

**Hologic Physician's Viewer 7.0
DICOM Conformance Statement**

1. Conformance Statement Overview

This document is the DICOM Conformance Statement for Hologic Physician's Viewer, version 7.0. It describes its DICOM capabilities and how it conforms to the DICOM 3.0 standard.

Table 1.1 provides an overview of the network services supported by Physician's Viewer.

Table 1.1.
NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Secondary Capture Image Storage	Yes	Yes
Grayscale Softcopy Presentation State Storage	Yes	No
Query/Retrieve		
Study Root Information Model – FIND	Yes	No
Study Root Information Model – MOVE	Yes	No

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3. Introduction

3.1. Revision History

Document Version	Date of Issue	Author	Description
1.0	05/12/2004	P. Kupovich	Initial version
2.0	03/09/2007	P. Kupovich	<ol style="list-style-type: none"> 1. Added support for Query on Series or Study level 2. Changed the statement format to satisfy new DICOM requirements
3.0	09/17/2007	P. Kupovich	<ol style="list-style-type: none"> 1. Made the document format DICOM 2007 compliant. 2. Updated for GSPS, Color DICOM images, and IVA Results.
4.0	5/18/2010	S. Brown-Macioci	Updated Physician View revision number to 6.2.
5.0	4/21/11	S. Brown-Macioci	Updated Physician View revision number to 7.0

3.2. Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.3. Definitions

This section provides the definitions of terms, acronyms, and abbreviations that are used throughout the document.

DICOM	Digital Imaging and Communication in Medicine, a standard on image communications in medical applications
HIS	Hospital Information System
RIS	Radiology Information System
AE	Application Entity
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object Pair, a definition of an information object (like an image) and of service (like storage) that can be performed for the object
VR	Value Representation, a data encoding method in DICOM
VM	Value Multiplicity, number of values in a DICOM attribute

UID	Unique Identifier
DIMSE	DICOM Message Service Element
TCP/IP	Transmission Control Protocol / Internet Protocol, a widely used computer networking protocol
QDR	QDR for Windows – Hologic image acquisition modality
UI	Application's User Interface
GUI	Graphical User Interface
GSPS	Grayscale Softcopy Presentation State

3.4. References

1. American College of Radiology - National Electrical Manufacturers Association (ACR-NEMA) Digital Imaging and Communications in Medicine V3.0-2000.

4. Networking

4.1. Implementation Model

4.1.1. Application Data Flow

There are three Real-World Activities that occur in the Physician's Viewer: Storage (SCU and SCP) and Query/Retrieve. The Application Data Flow Diagram shown on Figure 1 represents all of the Application Entities present in the Physician's Viewer application, and graphically depicts the relationship of the AE's use of DICOM to Real-World Activities.

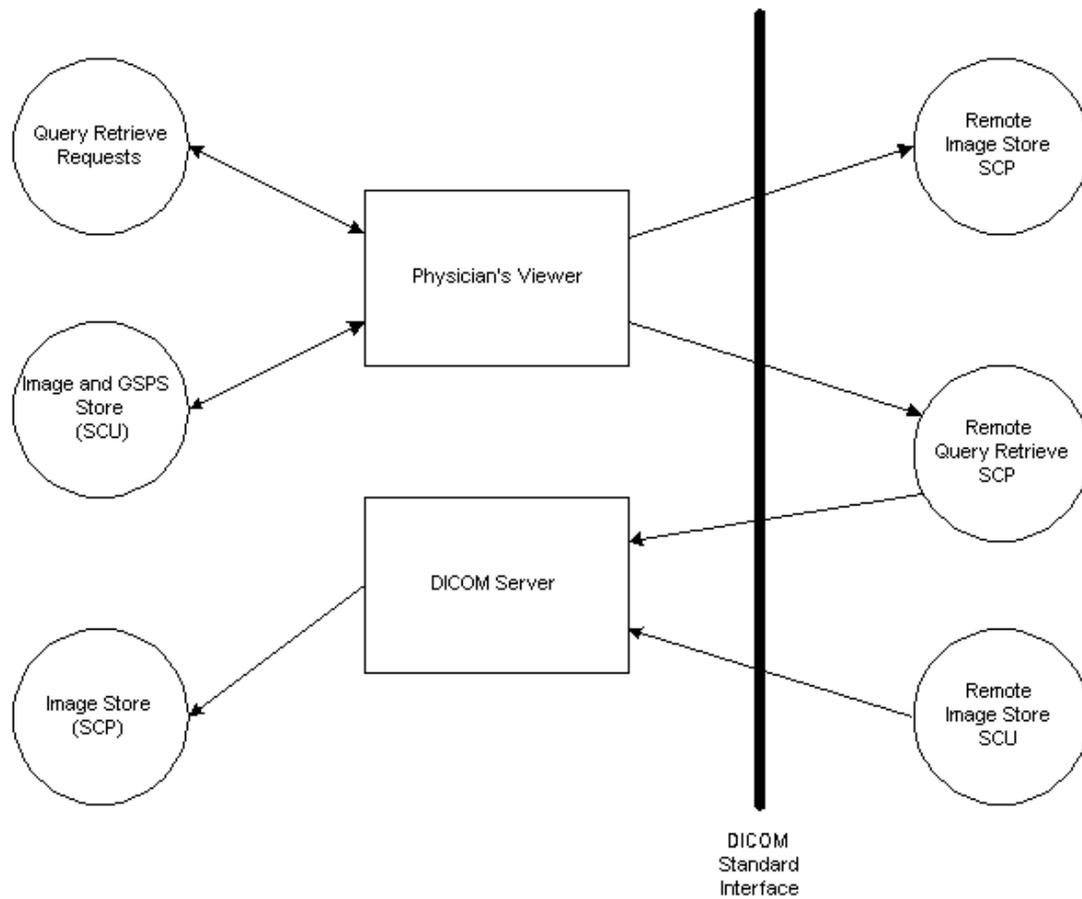


Figure 4.1-1.
Application Data Flow Diagram

4.1.1.1. Storage (SCU)

1. Physician's Viewer application generates DICOM files and stores them locally.
2. Physician's Viewer application initiates an association with a remote Storage SCP.
3. Physician's Viewer application pushes files to the remote Storage SCP using C-STORE command, and then closes the association.

