

## Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)

European Broadcasting Union

Union Européenne de Radio-Télévision



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## Foreword

This Technical Report (TR) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECTrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

The present document is based on the DVB document TM1324, rev. 8/162 rev. 22, and it may be converted into a standard after market feedback. For this purpose, the wording of a standard (normative elements) rather than of a technical report (informative elements) has been used.

**NOTE:** The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

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Founded in September 1993, the DVB Project is a market-led consortium of public and private sector organizations in the television industry. Its aim is to establish the framework for the introduction of MPEG-2 based digital television services. Now comprising over 200 organizations from more than 25 countries around the world, DVB fosters market-led systems, which meet the real needs, and economic circumstances, of the consumer electronics and the broadcast industry.

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# 1 Scope

The present document provides implementation guidelines for the use and implementation of the DVB Service Information (SI) coding in a DVB digital TV environment including satellite - cable - and terrestrial networks.

The guidelines are intended to be highly recommended rules for the usage of the DVB SI syntax specified in EN 300 468 [i.1]. As such, they facilitate the efficient and reliable implementation of basic user-interaction functions in Integrated Receiver-Decoders (IRD).

The rules apply to broadcasters, network operators as well as manufacturers.

The rules are specified in the form of constraints on the DVB SI streams or in terms of intended interpretation by IRDs.

The specification of these functions in no way prohibits IRD manufacturers from including additional features, and should not be interpreted as stipulating any form of upper limit to the performance.

The guidelines do not cover features related to user-interface details or advanced Electronic Program Guides (EPG). Such issues are left to the marketplace.

**NOTE:** It is highly recommended that the IRD should be designed to allow for future compatible extensions to the DVB SI syntax. All the fields "reserved" (for ISO), "reserved\_future\_use" (for ETSI), and "user defined" in the EN 300 468 [i.1] should be ignored by IRDs designed not to make use of them. The "reserved" and "reserved\_future\_use" fields may be specified in the future by the respective bodies, whereas the "user defined" fields will not be standardized.

The present document uses the terminology defined in EN 300 468 [i.1] and should be read in conjunction with that EN.

It is envisaged that the present document become a Technical Specification (TS), and therefore the text used throughout the present document is that of a TS.

---

# 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

**NOTE:** While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

## 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI EN 300 468: "Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".
- [i.2] ISO/IEC 13818-1: "Information technology - Generic coding of moving pictures and associated audio information: Systems".
- [i.3] ETSI EN 300 472: "Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bitstreams".
- [i.4] ETSI TS 101 162: "Digital Video Broadcasting (DVB); Allocation of Service Information (SI) codes for DVB systems".
- [i.5] ETSI EN 301 192: "Digital Video Broadcasting (DVB); DVB specification for data broadcasting".
- [i.6] ETSI TR 101 202: "Digital Video Broadcasting (DVB); Implementation guidelines for Data Broadcasting".
- [i.7] ITU-R Recommendation BS.1196-1: "Audio coding for digital terrestrial television broadcasting".

NOTE 1: Available at <http://www.itu.int/rec/recommendation.asp?type=items&lang=e&parent=R-REC-BS.1196-1-200104-I>.

NOTE 2: Annex 2 "Digital Audio Compression (AC-3) Standard (ATSC Standard)", contains additional information on the AC-3 audio encoding algorithm and decoding requirements, relevant to the present document. Appendix 1 to annex 2 of this Recommendation should be disregarded as it is not applicable to the present document.

- [i.8] ETSI EN 300 744: "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television".
- [i.9] ETSI TR 101 154: "Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications".
- [i.10] ETSI EN 301 775: "Digital Video Broadcasting (DVB); Specification for the carriage of Vertical Blanking Information (VBI) data in DVB bitstreams".
- [i.11] ETSI EN 301 210: "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for Digital Satellite News Gathering (DSNG) and other contribution applications by satellite".
- [i.12] ETSI EN 300 231: "Television systems; Specification of the domestic video Programme Delivery Control system (PDC)".
- [i.13] ISO/IEC 13818-3: "Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio".
- [i.14] ISO/IEC 11172-3: "Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part 3: Audio".
- [i.15] ETSI EN 300 743: "Digital Video Broadcasting (DVB); Subtitling systems".
- [i.16] ETSI EN 300 401: "Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".
- [i.17] ETSI TS 102 006: "Digital Video Broadcasting (DVB); Specification for System Software Update in DVB Systems".
- [i.18] ISO/IEC 13818-2: "Information technology - Generic coding of moving pictures and associated audio information: Video".



