

## DICOM Correction Proposal Form

Correction Number CP-317	
Log Summary: Clarify P-DATA PDU minimum length	
Type of Modification	Name of Standard
Correction	PS 3.8 2001
<p>Rationale for Correction</p> <p>A P-DATA PDU contains one or more PDVs, and each PDV should not be “empty”, that is of length 2 bytes with only a Presentation Context ID and a Message Control Header (whether or not that header is set to the last fragment or not, and whether or not it is a command or data fragment).</p> <p>In other words, zero-length fragments should be forbidden, but some implementations are sending them, causing receivers to fail.</p> <p>A note is added to clarify that zero-length fragments are explicitly forbidden, receivers must be prepared to accept them.</p> <p>Also, a minor typographic error in Table 9-23 is repaired.</p>	
Sections of documents affected	
PS 3.8, Annex E	
Correction Wording:	

*PS 3.8 Section 9.3.5 included unmodified to provide context:*

### 9.3.5 P-DATA-TF PDU STRUCTURE

A P-DATA-TF PDU shall be made of a sequence of mandatory fixed length fields followed by a variable length field. Table 9-22 shows the sequence of the mandatory fields.

The variable data field shall contain one or more Presentation-Data-Value Items.

**Table 9-22  
 P-DATA-TF PDU FIELDS**

PDU bytes	Field name	Description of field
1	PDU-type	04H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-6	PDU-length	This PDU-length shall be the number of bytes from the first byte of the following field to the last byte of the variable field. It shall be encoded as an unsigned binary number.
7-xxx	Presentation-data-value Item(s),	This variable data field shall contain one or more Presentation-data-value Items(s). For a complete description of the use of this field see Section 9.3.5.1

### 9.3.5.1 Presentation data value item structure

The Presentation Data Value Item shall be made of a sequence of mandatory fixed length fields followed by one variable length field. Table 9-23 shows the sequence of the fields.

The variable field shall consist of one Presentation-Data-Value.

**Table 9-23  
PRESENTATION-DATA-VALUE ITEM FIELDS**

Item bytes	Field name	Description of field
1-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Presentation-data-value field. It shall be encoded as an unsigned binary number.
5	Presentation-context-ID	Presentation-context-ID values shall be odd integers between 1 and 255, encoded as an unsigned binary number. For a complete description of the use of this field see Section 7.1.1.13.
<b>56</b> -xxx	Presentation-data-value	This Presentation-data-value field shall contain DICOM message information (command and/or data set) with a message control header. For a complete description of the use of this field see Annex E.

*Modify PS 3.8 Annex E as follows:*

## **Annex E Usage of the P-DATA service by the DICOM application entity (Normative)**

This Annex specifies how DICOM messages are encapsulated into the P-DATA Service by the DICOM Application Entity.

### **E.1 ENCAPSULATION RULES**

DICOM Messages are encapsulated in P-DATA request primitives as the user data of Presentation Data Values (PDV). A DICOM Message is fragmented in Command Fragments and Data Fragments, each placed in a PDV. The same presentation context shall be used for every fragment of the same message (i.e. same Presentation Context ID for the user data of the PDVs containing the fragments of a same message). A PDV User Data parameter shall contain one and only one fragment (either Command or Data) preceded by a Message Control Header. This header will indicate:

- a) whether the fragment is of the Command or Data type
- b) whether the fragment is or is not the last fragment of a Command/Data Stream of a DICOM Message

A P-DATA request PDV List parameter shall contain one or more such PDV(s) (Message Control Header and a complete message fragment). Each PDV is wholly contained in a given P-DATA request primitive and does not span across several P-DATA request primitives. The PDVs

contained in a P-DATA request primitive shall be related to the same DICOM message. Each fragment of a message shall consist of an even number of bytes.

- Notes:
- 1 No padding is necessary as PS 3.5 defines messages on an even byte boundary.
  2. The above rules state that each fragment contained in a PDV shall consist of an even number of bytes (only). Therefore, encoding such as Group Number, Element Number, Value Length, etc. (as defined by the DICOM Application Entity, see PS 3.5) is not guaranteed to be within the same PDV.

