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Information technology — Generic coding of moving pictures and associated audio information: Systems

AMENDMENT 1: Carriage of metadata over ITU-T Rec. H.222.0 | ISO/IEC 13818-1 streams

Technologies de l'information — Codage générique des images animées et du son associé: Systèmes

AMENDEMENT 1: Transport de métadonnées sur «streams»
ITU-T Rec. H.222.0 | ISO/CEI 13818-1

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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

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Amendment 1 to ISO/IEC 13818-1:2000 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. H.222.0.

In this corrected version of ISO/IEC 13818-1:2000/Amd.1:2003 a “reserved” field has been inserted in Table AMD1-13.

INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – Generic coding of moving pictures and associated audio information: Systems

Amendment 1

Carriage of metadata over ITU-T Rec. H.222.0 | ISO/IEC 13818-1 streams

1) Subclause 2.1

Insert the following new definitions and renumber existing ones accordingly:

2.1.28 metadata: Information to describe audiovisual content and data essence in a format defined by ISO or any other authority.

2.1.29 metadata access unit: A global structure within metadata that defines the fraction of metadata that is intended to be decoded at a specific instant in time. The internal structure of a metadata Access Unit is defined by the format of the metadata.

2.1.30 metadata application format: Identifies the format of the application that uses the metadata; signals application specific information for transport of metadata.

2.1.31 metadata decoder configuration information: Data needed by a receiver to decode a specific metadata service. Depending on the format of the metadata, decoder configuration information may or may not be needed.

2.1.32 metadata format: Identifies the coding format of metadata.

2.1.33 metadata service: Coherent set of metadata of the same format delivered to a receiver for a specific purpose.

2.1.34 metadata service id: Identifier of a specific metadata service; used for some transport methods of the metadata.

2.1.35 metadata stream: The concatenation or collection of metadata Access Units from one or more metadata services.

2) Table 2-18

Define a tag for a metadata stream by replacing Table 2-18 in clause 2:

Table 2-18 – Stream_id assignments

Stream_id	Note	Stream coding
1011 1100	(1)	program_stream_map
1011 1101	(2)	private_stream_1
1011 1110		padding_stream
1011 1111	(3)	private_stream_2
110x xxxx		ISO/IEC 13818-3 or ISO/IEC 11172-3 or ISO/IEC 13818-7 or ISO/IEC 14496-3 audio stream number x xxxx
1110 xxxx		ITU-T Rec. H.262 | ISO/IEC 13818-2 or ISO/IEC 11172-2 or ISO/IEC 14496-2 video stream number xxxx
1111 0000	(3)	ECM_stream
1111 0001	(3)	EMM_stream
1111 0010	(5)	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 Annex A or ISO/IEC 13818-6_DSM-CC_stream
1111 0011	(2)	ISO/IEC_13522_stream
1111 0100	(6)	ITU-T Rec. H.222.1 type A
1111 0101	(6)	ITU-T Rec. H.222.1 type B
1111 0110	(6)	ITU-T Rec. H.222.1 type C
1111 0111	(6)	ITU-T Rec. H.222.1 type D
1111 1000	(6)	ITU-T Rec. H.222.1 type E
1111 1001	(7)	ancillary_stream
1111 1010		ISO/IEC14496-1_SL-packetized_stream
1111 1011		ISO/IEC14496-1_FlexMux_stream
1111 1100		metadata stream
1111 1101		reserved data stream
1111 1110		reserved data stream
1111 1111	(4)	program_stream_directory

The notation x means that the values '0' or '1' are both permitted and results in the same stream type. The stream number is given by the values taken by the x's.

NOTE 1 – PES packets of type program_stream_map have unique syntax specified in 2.5.4.1.

NOTE 2 – PES packets of type private_stream_1 and ISO/IEC_13552_stream follow the same PES packet syntax as those for ITU-T Rec. H.262 | ISO/IEC 13818-2 video and ISO/IEC 13818-3 audio streams.

NOTE 3 – PES packets of type private_stream_2, ECM_stream and EMM_stream are similar to private_stream_1 except no syntax is specified after PES_packet_length field.

NOTE 4 – PES packets of type program_stream_directory have a unique syntax specified in 2.5.5.

