Digital Imaging and Communications in Medicine (DICOM)

Supplement 225

Multi-Fragment Video Transfer Syntax

Prepared by: Bill Wallace

DICOM Standards Committee, Working Group 4

1300 N. 17th Street, Suite 900

Rosslyn, Virginia 22209 USA

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Scope and Field of Application

This supplement adds new Transfer Syntaxes which permit fragmenting video encoding. The Transfer Syntaxes correspond to five existing transfer syntaxes:

- MPEG2 Main Profile / Main Level Video Compression
- MPEG2 Main Profile / High Level Video Compression
- MPEG-4 AVC/H.264 High Profile / Level 4.1 Video Compression
- MPEG-4 AVC/H.264 High Profile / Level 4.2 Video Compression
- MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 Video Compression

A significant motivation for this supplement is the appearance of videos of size larger than 2^32-2 bytes (e.g., procedure video recordings). Previously, those videos needed to be split into multiple DICOM instances.

The existing HEVC/H.265 Main Profile / Level 5.1 and HEVC/H.265 Main 10 Profile / Level 5.1 already specify the use of more than one fragment so do not need to be modified.

Modify PS3.3 Section C.7.6.6

C.7.6.6 Multi-frame Module

Table C.7-14 specifies the Attributes of a Multi-frame pixel data Image.

Table C.7-14. Multi-frame Module Attributes

Attribute Name	Tag	Type	Attribute Description
Number of Frames	(0028,0008)	1	Number of frames in a Multi-frame Image. See Section C.7.6.6.1.1 for further explanation.
Frame Increment Pointer	(0028,0009)	1	Contains the Data Element Tag of the Attribute that is used as the frame increment in Multi-frame pixel data. See Section C.7.6.6.1.2 for further explanation.
Stereo Pairs Present	(0022,0028)	3	The multi-frame pixel data consists of left and right stereoscopic pairs. See Section C.7.6.6.1.3 for further explanation. Enumerated Values: **YES** **NO**
Encapsulated Pixel	**(7FE0,0003)**	**3**	**The length of the pixel data bit stream encapsulated in Pixel Data**

Data Value Total Length			**(7FE0,0010), in bytes, when all the fragments have been combined, not including any trailing padding to even length in the last Fragment added for encapsulation.** **Note:** **This value will depend on the Transfer Syntax in which the Pixel Data (7FE0,0010) is encoded, and may need to be updated depending on the Transfer Syntax negotiated and selected for a particular transfer. See PS3.5 Section 8.2.**

Modify PS3.3 Section C.7.6.16

C.7.6.16 Multi-frame Functional Groups Module

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Table C.7.6.16-1. Multi-frame Functional Groups Module Attributes

Attribute Name	Tag	Type	Attribute Description
...			
Number of Frames	(0028,0008)	1	Number of frames in a Multi-frame Image. See Section C.7.6.6.1.1 for further explanation.
Stereo Pairs Present	(0022,0028)	3	The multi-frame pixel data consists of left and right stereoscopic pairs. See Section C.7.6.6.1.3 for further explanation. Enumerated Values: **YES** **NO**
Concatenation Frame Offset Number	...		
...			
Encapsulated Pixel Data Value Total Length	**(7FE0,0003)**	**3**	**The length of the pixel data bit stream encapsulated in Pixel Data (7FE0,0010), in bytes, when all the fragments have been combined, not including any trailing padding to even length in the last Fragment added for encapsulation.** **Note:** **This value will depend on the Transfer Syntax in which the Pixel Data (7FE0,0010) is encoded, and may need to be updated depending on the Transfer Syntax negotiated and selected for a particular transfer. See PS3.5 Section 8.2.**

Modify the paragraph in PS3.5 Sections 8.2

8.2 Native or Encapsulated Format Encoding

…

If sent in an Encapsulated Format (i.e., other than the Native Format) the Value Representation OB is used. The Pixel Cells are encoded according to the encoding process defined by one of the negotiated Transfer Syntaxes (see Annex A).

A Fragmentable Encapsulated Transfer Syntax allows t~~T~~he encapsulated pixel stream of encoded pixel data ~~**is segmented**~~ **to be split** into one or more Fragments**.**

A Non-Fragmentable Encapsulated Transfer Syntax requires the entire encapsulated pixel stream of encoded pixel data to be encoded in a single Fragment.