The fragmentation of any message results in a series of PDVs which shall be sent, on a given association, by a corresponding series of P-DATA requests preserving the ordering of the fragments of any message. Furthermore, no fragments of any other message shall be sent until all fragments of the current message have been sent (i.e. interleaving of fragments from different messages is not permitted).

It is strongly recommended that two consecutive PDVs in the same P-DATA Request primitive (therefore containing fragments of the same message using the same Presentation Context ID) do not contain two message Control Headers with the same type (Command or Data). These should have been combined in a single PDV by the sender. However, receivers must be able to receive and process such PDVs.

- Note: The above rules allow the sending in the same P-DATA request/indication of a Command fragment in the first PDV (with the last fragment flag set) followed by a Data Fragment in the second PDV (with the last fragment flag set or not). In particular, if the negotiated maximum length for the PDV List parameter of the P-DATA request is sufficient to hold a complete message, a single P-DATA request can be used to exchange an entire message.

**Individual PDVs shall not be sent with Presentation-data-value fields consisting only of a single byte containing a Message Control Header, but without any other content in the fragment. These should have been combined with the preceding or succeeding PDVs by the sender.**

- Note: Even though the above rules prohibit the sending of an “empty” PDV (such as with the last fragment flag set), it is recommended that receivers be able to receive and process such PDVs.**

## **E.2 MESSAGE CONTROL HEADER ENCODING**

The Message Control Header is located in front of each DICOM message fragment (see Figure E.2-1). Its presence is mandatory for all DICOM Abstract Syntaxes (see Annex B for further discussion on Abstract Syntaxes).

The Message Control Header shall be made of one byte with the least significant bit (bit 0) taking one of the following values:

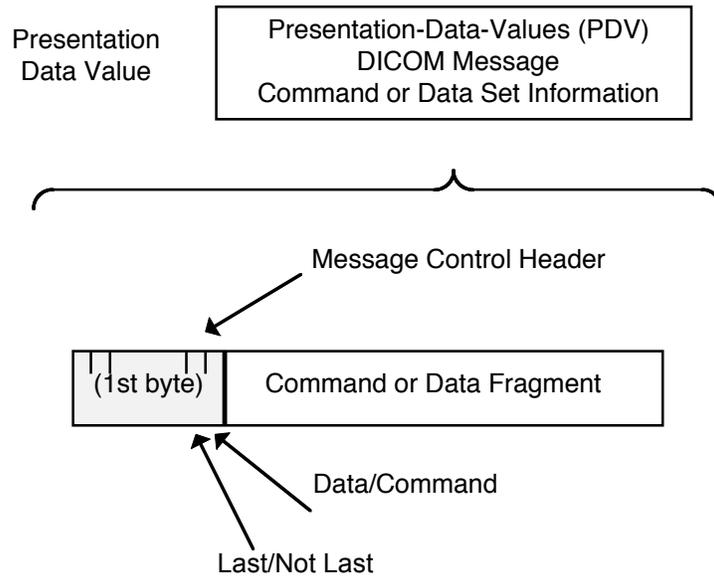
- a) If bit 0 is set to 1, the following fragment shall contain Message Command information.
- b) If bit 0 is set to 0, the following fragment shall contain Message Data Set information.

The next least significant bit (bit 1) shall be defined by the following rules:

- a) If bit 1 is set to 1, the following fragment shall contain the last fragment of a Message Data Set or of a Message Command.
- b) If bit 1 is set to 0, the following fragment does not contain the last fragment of a Message Data Set or of a Message Command.

Bits 2 through 7 are always set to 0 by the sender and never checked by the receiver.

Note: The Message Control Header, in the Transport data flow, is the 1st byte in each PDV. The Transfer Syntax, negotiated at association establishment, defines the encoding for the Command/Data fragment.



**Figure E.2-1**  
**PRESENTATION DATA VALUE AND THE MESSAGE CONTROL HEADER**