

DICOM Correction Proposal

STATUS	Final Text
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Correction Number	CP- 1499
Log Summary:	Fix CP 1365 setback with Long xxx Index List VR
Name of Standard	DICOM 2015c PS 3.3, PS 3.5 (CP-1451+Sup181), PS 3.6
Rationale for Correction:	<p>The CP1365 was submitted to overcome the shortcoming of allowing only 16-Bit Index values in the xxx Point Index List attributes in the Surface Mesh Primitives Macro.</p> <p>The situation has worsened by choosing the VR of UL, as this VR only has a 16-Bit attribute length field, allowing only 16.384 values in the new Long xxx Point Index List.</p> <p>Esp. for meshes typically encoded with the Long Triangle Point Index List, this is a dramatic setback in encoding possibilities. Only rough 5.460 Triangles can be encoded for one Surface mesh since CP1365 became active in the Standard. Modern algorithms create meshes beyond 100.000 triangles, what was the trigger for writing CP 1365 in order to switch from 16-Bit index values to 32-bit index values.</p> <p>The current CP tries to complete the change initiated by CP 1365. It is assumed that the VR of the attributes introduced by CP 1365 can be modified, as the new Long xxx Point Index List Attributes are not used due awareness of the restrictions with the UL value representation. But this needs to be assessed by WG-06 and reviewed in the DICOM community.</p> <p>What is really needed is an array of 32-bit Indices that can be stored in attributes with a 32-bit value length.</p> <p>The CP 1451, removing the remainder of the retired xxx Point Index List attributes in Part 5, remain unaffected in great deal by the current CP. Only the VR described in CP-1451 needs to be changed to the chosen VR of "OL" recently introduced in Sup 181.</p>
Correction Wording:	The Long Index attributes introduced by CP1365 shall have the VR changed from UL to OL.

PS3.3 – modify attribute description in Surface Mesh primitives Macro to recommend "long integer" interpretation

Table C.27-4. Surface Mesh Primitives Macro Attributes

Attribute Name	Tag	Type	Attribute Description
Long Vertex Point Index List	(0066,0043)	2	A list of point indices. Contains n point indices describing Vertices. See Section C.27.4.1 .
Long Edge Point Index List	(0066,0042)	2	A list of point indices. Contains 2n point indices describing

Attribute Name	Tag	Type	Attribute Description
			unconnected Edges. See Section C.27.4.1 .
Long Triangle Point Index List	(0066,0041)	2	A list of point indices. Contains 3n point indices describing unconnected Triangles. See Section C.27.4.1 .
Triangle Strip Sequence	(0066,0026)	2	All Triangle Strips in this Surface. Zero or more Items shall be included in this sequence.
>Long Primitive Point Index List	(0066,0040)	1	A list of point indices. See Section C.27.4.1 .
Triangle Fan Sequence	(0066,0027)	2	All Triangle Fans in this Surface. Zero or more Items shall be included in this sequence.
>Long Primitive Point Index List	(0066,0040)	1	A list of point indices. See Section C.27.4.1 .
Line Sequence	(0066,0028)	2	All Lines in this Surface. Zero or more Items shall be included in this sequence.
>Long Primitive Point Index List	(0066,0040)	1	A list of point indices. See Section C.27.4.1 .
Facet Sequence	(0066,0034)	2	All Facets in this Surface. Each sequence Item describes one facet. Zero or more Items shall be included in this sequence.
>Long Primitive Point Index List	(0066,0040)	1	A list of point indices. See Section C.27.4.1 .

C.27.4.1 Surface Mesh Primitives Macro Attribute Descriptions

The Surface Mesh Primitives Macro uses **32-bit long integer** point indices to reference the point rather than repeating point coordinates. All of the point coordinates used are specified within the Surface Points Sequence (0066,0011) of the same Surface Sequence (0066,0002) item. Point indices are described in [Section C.27.2.1.1](#).

Note

In a previous edition, other Attributes were used that had an OW VR and a limitation to no more than 65535 points per surface. These have been retired and replaced with new Attributes. See PS 3.3 2014a.

