TECHNICAL SPECIFICATION

ISO/TS 18234-2

First edition
2006-06-01

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

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

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 2: Structure de syntaxe, de sémantique et de cadrage (SSF)

Reference number
ISO/TS 18234-2:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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 18234-2 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

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 a user's equipment.

This document describes the Service and Network Information Application, which provides a means of informing end-users about all possible services and their content which are considered relevant by a service provider to either provide continuity of his services or inform the end-user about other related services. As stated in the design criteria, TPEG is a bearer independent system. Therefore some rules are established for the relation of information contents of the same service on different bearers. Also the mechanisms for following a certain service on one single bearer have to be defined. For the receiver it is essential to find an adjacent or similar service if it leaves the current reception area. Nonetheless, basic information describing the service itself is necessary. For the ease of the user, e.g. the service name, the service provider name, the operating time and many other hints are delivered by the TPEG-SNI application.

Also, general models for the hand-over and the referencing of services are developed and shown in detail. It is important to note that this Part 2 of CEN ISO/TS 18234 (TPEG-SSF) is closely related to Part 3 (TPEG-SNI) and so they must be used together, being dependent upon each other.

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, this document) 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) completes 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 18234-2, provides a full specification to the primitives used, framing, time calculation, numbers and to specific rules such as CRC calculation.

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-SSF_3.0/002.

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

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

1 Scope

This Technical Specification establishes the method of referencing used within a TPEG data-stream to allow a service provider to signal availability of the same service on another bearer channel or similar service data from another service.

TPEG is 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 a user's equipment.

The protocol is structured in a layered manner and employs a general purpose framing system which is adaptable and extensible, and which carries frames of variable length. This has been designed with the capability of explicit frame length identification at nearly all levels, giving greater flexibility and integrity, and permitting the modification of the protocol and the addition of new features without disturbing the operation of earlier client decoder models.

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/IEC 7498-1, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*

ISO/IEC 8859-1, *Information technology — 8-bit single byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 8859-2, *Information technology — 8-bit single byte coded graphic character sets — Part 2: Latin alphabet No. 2*

ISO/IEC 8859-3, *Information technology — 8-bit single byte coded graphic character sets — Part 3: Latin aAlphabet No. 3*

ISO/IEC 8859-4, *Information technology — 8-bit single byte coded graphic character sets — Part 4: Latin alphabet No. 4*

ISO/IEC 8859-5, *Information technology — 8-bit single byte coded graphic character sets — Part 5: Latin/Cyrillic alphabet*

ISO/IEC 8859-6, *Information technology — 8-bit single byte coded graphic character sets — Part 6: Latin/Arabic alphabet*

ISO/IEC 8859-7, *Information technology — 8-bit single byte coded graphic character sets — Part 7: Latin/Greek alphabet*

ISO/IEC 8859-8, *Information technology —8-bit single byte coded graphic character sets — Part 8: Latin/Hebrew alphabet*

ISO/IEC 8859-9, *Information technology — 8-bit single byte coded graphic character sets — Part 9: Latin alphabet No. 5*

ISO/IEC 8859-10, *Information technology — 8-bit single byte coded graphic character sets — Part 10: Latin alphabet No. 6*

ISO/IEC 8859-13, *Information technology — 8-bit single byte coded graphic character sets — Part 13: Latin alphabet No. 7*

ISO/IEC 8859-14, *Information technology — 8-bit single byte coded graphic character sets — Part 14: Latin alphabet No. 8 (Celtic)*

ISO/IEC 8859-15, *Information technology — 8-bit single byte coded graphic character sets — Part 15: Latin alphabet No. 9*

ISO/IEC 10646, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

3 Symbols and abbreviations

For the purposes of this Technical Specification, the following abbreviations apply:

3.1
AID
Application Identification

3.2
BPN
Broadcast, Production and Networks (an EBU document publishing number system)

3.3
B/TPEG
Broadcast/TPEG (the EBU project group name for the specification drafting group)

3.4
CEN
Comité Européen de Normalisation

3.5
DAB
Digital Audio Broadcasting

3.6
DARC
Data Radio Channel - an FM sub-carrier system for data transmission

3.7
DVB
Digital Video Broadcasting

3.8
EBU
European Broadcasting Union

3.9
INV
Introduction, Numbering and Versions (see CEN ISO/TS 18234-1)

3.10
IPR
Intellectual Property Right(s)

3.11
ISO
International Organization for Standardization

3.12
ITU-T
International Telecommunication Union - Telecom

3.13
OSI
Open Systems Interconnection

3.14
RTM
Road Traffic Message application (see CEN ISO/TS 18234-4)

3.15
SNI
Service and Network Information application (see CEN ISO/TS 18234-3)

3.16
SSF
Syntax, Symantics and Framing Structure (this specification)

3.17
TPEG
Transport Protocol Experts Group

3.18
TTI
Traffic and Travel Information

3.19
UAV
unassigned value

3.20
UTC
Coordinated Universal Time

4 Design principles

The following principles have been assumed in the development of the TPEG protocol, structure and semantics:

— TPEG is unidirectional

— TPEG is byte-oriented, where a byte is represented by eight bits

— TPEG provides a protocol structure, which employs asynchronous framing

— TPEG includes a CRC error detection capability applicable on a variety of different levels

— TPEG assumes the use of a transparent data channel

— TPEG assumes that underlying systems will have an appropriate level of reliability

— TPEG assumes that underlying systems may employ error correction

— TPEG has a hierarchical data frame structure

— TPEG is used to transport information from database to database

— TPEG provides service provider name, service name and network information

— TPEG permits the use of encryption mechanisms, if required by an application

4.1 TPEG transmission

TPEG is intended to operate via almost any simple digital data channel, and it assumes nothing of the channel other than the ability to convey a stream of bytes. To this end, the concept of transmission via a “piece of wire” is envisaged, in which the bearer has no additional service features.

In Figure 1, a variety of possible transmission channels are shown. The only requirement of the channel is that a sequence of bytes may be carried between the TPEG generator and the TPEG decoder. This requirement is described as “transparency”. However it is recognized that data channels may introduce errors. Bytes may be omitted from a sequence, bytes may become corrupted or additional and erroneous data could be received. Therefore TPEG incorporates error detection features at appropriate points and levels. It is assumed that bearer systems will introduce an appropriate level of error correction.

