

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Teleweb application –  
Part 2: Delivery methods

STANDARD PREVIEW  
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Application teleweb –  
Partie 2: Méthodes de distribution

IEC 62298-2:2005  
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## TELEWEB APPLICATION –

## Part 2: Delivery methods

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International Standard IEC 62298-2 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This standard cancels and replaces IEC/PAS 62298 published in 2002.

This first edition constitutes a technical revision.

This bilingual version (2012-11) corresponds to the monolingual English version, published in 2005-05.

The text of this standard is based on the following documents:

FDIS	Report on voting
100/923/FDIS	100/961/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 62298 consists of the following parts, under the general title *TeleWeb application*:

Part 1: General description

Part 2: Delivery methods

Part 3: Superteletext profile

Part 4: Hyperteletext profile

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## INTRODUCTION

The aim of TeleWeb is to deliver World Wide Web-style content to the living-room TV to give the viewer an enhanced television experience. A TeleWeb service broadcasts data files containing text and high-definition graphics to suitable decoders. The data transmitted can be closely linked to events within the accompanying TV programmes or can be more general in nature to emulate a traditional, but higher definition, superteletext service. Different profiles are defined.

It is intended that TV-based decoders be implemented in a cost-effective manner without recourse to the technology normally associated with personal computers. In part, this is achieved by limiting the number of different types of multimedia data that can be used within a service. By careful design of the user interface, decoder manufacturers will be able to offer easy-to-use equipment for accessing TeleWeb services without requiring the consumer to be computer-literate. In addition, they will be able to customize their products to differentiate them from those of their competitors.

This standard focuses on the transmission layer.

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## TELEWEB APPLICATION –

### Part 2: Delivery methods

#### 1 Scope

This part of IEC 62298 specifies the transmission layer of TeleWeb.

TeleWeb services can be broadcast in a number of different ways, for example, VBI, DVB, DAB, etc., and to a variety of decoder types, for example, TVs, portable decoders, PCs, etc. This standard specifies the transmission layer for VBI and DVB broadcasts.

#### 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.

IEC 62298-1: *TeleWeb application – Part 1: General description*

IEC 62298-3: *TeleWeb application – Part 3: Superteletext profile*

IEC 62298-4: *TeleWeb application – Part 4: Hyperteletext profile*<sup>1</sup>

ISO/IEC 13818-1, *Information technology – Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-6, *Information technology – Generic coding of moving pictures and associated audio information – Part 6: Extension for DSM-CC*

ISO 639-2, *Codes for the representation of names of languages – Part 2: Alpha-3 code*

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

ETSI TR 101 154: V1.4.1, *Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications*

ETSI TR 101 202, *Implementation guidelines for data broadcasting, V1.1.1*

ETSI EN 300 421, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services*

ETSI EN 300 429, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems*

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<sup>1</sup> To be published.



ETSI EN 300 706, *Enhanced Teletext Specification*

ETSI EN 300 708, *Television Systems; Data Transmission within Teletext*

ETSI EN 300 744, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television*

ETSI EN 301 192, *Digital Video Broadcasting (DVB); DVB specification for data broadcasting, V1.2.1*

ETSI ETS 300 472, *Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bit streams*

### 3 Terms, definitions and abbreviations

#### 3.1 Terms and definitions

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

##### 3.1.1

##### **bit ordering**

in all schematics, numeric values ordered with the most significant bit at the left-hand side and the least significant bit at the right-hand side

##### 3.1.2

##### **conditional access (CA)**

mechanism by which user access to service components can be restricted

##### 3.1.3

##### **Independent Data Line (IDL)**

stand-alone Teletext packet containing both control and application data. It does not form part of a Teletext page. The packet address is either 30 or 31

##### 3.1.4

##### **module**

when broadcast within a DSM-CC data carousel, the contents of a file and its attributes (for example, file type, creation date, etc.) are transmitted separately. The file itself is carried by a number of DDB messages and its attributes appear as descriptors within its module loop within a DII control message

##### 3.1.5

##### **signed integer**

positive or negative integer value, in decimal notation. The first digit is preceded by a mandatory plus (+) or minus (–) symbol with no white space between the symbol and the first digit

##### 3.1.6

##### **text string**

sequence of displayable Latin-1 characters

##### 3.1.7

##### **unsigned integer**

integer value, in decimal notation, not preceded by a plus (+) or minus (–) symbol

