International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.222.0

Amendment 1

(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 1: Extensions for simplified carriage of MPEG-4 over MPEG-2

Recommendation ITU-T H.222.0 (2012) – Amendment 1

ITU International Telecommunication Union

ITU-T H-SERIES RECOMMENDATIONS

AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	**H.220–H.229**
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND, TRIPLE-PLAY AND ADVANCED MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619
Advanced multimedia services and applications	H.620–H.629
Ubiquitous sensor network applications and Internet of Things	H.640–H.649
IPTV MULTIMEDIA SERVICES AND APPLICATIONS FOR IPTV	
General aspects	H.700–H.719
IPTV terminal devices	H.720–H.729
IPTV middleware	H.730–H.739
IPTV application event handling	H.740–H.749
IPTV metadata	H.750–H.759
IPTV multimedia application frameworks	H.760–H.769
IPTV service discovery up to consumption	H.770–H.779
Digital Signage	H.780–H.789
E-HEALTH MULTIMEDIA SERVICES AND APPLICATIONS	
Interoperability compliance testing of personal health systems (HRN, PAN, LAN and WAN)	H.820–H.849
Multimedia e-health data exchange services	H.860–H.869

For further details, please refer to the list of ITU-T Recommendations.

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 1

Extensions for simplified carriage of MPEG-4 over MPEG-2

Summary

Amendment 1 to Recommendation ITU-T H.222.0 (2012) | ISO/IEC 13818-1:2013 provides tools for a simplified carriage of MPEG-4 systems over MPEG-2, allowing MPEG-4 scenes to use PES packetized media streams carried over MPEG-2. It also defines an extension descriptor mechanism to solve the shortage of available code points for existing descriptors.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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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

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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.

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
3.9	ITU-T H.222.0 (2006) Amd. 5	2011-05-14	16	11.1002/1000/11287-en
3.10	ITU-T H.222.0 (2006) Amd. 6	2011-05-14	16	11.1002/1000/11288-en
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FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

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.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

CONTENTS

INTERNATIONAL STANDARD
RECOMMENDATION ITU-T

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

Amendment 1

Extensions for simplified carriage of MPEG-4 over MPEG-2

1) Table 2-31

Replace Table 2-31 with:

Table 2-31 – 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	IPMP Control Information Section (defined in ISO/IEC 13818-11)
0x08	ISO_IEC_14496_section
0x09-0x37	Rec. ITU-T H.222.0 | ISO/IEC 13818-1 reserved
0x38-0x3F	Defined in ISO/IEC 13818-6
0x40-0xFE	User private
0xFF	Forbidden

2) Table 2-45

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

Table 2-45 – Program and program element descriptors

descriptor_tag	TS	PS	Identification
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
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
55-62	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

3) Clauses 2.6.90 to 2.6.92

Insert after clause 2.6.89:

2.6.90 Extension descriptor

This descriptor provides a mechanism to extend the Rec. ITU-T H.222.0 | ISO/IEC 13818-1 descriptor range (see Table 2-45). The descriptors which are based on the extension descriptor are signalled using the extension descriptor with extension_descriptor_tag values defined in Table 2-103ter.

Table 2-103bis – Extension descriptor

Syntax	No. of bits	Mnemonic
Extension_descriptor () {		
descriptor_tag	**8**	**uimsbf**
descriptor_length	**8**	**uimsbf**
extension_descriptor_tag	**8**	**uimsbf**
if (Extension_descriptor_tag == 0x02) {		
		uimsbf
ObjectDescriptorUpdate()		
}		
else { for i=0; i<N; i++)		
reserved	**8**	**bslbf**
}		
}		

2.6.91 Semantic definition of fields in the extension descriptor

descriptor_tag – The descriptor_tag is an 8-bit field whose value is defined in Table 2-45.

descriptor_length – The descriptor_length is an 8-bit field specifying the number of bytes of the descriptor immediately following the descriptor_length field.

extension_descriptor_tag – The extension_descriptor_tag is an 8-bit field which identifies each descriptor that uses this tag value. See Table 2-103ter for the extension_descriptor_tag values.

ObjectDescriptorUpdate(): This structure is defined in section 8.5.5.2 of ISO/IEC 14496-1.

