TECHNICAL SPECIFICATION

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Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) —

Part 4: tpeg-ptiML

Informations sur le trafic et le tourisme (TTI) — Messages TTI via le langage de balisage extensible (XML) du groupe d'experts du protocole de transport (TPEG) —
Partie 4: tpeg-ptiML

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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 with a view to deciding whether it should be confirmed for a further three years, revised to become an International Standard, or withdrawn. In the case of a confirmed ISO/PAS or ISO/TS, it is reviewed again after six years at which time it has to be either transposed into an International Standard or 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 24530-4 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 204, *Intelligent transport systems,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European pre-Standard..." to mean "...this Technical Specification...".

ISO/TS 24530 consists of the following parts, under the general title *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML)*:

— *Part 1: Introduction, common data types and tpegML*

— *Part 2: tpeg-locML*

— *Part 3: tpeg-rtmML*

— *Part 4: tpeg-ptiML*

Introduction

TPEG in XML (tpegML) provides a solution for diverse requirements for the ultimate delivery of TPEG applications (potentially simultaneously) via for example ARIB, ATSC, DAB, DVB and the Internet. This will solve the minimal adaptation layers requirement and without doubling up on message carousels, which are handled at different layers of the protocol stacks.

The original 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 application data from the database of a service provider to an end-user's equipment.

TPEG binary was initially designed to meet a particular brief, from the EBU's Broadcast Management Committee; to develop a new protocol for Traffic and Travel Information, for use in the multimedia broadcasting environment. TPEG applications were developed with service and transport features, which enable travel-related messages to be coded, decoded, filtered and understood both by humans (visually and/or audibly) and by agent systems. This brief was also endorsed by the EBU TTI Broadcast Strategy Team, who recognized the vital importance of a bearer independent TTI protocol.

The development of TPEG binary technology is excellently matched both technically and economically to DAB and possibly to internet bearers, where of the order of up to 10 kbits/s is considered acceptable. However other bearers such as ARIB, ATSC and DVB may be able to offer much higher data rates with economic and technical utility. Nevertheless these bearers are highly structured (layered) in their ability to handle transparent data services and they include mechanisms suitable for carousel delivery, which would require a considerably different TPEG data structure before real transparency could be achieved.

Another potential use of tpegML is provided to Service Providers who would have a standardised message generation interface, yet be able to develop systems suited to their own requirements. This will enable Service Providers to exchange pre-edited information regardless of their message generation systems and be substantially language independent.

tpegML has been developed using the DTD approach, which allows the use of different language entity files to easily provide a truly language independent service. This approach has the advantage that tpegML files can be rendered in any language, provided the language entity file is available to the internet browser. This document provides English language entity files only. For other languages the entity files in this document only require direct translation.

The development of this ISO/TS 24530 series was undertaken jointly with European Broadcasting Union B/TPEG Group, which has evolved into the TPEG Forum Standards Task Force. Attention is drawn to the EBU sponsored TPEG Forum development principles, which require all inputs containing IPR to be declared during drafting work. No such declarations have been made.

Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) —

Part 4: tpeg-ptiML

1 Scope

This document establishes the XML encoding of the method of the Public Transport Information application.

The Public Transport Information Application is intended to cover all modes of public (ie collective) transport as well as inter-urban and intra-urban travel. The application itself is designed to allow the efficient and language independent transmission of public transport information either directly to an end-user, be it the public or another service provider, such as broadcasters, service operators or other information disseminating points or centres for onward transmission.

TPEG-PTI 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, and in TPEG-PTI these are labelled views, they are somewhat an analogue to:

— 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

While the elements needed to produce information for any one of these four “views” are largely germane across the presentations, the end-user focus of TPEG applications is seen as useful to be able to mimic presentations, to which end-users are accustomed.

TPEG-PTI views are intended to present information to end-users in a way that they are accustomed. TPEG-PTI messages can therefore group data elements to present one of the following views:

— Incident Report View

— Station/Terminal View

— Route View

— Individual Service View

It is important to bear in mind that these “views” 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, 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.

It is vital, for further understanding of this document, to have more than a passing understanding of the TPEG-PTI Binary specification which describes, among other things, in a step-by step approach: Message Management, Report views and how they are structured hierarchically to provide a full Public Transport Information message together with the TPEG Location Referencing system.

