

1	Status	Assigned
2	Date of Last Update	2019/02/23
3	Person Assigned	David Clunie
4		mailto:dclunie@dclunie.com
5	Submitter Name	Jörg Riesmeier
6		mailto:dicom@jriesmeier.com
7	Submission Date	2019/02/07

8	Correction Number CP-1888	
9	Log Summary: Reverse sense of all other encoding based on VR to follow rule for new VRs.	
10	Name of Standard	
11	PS3.5	
12	Rationale for Correction:	
13	When the introduction of new VRs began with CP 14, it was anticipated that for toolkits that had not been updated to be able to parse	
14	datasets containing VRs that they did not recognize, they would need to follow one pattern, and a rule stating this was introduced.	
15	It is easy to overlook making the necessary changes in the encoding table though, since it is defined in such a way that the "all other"	
16	applies to the existing short form VRs and not those that are new. Such a mistake was made in CP 1819 and corrected editorially	
17	in 2019b.	
18	This CP reverses the sense of these tables, to prevent making the same editorial mistake in the future, factors out the constraints	
19	on whether undefined length is allowed or not, and clarifies the new VR encoding general rule.	
20	There is no change to the actual encoding, only the documentation of it.	
21	Correction Wording:	

Amend DICOM PS3.5 as follows (changes to existing text are bold and underlined for additions and ~~struckthrough~~ for removals):

6.2 Value Representation (VR)

All new VRs defined in future versions of DICOM shall be of the same Data Element Structure as defined in Section 7.1.2 with reserved bytes after the VR and a 32-bit unsigned integer VL (i.e., following the format for VRs such as OB, ~~OD, OF, OL, OV, OW, SQ and UN or UT~~), and may or may not permit undefined length.

Note

1. Since all new VRs will be defined as specified in Section 7.1.2, an implementation may choose to ignore VRs not recognized by applying the rules stated in Section 7.1.2.
2. When converting a Data Set from an Explicit VR Transfer Syntax to a different Transfer Syntax, an implementation may copy Data Elements with unrecognized VRs in the following manner:
 - If the endianness of the Transfer Syntaxes is the same, the Value of the Data Element may be copied unchanged and if the target Transfer Syntax is Explicit VR, the VR bytes copied unchanged. In practice this only applies to Little Endian Transfer Syntaxes, since there was only one Big Endian Transfer Syntax defined.
 - If the source Transfer Syntax is Little Endian and the target Transfer Syntax is the (retired) Big Endian Explicit VR Transfer Syntax, then the Value of the Data Element may be copied unchanged and the VR changed to UN, since being unrecognized, whether or not byte swapping is required is unknown. If the VR were copied unchanged, the byte order of the value might or might not be incorrect.
 - If the source Transfer Syntax is the (retired) Big Endian Explicit VR Transfer Syntax, then the Data Element cannot be copied, because whether or not byte swapping is required is unknown, and there is no equivalent of the UN VR to use when the value is big endian rather than little endian.

The issues of whether or not the element may be copied, and what VR to use if copying, do not arise when converting a Data Set from Implicit VR Little Endian Transfer Syntax, since the VR would not be present to be unrecognized, and if the data element VR is not known from a data dictionary, then UN would be used.

7.1.2 Data Element Structure with Explicit VR

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 AE, AS, AT, CS, DA, DS, DT, FL, FD, IS, LO, LT, PN, SH, SL, SS, ST, TM, UI, UL and US the Value Length Field is the 16-bit unsigned integer following the two byte VR Field (Table 7.1-2). The value of the Value Length Field shall equal the length of the Value Field.
- for ~~VRs of OB, OD, OF, OL, OV, OW, SQ and UN~~ all other VRs the 16 bits following the two byte VR Field are reserved for use by later versions of the DICOM Standard. These reserved bytes shall be set to 0000H and shall not be used or decoded (Table 7.1-1). 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 VRs of OB, OD, OF, OL, OV, OW, SQ and UN, 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 with a 32-bit Value Length Field, the Value Length Field shall contain a value equal to the length (in bytes) of the Value Field.
- ~~for VRs of SV, UG, UR, UV and UT the 16 bits following the two byte VR Field are reserved for use by later versions of the DICOM Standard. These reserved bytes shall be set to 0000H and shall not be used or decoded. The Value Length Field is a 32-bit unsigned integer. The Value Field is required to have an Explicit Length, that is the Value Length Field shall contain a value equal to the length (in bytes) of the Value Field.~~

Note

VRs of SV, UC, UR, UV and UT may not have an Undefined Length, i.e., a Value Length of FFFFFFFFH.

- ~~for all other VRs the Value Length Field is the 16-bit unsigned integer following the two byte VR Field (Table 7.1-2). The value of the Value Length Field shall equal the length of the Value Field.~~

Table 7.1-1. Data Element with Explicit VR of ~~OB, OD, OF, OL, OV, OW, SQ, SV, UC, UR, UT, UN or UV~~ other than as shown in Table 7.1-2

Tag		VR		Value Length	Value
Group Number (16-bit unsigned integer)	Element Number (16-bit unsigned integer)	VR (2 single byte characters) of "OB", "OD", "OF", "OL", "OV", "OW", "SQ", "SV", "UC", "UR", "UT", "UN" or "UV"	Reserved (2 bytes) set to a value of 0000H	32-bit unsigned integer	Even number of bytes containing the Data Element Value(s) encoded according to the VR and negotiated Transfer Syntax. Delimited with Sequence Delimitation Item if of Undefined Length.
2 bytes	2 bytes	2 bytes	2 bytes	4 bytes	'Value Length' bytes if of Explicit Length

Table 7.1-2. Data Element with Explicit VR ~~other than as shown in Table 7.1-1~~ of AE, AS, AT, CS, DA, DS, DT, FL, FD, IS, LO, LT, PN, SH, SL, SS, ST, TM, UI, UL and US

Tag		VR	Value Length	Value
Group Number (16-bit unsigned integer)	Element Number (16-bit unsigned integer)	VR (2 single byte characters)	(16-bit unsigned integer)	Even number of bytes containing the Data Element Value(s) encoded according to the VR and negotiated Transfer Syntax.
2 bytes	2 bytes	2 bytes	2 bytes	'Value Length' bytes