

DICOM Correction Proposal

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Date of Last Update	2016/01/19
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Correction Number	CP-1163
Log Summary: Conformance for Web Services and Application Hosting	
Name of Standard PS3.2-2016 PS3.18-2016 PS3.19-2016	
Rationale for Correction Parts 18 and 19 added new features for Web Services and Application Hosting, but did not specify a method of claiming conformance in Part 2, or even a formal definition of the Services/SOP Classes (similar to the specification of the Media Services/SOP Classes in Part 4 Annex I) to which conformance claims could be made. In adding these formal definitions, the Media Services/SOP Classes specification is also being updated to eliminate the redundant specification of SOP Classes in Part 4 Annexes B and I.	
Correction Wording:	

Update PS 3.18

***Align with other Parts of DICOM by moving:
Section 2 Conformance to become Section 5,
Section 3 Normative References to become Section 2,
Section 4 Terms and Definitions to become Section 3,
Section 5 Symbols and Abbreviated Terms to become Section 4***

Conformance becomes

Update PS 3.18 Terms and Definitions to add terms from other Parts, and to follow style of other Parts

43 Terms and Definitions

3.1 DICOM Conformance Definitions

This part of the standard makes use of the following terms defined in PS3.2:

Conformance Statement

3.2 DICOM Information Object

This Part of the Standard makes use of the following terms defined in PS3.3:

Multi-frame image

3.3 DICOM Service Class Specifications

This Part of the Standard makes use of the following terms defined in PS3.4:

Real-World Activity

Service-Object Pair (SOP) Class

Service-Object Pair (SOP) Instance

3.4 DICOM Data Structures and Encoding

This Part of the Standard makes use of the following terms defined in PS3.5:

Data Element

Data Element Tag

Unique Identifier (UID)

3.5 DICOM Message Exchange Definitions

This Part of the Standard makes use of the following terms defined in PS3.7:

DICOM Message Service Element (DIMSE)

3.6 DICOM Web Services

For the purposes of this part of DICOM, the following terms and definitions apply.

4.1 DICOM Persistent Object

An instance of a data object as defined by PS3.3 that has been allocated a unique identifier in the format specified for SOP Instance UID in PS3.3 and has been chosen as an object to be saved securely for some period of time. Within the DICOM Standard, a DICOM Persistent Object is referred to as a Composite Service Object Pair (SOP) Instance.

~~4.2 Origin-Server~~

~~See IETF RFC-7230 Section 2.1 Client/Server Messaging.~~

~~4.3 User-Agent~~

~~See IETF RFC-7230 Section 2.1 Client/Server Messaging.~~

4.4 Web Client System

A system using Internet technologies (web, e-mail...) interested in retrieving DICOM Persistent Objects from a Web Enabled DICOM Server, through HTTP/HTTPS protocol.

4.5 Web Enabled DICOM Server

A system managing DICOM Persistent Objects and able to transmit them on request to the Web Client System.

4.6 Web Access to DICOM Persistent Objects

A service enabling the Web Client System to retrieve DICOM Persistent Objects managed by a Web Enabled DICOM Server, through HTTP/HTTPS protocol.

3.7 HyperText Transfer Protocol

This Part of the Standard makes use of the following terms defined in IETF RFC 7230 Section 2.1 Client/Server Messaging:

Origin-Server

User-Agent

Update PS 3.18 Conformance to be more specific:

25 Conventions

5a Conformance

An implementation may conform to the DICOM Web Services by supporting the role of Origin-server or User-agent, or both, for any of the SOP Classes defined in this Part. The structure of Conformance Statements is specified in PS3.2.

An implementation shall describe in its Conformance Statement the Real-World Activity associated with its use of DICOM Web Services, including any proxying between DICOM Web Services and equivalent DICOM Network (DIMSE) Services.

An implementation shall describe in its Conformance Statement the security mechanisms utilized by the implementation.

Add to PS 3.18; note: section to be renumbered with PS3.18 re-documentation

6.3a WADO-URI Conformance

An implementation conforming to the WADO-URI service shall support retrieval of one or more of the Information Objects specified for the DIMSE C-STORE based Storage Service Class, as specified in PS3.4 Annex B.4.

An implementation shall declare in its Conformance Statement the Information Objects supported for the WADO-URI service, and whether it plays the role of Origin-server or User-agent, or both.