Each Fragment~~**, each of which**~~ conveys its own explicit **even** length **(see Section A.4)**.

The **S**~~**s**~~equence of Fragments of the encapsulated pixel stream is terminated by a **Sequence D**~~**d**~~elimiter **Item**, thus allowing the support of encoding processes where the resulting length of the entire pixel stream is not known until it is entirely encoded. ~~**This**~~ Encapsulated Format**s** support~~**s**~~ both Single-Frame and Multi-Frame images (as defined in PS3.3). At least one frame shall be present, and hence at least one **F**~~**f**~~ragment will be present.

Note

1. Depending on the **Fragmentable Encapsulated** Transfer Syntax, a frame may be entirely contained within a single fragment, or may span multiple fragments to support buffering during compression or to avoid exceeding the maximum size of a fixed length fragment. A recipient can detect fragmentation of frames by comparing the number of fragments (the number of Items minus one for the Basic Offset Table) with the number of frames. Some performance optimizations may be available to a recipient in the absence of fragmentation of frames, but an implementation that fails to support such fragmentation does not conform to the Standard.

2. The total size of the encapsulated pixel stream, not including any trailing padding in the last Fragment, if known, may be encoded in Encapsulated Pixel Data Value Total Length (7FE0,0003); see PS3.3 Section C.7.6.6 Multi-frame Module and PS3.3 Section C.7.6.16 Multi-frame Functional Groups Module.

Modify the following portion of PS3.5 Sections 8.2.5, 8.2.6, 8.2.7 and 8.2.8 (same change 4 times)

8.2.5 MPEG2 Main Profile / Main Level Video Compression

DICOM provides a mechanism for supporting the use of MPEG2 Main Profile / Main Level Video Compression through the Encapsulated Format (see PS3.3). Annex A defines ~~**a**~~ **Non-Fragmentable and a Fragmentable Encapsulated** Transfer Syntax**es** that reference~~**s**~~ the MPEG2 Main Profile / Main Level Standard.

...

Note

1. ...

2. ...

3. ...

4. ...

5. The nominal Frame Time is supplied for the purpose of inclusion on the DICOM Cine Module Attributes, and should be calculated from the actual frame rate.

For the Non-Fragmentable Encapsulated Transfer Syntax, o~~O~~ne F~~f~~ragment shall contain the whole ~~MPEG2~~ stream.

For the Fragmentable Encapsulated Transfer Syntax, the stream may be segmented into multiple Fragments.

...

Note

1. If a ~~video~~ stream exceeds the maximum length of one fragment (~~approximately 4 GB~~**2^32-2 bytes**), it may be sent **using a Fragmentable Encapsulated Transfer Syntax. Alternatively, it may be sent using a Non-Fragmentable Encapsulated Transfer Syntax** as multiple SOP Instances, but each SOP Instance will contain an independent and playable bit stream, and not depend on the encoded bit stream in other (previous) instances. The manner in which such separate instances are related is not specified in the Standard, but mechanisms such as grouping into the same Series, and references to earlier instances using Referenced Image Sequence may be used.

~~**2. This constraint limits the length of the compressed bit stream to no longer than 2^32-2 bytes.**~~

2. **Fragmentable Encapsulated Transfer Syntaxes allow for streams of essentially unlimited length; the only limit imposed is the maximum Number of Frames (0028,0008), which is 2^31-1 frames (largest positive value in an Integer String VR).**

Modify the following portion of PS3.5 Sections 8.2.10 and 8.2.11 (same change 2 times)

8.2.10 HEVC/H.265 Main Profile / Level 5.1 Video Compression

HEVC/H.265 Main Profile / Level 5.1 Main tier is designed for the compression of 4:2:0 video formats up to 4k at 60 frames per second with a bit depth of 8 bits. DICOM provides a mechanism for supporting the use of HEVC/H.265 Image Compression through the Encapsulated Format (see PS3.3). Annex A defines a **Fragmentable** Transfer Syntax that references the HEVC/H.265 Standard.

...

The encapsulated pixel data stream may be segmented into ~~more than one f~~**multiple F**ragment**s**.