### 3.2 Abbreviations

<b>BSLBF</b>	Bit String, Left Bit First
<b>CA</b>	Conditional Access
<b>CRC</b>	Cyclic Redundancy Check
<b>DAB</b>	Digital Audio Broadcasting
<b>DDB</b>	Download Data Block message
<b>DII</b>	Download Info Indication message
<b>DSI</b>	Download Server Initiate message
<b>DSM-CC</b>	Digital Storage Media Command and Control
<b>DVB</b>	Digital Video Broadcasting
<b>ETS</b>	European Telecommunication Standard
<b>HTML</b>	Hyper Text Mark-up Language
<b>IDL</b>	Independent Data Line
<b>IEC</b>	International Electrotechnical Commission
<b>ISO</b>	International Organisation for Standardization
<b>LSB</b>	Least Significant Bit
<b>MJD</b>	Modified Julian Date
<b>MPEG</b>	Moving Picture Experts Group
<b>MSB</b>	Most Significant Bit
<b>OSI</b>	Open Systems Interconnection
<b>PES</b>	Packetized Elementary Stream
<b>PID</b>	Packet Identifier
<b>PMT</b>	Program Map Table
<b>RFC</b>	Internet Requests for Comments
<b>RPCHOF</b>	Remainder Polynomial Coefficient, Higher Order First
<b>SDT</b>	Service Description Table
<b>TS</b>	Transport Stream
<b>UIMSBF</b>	Unsigned Integer Most Significant Bit First
<b>URL</b>	Uniform Resource Locator
<b>UTC</b>	Universal Time Coordinated
<b>VBI</b>	Vertical Blanking Interval

## 4 Delivery profiles

There are several ways in which a TeleWeb application can be delivered (see Figure 1 in IEC 62298-1). For the purposes of this document, a delivery profile specifies layers 1 to 4 of the OSI seven-layer model.

### 4.1 TeleWeb delivered via Teletext packets in VBI lines

Figure 1 shows layers 1 to 4 of the OSI seven-layer model for delivering a TeleWeb service via Teletext packets. The application files are formed into a DSM-CC data carousel at the transport layer, as defined in 5.1. The components of the carousel are then encapsulated in independent Teletext data packets (see 6.3). These are transmitted in the VBI lines of an analog TV signal as described in ETSI EN 300 708.

Layer	Generic content	TeleWeb specific content
Layer 4: Transport	Arranging the data in a suitable way for transport	DSM-CC data carousel: Blocks and modules Descriptors Groups and supergroups  Delimiting between messages  Forward error correction
Layer 3: Network	Logical functions related to the multiplexing and demultiplexing of data packets belonging to different communications flows:  Data channel addressing Data packet sequencing	Format B independent data line as defined in ETSI EN 300 708 ("Packet 31")
Layer 2: Link	Logical functions related to data transmission:  Byte synchronization Error control (framing, misdirection and false detection) Data formatting	Normal Teletext packet format as defined in ETSI EN 300 706
Layer 1: Physical	Electrical transmission of the data signal	Normal Teletext parameters as defined in ETSI EN 300 706

**Figure 1 – Delivery method for TeleWeb using Teletext packets in VBI lines**

IEC 679/05

#### 4.2 TeleWeb delivered via PES packets in an MPEG-2 TS

Figure 2 shows layers 1 to 4 of the OSI seven-layer model for delivering a TeleWeb service via Teletext packets. The application files are formed into a DSM-CC data carousel at the transport layer, as defined in 5.1. The components of the carousel are then encapsulated in independent Teletext data packets (see 6.3). These are transmitted in an MPEG-2 transport stream using PES packets as described in ETSI ETS 300 472.

NOTE The data is prepared as it would be for transmitting in 4.1, added to a transport stream and treated as an analog Teletext service.

