
DICOM

Conformance Statement

Intera	R1.5
Achieva	R1.5
Panorama 1.0.T	R1.5



Issued by:

Philips Medical Systems Nederland B.V.
Medical IT, Interoperability

Building QV-282
P.O. Box 10.000
5680 DA Best
The Netherlands

email: <mailto:dicom@philips.com>
Internet: <http://www.medical.philips.com/>

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1. DICOM CONFORMANCE STATEMENT OVERVIEW

This document is the DICOM Conformance Statement for the Intera R1.5, Achieva R1.5 and Panorama 1.0.T R1.5, later referred to as the MR System.

The MR System is an embedded modality system for DICOM MR images. It provides, amongst other things, the following features:

- DICOM Verification service (for both SCU and SCP).
- Storage of images (and presentation states) on a remote DICOM system.
- Commitment of stored images on a remote DICOM system (Push Model).
- Querying for data on a remote DICOM system.
- Retrieval of images from a remote DICOM system.
- Basic Worklist Management (BWLM).
- Implementation of Modality Performed Procedure Step (MPPS).
- Storage and retrieval of images per DICOM media.
- Printing of hardcopies on a remote DICOM printer.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	UID		
Transfer			
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
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	Yes
Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes
Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes
Query/Retrieve			
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	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
Workflow Management			
Storage Commitment Push Model	1.2.840.10008.1.20.1	Option	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Option	No
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Option	No
Print Management			
Basic Film Session	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Yes	No
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	Yes	No
Printer	1.2.840.10008.5.1.1.16	Yes	No

The Modality Worklist, Modality Performed Procedure Step and Storage Commitment support are part of the IHE Scheduled Workflow option package.

The following table lists the supported media storage Application Profiles (with roles).

Table 2: Media Services

Media Storage Application Profile	Write Files (FSC or FSU)*	Read Files (FSR)
Magneto-Optical Disk		
CT/MR Studies on 2.3GB MOD	Option	Yes
CT/MR Studies on 4.1GB MOD	Option	Yes

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3. INTRODUCTION

3.1. Revision History

The revision history provides dates and differences of the different releases.

Table 3: Revision History

Document Version	Date of Issue	Author	Description
1.0	20 July 2005	PMS MIT-IO	Initial release version of the DICOM Conformance Statement for Intera R1.5, Achieva R1.5 and Panorama 1.0.T R1.5.

3.2. Audience

This Conformance Statement is intended for:

- (potential) customers
- system integrators of medical equipment
- marketing staff interested in system functionality
- software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structuring requirements of [DICOM] PS 3.2.

This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.
- **Validation**
Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**

The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.

The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see [DICOM] PS 3.3 and PS 3.4.

The following definitions and terms are used in this document.

Examination	Part of a Study, being a collection of direct related Series of Images (originating from the same modality/SOP class). The user interface – Patient Administration – of the MR System shall present all data per Examination. A study shall contain one or more Examinations.
MR System	Intera R1.5, Achieva R1.5 and Panorama 1.0.T R1.5
Philips	Philips Medical Systems Nederland B.V.

The following acronyms and abbreviations are used in this document.

AE	Application Entity
AP	Application Profile
BWLM	Basic Worklist Management
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
HIPAA	Health Insurance Portability and Accountability Act
HIS	Hospital Information System
IHE	Integrating the Healthcare Enterprise
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
MOD	Magneto-Optical Disk
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
PR	Presentation State
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair

TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security
UID	Unique Identifier

3.5. References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), Part 1 – 18 (NEMA PS 3.1-XXXX – PS 3.18-XXXX), National Electrical Manufacturers Association (NEMA) Publication Sales 1300 N. 17th Street, Suite 1847 Rosslyn, Virginia. 22209, United States of America

4. NETWORKING

4.1. Implementation model

The implementation model consists of three sections:

- the application data flow diagram, specifying the relationship between the Application Entities and the “external world” or Real-World Activities,
- a functional description of each Application Entity, and
- the sequencing constraints among them.

4.1.1. Application Data Flow

The MR System incorporates two networking Application Entities (AE). The related implementation model is shown in Figure 1.

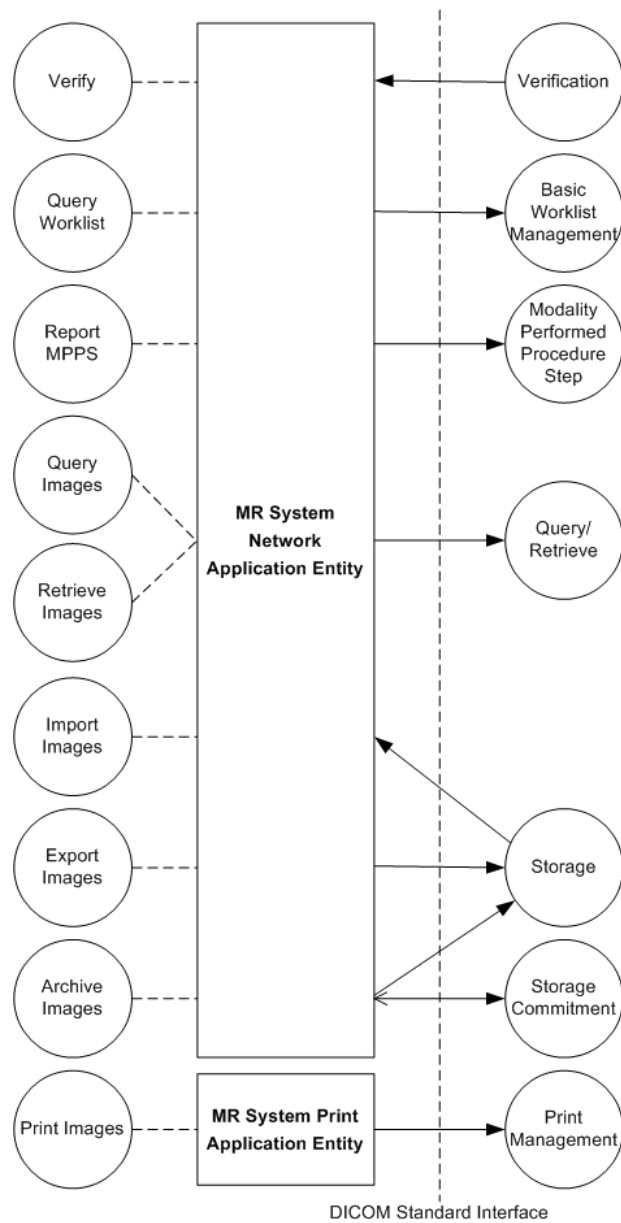


Figure 1: Application Data Flow Diagram

4.1.2. Functional Definition of AE's

This section describes in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions.

4.1.2.1. Functional Definition of the Network AE

Note that Query Worklist, Report MPPS, and Archive Images (Storage Commitment) functionality are part of the IHE Scheduled Workflow option package.

4.1.2.1.1. Verify

The MR System Network AE as Verification SCP implements the RWA Verify to handle verification requests.

4.1.2.1.2. Query Worklist

The MR System Network AE as Basic Worklist Management SCU implements the RWA Query Worklist to request the worklist from a DICOM Radiology Information System (RIS).

The function is initiated on the MR System by clicking the "RIS" button. After receiving the worklist data from the RIS the MR System will display the worklist on the user interface.

After selection of the relevant patient record the received patient data is displayed, and missing data may be manually added or invalid data may be modified before the patient data is stored in the local database.

4.1.2.1.3. Report MPPS

The MR System Network AE as Study Management SCU implements the RWA Report MPPS to create and update a Modality Performed Procedure Step object. The RWA is initiated at the start of a new examination to inform the DICOM Radiology Information System (RIS) (status "IN-PROGRESS").

When the image object has been acquired and archived one may click the "Ready" button when the MPPS is completed or the "Incomplete" button if the MPPS is discontinued. The MR System Network AE will send a new MPPS notification with the status "COMPLETED" or "DISCONTINUED".

4.1.2.1.4. Query Images

The MR System Network AE as Query/Retrieve SCU implements the RWA Query Images to find Examinations on a remote system (e.g. PACS).

4.1.2.1.5. Retrieve Images

The MR System Network AE as Query/Retrieve SCU implements the RWA Retrieve Images to initiate import images from a remote system (e.g. PACS).

4.1.2.1.6. Import Images

The MR System Network AE as Storage SCP implements the RWA Import Images to store images from a remote archive using the relevant image storage and/or Grayscale Softcopy Presentation State SOP class.

The MR System Network AE will respond to a remote request and store the images in the patient database. DICOM instances (Secondary Capture and native MR, Grayscale Softcopy Presentation State, and private SOP classes) may be imported for reference purposes only; when these are exported again then consistency and completeness cannot be guaranteed.

4.1.2.1.7. Export Images

The MR System Network AE as Storage SCU implements the RWA Export Images to store images and related object data on a remote system using the relevant image storage or Grayscale Softcopy Presentation State SOP class.

The MR images and object data, as selected per Examinations, can be sent to a selected remote system, either manually or by acquisition protocol.

The MR System can be configured to send Grayscale Softcopy Presentation State data for the selected Examinations.

Depending on the capabilities of the application receiving the MR images a large amount of information can be stored in private data elements. When modifying/processing those images such application is responsible for data consistency and therefore must remove the private data elements. Note that the MR System can be configured to suppress the storage of private data elements.

4.1.2.1.8. Archive Images

The MR System Network AE implements the RWA Archive Images to store (as Storage SCU) and, if configured, commit (as Storage Commitment SCU) images on the configured remote archive (e.g. PACS) using the Storage and Storage Commitment Push Model SOP class.

After sending a series of images to the archive, the MR System will request a storage commitment from this archive. The Storage Commitment status is indicated on the Patient Administration User Interface.

After commitment the user may decide to delete the images locally.

4.1.2.2. Functional Definition of the Print AE

4.1.2.2.1. Print Images

The MR System Print AE as Print Management SCU implements the RWA Print Images to send and print images on a DICOM network printer using the Basic Grayscale Print Management Meta SOP class.

After selecting the images these can be sent to a DICOM network printer.

4.1.3. Sequencing of Real World Activities

4.1.3.1. Integrated Workflow

The sequence diagram in Figure 2 shows a typical example of a workflow (using a single acquisition, a single storage with commitment, without pre-fetching).

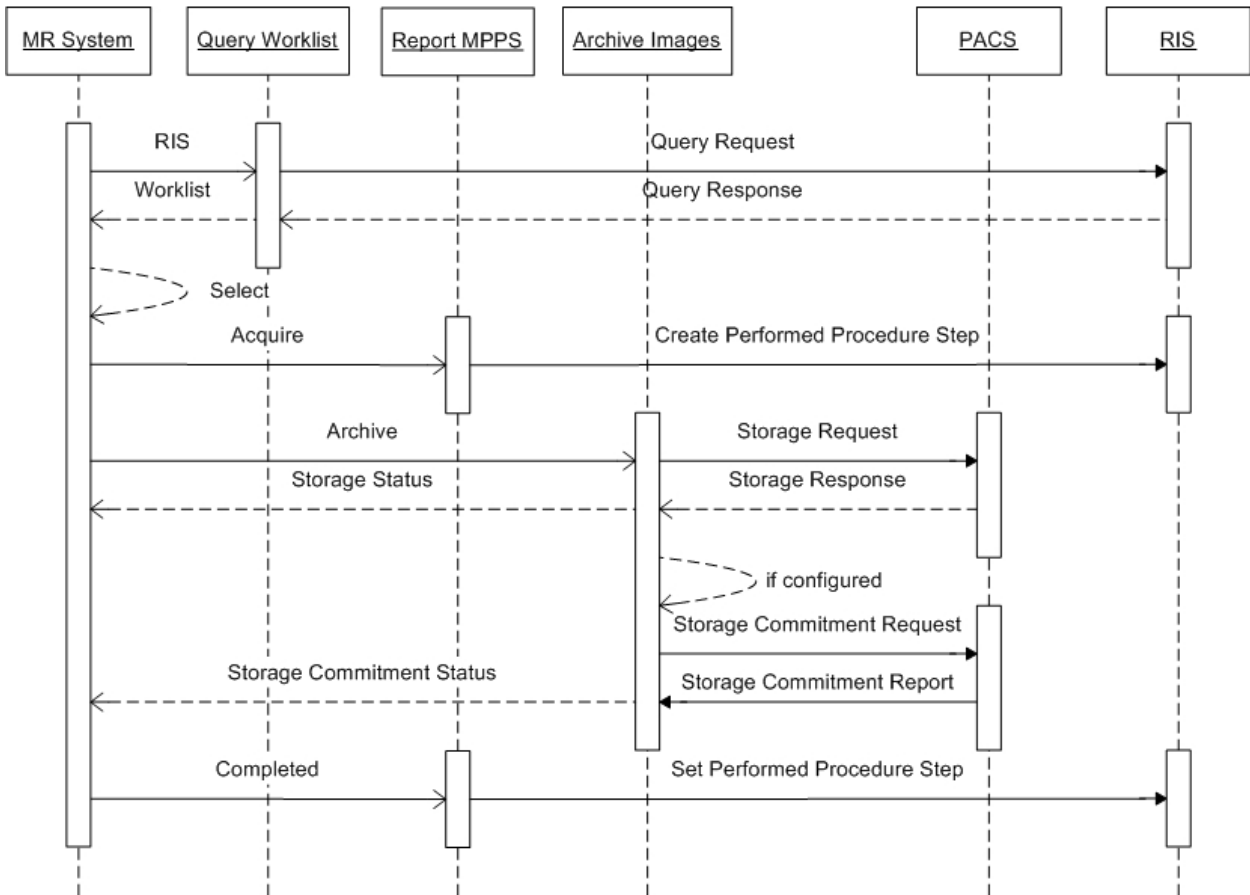


Figure 2: Sequencing of Integrated Workflow

The MR System workflow is initiated by clicking the “RIS” button. After receiving the worklist data from the RIS the MR System will display the worklist on the user interface.

Then one may select a relevant patient record and add missing data or modify invalid data (as specified) before the received patient data is stored in the local database. At the start and at the end of the acquisition/processing the configured MPPS system (RIS) is informed of the progress of the selected procedure step.

Before or after an acquisition a remote system can send related images of one or more of the scheduled patients to the MR System (pre-fetching, for reference only). The created images are converted into a DICOM message that can be sent to the remote system, or can be written onto MOD or local disk. After storage to a remote archive the MR System will request a storage commitment (as configured).

Note that, if no RIS is configured or no connection is possible, data can be introduced manually via the user interface.

After preparation of the scanner and the patient, the operator will perform the requested, or on his own initiative modified, procedure steps. Results may be MR images, Presentation State objects, and screen-grabs stored as Secondary Capture images, as well as Private MR Spectrum and Private MR Series Data.

4.1.3.2. Import Images per Query/Retrieve

The sequence diagram in Figure 3 shows a typical example of an import of a series of images per Query/Retrieve (e.g. pre-fetching).