A Surface Mesh shall contain one or more of the following primitive types:

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Correct DICOM PS3.5 Annex A.1, modify Note #2

A.1 DICOM Implicit Little Endian Transfer Syntax

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Note

1. Encoding of Curve Data and Audio Sample Data was previously defined but has been retired. See PS3.5-2004.
2. Vertex Point Index List (0066,0025), Edge Point Index List (0066,0024), Triangle Point Index List (0066,0023) and Primitive Point Index List (0066,0029) were previously defined with a value representation of OW and always interpreted as unsigned, but have been retired. These have been replaced by corresponding **ULOL** data elements, which allow values larger than 65535 to index the full range of points that can be encoded in Point Coordinates Data (0066,0016). See PS3.5-2015c.

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Correct DICOM PS3.5 Annex A.2, modify Note #3

A.2 DICOM Little Endian Transfer Syntax (Explicit VR)

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Note

1. For Data encoded with the Value Representation OB, the Data encoding is unaffected by Little Endian or Big Endian byte ordering.
2. Encoding of Curve Data and Audio Sample Data was previously defined but has been retired. See PS3.5-2004.
3. Vertex Point Index List (0066,0025), Edge Point Index List (0066,0024), Triangle Point Index List (0066,0023) and Primitive Point Index List (0066,0029) were previously defined with a value representation of OW and always interpreted as unsigned, but have been retired. These have been replaced by corresponding **ULOL** data elements, which allow values larger than 65535 to index the full range of points that can be encoded in Point Coordinates Data (0066,0016). See PS3.5-2015c.

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Correct DICOM PS3.5 Annex A.3, modify Note #3

A.3 DICOM Big Endian Transfer Syntax (Explicit VR)

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Note

1. For Data encoded with the Value Representation OB, the Data encoding is unaffected by Little Endian or Big Endian byte ordering.
2. Encoding of Curve Data and Audio Sample Data was previously defined but has been retired. See PS3.5-2004.
3. Vertex Point Index List (0066,0025), Edge Point Index List (0066,0024), Triangle Point Index List (0066,0023) and Primitive Point Index List (0066,0029) were previously defined with a value representation of OW and always interpreted as unsigned, but have been retired. These have been replaced by corresponding **ULOL** data elements, which allow values larger than 65535 to index the full range of points that can be encoded in Point Coordinates Data (0066,0016). See PS3.5-2015c.

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Correct DICOM PS3.5 Annex A.4, modify Note #3

A.4 Transfer Syntaxes For Encapsulation of Encoded Pixel Data

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Note

1. For Data encoded with the Value Representation OB, the Data encoding is unaffected by Little Endian or Big Endian byte ordering.
2. Encoding of Curve Data and Audio Sample Data was previously defined but has been retired. See PS3.5-2004.
3. Vertex Point Index List (0066,0025), Edge Point Index List (0066,0024), Triangle Point Index List (0066,0023) and Primitive Point Index List (0066,0029) were previously defined with a value representation of OW and always interpreted as unsigned, but have been retired. These have been replaced by corresponding **ULOL** data elements, which allow values larger than 65535 to index the full range of points that can be encoded in Point Coordinates Data (0066,0016). See PS3.5-2015c.

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PS3.6 – Table 6-1: modify VR of Long xxx Point Index List attributes to OL and VM to 1

Table 6-1. Registry of DICOM Data Elements

Tag	Name	Keyword	VR	VM	
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(0066,0040)	Long Primitive Point Index List	LongPrimitivePointIndexList	ULOL	1-n1	
(0066,0041)	Long Triangle Point Index List	LongTrianglePointIndexList	ULOL	3-3n1	
(0066,0042)	Long Edge Point Index List	LongEdgePointIndexList	ULOL	2-2n1	

Tag	Name	Keyword	VR	VM	
(0066,0043)	Long Vertex Point Index List	LongVertexPointIndexList	<u>ULOL</u>	<u>4-n1</u>	
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