Add to PS 3.18

6.4.5 WADO-WS Conformance

An implementation conforming to the WADO-WS service shall support retrieval of one or more of the Information Objects specified for the DIMSE C-STORE based Storage Service Class, as specified in PS3.4 Annex B.4.

An implementation shall declare in its Conformance Statement the Information Objects supported for the WADO-WS service, and whether it plays the role of Origin-server or User-agent, or both.

Add to PS 3.18

6.5.8 WADO-RS Conformance

An implementation conforming to the WADO-RS service shall support retrieval of one or more of the Information Objects specified for the DIMSE C-STORE based Storage Service Class, as specified in PS3.4 Annex B.4.

An implementation shall declare in its Conformance Statement the Information Objects supported for the WADO-RS service, and whether it plays the role of Origin-server or User-agent, or both.

An implementation playing the role of Origin-server shall declare in its Conformance Statement

Transactions supported (DICOM, rendered)

media types supported

rendered PS – referenced SOP classes

character sets (if other than UTF-8)

Add to PS 3.18

6.6.2 STOW-RS Conformance

An implementation conforming to the STOW-RS service shall support transfer of one or more of the Information Objects specified for the DIMSE C-STORE based Storage Service Class, as specified in PS3.4 Annex B.4.

An implementation shall declare in its Conformance Statement the Information Objects supported for the STOW-RS service, and whether it plays the role of Origin-server or User-agent, or both.

Add to PS 3.18

6.7.2 QIDO-RS Conformance

An implementation conforming to the QIDO-RS service shall declare such in its Conformance Statement, and whether it plays the role of Origin-server or User-agent, or both.

An implementation playing the role of Origin-server shall declare in its Conformance Statement

Fuzzy -matching

Paging limit / offset

Optional resources supported

Optional Attributes supported

Add to PS 3.18

6.8.2 RS Capabilities Conformance

An implementation conforming to the RS Capabilities service shall declare such in its Conformance Statement, and whether it plays the role of Origin-server or User-agent, or both.

Add to PS 3.18

6.9.12 UPS-RS Conformance

An implementation conforming to the UPS-RS service shall declare such in its Conformance Statement, and whether it plays the role of Origin-server or User-agent, or both.

An implementation playing the role of Origin-server shall declare in its Conformance Statement

Subscriptions / global / filtered

notifications

Add to PS 3.19 new section on Application Hosting Conformance

11 Conformance

An implementation may conform to the DICOM Application Hosting service by supporting the role of Hosting System or Hosted Application. The structure of Conformance Statements is specified in PS3.2.

An implementation conforming to the Application Hosting service shall support transfer of one or more of the Information Objects specified for the DIMSE C-STORE based Storage Service Class, as specified in PS3.4 Annex B.4, as either the source or the recipient of the data, or both.

or for the Non-Patient Object Storage Service Class identified in PS3.4 Annex XX.3 (related CP1550 on non-patient object storage service class)

11.1 Conformance as a Hosting System

An implementation conforming to the Application Hosting service as a Hosting System shall support all the API methods defined in Section 8.2 Host Interface, and all the API methods defined in 8.3 DataExchange Interface as both a source and a recipient of data.

It shall describe in its Conformance Statement its implementation model of use of the Application Hosting service, including its means of receiving or sending DICOM Instances via network or media, and its method of launching or connecting to one or more Hosted Applications.

Note

A Hosting System will typically also have a Conformance Statement for network and/or media exchange. The implementation model explains the relationship between objects exchanged via those services, and to/from the Hosted Application.

It shall describe the specific SOP Classes supported for exchange with a Hosted Application, and whether it is the source or the recipient of instances each of those SOP Classes relative to the Hosted Application.

It shall describe any non-DICOM data made available to Hosted Applications, and any private extensions to the API.

11.2 Conformance as a Hosted Application

An implementation conforming to the Application Hosting service as a Hosted Application shall support all the API methods defined in Section 8.1 Application Interface, and any of the API methods defined in 8.3 DataExchange Interface as either a source or a recipient of data, as necessary for its implementation model.

It shall describe in its Conformance Statement its model of use of the Application Hosting service, including the functions that the application provides.

Note

A Hosted Application may typically provide functions of data display, analysis, and/or data creation.

