:

— Leader board information as used at stations or terminals;

— A report on the state of a network;

— The description of an individual service;

— As a news flash report.

The elements needed to provide information for any one of the four end-user presentation modes are largely the same. The end-user focus of TPEG applications makes it useful to be able to mimic presentations, to which end-users are accustomed, for example a railway station indicator board.

TPEG-PTI messages can therefore group data elements to present one of the following end-user presentation modes:

— Incident message report;

— Station/terminal information;

— Route information;

— Individual service information.

It is important to bear in mind that these end-user presentation modes are merely presentational aides; they have little to do with the content in the individual data elements. They do, however indicate how data elements must be grouped if a presentation in any of these views is intended. Unlike the TPEG-RTM application (CEN ISO/TS 18234-4), TPEG-PTI benefits from the nodal structure of public transport, making use of its discrete start, end and stopping points as well as being limited to fixed, be it real or virtual, routes.

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 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/TS 18234-1, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 1: Introduction, Numbering and Versions*

ISO/TS 18234-2, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 2: Syntax, Semantics and Framing Structure (SSF)*

ISO/TS 18234-6, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 6: Location referencing for Applications*

3 Terms and definitions

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

NOTE Definitions in this specification are in some cases derived from definitions found in the DATEX Data Dictionary (ENV 13106). TPEG-PTI is completely focussed at delivering messages to end-users, so for this key operational reason some definitions have a different meaning from that found in the DATEX Data Dictionary. These differences are highlighted in this section.

3.1
additional information (ADI)
a combination of several elements to allow making full use of media links and back channels and to facilitate the description of less common occurrences and allow the listing of emergency numbers. For the full use, it needs function types as defined in TPEG table pti30

3.2
brand name (BDN)
an element permitting the use of the name of the service type given by the transport operator, intended to provide a means of easy identification of a service by an end-user

EXAMPLE “InterCity”, “Thalys”, “Eurostar”.

3.3
booking status (BS)
BS is used to indicate availability of a particular service. It is used together with TPEG table pti24

3.4
cross reference information (CRI)
pointer to one or more messages in the same, or another, TPEG service

3.5
day types (DYT)
element used in conjunction with other time types, such as the timetable or the time types, to allow describing the day on which a service is available or withdrawn. They are listed in TPEG table pti34

3.6
event reason (ER)
ER permits the reason for an event to be added to a message. It is structured to reflect on four subtypes of reasons, whether it is general, personnel, equipment or environment. The lead table is TPEG table pti18; the subtypes are listed in TPEG tables pti19 to TPEG table pti22

3.7
interval time (IVT)
IVT allows the description of repeated events within a certain time frame, such as running a special service but only for a limited period. For example, an additional service may be added for a period of three weeks, but it only runs on Tuesdays and Thursdays, so the STA and STO will mark the period, but IVT will be needed to clarify the addition applies to specific days

3.8
location referencing
method for referencing locations to facilitate the exchange of location related information between different systems

3.9
message
collection of coherent information sent through an information channel

3.10
message expiry time (MET)
date and time in accordance with EN ISO 8601 when the message should be deleted from all TPEG-decoders (used for message management purposes)

3.11
message generation time (MGT)
date and time stamp in accordance with EN ISO 8601 originated at the actual time and point of message generation (used for message management purposes)

3.12
message identifier (MID)
unique identifier for a sequence of versions of one message relating to a particular event of a particular service component

3.13
message report type (MRT)
element to signal the type of message for presentation purposes. It may be an incident message report, station/terminal information, route information or individual service information, as defined in TPEG table pti27

3.14
predicted time (PSTA/PSTO)
predicted time is dynamic, representing actual timings combined with estimates taking into account real-time events with bearings on the operating schedule. To indicate this, the start and stop time elements are as defined below but are prefixed with “P”. See also scheduled time

3.15
route description point (RDP)
TPEG-Locs with additional flags to indicate whether they are start, end and stopping as well as non-stopping points. Types are listed in TPEG table pti15

3.16
scheduled time (SSTA/SSTO)
scheduled time indicates intended or planned timings, usually available in advance of a journey. To indicate this, the start and stop time elements are as defined below but are prefixed with “S”. See also predicted time

3.17
service condition (SCO)
a description of what is happening with a service, e.g. additional train, cancelled ferry. Elements are listed in TPEG table pti13

3.18
service delivery point (SDP)
element permitting the refining of the TPEG-Loc description of a place of service by adding information on terminal gate or platform number/section. The details are listed in TPEG table pti17. To indicate whether it is a scheduled or predicted SDP, it is associated with TPEG table pti16_01 for scheduled or pti16_02 for predicted

3.19
service facilities (SF)
element allowing the description of available amenities for a particular service. They are found TPEG table pti23

3.20
severity factor (SEV)
amount of disruption to traffic likely to be caused by a particular event

NOTE This definition varies from the DATEX Data Dictionary definition (ENV 13106).

3.21
start time (STA)
date and time in accordance with EN ISO 8601 at which an event, or status information, began or is scheduled to begin (used for presentation to the end-user)

NOTE This definition varies from the DATEX Data Dictionary definition (ENV 13106).

3.22
stop time (STO)
date and time in accordance with EN ISO 8601 at which an event, or status information, ended or is scheduled to end (used for presentation to the end-user)

NOTE This definition varies from the DATEX Data Dictionary definition (ENV 13106).

3.23
ticket restrictions (TR)
TR is used to indicate validity of ticket types on particular services. It is used together with TPEG table pti25

3.24
time types (TMT)
element used to distinguish between scheduled and predicted times, be they once or repeated. The details are listed in TPEG table pti28. To indicate whether it is a scheduled or predicted time, it is associated with TPEG table pti16_01 for scheduled or pti16_02 for predicted

3.25
timetable type (TTT)
TTT is used to indicate the timetable period to which reference is made. It is used together with TPEG table pti33

3.26
transport mode (TM)
element specifying the mode of transport, whether train, ferry or other. TPEG table pti01 contains the modes identified

3.27
transport operator (TO)
the name of the operator of a service

EXAMPLE SNCF, Eurolinies Maritimes, EasyJet.

NOTE The TO might also be the overall responsible organization, for example in “code-sharing” agreements.

3.28
transport operator subsidiary (TOS)
the name of the provider of a particular service, applicable if an operator has different divisions

EXAMPLE Cross Country, West Coast as part of the Virgin Group.

NOTE This would also apply to the particular service within a “code-sharing” agreement.

3.29
transport service ID (TSID)
a unique alphanumeric designation of a service

EXAMPLE A flight number or a train number.

3.30
transport submode (TSM)
TSM refines the notion of transport mode. It allows distinguishing between fast and stopping services, and urban services. They are defined in TPEG table pti02 to TPEG table pti12

3.31
transport service name (TSN)
the name of a service

EXAMPLE A ship’s name or Metro Line name such as Koningin Beatrix or Circle Line.

3.32
unverified information (UNV)
UNV indicates that a message includes information from an unverified source

3.33
version number (VER)
serial number to distinguish successive messages having a particular message identifier. Version numbers are used incrementally, allowing the progress of an event to be tracked from first notification (VER = 0), through updates, to eventual cancellation (VER = 255)

NOTE This definition varies from the DATEX Data Dictionary definition (ENV 13106).

4 Abbreviations

For the purposes of this Technical Specification, the following abbreviations apply in addition to the abbreviations given in section 3.

4.1
AID
Application Identification

4.2
BPN
Broadcast, Production and Networks (an EBU document publishing number system)

4.3
B/TPEG
Broadcast/TPEG (the EBU project group name for the specification drafting group)

4.4
CEN
Comité Européen de Normalisation

4.5
EBU
European Broadcasting Union

4.6
ETSI
European Telecommunications Standards Institute

4.7
ILOC
Intersection location

4.8
INV
Introduction, Numbering and Versions (see CEN ISO/TS 18234-1)

4.9
IPR
Intellectual Property Right(s)

4.10
ISO
International Organization for Standardization

4.11
OSI
Open Systems Interconnection

4.12
PTI
Public Transport Information

4.13
RDS-TMC
Radio Data System – Traffic Message Channel

4.14
RFU
Reserved for future use (not necessarily abbreviated)

4.15
RTM
Road Traffic Message application (see CEN ISO/TS 18234-4)

4.16
SNI
Service and Network Information application (see CEN ISO/TS 18234-3)

4.17
SSF
Syntax, Symantics and Framing Structure (see CEN ISO/TS 18234-2)

4.18
TPEG
Transport Protocol Experts Group

4.19
TTI
Traffic and Travel Information

4.20
UTC
Coordinated Universal Time

4.21
UAV
Unassigned Value

5 PTI application overview

5.1 Introduction

The TPEG Public Transport Information Application is intended to work across a wide range of TPEG-decoder types and a variety of presentational possibilities should be supported. All types of TPEG-decoders shall be supported simultaneously, from sophisticated agent TPEG-decoders, “thick clients”, serving navigation systems, through to simple TPEG-decoders, “thin clients”, only able to decode text-based information as well as software implementations running on computers and hand-held devices.

Some of the conceivable devices may include GPS receivers with and without a digital map, be fixed, like home receivers or in-vehicle systems. Some may be portable, such as the next generation of mobile phones or hand-held computers. There may even be applications that can be used in vehicles as part of the navigation system and outside on a stand-alone basis. Public Transport Information received by such devices may be presented to users through use of text, synthesized speech, graphically or may be used directly in route calculation or any combination of these.

Public transport information will need to include at least some of the following elements to enable a user to make decisions based upon the content:

— Who is affected?

— What is the location to which the information relates?

— Which route or area is affected?

— The event being described

— The severity of the incident

— Whether the information is verified

— The duration for which the message is valid

— Does the message refer to a regular or ‘one-off’ event

— Consequences of the incident on journey times

— Advice on alternatives

— Any additional information

5.1.1 Message considerations

While no message is likely to ever affect all who could receive it, some messages will apply to a larger number of travellers than others. The coding structure reflects this and the ability to appropriately filter, gives users control over the type and kind of information they wish to receive. For the selection process to be most useful it should work on as many elements as possible, including, attributes, locations, times and the severity of a message.