Note

The recipient is expected to concatenate the fragments while decoding them. This allows for essentially unlimited length streams; the only limit imposed is the maximum value for Number of Frames (0028,0008) which is 2^31-1 **frames (largest positive value in an Integer String VR)**.

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Modify PS3.5 10.7-10.12

10.7 Transfer Syntax for MPEG2 Main Profile / Main Level Video Compression

~~**One Transfer Syntax is**~~ **Two Transfer Syntaxes are** specified for MPEG2 Main Profile / Main Level Video Compression.

10.9 Transfer Syntax for MPEG2 Main Profile / High Level Video Compression

~~One Transfer Syntax is~~ **Two Transfer Syntaxes are** specified for MPEG2 Main Profile / High Level Video Compression.

10.10 Transfer Syntax for MPEG-4 AVC/H.264 High Profile / Level 4.1 Video Compression

~~One Transfer Syntax is~~ **Two Transfer Syntaxes are** specified for MPEG-4 AVC/H.264 High Profile / Level 4.1 Video Compression and ~~one Transfer Syntax is~~ t**wo Transfer Syntaxes are** specified for MPEG-4 AVC/H.264 BD-compliant High Profile / Level 4.1. Transfer Syntax MPEG-4 AVC/H.264 High Profile / Level 4.1 corresponds to the ITU-T H.264 standard's profile and level specifications. Transfer Syntax MPEG-4 AVC/H.264 BD-compliant High Profile / Level 4.1 corresponds to a restricted set of spatial and temporal resolutions described Table 8-4. This Transfer Syntax limits the ITU-T H.264 High Profile / Level 4.1 to HD video formats that are supported by Blu-ray™ (BDRWP 2.B).

10.11 Transfer Syntaxes for MPEG-4 AVC/H.264 High Profile / Level 4.2 Video Compression

~~One Transfer Syntax is~~**Two Transfer Syntaxes are** specified for MPEG-4 AVC/H.264 High Profile / Level 4.2 for 2D Video Compression and ~~One Transfer Syntax is~~ t**wo Transfer Syntaxes are** specified for MPEG-4 AVC/H.264 High Profile / Level 4.2 for 3D Video Compression. Transfer Syntax MPEG-4 AVC/H.264 High Profile / Level 4.2 for 2D Video Compression corresponds to the ITU-T H.264 standard's profile and level specifications except that the use of frame packing formats for 3D video is not allowed as defined in Table 8-8. Transfer Syntax MPEG-4 AVC/H.264 High Profile / Level 4.2 for 3D Video Compression corresponds to the ITU-T H.264 standard's profile and level specifications. It should be used for transmitting stereoscopic 3D content with frame packing formats as defined in Table 8-8.

10.12 Transfer Syntax for MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 Video Compression

~~One Transfer Syntax is~~**Two Transfer Syntaxes are** specified for MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 Video Compression. Transfer Syntax MPEG-4 AVC/H.264 Stereo High Profile corresponds to the ITU-T H.264 standard's profile and level specifications.

For reference unchanged, PS3.5 A.4

A.4 Transfer Syntaxes For Encapsulation of Encoded Pixel Data

These Transfer Syntaxes apply to the encoding of the entire DICOM Data Set, even though the image Pixel Data (7FE0,0010) portion of the DICOM Data Set is the only portion that is encoded by an encapsulated format. These Transfer Syntaxes shall only be used when Pixel Data (7FE0,0010) is present in the top level Data Set, and hence shall not be used when Float Pixel Data (7FE0,0008) or Double Float Pixel Data (7FE0,0009) are present. This implies that when a DICOM Message is being encoded according to an encapsulation Transfer Syntax the following requirements shall be met:

1. ...

2. ...

3. The encoding of the Data Elements of the Data Set shall be as follows according to their Value Representations:

   - ...

   - For the Value Representations OB, OL, OV and OW, the encoding shall meet the following specification depending on the Data Element Tag:

     - Pixel Data (7FE0,0010) may be encapsulated or native.

       It shall be encapsulated if present in the top-level Data Set (i.e., not nested within a Sequence Data Element).

Note

The distinction between fixed value length (native) and undefined value length (encapsulated) is present so that the top level Data Set Pixel Data can be compressed (and hence encapsulated), but the Pixel Data within an Icon Image Sequence may or may not be compressed.