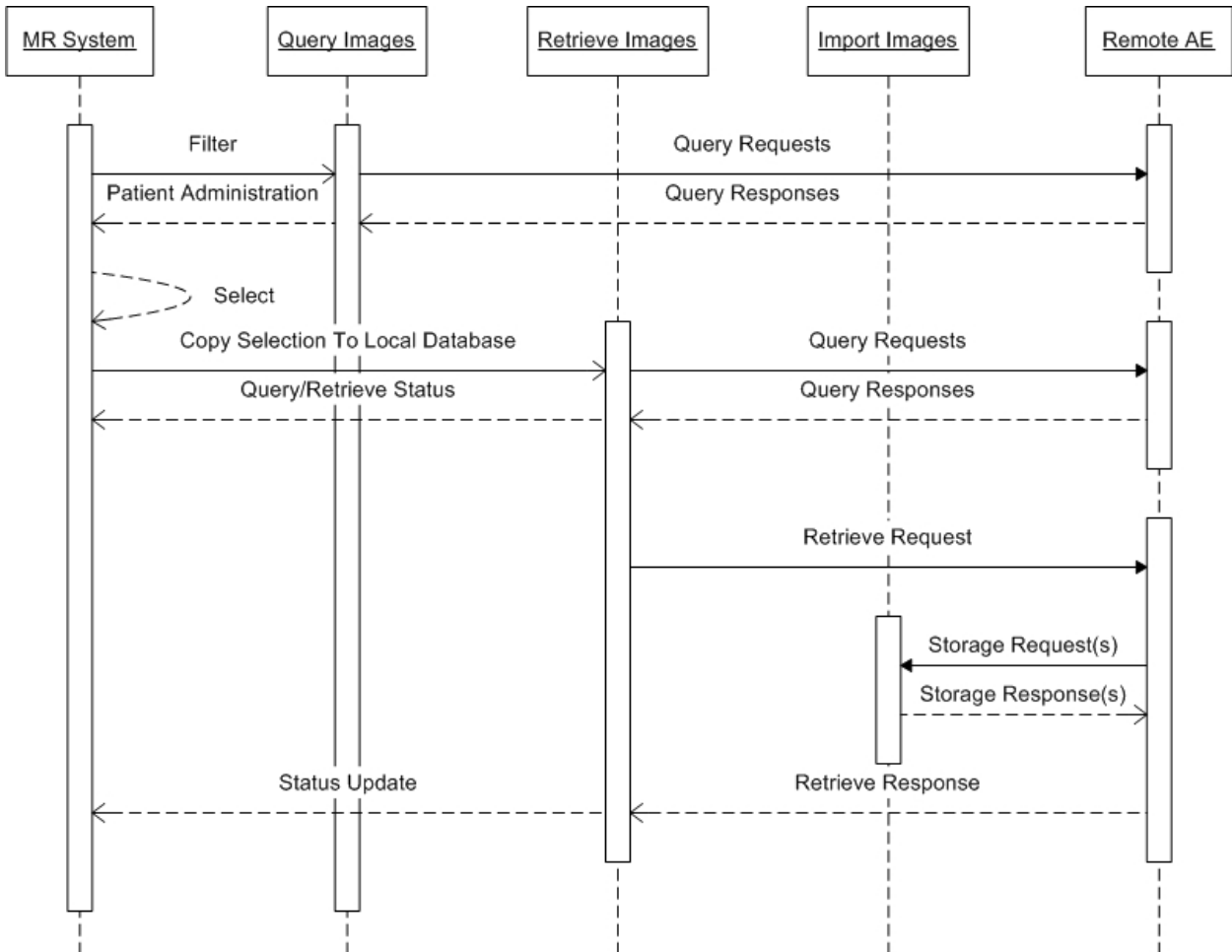


Figure 3: Sequencing of Import Images per Query/Retrieve

The MR System sends initial query requests to the remote AE to find all Examinations matching the specified filter. After selecting the Examinations to be retrieved the copy selection to local database is initiated. New query requests are sent to find the Series related to the selected Examinations. This is followed by retrieve requests to the remote AE to move all required Series of Images. Then for each retrieve request the remote AE will store the related Images on the MR System.

4.2. AE Specifications

The network capability of the system consists of two DICOM Application Entities:

- MR System Network AE
- MR System Print AE

These are specified in section 4.2.1 and section 4.2.2.

The media services are described in section 5.

4.2.1. Network AE

4.2.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 4: SOP Classes for the Network AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No*	Yes
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
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	Yes
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	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
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No
Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes
Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes

*The Verification SCU functionality is incorporated in the configuration tool.

4.2.1.2. Association Policies

This section describes the general association establishment and acceptance policies of the Network AE.

4.2.1.2.1. General

The following DICOM standard application context is specified.

Table 5: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

4.2.1.2.2. Number of Associations

The number of simultaneous associations that the Network AE may support as a SCU or SCP is specified as follows.

Table 6: Number of Associations as an Association Initiator for the Network AE

Maximum number of simultaneous associations	2
---	---

Table 7: Number of Associations as an Association Acceptor for the Network AE

Maximum number of simultaneous associations	Configurable, default is 2
---	----------------------------

4.2.1.2.3. Asynchronous Nature

Not applicable.

4.2.1.2.4. Implementation Identifying Information

The following values are used for Implementation Class UID and Implementation Version Name.

Table 8: DICOM Implementation Class and Version for the Network AE

Implementation Class UID	1.3.46.670589.11.0.0.51.4.3.0
Implementation Version Name	MR DICOM 3.0

4.2.1.2.5. Communication Failure Handling

The behavior of the Network AE during communication failure is summarized in Table 9.

Table 9: Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The association setup fails, the reason is logged and reported to the user.

4.2.1.3. Association Initiation Policy

This section describes the conditions under which the Network AE will initiate an association.

The behavior of the Network AE during association rejection is summarized in Table 10.

Table 10: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior	
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		2 – application-context-name-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		3 – calling-AE-title-not-recognized	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		7 – called-AE-title-not-recognized	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		2 – protocol-version-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		2 – local-limit-exceeded	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
	2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
			2 – application-context-name-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
3 – calling-AE-title-not-recognized			The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
7 – called-AE-title-not-recognized			The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
2 – DICOM UL service-provider (ACSE related function)		1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		2 – protocol-version-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
3 – DICOM UL service-provider (presentation related function)		1 – temporary-congestion	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	
		2 – local-limit-exceeded	The user is notified (via pop-up). If applicable the command will be retried. Log entry.	

4.2.1.3.1. Query Worklist

4.2.1.3.1.1. Description and Sequencing of Activities

Query Worklist may be used to update the worklist for the MR System.

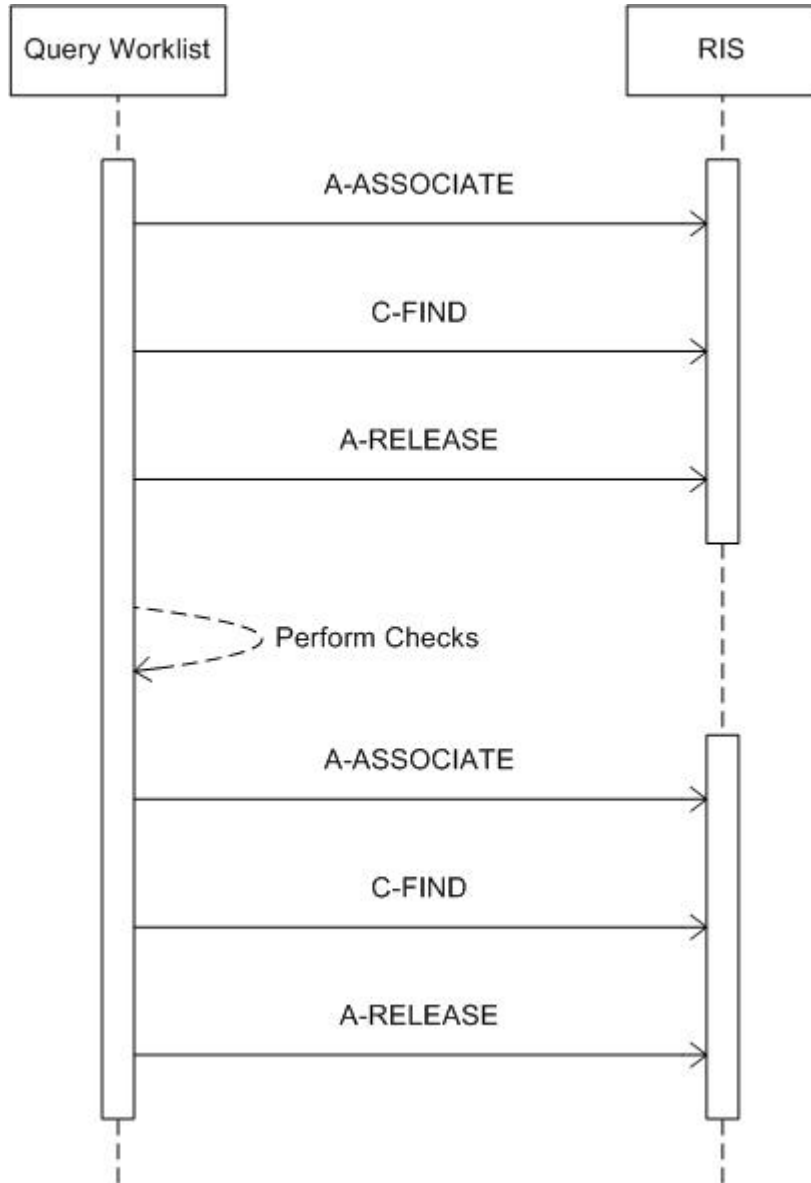


Figure 4: Sequencing of Query Worklist

The Query Worklist function will be accessible through the MR System user interface. An association will be initiated to the configured remote system (typically a RIS). After an initial worklist query the MR System will perform some checks on the received response data. Then it will send the actual worklist query. After receiving the worklist the association will be released.

4.2.1.3.1.2. Proposed Presentation Contexts

The presentation context proposed by the Network AE for Query Worklist is defined in Table 11.

Table 11: Proposed Presentation Contexts for Query Worklist

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The order of the proposed transfer syntaxes is configurable; ELE is preferred.

4.2.1.3.1.3. SOP Specific Conformance for SOP Classes

The MR System provides the RIS dialog to enter matching criteria for the following matching keys.

Table 12: Matching Keys for Query Worklist

Matching Key	DICOM Matching Key		Note
	Name	Tag	
Accession Number	Accession Number	(0008,0050)	Default value is empty.
	Scheduled Procedure Step Sequence	(0040,0100)	-
Modality	> Modality	(0008,0060)	Default value is empty (*).
Scheduled Station	> Scheduled Station AE Title	(0040,0001)	Default value is the local AET (LOCAL).
Start Date	> Scheduled Procedure Step Start Date	(0040,0002)	Begin range; default value is today (0).
End Date			End range; default value is tomorrow (1).

The complete set of matching keys for Query Worklist is specified in section 8.1.1 Created SOP Instances. The use of specific character set is as specified in section 6, Support of Character Sets.

Table 13 lists the attributes that are shown on the New Examination dialog, providing the mapping of the DICOM attribute to the UI entry.

Table 13: Mapping between UI Fields and DICOM Attributes for Query Worklist

UI Entry	DICOM Element		Examination Entry Editable	
	Name	Tag	Manual	RIS
Examination				
Accession number	Accession Number	(0008,0050)	Yes	No
Physician	Referring Physician's Name	(0008,0090)	Yes	No
Patient's name	Patient's Name	(0010,0010)	Yes	No
Registration ID	Patient ID	(0010,0020)	Yes	No
Date of birth	Patient's Birth Date	(0010,0030)	Yes	No
Sex	Patient's Sex	(0010,0040)	Yes	No
Patient weight	Patient's Weight	(0010,1030)	Yes	Yes
	Scheduled Procedure Step Sequence	(0040,0100)	No	No

UI Entry	DICOM Element		Examination Entry Editable	
	Name	Tag	Manual	RIS
Exam name	> Scheduled Procedure Step Description	(0040,0007)	Yes	Yes
Exam date	Study Date	(0008,0020)	Yes	Yes
	Performed Procedure Step Start Date	(0040,0244)		
	Performed Procedure Step End Date	(0040,0250)		
Comments	Comments on the Performed Procedure Step	(0040,0280)	Yes	Yes
General Worklist				
Medical Alerts	Medical Alerts	(0010,2000)	Yes	No
Contrast Allergies	Contrast Allergies	(0010,2110)	Yes	No
Pregnancy Status	Pregnancy Status	(0010,21C0)	Yes	No
Requested Procedure				
	Requested Procedure Code Sequence	(0032,1064)	No	No
Code Value	> Code Value	(0008,0100)	No	No
Code Scheme Designator	> Coding Scheme Designator	(0008,0102)	No	No
Code Scheme Version	> Coding Scheme Version	(0008,0103)	No	No
Code Meaning	> Code Meaning	(0008,0104)	No	No
Procedure ID	Requested Procedure ID	(0040,1001)	No	No
Comments	Requested Procedure Comments	(0040,1400)	No	No
Scheduled Procedure Step				
	Scheduled Procedure Step Sequence	(0040,0100)	No	No
Modality	> Modality	(0008,0060)	No	No
	> Scheduled Procedure Step Start Date	(0040,0002)	No	No
	> Scheduled Procedure Step Start Time	(0040,0003)	No	No
	> Scheduled Protocol Code Sequence	(0040,0008)	No	No
Code Value	>> Code Value	(0008,0100)	No	No
Code Scheme Designator	>> Coding Scheme Designator	(0008,0102)	No	No
Code Scheme Version	>> Coding Scheme Version	(0008,0103)	No	No
Code Meaning	>> Code Meaning	(0008,0104)	No	No
Procedure Step Description	> Scheduled Procedure Step Description	(0040,0007)	No	No
Procedure Step ID	> Scheduled Procedure Step ID	(0040,0009)	No	No
Pre-Medication	> Pre-Medication	(0040,0012)	No	No
Comments	> Comments on the Scheduled Procedure Step	(0040,0400)	No	No
Performed Procedure Step				
	Performed Protocol Code Sequence	(0040,0260)	No	No
Code Value	> Code Value	(0008,0100)	Yes	Yes
Code Scheme Designator	> Coding Scheme Designator	(0008,0102)	Yes	Yes
Code Scheme Version	> Coding Scheme Version	(0008,0103)	Yes	Yes
Code Meaning	> Code Meaning	(0008,0104)	Yes	Yes
Comments	Comments on the Performed Procedure Step	(0040,0280)	Yes	Yes

The details regarding the response behavior to status codes are provided in Table 14.

Table 14: DICOM Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Refused	A700	Out of resources	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Failed	A900	Identifier does not match SOP class	No query results are displayed. The association is released. The reason is logged and reported by message in console.
	Cxxx	Unable to process	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Cancel	FE00	Matching terminated due to Cancel request	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The Query Worklist job continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The Query Worklist job continues.
Success	0000	Matching is complete	The query results are displayed. The association is released. Report message in console.

The behavior of the AE during communication failure is summarized in Table 15.

Table 15: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The Query Worklist job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The Query Worklist job fails. The reason is logged and reported to the user.

4.2.1.3.2. Report MPPS

4.2.1.3.2.1. Description and Sequencing of Activities

When the first scan of an examination is initiated the Network AE initiates an association to the MPPS server (typically a RIS) and sends an N-CREATE message with all appropriate information for the study; the status will be set to IN-PROGRESS. After clicking the "Ready" or "Incomplete" button the Network AE will Archive Images that were acquired (only those that have not been archived yet) and send an N-SET message with the end date and time and a status of respectively "COMPLETED" or "DISCONTINUED".