NOTE Part of each TPEG message is a location reference. TPEG technology uses one location referencing system across all Applications, known as TPEG-Loc (CEN ISO/TS 18234-6). This has the potential of enabling messages from different TPEG streams to be linked by their common location. Each message will be about a particular location. The location may be quite specific, a single point on the network, a segment between two given points, or it may be a more general area, often with more vague boundaries. The way in which the location is coded is important as it allows information to be filtered by TPEG-decoders and integrated with route planning and navigation systems.

The descriptive phrase and attribute part of the message about an incident allows a user to make a judgement about the likely progress of a journey, and may either directly or indirectly provide advice allowing travel plans to be revised. To allow appropriate decisions to be made, various data about the incident may be required. If for example, a problem occurs, in general the effect the incident causes will change over time. Immediately following the incident, there will be some disruption, this may initially increase, and then begin to lessen as the problem is cleared, and eventually the network will return to normal.

Each incident has a unique reference number (MID), and the changing progress of an incident is tracked by including a VER with each message. The service provider will allocate a new MID and VER = 0 for a new message, subsequent updates to the same event are indicated by allocation of the next higher VER. A MID and version number 255 has the effect of cancelling all earlier versions of the same message.

There are a few particular things to note about MID and VER.

The first is that VER do NOT “wrap around” from version 255 to version 0. In the unlikely event that more than 254 updates to a specific incident is required, service providers must generate a ‘new’ message, using a new MID (and VER = 0), and cancel the earlier message using Version number = 255. A public transport information message uses two mandatory elements: MID and VER=255, which, used in combination, cancels earlier sent messages with the same message ID.

The shortest non-cancellation message contains MID, VER, LOC and EVE; it should be noted that once a location reference is used, one or more corresponding event descriptions must be included.

The second thing to note is that a message identification number, once used, and then cancelled, must NOT be re-used until the longest time-period possible has elapsed. Ideally, a service provider should use all 65 535 possible message identification numbers before re-using a previously used MID.

This use of message identification numbers and version numbers will ensure that TPEG-decoders can unambiguously identify the latest versions of each road traffic message, even if messages are received by the TPEG-decoder 'out of sequence', when for example an earlier version of a message arrives after a subsequent version, which updates the information that was originally transmitted.

Message identifier and version are the two elements that are mandatory for every message. They are used for message management purposes in the user's TPEG-decoder, and are not intended for direct display to the user.

All other elements of a message are optional, used when appropriate. These include elements relating to time, the specific or general location to which the message relates, and which particular driving lanes or carriageway are affected. The service provider is also able to make a judgement on the severity of the effect the incident may have upon journey times, and whether an authoritative reporter has verified the information. As a result of a particular message, a user may wish to access more information, perhaps a suggested diversion route, or even to study alternative modes of transport. An easy means of accessing additional information, for example road traffic messages relating to an airport terminal, within a different TPEG application is provided with the cross-referencing information.

5.2 TPEG-message concept

TPEG Applications follow an overall concept, which is indicated by the diagrams in this section to give a quick and easily understood human concept, before a more technical description is given.

TPEG event messages may be seen as being built from three different parts, or containers, each with its own clear task: a message management container, an application event container (in this application, the PTI container) and a location container, a shown in Figure 1. (Location referencing details are described in TPEG-Loc (CEN ISO/TS 18234-6).

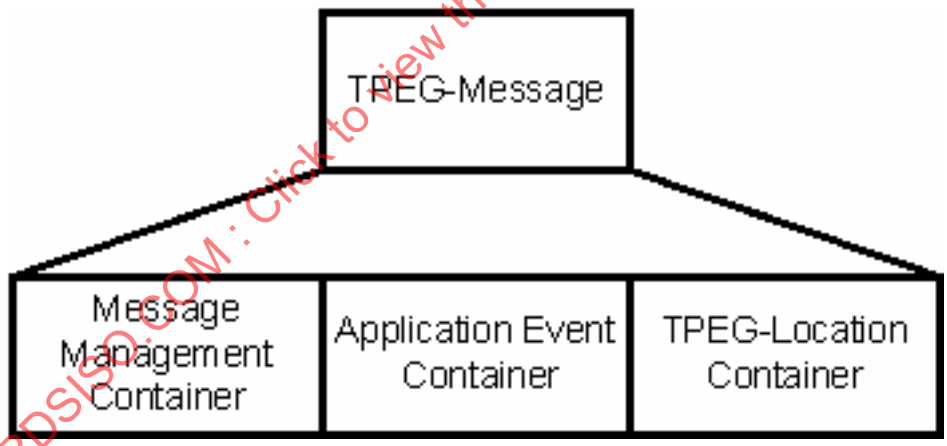

Figure 1 — The three containers

The message management container handles all the elements that allow message tracking, quick identification, validity and other "administrative" tasks. The elements in the application event container are used to describe, with the end-user in mind, the reason for the message, what has happened, and what an end-user may wish to know. The location container describes the location, route or an area for which the event message is applicable.

Regardless of delivery method, it is assumed that a TPEG decoder will "see" a number of TPEG-messages, one after the other, where they may be messages defined by one or more Applications. Figure 2 shows this concept where two applications: TPEG-PTI and TPEG-RTM (CEN ISO/TS 18234-4) messages are streamed together.

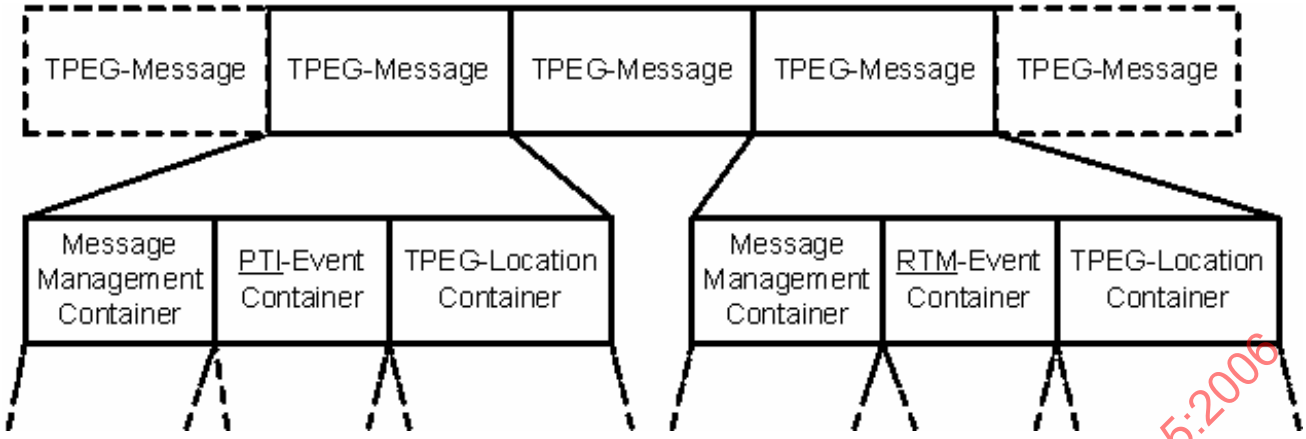

Figure 2 — TPEG-messages showing message management, event and location containers

Where a TPEG-message is one carrying traffic and travel information, Figure 2 also shows that it comprises three “containers”: one for the message management, one for event content (e.g. “Accident – Buses running slowly, etc.) and one for the location content (both machine readable and human understandable data).

5.3 TPEG-messages delivering additional information

TPEG-messages may also contain vital information for the full use of a service. For example, a special form of message which is only a message management container (without any associated location container) may be inserted to cancel an existing message (see 5.4.1). This concept is illustrated, in Figure 3.

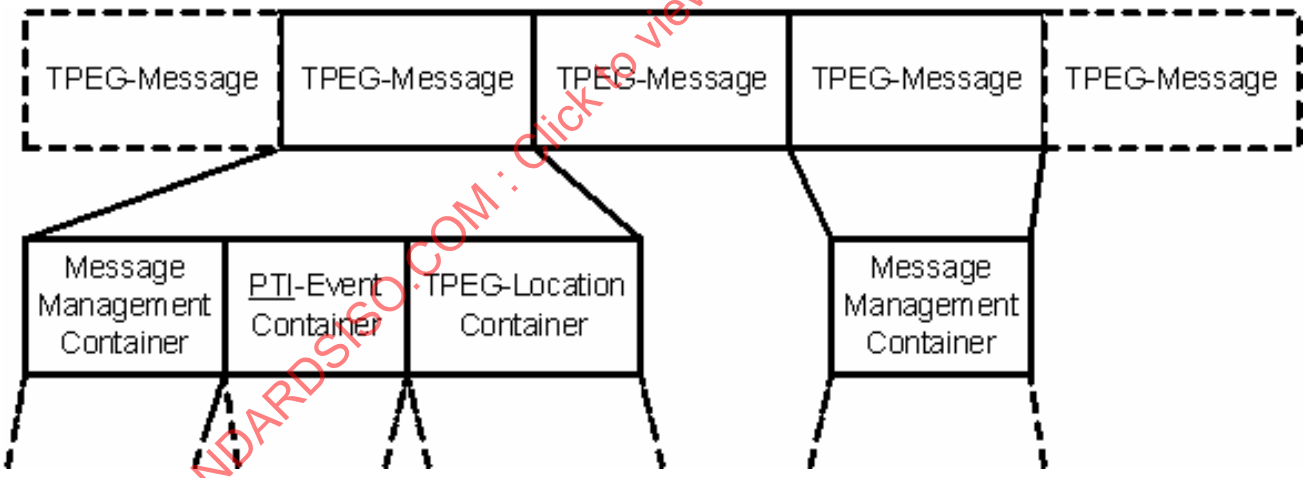

Figure 3 — Delivering additional non-message information

5.4 Elements of a TPEG public transport information message

Most elements of a public transport information are optional, sent only if specifically required. Thus a TPEG-message container may include various elements according to the following descriptions. Figure 4 shows a TPEG-PTI message, which has three containers.