[i.19] "Implementation guidelines for use of telecommunications interfaces in the Digital Broadcasting systems" (DVB Project office).

[i.20] ATSC Document A/56: "System Information for Digital Television".

NOTE: Available at <http://www.atsc.org>.

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**AC-3:** refers to the coding of audio using the Dolby AC-3 method (ITU-R Recommendation BS.1196-1 [i.7])

NOTE: The Service Information requirements for AC-3 streams carried in DVB systems is described in annex E of EN 300 468 [i.1]. The carriage of AC-3 elementary streams as private data within MPEG systems is described in annex C of TR 101 154 [i.9].

**bouquet:** collection of services marketed as a single entity

**broadcaster (SERVICE Provider):** organization which assembles a sequence of events or programmes to be delivered to the viewer based upon a schedule

**cell:** geographical area that is covered with DVB-T signals delivering one or more particular transport streams throughout the area by means of one or more transmitters

NOTE: The cell may in addition contain repeaters. Two neighbouring cells may be intersecting, or fully overlapping. The cell\_id that is used to uniquely identify a cell is unique within each original\_network\_id. For hand-over purposes it is more convenient if the transport streams associated with the cell cover exactly the same area, or only one transport stream per cell is used.

**component (ELEMENTARY Stream):** one or more entities which together make up an event

EXAMPLE: Video, audio, Teletext.

**Conditional Access (CA) system:** system to control subscriber access to services, programmes and events

EXAMPLE: Videoguard, Eurocrypt.

**delivery system:** physical medium by which one or more multiplexes are transmitted

EXAMPLE: Satellite system, wide-band coaxial cable, fibre optics, terrestrial channel of one emitting point.

**event:** grouping of elementary broadcast data streams with a defined start and end time belonging to a common service

EXAMPLE: First half of a football match, News Flash, first part of an entertainment show.

**MPEG-2:** refers to the standard ISO/IEC 13818:

NOTE: Systems coding is defined in part 1 [i.2].

Video coding is defined in part 2 [i.18].

Audio coding is defined in part 3 [i.13].

**multiplex:** stream of all the digital data carrying one or more services within a single physical channel

**network:** collection of MPEG-2 TS multiplexes transmitted on a single delivery system

EXAMPLE: All digital channels on a specific cable system.

**programme:** concatenation of one or more events under the control of a broadcaster

EXAMPLE: News show, entertainment show.

**section:** syntactic structure used for mapping all service information into ISO/IEC 13818-1 [i.2]

NOTE: Transport Stream (TS) packets.

**service:** sequence of programmes under the control of a broadcaster which can be broadcast as part of a schedule

**Service Information (SI):** digital data describing the delivery system, content and scheduling/timing of broadcast data streams, etc.

NOTE: It includes MPEG-2 Program Specific Information (PSI) together with independently defined extensions.

**subcell:** geographical area that is part of the cell's coverage area and that is covered with DVB-T signals by means of a transposer

NOTE: In conjunction with the cell\_id the cell\_id\_extension is used to uniquely identify a subcell.

**sub-table:** comprising a number of sections with the same value of table\_id, table\_id\_extension and version\_number

NOTE: The table\_id\_extension field is equivalent to the fourth and fifth byte of a section when the section\_syntax\_indicator is set to a value of "1".

**table:** comprising a number of sections with the same value of table\_id

**Transport Stream (TS):** data structure defined in ISO/IEC 13818-1 [i.2]

NOTE: It is the basis of the DVB standards.