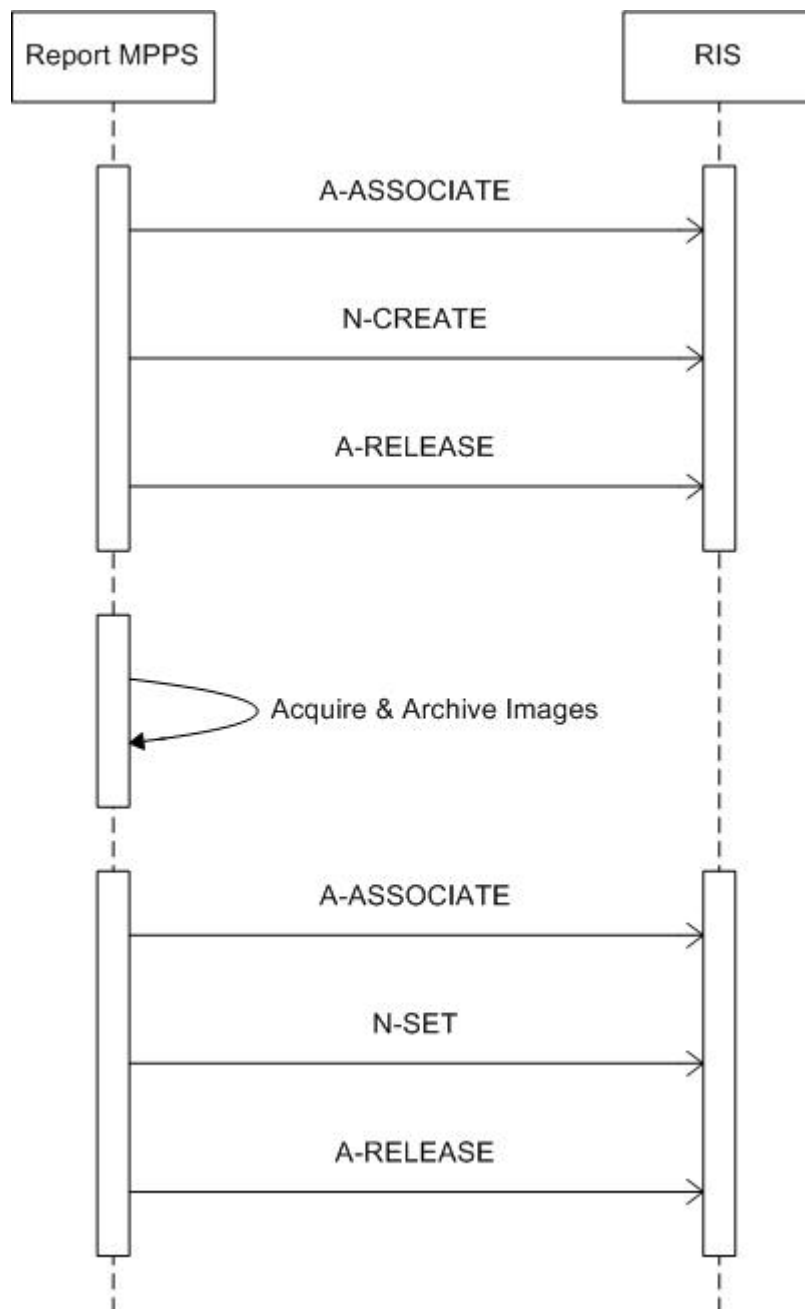


Figure 5: Sequencing of Report MPPS

4.2.1.3.2.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Report MPPS is defined in Table 16.

Table 16: Proposed Presentation Contexts for Report MPPS

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The order of the proposed transfer syntaxes is configurable; ELE is preferred.

4.2.1.3.2.3. SOP Specific Conformance for SOP Classes

The mapping of attributes for Report MPPS are specified in the in section 8.1.3 Attribute Mapping.

The details regarding the response behavior to status codes for the N-CREATE DIMSE are provided in Table 17.

Table 17: DICOM N-CREATE Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The association will be released. Message in console.
Failure	xxxx	(any other failure)	Message in console. The reason is logged.

The behavior of the AE during an N-CREATE communication failure is summarized in Table 18.

Table 18: DICOM N-CREATE Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The N-CREATE command fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The N-CREATE command fails. The reason is logged and reported to the user.

The details regarding the response behavior to status codes for the N-SET DIMSE are provided in Table 19.

Table 19: DICOM N-SET Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The association will be released. Message in console.

Service Status	Code	Further Meaning	Behavior
Failure	0110	Performed procedure step object may no longer be updated	(Error ID A710) Message in console. The reason is logged
	xxxx	(any other failure)	Message in console. The reason is logged.

The behavior of the AE during an N-SET communication failure is summarized in Table 20.

Table 20: DICOM N-SET Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The N-SET command fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The N-SET command fails. The reason is logged and reported to the user.

4.2.1.3.3. Query Images

4.2.1.3.3.1. Description and Sequencing of Activities

Query Images may be used to find Examinations on a remote system. After clicking the Patient Administration – “Filter” button the Filter dialog offers the possibility to enter the required matching keys. One may now click the “Apply Filter” button to activate the specified filter settings or the “Proceed” button to reset the Patient Administration according to the specified filter settings.

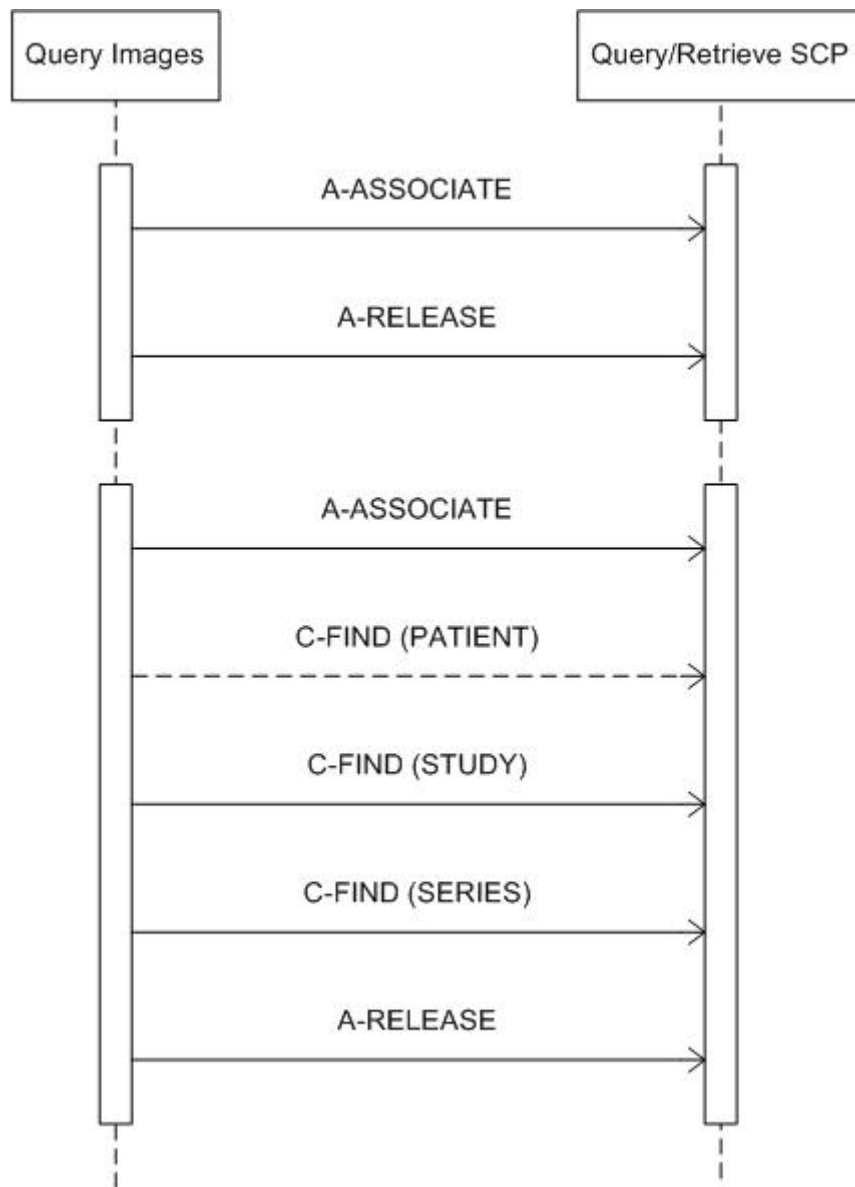


Figure 6: Sequencing of Query Images

The query dialog is initiated when clicking either the Patient Administration dialog – “Connect” button or the Filter dialog – “Proceed” button. The Network AE will try and request an association at the Query/Retrieve SCP. Then a query filter can be

specified and the Network AE initiates a new association to send query requests (as specified in the Filter dialog) to the Query/Retrieve SCP, starting with Patient or Study level query (for Patient Root (preferred) or Study Root model respectively) through to Series level queries (i.e. no Image level queries).

4.2.1.3.3.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Query Images is defined in Table 21.

Table 21: Proposed Presentation Contexts for Query Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All configured Query/Retrieve Information Model – FIND SOP classes.	See Table 1.	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The order of the proposed transfer syntaxes is configurable; ELE is preferred.

4.2.1.3.3.3. SOP Specific Conformance for SOP Classes

Depending on the configuration the MR System shows the following behaviour.

If the remote system is configured as archive (PACS) then the MR System requires a non-universal matching query filter before performing a query on the remote system. Otherwise the Network AE will perform an initial universal matching query. After this initial query the subsequent queries will be as specified in the Patient Administration Filter.

The MR System provides the Patient Administration – Filter dialog to enter matching criteria for the following matching keys.

Table 22: Patient Administration Filter

Filter Key	DICOM Matching Key		Note
	Name	Tag	
Patient name	Patient's Name	(0010,0010)	-
Registration ID	Patient ID	(0010,0020)	The initial query will always perform a universal match on Patient ID, independent on the entered matching value. Next the MR System will filter the relevant data, and implement further queries based on this data.
Date of birth	Patient's Birth Date	(0010,0030)	-
Exam date	Performed Procedure Step Start Date	(0040,0244)	-
Exam status	Performed Procedure Step Status	(0040,0252)	Enumerated value: Ready; Not ready.
Exam name	Performed Procedure Step Description	(0040,0254)	-

The complete set of matching keys for Query Images is specified in section 8.1.1 Created SOP Instances.

The use of specific character set is as specified in section 6, Support of Character Sets. The specific character set value is not checked.

The details regarding the response behavior to status codes are provided in Table 23.

Table 23: DICOM Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Refused	A700	Out of resources – Unable to calculate number of matches	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Failed	A900	Identifier does not match SOP class	No query results are displayed. The association is released. The reason is logged and reported by message in console.
	Cxxx	Unable to process	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Cancel	FE00	Sub-operations terminated due to Cancel indication	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The Query Images job continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The Query Images job continues.
Success	0000	Matching is complete	The query results are displayed. The association is released. Report message in console.

The behavior of the AE during communication failure is summarized in Table 24.

Table 24: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The Query Images job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The Query Images job fails. The reason is logged and reported to the user.

4.2.1.3.4. Retrieve Images

4.2.1.3.4.1. Description and Sequencing of Activities

In order to be able to select any Examination one must first Query Images on the remote database. Then the Series of Images of the selected Examinations may be copied from the queried remote database to the local database by means of the "Local Database" button in the MR System Patient Administration – Destinations environment.

The Retrieve Images process includes the actions as shown in Figure 7. For each examination the Network AE initiates a new association to send move requests on series level only. The status of this retrieve is shown in the Queue Manager.

Figure 7 shows the diagram for the move request for only one Examination containing only one Series of Images.

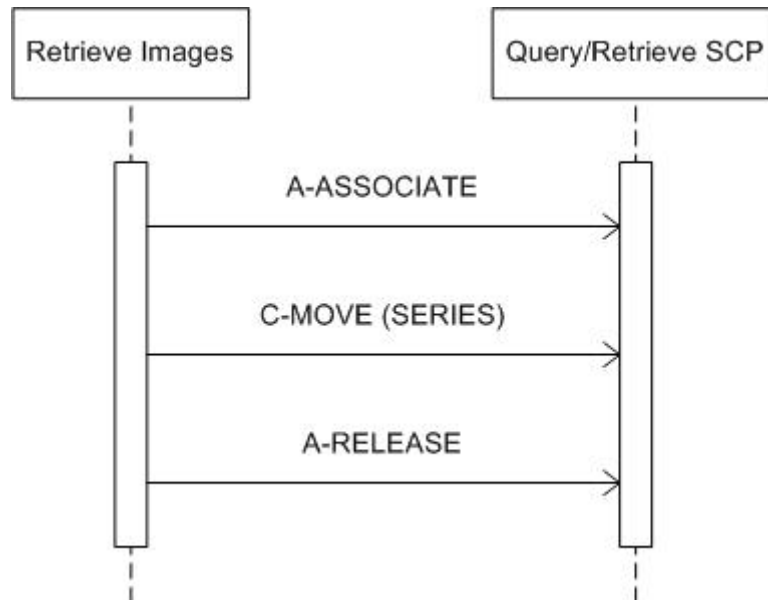


Figure 7: Sequencing of Retrieve Images

4.2.1.3.4.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Retrieve Images is defined in Table 25.

Table 25: Proposed Presentation Contexts for Retrieve Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All configured Query/Retrieve Information Model – FIND SOP classes.	See Table 1.	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
All configured Query/Retrieve Information Model – MOVE SOP classes.	See Table 1.	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The order of the proposed transfer syntaxes is configurable; ELE is preferred.

4.2.1.3.4.3. SOP Specific Conformance for SOP Classes

All details regarding the C-FIND response behavior to status codes are provided in Table 23. The behavior of the AE during C-FIND communication failure is summarized in Table 24.

All details regarding the C-MOVE response behavior to status codes are provided in Table 26.

Table 26: DICOM C-MOVE Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Refused	A701	Out of resources – Unable to calculate number of matches	The Retrieve Images job is marked as Failed at the queue manager. The association is released. The reason is logged and reported by message in console.
	A702	Out of resources – Unable to perform sub-operations	The Retrieve Images job is marked as Failed at the queue manager. The association is released. The reason is logged and reported by message in console.
	A801	Destination unknown	The Retrieve Images job is marked as Failed at the queue manager. The association is released. The reason is logged and reported by message in console.
Failed	A900	Identifier does not match SOP class	The Retrieve Images job is marked as Failed at the queue manager. The association is released. The reason is logged and reported by message in console.
	Cxxx	Unable to process	The Retrieve Images job is marked as Failed at the queue manager. The association is released. The reason is logged and reported by message in console.
Warning	B000	Sub-operations complete – One or more failures	The Retrieve Images job is marked as Completed at the queue manager. The association is released.
Cancel	FE00	Sub-operations terminated due to Cancel indication	The Retrieve Images job is marked as Failed at the queue manager. The association is released. The reason is logged and reported by message in console.
Pending	FF00	Sub-operations are continuing	The Retrieve Images job continues.
Success	0000	Sub-operations complete – No failures	The Retrieve Images job is marked as Completed at the queue manager. The association is released.

The behavior of the AE during C-MOVE communication failure is summarized in Table 27.