4.1.1.2. Storage (SCP)

1. DICOM Server application listens for incoming association requests, typically from APEX (QDR) or another Physician's Viewer applications.
2. Upon accepting the association, DICOM Server stores the received DICOM files locally.

4.1.1.3. Query / Retrieve

1. Physician's Viewer application initiates an association with a remote Query / Retrieve SCP.
2. Physician's Viewer application queries the remote Query / Retrieve SCP to obtain the information using C-FIND command, and then closes the association.
3. Physician's Viewer application initiates another association with remote Query / Retrieve SCP.
4. Physician's Viewer application requests the remote Query / Retrieve SCP to retrieve the images to the DICOM Server using C-MOVE command.
5. DICOM Server stores receives DICOM files locally.
6. Upon retrieving all the images, Physician's Viewer closes the association.

4.1.2. Functional Definitions of AE's

There are two software applications: Physician's Viewer and DICOM Server representing two Application Entities.

4.1.2.1. Functional Definition of Physician's Viewer Application Entity

4.1.2.1.1. Storage SCU

The user is presented with a UI to send either the entire study, or a subset of images from the study. If multiple send destinations are available, the user may pick one or more destinations from the list.

In addition to the image files, the Physician's Viewer AE may automatically generate GSPS files and IVA Results files for IVA scans, based on the configuration settings. The Physician's Viewer AE generates DICOM files, stores them locally, and puts corresponding entries in the queue. Immediately after this, it tries to send the files to specified Storage SCPs. In case of failure, it will retry sending files according to the configured queue settings. The user is provided with user interface to monitor status of each queue entry and manage the entries.

4.1.2.1.2. Query Retrieve

The user is presented with a UI to select one or more matching keys as search criteria to obtain the list of matching entries in the Image Archive. If multiple remote Query Retrieve SCPs are available, the user may pick a destination from the list. Only a single selection is allowed. The user may select a query level: available options are Study and Series.

In case of successful query, the Physician's Viewer AE displays a list of obtained entries. The user may select one or more entries from the list to retrieve images for.

The user may use the Query/Retrieve configuration screen to specify a destination for the retrieved images. Typically the destination is the DICOM Server, so the user may open the images with Physician's Viewer.

During the image transfer, Physician's Viewer displays the transfer status (i.e. how many images have already been transferred).

If either Query or Retrieve part of the transaction fails, no retry will be made.

4.1.2.2. DICOM Server

The DICOM Server application serves as an SCP for Storage. It receives and stores DICOM images for use by Physician's Viewer only. Typically, it receives the images from either QDR stations or Physician's Viewer stations. Upon receiving an image, it stores it locally, so the Physician's Viewer application can access the file.

4.1.3. Sequencing of Real-world Activities

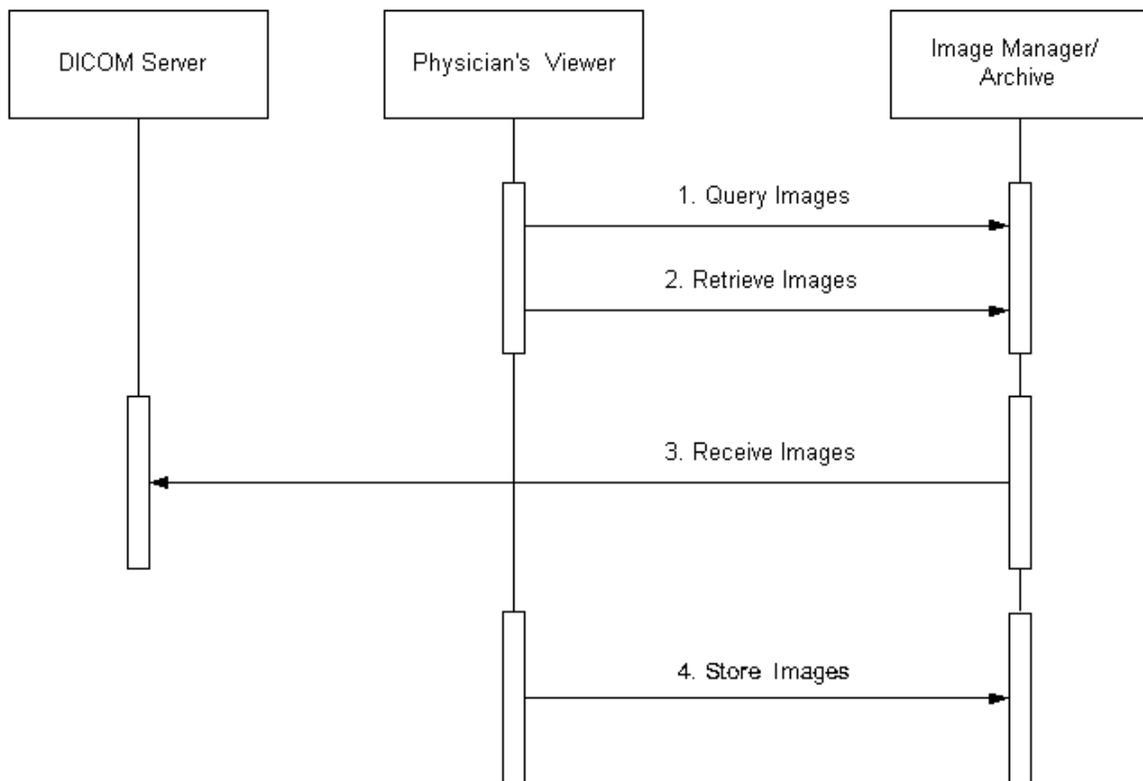


Figure 2. Sequencing of real-world activities

1. Query

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Physician's Viewer opens an association with the remote Query / Retrieve SCP. Upon accepting the association by the remote SCP, it sends a series of C-FIND requests according to the specified search criteria. After receiving all the requested information, the Physician's Viewer closes the association.

