International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.222.0

Amendment 2

(01/2014)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Transmission multiplexing and synchronization

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

Amendment 2: Signalling of transport profiles, signalling MVC view association to eye and MIME type registration

Recommendation ITU-T H.222.0 (2012) – Amendment 2

ITU International Telecommunication Union

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INTERNATIONAL STANDARD ISO/IEC 13818-1
RECOMMENDATION ITU-T H.222.0

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

Amendment 2

Signalling of transport profiles, signalling MVC view association to eye and MIME type registration

Summary

Amendment 2 to ITU-T H.222.0 (2012) | ISO/IEC 13818-1:2013 specifies three items:

- a new descriptor to signal transport profiles, and it specifies a profile for 'adaptive streaming' applications;
- it extends the MVC_extension descriptor to signal association between stereoscopic MVC views to the left or right eye for display assistance;
- a new informative annex which defines the currently used MIME types for MPEG-2 transport streams.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T H.222.0	1995-07-10	15	11.1002/1000/1071-en
1.1	ITU-T H.222.0 (1995) Amd. 1	1996-11-11	16	11.1002/1000/3834-en
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1.4	ITU-T H.222.0 (1995) Amd. 3	1998-02-06	16	11.1002/1000/4228-en
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2.0	ITU-T H.222.0	2000-02-17	16	11.1002/1000/5142-en
2.1	ITU-T H.222.0 (2000) Technical Cor. 1	2001-03-01	16	11.1002/1000/5419-en
2.2	ITU-T H.222.0 (2000) Technical Cor. 2	2002-03-29	16	11.1002/1000/5675-en
2.3	ITU-T H.222.0 (2000) Amd. 1	2002-12-14	16	11.1002/1000/6190-en
2.4	ITU-T H.222.0 (2000) Amd. 1/Cor. 1	2003-06-29	16	11.1002/1000/6449-en
2.5	ITU-T H.222.0 (2000) Amd. 2	2003-06-29	16	11.1002/1000/6363-en
2.6	ITU-T H.222.0 (2000) Amd. 3	2004-03-15	16	11.1002/1000/7208-en
2.7	ITU-T H.222.0 (2000) Technical Cor. 3	2005-01-08	16	11.1002/1000/7435-en
2.8	ITU-T H.222.0 (2000) Amd. 4	2005-01-08	16	11.1002/1000/7436-en
2.9	ITU-T H.222.0 (2000) Amd. 5	2005-01-08	16	11.1002/1000/7437-en
2.10	ITU-T H.222.0 (2000) Technical Cor. 4	2005-09-13	16	11.1002/1000/8560-en
3.0	ITU-T H.222.0	2006-05-29	16	11.1002/1000/8802-en
3.1	ITU-T H.222.0 (2006) Amd. 1	2007-01-13	16	11.1002/1000/9024-en
3.2	ITU-T H.222.0 (2006) Amd. 2	2007-08-29	16	11.1002/1000/9214-en
3.3	ITU-T H.222.0 (2006) Cor. 1	2008-06-13	16	11.1002/1000/9471-en
3.4	ITU-T H.222.0 (2006) Cor. 2	2009-03-16	16	11.1002/1000/9692-en
3.5	ITU-T H.222.0 (2006) Amd. 3	2009-03-16	16	11.1002/1000/9691-en
3.6	ITU-T H.222.0 (2006) Cor. 3	2009-12-14	16	11.1002/1000/10621-en
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3.8	ITU-T H.222.0 (2006) Amd. 4	2009-12-14	16	11.1002/1000/10623-en
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* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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

Amendment 2

Signalling of transport profiles, signalling MVC view association to eye and MIME type registration

1) Clause 2.6.1

In clause 2.6.1, replace Table 2-45 with:

Table 2-45 – Program and program element descriptors

descriptor_tag	TS	PS	Identification
0	n/a	n/a	Reserved
1	n/a	X	Forbidden
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
35	X		multiplexBuffer_descriptor
36	X	X	content_labeling_descriptor
37	X	X	metadata_pointer_descriptor
38	X	X	metadata_descriptor

Table 2-45 – Program and program element descriptors

descriptor_tag	TS	PS	Identification
39	X	X	metadata_STD_descriptor
40	X	X	AVC video descriptor
41	X	X	IPMP_descriptor (defined in ISO/IEC 13818-11, MPEG-2 IPMP)
42	X	X	AVC timing and HRD descriptor
43	X	X	MPEG-2_AAC_audio_descriptor
44	X	X	FlexMuxTiming_descriptor
45	X	X	MPEG-4_text_descriptor
46	X	X	MPEG-4_audio_extension_descriptor
47	X	X	Auxiliary_video_stream_descriptor
48	X	X	SVC extension descriptor
49	X	X	MVC extension descriptor
50	X	n/a	J2K video descriptor
51	X	X	MVC operation point descriptor
52	X	X	MPEG2_stereoscopic_video_format_descriptor
53	X	X	Stereoscopic_program_info_descriptor
54	X	X	Stereoscopic_video_info_descriptor
55	X	n/a	Transport_profile_descriptor
56-62	n/a	n/a	Rec. ITU-T H.222.0 | ISO/IEC 13818-1 Reserved
63	X	X	Extension_descriptor
64-255	n/a	n/a	User Private