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/TS 24530-1, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 1: Introduction, common data types and tpegML*

ISO/TS 24530-2, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 2: tpeg-locML*

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 (SFF)*

ISO/TS 18234-5, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 5: Public Transport Information application*

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

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

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

3 Abbreviated terms

For the purposes of this document, the following abbreviations apply.

3.1
ARIB
Association of Radio Industries and Business (Japan)

3.2
ATSC
American Television Standards Committee (USA)

3.3
DAB
Digital Audio Broadcasting

3.4
DTD/dtd
Document Type Definition - lower case used for file naming

3.5
DVB
Digital Video Broadcasting

3.6
EBU
European Broadcasting Union

3.7
IPR
Intellectual Property Right(s)

3.8
PTI
Public Transport Information

3.9
TPEG
Transport Protocol Experts Group

3.10
tpegML
tpeg XML applications - use lower case to distinguish them from the TPEG binary applications which use upper case

3.11
TPEG-Loc
Location Referencing for applications

3.12
TTI
Traffic and Travel Information

3.13
WGS84
World Geodetic System 1984

3.14
XML
Extensible Markup Language

4 Format of this document

This document is divided into Sections, each describes an XML element used in tpegML. Each element has an introduction explaining what it is for, the DTD definition relevant to it, guidelines “extending” the DTD and an example. The complete .dtd and .ent files are contained in Annexes A and B.

4.1 Tables

A large number of attributes used in elements in tpegML are based on tables in the TPEG specifications. To encode this in XML there are defined general entity references for all the table entries. In this Technical Specification series these entities are taken from the TPEG tables defined in the equivalent part of ISO/TS 18234.

For display in other languages these entity files only need to be replaced by directly translated equivalents.

These are named, for example `ptiX_Y`, where X is the table number and Y is the row number (e.g. "`pti01_1`" is the entry in the PTI `mode_of_transport` table for `railway service`). The DTD does not restrict the entity references that can be used in an attribute so the 'guidelines' sections indicate which entities/tables should be used for which attributes.

Table numbers use a leading zero below 10, whereas the row number within a table does not use a leading zero. Table numbers are random and entries within a table are random – no priority order is implied.

4.2 Example XML

This example shows the following message: *"Security alert at King's Cross – all services disrupted"* expressed as a single tpegML message using elements from tpeg-locML and tpeg-ptiML.

```
<tpeg_message>
        <public_transport_information message_id="1234" version_number="2"
            message_generation_time="2004-06-11T11:21:00"
            start_time="2004-06-11T11:30:00"
            message_expiry_time="2004-06-11T13:10:00"
            severity_factor="&pti26_5;"
            unverified_information="&pti32_255;">
            <location_container language="&loc41_30;">
                <!-- nodal area -->
                <location_coordinates location_type="&loc01_2;">
                    <location_point>
                        <mode_type_list>
                            <!-- coach, bus and taxi -->
                            <mode_of_transport mode_of_transport="&loc05_3;"/>
                            <mode_of_transport mode_of_transport="&loc05_6;"/>
                            <mode_of_transport mode_of_transport="&loc05_12;"/>
                        </mode_type_list>
                        <WGS84 longitude="-0.123028" latitude="51.531917"/>
                        <location_descriptor descriptor_type="&loc03_18;" descriptor="King's Cross"/>
                        <location_descriptor descriptor_type="&loc03_24;" descriptor="London"/>
                    </location_point>
                </location_coordinates>
            </location_container>
            <!-- All services -->
            <transport_mode transport_mode="&pti01_17;"/>
            <!-- security alert, very serious disruption -->
            <service_information>
```