2. Retrieve

Physician's Viewer opens an association with the remote Query / Retrieve SCP. Upon accepting the association by the remote SCP, it sends a series of C-MOVE requests according to the user selection of images and the destination, to retrieve images to a specified destination, typically a DICOM Server. Specified DICOM Server receives a series of C-STORE requests and stores the images locally as DICOM files. After all requested images have been retrieved, Physician's Viewer closes the association.

3. Receive Images

The DICOM Server listens for incoming associations. Upon receiving the C-STORE requests, it receives the images and sends back a C-STORE response.

4. Send Images

The Physician's Viewer application tries to open an association with remote Storage SCP for each specified destination and send the files using a STORE request. Upon receipt of a C-STORE Response or in case of error, it closes the association.

4.2. AE Specifications

4.2.1. Physician's Viewer Application Entity Specification

4.2.1.1. SOP Classes

Physician's Viewer application provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID	SCU	SCP
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

4.2.1.2. Association Policies

4.2.1.2.1. General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1
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4.2.1.2.2. Number Of Associations

Physician's Viewer AE initiates only one association at a time.
Physician's Viewer AE does not accept associations.

4.2.1.2.3. Asynchronous Nature

Physician's Viewer application does not support asynchronous communications.

4.2.1.2.4. Implementation Identifying Information

The Implementation Identifying Information for Physician's Viewer is:

Implementation Class UID	1.2.840.113850
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4.2.1.3. Association Initiation Policy

4.2.1.3.1. Activity – Send Images

4.2.1.3.1.1. Description and Sequencing of Activities

A user can select images and request them to be sent to multiple destinations. Based on the configuration settings, additional IVA Results file and GSPS file may be automatically generated for IVA scans. Each request is forwarded to the send queue and processed individually. If GSPS file is generated along with image file, both files are treated as one queue entry. If IVA Results file is generated, it is treated as a separate queue entry. If the same scan is requested to be sent to multiple destinations, there is a separate queue entry for each destination. Each request is processed immediately after forwarding to the send queue. Requests are processed in the same order as they were initially entered. For image/GSPS files pair, a GSPS file is attempted to be sent only after the image file was successfully sent.

The Physician's Viewer AE initiates an association with Storage SCP AE specified in the first queue entry, and sends files using C-STORE Request. For the subsequent queue entries, the Physician's Viewer AE issues C-STORE Requests over the same association

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as long as each following queue entry specifies the same Storage SCP AE. If an entry specifies a different AE, Physician's Viewer closes the current association and opens a new one with specified new Storage SCP.

If an association cannot be established with the Storage SCP, or if the C-STORE Response from the Storage SCP contains a status other than Success or Warning, the related send queue entry is marked as pending. The Physician's Viewer AE will retry sending files for pending queue entries according to the configured settings. For image/GSPS file pair, if an image file was successfully sent, and sending the GSPS file failed, the Physician's Viewer AE will retry to send only the GSPS file.

After exercising maximum number of attempts to send files for a queue entry, the entry is marked as failed, and no further attempts will be performed.