2) Clause 2.6.78

Replace clause 2.6.78 with the following:

2.6.78 MVC extension descriptor

For MVC video sub-bitstreams of AVC video streams conforming to one or more profiles defined in Annex H of Rec. ITU-T H.264 | ISO/IEC 14496-10, the MVC extension descriptor provides information about the AVC video stream resulting from reassembling (up to) the associated MVC video sub-bitstream and provides information about the contained MVC video sub-bitstream and for the reassembly of the associated MVC video sub-bitstream. There may be one MVC extension descriptor associated with any of the MVC video sub-bitstreams (with stream_type equal to 0x20) of an AVC video stream conforming to one or more profiles defined in Annex H of Rec. ITU-T H.264 | ISO/IEC 14496-10. When the MVC video sub-bitstream is an MVC base view sub-bitstream, the MVC extension descriptor shall be present in the associated PMT or PSM for stream_type equal to 0x1B.

This descriptor can also be used by applications that require association between stereoscopic MVC views and left or right eye using the syntax elements 'view_association_not_present' and 'base_view_is_left_eyeview'.

Table 2-97 – MVC extension descriptor

Syntax	No. of bits	Mnemonic
MVC_extension_descriptor() {		
descriptor_tag	**8**	**uimsbf**
descriptor_length	**8**	**uimsbf**
average_bit_rate	**16**	**uimsbf**
maximum_bitrate	**16**	**uimsbf**
view_association_not_present	**1**	**bslbf**
base_view_is_left_eyeview	**1**	**bslbf**
reserved	**2**	**bslbf**
view_order_index_min	**10**	**bslbf**
view_order_index_max	**10**	**bslbf**
temporal_id_start	**3**	**bslbf**
temporal_id_end	**3**	**bslbf**
no_sei_nal_unit_present	**1**	**bslbf**
no_prefix_nal_unit_present	**1**	**bslbf**
}		

3) Clause 2.6.79

Add the following two semantic elements after maximum_bitrate:

view_association_not_present – This 1-bit flag when set to '0' indicates that the syntax element base_view_is_left_eyeview signals the association between base view and left or right eye. When this flag is set to '1' no such association is signalled.

base_view_is_left_eyeview – This flag shall be set to '1' when the view_association_not_present_flag is set to '1' and no view association is conveyed in the descriptor. When the view_association_not_present_flag is set to '0' and this flag is set to '1', it indicates that the base view is associated with the left eye view (or enhancement view is associated with the right eye view). When the view_association_not_present_flag is set to '0' and this flag is set to '0', it indicates that the base view is associated with the right eye view (or enhancement view is associated with the left eye view).

4) Clauses 2.6.93 and 2.6.94

Insert the following new clauses after clause 2.6.92:

2.6.93 Transport_profile_descriptor

The Transport_profile_descriptor may be associated in the PMT to signal a profile value of transport stream in the associated program. When present, the descriptor shall only be located in the loop following the program_info_length field in the PMT. If the descriptor is not included in the PMT, then the associated transport stream conforms to the strict profile.

Table 2-103quater – Transport_profile_descriptor syntax

Syntax	No. of bits	Format
Transport_profile_descriptor{		
descriptor_tag	8	uimsbf
descriptor_length	8	uimsbf
transport_profile	8	uimsbf
For (i=0; i<N; i++) {		
private_data	8	bslbf
}		
}		

2.6.94 Semantic definition of fields in the Transport_profile_descriptor

transport_profile: This 8-bit profile value signals the use of constraints in the associated transport stream for the program. See Table 2-103quater.

Table 2-103quinquies – Transport_profile values

Values	Description
0x00	unspecified
0x01	Complete profile (see Note 1)
0x02	Adaptive profile (see Note 2)
0x03-0x0F	reserved
0x0F-0xFF	user_private (see Note 3)

NOTE 1 – Transport streams using this profile conform to all the normative definitions for transport streams. These include conformant discontinuities, PCR jitter/accuracy, strict T-STD management, PCR interval conformance (less than 100 ms), as well as PTS/DTS interval (0.7 seconds) and compliance.

NOTE 2 – Transport streams using this profile conform to all the normative definitions for transport streams with the following exceptions:

– The PCR jitter may exceed the specified tolerance as applications that use this profile usually do not include null-PID packets. Clients that process these streams usually do not use the PCR to derive the decoder STC. However, the PCR value can be used in conjunction with the PTS and DTS for conformant STD management of all the media components in the associated program;

– the PCR interval occasionally exceeds 100 ms in applications that use this profile due to occasional bit rate variations in certain locations;

– conforming continuity counter errors and time base discontinuity may occur more frequently than in complete profile.

NOTE 3 – User private values of transport_profile that need unique identification can use the MPEG registration_descriptor with a unique format_identifier value that is obtained from the Registration Authority.

5) New Annex T

Add the following after Annex S:

Annex T

MIME type for MPEG-2 transport streams

(This annex does not form an integral part of this Recommendation | International Standard.)