Table 27: DICOM C-MOVE Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The Retrieve Images job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	N/A
Association Aborted	The Retrieve Images job fails. The reason is logged and reported to the user.

4.2.1.3.5. Export Images

4.2.1.3.5.1. Description and Sequencing of Activities

Using the local patient database one may export Images to the selected network destination by clicking the Network button “Copy Selection To DICOM Node”. For each selected Examination the Network AE will then initiate a successive association with the selected network node. Within such association all images and applicable presentation state objects of the particular Examination will be exported consecutively. When the storage job has finished, either successful or not, the Network AE will release the association.

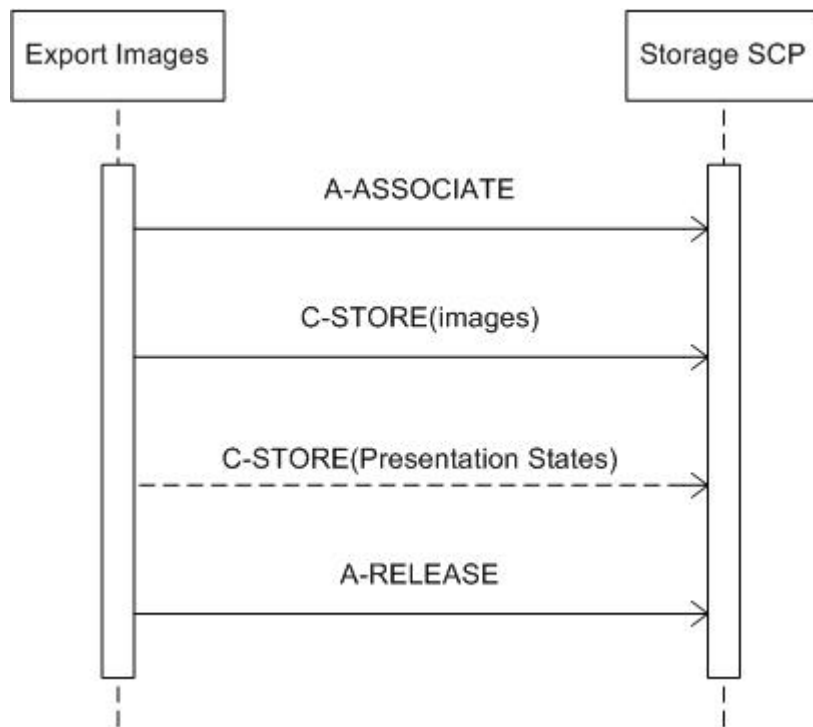


Figure 8: Sequencing of Export Images

4.2.1.3.5.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Export Images is defined in Table 28.

Table 28: Proposed Presentation Contexts for Export Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All configured Storage SOP classes.	See Table 1.	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The order of the proposed transfer syntaxes is configurable; ELE is preferred.

4.2.1.3.5.3. SOP Specific Conformance for SOP Classes

When receiving a C-STORE response with Refused or Error status the Network AE will release the association. All the images associated with the job will be considered by the Network AE to have failed to transfer. The Network AE has the ability to automatically recover from this situation and will attempt to send all the images at a later time.

The details regarding the response behavior are provided in Table 29.

Table 29: DICOM Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Refused	A7xx	Out of resources	The Export Images job fails and the association is released. The reason is logged and reported by message in console.
Error	A9xx	Data set does not match SOP class	The Export Images job fails and the association is released. The reason is logged and reported by message in console.
	Cxxx	Cannot understand	The Export Images job fails and the association is released. The reason is logged and reported by message in console.
Warning	B000	Coercion of data elements	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.
	B006	Elements discarded	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.
	B007	Data set does not match SOP class	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.
Success	0000	Storage is complete	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.

The behavior of the AE during communication failure is summarized in Table 30.

Table 30: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The Export Images job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The Export Images job fails. The reason is logged and reported to the user.

4.2.1.3.6. Archive Images

4.2.1.3.6.1. Description and Sequencing of Activities

Using the local patient database one may archive Images to the selected network destination by clicking the PACS button "Copy Selection To PACS". For each selected Examination the Network AE will then successively do the following.

First the Network AE will initiate an association with the configured PACS node. Within such association all images and applicable presentation state objects of the particular Examination will be exported consecutively. When the storage job has finished, either successful or not, the Network AE will release the association.

If the storage job failed then the storage job will have to be executed over again.

Otherwise, if storage commitment is configured then, for each exported Series of Images the Network AE will request storage commitment on the PACS. Each storage commitment request handles the storage commitment of one series of images within its own association.

The Network AE supports both synchronous and asynchronous storage commitment. When synchronous storage commitment is configured and the event report is not received within the configured time-out interval, the Network AE will release the association and the storage commitment will commence as asynchronous.

Figure 9 shows the sequence diagram for the storage and synchronous storage commitment of an Examination containing one Series of images.

Figure 10 shows the same using asynchronous storage commitment.

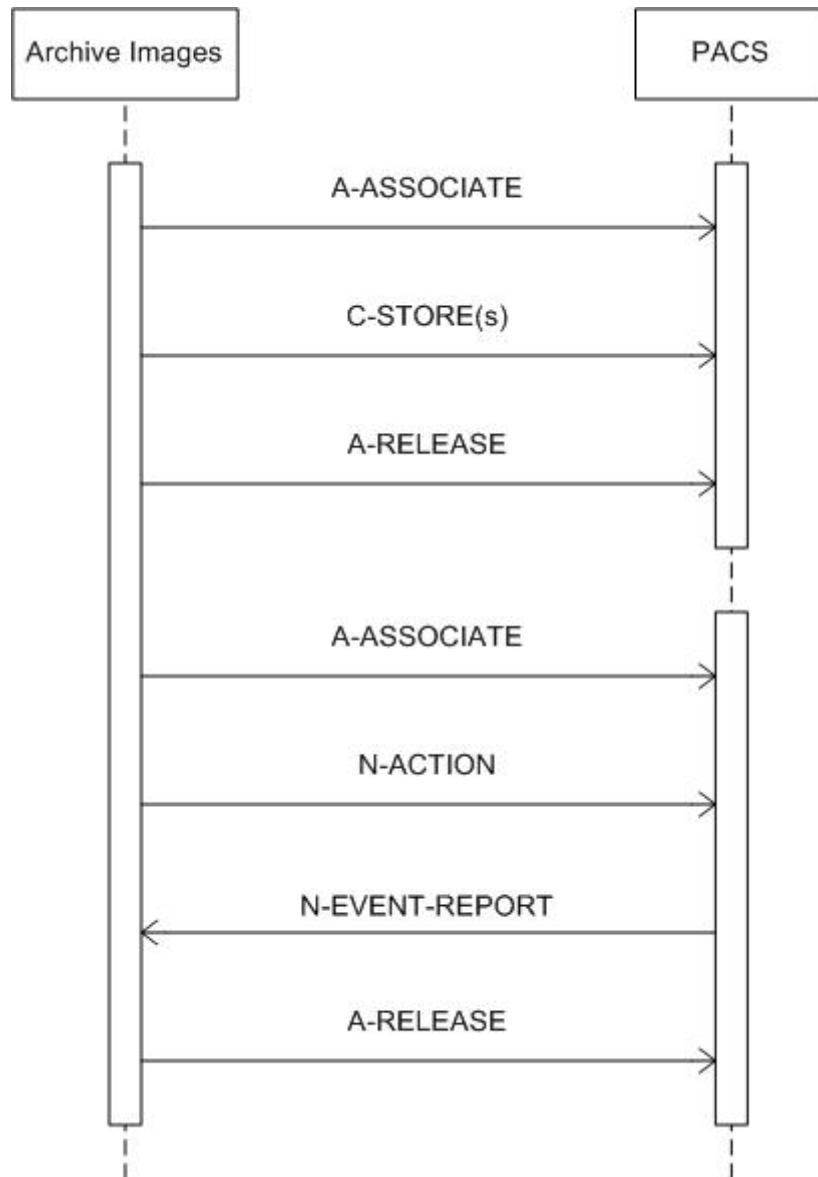


Figure 9: Sequencing of Synchronous Archive Images

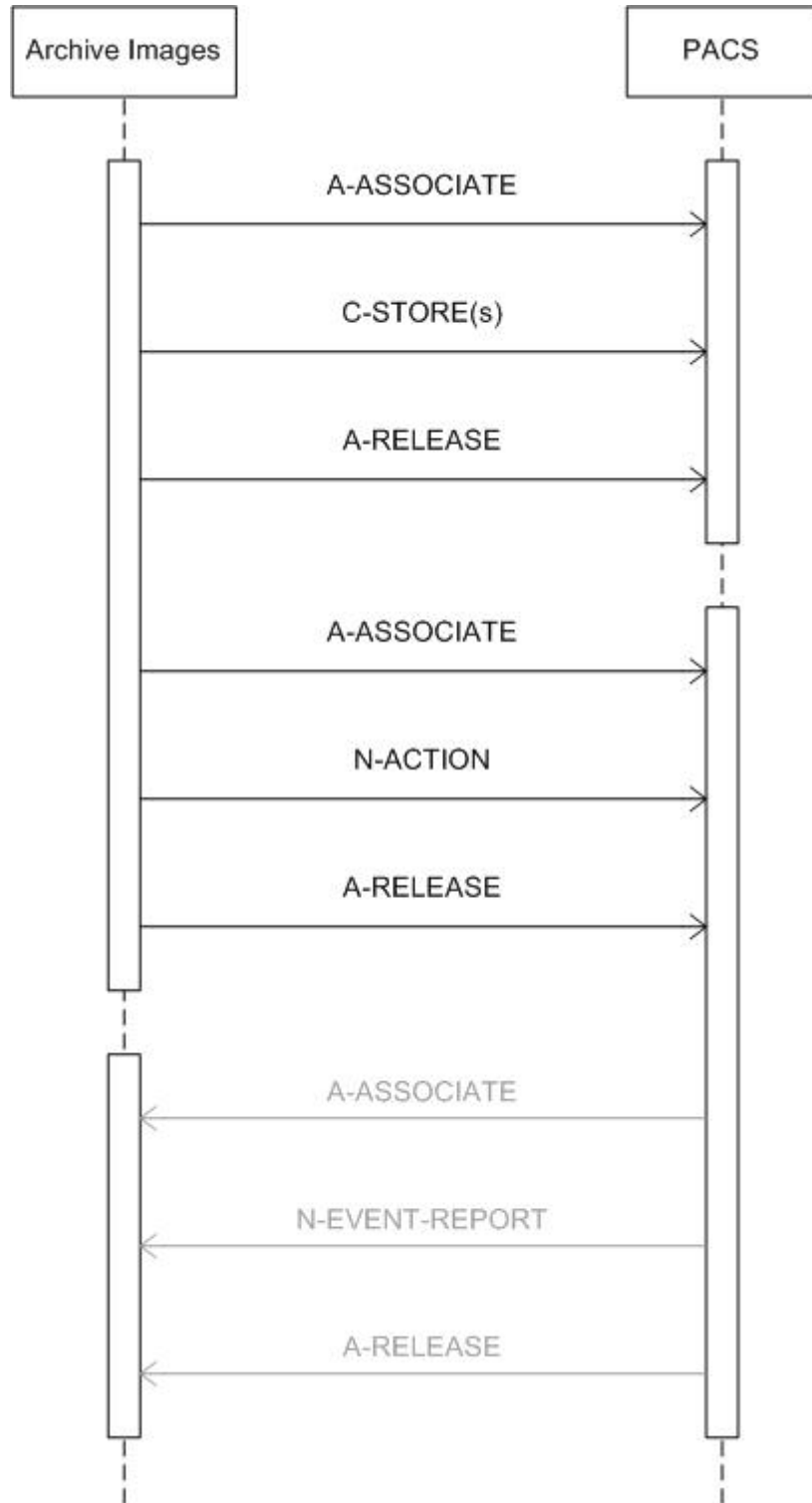


Figure 10: Sequencing of Asynchronous Archive Images

4.2.1.3.6.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Archive Images is defined in Table 31.

Table 31: Proposed Presentation Contexts for Archive Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All configured Storage SOP classes.	See Table 1.	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

The order of the proposed transfer syntaxes is configurable; ELE is preferred.

4.2.1.3.6.3. SOP Specific Conformance for SOP Classes

As Grayscale Softcopy Presentation State objects are not stored in the same Series as the related Images, the Network AE will initiate separate associations for committing those Series – one after the other.

The details regarding the response behavior for the Archive Images storage are provided in Table 29.

The details regarding the response behavior for the Archive Images storage commitment request are provided in Table 32.

Table 32: DICOM N-ACTION Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The association will be released. Message in console.
Failure	xxxx	(any failure)	Message in console. The reason is logged.

The details regarding the response behavior for the Archive Images storage commitment event report are provided in section 4.2.1.4.3.3.

The behavior of the Network AE during storage communication failure is summarized in Table 30.

The behavior of the Network AE during storage commitment request communication failure is summarized in Table 33.

Table 33: DICOM N-ACTION Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The association is released. The Archive Images job expects storage commitment report.
Association Time-out SCU	The association is released. The Archive Images job expects storage commitment report.
Association Aborted	The Archive Images job expects storage commitment report.

4.2.1.4. Association Acceptance Policy

This section describes the conditions under which the Network AE will accept an association.

The AE association rejection policies are summarized in Table 34.

Table 34: DICOM Association Rejection Policies

Result	Source	Reason/Diagnosis	Explanation
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		2 – application-context-name-not-supported	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		3 – calling-AE-title-not-recognized	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		7 – called-AE-title-not-recognized	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		2 – protocol-version-not-supported	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
2 – local-limit-exceeded		If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).	
2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		2 – application-context-name-not-supported	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		3 – calling-AE-title-not-recognized	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		7 – called-AE-title-not-recognized	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).

Result	Source	Reason/Diagnosis	Explanation
		2 – protocol-version-not-supported	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).
		2 – local-limit-exceeded	If applicable the command will be retried. Log entry. The user is notified via pop-up (in preview mode only).

4.2.1.4.1. Verify

4.2.1.4.1.1. Description and Sequencing of Activities

The Network AE will act as a Verification SCP for any remote SCU.

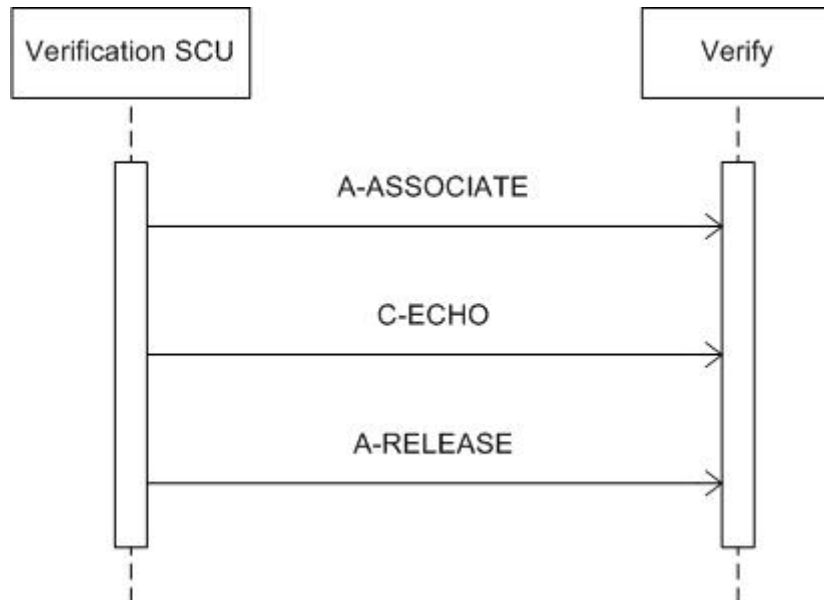


Figure 11: Sequencing of Verify

The Network AE accepts associations to verify application level communication using the C-ECHO command.