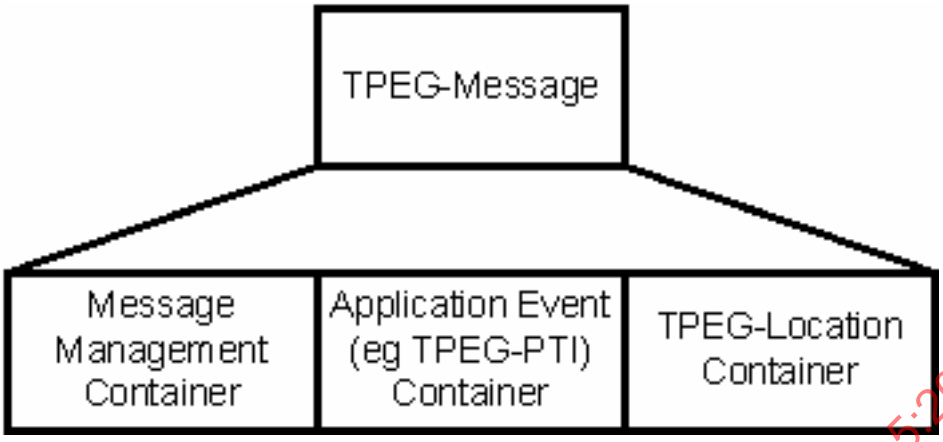

Figure 4 — TPEG-PTI message normally has three containers

5.4.1 Cancellation message

A special case, used to cancel an earlier message, only comprises the two mandatory elements, message identifier and version number = 255. Note it does not have an associated location container. This is shown in Figure 5.

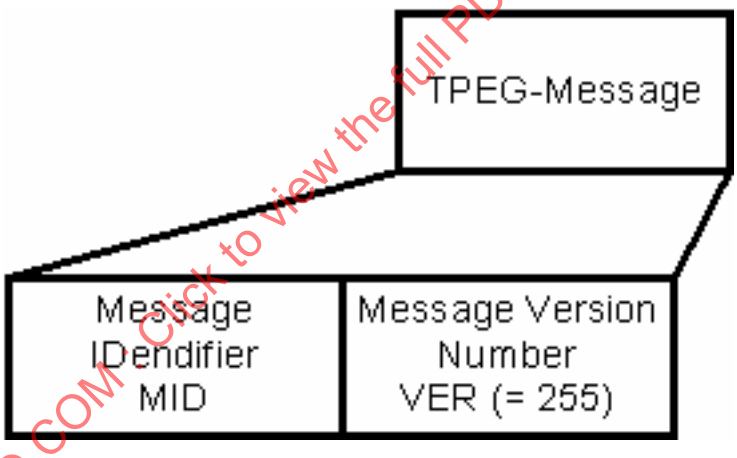

Figure 5 — Cancellation message

5.4.2 Short PTI-messages

Often a message will include only a few elements. The shortest, non-cancellation message may contain only four elements: MID, VER, EVE and LOC.

5.4.3 PTI-messages — All possible elements

The elements that describe the actual event are taken from the following list.

Their individual combination will reflect on the particular message report type that a service provider has chosen as the frame for generating the message. These elements form the set of elements needed to describe public transport information; subsets are presented to an end-user in one of these report types: incident messages, station/terminal information, route information or individual service information.

The elements are:

— TM: Transport Mode (TPEG table pti01)

— TSM: Transport Submode (TPEG tables pti02 to pti12)

— BDN: Brand Name (text string)

— TSID: Transport Service ID (TPEG table pti14 + text string)

— TSN: Transport Service Name (text string)

— TO: Transport Operator name (text string)

— TOS: Transport Operator subsidiary name (text string)

— SCO: Service Condition type (TPEG table pti13)

— SF: Service Facilities (TPEG table pti23)

— BS: Booking Status (TPEG table pti24)

— TR: Ticket Restrictions (TPEG table pti25)

— ER: Event Reason (TPEG tables pti18 to pti22)

— RDP: Route Description Point (TPEG table pti15 + TPEC-Loc)

— SDP: Service Delivery Point (TPEG table pti16 (scheduled or predicted) + pti17 + text string)

— TMT (Time Type): Time Information (TPEG table pti16 + pti28 + pti34 + time (EN ISO 8601))

— TTT: Timetable Type (TPEG table pti33)

— MRT: Message Report Type (TPEG table pti27)

— ADI: Additional Information: (TPEG table pti30 + loc41 + text string)

5.4.4 Declarative coding

NOTE Every TPEG-PTI element is declaratively coded, and therefore the order of the elements is not defined.

This method of coding allows a public transport information message to contain one or more event description elements, according to the need to describe various aspects of the event. For example an accident with appropriate detail and the resultant network performance with appropriate detail and a suggested diversionary route may be combined together within the same message.

5.5 Message management container

5.5.1 Message management container — Elements

Each TPEG-PTI message, in common with all TPEG messages, shall contain MID and VER and may contain the following elements:

— MID: message identifier

— VER: version number

— SEV: severity/priority

— UNV: verified/unverified

— STA: start time

— STO: end time - if unknown the element is not transmitted

— MGT: message generation time

— MET: message expiry time

— CRI: Cross Reference

5.5.2 Dates and times

Date and time references are included within the public transport information application to serve two distinct purposes. The first is for use by the TPEG-decoder, for both presentation to the user and for filtering of information. The second is essentially for message management, and is not intended for display to the end-user. Date and time should be expressed with an accuracy of ±1 second, referenced to Universal Co-ordinated Time (UTC) (EN ISO 8601).

NOTE For simplicity in reading this specification the complete phrase 'date and time' is often shortened to only: 'time'. It should be noted however that the coding algorithm for date and time always causes both date and time to be conveyed in a message.

All time (and date) elements within the message management container shall use UTC without local time offset.

5.5.2.1 Start and stop times

The most obvious use is when describing events with scheduled start and end times, for example the times during which a road is planned for closure for roadworks. Provision is made to specify both a start time and a stop time for each message. These times are intended for presentation to the user, and possibly may be used as an element in message filtering by the end user's TPEG-decoder.

In the case of a message relating to an unplanned incident, for example an accident, it may be unnecessary to specify a start time as the incident has already occurred. The end time of an unplanned incident is likely to change over the lifetime of a message, since it may not be known with any certainty, sometimes it may be difficult to specify a stop time.

5.5.2.2 Message expiry time

Another use of time information is for message management purposes.

A mechanism is required to ensure that old messages are eventually purged from TPEG-decoders. This is because there is no guarantee that, once a TPEG-decoder has received a message, it will receive an update message, or cancellation message. A service provider sending the message expiry time to detail when the TPEG-decoder should delete a message will therefore achieve message purging. The message expiry time is not presented to the end-user; it is only for message deletion purposes in the TPEG-decoder.

Another means of deleting messages is possible with the service component reset (SCR) feature provided in the TPEG Service and Network Information (SNI) Application, (CEN ISO/TS 18234-3). Use of SCR by a service provider is optional. The service component reset is delivered in the guide to the service table for a specific service component used for the PTI application. On receipt of the SCR for the PTI application, the TPEG decoder knows that all messages older than the <time_t> value in the SCR table are no longer valid. Hence the SCR feature provides the ability for a service provider to delete several messages with a single

command, as may exceptionally be required in order to reset the message stock following a major problem with the message generation system.

5.5.2.3 Message generation time

A message generation time may also be included with each message. This is not intended for display to the end-user, as its primary purpose is to enable a service provider to track a message through the distribution and broadcast infrastructure from end-to-end.

If a service provider intends to make use of the service component reset feature (see 5.5.2.5) provided by the Service and Network Information (SNI) Application (CEN ISO/TS 18234-3), the inclusion of the message generation time with every non-cancellation (MID and VER = 255) message is mandatory.

5.5.2.4 Time schedule information

For certain types of messages there is a need to give a schedule for when the event takes place. For single events this time information can be handled by the start and stop time functionality but for certain types, for example a schedule for the opening times of a tunnel or alternative starting times for convoy driving there is a need to be able to send schedules for the events. These times are intended for presentation to the user.

5.5.2.5 Service component reset

Another means of deleting messages is possible with the service component reset (SCR) feature provided in the Service and Network Information (SNI) Application (CEN ISO/TS 18234-3). Use of SCR by a service provider is optional.

The service component reset is delivered in the guide to the service table for a specific service component used for the PTI application. On receipt of the SCR for the PTI application, the TPEG decoder knows that all messages older than the <time_t> value in the SCR table are no longer valid. Hence the SCR feature provides the ability for a service provider to delete several messages with a single command, as may exceptionally be required in order to reset the message stock following a major problem with the message generation system.

5.5.3 Public transport information effect and reliability

Public transport information essentially contains two primary pieces of information: what has occurred, and where. For an end-user or agent system to make judgements about the effect on travel, it is often necessary to provide further information. A service provider may optionally provide additional information.

5.5.3.1 Severity factor

A major factor in accessing which messages to present is how seriously the incident is likely to affect the journey. This is a judgement that can only be assessed by the service provider who will choose one of the levels to represent the disruption to travel. The severity factor is determined by the service provider to reflect an editorial judgement to represent the disruption to travel. The severity factor is likely change over the lifetime of an event as it develops.

The severity factor may be one element that is assessed and used by broadcast systems and bearers to determine message repetition rates, or even which messages to ignore entirely should the total number of messages exceed capacity on lower data-rate bearers.

This element is provided for filtering purposes by a TPEG-decoder, for example it might be useful for an end-user to only be alerted if messages surpass a minimum level of severity.

5.5.3.2 Unverified information

Although most service providers compile information received from reliable sources, on occasion, due to the potential importance of the information, it may be appropriate to send a message about an incident that has not yet been verified. A particular message may be coded to indicate to the end-user that it has not yet been verified. The TPEG-decoder should present the information to the end-user, indicating that the message has not been verified.