It shall describe the specific SOP Classes supported for exchange with a Hosting System, and whether it is the source or the recipient of instances each of those SOP Classes relative to the Hosting System.

It shall describe any private extensions to the API.

Update PS 3.2 Section 7, combining current sections 7.1 and 7.2 into a new section 7.1 with additional requirements for web service and application hosting:

7 Conformance Requirements

7.1 Implementation Conformance

An implementation claiming DICOM conformance ~~may choose to~~ **shall** support one **or more** of the following:

- network conformance according to Section 7.1.1 (DICOM Network Conformance Requirements);
- media storage conformance according to Section 7.1.2 (DICOM Media Storage Conformance Requirements);
- **web service conformance according to Section 7.1.3 (DICOM Web Service Conformance Requirements);**
- **application hosting conformance according to Section 7.1.4 (DICOM Application Hosting Service Conformance Requirements).**

~~– both of the above.~~

7.1.1 DICOM Network Conformance Requirements

An implementation claiming DICOM network (**DIMSE protocol**) conformance shall:

...

7.1.2 DICOM Media Interchange Conformance Requirements

An implementation claiming DICOM Media Interchange conformance shall:

- conform to the minimum conformance requirements defined in this section;
- provide with the implementation a Conformance Statement structured according to the rules and policies in this Part including Annex **GA**;

...

7.1.3 DICOM Web Service Conformance Requirements

An implementation claiming DICOM Web Service conformance shall:

- **provide with the implementation a Conformance Statement structured according to the rules and policies in this Part including Annex A;**
- **conform to at least one Standard or Standard Extended SOP class using Web Services as defined in PS3.18;**

Note

Conformance to a Standard or Standard Extended SOP class using Web Services implies conformance to the related IOD outlined in PS3.3, the Data Elements defined in PS3.6, and the Web Service transactions defined in PS3.18.

- **comply with the rules governing SOP Class types outlined in Section 7.3;**
- **produce and/or process Data Sets as defined in PS3.5, using the DICOM native encoding defined in PS3.5, the XML encoding defined in PS3.19, or the JSON encoding defined in PS3.18;**
- **support communication using Hypertext Transfer Protocol over TCP/IP (See PS3.18).**

7.1.4 DICOM Application Hosting Conformance Requirements

An implementation claiming DICOM application hosting conformance shall:

- **provide with the implementation a Conformance Statement structured according to the rules and policies in this Part including Annex A;**
- **conform to the application programming interface (API) as defined in PS3.19, and support exchange of at least one Standard or Standard Extended SOP class using that API;**

Note

Conformance to a Standard or Standard Extended SOP class using the application hosting API implies conformance to the related IOD outlined in PS3.3, the Data Elements defined in PS3.6, and the API defined in PS3.19.

- **comply with the rules governing SOP Class types outlined in Section 7.3;**
- **produce and/or process Data Sets as defined in PS3.5, using the DICOM native encoding defined in PS3.5, or the XML encoding defined in PS3.19.**

7.2 (Reserved)

Note

The content of this section in prior editions has been incorporated into Section 7.1.

<i>Update PS 3.2 Annex A with additional requirements for web service and application hosting:</i>
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A DICOM Conformance Statement Template (Normative)

This Annex is a template that shall be used to generate a DICOM Conformance Statement. The document is hierarchically structured in three different levels:

- A DICOM Conformance Statement Overview, which is typically one page, geared towards people that want to get a quick overview of the functionality and services.
- For Networking and Media, the relationship between the AEs, followed by the information for each AE; **or for Web Services and Application Hosting, a description of the application**
- For the services supported as SCU and SCP, all the SOP specific details

Additional sections specify configuration, application management, and deployment and security details. Annexes are provided to specify the Object descriptions (IODs), with specifics about ~~the field~~ **data element** usage as well as the data dictionaries.

Note

The numbering scheme for numbering paragraphs in this document is to be used as a guideline in preparing the outline of the Conformance Statement. Although strongly encouraged, the Conformance Statement is not required to have exactly the same paragraph numbers because a particular Conformance Statement might have special considerations, which will cause the outline to differ in certain details from the outline of this document. In addition, a vendor might have internal company guidelines prescribing a specific format. Note however, that the overall structure, tables, definition of variables and information such as headers, should be strictly followed.