4.2.1.4.1.2. Accepted Presentation Contexts

The Network AE may accept the following presentation contexts.

Table 35: Acceptable Presentation Contexts for Verify

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		ILE	1.2.840.10008.1.2	SCP	None

The preferred transfer syntax is ELE.

4.2.1.4.1.3. SOP Specific Conformance for SOP Classes

The status behavior of the Network AE is as shown in Table 36.

Table 36: Network AE C-ECHO Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	Message in console.

4.2.1.4.2. Import Images

4.2.1.4.2.1. Description and Sequencing of Activities

The Network AE will act as a Storage SCP for any remote Storage SCU that is configured in the MR System configuration using an accepted presentation context.

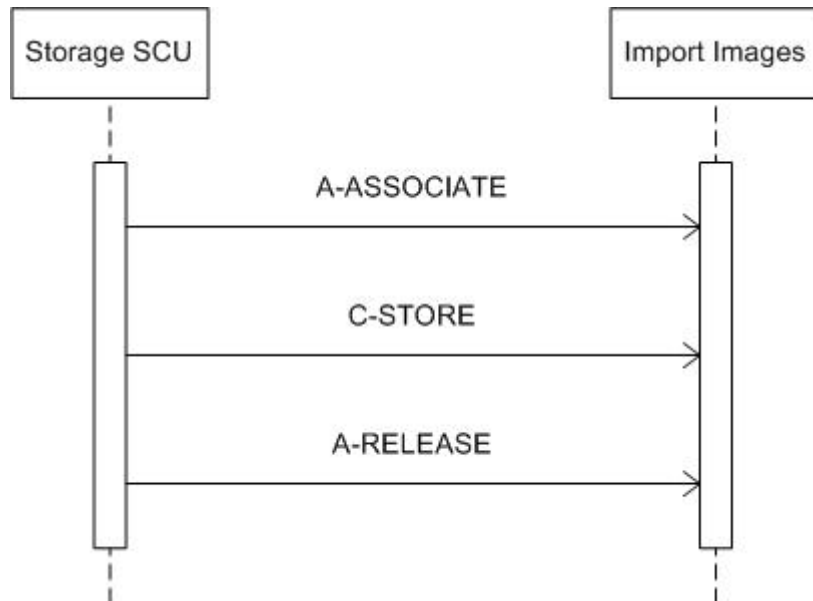


Figure 12: Sequencing of Import Images

After the Network AE accepts an association from the Storage SCU it will receive images, send store responses including the relevant status, and finally release the association on SCU request.

4.2.1.4.2.2. Accepted Presentation Contexts

The Network AE may accept the following presentation contexts.

Table 37: Acceptable Presentation Contexts for Import Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All configured storage SOP classes	All storage SOP classes in table 2	ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None
		ILE	1.2.840.10008.1.2	SCP	None

The preferred transfer syntax is ELE.

4.2.1.4.2.3. SOP Specific Conformance for SOP Classes

Secondary Capture images may be imported at any time and from any source. However, the Network AE may only import MR images and Presentation State objects that were created on an MR System. These imported images may be used for reference only; it is not the intention to export them again. When the Network AE receives non-native MR images it may not import the images but respond with error status (C000) "Cannot understand" and abort the association.

The status behavior of the Network AE is as shown in Table 38.

Table 38: Network AE C-STORE Status Response

Service Status	Code	Further Meaning	Description
Refused	A700	Out of resources	The local database is full; recovery from this condition is left to the SCU. The MR System sends the failure response, logs the condition, and aborts the association.
Error	A900	Data set does not match SOP class	The SOP class of the image(s) does not match the negotiated abstract syntax. The MR System sends the failure response, logs the condition, and aborts the association.
	C000	Cannot understand	The image(s) cannot be parsed. The MR System sends the failure response, logs the condition, and aborts the association.
Success	0000	Storage is complete	The image(s) shall be stored in the local database.

4.2.1.4.3. Archive Images

4.2.1.4.3.1. Description and Sequencing of Activities

The Network AE will act as a Storage Commitment SCU for the configured Storage Commitment SCP to receive asynchronous Storage Commitment reports from Storage Commitment requests send by Archive Images (as Storage Commitment SCU), using an accepted presentation context.

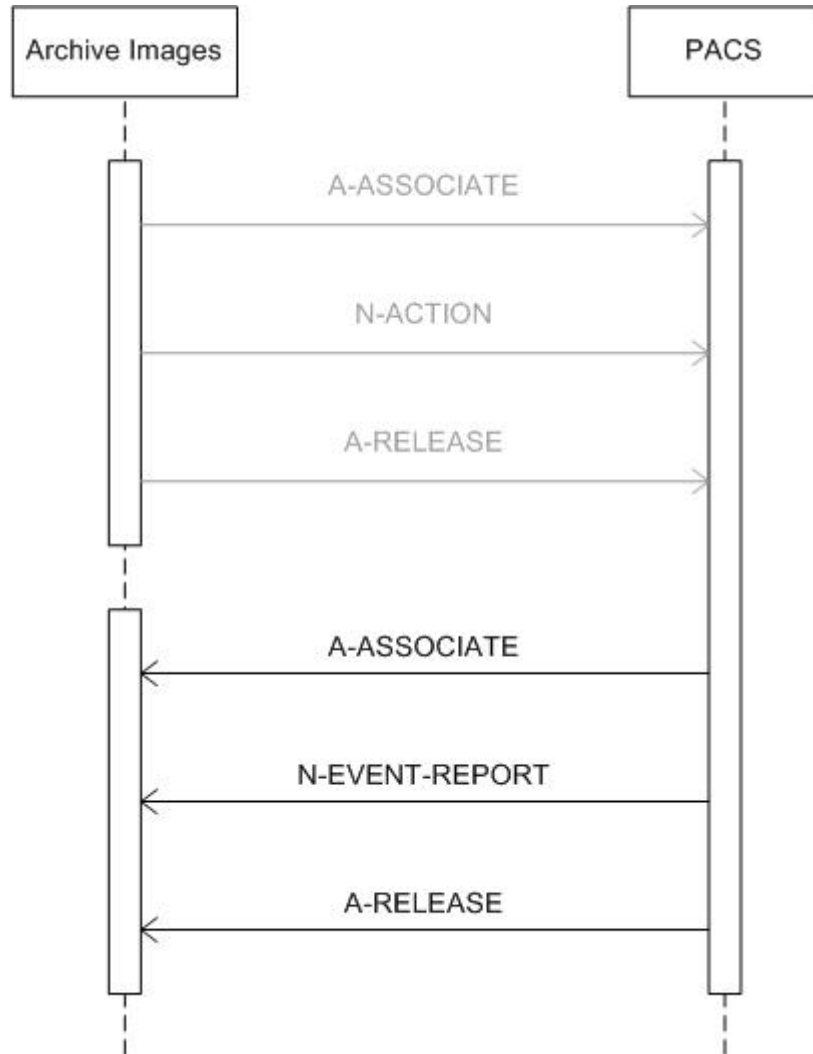


Figure 13: Sequencing of Archive Images

After the Network AE accepts an association from the remote Storage Commitment SCP it will receive Storage Commitment reports, send responses including the relevant status, and finally release the association on SCP request.

4.2.1.4.3.2. Accepted Presentation Contexts

The Network AE may accept the following presentation contexts.

Table 39: Acceptable Presentation Contexts for Archive Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	1.2.840	ELE	1.2.840.10008.1.2.1	SCU	None
	.10008.1.20	EBE	1.2.840.10008.1.2.2	SCU	None
	.1	ILE	1.2.840.10008.1.2	SCU	None

The preferred transfer syntax is ELE.

4.2.1.4.3.3. SOP Specific Conformance for SOP Classes

The storage commitment status is reflected in the Patient Administration Examination status. If the storage commitment failed, the operator is responsible to retry Archive Images.

On receiving a storage commitment result with Event Type ID 1 (Storage Commitment Request Successful) the MR System Patient Administration Examination status shall be updated to reflect the successful storage commitment.

On receiving a storage commitment result with Event Type ID 2 (Storage Commitment Request Complete – Failures Exist) the Network AE shall behave as summarized in Table 40.

Table 40: Network AE N-EVENT-REPORT Failure Handling Behavior

Failure Reason		Behavior
Code	Semantic	
0110	Processing failure	Retry storage commitment request.
0112	No such object instance	Retry store and storage commitment request.
0119	Class / Instance conflict	Inform user and abort.
0122	Referenced SOP class not supported	Inform user and abort.
0131	Duplicate transaction UID	Inform user and abort.
0213	Resource limitation	Retry storage commitment request.

The status processing behavior of the Network AE is summarized in Table 41.

Table 41: Network AE N-EVENT-REPORT Status Processing Behavior

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	The MR System logs the event.

4.2.2. Print AE

4.2.2.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 42: SOP Classes for the Print AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	Yes	No
> Basic Film Session	1.2.840.10008.5.1.1.1	Yes	No
> Basic Film Box	1.2.840.10008.5.1.1.2	Yes	No
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Yes	No
> Printer	1.2.840.10008.5.1.1.16	Yes	No

4.2.2.2. Association Policies

This section describes the general association establishment and acceptance policies of the Print AE.

4.2.2.2.1. General

The following DICOM standard application context is specified.

Table 43: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

4.2.2.2.2. Number of Associations

The number of simultaneous associations that the Print AE may support is specified as follows. The Print AE does not accept any associations.

Table 44: Number of Associations as an Association Initiator for the Print AE

Maximum number of simultaneous associations	1
---	---

4.2.2.2.3. Asynchronous Nature

Not applicable.

4.2.2.2.4. Implementation Identifying Information

The following values are used for Implementation Class UID and Implementation Version Name.

Table 45: DICOM Implementation Class and Version for the Print AE

Implementation Class UID	2.16.124.113531.1.1.1
Implementation Version Name	MR PRINT 1.2

4.2.2.2.5. Communication Failure Handling

The behavior of the Print AE during communication failure is summarized in Table 46.

Table 46: Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The association setup fails, the reason is logged and reported to the user.

4.2.2.3. Association Initiation Policy

This describes the conditions under which the Print AE will initiate an association.

The behavior of the Print AE during association rejection is summarized in Table 47.

Table 47: DICOM Association Rejection Handling

Result	Source	Reason/Diagnosis	Behavior
1 – rejected-permanent	1 – DICOM UL service-user	1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		2 – application-context-name-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		3 – calling-AE-title-not-recognized	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		7 – called-AE-title-not-recognized	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
	2 – DICOM UL service-provider (ACSE related function)	1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		2 – protocol-version-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
	3 – DICOM UL service-provider (presentation related function)	1 – temporary-congestion	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		2 – local-limit-exceeded	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
	2 – rejected-transient	1 – DICOM UL service-user	1 – no-reason-given
2 – application-context-name-not-supported			The user is notified (via pop-up). If applicable the command will be retried. Log entry.
3 – calling-AE-title-not-recognized			The user is notified (via pop-up). If applicable the command will be retried. Log entry.
7 – called-AE-title-not-recognized			The user is notified (via pop-up). If applicable the command will be retried. Log entry.
2 – DICOM UL service-provider (ACSE related function)		1 – no-reason-given	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		2 – protocol-version-not-supported	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
3 – DICOM UL service-provider (presentation related function)		1 – temporary-congestion	The user is notified (via pop-up). If applicable the command will be retried. Log entry.
		2 – local-limit-exceeded	The user is notified (via pop-up). If applicable the command will be retried. Log entry.

4.2.2.3.1. Print Images

4.2.2.3.1.1. Description and Sequencing of Activities

Before Print Images the Print AE must have an open association with the Printer. If no association is opened yet, the operator may initiate an association manually by selecting "On" in the printer queue manager dialog; otherwise the Print AE may try and initiate an association automatically at certain time intervals.

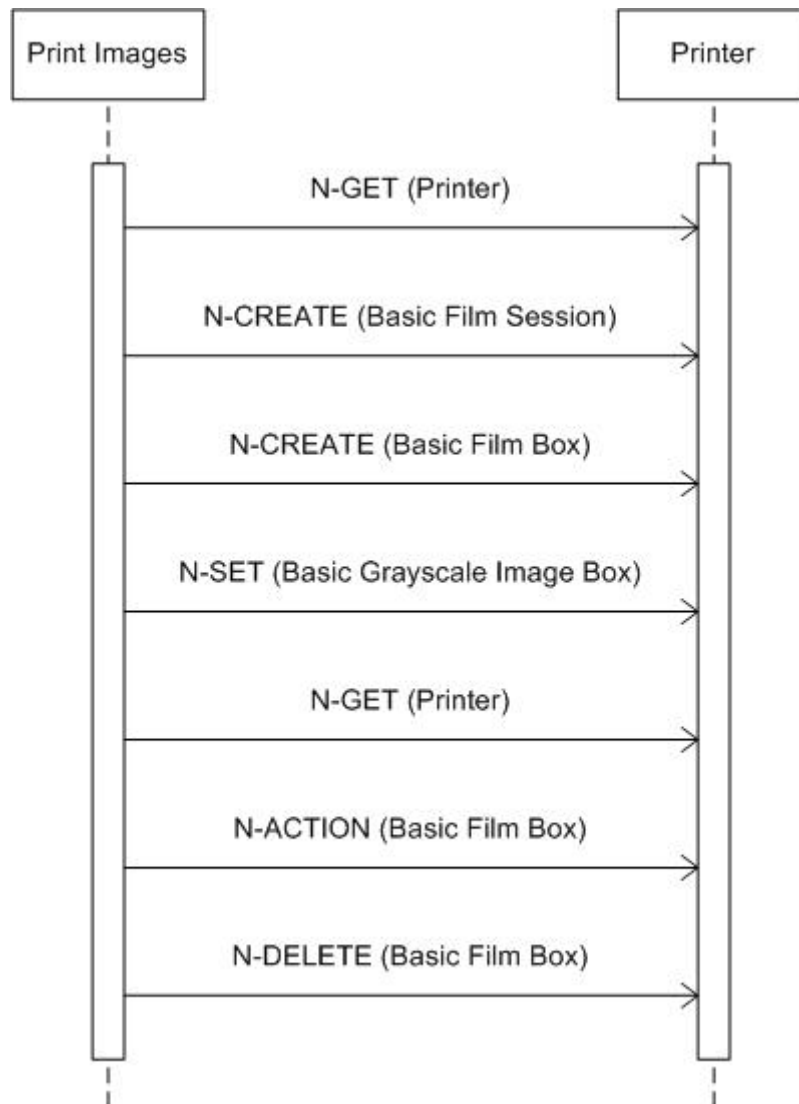


Figure 14: Sequencing of Print Images

Note that the first N-GET message is used to inquire for general printer information, where the second N-GET message is used to inquire for printer status information only.