5.5.4 Cross-reference information concept

Transport Infrastructures are complex and a single incident may have a profound affect on the performance of many different parts of the infrastructure. Cross-reference information (CRI) is designed to provide a connection to other messages. Although this should work across all TPEG applications, here it will only be described as a part within the TPEG-PTI application. Two types of links are envisaged: a message link to a particular version of another and a message link to all versions of the other. In addition, elements in TPEG table pti31 allow the identification of the type of hand-over from the source message to the target message, examples are “alternative” service, “connection held” or “status of connection undecided”.

CRI is a link to a particular MID or those elements needed to pick out any messages to which the current message is referring, i.e. within the same TPEG-PTI stream or other TPEG component elements, (e.g. TPEG-RTM messages) within the same TPEG service.

5.6 Application event (PTI) container

A major objective of service providers in the development of intelligent information systems has been the ability to present descriptions of public transport information to end-users, independent of language. Currently the most suitable method of achieving this essential objective is to use a standardized catalogue of descriptive words or phrases each represented by a short-form code. A TPEG-decoder interprets this code by reference to a stored table, and it can then present the phrase appropriately to the end-user. Presentation can be verbal or in written text form in a language determined by the user, or represented symbolically by an icon.

In TPEG-PTI, the entire event information is built up using descriptive “words” or brief concept descriptions, with numeric and other quantifiers and qualifiers, selected from a hierarchical classification structure.

Level one classes in TPEG-PTI, such as <mode_of_transport>, <message_report_type> and <service_information>, denote principle categories which group relevant content descriptions. They are intended to present an end-user with an *overview* of the message. In most cases level one classes have sub-divisions allowing for further refining the relevant descriptions. This methodology enables a service provider to deliver information to a degree to which details are available and are judged useful or relevant. At the other end of the delivery chain, a TPEG-decoder is equally able to present available information to the level required.

This concept of a message using several levels may be illustrated by considering this example of a message:

EXAMPLE

“A landslide is blocking a railway line”

Level 1 Route Description
Level 1 Railway Service
Level 2 Cancelled
Level 3 Environment Event
Level 4 landslide

The minimal element in the example would tell a TPEG-decoder that there was a railway route message. The next level would then add the fact that services were cancelled. An additional detail such as the problem was environmental and in fact a landslide could be discovered by looking at further refining levels.

Suppliers of TPEG-decoders have the freedom to present information to whatever level they feel appropriate; any may choose different levels for different aspects of the message. A service provider, similarly, can

choose the amount of detail to send. The hierarchical approach is useful for distribution on bearers of different capacity. High capacity ones may carry all levels of the message, whilst lower ones may carry fewer levels, but still retain the essential (top level) elements of a message.

The hierarchical coding structure is future-proof, since it allows a new message component to be added and used by a service provider. Existing TPEG-decoders, although not able to decode it, can represent the message component fully to one level higher.

The method also results in efficient coding where many of the event tables can be used under several level-one class messages. This reduces the number of reference tables that need to be stored in the TPEG-decoder.

TPEG-PTI event container elements make use of an extended time format. It shall use UTC plus local time offset in the form: "yyyy-mm-ddThh:mm:ss ± local offset". This is delivered as a text string, to present local time to the end-user.

5.7 Location referencing

Messages relate to real-world objects that are called locations. Each message requires a description of the location, to which the message relates. TPEG-decoders without navigational systems or digital maps will require the location to be expressed as character strings, using familiar place names such as town names, rail terminals or airport names to be presented either as text or speech to the end user. Intelligent systems, such as digital mapped-based TPEG-decoders, require the location information to be expressed in a machine-readable coded form.

Within the “location co-ordinates” elements, TPEG-Loc combines both requirements in a way that permits machine interpretation while simultaneously ensuring useful, human understandable, analogues are available. The specification for location referencing is fully described in TPEG-Loc (CEN ISO/TS 18234-6).

6 PTI container

6.1 Structure of public transport information

Here follows an indication of the structure of a TPEG-public transport information message in a hierarchical sense and an “internal hierarchical index” to the message content — message management, event description — structures and finally coding, for the message management and PTI-event containers, as shown in Figure 6.

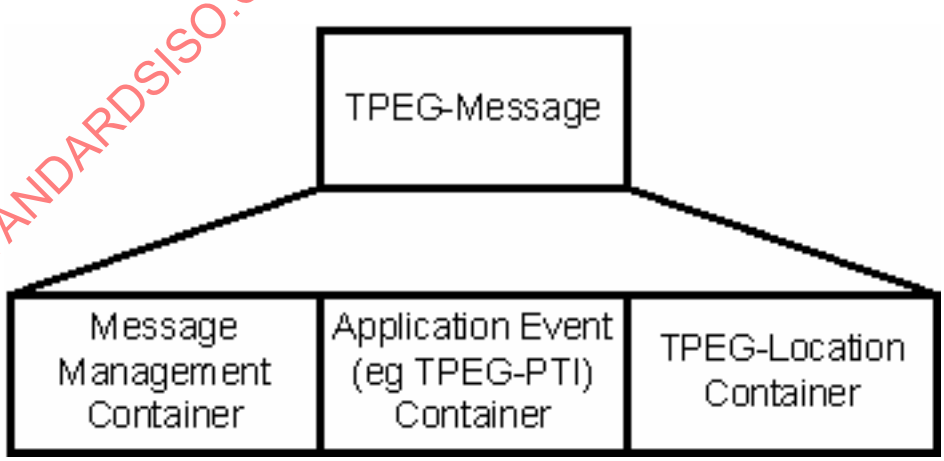

Figure 6 — TPEG-PTI message containers

MANDATORY ELEMENTS

public_transport_information (message_id, version_number,[ ]..) : Section 7

DATE AND TIME ELEMENTS

message_generation_time	: Section 7
start_time	: Section 7
stop_time	: Section 7
message_expiry_time	: Section 7

EFFECT AND RELIABILITY ELEMENTS

severity_factor	: Section 7
unverified_information	: Section 7

LOCATION ELEMENTS

TPEG-Loc	(CEN ISO/TS 18234-6)

EVENT DESCRIPTIVE ELEMENTS

transport_mode	: Section 8.2.1
service_information	: Section 8.2.2
message_report_type	: Section 8.2.3
additional_information	: Section 8.2.4

CROSS REFERENCE ELEMENT

cross_reference	: Section 8.7.5

6.2 Notation

The structure of public transport information application is developed in a stylized indented form which shows the hierarchy of the various data structures, the sub-components which are required and those which are optional and repeatable.

An example will serve to illustrate the concept:

Rail Information (Date, Time)

Date (year, month, day)

Time (hour, minute, second)

In the example, the data structure called ‘Rail Information’ has two components, ‘Date’ and ‘Time’.

Date is itself composed of components ‘year’, ‘month’, and ‘day’. Similarly, ‘Time’ is composed of components ‘hour’, ‘minute’, and ‘second’.

It may be that it is not strictly necessary to include Time in every Rail Information. Furthermore, when Time is included, the third field may not be necessary. To illustrate this, the data structures can be written thus:

Rail Information (Date, [ ] ..)

Time (hour, minute, [ ]..)

second

Date (year, month, day)

The square brackets in the rail information structure indicate where optional elements listed directly below may be included. These options are indented. In the example, there is only one option, that of 'Time'. Time itself has two fixed elements, and one optional element. The only option is 'Second', which is shown indented. The data structure 'Date' is separate.

Taking this concept further, it can be shown that both date and time may be designed as options in the rail information structure, year and month within date and minutes and seconds within Time.

Rail Information ([ ] ..)

Date (year, [ ]..)

month

day

Time (hour, [ ]..)

minutes

seconds

6.3 PTI application component frame

6.3.1 Coding syntax and semantics

The public transport information application is coded according to the syntax and semantics described in TPEG-SSF (CEN ISO/TS 18234-2).

6.3.2 Component frame

Section 6.3.3 defines the public transport information application component frame. The service component id (scid) is allocated dynamically by the TPEG-SNI application, as described in TPEG-SNI (CEN ISO/TS 18234-3).

Each <public_transport_information> element should only occur at most once, in the component frame.

The CRC check of the n* <public_transport_information> is two bytes long, and is based on the ITU polynomial $x^{16} + x^{12} + x^5 + 1$. The PTI Component Data CRC is calculated from all the bytes of the PTI Component Data (i.e. n * <public_transport_information>), including the "Number of PTI messages" field. The calculation of the CRC is described in Annex C to TPEG-SSF (CEN ISO/TS 18234-2).

6.3.3 Coding of the PTI application component frame

<component_frame(x)>:=	: Public Transport Information Application
<intunti>(scid)	: Service Component Identifier (scid = x)
<intunli>	: Length of application data in bytes
<crc>	: Header CRC : Application Data
<intunti>(n)	: Number of PTI messages
n * **<public_transport_information>**	: Public Transport Information messages
<crc>	: CRC check of all messages

7 Message management container

7.1 Mandatory elements

A public transport information message consists of at least two mandatory elements, the message identifier and a version number.

7.1.1 Message identifier (MID)

The message identifier is described in 3.12.

message_id (number)	{range: 0 .. 65535}

7.1.2 Version number (VER)

The version number is described in 3.33.

version_number (number)	{range 0.. 255}

7.2 Date and time elements

Date and time elements are described in 3.

In the case of MGT, STA, STO, and MET they are coded as described in TPEG-SSF (CEN ISO/TS 18234-2)

In other cases date and time elements are given as text strings in the form: “yyyy-mm-ddThh:mm:ss ± local offset”.

7.2.1 Message generation time (MGT)

The message-element message generation time is described in 3.11.

message_generation_time (date and time)	{resolution: seconds}

7.2.2 Start time (STA)

The message-element start time is described in 3.21.

start_time (date and time)	{resolution: minutes}

7.2.3 Stop time (STO)

The message-element stop time is described in 3.22.

stop_time (date and time)	{resolution: minutes}

7.2.4 Message expiry time (MET)

The message-element message expiry time is described in 3.10.

message_expiry_time (date and time)	{resolution: seconds}

7.3 Severity and reliability elements

7.3.1 Severity factor (SEV)

The message-element severity factor is described in 3.20.

severity_factor (number) {range: see TPEG table pti26}

If the severity factor element is not sent, 'unspecified' should be assumed: this equates to code 255 in TPEG table pti26.