Layer	Generic content	TeleWeb specific content
Layer 4: Transport	Arranging the data in a suitable way for transport	Embedding in DSM-CC data carousel as specified in this standard
Layer 3: Network	Logical functions related to the multiplexing and demultiplexing of data packets belonging to different communications flows:  Data channel addressing Data packet sequencing	Embedding in Format B independent data line as defined in ETSI EN 300 708 ("Packet 31")
Layer 2: Link	Logical functions related to the data transmission:  Byte synchronization Error control (framing, misdirection and false detection) Data formatting	Embedding in an MPEG-2 transport stream using PES packets ETSI ETS 300 472
Layer 1: Physical	Electrical transmission of the data signal	Multiplexing and transmission according to DVB-T ETSI EN 300 744, DVB-C ETSI EN 300 429 or DVB-S ETSI EN 300 421

**Figure 2 – Delivery method for TeleWeb using PES packets in an MPEG-2 TS**

IEC 680/05

**4.3 TeleWeb delivered via DSM-CC sections in an MPEG-2 TS**

Figure 3 shows layers 1 to 4 of the OSI seven-layer model for delivering a TeleWeb service via DSM-CC sections. The application files are formed into a DSM-CC data carousel at the transport layer, as defined in 5.1. The components of the carousel are then encapsulated in DSM-CC sections in an MPEG-2 transport stream as described in ISO/IEC 13818-6.

Layer	Generic content	TeleWeb specific content
Layer 4: Transport	Arranging the data in a suitable way for transport	Embedding in DSM-CC data carousel as specified in this standard
Layer 3: Network	Logical functions related to the multiplexing and demultiplexing of data packets belonging to different communications flows:  Data channel addressing Data packet sequencing	Embedding in DSM-CC sections as specified in this standard
Layer 2: Link	Logical functions related to the data transmission:  Byte synchronization Error control (framing, misdirection and false detection) Data formatting	Embedding in TS packets as specified in ISO/IEC 13818-6
Layer 1: Physical	Electrical transmission of the data signal	Multiplexing and transmission according to DVB-T ETSI EN 300 744, DVB-C ETSI EN 300 429 or DVB-S ETSI EN 300 421

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**Figure 3 – Delivery method for TeleWeb using DSM-CC sections in an MPEG-2 TS**

**4.4 TeleWeb delivered via other methods**

This standard will be amended when necessary with other transport methods.

**5 Transport layer protocols**

This clause defines protocols for implementing the transport layer.

**5.1 DSM-CC data carousel**

**5.1.1 Overview**

The files of a TeleWeb service are organized in DSM-CC data carousels according to the general principles defined in ISO/IEC 13818-6 and adapted for DVB applications as described in ETSI EN 301 192 and ETSI TR 101 202. The DSM-CC data carousel specification embodies the cyclic transmission of data to receivers. The data transmitted within a carousel is first organized into “modules”, which are then subdivided into “blocks”. All the blocks of all modules within the data carousel are of the same size, except for the last block of each module, which may be of a smaller size. Each individual file in a TeleWeb service is treated as a module. Modules can be clustered together to form a “group”. Likewise, groups can be clustered to form “supergroups”.