T.1 Introduction

This annex provides the formal MIME type registration for MPEG-2 transport streams. It is referenced from the registry at http://www.iana.org/.

T.2 MIME type and subtype

MIME media type name:
video

MIME subtype name:
mp2t

Required parameters:
none

Optional parameters:
The '`profiles`' parameter as documented in T.2.1

The '`codecs`' parameter as document in T.2.2

Encoding considerations:

This type is defined for general use; for transfer via RTP see IETF RFC 3550.

Security considerations:
see T.3

Interoperability considerations:

The specification defines a platform-independent expression of a presentation, and it is intended that wide interoperability can be achieved.

Published specification:
ITU-T H.222.0 | ISO/IEC 13818-1, Information technology – Generic coding of moving pictures and associated audio information: Systems

Applications that use this media type:
various, including video streaming and video broadcasting applications

Additional information:
File extension(s):

.ts

Intended usage:

COMMON

Other information/General comments:

none

Person to contact for further information:

Name:

David Singer

e-mail:

Singer@apple.com

Change controller:

ISO/IEC JTC1/SC29 (MPEG)

T.3 Security considerations

It is possible to inject non-compliant streams (audio, video and systems) in the transport stream to overload the receiver/decoder's buffers. This might compromise the functionality of the receiver or even crash it.

An MPEG-2 transport stream is an extensible container format, and hence might carry streams that have active aspects (e.g., contain script snippets). If those subsystems are not properly defined or implemented, it may be possible to crash the receiver or temporarily make it unavailable.

T.4 Parameters

T.4.1 The profiles parameter

Parameter Name: `profiles`

Parameter Value: The 'profiles' parameter is an optional parameter that indicates one or more profiles to which the stream claims conformance. The contents of this attribute shall conform to either the `pro-simple` or `pro-fancy` productions of IETF RFC 6381, Section 4.5. The profile identifiers reported in the MIME type parameter takes as value the `transport_profile`, coded as a decimal integer, e.g., `profiles="1"` for streams conforming to the 'complete' profile.

Example: `video/mp2t;profiles="1"`

T.4.2 The codecs parameter

Parameter Name: `codecs`

Parameter Value:

The 'codecs' parameter is an optional parameter that indicates one or more codecs which are used for the elementary streams in the MPEG-2 TS. The contents of this attribute shall conform to either the `pro-simple` or `pro-fancy` productions of IETF RFC 6381, Section 3.2. IETF RFC 6381 defines '`codecs`' parameter as a single value, or a comma-separated list of values identifying the codec(s), where each value consists of one or more dot-separated elements. The first element of such a value can be derived from the value of `stream_type` in the `program_map_section`. If the `stream_type` value appears in Table T.1, the value in the `first element` column shall be used as the first element. If the `stream_type` value is between `0x80` and `0xFF`, the first element may be derived in ways not specified by this annex (e.g., by examining the contents of `registration_descriptor`, if used).

Table T.1 – 'codecs' parameter values

stream_type	first element
0x01	mp1v
0x02	mp2v
0x03	mp1a
0x04	mp2a
0x0F	mp2a
0x10	mp4v
0x11	mp4a
0x1B	avc1
0x1C	mp4a
0x1D	tx3g
0x1F	svc1
0x20	mvc1
0x21	mjp2

Wherever a definition for additional elements exists in IETF RFC 6381 for a given first element, the definition in IETF RFC 6381 shall be followed.

When the first element of a value is 'mp1a', 'mp1v','mp2a' or 'mp2v', the second element of the codecs parameter value is the hexadecimal representation of the MP4 Registration Authority ObjectTypeIndication (OTI) for the appropriate specification and profile.

When the first element of a value is 'mp1a.6B' (ISO/IEC 11172-3), or 'mp2a.069' (i.e., ISO/IEC 13818-3), the third element of the codecs parameter value is the hexadecimal representation of the 2-bit layer, as defined in 2.6.4.

Examples:

ISO/IEC 13818-2 Main Profile

```
video/mp2ts;codecs="mp2v.61"
```

ISO/IEC 11172-3 layer 3 is represented

```
video/mp2ts;codecs="mp2a.6B.03"
```

ISO/IEC 13818-3 layer 2 is represented

```
video/mp2ts;codecs="mp2a.69"
```

ISO/IEC 13818-7 Low Complexity Profile

```
video/mp2ts;codecs="mp2a.67"
```

Dolby AC-3 audio (per ATSC A/52, AC-3 audio has stream_type 0x81 and format_identifier "AC-3" in the `registration_descriptor`)

```
video/mp2ts;codecs="ac-3"
```

ISO/IEC 13818-2 Main Profile Video together with ISO/IEC 13818-7 audio

```
video/mp2ts;codecs="mp2v.61,mp2a.67"
```

6) Bibliography

Add the following two bibliographic entries:

– IETF RFC 6381 (2011), *The 'Codecs' and 'Profiles' Parameters for "Bucket" Media Types*.

– IETF RFC 3550 (2003), *RTP: A Transport Protocol for Real-Time Applications*.

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