7.3.2 Unverified Information (UNV)

The message-element Unverified information is described in 3.32.

Unverified_information (number) {range: see TPEG table pti32}

If the Unverified Information element is not sent, 'verified' should be assumed: this equates to code 255 in TPEG table pti32.

7.4 Coding of the message management container

7.4.1 Public transport information

<public_transport_information> =	
<intunli>(mid)	: Message ID
<intunti>(ver)	: Version number
<intunli>	: Number of bytes following the length indicator
<bitswitch>(selector)	: Message elements supplied
if (selector = xxxxxxx1) **<time_t>**	: Message generation time
if (selector = xxxxxx1x) **<time_t>**	: Start time
if (selector = xxxxx1xx) **<time_t>**	: Stop time
if (selector = xxxx1xxx) **<time_t>**	: Message expiry time
if (selector = xxx1xxxx) **<pti26>**	: Severity factor, see TPEG table pti26
if (selector = xx1xxxxx) **<intunlo>**	: Reserved for future use
if (selector = x1xxxxxx) **<pti32>**	: Unverified information, see TPEG table pti32
if (selector = 1xxxxxxx) **<pti_components>**	: Public transport information components

7.4.2 PTI components template

<pti_components>:=	
<intunti>(n)	: Number of components
n * <pti_component()>	: Public transport information component

7.4.3 PTI component template

<pti_component(x)>:=	: Public transport information component template
<intunti>(id),	: Identifier (id)
<intunli>(n),	: Length, n, of component data in bytes
n * **<byte>;**	: Component data

7.4.4 PTI component – TPEG-Loc link

<pti_component(B0)>:=	: TPEG-Location Referencing (see TPEG-Loc)
<intunti>(id),	: Identifier, id = B0 hex
<intunli>(n),	: Length, n, of component data in bytes
<tpeg_loc_container>;	: TPEG-Location Container

8 Event container

8.1 Event description

The event description uses a hierarchical approach to define events in a number of levels, which allow recursive coding. Top level classes have been chosen to ensure that TPEG-decoders can obtain the maximum amount of useful information from only level one data. The following elements are top level classes, that is, they constitute a minimum of information that can usefully be delivered to an end-user client. Level one classes are chosen to enable end-user filtering and to ensure that TPEG-decoders can obtain the maximum amount of useful information from, only, level one data.

8.2 Level one classes and their descriptions

Public transport information can often be complex, consisting of a number of separate messages connected together in specific ways.

8.2.1 Transport mode (TM)

The transport mode element is to allow end-user filtering on the different types of public or collective transport.

8.2.2 Service information (SINF)

Service information, while a level one class, does benefit dramatically from further details, specified by elements of sub-classes. Service Information identifies and describes the service. Identification includes the service ID, service name and operator names. Descriptive elements include the condition of a service, the facilities available, booking and ticket status, any event details and details of the route and times.

One sub-class type provides time details, in many cases these are essential to identify a particular service.

8.2.3 Message report type (MRT)

The message report type is an element for the decoder to present information in the way intended by the service provider. The type of information can be an incident report, station leader board listing or route and service specific information.

8.2.4 Additional information (ADI)

Additional information allows the display of further information, such as telephone numbers and enabling use of multimedia links. This is compound information made up of several elements such as language codes and function types as specified in TPEG table pti30.

8.3 Sub-level classes

To provide additional granularity for a message, top level classes can have sub-classes or lower level elements.

8.3.1 Transport submode (TSM)

Sub-level classes within the Transport Mode top level class include the Transport submode (TSM) — a more detailed description of the kind of transport that is at issue. The element is taken from TPEG tables pti02 to pti12.

The Transport submode type allows users to identify the type of service. To identify a service, several means are used either independent or in combination. These include a transport service ID, such as a flight number or a service name, such as the name of a ferry.

The transport service ID, is essential to avoid mix-ups and confusion for the user. Many services might have the same destination, but the user may only be permitted to use one particular service. This is usually true in the world of aviation. Many planes fly to Rome, but passengers may normally only use the flight for which they have a valid ticket, the flight itself is identified by its flight number.

8.3.2 Brand name (BDN)

The Brand Name allows the identification of transport mode by reference to an advertized brand such as “Skytrain”, which is part of a multimodal journey, checked in for a flight, but the referenced segment is actually a short rail connection.

8.3.3 Transport service ID (TSID)

Transport Service ID provides an additional means of identifying a service through its reference, such as a named route in the case of maritime services or the use of an alpha-numeric code in the case of aviation services.

8.3.4 Transport operator (TO)

The operator is the company who operates the service. An example in the UK is the “GNER” service along the East Coast Mainline. It is provided by trains leased from a third company, on tracks owned by “Network Rail”, but the service provider in the PTI sense is “GNER”. In the case of an alliance, it will be the operator who *actually* provides the service not the alliance partner. The operator is not necessarily the same as the company selling the ticket, especially in the case of alliances.

8.3.5 Transport operator subsidiary (TOS)

With “code-sharing” commonplace in some industries and in others with a number of different subsidiaries of one large company providing different services, it is necessary to use a further layer that will allow users to filter according to their specifications as well as distinguishing services more clearly.

8.3.6 Other service related information

8.3.6.1 Event reason (ER)

The event reason element will provide the “why” of any information.

8.3.6.2 Route description point (RDP)

The route description point will allow a user to filter on messages based on any number of locations where a service might or might not be available. For greater granularity, the service delivery point permits differentiating between a scheduled or predicted delivery point.

8.3.6.3 Time type (TMT)

The time type is used to describe time information to distinguish between scheduled and predicted times. The former being a static, planned time while the second is dynamic and reflects the current conditions. Elements of TPEG tables pti 16, pti28 and TPEG table pti34 are used to signal these parameters.

Times are either fixed start and end times or interval periods depending on what information is most appropriate.

8.3.6.3.1 Scheduled start time: SSTA

The message-element scheduled start time is described in 3.16

start_time (date and time) {resolution: minutes}

8.3.6.3.2 Predicted start time: PSTA

The message-element Predicted Start Time is described in 3.14

start_time (date and time) {resolution: minutes}

8.3.6.3.3 Scheduled stop time: SSTO

The message-element Scheduled Stop Time is described in 3.16

stop_time (date and time) {resolution: minutes}

8.3.6.3.4 Predicted stop time: PSTO

The message-element Predicted Stop Time is described in 3.14

stop_time (date and time) {resolution: minutes}

8.3.6.3.5 Interval time: IVT

The message-element Interval Time is described in 3.7

Interval_time (date and time) {resolution: minutes}

8.3.6.4 Service delivery point (SDP)

End users will benefit from information such as platform number, boarding gate and harbour pier, to be able to identify their service interests. In many cases it will be useful to indicate if the scheduled delivery point will be the actual or predicted one.

8.3.6.5 Service condition (SCO)

It is probably important for an end-user to know the current condition of a service. The service condition element provides information such as delayed, cancelled and replacement transport.

8.3.6.6 Service facilities (SF)

The service facilities element enhances the information by describing a service more fully, for example it is possible to indicate whether a service can be used by disabled people or travellers with bicycles.

8.3.6.7 Booking status (BS)

The booking status element indicates whether a service is fully booked or there is space is available.

8.3.6.8 Ticket restrictions (TR)

Ticket restrictions indicate permitted ticket types for a particular service.

8.3.6.9 Timetable type (TTT)

The timetable type is used for indicating what timetable is underlying the current operation, i.e. summer timetable, winter timetable or emergency timetable. This is particularly useful when timetable changes need to be signalled.

8.3.7 Message report type (MRT)

The message report type indicates the end-user presentation mode the service provider has used to compile the PTI message. It is used together with TPEG table pti27 and contains: incident message report, Station/terminal information, route information and individual service information. The message report type can further be used to indicate which timetable is applicable.

8.3.7.1 Incident message report

When the incident message report is signalled, a limited set of the TPEG-PTI event elements may be used. This viewpoint allows a service provider to give information where details are limited or the impact of the message is very large.

8.3.7.2 Station/terminal information

When station/terminal information is signalled, the service provider's intention is to provide "leader board" type information. The focus lies with providing information to and from a fixed point.

8.3.7.3 Route information

A service provider may signal route information when dealing with information concerning part or all of a transport network. As messages of this type affect more than one service it is important to know which mode and submodes are affected, it could be that only suburban rail services are affected. With the operator and sub-operator elements the same applies.

8.3.7.4 Individual service information

Using individual service information, a service provider can describe an event affecting an individual service.

8.4 End-user presentation modes

The following sections describe the methodology for delivering one of the four specific presentation modes, which have been selected to supply PTI information to the end-user client.

8.4.1 Incident message report

When the incident message report is signalled a limited set of the TPEG-PTI event elements may be used. This report allows a service provider to give information where details are limited or the impact of the message is very large.

EXAMPLE An example message may deliver the following information:

"Report of a bomb explosion at Ulm Railway station in Germany. There is also an emergency phone number for German speakers."

This information is likely to contain, at least, the following elements and values to be used within the three containers described in 6.1:

MID=395
VER=1
SEV=4
STA:2001-11-14T08:15
MGT:2001-11-14T08:15
TPEG-Loc: eg DE, Bayern, Railway Station: Ulm
SSTA, scheduled start time: Event Start Time (TPEG table pti16_1 + pti28_3): 2001-11-14T08:15+01:00
TM, transport mode: Rail
SCO, service condition: no service (TPEG table pti13_5)
TO, transport operator: Die Bahn
ER, event reason: bomb explosion (TPEG tables pti18_1 + pti19_2)
MRT, message report type: incident (TPEG table pti27_1)
ADI, additional information: (TPEG table loc41_40 + pti30_2) Info Phone Number +49 1234 234 234

8.4.2 Station/terminal information

When station/terminal information is signalled, the service provider's intention is to provide "leader board" type information. The focus lies with providing information to and from a fixed point.