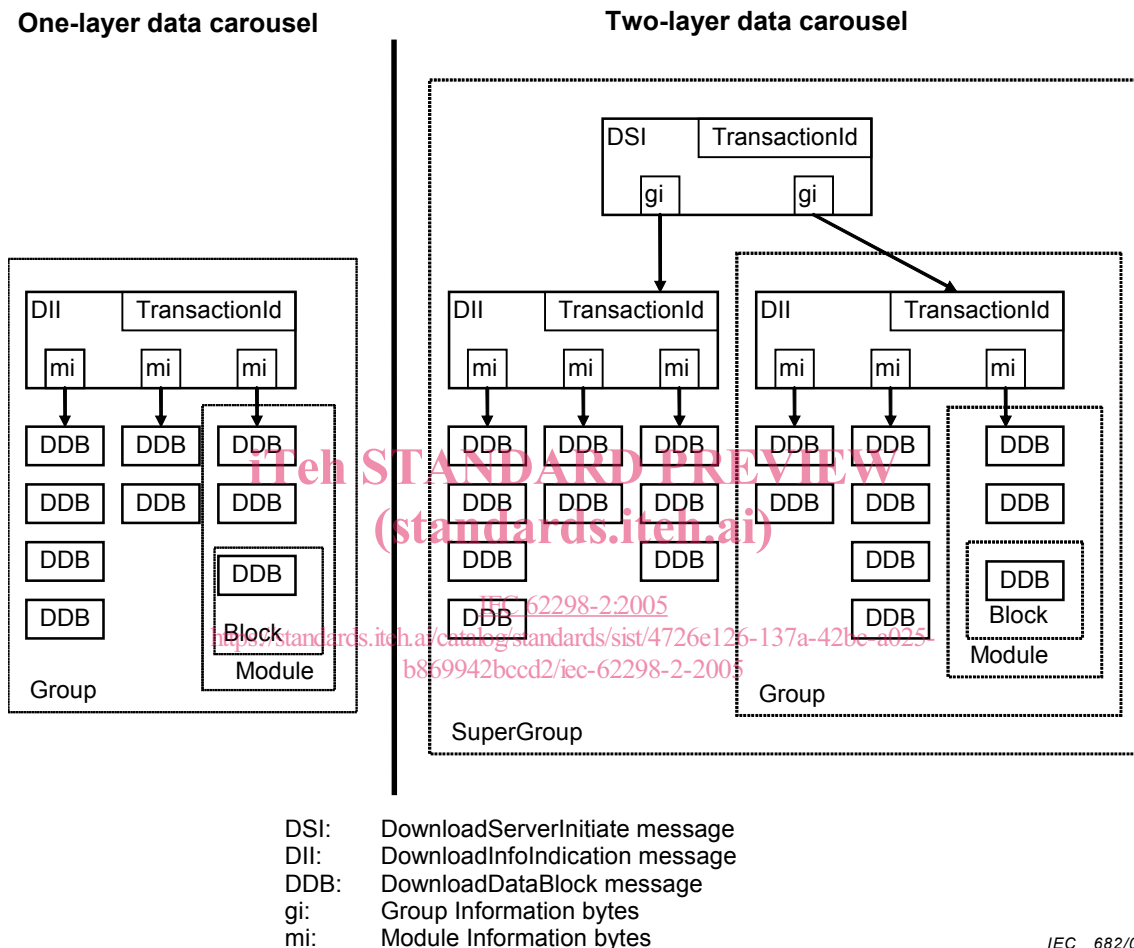
The data carousel specification defined here uses three messages from the full data carousel specification defined in ISO/IEC 13818-6. The data blocks are carried in DownloadDataBlock (DDB) messages, while control over the modules is provided by DownloadInfoIndication (DII) and DownloadServerInitiate (DSI) messages. Other DSM-CC messages listed in ISO/IEC 13818-6 are not used in the TeleWeb application and should be ignored by receivers designed to this edition. All messages begin with the generic DSM-CC Message Header.<sup>2</sup>

<sup>2</sup> ISO/IEC 13818-6, Clause 2.

This header contains information about the type and size of the message. The maximum size of any DII, DSI or DDB message shall be 4 084 bytes (including the message header).

A receiver shall ignore message fields marked “reserved” (ISO-designated) or “reserved for future use” (ETSI-designated), noting that such fields may be variable in size.

A data carousel can have one or two layers of control information as shown in Figure 4. The service provider is free to choose the most appropriate type. A receiver shall be able to work with both types.



**Figure 4 – Structure of one-layer and two-layer data carousels**

A one-layer carousel defines a single group. The top-level control message is a DII message. This describes all the modules in the carousel. The module description includes a descriptor loop that carries the attributes (for example, type, theme) of each module.

A two-layer carousel comprises a number of one-layer carousels. The top-level control message is a DownloadServerInitiate message (DSI), 5.1.2.2. This describes the different groups in the supergroup. Each group is described by a DII message as for a one-layer carousel.

A TeleWeb service may be implemented across a number of carousels. The need for multiple carousels arises because of the significant overhead associated with updating the contents of control messages when transmitting real-time information. This can be minimized by limiting the amount of data in a carousel that contains information that changes very frequently. The maximum number of carousels may be limited by the transmission method.

### 5.1.2 DSM-CC messages

#### 5.1.2.1 DownloadInfoIndication message

A DownloadInfoIndication message contains the description of the modules within a group as well as some general parameters of the data carousel such as block size. Each module within the group can be described by a number of descriptors. These carry the TeleWeb-specific attributes.

The syntax of a DII message is shown in Table 1. The final column indicates if a field has a fixed or variable value in the TeleWeb application.