Table 2-103ter – Extension descriptor tag values

Extension_descriptor_tag	TS	PS	Identification
0	n/a	n/a	Reserved
1	n/a	X	Forbidden
2	X	X	ODUpdate_descriptor
3-255	n/a	n/a	Rec. ITU-T H.222.0 | ISO/IEC 13818-1 Reserved

2.6.92 ODUpdate_descriptor

The ODUpdate_descriptor may be used to carry a set of ObjectDescriptors through an ObjectDescriptorUpdate, as a replacement or as a complement to ISO/IEC 14496 object descriptor streams defined in the IOD. If used, the ObjectDescriptorUpdate command shall be processed by the MPEG-4 terminal as defined in clause 7.2.5.5.2 of ISO/IEC 14496-1. The descriptors carried in the ODUpdate_descriptor are in the same name scope as the scene description described in the InitialObjectDescriptor carried in the IOD descriptor.

When an ODUpdate_descriptor is used within a transport stream, the ODUpdate_descriptor shall be conveyed in the descriptor loop immediately following the program_info_length field in the program map table, and shall be included after an IOD descriptor.

When an ODUpdate_descriptor is used within a program stream, the ODUpdate_descriptor shall be conveyed in the descriptor loop immediately following the program_stream_info_length field in the program stream map, and shall be included after an IOD descriptor.

If an ODUpdate_descriptor is included before an IOD descriptor or if IOD descriptor is not present, then the ODUpdate descriptor shall be ignored. More than one ODUpdate_descriptor may be included in a program map table or program stream map.

4) Clause 2.11.3.1

At the end of clause 2.11.3.1 add:

Additionally, an ISO/IEC 14496 audiovisual scene may refer to non SL-Packetized streams carried in an Rec. ITU-T H.222.0 | ISO/IEC 13818-1 transport stream using a "pid://PID_NUMBER" URL scheme instead of a "od://OD_ID" URL scheme.

ISO/IEC 14496 streams may derive their time base from the PCR of the program through the OCR_ES_ID mechanism.

5) Clause 2.11.3.3

a) In clause 2.11.3.3, add the following new bullet point to the end of the first list of bullet points:

– The object time base of an SL-packetized stream whose OCR_ES_ID identifies a non SL-packetized stream with a PID equal to the PCR PID is fstc(t) / 300

b) Replace the last paragraph of clause 2.11.3.3 with:

For SL-packetized streams inheriting their object time base from the PCR PID, the following considerations apply:

– TimeStampResolution = 90000 / 2k, with k a positive integer larger than or equal to zero.

– TimeStampLength = 33–k.

For SL-packetized streams carrying an OCR, the relationship between a value of the STC and the corresponding value of the object time base of a stream is established by associating PTS fields in PES packet headers with the OCR or FCR in SL packet headers and FlexMux Stream packets respectively, as specified in 2.11.3.6 and 2.11.3.7.

For SL-packetized streams inheriting their time base from the PCR, the object time base of such a stream is $f_{stc}(t) / 300$.

6) Clause 2.11.3.8

a) In clause 2.11.3.8, replace:

Only SL-packetized object descriptor streams and scene description streams shall use ISO_IEC_14496_sections.

with:

Any ISO/IEC 14496 stream may be carried over ISO_IEC_14496_sections.

b) In clause 2.11.3.8, replace:

Table 2-105 shows the syntax of ISO_IEC_14496_sections defined to convey ISO/IEC 14496-1 elementary streams, qualified by the table_id as either object descriptor or scene description stream data.

with:

Table 2-105 shows the syntax of ISO_IEC_14496_sections defined to convey ISO/IEC 14496-1 elementary streams, qualified by the table_id as either object descriptor stream data, scene description stream data or any other ISO/IEC 14496 stream data.

c) *In clause 2.11.3.8, add the following sentence:*

Other ISO/IEC 14496 stream data consists of an ISO/IEC 14496 table. The ISO/IEC 14496 table may be transmitted in multiple ISO_IEC_14496_sections.

after:

It is not required that a complete table be received in order to process its payload. However, the payload of sections shall be processed in the correct order, as indicated by the value of the section_number field in the ISO_IEC_14496_section header bytes.

d) *In clause 2.11.3.8, replace:*

This 8-bit field shall be set to '0x04' or '0x05' in case of an ISO_IEC_14496_section. A value of '0x04' indicates an ISO_IEC_14496_scene_description_section that carries an ISO/IEC 14496-1 scene description stream. A value of '0x05' indicates an ISO_IEC_14496_object_descriptor_section that carries an ISO/IEC 14496-1 object descriptor stream.

with:

This 8-bit field shall be set to '0x04', '0x05', or '0x08', in case of an ISO_IEC_14496_section. A value of '0x04' indicates an ISO_IEC_14496_section that carries an ISO/IEC 14496-1 scene description stream. A value of '0x05' indicates an ISO_IEC_14496_section that carries an ISO/IEC 14496-1 object descriptor stream. A value of '0x08' indicates an ISO_IEC_14496_section that carries other ISO/IEC 14496 streams.