4.2.2.3.1.2. Proposed Presentation Contexts

The presentation context proposed by Print AE for Print Images is defined in Table 48.

Table 48: Proposed Presentation Contexts for Print Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	ILE	1.2.840.10008.1.2	SCU	None
Presentation LUT	1.2.840.10008.5.1.1.23	ILE	1.2.840.10008.1.2	SCU	None

4.2.2.3.1.3. SOP Specific Conformance for SOP Classes

This section includes the SOP specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

The Print AE cannot handle any N-EVENT-REPORT messages.

The details regarding the response behavior to all status codes, both from an application level and communication errors are provided in Table 49 to Table 54.

Table 49: DICOM Command Response Status Handling Behavior for Printer N-GET

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	xxxx	(any warning)	The print job continues and the warning is logged.
Failure	xxxx	(any failure)	The print job is marked as failed, the reason is reported and logged.

Table 50: DICOM Command Response Status Handling Behavior for Basic Film Session N-CREATE

Service Status	Code	Further Meaning	Behavior
Success	0000	Film session successfully created	The print job continues.
Warning	B600	Memory allocation not supported	The print job continues and the warning is logged.

Table 51: DICOM Command Response Status Handling Behavior for Basic Film Box N-CREATE

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	B605	Requested Min Density or Max Density outside of printer's operating range	The print job continues and the warning is logged.
Failure	C616	There is an existing Film Box that has not been printed	The print job is marked as failed, the reason is logged.

Table 52: DICOM Command Response Status Handling Behavior for Basic Grayscale Image Box N-SET

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	B604	Image size is larger than image box size – the image has been de-magnified	The print job continues and the warning is reported and logged.
	B605	Requested Min Density or Max Density outside of printer's operating range	The print job continues and the warning is reported and logged.
	B609	Image size is larger than image box size – the image has been cropped to fit	The print job continues and the warning is reported and logged.
	B60A	Image size or combined print image size is larger than image box size – the image or combined print image has been decimated to fit	The print job continues and the warning is reported and logged.
Failure	C603	Image size is larger than image box size	The print job is marked as failed, the reason is reported and logged.
	C605	Insufficient memory in printer to store the image	The print job is marked as failed, the reason is reported and logged.
	C613	Combined print image size is larger than image box size	The print job is marked as failed, the reason is reported and logged.

Table 53: DICOM Command Response Status Handling Behavior for Basic Film Box N-ACTION

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Warning	B603	Film Box SOP instance hierarchy does not contain Image Box SOP instances	The print job continues and the warning is reported and logged.
	B604	Image size is larger than image box size – the image has been de-magnified	The print job continues and the warning is reported and logged.
	B609	Image size is larger than image box size – the image has been cropped to fit	The print job continues and the warning is reported and logged.
	B60A	Image size or combined print image size is larger than image box size – the image or combined print image has been decimated to fit	The print job continues and the warning is reported and logged.
Failure	C602	Unable to create print job SOP instance – print queue is full	The print job is marked as failed, the reason is reported and logged.
	C603	Image size is larger than image box size	The print job is marked as failed, the reason is reported and logged.

Service Status	Code	Further Meaning	Behavior
	C613	Combined print image size is larger than image box size	The print job is marked as failed, the reason is reported and logged.

Table 54: DICOM Command Response Status Handling Behavior for Basic Film Box N-DELETE

Service Status	Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.
Failure	0110	Processing failure	The status is logged.
	0112	No such object instance	The status is logged.
	0117	Invalid object instance	The status is logged.
	0118	No such SOP class	The status is logged.
	0119	Class instance conflict	The status is logged.
	0210	Duplicate invocation	The status is logged.
	0211	Unrecognized operation	The status is logged.
	0212	Mistyped argument	The status is logged.
	0213	Resource limitation	The status is logged.

The behavior of the AE during communication failure is summarized in Table 55.

Table 55: DICOM Command Communication Failure Behavior

Exception	Behavior
Reply Time-out	The association is released.
Association Time-out SCU	The association is released.
Association Aborted	The Print Images job is marked as failed. The reason is logged and reported to the user.

4.2.2.4. Association Acceptance Policy

The MR System Print AE does not accept any associations.

4.3. Network Interfaces

4.3.1. Physical Network Interface

The MR System provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM standard. No OSI stack communications are provided with this implementation.

The MR System supports Ethernet v2.0 and IEEE 802.3, 10/100/1000 Base-T, depending on the system hardware.

4.3.2. Additional Protocols

Not applicable.

4.4. Configuration

The MR System is configured by means of a configuration program. This program is accessible from the login prompt of the operating system. It is password protected and intended to be used by Philips Customer Support Engineers only. The program allows the Customer Support Engineer to enter configuration information needed by the MR System applications.

4.4.1. AE Title/Presentation Address Mapping

4.4.1.1. Local AE Titles

The MR System can be configured in two ways for the local IP network:

- Automatically via DHCP (hospital provided).
- By assigning a dedicated IP address, (sub)net mask and gateway (if necessary) manually.

This is determined upon installation time of the MR System.

The MR System host name is configurable.

The local AE title mapping and configuration is as specified in the following table.

Table 56: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
Network AE	NODENAME	3010
Print AE	NODENAME	3010

4.4.1.2. Remote AE Title/Presentation Address Mapping

4.4.1.2.1. Remote SCP Configuration

All relevant remote applications that are able to accept an association from the MR System must be configured on the MR System with the following information:

- IP Address.
- Host name and listening port number.
- AE Title.
- The SOP classes and transfer syntaxes that are supported by the remote application.

4.4.1.2.2. Remote SCU Configuration

All relevant remote applications that are able to initiate an association with the MR System must be configured on the MR System with the following information:

- IP Address.
- Host name and listening port number.
- AE Title.
- The SOP classes and transfer syntaxes for which the MR System accepts associations.

4.4.2. Parameters

This section specifies any important operational parameters and, if configurable, their default value and range.

Table 57: Configuration Parameters table

Parameter	Configurable	Default Value
General Parameters		
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	No	180 [s]
General DIMSE level time-out values	No	300 [s]
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	No	ref. operating system
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	ref. operating system
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	ref. operating system
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	ref. operating system
AE Specific Parameters		
Size constraint in maximum object size	No	-
Maximum PDU size the AE can receive	Yes	32768
Maximum PDU size the AE can send	Yes	32768
AE specific DIMSE level time-out values	No	300 [s]
Number of simultaneous SCP associations	Yes	2
SOP Class support	Yes	per template
Convert MR image to Secondary Capture	No	No
Transfer Syntax support	Yes	ELE, EBE, ILE

4.4.2.1. Configuration of the Local System

The following items are configurable per MR System installation:

Table 58: Installation Configuration Items of MR System

Parameter	Explanation	Default
Maximum data PDU size	For associations initiated by the MR System; value must be greater than 0	32768
Allow incoming queries?	Not used – should not be changed	No
ARTIM timeout	Max. time MR System waits for an incoming association	60 seconds
Max nbr of associations	Simultaneous incoming connections to the MR System	1
Image number direction	Instance number given upon storage export	H-F / R-L / A-P
Institution name	Must be shorter than 40 characters	-

The following DICOM services are only supported when a software key has been purchased:

- RIS (Modality Worklist Management).
- Storage Commitment and Modality Performed Procedure Step (MPPS).

4.4.2.2. Configuration per Remote System

All relevant remote applications are defined through selection of one of the available preconfigured templates. Each defined remote application can be fine-tuned (if necessary) through several configurable parameters. What parameters are configurable depends on the selected template.

Table 59: Configurable Parameters for Remote Systems of MR System

Parameter	Explanation	Default
IsArchive	If set to Yes then the network node plays role of archive	-
Storage Commitment	Only when IsArchive is Yes;	-
Network Node Name		

Parameter	Explanation	Default
Storage Commitment Max. Reply Waiting Time	Only when IsArchive is Yes; For asynchronous storage commitment use -1	-
Supported SOP classes	Depends on used template; SOP classes can be unconfigured	-
Supported Transfer Syntaxes	Depends on used template; the preference can be configured by ordering the supported transfer syntaxes	-
ARTIM timeout	Max. time MR System waits for association acknowledge	60 seconds
Split multiple day range	Only with RIS template	Yes
Pure DICOM	Do not send private attributes: only standard attributes	No
Combine MR Rescaling	Rescaling for pixel calibration is discarded (combined with window)	Yes
Send logging	For trouble shooting purposes	No
Receive logging	For trouble shooting purposes	No
Add group length attributes	For trouble shooting purposes	No

- The Basic Worklist Management services may be configured for one node only.
- A worklist query can be configured in two ways:
 - MR System requests one worklist: for today till tomorrow
 - MR System requests two worklists: one for today and one for tomorrow (default)
 This is configurable through the parameter 'Split multiple day range'.
- The MPPS service may be configured for one node only.
- If IsArchive is set to Yes then the following statements apply:
 - Only complete series can be sent;
 - Storage commitment will be enabled;
 - A committed image will be marked in the Patient Administration UI with "archive" flag set;
 - Query filter must be specified and applied.
- The MR System can autopush MR images to the selected remote application. Whether or not to autopush a scan is defined in the scan protocol.

4.4.2.3. Print Configuration

Configurable per MR System installation:

- The DICOM printers to be selected by the operator.

Configurable for each defined DICOM printer:

All relevant DICOM printers are defined through selection of one of the available preconfigured templates. Each defined DICOM printer can be fine-tuned (if necessary) through several configurable parameters.

The following list shows all the configurable printer parameters. Depending on the type of printer not all parameters may be present.

- Medium type
- Film formats
- Destination
- Photometric Interpretation
- Film size ID
- Orientation
- Magnification
- Smoothing
- Border density
- Empty image density
- Min. density

-
- Max. density
 - Trim
 - Configuration Info
 - Polarity

The MR System can print to only one DICOM printer at a time.

5. MEDIA INTERCHANGE

5.1. Implementation Model

5.1.1. Application Data Flow Diagram

Figure 15 shows the application data flow diagram presenting all of the Application Entities present in an implementation and graphically depicting the relationship of the AE's use of DICOM to Real-World Activities.

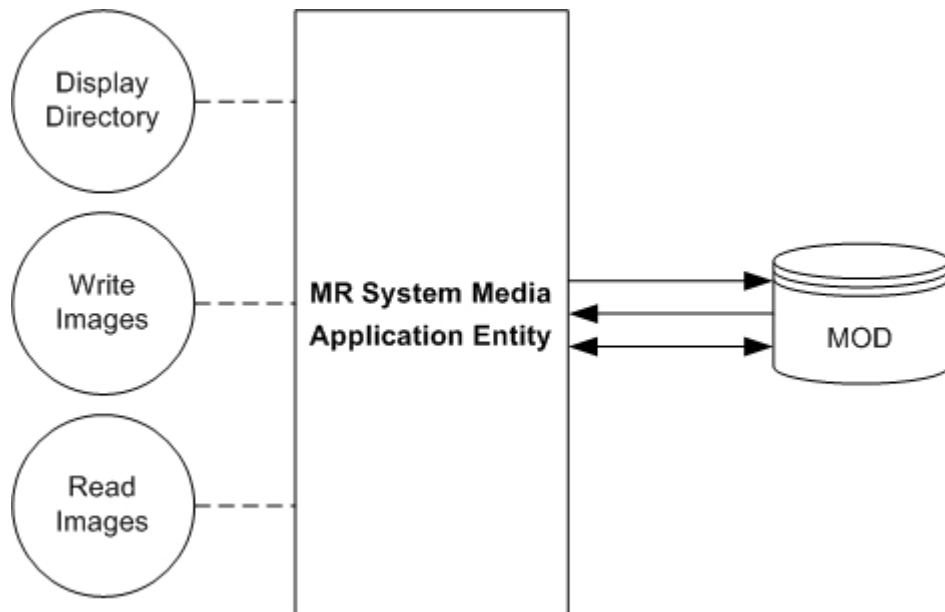


Figure 15: Application Data Flow Diagram

5.1.2. Functional Definitions of AE's

This section describes in general terms the functions to be performed by the AE, and the DICOM services used to accomplish these functions.

5.1.2.1. Functional Definition of the Media AE

The Media AE is the one and only Media application entity within the MR System. It includes the following service class.

Media Storage Service Class

The Media AE can perform the Media Storage service as SCU, with capabilities for RWA Display Directory (as FSR), RWA Write Images (as FSC/FSU), and RWA Read Images (as FSR).

Using an initialized MOD, Write Images can be initiated by selecting the requested images and clicking the media copy button.

5.1.3. Sequencing of Real World Activities

Whenever an MOD has to be written the Media AE first tries to read the DicomDIR. Then the Media AE will write the images of the selected Examinations and the updated DicomDIR to the DICOM media.

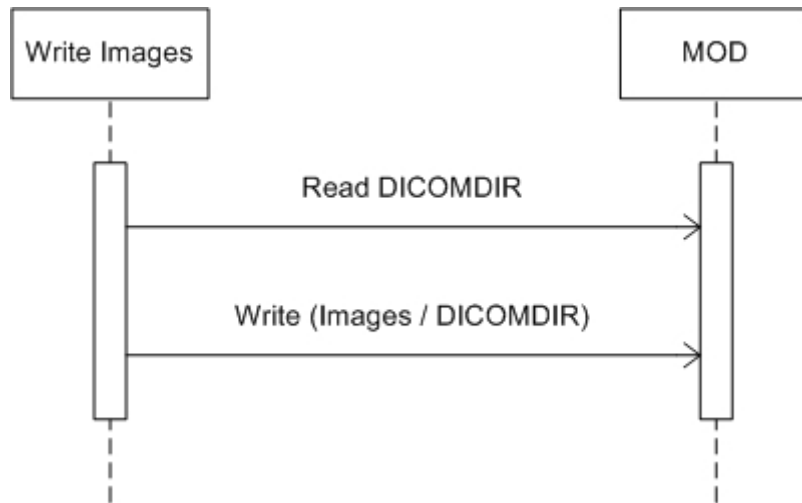


Figure 16: Sequencing of Media Write

5.1.4. File Meta Information for Implementation Class and Version

The following values are assigned to the File Meta Information attributes (see PS 3.10) that pertain to the Implementation Class and Version.

Table 60: DICOM Implementation Class and Version for MR System

File Meta Information Version	00, 01
Implementation Class UID	1.3.46.670589.11.0.0.51.4.3.0
Implementation Version Name	MR DICOM 3.0

5.2. AE Specifications

5.2.1. Media AE

The following table lists the Application Profiles and their Real-World Activities, the roles required for each of these Real-World Activities, and the Service Class option.

Table 61: AE Related Application Profiles, Real-World Activities, and Roles

Supported Application Profile	Real-World Activity	Roles	SC Option
AUG-CTMR-MOD23	Display Directory	FSR	Interchange
	Write Images	FSC, FSU	Interchange
	Read Images	FSR	Interchange
AUG-CTMR-MOD41	Display Directory	FSR	Interchange
	Write Images	FSC, FSU	Interchange
	Read Images	FSR	Interchange

The next table gives an overview of the supported SOP Classes that can be read and written according the Application Profiles in Table 61.

Table 62: Supported SOP Classes by the Media AE

SOP Class	
Name	UID
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1
Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2

Note that the Grayscale Softcopy Presentation State object is not in the application profile but is written as an additional SOP class (extended Application profile).