If native, it shall have a defined Value Length, and be encoded as follows:

- ...

If encapsulated, it has the Value Representation OB and is an octet-stream resulting from one of the encoding processes. It contains the encoded pixel data stream fragmented into one or more Item(s). This Pixel Data Stream may represent a Single or Multi-frame Image. See Table A.4-1 and Table A.4-2.

- The Length of the Data Element (7FE0,0010) shall be set to the Value for Undefined Length (FFFFFFFFH).
- Each Data Stream Fragment encoded according to the specific encoding process shall be encapsulated as a DICOM Item with a specific Data Element Tag of Value (FFFE,E000). The Item Tag is followed by a 4 byte Item Length field encoding the explicit number of bytes of the Item.

  Note

  Whether more than one fragment per frame is permitted or not is defined per Transfer Syntax.

- All items containing an encoded fragment shall be made of an even number of bytes greater or equal to two. The last fragment of a frame may be padded, if necessary, to meet the sequence item format requirements of the DICOM Standard.

  Note

  1. Any necessary padding may be added in the JPEG or JPEG-LS compressed data stream as per ISO 10918-1 and ISO 14495-1 such that the End of Image (EOI) marker ends on an even byte boundary, or may be appended after the EOI marker, depending on the implementation.

  2. ISO 10918-1 and ISO 14495-1 define the ability to add any number of padding bytes FFH before any marker (all of which also begin with FFH). It is strongly recommended that FFH padding bytes not be added before the Start of Image (SOI) marker.

- The first Item in the Sequence of Items before the encoded Pixel Data Stream shall be a Basic Offset Table item. The Basic Offset Table Item Value, however, is not required to be present:
  - When the Item Value is not present, the Item Length shall be zero (00000000H) (see Table A.4-1).
  - When the Item Value is present, the Basic Offset Table Item Value shall contain concatenated 32-bit unsigned integer values that are byte offsets to the first byte of the Item Tag of the first fragment for each frame in the Sequence of Items. These offsets are measured from the first byte of the first Item Tag following the Basic Offset Table item (see Table A.4-2).

    Note

    1. For a Multi-Frame Image containing only one frame or a Single Frame Image, the Basic Offset Table Item Value may be present or not. If present it will contain a single 00000000H value.

    2. Decoders of encapsulated pixel data, whether Single Frame or Multi-Frame, need to accept both an empty Basic Offset Table (zero length) and a Basic Offset Table filled with 32 bit offset values.

    3. A Basic Offset Table Item Value is not permitted (i.e., the Item Length of the first Item will be zero) if Extended Offset Table (7FE0,0001) is present.

- This Sequence of Items is terminated by a Sequence Delimiter Item with the Tag (FFFE,E0DD) and an Item Length Field of Value (00000000H) (i.e., no Value Field shall be present).

- ...

Table A.4-1. Example for Elements of an Encoded Single-Frame Image Defined as a Sequence of Three Fragments Without Basic Offset Table Item Value

Pixel Data Element Tag	Value Representation		Data Element Length	Data Element				
(7FE0, 0010) with VR of OB	OB	0000H Reserved	FFFF FFFFH undefined length	Basic Offset Table with NO Item Value		First Fragment (Single Frame) of Pixel Data		
				Item Tag	Item Length	Item Tag	Item Length	Item Value
				(FFFE, E000)	0000 0000H	(FFFE, E000)	0000 04C6H	Compressed Fragment
4 bytes	2 bytes	2 bytes	4 bytes	4 bytes	4 bytes	4 bytes	4 bytes	04C6H bytes

Table A.4-1b. Example for Elements of an Encoded Single-Frame Image Defined as a Sequence of Three Fragments Without Basic Offset Table Item Value (continued)

Data Element Continued							
Second Fragment (Single Frame) of Pixel Data			Third Fragment (Single Frame) of Pixel Data			Sequence Delimiter Item	
Item Tag	Item Length	Item Value	Item Tag	Item Length	Item Value	Sequence Delim. Tag	Item Length
(FFFE, E000)	0000 024AH	Compressed Fragment	(FFFE, E000)	0000 0628H	Compressed Fragment	(FFFE,E0DD)	0000 0000H
4 bytes	4 bytes	024AH bytes	4 bytes	4 bytes	0628H bytes	4 bytes	4 bytes

