

DICOM Correction Proposal Form

Tracking Information - Administration Use Only	
Correction Proposal Number	CP-218
STATUS	Assigned
Date of Last Update	2000/09/27
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Submission date	2000/09/14

Correction Number	CP-218
Log Summary: Compression Transfex Syntax for Structured Reporting	
Type of Modification	Name of Standard
Addition	PS 3.5, 3.6
<p>Rationale for Correction</p> <p>All existing compression transfer syntaxes only compress the pixel data.</p> <p>Structured reports are extremely redundant in their encoding, with considerable repetition of strings and tags. They can grow quite large, and may well be transmitted over lower bandwidth channels than used for images and stored in databases where size is a concern.</p> <p>Accordingly an existing, industry standard, compression process is proposed that is applied to the entire data set, not just the pixel data. The scheme proposed is the “deflate” algorithm widely used in the gzip and zip programs. It is not subject to any patent restrictions and requires no license fees. Freely available multi-platform implementations are available. The scheme is described in an Internet RFC.</p> <p>Experiments indicate that the scheme is extremely effective for structured reports, and moderately effective for waveforms, and given its universal availability, development of an alternative DICOM-specific scheme that understood and took advantage of the structure of the message (other than bulk data) cannot be justified. For images, it is not very effective.</p> <p>Examples of performance (testing deflate using “gzip –best”):</p> <ul style="list-style-type: none"> • A 36,112 byte structured report compressed to 3,014 bytes (11.98:1) • A 62,450 12-lead ECG waveform compressed to 26,139 bytes (2.39:1) • For a large range of images, deflate achieves 2.38:1 compression compared to lossless JPEG (SV 1) 2.79:1 and JPEG-LS 3.81:1. 	
<p>Sections of documents affected</p> <p>PS 3.5 Section 2, Annex A</p> <p>PS 3.6 Annex A</p>	
Correction Wording:	

Add to PS 3.5 Section 2, Normative References:

RFC 1951

DEFLATE Compressed Data Format Specification version 1.3

Note: RFC 1951 is available from "<http://www.faqs.org/rfcs/rfc1951.html>".

Add to PS 3.5 Annex A, Transfer Syntax Specifications:

A.5 DICOM DEFLATED LITTLE ENDIAN TRANSFER SYNTAX (EXPLICIT VR)

This Transfer Syntax applies to the encoding of the entire DICOM Data Set.

The entire Data Set is first encoded according to the rules specified in Section A.2 DICOM Little Endian Transfer Syntax (Explicit VR).

The entire byte stream is then compressed using the "Deflate" algorithm defined in Internet RFC 1951.

- Notes:
1. The Pixel Data (7FE0,0010) is not handled in any special manner. The pixel data is first encoded as sequential uncompressed frames without encapsulation, and then is handled as part of the byte stream fed to the "deflate" compressor in the same manner as the value of any other attribute.
 2. This transfer syntax is particularly useful for compression of objects without pixel data, such as structured reports. It is not particularly effective at image compression, since any benefit obtained from compressing the non-pixel data is offset by less effective compression of the much larger pixel data.
 3. A freely available reference implementation of the "deflate" compressor may be found in the zlib package which may be downloaded from <ftp://ftp.uu.net/pub/archiving/zip/zlib/>.

This DICOM Deflated Explicit VR Little Endian Transfer Syntax shall be identified by a UID of Value "1.2.840.10008.1.2.1.99"

Add to PS 3.6 Annex A, Registry of UIDs:

**Table A-1
UID VALUES**

UID Value	UID NAME	UID TYPE	Part
1.2.840.10008.1.1	Verification SOP Class	SOP Class	PS 3.4
1.2.840.10008.1.2	Implicit VR Little Endian: Default Transfer Syntax for DICOM	Transfer Syntax	PS 3.5
1.2.840.10008.1.2.1	Explicit VR Little Endian	Transfer Syntax	PS 3.5
<u>1.2.840.10008.1.2.1.99</u>	<u>Deflated Explicit VR Little Endian</u>	<u>Transfer Syntax</u>	<u>PS 3.5</u>
1.2.840.10008.1.2.2	Explicit VR Big Endian	Transfer Syntax	PS 3.5

1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	Transfer Syntax	PS 3.5
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