5.2.1.1. File Meta Information for the Media AE

The Media AE has no specific File Meta Information.

5.2.1.2. Real-World Activities

5.2.1.2.1. Display Directory

The Media AE supports the FSR role to interchange stored data on DICOM media.

5.2.1.2.1.1. Media Storage Application Profiles

The Media AE will act as a FSR when reading the directory of DICOM media. This will result in an overview of the Examinations on the MR System Patient Administration.

5.2.1.2.2. Write Images

5.2.1.2.2.1. Media Storage Application Profile

The Media AE supports the FSC role to interchange stored data on DICOM media.

The Media AE will act as a FSC when writing all images of the selected Examinations onto DICOM media.

5.2.1.2.2.1.1. Options

The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, a generated dummy value will be filled in.

Implementation remarks and restriction:

- When writing the DICOMDIR records the following key values are generated if no value of the corresponding attribute is supplied:
 - Patient ID;
 - Study ID;
 - Study Instance UID;
 - Series Number;
 - Series Instance UID;
 - Image Number;
 - SOP Instance UID.
- The mechanism of generating a value for Patient ID creates each time a new value based on Patient's Name for each new study written to DICOM media, even if this study belongs to a patient recorded earlier.
- The default value for the Pixel Intensity Relationship (0028,1040) is set to DISP.

- A number of attributes (e.g., Window Width and Window Centre) can be formatted as floating point numbers.

5.2.1.2.3. Read Images

The Media AE supports the FSR role to interchange stored data on DICOM media.

5.2.1.2.3.1. Media Storage Application Profiles

The MR System Media AE will act as a FSR when reading all images of the selected Examinations from DICOM media. Only images made on an MR System are allowed to be imported again; these imported images are to be used for reference only, it is not intended to export them again.

5.2.1.2.3.1.1. Options

The mandatory attributes of the DICOM images are required for the correct storage of the images in the MR System internal image database. For conformance see section 8.

5.3. Augmented and Private Application Profiles

This section describes any augmented and private Application Profiles.

5.3.1. Augmented Application Profiles

5.3.1.1. Augmented Application Profile AUG-CTMR-MOD23

5.3.1.1.1. SOP Class Augmentations

As an augmentation to the STD-CTMR-MOD23 application profiles, also grayscale softcopy presentation state and private objects shall be interchanged per MOD.

5.3.1.1.2. Directory Augmentations

Not applicable.

5.3.1.1.3. Other Augmentations

Not applicable.

5.3.1.2. Augmented Application Profile AUG-CTMR-MOD41

5.3.1.2.1. SOP Class Augmentations

As an augmentation to the STD-CTMR-MOD41 application profiles, also grayscale softcopy presentation state and private objects shall be interchanged per MOD.

5.3.1.2.2. Directory Augmentations

Not applicable.

5.3.1.2.3. Other Augmentations

Not applicable.

5.3.2. Private Application Profiles

Not applicable.

5.4. Media Configuration

Not applicable.

6. SUPPORT OF CHARACTER SETS

The MR System supports the following character sets.

Table 63: Supported Character Sets of the MR System

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859
	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/01	ISO-IR 100	G1	Supplementary set of ISO 8859
Japanese	ISO_IR 13	-	ISO-IR 13	G1	JIS X 0201: Katakana
		-	ISO-IR 14	G0	JIS X 0201: Romaji
	ISO 2022 IR 13	ESC 02/09 04/09	ISO-IR 13	G1	JIS X 0201: Katakana
		ESC 02/08 04/10	ISO-IR 14	G0	JIS X 0201: Romaji
	ISO 2022 IR 87	ESC 02/04 04/02	ISO-IR 87	G0	JIS X 0208: Kanji
	ISO 2022 IR 159	ESC 02/04 02/08 04/04	ISO-IR 159	G0	JIS X 0212: Supplementary Kanji set

Note that the MR System supports Japanese character sets only for use in the Patient's Name attribute (0010,0010).

Internally the MR System only uses Unicode characters. This implies that text will be displayed as Unicode too.

If the MR System receives a Specific Character Set that is not supported then the related association will be aborted.

However, if a RIS Worklist contains a Specific Character Set attribute that is not empty and not supported according Table 63 then the MR System will send a C-CANCEL request to the RIS and a "RIS ERROR" message will be displayed; the MR System will reject the RIS import.

The Print AE provides no support for extended character sets in the communication with DICOM SCP's.

7. SECURITY

7.1. Transport Layer Security (TLS)

Secure communication is a “mode of operation” of the MR System supported by the implementation of the Transport Layer Security (TLS). This functionality will be used by nodes that can authenticate each other before exchanging DICOM information over a secure connection.

For secure communication the TLS protocol v1.0 is used, providing message authentication, integrity, confidentiality, and replay protection. Confidentiality is optional and can be controlled by the encryption settings.

The MR System is capable of communicating using the following Cipher Suites:

- TLS_RSA_WITH_NULL_SHA (Node authentication without encryption);
- TLS_RSA_WITH_3DES_SHA (Node authentication with encryption).

7.2. Association Level Security

The MR System accepts associations only from known applications or an application whose “calling AE Title” is defined in its configuration file. The MR System will reject association requests from unknown applications, i.e. applications that offer an unknown “calling AE title”. An application entity (AE) is known if – and only if – it is defined during configuration of the MR System, which is done via the configuration application.

7.3. Application Level Security

The MR System allows the use of either conventional (non-secure) communication or secure communication based on the Transport Layer Security (TLS) protocol. If configured, the MR System supports security measures for:

- secure authentication of a node;
- integrity and confidentiality of transmitted data;
- replay protection;
- generation of audit trail records;
- access control and user authentication.

7.4. HIPAA

Among the list of HIPAA requirements to be supported the security mechanisms outlined below have been implemented.

Table 64: Security Mechanisms

Requirement	Implementation	Technical Solution
Access Control	Role-based access	The MR System system enables applications to provide access to functionality based on roles.
	User-based access	The MR System system protects files, applications, and other system resources from unauthorized use based on user roles.
	Encryption	The MR System system is capable of encrypting data prior to transmission using public key or private key encryption (over TLS) using TLS_RSA_WITH_3DES_SHA. It is also capable of secure communication without encryption (also over TLS) using TLS_RSA_WITH_NULL_SHA.
Audit Trail	-	The MR System system provides the ability to audit a variety of system and security events (logon, logoff, startscan, stopscan, etc.). In absence of a central syslog server these audit trail messages are logged locally. The syslog server can be configured via the configuration application of the MR System system.

Requirement	Implementation	Technical Solution
Data Authentication	-	The MR System system provides digital signatures in the form of digital certificates (Base-64 encoded X.509 certificates). For secure transmission the MR System system uses the standard TLS protocols to ensure message integrity.
Entity Authentication	Unique user identification	The number of users and their privileges are limited based on predefined user roles. In addition, the MR System system supports hardware dongle, SmartCard based user privilege allocation, and user authentication across a secure communications channel.
	Password	Requirements for MR System user passwords can be configured via the Group Policy management application. Options include minimum password length, maximum password age, password re-use, etc.
	Token	Windows 2000 operating system supports authentication via both hardware dongle and SmartCard.

8. ANNEXES

8.1. IOD Contents

8.1.1. Created SOP Instances

This section specifies each IOD created by the MR System Network AE.

Used abbreviations are:

For module Usage

ALWAYS	the module is always present
EMPTY	the (mandatory) module does not contain any attributes
MAYBE	the module is present under specified condition
NEVER	the module is not present
NOT	the module is not present for actual condition
OPTIONAL	the module may be available, depending on source object

For attribute Definition

The first value is about the presence of the attribute and the next value(s) tell something about the source. In case the source contains multiple values, then either one of these may be applicable depending on the use of the system.

Presence

1	conform (VT=1); the attribute shall be unconditionally present, always with value
1C	conform (VT=1C); the attribute shall be conditionally present, and then always with value (thus the attribute may be omitted from module due to condition)
2	conform (VT=2); the attribute shall be unconditionally present, either with or without value (thus possibly empty)
2C	conform (VT=2C); the attribute shall be conditionally present, and then either with or without value (thus possibly empty, and the attribute may be omitted from module due to condition)
2E	the attribute shall be unconditionally present, always empty
2CE	the attribute shall be conditionally present, and then always empty (thus the attribute may be omitted from module due to condition)

Note that the condition applies on the presence of the attribute in the module; it does not apply to the presence of a value for the attribute! For the value the "E" "condition" in "2E" and "2CE" is included; this "E" states that the attribute (if present) per definition shall be empty; otherwise the presence of the value is undefined (i.e. "2" or "2C"). The abbreviation "1" specifies that the attribute value shall always be present at all times (i.e. when the attribute itself is present) – this rounds off the definitions for presence.

Source

AUTO	the attribute value is generated automatically
CONF	the attribute value source is a configurable parameter
IMPL	the attribute value source is a user-implicit setting
MPPS	the attribute value source is a modality performed procedure step
MWL	the attribute value source is a modality worklist
SPEC	the attribute value source is a specific DICOM object
USER	the attribute value source is explicit user input

8.1.1.1. **Magnetic Resonance Image Storage SOP Class**

Table 65: Modules of the Magnetic Resonance Image Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient	ALWAYS
	Patient Medical	ALWAYS
Study	General Study	ALWAYS
	Patient Study	ALWAYS
	Study Classification	ALWAYS
	Study Scheduling	ALWAYS
	Requested Procedure	ALWAYS
	Imaging Service Request	ALWAYS
	Performed Procedure Step Information	ALWAYS
	General Series	ALWAYS
Frame of Reference	Frame of Reference	ALWAYS
Equipment	General Equipment	ALWAYS
Image	General Image	ALWAYS
	Image Plane	ALWAYS
	Image Pixel	ALWAYS
	MR Image	ALWAYS
	Overlay Plane	MAYBE, not if Presentation State objects are supported
	Modality LUT	MAYBE, not for combined MR rescaling
	VOI LUT	ALWAYS
	SOP Common	ALWAYS
	Private Group	MAYBE, not for pure DICOM images

Table 66: Created Magnetic Resonance Image Storage SOP Class Attributes

Name	Tag	VR	Definition	Comment
Patient Module				
Patient's Name	0010,0010	PN	1, MWL / USER	-
Patient ID	0010,0020	LO	1, MWL / USER	-
Patient's Birth Date	0010,0030	DA	1, MWL / USER	-
Patient's Sex	0010,0040	CS	1, MWL / USER	Applied Value(s): F, M, O
Ethnic Group	0010,2160	SH	2, MWL / USER	-
Patient Comments	0010,4000	LT	2, MWL	-
Patient Medical Module				
Medical Alerts	0010,2000	LO	2, MWL / USER	-
Contrast Allergies	0010,2110	LO	2, MWL / USER	-
Additional Patient History	0010,21B0	LT	2, MWL	-
Pregnancy Status	0010,21C0	US	2, MWL / USER	Applied Value(s): 0001, 0002, 0003, 0004
Special Needs	0038,0050	LO	2, MWL	-
Patient State	0038,0500	LO	2, MWL	-
General Study Module				
Study Date	0008,0020	DA	1, AUTO / MWL	-

Name	Tag	VR	Definition	Comment
Study Time	0008,0030	TM	1, AUTO / MWL	-
Accession Number	0008,0050	SH	1, AUTO / MWL / USER	-
Referring Physician's Name	0008,0090	PN	2, MWL / USER	-
Study Description	0008,1030	LO	2, MWL / USER	-
Procedure Code Sequence	0008,1032	SQ	1C, MWL / USER	If not empty.
>Code Value	0008,0100	SH	1, MWL / USER	-
>Coding Scheme Designator	0008,0102	SH	1, MWL / USER	-
>Coding Scheme Version	0008,0103	SH	1C, MWL / USER	-
>Code Meaning	0008,0104	LO	1, MWL / USER	-
>Context Group Local Version	0008,0107	DT	1C, MWL	-
>Code Set Extension Flag	0008,010B	CS	1, MWL	Applied Value(s): N, Y
>Code Set Extension Creator UID	0008,010D	UI	1C, MWL	-
Referenced Study Sequence	0008,1110	SQ	1C, MWL	If received from RIS.
>Referenced SOP Class UID	0008,1150	UI	1, AUTO / MWL	-
>Referenced SOP Instance UID	0008,1155	UI	1, AUTO / MWL	-
Study Instance UID	0020,000D	UI	1, AUTO / MWL	-
Study ID	0020,0010	SH	2, AUTO / MWL	-
Patient Study Module				
Admitting Diagnoses Description	0008,1080	LO	2, MWL	-
Patient's Weight	0010,1030	DS	1, MWL / USER	-
Occupation	0010,2180	SH	2, MWL	-
Study Classification Module				
Study Comments	0032,4000	LT	2, MPPS	-
Study Scheduling Module				
Requesting Physician	0032,1032	PN	2, MWL	-
Requesting Service	0032,1033	LO	2, MWL	-
Requested Procedure Description	0032,1060	LO	2, MWL	-
Requested Contrast Agent	0032,1070	LO	2, MWL	-
Requested Procedure Module				
Requested Procedure ID	0040,1001	SH	2, MWL	-
Reason for the Requested Procedure	0040,1002	LO	2, MWL	-
Requested Procedure Priority	0040,1003	SH	2, MWL	Applied Value(s): HIGH, LOW, MEDIUM, ROUTINE, STAT
Patient Transport Arrangements	0040,1004	LO	2, MWL	-
Requested Procedure Location	0040,1005	LO	2, MWL	-
Requested Procedure Comments	0040,1400	LT	2, MWL	-
Imaging Service Request Module				
Reason for the Imaging Service Request	0040,2001	LO	2, MWL	-
Issue Date of Imaging Service Request	0040,2004	DA	2, MWL	-
Issue Time of Imaging Service Request	0040,2005	TM	2, MWL	-
Order Enterer's Location	0040,2009	SH	2, MWL	-

Name	Tag	VR	Definition	Comment
Order Callback Phone Number	0040,2010	SH	2, MWL	-
Imaging Service Request Comments	0040,2400	LT	2, MWL	-
Performed Procedure Step Information Module				
Performed Station AE Title	0040,0241	AE	1, CONFIG	-
Performed Station Name	0040,0242	SH	2, CONFIG	-
Performed Location	0040,0243	SH	2, CONFIG	-
Performed Procedure Step End Date	0040,0250	DA	2, AUTO	-
Performed Procedure Step End Time	0040,0251	TM	2, AUTO	-
Performed Procedure Step Status	0040,0252	CS	1, IMPL	Applied Value(s): COMPLETED, DISCONTINUED, IN PROGRESS
Performed Procedure Type Description	0040,0255	LO	2, IMPL	-
General Series Module				
Series Date	0008,0021	DA	1, AUTO	-
Series Time	0008,0031	TM	1, AUTO	-
Modality	0008,0060	CS	1, AUTO	Applied Value(s): MR
Series Description	0008,103E	LO	2, AUTO	Contains Sub-anatomy and Scan name
Operator's Name	0008,1070	PN	2E, AUTO	-
Referenced Study Component Sequence	0008,1111	SQ	1, AUTO	-
>Specific Character Set	0008,0005	CS	1, SPEC	Applied Value(s): ISO_IR 13, ISO_IR 100, ISO 2022 IR 13, ISO 2022 IR 87, ISO 2022 IR 100, ISO 2022 IR 159
>Instance Creation Date	0008,0012	DA	1, AUTO	-
>Instance Creation Time	0008,0013	TM	1, AUTO	-
>Instance Creator UID	0008,0014	UI	1, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1, MPPS	Applied Value(s): 1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	0008,1155	UI	1, MPPS	-
>Instance Number	0020,0013	IS	1, AUTO	-
Body Part Examined	0018,0015	CS	2, AUTO	Applied Value(s): ABDOMEN, ANKLE, BREAST, CHEST, CLAVICLE, COCCYX, CSPINE, ELBOW, EXTREMITY, FOOT, HAND, HIP, KNEE, LSPINE, PELVIS, SHOULDER, SKULL, SSPINE, TSPINE
Protocol Name	0018,1030	LO	1, USER	Scan name.
Patient Position	0018,5100	CS	1, AUTO	-
Series Instance UID	0020,000E	UI	1, AUTO	Generated by Intera Achieva system.
Series Number	0020,0011	IS	1, AUTO	Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number.
Laterality	0020,0060	CS	2C, USER	-