**Table 1 – Syntax of the DownloadInfoIndication message**

Syntax	No. of bytes	TeleWeb use
DownloadInfoIndication() {		
protocolDiscriminator	1	Fixed at 0x11
dsmccType	1	Fixed at 0x03
messageId	2	Fixed at 0x1002
transactionId	4	Variable
reserved	1	Fixed at 0xFF
adaptationLength	1	Variable
messageLength	2	Variable
dsmccAdaptationHeader()	adaptationLength	Reserved for future use
downloadId	4	Variable
blockSize	2	Variable
windowSize	1	Fixed at 0x00
ackPeriod	1	Fixed at 0x00
tCDownloadWindow	4	Fixed at 0x00 throughout
tCDownloadScenario	4	Variable
compatibilityDescriptorLength	2	Fixed at 0x0000 (no compatibilityDescriptor)
numberOfModules	2	Variable
for(i=0; i< numberOfModules; i++) {		
moduleId	2	Variable
moduleSize	4	Variable
moduleVersion	1	Variable
moduleInfoLength	1	Variable
for(j=0; j< moduleInfoLength; j++) {		
moduleInfoByte	1	Variable
}		
}		
privateDataLength	2	Variable
for(i=0; i< privateDataLength; i++) {		
privateDataByte	1	Reserved for future use
}		
}		

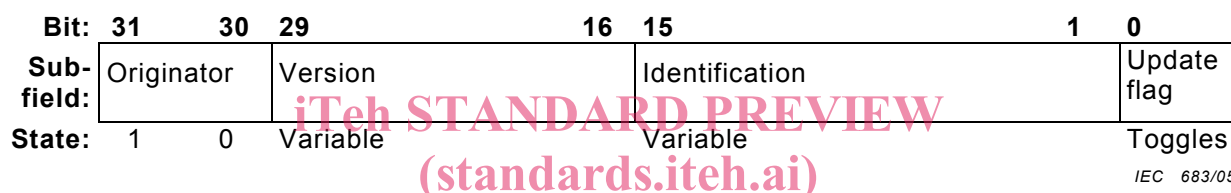
The protocolDiscriminator field is used to indicate that the message is a DSM-CC message within a particular environment. This field has the fixed value of 0×11.

The dsmccType field is used to indicate the type of DSM-CC message.<sup>3</sup> The “user-to-network” download messages of which data carousels are a part have been allocated the value 0×03.

The messageId field is fixed at 0×1002 to identify the message as a DownloadInfoIndication message.<sup>4</sup>

The transactionId field provides both the unique identification of a control message and version information. The version component is changed whenever any field of the message is modified. Reference ISO/IEC 13818-6 defines the transactionId as consisting of a 2-bit transactionId\_ordinator field (2 MSBs) and a 30-bit transaction\_number field.<sup>5</sup> The TeleWeb application adopts the DVB interpretation as described in ETSI TR 101 202 and divides the field into the four subfields shown in Figure 5.

In the case of a two-layer carousel, each DII message is referenced from within the group loop of the DSI message. The transactionId field in a DII message and the corresponding groupId field in the DSI message are coded identically.



**Figure 5 – Format of transactionId field**

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The Update Flag (bit 0) shall be toggled every time the message is updated.

The Identification subfield (bits 1 to 15) shall be set to 0×0000 for the top-level control message in the data carousel. All other control messages shall have one or more non-zero bits as described in ETSI EN 301 192. This coding scheme enables a receiver to determine whether a carousel is one- or two-layered having acquired any DII message.

- For the one-layer carousel, the identification field in the DII message will be 0×0000.
- For the two-layer carousel, the identification field in a DII message will be in the range 0×0001 to 0×7FFF.
- The identification field in the DSI message will be 0×0000.

NOTE If multiple carousels are used, a receiver is likely to detect DII messages with identification values from 0×0000 to 0×7FFF.

The Version subfield (bits 16 to 29) conveys a version number for the message. This value shall be incremented modulo 0×4000 every time the control message is updated.

NOTE A receiver should not expect to see linearly incrementing version numbers. There may be missing values. For example, the encoder might have prepared a new DII message (and incremented the version number) following a change, but before it can be transmitted another change is detected, causing the version number to be incremented yet again before transmission. The updating actions required on a change of data are described in 5.1.3.

<sup>3</sup> ISO/IEC 13818-6, Clause 2, Table 2-2.

<sup>4</sup> ISO/IEC 13818-6, 7.3, Table 7-4.

<sup>5</sup> ISO/IEC 13818-6, Clause 2, Figure 2-1.