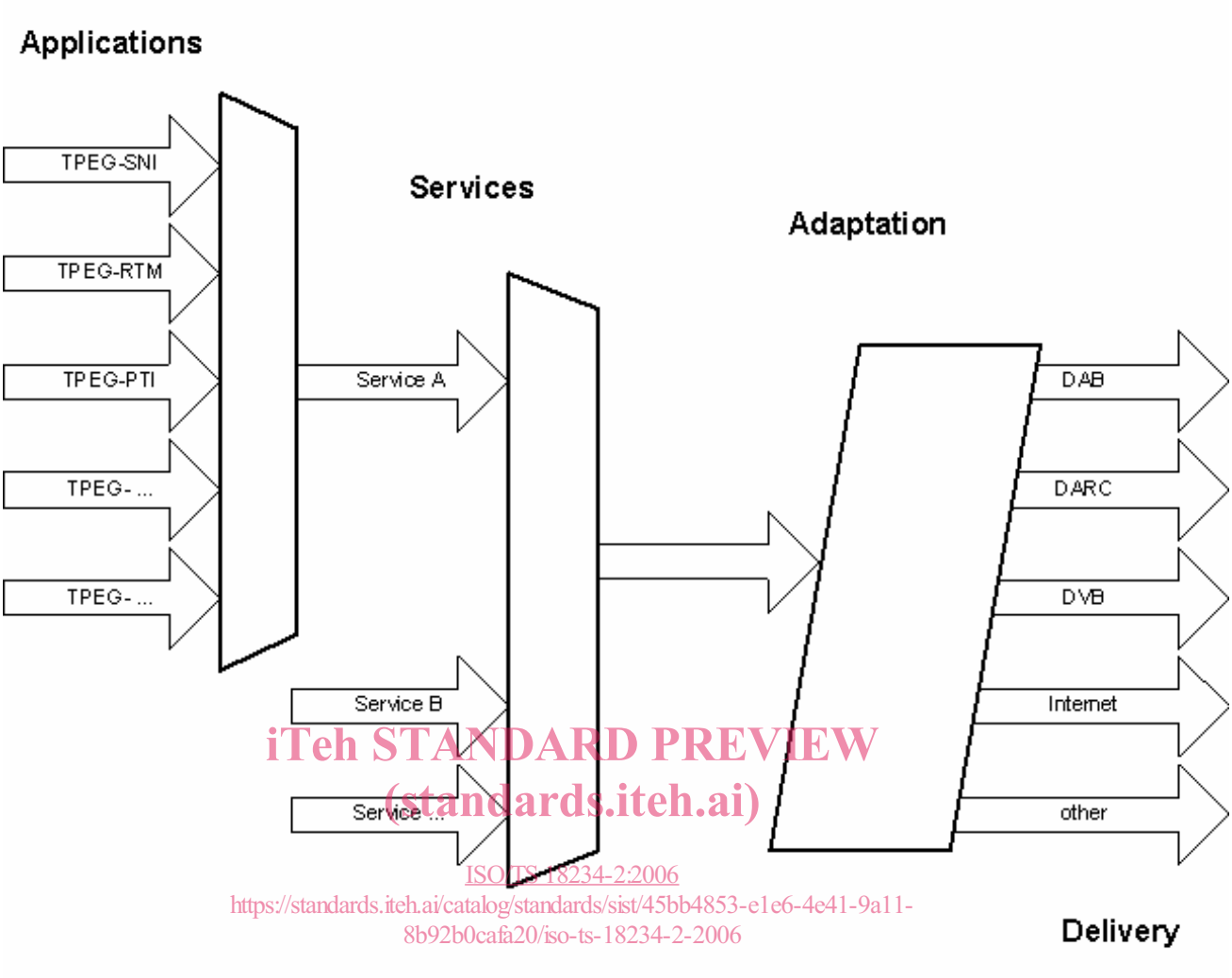

Figure 1 — TPEG data may be delivered simultaneously via different bearers

4.2 TPEG layer model

In Figure 2, the different layers of the TPEG protocol are identified in accordance with the ISO/OSI model (ISO/IEC 7498-1).