EXAMPLE An example message may deliver the information on services at Ulm railway station. This information is likely to contain, at least, the following elements and values to be used within the three containers described in 6.1:

MID=421
VER=3
SEV=1
STA: 2001-11-14T08:50
STO: 2001-11-14T12:30
MGT: 2001-11-14T07:03
TPEG-Loc: eg DE, Bayern, Railway Station: Ulm
TM, transport mode: Rail
TSM, transport sub mode: Long Distance
SCO, service condition: on time (TPEG table pti13_9)
TSID, transport service ID: IC903
TSN, transport service name: Thomas Alvar Edison
TO, transport operator: Die Bahn
RDP, Route Description Point: Start (TPEG table pti15_1) + TPEG-Loc: Stuttgart
TMT: Scheduled departure (TPEG table pti16_1 + pti28_2) 2001-11-14T06:03+01:00
SDP: Scheduled Platform (TPEG table pti16_1+ pti17_1) 5a

SDP: Predicted Platform (TPEG table pti16_2 + pti17_1) 8b
RDP, Route Description Point: End (TPEG table pti15_2) + TPEG-Loc: München
TMT: Scheduled arrival (TPEG table pti16_1 + pti28_1) 2001-11-14T10:03+01:00
TMT: Predicted arrival (TPEG table pti16_2 + pti28_2) 2001-11-14T11:00+01:00
RDP, route description point: Stopping (TPEG table pti15_3) + TPEG-Loc: Augsburg
RDP, route description point: Stopping (TPEG table pti15_3) + TPEG-Loc: Pasing
SF, service facilities: Restaurant (TPEG table pti23_1)
TTT, timetable type: Winter Timetable (TPEG table pti33_1)
MRT: Station/Terminal View (TPEG table pti27_2)
ADI: Die Bahn webpage: (TPEG tables loc41_40 + pti30_1) http://www.diebahn.de/stuttgart_info.html
CRI: connection (TPEG table pti31_1) + MID=00436

8.4.3 Route information

A service provider may signal route information when dealing with information concerning part or all of a transport network. This information is likely to contain, at least, the following elements and values to be used within the three containers described in 6.1:

MID=421

VER=3

SEV=1

STA: 2001-11-14T11:21

STO: 2001-11-14T15:03

MGT: 2001-11-14T10:04

TPEG-Loc: e.g. from Lyon to Paris

TM, transport mode: Railway (TPEG table pti01_1)

TSM, transport submode: Long Distance train (TPEG table pti02_2)

SCO, service condition: Disruption (TPEG table pti13_6)

TO, transport operator: SNCF

ER: service information: equipment problem, (TPEG table pti18_3), signal failure (TPEG table pti21_4)

RDP, route description point: Start (TPEG table pti15_1) + TPEG-Loc: eg Lyon

RDP, route description point: End (TPEG table pti15_2) + TPEG-Loc: eg Paris

MRT, message report type: route view (TPEG table pti27_3)

ADI: SNCF web page: (TPEG table loc41_36 + pti30_1) http://www.sncf.fr

8.4.4 Individual service information

When individual service information is signalled, a service provider can describe an event affecting an individual service. This information is likely to contain, at least, the following elements and values to be used within the three containers described in 6.1:

MID=271

VER=2

SEV=4

STA: 2001-11-14T07:30

STO: 2001-11-14T09:10

MGT: 2001-11-14T07:30

TPEG-Loc: eg from London to Geneva

TM, transport mode: Air (TPEG table pti01_11)

BDN, brand name: “The webs favourite airline”

SCO, service condition: arrives early (TPEG table pti13_20)

TSID, transport service ID: (TPEG table pti14_2) + ESY905

TO, transport operator: Easy Jet

RDP route description point: Start (TPEG table pti15_1) + TPEG-Loc: eg London Luton

TMT: Scheduled departure (TPEG table pti16_1 + pti28_2) 2001-11-14T06:30+00:00

RDP, route description point: End (TPEG table pti15_2) TPEG-Loc: eg Geneva Cointrin

TMT: Scheduled arrival (TPEG table pti16_1 + pti28_1) 2001-11-14T09:00+01:00

TMT: Predicted arrival (TPEG table pti16_2 + pti28_2) 2001-11-14T08:50+01:00

TTT, timetable type: Winter Timetable (TPEG table pti33_1)

MRT: service view (TPEG table pti27_4)

ADI: Easy Jet Webpage: (TPEG table loc41_30 + pti30_1) http://www.easyjet.com/

8.5 Coding structure

transport_mode (transport_mode/pti01, transport_submode, [ ]...)

brand_name (brand_name/s_string)

service_information ([ ]…)

transport_service_identification ([ ]…)

transport_service_id (transport_information_type/pti14, transport_service_id/s_string)

transport_service_name (transport_service_name/s_string)

operator_name (operator_name/s_string)

operator_subsidiary_name (operator_subsidiary_name/s_string)

service_condition (service_condition_type/pti13)

service_facilities (service_facility_type/pti23)

booking_status (booking_status_type/pti24)

ticket_restrictions (ticket_restriction_type/pti25)

event_reason (event_reason_type/pti18, event_reason_subtype, [ ] …)

route_description ([ ]...)

service_delivery_point (scheduled_predicted/pti16, service_delivery_point_type/pti17, service_delivery_point_name/s_string)

time_type (scheduled_predicted/pti16, time_type/pti28, [ ]…)

time_instance (time_instance/time_local)

interval_time(interval_time/intunti)

service_day_type(service_day_type/pti34)

timetable_type (timetable_type/pti33)

location_container (route_description/pti15, location_container/tpeg_loc_container)

message_report_type (message_report_type/pti27, [ ]…)

additional_information (function_type/pti30, language code/loc41, additional_information/s_string)

cross_reference (crossreference_type/pti31, MID, [ ], SID, SCID, VER)

8.6 Event container data types

Data types used by TPEG-PTI shall be derived from those given in TPEG-SSF (CEN ISO/TS 18234-2).

Additionally, a data type for a local time including the offset relative to UTC and delivered as a text string is required.

8.6.1 Time including local offset (time_local)

<time_local>:= **<short_string>;**	: Time including local offset

This text string shall be in the form: YYYY-MM-DDThh:mm:ss±hh:mm, eg “2002-05-14T14:30:00+01:00”. It must always be sent as local time, with the local time offset included, however the off-set shall not be displayed.

8.7 Coding of event container

8.7.1 Transport mode

<pti_component(A0)>:=	: Transport Mode
<intunti>(id),	: Identifier, id = 0xA0 hex
<intunli>(n),	: Length, n, of component data in bytes
<pti01>(transport_mode),	: Transport mode, TPEG table pti01
<**intunti**>(transport_submode),	: Transport submode, see table in 8.9.3
m * **<transport_mode_component()>;**	: Transport mode components

8.7.1.1 Transport mode component template

<transport_mode_component(x)>:=	: Transport mode component template
<intunti>(id),	: Identifier, id = x hex
<intunti>(n),	: Length, n, of component data in bytes
n * **<byte>**;	: Component data

8.7.1.2 Brand name

<transport_mode_component(01)>:=	: Brand name
<intunti>(id)	: Identifier, id = 01 hex
<intunti>(n)	: Length, n, of component data in bytes
<short_string>	: Brand name

8.7.2 Service information

<pti_component(A1)>:=	: Service information
<intunti>(id),	: Identifier, id = 0xA1 hex
<intunli>(n)	: Length, n, of component data in bytes
m * **<service_information_component()>**	: Service information components

8.7.2.1 Service information component template

<service_information_component(x)>:=	: Service information component template
<intunti>(id),	: Identifier, id = x hex
<intunli>(n)	: Length, n, of component data in bytes
n * **<byte>**	: Component data

8.7.2.2 Transport service identification

< service_information_component(01)>:=	: Transport service identification
<intunti>(id)	: Identifier, id = 01 hex
<intunli>(n)	: Length, n, of component data in bytes
m * **<transport_service_identification_component()>**	: Transport service identification components

8.7.2.2.1 Transport service identification component template

<transport_service_identification_component(x)>:=	: Transport service identification component template
<intunti>(id)	: Identifier, id = x hex
<intunti>(n)	: Length, n, of component data in bytes
n * **<byte>**	: Component data

8.7.2.2.2 Transport service id

<transport_service_identification_component(01)>:=	: Transport service id
<intunti>(id),	: Identifier, id = 01 hex
<intunti>(n),	: Length, n, of component data in bytes
pti14>(transport_information_type),	: Transport information type, TPEG table pti14
<short_string>;	: Transport service id

8.7.2.2.3 Transport service name

<transport_service_identification_component(02)>:=	: Transport service name
<intunti>(id),	: Identifier, id = 02 hex
<intunti>(n),	: Length, n, of component data in bytes
<short_string>;	: Transport service name

8.7.2.2.4 Operator name

<transport_service_identification_component(03)>:=	: Operator name
<intunti>(id)	: Identifier, id = 03 hex
<intunti>(n)	: Length, n, of component data in bytes
<short_string>	: Operator name

8.7.2.2.5 Operator subsidiary name

<transport_service_identification_component(04)>:=	: Operator subsidiary name
<intunti>(id)	: Identifier, id = 04 hex
<intunti>(n)	: Length, n, of component data in bytes
<short_string>	: Operator subsidiary name

8.7.2.3 Service condition

<service_information_component(02)>:=	: Service condition
<intunti>(id)	: Identifier, id = 02 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti13>(service_condition)	: Service condition type, TPEG table pti13

8.7.2.4 Facilities

<service_information_component(03)>:=	: Facilities
<intunti>(id)	: Identifier, id = 03 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti23>(facilities_type)	: Facilities type, TPEG table pti23

8.7.2.5 Booking status

<service_information_component(04)>:=	: Booking status
<intunti>(id)	: Identifier, id = 04 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti24>(booking_status)	: Booking status type, TPEG table pti24