Table A.4-2. Examples of Elements for an Encoded Two-Frame Image Defined as a Sequence of Three Fragments with Basic Table Item Values

Pixel Data Element Tag	Value Representation		Data Element Length	Data Element					
(7FE0, 0010) with VR of OB	OB	0000H Reserved	FFFF FFFFH undefined length	**Basic Offset Table with Item Value**			**First Fragment (Frame 1) of Pixel Data**		
				Item Tag	**Item Length**	**Item Value**	**Item Tag**	**Item Length**	**Item Value**
				(FFFE, E000)	0000 0008H	0000 0000H 0000 0646H	(FFFE, E000)	0000 02C8H	Compressed Fragment
4 bytes	2 bytes	2 bytes	4 bytes	4 bytes	4 bytes	0008H bytes	4 bytes	4 bytes	02C8H bytes

Table A.4-2b. Examples of Elements for an Encoded Two-Frame Image Defined as a Sequence of Three Fragments with Basic Table Item Values (continued)

Data Element Continued							
Second Fragment (Frame 1) of Pixel Data			**Third Fragment (Frame 2) of Pixel Data**			**Sequence Delimiter Item**	
Item Tag	**Item Length**	**Item Value**	**Item Tag**	**Item Length**	**Item Value**	**Sequence Delimiter Tag**	**Item Length**
(FFFE, E000)	0000 036EH	Compressed Fragment	(FFFE, E000)	0000 0BC8H	Compressed Fragment	(FFFE, E0DD)	0000 0000H
4 bytes	4 bytes	036EH bytes	4 bytes	4 bytes	0BC8H bytes	4 bytes	4 bytes

Modify PS3.5 A.4.5 - A.4.8

A.4.5 MPEG2 Video Compression

The International Standards Organization ISO/IEC MPEG2 has developed an International Standard, [ISO/IEC 13818-2] 'Information Technology - Generic coding of moving pictures and associated audio information: video -- part 2', referred to as "MPEG-2".

A DICOM Transfer Syntax for MPEG2 Video Compression shall be identified by a UID value of ~~either~~ **one of**:

- 1.2.840.10008.1.2.4.100 corresponding to MPEG2 Main Profile / Main Level option of the ISO/IEC MPEG2 Video standard **encoded in a single Fragment,**
- 1.2.840.10008.1.2.4.101 corresponding to the MPEG2 Main Profile / High Level option of the ISO/IEC MPEG2 Video standard **encoded in a single Fragment**,
- **1.2.840.10008.1.2.4.100.1 corresponding to MPEG2 Main Profile / Main Level option of the ISO/IEC MPEG2 Video standard,**
- **1.2.840.10008.1.2.4.101.1 corresponding to the MPEG2 Main Profile / High Level option of the ISO/IEC MPEG2 Video standard encoded in one or more Fragments.**

A.4.6 MPEG-4 AVC/H.264 High Profile / Level 4.1 Video Compression

The International Standards Organization ISO/IEC MPEG4 has developed an International Standard, [ISO/IEC 14496-10] (MPEG-4 Part 10), for the video compression of generic coding of moving pictures and associated audio information. This standard is jointly maintained and has identical technical content as the ITU-T H.264 standard.

A DICOM Transfer Syntax for MPEG-4 AVC/H.264 Video Compression shall be identified by a UID value of ~~either~~ **one of**:

- 1.2.840.10008.1.2.4.102 corresponding to the MPEG-4 AVC/H.264 High Profile / Level 4.1 of the ITU-T H.264 Video standard **encoded in a single Fragment,**
- 1.2.840.10008.1.2.4.103 corresponding to the MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1 of the ITU-T H.264 Video standard with the temporal and spatial resolution restrictions defined in Table 8-4 **encoded in a single Fragment,**
- **1.2.840.10008.1.2.4.102.1 corresponding to the MPEG-4 AVC/H.264 High Profile / Level 4.1 of the ITU-T H.264 Video standard encoded in one or more Fragments,**
- **1.2.840.10008.1.2.4.103.1 corresponding to the MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1 of the ITU-T H.264 Video standard with the temporal and spatial resolution restrictions defined in Table 8-4 encoded in one or more Fragments.**

A.4.7 MPEG-4 AVC/H.264 High Profile / Level 4.2 Video Compression

The International Standards Organization ISO/IEC MPEG4 has developed an International Standard, [ISO/IEC 14496-10] (MPEG-4 Part 10), for the video compression of generic coding of moving pictures and associated audio information. This standard is jointly maintained and has identical technical content as the ITU-T H.264 standard.