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC-3	dolby AC-3 audio coding
ASCII	American Standard Code for Information Interchange
ATSC	Advanced Television Systems Committee of the USA
BAT	Bouquet Association Table
CA	Conditional Access
CR	Carriage Return character
DAB	Digital Audio Broadcasting
DIT	Discontinuity Information Table
DSNG	Digital Satellite News Gathering
DVB	Digital Video Broadcasting
DVD	Digital Versatile Disc
EIT	Event Information Table
EPG	Electronic Program Guide
ES	Elementary Stream
GPS	Global Positioning System
IRD	Integrated Receiver-Decoder
LF	Line Feed Character
MFN	Multi-Frequency Network
MJD	Modified Julian Date
MPEG	Moving Pictures Expert Group
NIT	Network Information Table
NVOD	Near Video On Demand
PAT	Program Association Table
PDC	Programme Delivery Control
PID	Packet Identifier
PIL	Programme Identification Label
PMT	Program Map Table
PSI	Program Specific Information
QAM	Quadrature Amplitude Modulation

QPSK	Quadrature Phase Shift Keying
RST	Running Status Table
SDT	Service Description Table
SFN	Single Frequency Network
SHY	Soft HYphen
SI	Service Information
SIT	Selection Information Table
SMATV	Satellite Master Antenna TeleVision
ST	Stuffing Table
TDT	Time and Date Table
TOT	Time Offset Table
TPS	Transmission Parameter Signalling
TS	Technical Specification
TS	Transport Stream
TSDT	Transport Stream Description Table
UCS	Universal Character Set
UTC	Universal Time Coordinated
UTF	UCS Transformation Format
VBI	Vertical Blanking Interval
VPS	Video Programme System
WSS	Wide Screen Signalling

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Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/69a98219-1106-4f62-b53c-254e3e3f9caf/etsi-tr-101-211-v1.9.1-2009-06>

## 4 Rules of operation

This clause contains some recommendations on the usage of the Digital Video Broadcasting (DVB) Service Information (SI) syntax.