8.7.2.6 Ticket restrictions

<service_information_component(05)>:=	: Ticket restrictions
<intunti>(id)	: Identifier, id = 05 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti25>(ticket_restrictions_type)	: Ticket restrictions type, TPEG table pti25

8.7.2.7 Event reason

<service_information_component(06)>:=	: Event reason
<intunti>(id)	: Identifier, id = 06 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti18>(event_reason_type)	: Event reason type, TPEG table pti18
<intunti>(event_reason_subtype)	: Event reason subtype, see table in Section 8.9.4

8.7.2.8 Route description

<service_information_component(07)>:=	: Route description
<intunti>(id)	: Identifier, id = 07 hex
<intunli>(n)	: Length, n, of component data in bytes
m * **<route_description_component()>**	: Route description components

8.7.2.8.1 Route description component template

<route_description_component(x)>:=	: Route description component template
<intunti>(id),	: Identifier, id = x hex
<intunli>(n),	: Length, n, of component data in bytes
n * **<byte>**;	: Component data

8.7.2.8.2 Service delivery point

<route_description_component(01)>:=	: Service delivery point
<intunti>(id),	: Identifier, id = 01 hex
<intunli>(n),	: Length, n, of component data in bytes
<**pti16**>(scheduled_predicted),	: Scheduled or predicted
<pti17>(service_delivery_point_type),	: Service delivery point type, TPEG table pti17
<short_string>;	: Service delivery point name

8.7.2.8.3 Time type

<route_description_component(02)>:=	: Time type
<intunti>(id),	: Identifier, id = 02 hex
<intunli>(n),	: Length, n, of component data in bytes
<**pti16**>(scheduled_predicted),	: Scheduled or predicted
<pti28>(time_type),	: Time type, TPEG table pti28
m * **<time_type_component()>**;	: Time type components

8.7.2.8.3.1 Time type component template

<time_type_component(x)>:=	: Time type component template
<intunti>(id),	: Identifier, id = x hex
<intunti>(n),	: Length, n, of component data in bytes
n * **<byte>**;	: Component data

8.7.2.8.3.2 Time instance

<time_type_component(01)>:=	: Time instance
<intunti>(id),	: Identifier, id = 01 hex
<intunti>(n),	: Length, n, of component data in bytes
<time_local>;	: Time including local offset

8.7.2.8.3.3 Interval time

<time_type_component(02)>:=	: Interval time
<intunti>(id),	: Identifier, id = 02 hex
<intunti>(n),	: Length, n, of component data in bytes
<intunti>;	: Interval time

8.7.2.8.3.4 Service day type

<time_type_component(03)>:=	: Service day type
<intunti>(id),	: Identifier, id = 03 hex
<intunti>(n),	: Length, n, of component data in bytes
<pti34>(service_day_type);	: Service day type

8.7.2.8.4 Timetable type

<route_description_component(03)>:=	: Timetable type
<intunti>(id),	: Identifier, id = 03 hex
<intunli>(n),	: Length, n, of component data in bytes
<pti33>(timetable_type);	: Timetable type, TPEG table pti33

8.7.2.8.5 Location container

<route_description_component(04)>:=	: Location container
<intunti>(id),	: Identifier, id = 04 hex
<intunli>(n),	: Length, n, of component data in bytes
<pti15>(route_description_type),	: Route description type, TPEG table pti15
<tpeg_loc_container>;	: TPEG location container, see 5.3.2 of CEN ISO/TS 18234-6)

8.7.3 Message report type

<pti_component(A2)>:=	: Message report type
<intunti>(id)	: Identifier, id = 0xA2 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti27>(message_report_type)	: Message report type, TPEG table pti27
m * **<message_report_type_component()>**	: Message report type components

8.7.3.1 Message report type component template

<message_report_type_component(x)>:=	: Message report type component template
<intunti>(id),	: Identifier, id = x hex
<intunti>(n),	: Length, n, of component data in bytes
n * **<byte>**;	: Component data

8.7.4 Additional information

<pti_component(A3)>:=	: Additional information
<intunti>(id)	: Identifier, id = 0xA3 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti30>(function_type)	: Function type, TPEG table pti30
<loc41>(language_code)	: Language code
<short_string>	: Additional information

8.7.5 Cross-reference

<pti_component(A4)>:=	: Cross-reference
<intunti>(id)	: Identifier, id = 0xA4 hex
<intunli>(n)	: Length, n, of component data in bytes
<pti31>(cross_reference_type)	: Cross-reference type, TPEG table pti31
<intunli>	: MID
<bitswitch>(selector)	: Cross-reference information supplied
if (selector = xxxxxxx1) **<sid_abc>**	: SID-A, SID-B, SID-C, TPEG-SSF (CEN ISO/TS 18234-2)
if (selector = xxxxxx1x) **<intunti>**,	: SCID
if (selector = xxxxx1xx) **<intunti>**;	: VER

8.8 PTI application primitives

8.8.1 PTI tables pti01 to pti28 and pti30 to pti34

Table 1 — PTI tables pti01 to pti28 and pti30 to pti34

<pti_01>:=	: mode of transport
<intunti>;	: TPEG table pti01
<pti_02>:=	: railway service type
<intunti>;	: TPEG table pti02
<pti_03>:=	: coach service type
<intunti>;	: TPEG table pti03
<pti_04>:=	: urban railway type
<intunti>;	: TPEG table pti04
<pti_05>:=	: bus service type
<intunti>;	: TPEG table pti05
<pti_06>:=	: tram service type
<intunti>;	: TPEG table pti06
<pti_07>:=	: water transport service type
<intunti>;	: TPEG table pti07
<pti_08>:=	: air service type
<intunti>;	: TPEG table pti08

<pti_09>:=	: telecabin service type
<intunti>;	: TPEG table pti09
<pti_10>:=	: funicular service type
<intunti>;	: TPEG table pti10
<pti_11>:=	: taxi service type
<intunti>;	: TPEG table pti11
<pti_12>:=	: self-drive vehicle type
<intunti>;	: TPEG table pti12
<pti_13>:=	: service condition type
<intunti>;	: TPEG table pti13
<pti_14>:=	: transport information type
<intunti>;	: TPEG table pti14
<pti_15>:=	: route point type
<intunti>;	: TPEG table pti15
<pti_16>:=	: scheduled predicted
<intunti>;	: TPEG table pti16
<pti_17>:=	: service delivery point type
<intunti>;	: TPEG table pti17
<pti_18>:=	: event reason type
<intunti>;	: TPEG table pti18
<pti_19>:=	: miscellaneous event type
<intunti>;	: TPEG table pti19
<pti_20>:=	: personnel problem type
<intunti>;	: TPEG table pti20
<pti_21>:=	: equipment event type
<intunti>;	: TPEG table pti21
<pti_22>:=	: environment event type
<intunti>;	: TPEG table pti22

<pti_23>:=	: service facility type
<intunti>;	: TPEG table pti23
<pti_24>:=	: booking status type
<intunti>;	: TPEG table pti24
<pti_25>:=	: ticket restriction type
<intunti>;	: TPEG table pti25
<pti_26>:=	: severity type
<intunti>;	: TPEG table pti26
<pti_27>:=	: message report type
<intunti>;	: TPEG table pti27
<pti_28>:=	: time type
<intunti>;	: TPEG table pti28
NOTE: pti 29 – reserved for future use	
<pti_30>:=	: additional information type
<intunti>;	: TPEG table pti30
<pti_31>:=	: cross reference type
<intunti>;	: TPEG table pti31
<pti_32>:=	: unverified information
<intunti>;	: TPEG table pti32
<pti_33>:=	: timetable type
<intunti>;	: TPEG table pti33
<pti_34>:=	: service day type
<intunti>;	: TPEG table pti34

8.9 TPEG tables (pti01 to pti34) indexing

The TPEG tables (pti) numbers and code values have no order-significance and only have number values randomly assigned during the development process. In order to aid navigation of these tables the following two sections provide an “internal index” to the tables, firstly in name order and secondly in number order.

8.9.1 TPEG tables (pti01 to pti34) – ordered by name

Table 2 — TPEG tables (pti01 to pti34) – ordered by name

Description	Table
additional_information_type	30
air_service_type	8
booking_status_type	24
bus_service_type	5
coach_service_type	3
cross_reference_type	31
Environment_event_type	22
equipment_event_type	21
event_reason_type	18
funicular_service_type	10
message_report_type	27
miscellaneous_event_type	19
mode_of_transport	1
personnel_problem_type	20
railway_service_type	2
Reserved for future use	29
route_point_type	15
scheduled_predicted	16
self-drive_vehicle_type	12
service_condition_type	13
service_day_type	34
service_delivery_point_type	17
service_facility_type	23
severity_type	26
taxi_service_type	11
telecabin_service_type	9
ticket_restriction_type	25
timetable_type	33
time_type	28
tram_service_type	6
transport_information_type	14
urban_railway_service_type	4
unverified_information	32
water_transport_service_type	7
~ end of version 3.0 tables ~	

8.9.2 TPEG tables (pti01 to pti34) – ordered by table number

Table 3 — TPEG tables (pti01 to pti34) – ordered by table number

Table	Description
1	mode_of_transport
2	railway_service_type
3	coach_service_type
4	urban_railway_service_type
5	bus_service_type
6	tram_service_type
7	water_transport_service_type
8	air_service_type
9	telecabin_service_type
10	funicular_service_type
11	taxi_service_type
12	self-drive_vehicle_type
13	service_condition_type
14	transport_information_type
15	route_point_type
16	scheduled_predicted
17	service_delivery_point_type
18	event_reason_type
19	miscellaneous_event_type
20	personnel_problem_type
21	equipment_event_type
22	environment_event_type
23	service_facility_type
24	booking_status_type
25	ticket_restriction_type
26	severity_type
27	message_report_type
28	time_type
29	*Reserved for future use*
30	additional_information_type
31	cross_reference_type
32	unverified_information
33	timetable_type
34	service_day_type
	~ end of version 3.0 tables ~

8.9.3 TPEG table pti01 – transport submode cross-reference table

The transport submode can only be decoded given the code for the transport mode. Therefore a cross-reference table exists to inform a client decoder what TPEG table it should use to decode the transport submode, given the code for the transport mode.