An implementation that uses Web Services only as a User-Agent, or Application Hosting as a Hosted Application, may provide a simplified Conformance Statement with just the overview table, a description of the implementation model, and any necessary deployment and security details.

Update PS 3.2 Section A.1 with overview description for web service and application hosting:

A.1 Conformance Statement Overview

...

For Web Services, a table shall be used to identify the supported Web Service classes. For the storage (STOW-RS) and retrieval (WADO-URI, WADO-WS, and WADO-RS) services, the specific supported IODs shall be identified.

Table A.1-4. DICOM Web Services

<u>Service</u>	<u>Client (User-agent)</u>	<u>Server (Origin-server)</u>
Transfer (STOW-RS)	<u>Yes</u>	<u>No</u>
<u>VL Photographic Image</u>		
<u>Video Photographic Image</u>		
<u>Key Object Selection Document</u>		
Query (QIDO-RS)	<u>Yes</u>	<u>No</u>
Retrieve (WADO-URI)	<u>No</u>	<u>No</u>
Retrieve (WADO-WS)	<u>No</u>	<u>No</u>
Retrieve (WADO-RS)	<u>Yes</u>	<u>No</u>
<u>VL Photographic Image</u>		

<u>Service</u>	<u>Client (User-agent)</u>	<u>Server (Origin-server)</u>
Video Photographic Image		
Workflow (UPS-RS)	<u>Yes</u>	<u>No</u>
RS Capabilities	<u>Yes</u>	<u>No</u>

For Application Hosting, a table shall be used to identify whether the implementation is a Hosting System or Hosted Application, as indicated in the top row, and the supported IODs.

Table A.1-5. DICOM Application Hosting

Hosted Application		
<u>Information Objects</u>	<u>Source</u>	<u>Recipient</u>
CT Image	<u>No</u>	<u>Yes</u>
Enhanced CT Image	<u>No</u>	<u>Yes</u>
MR Image	<u>No</u>	<u>Yes</u>
Enhanced MR Image	<u>No</u>	<u>Yes</u>
Nuclear Medicine Image Storage	<u>No</u>	<u>Yes</u>
Positron Emission Tomography Image	<u>No</u>	<u>Yes</u>
Enhanced PET Image	<u>No</u>	<u>Yes</u>
Spatial Registration	<u>No</u>	<u>Yes</u>
Segmentation	<u>Yes</u>	<u>No</u>
Surface Segmentation	<u>Yes</u>	<u>No</u>

A.4.2.1 "Application Entity <1>"

Every detail of this specific Application Entity shall be completely specified under this section.

AEs that utilize the DIMSE services shall have the following sections.

Note

AEs that utilize other services are described later, and will re-use this section numbering.

...

A.4.2.2 "Application Entity <1>"

An Application Entity that supports the WADO transport services shall have the following sections:

Details of this specific Application Entity shall be specified under this section.

A.4.2.2.1 WADO-WS Specifications

All WADO WS services that are supported shall be listed. Other WADO WS services that are not supported may be indicated.

For each supported service, the parameters and restrictions on those parameters shall be described.

Any connection policies such as restrictions on the number of connections, support for asynchronous WS requests, etc. shall be described.

A.4.2.2.2 WADO-URI Specifications

All WADO-URI services that are supported shall be listed. Other WADO-URI services that are not supported may be indicated.

For each supported service, the parameters and restrictions on those parameters shall be described.

Any connection policies such as restrictions on the number of connections, support for pipeline requests, etc. shall be described.

A.4.2.2.3 Restful Services Specifications

All RESTful services that are supported shall be listed. Other RESTful services that are not supported may be indicated.

For each supported service, the parameters and restrictions on those parameters shall be described.

Any connection policies such as restrictions on the number of connections, support for pipeline requests, etc. shall be described.

<p><i>Add after PS 3.2 Section A.5, renumbering subsequent sections:</i></p>

A.5a Web Services

A.5a.1 Implementation Model

The Implementation Model shall identify the DICOM Web Service application end points in the implementation, and relate the applications to Real-World Activities.

An implementation that uses Web Services only as a User-Agent may have a simple Implementation Model section.

An implementation that is a Web Services Origin-server, or that has multiple Web Service application end points, should follow the complete detailed description of this template.