This example shows the following message: *"Individual service information about the Hogwart's Express"* using the tpegML document format containing a single message with multiple aspects affecting this service.

```
    <tpeg_document generation_time="2002-02-11T11:00:00+0">
    <tpeg_message_set>
        <tpeg_message>
            <originator country="UK" originator_name="BBC Wizard Travel"/>
            <summary xml:lang="en">Wizard Rail's Hogwards Express is delayed by an hour because of hail.</summary>
            <multimedia/>
            <public_transport_information message_id="1234" version_number="2" message_generation_time="2002-02-
11T11:21:00" start_time="2002-02-11T11:30:00" message_expiry_time="2002-02-11T13:10:00" severity_factor="&pti026_4;"
unverified_information="&pti32_255;">
                <location_container language="&loc41_30;">
                    <location_coordinates location_type="&loc01_3;">
                        <!-- From... -->
                        <location_point>
                            <WGS84 longitude="-0.123028" latitude="51.531917"/>
                            <location_descriptor descriptor_type="&loc03_3;" descriptor="London"/>
                            <location_descriptor descriptor_type="&loc03_18;" descriptor="King's Cross"/>
                        </location_point>
                        <!-- To... -->
                        <location_point>
                            <WGS84 longitude="-2.188690" latitude="53.951803"/>
```

```
                        <location_descriptor descriptor_type="&loc03_4;" descriptor="Hogwarts"/>
                        <location_descriptor descriptor_type="&loc03_18;" descriptor="Hogwarts Terminus"/>
                    </location_point>
                </location_coordinates>
            </location_container>
            <!-- Cross Country Railway service, brand: Wizard School -->
            <transport_mode transport_mode="&pti01_1;" transport_submode="&pti02_14;">
                <brand_name brand_name="Wizard School"/>
            </transport_mode>
            <!-- Service description -->
            <service_information>
                <!-- Service identification, type, -->
                <transport_service_identification>
                    <transport_service_id transport_information_type="&pti14_3;" transport_service_id="666"/>
                    <transport_service_id transport_information_type="&pti14_1;" transport_service_id="Stream Train"/>
                    <transport_service_name transport_service_name="Hogwarts Express"/>
                    <operator_name operator_name="Wizard Rail"/>
                </transport_service_identification>
                <!-- Service Condition - disrupted -->
                <service_condition service_condition_type="&pti13_6;"/>
                <!-- Snacks service and free seating -->
                <facilities facilities_type="&pti23_2;"/>
                <facilities facilities_type="&pti23_11;"/>
                <!-- Disruption due to severe hail -->
                <event_reason event_reason_type="&pti18_4;" event_reason_subtype="&pti22_11;"/>
                <!-- Route Description -->
                <route_description>
                    <!-- Location of start point -->
                    <route_description_type route_description_type="&pti15_1;">
                        <location_container language="">
                            <location_coordinates location_type="&loc01_2;">
                                <mode_type_list>
                                    <mode_of_transport mode_of_transport="&loc05_2;"/>
                                    <mode_of_transport mode_of_transport="&loc05_6;"/>
                                    <mode_of_transport mode_of_transport="&loc05_12;"/>
                                </mode_type_list>
                                <location_point>
                                    <WGS84 longitude="-0.123028" latitude="51.531917"/>
                                    <location_descriptor descriptor_type="&loc03_18;" descriptor="King's Cross"/>
                                    <location_descriptor descriptor_type="&loc03_24;" descriptor="London"/>
                                </location_point>
                            </location_coordinates>
                        </location_container>
                        <!-- Scheduled departure time -->
                        <time_type time_type="&pti28_2;" planning_status_type="&pti16_1;">
                            <time_instance local_time="2002-09-01T11:30:00+1"/>
                        </time_type>
                        <!-- Timetable -->
                        <timetable_type timetable_type="&pti33_4;"/>
                        <!-- Scheduled Platform -->
                        <service_delivery service_delivery_point_type="&pti17_1;" planning_status_type="&pti16_1;"
service_delivery_point_name="9 3/4"/>
                    </route_description_type>
                    <!-- Not stopping at... -->
                    <route_description_type route_description_type="&pti15_5;">
                        <location_container language="&loc41_30;">
                            <location_coordinates location_type="&loc01_2;">
                                <mode_type_list>
                                    <mode_of_transport mode_of_transport="&loc05_2;"/>
                                </mode_type_list>
                                <location_point>
                                    <WGS84 longitude="" latitude=""/>
                                    <location_descriptor descriptor_type="&loc03_24;" descriptor="Slitherin"/>
                                </location_point>
                            </location_coordinates>
                        </location_container>
                    </route_description_type>
                    <!-- Destination -->
                    <route_description_type route_description_type="&pti15_2;">
                        <location_container language="">
                            <location_coordinates location_type="&loc01_2;">
```