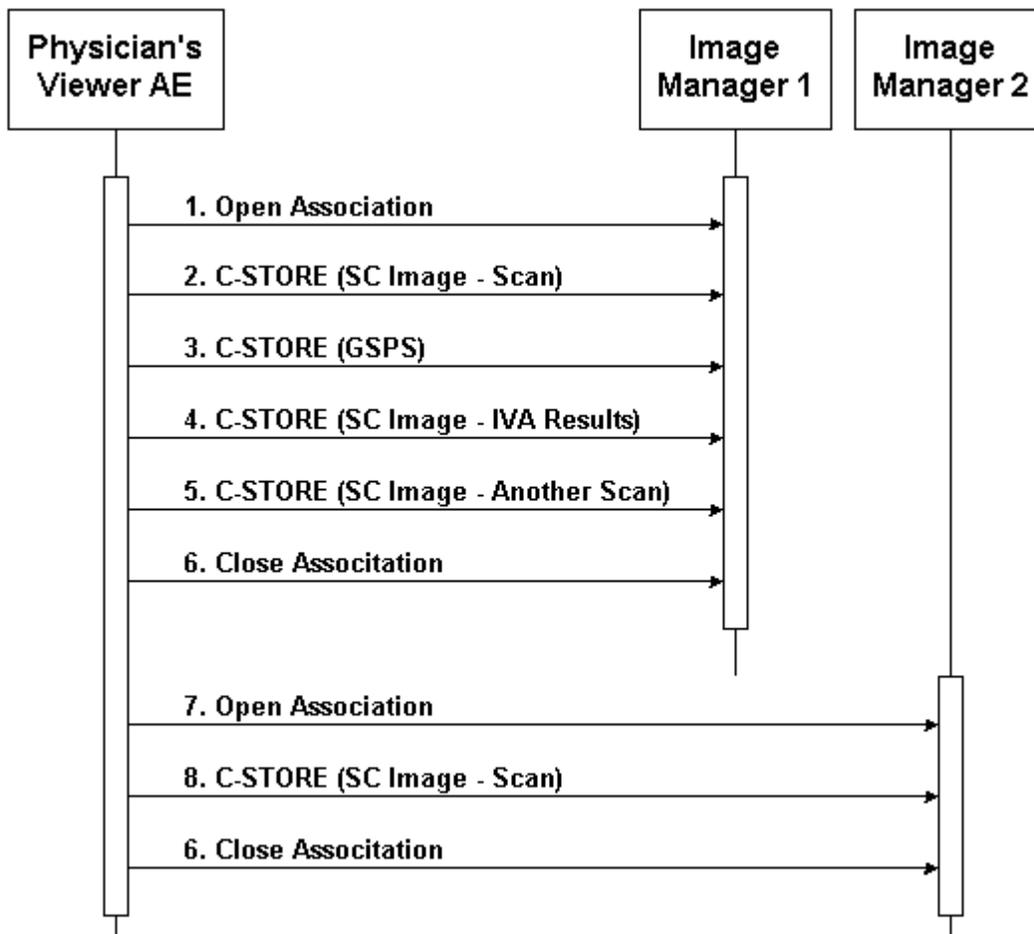


Figure 4.2-1. Sequencing of Activity – Send Images

A possible sequence of interactions between the Physician's Viewer AE and an Image Manager (e.g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in Figure 4.2-1:

1. The Physician's Viewer AE opens an association with the Image Manager.

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2. An SC image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
3. A GSPS instance is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
4. An SC image for IVA Results is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
5. Another SC image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
6. The Physician's Viewer AE closes the association with the Image Manager.
7. The Physician's Viewer AE opens an association with another Image Manager.
8. An SC image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
9. The Physician's Viewer AE closes the association with the Image Manager.

NOTE: Many other message sequences are possible depending on the number of scans to be stored, scan types, number of destinations, and configuration settings.

4.2.1.3.1.2. Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

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		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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4.2.1.3.1.3. SOP Specific Conformance

The behavior of Physician's Viewer AE when encountering status codes in a C-STORE response is summarized in the table below:

Status	Status Code	Meaning	Behavior
Success	0000	Image transferred successfully	Transaction marked as COMPLETED
Warning	B000	Coercion of Data Elements	Warning is logged, transaction marked as COMPLETED
Warning	B006	Elements Discarded	
Warning	B007	Data Set does not match SOP Class	
Other	Other	Failure or unknown status code	Status and contents of the Error Comment attribute (0000,0902) (if present) is logged and accessible via the UI, transaction marked as FAILED, no further retries will be made.

The behavior of Physician's Viewer AE during communication failure is summarized in the table below:

Exception	Behavior
Association can not be established	Transaction is marked as pending. Failure reason is logged. Further retry attempts will be made until maximum retry number is reached, after which the transaction is marked as failed.
Timeout	
Association aborted by the SCP or network layers	

4.2.1.3.2. Activity - Query Remote AE

4.2.1.3.2.1. Description and Sequencing of Activities

The user initiates Query from the Query Retrieve screen. The user may select a single Remote AE from the list of configured multiple Query SCPs.

The Physician's Viewer AE initiates an association with the Query Retrieve SCP. Once the association has been established, the Physician's Viewer sends a C-FIND request according to the user-configured parameters and waits for transmission of conformant

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Query service messages. The association is closed after retrieving the last message or in case of error. Received study information is displayed to the user.

Query is performed on Study or Series level, selectable by the user.

Only a single attempt is made to query the remote AE. If the query fails, for whatever reason, no retry will be performed.

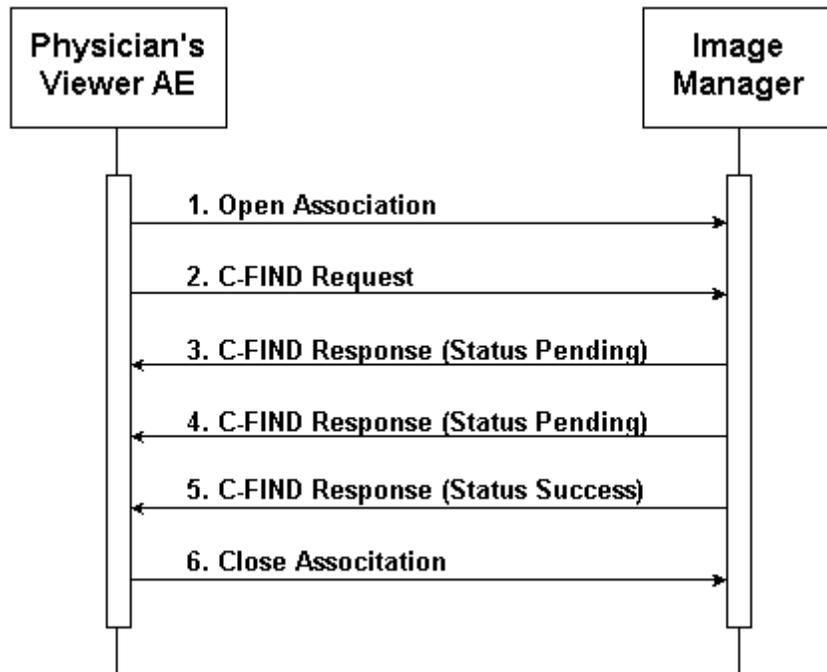


Figure 4.2-5. Sequencing of Activity – Query Remote AE

A possible sequence of interactions between the Physician's Viewer AE and an Image Manager (e.g. a storage or archive device supporting the Query Retrieve SOP Classes as an SCP) is illustrated in the Figure above:

1. The Physician's Viewer AE opens an association with the Image Manager.
2. The Physician's Viewer AE sends a C-FIND request to the Image Manager containing the Query attributes.
3. The Image Manager returns a C-FIND response containing the requested attributes of the first matching study.
4. The Image Manager returns another C-FIND response containing the requested attributes of the second matching study.
5. The Image Manager returns another C-FIND response with status Success, indicating that no further matching studies exist. This example assumes that only 2 studies match the Query criteria.
6. The Physician's Viewer AE closes the association with the Image Manager.