7) Annex R

a) *In clause R.2, replace the following bullet:*

– Locate the additional streams using their ES_ID and the stream map table.

with:

– Locate the additional streams using their ES_ID and the stream map table.

– If ODUpdate_descriptors are present in the first descriptor loop, process the ObjectDescriptor_Update as defined in 2.6.92.

b) *At the end of Annex R add:*

Figure R.3 gives an example of ISO/IEC 14496 program elements in a transport stream, consisting of a scene description stream (BIFS-Command), and audio and video streams natively carried over PES (no SL packetization or FlexMux). BIFS-Command stream are conveyed by means of ISO_IEC_14496_sections, and the BIFS scene directly refers to the audio and video streams in the transport stream through "pid://" URLs in the BIFS media nodes.

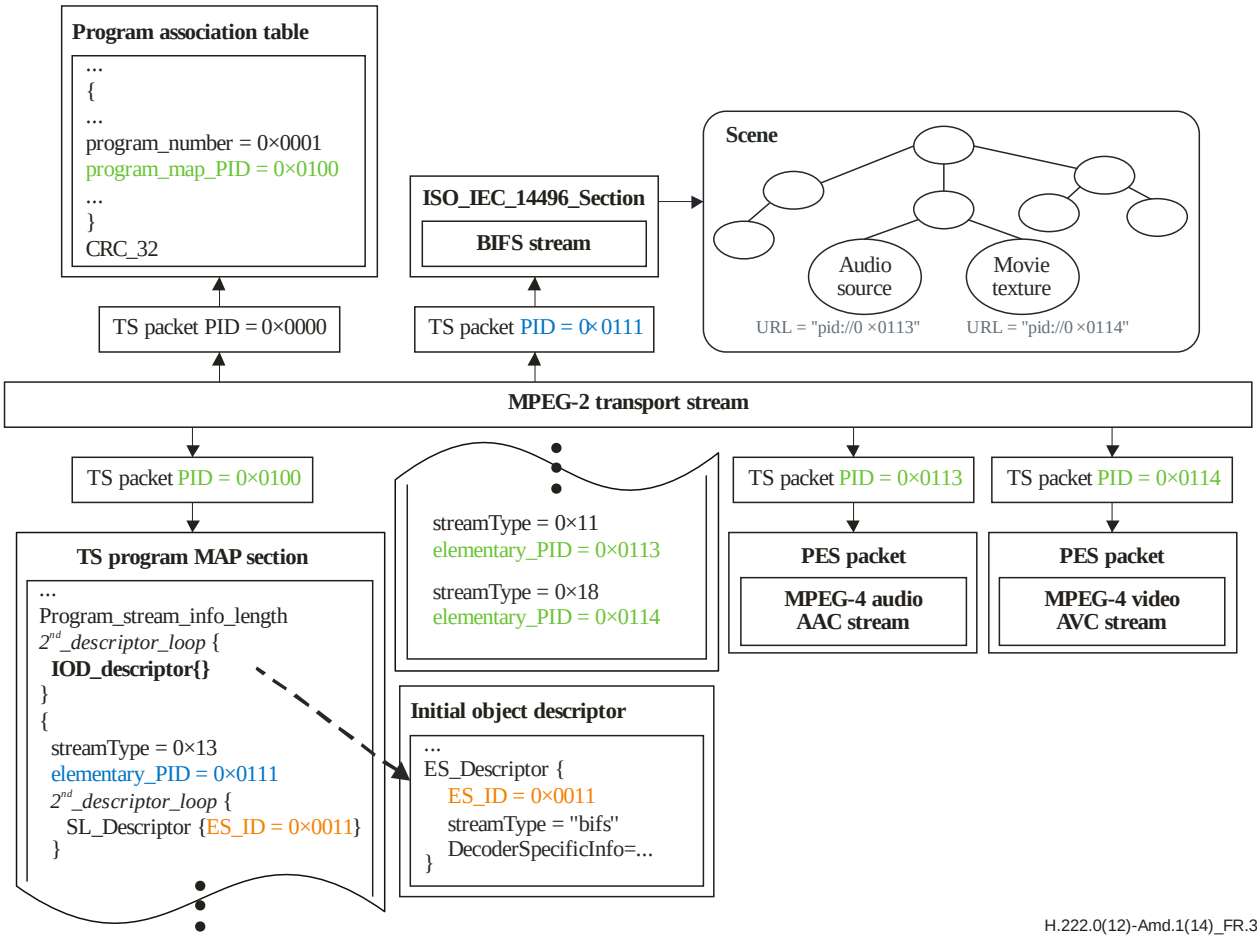

Figure R.3 – Usage of MPEG-4 in a transport stream with BIFS scene referring to native PES

Figure R.4 gives an example of ISO/IEC 14496 program elements in a transport stream, consisting of a scene description stream (BIFS-Command) and an image stream. The BIFS-Command stream is conveyed by means of ISO_IEC_14496_sections, the image stream is conveyed in PES packets using SL packetization. The ObjectDescriptor associated with the image stream is conveyed by means of an ODUpdate_Descriptor in the first descriptor loop of the PMT.