NOTE 5 – PES packets of type DSM-CC_stream have a unique syntax specified in ISO/IEC 13818-6.

NOTE 6 – This stream_id is associated with stream_type 0x09 in Table 2-29.

NOTE 7 – This stream_id is only used in PES packets, which carry data from a Program Stream or an ISO/IEC 11172-1 System Stream, in a Transport Stream (refer to 2.4.3.7).

3) Table 2-26

Define a metadata_section tag by replacing Table 2-26 in clause 2:

Table 2-26 – table_id assignment values

Value	Description
0x00	Program_association_section
0x01	Conditional_access_section (CA_section)
0x02	TS_program_map_section
0x03	TS_description_section
0x04	ISO_IEC_14496_scene_description_section
0x05	ISO_IEC_14496_object_descriptor_section
0x06	Metadata_section
0x07-0x37	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 Reserved
0x38-0x3F	Defined in ISO/IEC 13818-6
0x40-0xFE	User private
0xFF	Forbidden

4) Table 2-29

Define tags for a metadata carried in PES packets, metadata_sections and DSM-CC by replacing Table 2-29 in clause 2:

Table 2-29 – Stream type assignments

Value	Description
0x00	ITU-T | ISO/IEC Reserved
0x01	ISO/IEC 11172 Video
0x02	ITU-T Rec. H.262 | ISO/IEC 13818-2 Video or ISO/IEC 11172-2 constrained parameter video stream
0x03	ISO/IEC 11172 Audio
0x04	ISO/IEC 13818-3 Audio
0x05	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 private_sections
0x06	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 PES packets containing private data
0x07	ISO/IEC 13522 MHEG
0x08	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 Annex A DSM-CC
0x09	ITU-T Rec. H.222.1
0x0A	ISO/IEC 13818-6 type A
0x0B	ISO/IEC 13818-6 type B
0x0C	ISO/IEC 13818-6 type C
0x0D	ISO/IEC 13818-6 type D
0x0E	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 auxiliary
0x0F	ISO/IEC 13818-7 Audio with ADTS transport syntax
0x10	ISO/IEC 14496-2 Visual
0x11	ISO/IEC 14496-3 Audio with the LATM transport syntax as defined in ISO/IEC 14496-3/Amd.1
0x12	ISO/IEC 14496-1 SL-packetized stream or FlexMux stream carried in PES packets
0x13	ISO/IEC 14496-1 SL-packetized stream or FlexMux stream carried in ISO/IEC14496_sections.
0x14	ISO/IEC 13818-6 Synchronized Download Protocol

Table 2-29 – Stream type assignments

Value	Description
0x15	Metadata carried in PES packets using the Metadata Access Unit Wrapper defined in 2.12.4.1
0x16	Metadata carried in metadata_sections
0x17	Metadata carried in ISO/IEC 13818-6 (DSM-CC) Data Carousel
0x18	Metadata carried in ISO/IEC 13818-6 (DSM-CC) Object Carousel
0x19	Metadata carried in ISO/IEC 13818-6 Synchronized Download Protocol using the Metadata Access Unit Wrapper defined in 2.12.4.1
0x1A-0x7F	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 Reserved
0x80-0xFF	User Private

5) Table 2-39

Define tags for a metadata related descriptors by replacing Table 2-39 in clause 2:

Table 2-39 – Program and program element descriptors

descriptor_tag	TS	PS	Identification
0	n/a	n/a	Reserved
1	n/a	n/a	Reserved
2	X	X	video_stream_descriptor
3	X	X	audio_stream_descriptor
4	X	X	hierarchy_descriptor
5	X	X	registration_descriptor
6	X	X	data_stream_alignment_descriptor
7	X	X	target_background_grid_descriptor
8	X	X	Video_window_descriptor
9	X	X	CA_descriptor
10	X	X	ISO_639_language_descriptor
11	X	X	System_clock_descriptor
12	X	X	Multiplex_buffer_utilization_descriptor
13	X	X	Copyright_descriptor
14	X		Maximum_bitrate_descriptor
15	X	X	Private_data_indicator_descriptor
16	X	X	Smoothing_buffer_descriptor
17	X		STD_descriptor
18	X	X	IBP_descriptor
19-26	X		Defined in ISO/IEC 13818-6
27	X	X	MPEG-4_video_descriptor
28	X	X	MPEG-4_audio_descriptor
29	X	X	IOD_descriptor
30	X		SL_descriptor
31	X	X	FMC_descriptor
32	X	X	External_ES_ID_descriptor
33	X	X	MuxCode_descriptor
34	X	X	FmxBufferSize_descriptor