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4.2.1.3.2.2. Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.2.3. SOP Specific Conformance

The following attributes may be entered by the user and used in Study Root Query request:

Attribute Name	Tag	Types of Matching
Study Level		
Study Instance UID	(0020,000D)	S
Study Date	(0008,0020)	R
Study Time	(0008,0030)	S
Accession Number	(0008,0050)	S, *, U
Patient Name	(0010,0010)	S, *, U
Patient ID	(0010,0020)	S, *, U
Patient's Birth Date	(0010,0030)	S
Study ID	(0020,0010)	S, *, U
Modalities in Study	(0008,0061)	S
Referring Physician's Name	(0008, 0090)	S, *, U
Series Level		
Series Instance UID	(0020,000E)	S
Modality	(0008,0060)	S
Series Number	(0020,0011)	S
Request Attribute Sequence	(0040,0275)	
>Requested Procedure ID	(0040,1001)	S
>Scheduled Procedure Step ID	(0040,0009)	S
Performed Procedure Step Start Date	(0040,0244)	S

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Performed Procedure Step Start Time	(0040,0245)	S
Image Level		
SOP Instance UID	(0008,0018)	S
Instance Number	(0020,0013)	S

Types of Matching: An "S" indicates the identifier attribute uses Single Value Matching, an "R" indicates Range Matching, an "*" indicates wildcard matching, and a 'U' indicates Universal Matching.

Series Level and Image Level attributes are not used if query is performed on Study Level.

The following table describes Physician's Viewer behavior depending on Status Codes of messages received from the SCP.

Status	Status Code	Meaning	Behavior
Success	0000	Matching is complete – No final Identifier is supplied	Complete the transaction
Pending	FF00	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	Continue the transaction
Pending (No Optional Key Support)	FF01	Matches are continuing – Warning that one or more Optional Keys were not supported for existence for this Identifier	Continue the transaction without logging any warnings or errors
Other	Other	Failure or unknown status code	Terminates receiving of matches. Status code and contents of the Error Comment attribute (0000,0902) (if present) is logged. Error message is displayed. Matches received prior to this code are handled normally.

The behavior of Physician's Viewer AE during communication failure is summarized in the table below:

Exception	Behavior
Association can not be established	Error is logged. Error message is displayed.
Timeout	Error is logged. Error message is displayed.

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Association aborted by the SCP or network layers	Matches received prior to this code are handled normally.
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4.2.1.3.3. Activity - Retrieve from Remote AE

4.2.1.3.3.1. Description and Sequencing of Activities

The user makes a selection from the entries displayed on the Query Retrieve screen as result of last Query Request, and presses the Retrieve button. Retrieve Request is performed on the same level as the last Query (Study or Series).

The Physician's Viewer AE opens an association with the same Remote AE that was used for Query Request. A separate C-MOVE Request is issued for each study or series. Upon processing C-MOVE Requests for all selected items, the Physician's Viewer AE closes the association.

The Physician's Viewer displays number of retrieved studies or series on the Query Retrieve screen and is updates it each time when new study or series is retrieved.

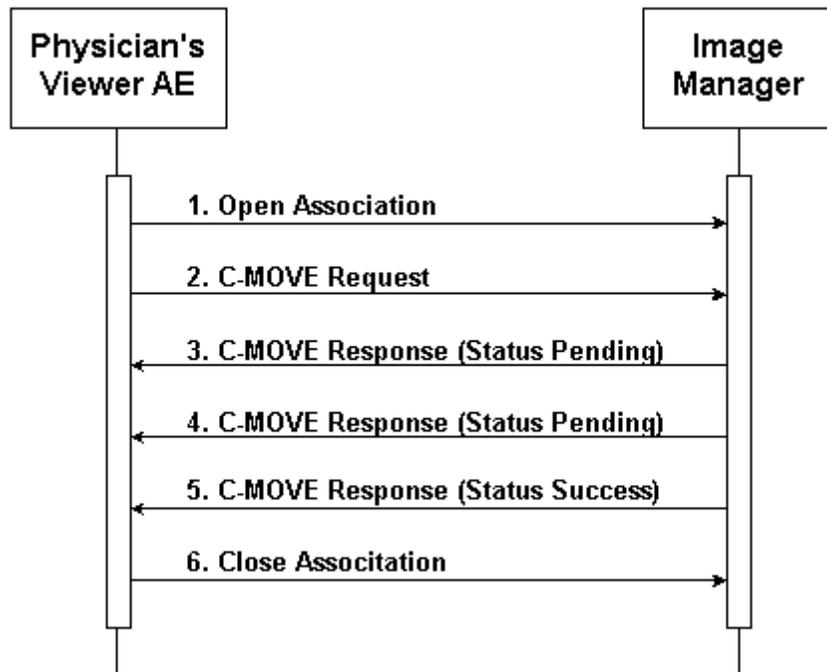


Figure 4.2-6. Sequencing of Activity – Retrieve from Remote AE

A possible sequence of interactions between the Physician's Viewer AE and an Image Manager (e.g. a storage or archive device supporting the Query Retrieve SOP Classes as an SCP) is illustrated in the Figure above:

1. The Physician's Viewer AE opens an association with the Image Manager.

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2. The Physician's Viewer AE sends a C-MOVE request to the Image Manager containing the Request Identifier.
3. The Image Manager returns a C-MOVE response containing the status of moving images for a specified study or series.
4. The Image Manager returns another C-MOVE response containing the updated status of moving images for a specified study or series.
5. The Image Manager returns another C-MOVE response with status Success, indicating that moving is completed.
6. The Physician's Viewer AE closes the association with the Image Manager.