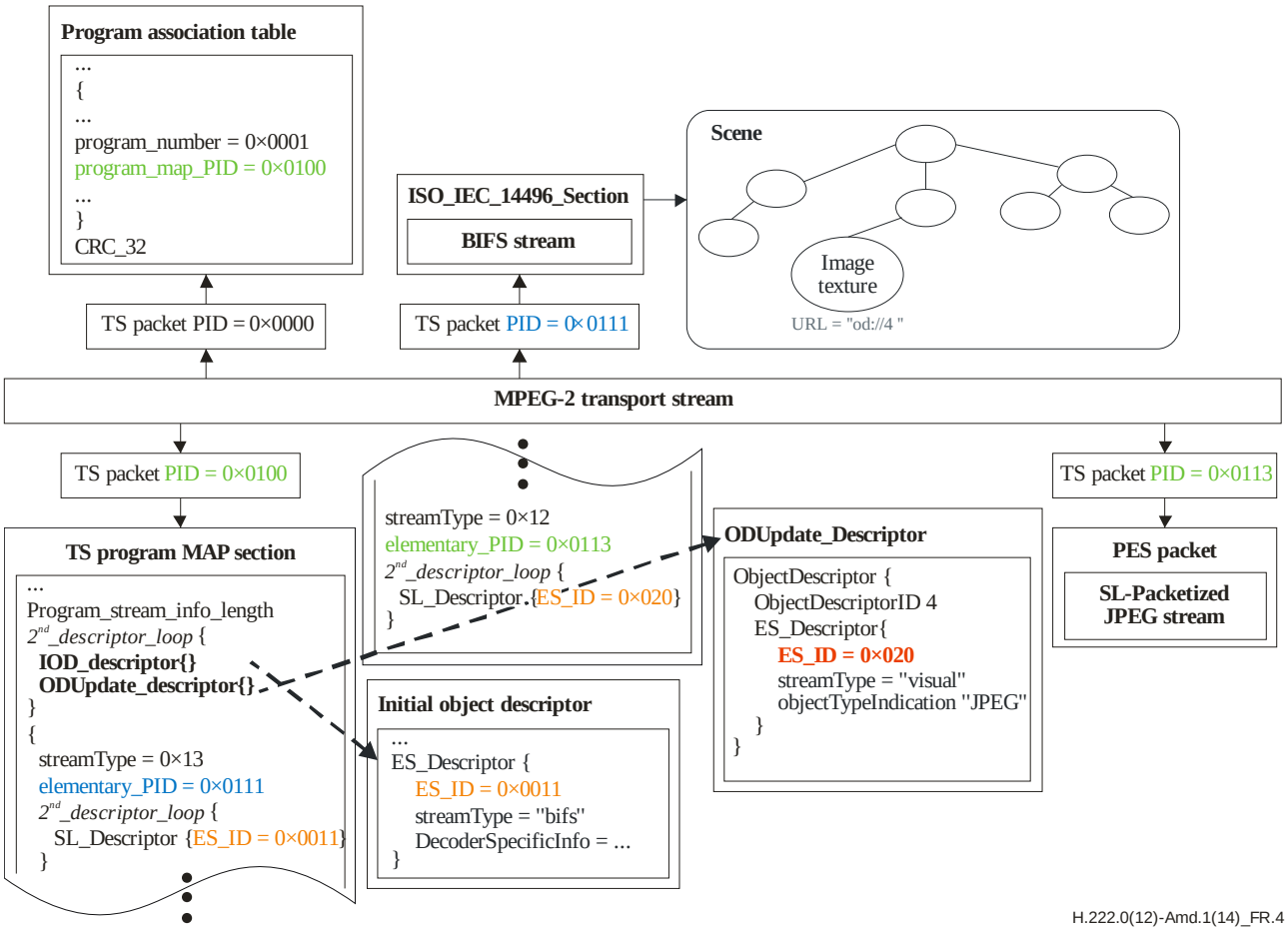

Figure R.4 – Usage of MPEG-4 in a transport stream with an ODUpdate_descriptor carrying an image ObjectDescriptor in the PMT

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Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
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Series H	**Audiovisual and multimedia systems**
Series I	Integrated services digital network
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