NOTE Some transport modes do not have a transport submode table defined. In these cases a code (one byte, set to 0) for the transport submode must be transmitted; however TPEG decoders should ignore the code for the transport submode.

Table 4 — TPEG table pti01 – transport submode cross-reference table

Code	CEN-English 'Word'	Entry in related TPEG table (submode), table name:
0	unknown	(submode = 0), *no TPEG table available*
1	railway service	TPEG Table pti02(...), railway_service_type
2	coach service	TPEG Table pti03(...), coach_service_type
3	suburban railway service	(submode = 0), *no TPEG table available*
4	urban railway service	TPEG Table pti04(...), urban_railway_service_type
5	metro service	(submode = 0), *no TPEG table available*
6	underground service	(submode = 0), *no TPEG table available*
7	bus service	TPEG Table pti05(...), bus_service_type
8	trolleybus service	(submode = 0), *no TPEG table available*
9	tram service	TPEG Table pti06(...), tram_service_type
10	water transport service	TPEG Table pti07(...), water_transport_service_type
11	air service	TPEG Table pti08(...), air_service_type
12	ferry service	(submode = 0), *no TPEG table available*
13	telecabin service	TPEG Table pti09(...), telecabin_service_type
14	funicular service	TPEG Table pti10(...), funicular_service_type
15	taxi service	TPEG Table pti11(...), taxi_service_type
16	self-drive	TPEG Table pti12(...), self-drive_vehicle_type
17	all services	(submode = 0), *no TPEG table available*
18	all services except	(submode = 0), *no TPEG table available*

8.9.4 TPEG table pti18 – event reason subtype cross-reference table

The event reason subtype can only be decoded given the code for the event reason type. Therefore a cross-reference table exists to inform a client decoder what TPEG table it should use to decode the event reason subtype, given the code for the event reason type.

NOTE Some event reason types do not have a event reason subtype table defined. In these cases a code (one byte, set to 0) for the event reason subtype must be transmitted; however, TPEG decoders should ignore the code for the event reason subtype.

Table 5 — TPEG table pti18 – event reason subtype cross-reference table

Code	CEN-English 'Word'	Entry in related TPEG table (subtype), table name:
0	unknown	(subtype = 0), *no TPEG table available*
1	miscellaneous event reason	TPEG Table pti19(...), miscellaneous_event_type
2	personnel problem reason	TPEG Table pti20(...), personnel_problem_type
3	equipment event reason	TPEG Table pti21(...), equipment_event_type
4	environment event reason	TPEG Table pti22(...), environment_event_type

8.9.5 TPEG tables – structure and semantics

TPEG tables provide a list of the CEN-English 'word' with associated code value, and additionally comments, and where helpful, Examples are given. The CEN-English 'word' describes a single entity as far as possible with a single word, but it is necessary to sometimes use a short phrase to describe the entity, e.g. cross-country rail service; nevertheless, TPEG tables are in essence tables of singular words. Where the coding allows multiplicity of the entity then the CEN-English 'word' shall be singular. In other cases there are a number of logical plurals, e.g. weekdays, which are commented accordingly.

The key principle for the use of the CEN-English 'Word' code value is that all client devices shall be designed to make their own assessment of the context and multiplicity, in order to deliver a semantically acceptable message in the chosen display language.

8.9.6 TPEG tables (pti01 to pti34 Version 3.0)

Table 6 — TPEG table pti01: mode_of_transport

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	railway service		
2	coach service		
3	suburban railway service		
4	urban railway service		
5	metro service		
6	underground service		
7	bus service		
8	trolleybus service		
9	tram service		
10	water transport service		
11	air service		
12	ferry service		
13	telecabin service		
14	funicular service		
15	taxi service		
16	self-drive		
17	all services	logical plural	
18	all services except	contains logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined public transport service	- the table default word -	

Table 7 — TPEG table pti02: railway_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	high speed rail service		TGV (FR), ICE (DE), Eurostar (GB)
2	long distance rail service		InterCity/EuroCity
3	inter regional rail service		InterRegion (GB), Cross County Rail (DE)
4	car transport rail service		Simplon Autoverlad (CH)
5	sleeper rail service		GNER Sleeper (GB)
6	regional rail service		TER (FR), Regionalzug (DE)
7	tourist railway service		Romney, Hythe & Dymchurch (GB)
8	rail shuttle service	i.e. within a complex	Gatwick Shuttle (GB), Sky Line (DE)
9	suburban rail service		S-Bahn (DE), RER (FR)
10	replacement rail service		
11	special rail service		
12	lorry transport rail service		
13	all rail services	logical plural	
14	cross-country rail service		
15	vehicle transport rail service		
16	rack and pinion railway		Roche de Nayes (CH)
17	additional rail service		
..	***~ end of version 3.0 ~***		
..			
255	undefined rail service	- the table default word -	

Table 8 — TPEG table pti03: coach_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	international coach service		EuroLine, Touring
2	national coach service		Natonal Express (GB)
3	shuttle coach service		Roissy Bus (FR), Reading-Heathrow (GB)
4	regional coach service		
5	special coach service		
6	sightseeing coach service		
7	tourist coach service		
8	commuter coach service		
9	all coach services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined coach service type	- the table default word -	

Table 9 — TPEG table pti04: urban_railway_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	metro service		Paris Ligne 14 (Météor) serving all stops on whole line (FR)
2	underground service		
3	urban railway service		
4	all urban railway services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined urban railway service	- the table default word -	

Table 10 — TPEG table pti05: bus_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	regional bus service		Eastbourne-Maidstone (GB)
2	express bus service		X19 Wokingham-Heathrow (GB)
3	stopping bus service		38 London: Clapton Pond-Victoria (GB)
4	local bus service		
5	night bus service		N prefixed buses in London (GB)
6	post bus service		Maidstone P4 (GB)
7	special-needs bus service	contains logical plural	
8	mobility bus service		
9	mobility bus for registered disabled service		
10	sightseeing bus service		
11	shuttle bus service		747 Heathrow-Gatwick Airport Service(GB)
12	school bus service		
13	school and public service bus service		
14	rail-replacement bus service		
15	demand and response bus service		
16	all bus services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined bus service	- the table default word -	

Table 11 — TPEG table pti06: tram_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	city tram service		
2	local tram service		as found in: Munich (DE), Brussels (BE), Croydon (GB)
3	regional tram service		
4	sightseeing tram service		as found on: Blackpool Seafront (GB)
5	shuttle tram service		
6	all tram services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined tram service	- the table default word -	

Table 12 — TPEG table pti07: water_transport_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	international car ferry service		Dover-Calais (FR-GB)
2	national car ferry service		Sweden-Gotland (SE), Scotland-N. Ireland (GB)
3	regional car ferry service		Friesian Islands (NL) Scottish Islands (GB)
4	local car ferry service		Plymouth (GB), Venice-Lido Link (IT)
5	international passenger ferry service		Jetfoil: Dover-Ostend
6	national passenger ferry service		Southampton-Ryde (GB)
7	regional passenger ferry service		Lac Léman (CH-FR)
8	local passenger ferry service		Venice Water Bus (IT)
9	post boat service		Bergen-Sogne Fjord (NO)
10	train ferry service		Helsingør - Helsingborg
11	road-link ferry service		Reedham ferry Norfolk (UK)
12	airport-link ferry service		San Marco-Venice (IT)
13	car high-speed ferry service		HSS: Holyhead-Dun Loaghaire
14	passenger high-speed ferry service		Jetfoil: Dover-Ostend
15	sightseeing boat service		"Bâteau Mouche"
16	school boat		
17	cable-drawn boat service		
18	river bus service		
19	scheduled ferry service		
20	shuttle ferry service		
21	all water transport services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined water transport service	- the table default word -	

Table 13 — TPEG table pti08: air_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	international air service		Schiphol – New York
2	national air service		Moscow-Vladivostok
3	intercontinental air service		Frankfurt – New York
4	national scheduled air service		Heathrow-Edinburgh (GB)
5	shuttle air service		Penzance-Isles of Scilly (GB)
6	intercontinental air charter service		Frankfurt - Florida
7	international air charter service		London – Majorca
8	round-trip air charter service		Concorde round trip
9	sightseeing air service		Swiss Alps Interlaken
10	helicopter air service		New York JFK – Manhattan
11	domestic air charter flight		
12	Schengen-area air service	i.e. service within EU Schengen area, without passport requirements	Geneva (FR) - Paris Charles de Gaulle
13	airship service		
14	all air services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined air service	- the table default word -	

Table 14 — TPEG table pti09: telecabin_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown service		
1	telecabin service		Territet - Glion (CH)
2	cable car service		Salève (CH)
3	elevator service		Lisbon (PO)
4	chair lift service		
5	drag lift service		
6	small telecabin service		
7	all telecabin services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined telecabin service	- the table default word -	

Table 15 — TPEG table pti10: funicular_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	funicular service		San Francisco (US), Montmatre (FR)
2	all funicular services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined funicular service	- the table default word -	

Table 16 — TPEG table pti11: taxi_service_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	communal taxi service		Dolmos (TR)
2	water taxi service		Venice (IT)
3	rail taxi service		Bahn-Taxi (DE)
4	bike taxi service	i.e. motorbike	Berlin (DE), London (GB)
5	licenced taxi service		London black cab (GB)
6	private hire vehicle service		mini cab
7	all taxi services	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined taxi service	- the table default word -	

Table 17 — TPEG table pti12: self-drive_vehicle_type

Code	CEN-English 'Word'	Comments	Examples
0	unknown		
1	hire car		Hertz, Avis, Eurocar
2	hire van		Brighton Vehicle Hire (GB)
3	hire motorbike		
4	hire cycle		
5	all self-drive vehicles	logical plural	
..	***~ end of version 3.0 ~***		
..			
255	undefined self-drive vehicle	- the table default word -	