4.2.1.3.3.2. Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.3.3. SOP Specific Conformance

The table below describes Study Root Request Identifier:

Attribute Name	Tag	Unique, Matching, or Return Key
Study Level		
Study Instance UID	(0020,000D)	U
Series Level		
Study Instance UID	(0020,000D)	M
Series Instance UID	(0020,000E)	U

The following table describes Physician's Viewer behavior depending on Status Codes of messages received from the SCP.

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Status	Status Code	Meaning	Behavior
Success	0000	Moved all images successfully	Complete the transaction. Retrieve status is updated on the UI.
Pending	FF00	Continuing moving images	Continue the transaction. Retrieve status is updated on the UI.
Other	Other	Failure or unknown status code	A list of ailed SOP Instance UIDs, status code, and contents of the Error Comment attribute (0000,0902) (if present) is logged. Studies retrieved prior to this code are handled normally.

The behavior of Apex AE during communication failure is summarized in the table below:

Exception	Behavior
Association can not be established	Error is logged. Error message is displayed if running on the foreground.
Timeout	Error is logged. Images received prior to this code are handled normally. Error message is displayed.
Association aborted by the SCP or network layers	

4.2.1.4. Association Acceptance Policy

The Physician's Viewer AE does not accept incoming associations.

4.2.2. DICOM Server Application Entity Specification

4.2.2.1.SOP Classes

DICOM Server application provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP:

SOP Class Name	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

4.2.2.2. Association Policies

4.2.2.2.1. General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Application Context Name	1.2.840.10008.3.1.1.1
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4.2.2.2.2. Number Of Associations

The DICOM Server AE does not initiate associations.
The DICOM Server AE accepts only one association at a time.

4.2.2.2.3. Asynchronous Nature

The DICOM Server AE does not support asynchronous communications.

4.2.2.2.4. Implementation Identifying Information

The Implementation Identifying Information for DICOM Server is:

Implementation Class UID	1.2.840.113850.1
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4.2.2.3. Association Initiation Policy

DICOM Server application never initiates associations.

4.2.2.4. Association Acceptance Policy

The Apex AE accepts associations for the Real-World Activity: Receive Images.

The Apex AE may reject associations as shown in the table below:

Result	Reason/Diag	Explanation
1 – rejected-permanent	1 – no-reason-given	The association request could not be parsed.

4.2.2.4.1. Activity – Receive Images

4.2.2.4.1.1. Description and Sequencing of Activities

The DICOM Server AE waits for associations with C-STORE request messages from Storage SCU. It accepts the associations and sends back C-STORE response messages.

Upon receiving and accepting a C-STORE request, the DICOM Server AE stores DICOM files into the configured directory, for further processing by Physician's Viewer.

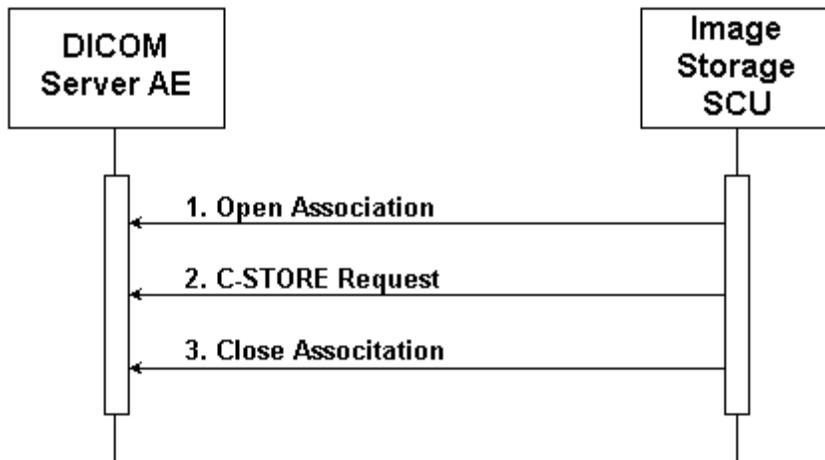


Figure 4.2-7. Sequencing of Activity – Receive Images

A possible sequence of interactions between the DICOM Server AE and an Image Store SCU is illustrated in the Figure above:

1. The Image Store SCU opens a new association with the DICOM Server AE.
2. The Image Store SCU transmits an SC Image using C-STORE Request and receives from DICOM Server a C-STORE Response with status Success.
3. The Store SCU closes the association with the DICOM Server AE.

4.2.2.4.1.2. Acceptable Presentation Contexts

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

		Explicit VR Big Endian	1.2.840.10008.1.2.2		
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4.2.2.4.1.3. SOP Specific Conformance

DICOM Server application always returns success status code 0000.

4.3. Network Interfaces

4.3.1. Supported Communication Stacks

DICOM Upper Layer (PS 3.8.) is supported using TCP/IP.

4.3.2. TCP/IP Stack

The TCP/IP stack is inherited from the operating system on which it is running.

4.3.3. Physical Media Support

The physical medium is inherited from the computer on which it is running.

4.4. Configuration

4.4.1. AE Title / Presentation Address Mapping

4.4.1.1. Local AE Title / Presentation Address Mapping

Both applications use the AE Titles and TCP/IP Ports configured via the User Interface. The local AE Title used by each application can be configured independently of the AE Title used by other application. If so configured, local AEs are capable of using the same AE Title.

4.4.1.2. Remote AE Title / Presentation Address Mapping

The remote applications AE Titles and listening TCP/IP ports are user configurable via the Physician's Viewer System Configuration screen.

4.4.1.2.1. Storage

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The user may configure Storage SCP AE Title, IP Address/Host Name, Port Number, and Destination Name. Multiple Storage SCPs can be defined. The Destination Name should be unique for each defined Storage SCP.

4.4.1.2.2. Query Retrieve

The user may configure Query Retrieve SCP AE Title, IP Address/Host Name, and Port Number. Multiple Query Retrieve SCPs can be defined. The AE Title should be unique for each defined Query Retrieve SCP.

