TECHNICAL SPECIFICATION

ISO/TS 24530-1

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

Part 1: Introduction, common data types and tpegML

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 1: Introduction, types de données courantes et tpegML

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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to deciding whether it should be confirmed for a further three years, revised to become an International Standard, or withdrawn.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 24530-1 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 the solution to 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 TS series, Parts 2-4, provide English language entity files only. For other languages the entity files in this series 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 1: **Introduction, common data types and tpegML**

1 Scope

This document establishes the top-level “containers” for TPEG messages in XML and the common data types that are used by tpegML applications (e.g. tpeg-ptiML). Inherently tpegML is designed to “map” TPEG Binary (ISO/TS 18234 series), however additional tags are provided to create a message and message set structure to facilitate internet file delivery.

The TPEG applications are intended to convey information to end-users. The information provided relates to event and status information on transport networks and on associated infrastructure affecting a journey. For example, limited information about abnormal operation of links in the network may be included, such as ferries, lifting-bridges, etc.

The TPEG applications have the broad objective to allow the generation of Traffic and Travel Information (TTI) messages, for delivery to the end-user by one or more bearers. A hierarchical methodology has been developed to allow the creation of messages from a set of TPEG tables, which are essentially word-oriented and cover most needs.

These TPEG tables (essentially word-oriented data object dictionaries) comprise a wide ranging ability to describe a TTI event and some status information, introducing new precision in a number of areas such as “Vehicle types”, “Positional information on the carriageway” and “Diversion routing advice”.

It is vital, for further understanding of this document, to have more than a passing understanding of the TPEG binary specifications which describe, among other things, in a step-by step approach: Message Management, Level One Classes and how they are structured hierarchically to provide a full message/information application 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 24530-2, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 2: tpeg-locML*

ISO/TS 24530-3, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 3: tpeg-rtmML*

ISO/TS 24530-4, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 4: tpeg-ptiML*

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 18234-4, *Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 4: Road Traffic Message (RTM) application*

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
RTM
Road Traffic Message

3.10
SSF
Syntax, Semantics and Framing Structure

3.11
TPEG
Transport Protocol Experts Group

3.12
tpegML
tpeg XML applications - use lower case to distinguish them from the TPEG binary applications which use upper case

3.13
tpeg-loc
Location Referencing for applications

3.14
TTI
Traffic and Travel Information

3.15
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 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 `rtmX_Y`, where X is the table number and Y is the row number (e.g. “`rtm01_01`” is the entry in the RTM `vehicle_type` table for `car`). 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

The following example shows the following message: *“An accident closes A12 at Brentwood, Essex”* expressed as a single tpegML message using elements from tpeg-locML and tpeg-rtmML:

```
<tpeg_message>
      <originator country="UK" originator_name="BBC Travel"/>
      <summary xml:lang="en">Accident closes A12 at Brentwood, Essex</summary>
      <road_traffic_message message_id="123"
                                 version_number="1"
                                 message_generation_time="2002-04-03T13:03:00Z"
                                 severity_factor="&rtm31_4;">

            <!-- Location is on A12 in Brentford, Essex -->
            <location_container language="&loc41_30;">
                  <location_coordinates location_type="&loc01_5;">
                        <WGS84 longitude="-0.1337" latitude="51.52641"/>
                        <location_descriptor descriptor_type="&loc03_7;" descriptor="A12"/>
                        < location_descriptor descriptor_type="&loc03_8;" descriptor="A128"/>
                        <location_descriptor descriptor_type="&loc03_24;" descriptor="Brentwood"/>
                        < location_descriptor descriptor_type="&loc03_25;" descriptor="Essex"/>
                        <direction direction_type="&loc02_2;"/>
                  </location_coordinates>
            </location_container>

            <!-- Accident in thick fog involving 50 vehicles -->
            <accidents number_of="1">
                  <position position="&rtm10_37;"/>
                  <vehicles number_of="50">
                        <vehicle_problem vehicle_problem="&rtm03_22;"/>
                  </vehicles>
            </accidents>
            <visibility>
                  <obscurity obscurity_problem="&rtm17_2;" visibility_distance="20"/>
            </visibility>
            <network_conditions>
                  <position position="&rtm10_37;"/>
                  <restriction restriction="&rtm49_1;"/>
            </network_conditions>

      </road_traffic_message>
</tpeg_message>
```


The following example shows the following message: *"Security alert at King's Cross – all services disrupted and buses diverted"*, expressed as a collection of tpegML messages using elements from tpeg-ptiML and tpeg-locML:


```
<tpeg_document generation_time="2002-02-11T11:00:00+0">
  <tpeg_message_set>
      <tpeg_message>
            <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="&pti26_5;"
                  unverified_information="&pti32_255;">

                  <location_container language="&loc41_30;">
                        <!-- nodal area -->
                        <location_coordinates location_type="&loc01_2;">
                              <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_coordinates>
                  </location_container>

                  <-- All services -->
                  <transport_mode transport_mode="&pti01_17;"/>

                  <!-- security alert, very serious disruption -->
                  <service_information>
```