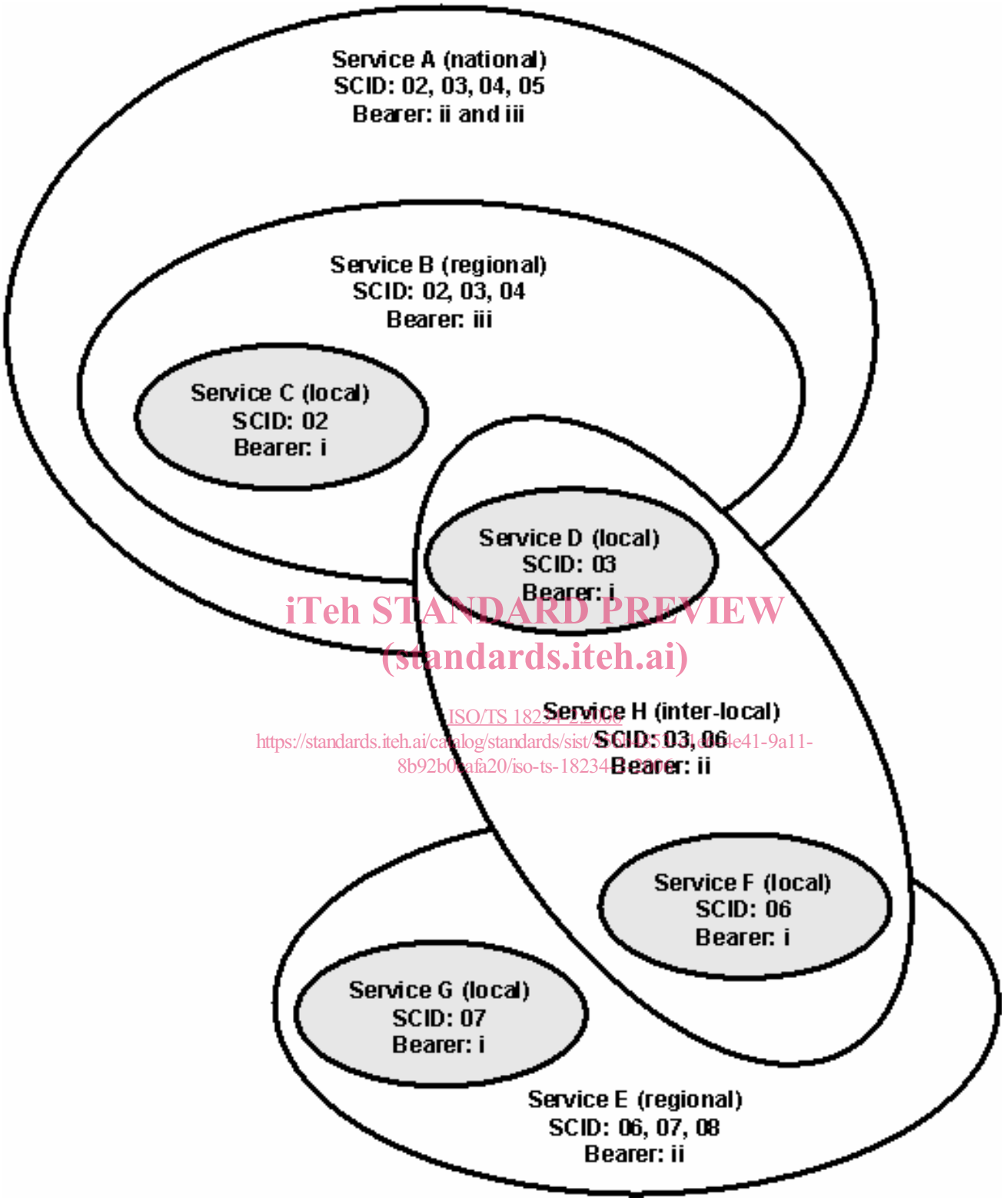

Figure 2 — TPEG in relation to the ISO/OSI Layer Model

Layer 7 is the top level and referred to in TPEG as the application layer. Initially the following applications were defined:

— TPEG specifications - Part 3: Service and Network Information Application (Service provider name, logo, hand-over information, etc.) (CEN ISO/TS 18234-3)

— TPEG specifications - Part 4: Road Traffic Message application (Event description, location description, etc.) (CEN ISO/TS 18234-4)

Layer 4 is the packetization layer. Components are merged into a single stream and encrypted and/or compressed.

Layer 3 is the network layer. This layer defines the means for synchronization and routing. This is the lowest layer of the TPEG protocol.

Layer 2 is the datalink layer. This layer consists of a wide range of different bearers, which are suitable carriers for the TPEG protocol. An adaptation layer may be required in order to map the TPEG stream onto that bearer.

Layer 1 is the physical layer. This defines the transmission medium (radio waves, wire, optical, etc.). One particular bearer can make use of different physical layers.

5 Conventions and symbols

5.1 Conventions

5.1.1 Byte ordering

All numeric values using more than one byte are coded in “Big Endian” format (most significant byte first). Where a byte is subdivided into bits, the most significant bit (“b7”) is at the left-hand end and the least significant bit (“b0”) is at the right-hand end of the structure.

5.1.2 Method of describing the byte-oriented protocol

TPEG uses a data-type representation for the many structures that are integrated to form the transmission protocol. This textual representation is designed to be unambiguous, easy to understand and to modify, and does not require a detailed knowledge of programming languages.

Data types are built up progressively. Primitive elements, which may be expressed as a series of bytes are built into compound elements. More and more complex structures are built up with compound elements and primitives. Some primitives, compounds and structures are specified in this document, and apply to all TPEG applications. Other primitives, compounds and structures are defined within applications and are local only to that application.

A resultant byte-stream coded using C-type notation is shown in Annex E.

5.1.3 Reserved data fields

If any part of a TPEG data structure is not completely defined, then it should be assumed to be available for future use. The notation is UAV (unassigned value). This unassigned value should be encoded by the service provider as the value 00 hex. This allows newer decoders using a future TPEG specification to ignore this data when receiving a service from a provider encoding to this older level of specification. A decoder which is not aware of the use of any former UAVs can still make use of the remaining data fields of the corresponding information entity. However, the decoder will not be able to process the newly defined additional information.

5.2 Symbols

5.2.1 Literal numbers

Whenever literal numbers are quoted in TPEG specifications, the following applies:

123 = 123 decimal