4.4.2. Parameters

The table below describes parameters that can be configured by the user:

Category	Parameters	Default Value	Comments
Physician's Viewer - Storage			
Send Parameters for Image Storage – configurable separately for each remote AE	Interpreting Physician	None	Populates the “Physician Reading Study” attribute (0008,1060) in all DICOM files
	Grayscale Only	No	Send images in color or grayscale
	Presentation Files	No	Send GSPS files (for IVA scans only)
	IVA Results Files	No	Send IVA Results files (for IVA scans only)
Automatic Retry Parameters	Retry Number (times)	3	Number of times a failed job may be retried
	Retry Interval (Min)	10	Delay between retrying failed jobs
Physician's Viewer - Query Retrieve			
Move Destination (where to retrieve images)	Move Destination – local or remote	Local	Retrieve images to local PC for further processing by Physician's Viewer, or to remote PC where standalone central DICOM Server is running, for subsequent use by several Physician's Viewers.
	IP Address/Host Name of remote Move Destination	None	IP Address/Host Name of remote PC where standalone central DICOM Server is running
DICOM Server			
DICOM Server Configuration	Receiving Directory	See Note 1	Directory where to save received DICOM files

Note 1. Default value for Receiving Directory is C:\Program files\Hologic\Physician's Viewer\DICOM Receiving.

5. Media Interchange

No media interchange supported.

6. Support of Character Sets

Physician's Viewer supports the ISO_IR 192 extended character set.

7. Security

No specific security measures are supported.
It is assumed that application is used within a secured environment.

8. Annexes

8.1. IOD Contents

The Physician's Viewer application stores the images as DICOM files. When it transfers the images, it includes all the DICOM attributes present in the original DICOM file. In addition, it may include following attributes:

Attribute Name	Tag	VR	VM
Name of Physician(s) Reading Study	(0008,1060)	PN	1
Private Creator	(0021,00xx)	LO	1
IVA Analysis Data	(0021,xx01)	LT	1

Tables below specify the attributes of IVA Results Secondary Capture Images and Grayscale Softcopy Presentation States transmitted by the Physician's Viewer application.

The tables use a number of abbreviations.

The abbreviations used in the "Presence of ..." column are:

VNAP Value Not Always Present (attribute sent zero length if no value is present)
ANAP Attribute Not Always Present
ALWAYS Always Present
EMPTY Attribute is sent without a value

The abbreviations used in the "Source" column:

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MWL	The attribute value source is from Modality Worklist
USER	The attribute value source is from User input
AUTO	The attribute value is generated automatically
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step
CONFIG	The attribute value source is a configurable parameter

Note: All dates and times are encoded in the local configured calendar and time.

IOD of Created GSPS SOP Instances for IVA Analysis Results

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module					
Patient's Name	(0010,0010)	PN	From referenced image	VNAP	MWL/USER
Patient ID	(0010,0020)	LO	From referenced image	VNAP	MWL/USER
Patient's Birth Date	(0010,0030)	DA	From referenced image	VNAP	MWL/USER
Patient's Sex	(0010,0040)	CS	From referenced image	VNAP	MWL/USER
General Study Module					
Study Instance UID	(0020,000D)	UI	From referenced image	ALWAYS	MWL/AUTO/USER
Study Date	(0008,0020)	DA	From referenced image	ALWAYS	AUTO
Study Time	(0008,0030)	TM	From referenced image	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From referenced image	VNAP	MWL/USER
Study ID	(0020,0010)	SH	From referenced image	VNAP	AUTO
Accession Number	(0008,0050)	SH	From referenced image	VNAP	MWL/USER
General Series Module					
Series Instance UID	(0020,000E)	UI	Generated by Apex	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by Apex	ALWAYS	AUTO
Laterality	(0020,0060)	CS	From referenced image	ANAP	AUTO
Presentation Series Module					
Modality	(0008,0060)	CS	PR	ALWAYS	CONFIG
<i>General Equipment Module</i>					

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Manufacturer	(0008,0070)	LO	HOLOGIC	ALWAYS	AUTO
S/W Versions	(0018,1020)	LO	From Configuration	ALWAYS	CONFIG
Presentation State Module					
Image Number	(0020,0013)	IS	Generated by Apex	ALWAYS	AUTO
Presentation Label	(0070,0080)	CS	HOLOGIC	ALWAYS	AUTO
Presentation Description	(0070,0081)	LO	Hologic QDR IVA Analysis	ALWAYS	AUTO
Presentation Creation Date	(0070,0082)	DA	<yyyymmdd>, date of this GSPS file creation	ALWAYS	AUTO
Presentation Creation Time	(0070,0083)	TM	<hhmmss>, time of this GSPS file creation	ALWAYS	AUTO
Presentation Creator's Name	(0070,0084)	PN	Zero length	EMPTY	AUTO
Referenced Series Sequence	(0008,1115)	SQ	One item	ALWAYS	AUTO
>Series Instance UID	(0020,000E)	UI	From referenced image	ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ	One item	ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	From referenced image	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	From referenced image	ALWAYS	AUTO
Displayed Area Module					
Displayed Area Selection Sequence	(0070,005A)	SQ	One item	ALWAYS	AUTO
>Displayed Area Top Left Hand Corner	(0070,0052)	SL	0\0	ALWAYS	AUTO
>Displayed Area Bottom Right Hand Corner	(0070,0053)	SL	Referenced Image Width\Height	ALWAYS	AUTO
>Presentation Size Mode	(0070,0100)	SL	SCALE TO FIT	ALWAYS	AUTO
>Presentation Pixel Aspect Ratio	(0070,0102)	IS	1\1	ALWAYS	AUTO
Graphic Annotation Module					