### 4.1 Service Information (SI) table information

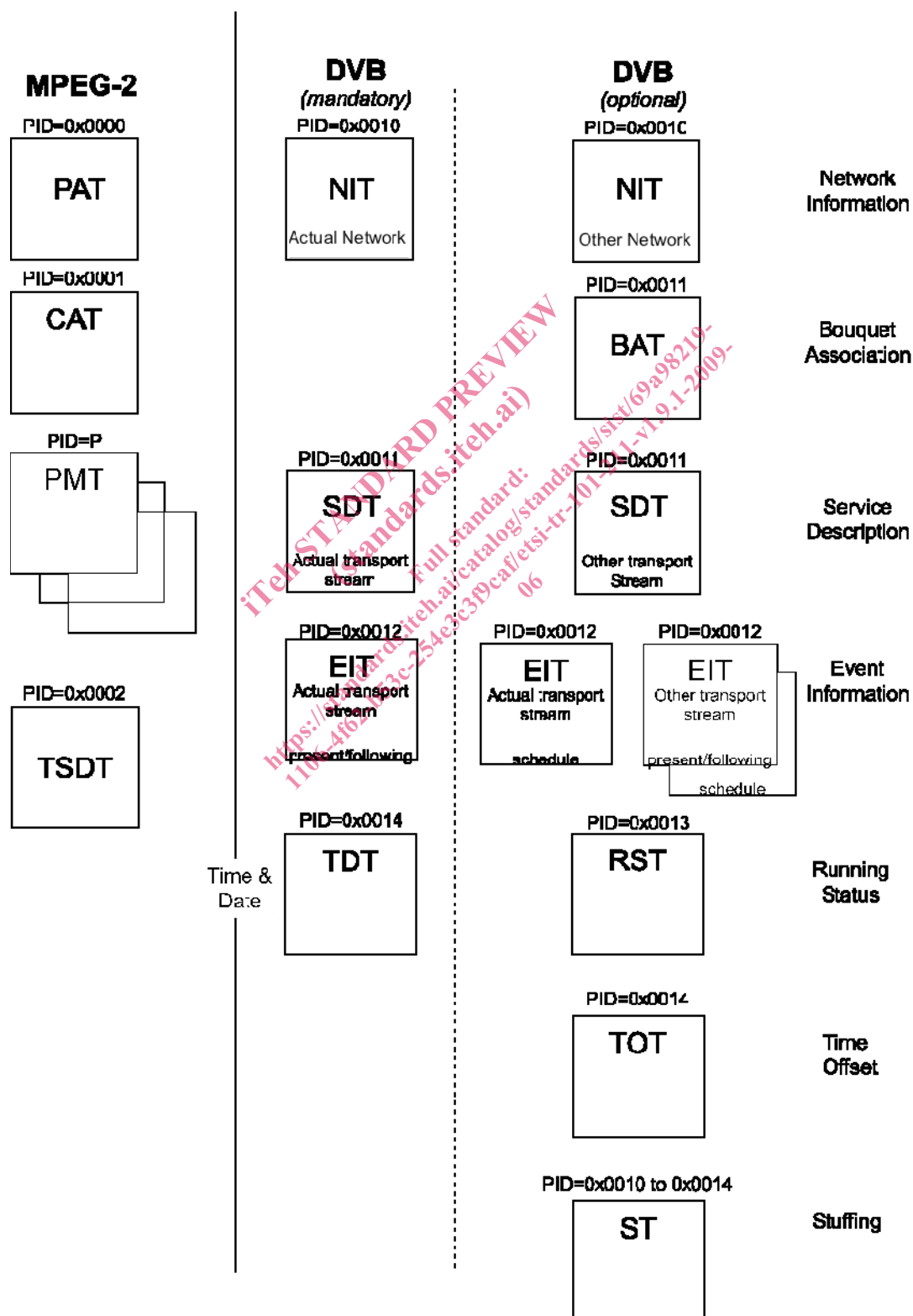


Figure 1: SI table information

### 4.1.1 Network Information Table (NIT) information

The Network Information Table (NIT) provides a grouping of Transport Streams (TSs) and the relevant tuning information. The NIT could be used during set-up procedures of the IRD and the relevant tuning information may be stored in non-volatile memory. The NIT also could be used to signal changes of tuning information. The following rules apply to the NIT:

- a) transmission of the NIT is mandatory for the actual delivery system;
- b) the NIT describing the actual delivery system is valid if and only if it contains applicable delivery system descriptors for the actual delivery system. This rule specifies the conditions under which the NIT contains valid information. At some transitions of broadcast delivery system boundaries, the NIT carried in a TS is allowed to describe an earlier network in the broadcast chain. A different mechanism has to be selected by the IRD to obtain the relevant tuning information for the actual delivery system. If a satellite IRD receives a satellite delivery system descriptor for the actual delivery system, then it is valid. If a cable IRD receives a cable delivery system descriptor for the actual delivery system, then it is valid. If a cable IRD receives a satellite delivery system descriptor for the actual delivery system, then it is assumed to be invalid for the cable IRD;
- c) if a valid NIT for the actual delivery system is present in the SI bit stream then it will list all TSs of the actual delivery system;
- d) the SI stream will have at least 8 TS packets per 10 s carrying NIT data or NULL packets. This rule simplifies the replacement of the NIT at broadcast delivery system boundaries. With the simple replacement mechanism, local frequency control is possible with relatively low cost equipment.

The SI uses two labels related to the concept of a delivery system, namely the `network_id` and the `original_network_id`. The latter is intended to support the unique identification of a service, contained in a TS, even if that TS has been transferred to another delivery system than the delivery system where it originated. A TS can be uniquely referenced through the path `original_network_id/transport_stream_id`.

A service can be uniquely referenced through the path `original_network_id/transport_stream_id/service_id`. The `network_id`, thus, is not part of this path.

In addition each `service_id` will be unique within each `original_network_id`. When a service (contained inside a TS) is transferred to another delivery system, only the `network_id` changes, whereas the `original_network_id` remains unaffected.

By way of example, consider the following, where two services (A and B), which originate in two different delivery systems and happen to have the same `service_ids` and `transport_stream_ids`, are transferred to a new delivery system.

In the example, the two services are located on different TSs (X and Y) in the new network. If the two services were being combined onto the same TS, then it would be necessary to modify the identification of the services, since the same `service_id` value cannot be assigned to more than one service within a TS, and only one `original_network_id` can be associated with a TS (see clause 5.3 for further discussion on transitions at broadcast delivery media boundaries).