A DICOM Transfer Syntax MPEG-4 AVC/H.264 High Profile / Level 4.2 for 2D Video Compression shall be identified by a UID value of **one of**:

- 1.2.840.10008.1.2.4.104 corresponding to the MPEG-4 AVC/H.264 High Profile / Level 4.2 of the ITU-T H.264 Video standard with the restriction that frame packing for stereoscopic 3D content shall not be used as defined in Table 8-8**, encoded in a single Fragment,**
- **1.2.840.10008.1.2.4.XX104 corresponding to the MPEG-4 AVC/H.264 High Profile / Level 4.2 of the ITU-T H.264 Video standard with the restriction that frame packing for stereoscopic 3D content shall not be used as defined in Table 8-8, encoded in one or more Fragments.**

A DICOM Transfer Syntax MPEG-4 AVC/H.264 High Profile / Level 4.2 for 3D Video Compression shall be identified by a UID value of **one of**:

- 1.2.840.10008.1.2.4.105 corresponding to the MPEG-4 AVC/H.264 High Profile / Level 4.2 of the ITU-T H.264 Video standard. It should be used for transmitting stereoscopic 3D content with frame packing formats as defined in Table 8-8, **encoded in a single Fragment.**

- **1.2.840.10008.1.2.4.XX105 corresponding to the MPEG-4 AVC/H.264 High Profile / Level 4.2 of the ITU-T H.264 Video standard. It should be used for transmitting stereoscopic 3D content with frame packing formats as defined in Table 8-8, encoded in one or more Fragments.**

A.4.8 MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 Video Compression

The International Standards Organization ISO/IEC MPEG4 has developed an International Standard, [ISO/IEC 14496-10] (MPEG-4 Part 10), for the video compression of generic coding of moving pictures and associated audio information. This standard is jointly maintained and has identical technical content as the ITU-T H.264 standard.

A DICOM Transfer Syntax for MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 Video Compression shall be identified by a UID value of **one of**:

- 1.2.840.10008.1.2.4.106 corresponding to the MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 of the ITU-T H.264 Video standard, **encoded in a single Fragment.**

- **1.2.840.10008.1.2.4.106 corresponding to the MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2 of the ITU-T H.264 Video standard, encoded in one or more Fragments.**

Modify PS3.6 Table 6-1 by adding

(7FE0,0003)	Encapsulated Pixel Data Value Total Length	EncapsulatedPixelDataValueTotalLength	UV	1	

Add the following lines to PS3.6 Appendix A Registry of

1.2.840.10008.1.2.4.100	MPEG2 Main Profile / Main Level	MPEG2MPML	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.100.1	**Fragmentable MPEG2 Main Profile / Main Level**	**MPEG2MPMLF**	**Transfer Syntax**	**PS3.5**
1.2.840.10008.1.2.4.101	MPEG2 Main Profile / High Level	MPEG2MPHL	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.101.1	**Fragmentable MPEG2 Main Profile / High Level**	**MPEG2MPHLF**	**Transfer Syntax**	**PS3.5**

1.2.840.10008.1.2.4.102	MPEG-4 AVC/H.264 High Profile / Level 4.1	MPEG4HP41	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.102.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.1**	**MPEG4HP41F**	**Transfer Syntax**	**PS3.5**
1.2.840.10008.1.2.4.103	MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	MPEG4HP41BD	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.103.1	**Fragmentable MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1**	**MPEG4HP41BDF**	**Transfer Syntax**	**PS3.5**
1.2.840.10008.1.2.4.104	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video	MPEG4HP422D	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.104.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video**	**MPEG4HP422DF**	**Transfer Syntax**	**PS3.5**
1.2.840.10008.1.2.4.105	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video	MPEG4HP423D	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.105.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video**	**MPEG4HP423DF**	**Transfer Syntax**	**PS3.5**
1.2.840.10008.1.2.4.106	MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2	MPEG4HP42STEREO	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.106.1	**Fragmentable MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2**	**MPEG4HP42STEREOF**	**Transfer Syntax**	**PS3.5**
1.2.840.10008.1.2.4.107	HEVC/H.265 Main Profile / Level 5.1	HEVCMP51	Transfer Syntax	PS3.5
1.2.840.10008.1.2.4.108	HEVC/H.265 Main 10 Profile / Level 5.1	HEVCM10P51	Transfer Syntax	PS3.5

