

DICOM Correction Proposal Form

Tracking Information - Administrator Use Only	
Correction Proposal Number	CP -123
STATUS	Assigned - revision 04
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Person Assigned	David Clunie dclunie@idt.net
Log Summary: Explicit VR length field for new VRs to support byte-order conversion	
Submitter Name: Herve Hoehn	Submission Date: 98/01/06
Type of Modification: Clarification	
Name of Document: PS 3.5 2000 Data Structure and Encoding	Version Number:
<p>Rationale for Change:</p> <p>Supplement 14 adds a VR of UN (Unknown) to allow attributes received in default Implicit VR Little Endian Transfer Syntax to be preserved in explicit VR even if the dictionary VR is not known (eg. for new standard attributes or private attributes).</p> <p>The byte order for UN is defined to be Little Endian (in case the "real" VR is multibyte).</p> <p>The same supplement also creates the conditions for the extension of the standard with new VRs by defining the encoding form of the Value Length and VR fields.</p> <p>This creates the possibility that an implementation will receive an attribute in an Explicit VR Transfer Syntax, but with a VR that it does not recognize.</p> <p>In this case, if the Transfer Syntax is Little Endian, then the attribute may safely be stored and regurgitated as UN.</p> <p>On the other hand, if the attribute is received in an Explicit Big Endian Transfer Syntax, then the implementation that does not recognize the VR does not know whether to store or transmit the value in the same or swapped byte order, since the unrecognized VR may be single or multi-byte.</p> <p>This correction adds a mechanism for all new VRs to make use of the spare padding bytes in the "long form" of explicit VR encoding to encode the actual length in bytes of each value for that VR (e.g. 1,2 or 4 bytes), thus allowing correct byte swapping regardless of the explicit transfer syntax in which the data was received.</p> <p>This proposal handles the case in which an unrecognized VR is received in Explicit VR Big Endian Transfer Syntax that needs to be retransmitted in either Implicit or Explicit VR Little Endian.</p>	
Sections of Document Affected:	

Suggested Wording of Changes:

Item #1

Change section 7.1.2 to describe the use of the VR Length field - all modifications to the existing section are shown in **BOLD underlined** font.

When using the Explicit VR structures, the Data Element shall be constructed of four consecutive fields: Data Element Tag, VR, Value Length, and Value. Depending on the VR of the Data Element, the Data Element will be structured in one of two ways:

- for VRs of OB, OW, SQ and UN the 16 bits following the two character VR Field are **used as follows:**
 - **the first byte may explicitly specify the length of a single value encoded in that VR, i.e. 1, 2 or 4 bytes**

Note:

 - 1. In previous versions of the standard, this byte was reserved and set to 00H.**
 - 2. If this field contains zero, then the receiver must use its implicit knowledge of the characteristics of the VR to determine the actual length of a single value.**
 - 3. The VR length can be used by receivers that encounter unexpected VRs (e.g. those added to the standard since their implementation) to reorder the bytes of values when translating between transfer syntaxes.**
 - 4. It is recommended that all VRs added to the standard in future make the use of this length field mandatory.**
 - **the second byte is** reserved for use by later versions of the DICOM Standard. **These This** reserved bytes shall be set to ~~00~~00H and shall not be used or decoded (Figure 7.1.2-1).
 - The Value Length Field is a 32-bit unsigned integer. If the Value Field has an Explicit Length, then the Value Length Field shall contain a value equal to the length (in bytes) of the Value Field. Otherwise, the Value Field has an Undefined Length and a Sequence Delimitation Item marks the end of the Value Field.
- for all other VRs the Value Length Field is the 16-bit unsigned integer following the two character VR Field (Figure 7.1.2-2). The value of the Value Length Field shall equal the length of the Value Field.

Item #2

Add use of VR Length field in reserved bytes to Figures 7.1.2-1- all modifications to the existing section are shown in **BOLD Underline** font.

Figure 7.1.2-1: Data Element with Explicit VR of OB, OW, SQ, UB or UN

Tag		VR			Value Length	Value
Group Number (16-bit unsigned integer)	Element Number (16-bit unsigned integer)	VR (2 byte character string) of "OB", "OW", "SQ" or "UN"	<u>Reserved (2 bytes) set to a value of 0000H</u> <u>VR Length</u>	<u>Reserved (1 byte) set to a value of 00H</u>	32-bit unsigned integer	Even number of bytes contain the Data Element Value(s) encoded according to the VR ar negotiated Transfer Syntax. Delimited with Sequence Delimitation Item if of Undefined Length.
2 bytes	2 bytes	2 bytes	<u>2 1 bytes</u>	<u>1 byte</u>	4 bytes	'Value Length' bytes if of Explicit Length