Table 2-39 – Program and program element descriptors

descriptor_tag	TS	PS	Identification
35	X		MultiplexBuffer_descriptor
36	X	X	Content_labeling_descriptor
37 38 39	X X X	X X X	Metadata_pointer_descriptor Metadata_descriptor Metadata_STD_descriptor
40-63	n/a	n/a	ITU-T Rec. H.222.0 | ISO/IEC 13818-1 Reserved
64-255	n/a	n/a	User Private

6) New subclauses after subclause 2.6.55

Add the following subclauses after subclause 2.6.55:

2.6.56 Content labelling descriptor

The content labelling descriptor assigns a label to content; the label can be used by metadata to reference the associated content. This label, the content_reference_id_record, is metadata application format specific. The content labelling descriptor is associated with a content segment. For the purpose of this clause, a content segment is defined as a portion in time of a program, an elementary stream (such as audio or video) or any combination of programs or elementary streams. The descriptor may be included in the PMT in the descriptor loop for either the program or an elementary stream, but may also be contained in tables not defined in this Specification, for example tables to describe segments of programs or elementary streams. The content labelling descriptor also provides information on which content time base is used and on the offset between the content time base and the metadata time base. When the Normal Play Time (NPT) concept of DSM-CC, as specified in IEC/ISO 13818-6, is used as the content time base, the ID of the NPT time base is provided. The descriptor allows for carriage of private data.

Table Amd.1-1 – Content labelling descriptor

Syntax	No. of bits	Mnemonic
Content_labeling_descriptor () {		
descriptor_tag	**8**	**uimsbf**
descriptor_length	**8**	**uimsbf**
metadata_application_format	**16**	**uimsbf**
if (metadata_application_format== 0xFFFF){		
metadata_application_format_identifier	**32**	**uimsbf**
}		
content_reference_id_record_flag	**1**	**bslbf**
content_time_base_indicator	**4**	**uimsbf**
reserved	**3**	**bslbf**
if (content_reference_id_record_flag == '1'){		
content_reference_id_record_length	**8**	**uimsbf**
for (i=0; i<content_reference_id_record_length;i++){		
content_reference_id_byte	**8**	**bslbf**
}		
}		
if (content_time_base_indicator== 1|2){		
reserved	**7**	**bslbf**
content_time_base_value	**33**	**uimsbf**
reserved	**7**	**bslbf**
metadata_time_base_value	**33**	**uimsbf**
}		
if (content_time_base_indicator== 2){		
reserved	**1**	**bslbf**
contentId	**7**	**uimsbf**
}		
if (content_time_base_indicator==3|4|5|6|7){		
time_base_association_data_length	**8**	**uimsbf**
for (i=0; i< time_base_association_data_length;i++){		
reserved	**8**	**bslbf**
}		
}		
for (i=0; i<N;i++){		
private_data_byte	**8**	**bslbf**
}		
}		

2.6.57 Semantic definition of fields in content labelling descriptor

metadata_application_format: The metadata_application_format is a 16-bit field, coded as defined in Table Amd.1-2, that specifies the application responsible for defining usage, syntax and semantics of the content_reference_id record and of any other privately defined fields in this descriptor. See also subclause 2.12.1. The value 0xFFFF indicates that the format is signalled by the value carried in the metadata_application_format_identifier field.

Table Amd.1-2 – metadata_application_format

Value	Description
0x0000-0x00FF	Reserved
0x0100-0xFFFE	User defined
0xFFFF	Defined by the metadata_application_format_identifier field

metadata_application_format_identifier: The coding of this 32-bit field is fully equivalent to the coding of the format_identifier field in the registration_descriptor, as defined in subclause 2.6.8.