Add the following lines to PS3.18 Table 8.7.3-2. Transfer Syntax UIDs for application/dicom Media Types:

310 **Table 8.7.3-2. Transfer Syntax UIDs for application/dicom Media Types**

Category	Transfer Syntax UID	Transfer Syntax Name	Optionality
Video	1.2.840.10008.1.2.1	Explicit VR Little Endian	D
	1.2.840.10008.1.2.4.100	MPEG2 Main Profile @ Main Level	O
	1.2.840.10008.1.2.4.100.1	**Fragmentable MPEG2 Main Profile @ Main Level**	**O**
	1.2.840.10008.1.2.4.101	MPEG2 Main Profile @ High Level	O
	1.2.840.10008.1.2.4.101.1	**Fragmentable MPEG2 Main Profile @ High Level**	**O**
	1.2.840.10008.1.2.4.102	MPEG-4 AVC/H.264 High Profile / Level 4.1	O
	1.2.840.10008.1.2.4.102.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.1**	**O**
	1.2.840.10008.1.2.4.103	MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	O
	1.2.840.10008.1.2.4.103.1	**Fragmentable MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1**	**O**
	1.2.840.10008.1.2.4.104	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video	O
	1.2.840.10008.1.2.4.104.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video**	**O**
	1.2.840.10008.1.2.4.105	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video	O
	1.2.840.10008.1.2.4.105.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video**	**O**
	1.2.840.10008.1.2.4.106	MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2	O
	1.2.840.10008.1.2.4.106.1	**Fragmentable MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2**	**O**
	1.2.840.10008.1.2.4.107	HEVC/H.265 Main Profile / Level 5.1	O

Category	Transfer Syntax UID	Transfer Syntax Name	Optionality
	1.2.840.10008.1.2.4.108	HEVC/H.265 Main 10 Profile / Level 5.1	O

Add the following lines to PS3.18 Table 8.7.3-5. Media Types and Transfer Syntax UIDs for Compressed Data in Bulkdata:

Table 8.7.3-5. Media Types and Transfer Syntax UIDs for Compressed Data in Bulkdata

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Resource Category	Media Type	Transfer Syntax UID	Transfer Syntax Name	Optionality
Video	video/mpeg2	1.2.840.10008.1.2.4.100	MPEG2 Main Profile @ Main Level	O
		1.2.840.10008.1.2.4.100.1	**Fragmentable MPEG2 Main Profile @ Main Level**	**O**
		1.2.840.10008.1.2.4.101	MPEG2 Main Profile @ High Level	D
		1.2.840.10008.1.2.4.101.1	**Fragmentable MPEG2 Main Profile @ High Level**	**O**
	video/mp4	1.2.840.10008.1.2.4.102	MPEG-4 AVC/H.264 High Profile / Level 4.1	D
		1.2.840.10008.1.2.4.102.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.1**	**O**
		1.2.840.10008.1.2.4.103	MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1	O
		1.2.840.10008.1.2.4.103.1	**Fragmentable MPEG-4 AVC/H.264 BD-compatible High Profile / Level 4.1**	**O**
		1.2.840.10008.1.2.4.104	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video	O
		1.2.840.10008.1.2.4.104.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.2 For 2D Video**	**O**

Resource Category	Media Type	Transfer Syntax UID	Transfer Syntax Name	Optionality
		1.2.840.10008.1.2.4.105	MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video	O
		1.2.840.10008.1.2.4.105.1	**Fragmentable MPEG-4 AVC/H.264 High Profile / Level 4.2 For 3D Video**	**O**
		1.2.840.10008.1.2.4.106	MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2	O
		1.2.840.10008.1.2.4.106.1	**Fragmentable MPEG-4 AVC/H.264 Stereo High Profile / Level 4.2**	**O**