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Graphic Annotation Sequence	(0070,0001)	SQ	One or more items	ALWAYS	AUTO
>Graphic Layer	(0070,0002)	CS	1	ALWAYS	AUTO
>Text Object Sequence	(0070,0008)	SQ	One or more items if text annotation present	ANAP	AUTO
>>Anchor Point Annotation Units	(0070,0004)	CS	PIXEL	ANAP	AUTO
>>Unformatted Text Value	(0070,0006)	ST	From user input	ANAP	AUTO
>>Bounding Box Top Left Hand Corner	(0070,0010)	FL	From user input	ANAP	AUTO
>>Bounding Box Bottom Right Hand Corner	(0070,0011)	FL	From user input	ANAP	AUTO
>>Bounding Box Text Horizontal Justification	(0070,0012)	CS	LEFT	ANAP	AUTO
>Graphic Object Sequence	(0070,0009)	SQ	One or more items if graphic annotation present	ANAP	AUTO
>>Graphic Annotation Units	(0070,0005)	CS	PIXEL	ANAP	AUTO
>>Graphic Dimensions	(0070,0020)	US	From user input	ANAP	AUTO
>>Number of Graphic Points	(0070,0021)	US	From user input	ANAP	AUTO
>>Graphic Data	(0070,0022)	FL	From user input	ANAP	AUTO
>>Graphic Type	(0070,0023)	CS	POLYLINE	ANAP	AUTO
>>Graphic Filled	(0070,0024)	CS	N	ANAP	AUTO
Graphic Layer Module					
Graphic Layer Sequence	(0070,0060)	SQ	One item	ALWAYS	AUTO
>Graphic Layer	(0070,0002)	CS	1	ALWAYS	AUTO
>Graphic Layer Order	(0070,0062)	IS	1	ALWAYS	AUTO

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<i>Presentation LUT Module</i>					
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ALWAYS	AUTO
SOP Common Module					
Specific Character Set	(0008,0005)	CS	ISO_IR 192, included only if referenced image is in Unicode	ANAP	CONFIG
SOP Class UID	(0008,0016)	UI	GSPS SOP Class UID	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by Apex	ALWAYS	AUTO

IOD of Created SC SOP Instances for IVA Results Images

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module					
Patient's Name	(0010,0010)	PN	From source scan image	VNAP	MWL/USER
Patient ID	(0010,0020)	LO	From source scan image	VNAP	MWL/USER
Patient's Birth Date	(0010,0030)	DA	From source scan image	VNAP	MWL/USER
Patient's Sex	(0010,0040)	CS	From source scan image	VNAP	MWL/USER
General Study Module					
Study Instance UID	(0020,000D)	UI	From source scan image	ALWAYS	MWL/AUTO/USER
Study Date	(0008,0020)	DA	From source scan image	ALWAYS	AUTO
Study Time	(0008,0030)	TM	From source scan image	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From source scan image	VNAP	MWL/USER
Study ID	(0020,0010)	SH	From source scan image	VNAP	AUTO
Accession Number	(0008,0050)	SH	From source scan image	VNAP	MWL/USER
General Series Module					
Modality	(0008,0060)	CS	From source scan image	ALWAYS	CONFIG
Series Instance	(0020,000E)	UI	From source scan image	ALWAYS	AUTO

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UID			image		
Series Number	(0020,0011)	IS	Generated by Apex	ALWAYS	AUTO
General Equipment Module					
Manufacturer	(0008,0070)	LO	HOLOGIC	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	From Configuration	ALWAYS	CONFIG
Manfr's Model Name	(0008,1090)	LO	From Configuration	ALWAYS	CONFIG
Device S/N	(0018,1000)	LO	From Configuration	ALWAYS	CONFIG
S/W Versions	(0018,1020)	LO	From Configuration	ALWAYS	CONFIG
SC Equipment Module					
Conversion Type	(0008,0064)	CS	DV	ALWAYS	AUTO
SC Device Software Version	(0018,1019)	LO	From Configuration	ALWAYS	CONFIG
General Image Module					
Image Number	(0020,0013)	IS	Generated by Apex	ALWAYS	AUTO
Image Pixel Module					
Samples per pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Generated by Apex	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by Apex	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	8	ALWAYS	AUTO
High Bit	(0028,0102)	US	7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
SC Image Module					
Date of Secondary Capture	(0018,1012)	DA	<yyyymmdd>, date of this DICOM file creation	ALWAYS	AUTO
Time of Secondary Capture	(0018,1014)	TM	<hhmmss>, time of this DICOM file creation	ALWAYS	AUTO
SOP Common Module					
Specific Character Set	(0008,0005)	CS	ISO_IR 192, included only if source scan image us in Unicode	ANAP	CONFIG

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SOP Class UID	(0008,0016)	UI	Secondary Capture Image Storage SOP Class UID	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by Apex	ALWAYS	AUTO
Image Pixel Module					
Pixel Data	(7FE0,0010)	OW	Generated by Apex	ALWAYS	AUTO
Private Flags Module					
Private Creator	(0013,00xx)	LO	HOLOGIC	ALWAYS	AUTO
IVA Results Flag	(0013,xx00)	LO	IVA Results	ALWAYS	AUTO

8.2. Data Dictionary of Private Attributes

Private group 0013 is used to include IVA Results flag, indicating that the image contains IVA results and not an actual scan image.

Tag	Attribute Name	VR	VM
(0013,00xx)	Private Creator	LO	1
(0013,xx00)	IVA Results Flag	LO	1

Additional private attributes may be included into scan image files, if inherited from the original source scan DICOM file.

8.3. Coded Terminology and Templates

No coded terminology and templates are supported.

8.4. Grayscale Image Consistency

It is recommended to use the color quality not less than 24 bits. If current system setting is less than 24 bits, a warning message will be displayed.

8.5. Standard Extended / Specialized Private SOP Classes

No Specialized or Private SOP Classes are supported.

8.6. Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.