NOTE – The assigned Registration Authority for the format_identifier field is SMPTE.

content_reference_id_record_flag: The content_reference_id_record_flag is a 1-bit flag that signals the presence of a content_reference_id_record in this descriptor.

content_time_base_indicator: The content_time_base_indicator is a 4-bit field which specifies the used content time base. If the descriptor is associated with a program, then the content time base applies to all streams that are part of that program. A value of 1 indicates usage of the STC, while a value of 2 indicates usage of NPT, the Normal Play Time as defined in ISO/IEC 13818-6. The values between 8 and 15 indicate usage of a privately defined content time base. If coded with a value of 0, no content time base is defined in this descriptor. If no content time base is specified for a

program or stream, then the mapping of time references in the metadata to the content is not defined in this Specification.

Table Amd.1-3 – Content_time_base_indicator values

Value	Description
0	No content time base defined in this descriptor
1	Use of STC
2	Use of NPT
3-7	Reserved
8-15	Use of privately defined content time base

content_reference_id_record_length: The content_reference_id_record_length is an 8-bit field that specifies the number of content_reference_id_bytes immediately following this field. This field shall not be coded with the value 0.

content_reference_id_byte: The content_reference_id_byte is part of a string of one or more contiguous bytes that assigns one or more reference identifications (labels) to the content to which this descriptor is associated. The format of this byte string is defined by the body indicated by the coded value in the metadata_application_format field.

content_time_base_value: The content_time_base_value is a 33-bit field that specifies a value in units of 90 kHz of the content time base indicated by the content_time_base_indicator field.

metadata_time_base_value: The metadata_time_base_value is a 33-bit field that is coded in units of 90 kHz. The field is coded with the value of the metadata time base at the instant in time in which the time base indicated by content_time_base_indicator reaches the value encoded in the content_time_base_value field. Note that the metadata time base may use any time scale, but that its value is to be coded in units of 90 kHz. For example, if a SMPTE type of time code is used, then the number of hours, minutes, seconds and frames is expressed in the corresponding number of 90 kHz units.

contentId: The contentId is a 7-bit field that specifies the value of the content_Id field in the NPT Reference Descriptor for the applied NPT time base.

time_base_association_data_length: The time_base_association_data_length is an 8-bit field that specifies the number of reserved bytes immediately following this field. The reserved bytes can be used to carry time base association data for time bases defined in future.

private_data_byte: The private_data_byte is an 8-bit field. The private_data_bytes represent data, the format of which is defined privately. These bytes can be used to provide additional information as deemed appropriate. The use of these bytes is defined by the metadata application format.

2.6.58 Metadata pointer descriptor

The metadata pointer descriptor points to a single metadata service and associates this metadata service with audiovisual content in an ITU-T Rec. H.222.0 | ISO/IEC 13818-1 stream. The metadata is associated with the content within the context of the descriptor. The context is defined by the location of the descriptor. In a transport stream, the descriptor may be located in the PMT in the descriptor loop for either the program or an elementary stream, but may also be located in tables not defined in this Specification, such as tables describing bouquets of broadcast services. The metadata may be located in an ITU-T Rec. H.222.0 | ISO/IEC 13818-1 stream, but the same metadata may also be provided on alternative locations, such as the Internet.

The descriptor may contain location information of metadata that is not carried in an ITU-T Rec. H.222.0 | ISO/IEC 13818-1 stream; the coding of the location information is metadata application format specific. The descriptor allows for carriage of private data.

For metadata carried in an ITU-T Rec. H.222.0 | ISO/IEC 13818-1 stream, the descriptor specifies the tools used for such carriage. If the metadata is carried in PES packets, metadata sections, or ISO/IEC 13818-6 synchronized download sections, the metadata_service_id field identifies the metadata service in the referenced metadata stream. If a ISO/IEC 13818-6 carousel is used to carry the metadata, then the private data may provide information to signal the metadata service, such as the applied value of the module_id for carriage of the metadata in a data carousel, and the file name of the metadata when the object carousel is used.

Receivers should be aware that multiple metadata services may be pointed to from the same program or audiovisual stream (as defined by the context of the descriptor). A unique metadata pointer descriptor shall be used to point to each