Name	Tag	VR	Definition	Comment
Performed Procedure Step Start Date	0040,0244	DA	1, MPPS	-
Performed Procedure Step Start Time	0040,0245	TM	1, MPPS	-
Performed Procedure Step ID	0040,0253	SH	1, AUTO	-
Performed Procedure Step Description	0040,0254	LO	2, MWL / USER	-
Performed Action Item Code Sequence	0040,0260	SQ	2, MWL / USER	Filled if scheduled, otherwise empty.
>Code Value	0008,0100	SH	1, MWL / USER	-
>Coding Scheme Designator	0008,0102	SH	1, MWL / USER	-
>Coding Scheme Version	0008,0103	SH	1C, MWL / USER	-
>Code Meaning	0008,0104	LO	1, MWL / USER	-
>Mapping Resource	0008,0105	CS	1C, MWL	-
>Context Group Version	0008,0106	DT	1C, MWL	-
>Context Group Local Version	0008,0107	DT	1C, MWL	-
>Code Set Extension Flag	0008,010B	CS	1, MWL	Applied Value(s): N, Y
>Private Coding Scheme Creator UID	0008,010C	UI	2E, AUTO	-
>Code Set Extension Creator UID	0008,010D	UI	1C, MWL	-
>Context Identifier	0008,010F	CS	2, MWL	-
Request Attributes Sequence	0040,0275	SQ	2, MWL	-
>Scheduled Procedure Step Description	0040,0007	LO	2, MWL	-
>Scheduled Procedure Step ID	0040,0009	SH	1, MWL	-
>Requested Procedure ID	0040,1001	SH	1, MWL	-
Comments on the Performed Procedure Steps	0040,0280	ST	2, MWL / USER	-
Frame of Reference Module				
Frame of Reference UID	0020,0052	UI	1, AUTO	-
Position Reference Indicator	0020,1040	LO	2E, AUTO	-
General Equipment Module				
Manufacturer	0008,0070	LO	1, AUTO / CONF	Applied Value(s): Philips Medical Systems
Institution Name	0008,0080	LO	1, CONF	Configured on the system.
Station Name	0008,1010	SH	1, CONF	Same as the Host Name.
Institutional Department Name	0008,1040	LO	2, AUTO	-
Manufacturer's Model Name	0008,1090	LO	1, AUTO	Applied Value(s): Achieva, Intera, Panorama 1.0T
Device Serial Number	0018,1000	LO	1, AUTO	System serial number.
Software Version(s)	0018,1020	LO	1, AUTO	The release text of the original Image.
General Image Module				
Acquisition Date	0008,0022	DA	1, AUTO	Copy of Content Date.
Content Date	0008,0023	DA	1, AUTO	-
Acquisition Time	0008,0032	TM	1, AUTO	Copy of Content Time.
Content Time	0008,0033	TM	1, AUTO	-
Referenced Image Sequence	0008,1140	SQ	2, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1, IMPL	-
>Referenced SOP Instance UID	0008,1155	UI	1, IMPL	-
Acquisition Number	0020,0012	IS	1, AUTO	Scan Number.
Instance Number	0020,0013	IS	1, AUTO	-
Patient Orientation	0020,0020	CS	2C, AUTO	-

Name	Tag	VR	Definition	Comment
Image Comments	0020,4000	LT	2E, AUTO	-
Lossy Image Compression	0028,2110	CS	1, AUTO	Applied Value(s): 00
Image Plane Module				
Slice Thickness	0018,0050	DS	1, AUTO	-
Image Position (Patient)	0020,0032	DS	1, AUTO	-
Image Orientation (Patient)	0020,0037	DS	1, AUTO	-
Slice Location	0020,1041	DS	1, AUTO	-
Pixel Spacing	0028,0030	DS	1, AUTO	-
Image Pixel Module				
Planar Configuration	0028,0006	US	1C, AUTO	-
Rows	0028,0010	US	1, AUTO	-
Columns	0028,0011	US	1, AUTO	-
Pixel Aspect Ratio	0028,0034	IS	1, AUTO	Applied Value(s): (1,1)
Bits Stored	0028,0101	US	1, SPEC	-
High Bit	0028,0102	US	1, SPEC	-
Pixel Representation	0028,0103	US	1, AUTO	-
Pixel Data	7FE0,0010	OW	1, SPEC	-
MR Image Module				
Image Type	0008,0008	CS	1, AUTO	-
Scanning Sequence	0018,0020	CS	1, AUTO	-
Sequence Variant	0018,0021	CS	1, AUTO	-
Scan Options	0018,0022	CS	2, IMPL	-
MR Acquisition Type	0018,0023	CS	1, AUTO	-
Sequence Name	0018,0024	SH	1, AUTO	User defined name for the Scanning Sequence (0018,0020) and Sequence Variant (0018,0021) combination.
Repetition Time	0018,0080	DS	1C, IMPL / USER	-
Echo Time	0018,0081	DS	1, IMPL / USER	-
Inversion Time	0018,0082	DS	1C, IMPL / USER	-
Number of Averages	0018,0083	DS	1, IMPL / USER	-
Imaging Frequency	0018,0084	DS	1, CONF	-
Imaged Nucleus	0018,0085	SH	1, IMPL	-
Echo Number(s)	0018,0086	IS	2, IMPL	-
Magnetic Field Strength	0018,0087	DS	2, CONF	-
Spacing Between Slices	0018,0088	DS	1, IMPL / USER	-
Number of Phase Encoding Steps	0018,0089	IS	2, IMPL / USER	-
Echo Train Length	0018,0091	IS	2, IMPL / USER	-
Percent Sampling	0018,0093	DS	2, IMPL / USER	-
Percent Phase Field of View	0018,0094	DS	2, IMPL / USER	-
Trigger Time	0018,1060	DS	2C, IMPL / USER	-
Low R-R Value	0018,1081	IS	2C, IMPL	-
High R-R Value	0018,1082	IS	2C, IMPL	-
Intervals Acquired	0018,1083	IS	1C, IMPL	-
Intervals Rejected	0018,1084	IS	2C, IMPL	-

Name	Tag	VR	Definition	Comment
Heart Rate	0018,1088	IS	2C, IMPL / USER	-
Trigger Window	0018,1094	IS	2C, IMPL	-
Reconstruction Diameter	0018,1100	DS	2, CONF	-
Receiving Coil	0018,1250	SH	1, IMPL / USER	-
Transmitting Coil	0018,1251	SH	1, IMPL / USER	-
Acquisition Matrix	0018,1310	US	2, IMPL	-
In-plane Phase Encoding Direction	0018,1312	CS	2, IMPL	-
Flip Angle	0018,1314	DS	2, IMPL / USER	-
Temporal Position Identifier	0020,0100	IS	2, IMPL	-
Number of Temporal Positions	0020,0105	IS	2, IMPL / USER	-
Samples per Pixel	0028,0002	US	1, AUTO	Applied Value(s): 1
Photometric Interpretation	0028,0004	CS	1, AUTO	Applied Value(s): MONOCHROME2
Bits Allocated	0028,0100	US	1, AUTO	Applied Value(s): 16
Overlay Plane Module				
Overlay Rows	6000,0010	US	1, AUTO	-
Overlay Columns	6000,0011	US	1, AUTO	-
Overlay Description	6000,0022	LO	2E, AUTO	-
Overlay Type	6000,0040	CS	1, AUTO	Applied Value(s): G, R
Overlay Subtype	6000,0045	LO	2E, AUTO	-
Overlay Origin	6000,0050	SS	1, AUTO	-
Overlay Bits Allocated	6000,0100	US	1, AUTO	Applied Value(s): 1
Overlay Bit Position	6000,0102	US	1, AUTO	Applied Value(s): 0
ROI Area	6000,1301	IS	2E, AUTO	-
ROI Mean	6000,1302	DS	2E, AUTO	-
ROI Standard Deviation	6000,1303	DS	2E, AUTO	-
Overlay Label	6000,1500	LO	2E, AUTO	-
Overlay Data	6000,3000	OW	1, AUTO	-
Modality LUT Module				
Rescale Intercept	0028,1052	DS	1, AUTO	-
Rescale Slope	0028,1053	DS	1, AUTO	-
Rescale Type	0028,1054	LO	1, AUTO	Applied Value(s): cm/sec, milliradians, milliseconds, mm ² /sec, normalized, seconds, US
VOI LUT Module				
Window Center	0028,1050	DS	1, AUTO	-
Window Width	0028,1051	DS	1, AUTO	-
SOP Common Module				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 13, ISO_IR 100, ISO 2022 IR 13, ISO 2022 IR 87, ISO 2022 IR 100, ISO 2022 IR 159
Instance Creation Date	0008,0012	DA	1, AUTO	-
Instance Creation Time	0008,0013	TM	1, AUTO	-
Instance Creator UID	0008,0014	UI	1, AUTO	-
SOP Class UID	0008,0016	UI	1, AUTO	Applied Value(s): 1.2.840.10008.5.1.4.1.1.4

Name	Tag	VR	Definition	Comment
SOP Instance UID	0008,0018	UI	1, AUTO	-
Private Group				
Private Creator Group 2001	2001,0010	LO	1, AUTO	-
Chemical Shift	2001,1001	FL	2C, USER	Only applicable for spectro 2dsi.
Chemical Shift Number MR	2001,1002	IS	2C, IMPL	Only applicable for spectro 2dsi.
Diffusion B-Factor	2001,1003	FL	2C, USER	Only applicable for diffusion scans.
Diffusion Direction	2001,1004	CS	2C, USER	Only applicable for diffusion scans.
Image Enhanced	2001,1006	CS	2, IMPL / USER	-
Image Type ED ES	2001,1007	CS	2, IMPL / USER	-
Phase Number	2001,1008	IS	1, IMPL	When cardiac synchronization used.
Slice Number MR	2001,100A	IS	1, IMPL	-
Diffusion Echo Time	2001,1011	FL	2C, IMPL	Only applicable for diffusion scans.
Dynamic Series	2001,1012	CS	2, USER	-
EPI Factor	2001,1013	SL	1, IMPL / USER	Default value is 1.
Number of Echoes	2001,1014	SL	2, USER	-
Number of Locations	2001,1015	SS	2, IMPL / USER	-
Number of PC Directions	2001,1016	SS	2, USER	-
Number of Phases MR	2001,1017	SL	2, IMPL / USER	-
Number of Slices MR	2001,1018	SL	2, IMPL / USER	-
Partial Matrix Scanned	2001,1019	CS	2, IMPL / USER	-
PC Velocity	2001,101A	FL	1, IMPL / USER	Default value is 0.
Prepulse Delay	2001,101B	FL	2, IMPL / USER	-
Prepulse Type	2001,101C	CS	2, USER	-
Reconstruction Number MR	2001,101D	IS	2, IMPL	-
Respiration Sync	2001,101F	CS	2, USER	-
SPIR	2001,1021	CS	2, USER	-
Water Fat Shift	2001,1022	FL	2, IMPL / USER	-
Flip Angle Philips	2001,1023	DS	1, IMPL / USER	-
Number of Stacks	2001,1060	SL	2, USER	-
Number of Dynamic Scans	2001,1081	IS	2, IMPL / USER	-
Acquisition Number	2001,107B	IS	1, IMPL	-
Private Creator Group 2005	2005,0010	LO	1, AUTO	-
Number of Chemical Shift	2005,1020	SL	2C, USER	Only applicable for spectro 2dsi.
Syncra Scan Type	2005,10A1	CS	2C, USER	If syncra scan. Applied Value(s): SENSE, SYN_CLASSIC, SYN_COCA

8.1.1.2. Secondary Capture Image Storage SOP Class

Table 67: Modules of the Secondary Capture Image Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient	ALWAYS
	Patient Medical	ALWAYS
Study	General Study	ALWAYS
	Patient Study	ALWAYS
Series	General Series	ALWAYS
Equipment	General Equipment	ALWAYS
	SC Equipment	ALWAYS
Image	General Image	ALWAYS
	Image Pixel	ALWAYS
	SC Image	ALWAYS
	Overlay Plane	ALWAYS
	SOP Common	ALWAYS

Table 68: Created Secondary Capture Image Storage SOP Class Attributes

Name	Tag	VR	Definition	Comment
Patient Module				
Patient's Name	0010,0010	PN	1, SPEC	-
Patient ID	0010,0020	LO	1, SPEC	-
Patient's Birth Date	0010,0030	DA	1, SPEC	-
Patient's Sex	0010,0040	CS	1, SPEC	Applied Value(s): F, M, O
Ethnic Group	0010,2160	SH	2, SPEC	-
Patient Comments	0010,4000	LT	2, SPEC	-
Patient Medical Module				
Medical Alerts	0010,2000	LO	2, SPEC	-
Contrast Allergies	0010,2110	LO	2, SPEC	-
Additional Patient History	0010,21B0	LT	2, SPEC	-
Pregnancy Status	0010,21C0	US	2, SPEC	Applied Value(s): 0001, 0002, 0003, 0004
Special Needs	0038,0050	LO	2, SPEC	-
Patient State	0038,0500	LO	2, SPEC	-
General Study Module				
Study Date	0008,0020	DA	1, SPEC	-
Study Time	0008,0030	TM	1, SPEC	-
Accession Number	0008,0050	SH	1, SPEC	-
Referring Physician's Name	0008,0090	PN	2, SPEC	-
Study Description	0008,1030	LO	2, SPEC	-
Procedure Code Sequence	0008,1032	SQ	1C, SPEC	If present in original study.
>Code Value	0008,0100	SH	1, SPEC	-
>Coding Scheme Designator	0008,0102	SH	1, SPEC	-
>Coding Scheme Version	0008,0103	SH	1C, SPEC	-
>Code Meaning	0008,0104	LO	1, SPEC	-
>Context Group Local Version	0008,0107	DT	1C, SPEC	-
>Code Set Extension Flag	0008,010B	CS	1, SPEC	Applied Value(s): N, Y
>Code Set Extension Creator UID	0008,010D	UI	1C, SPEC	-
Referenced Study Sequence	0008,1110	SQ	1C, SPEC	If present in original study.
>Referenced SOP Class UID	0008,1150	UI	1, SPEC	-
>Referenced SOP Instance UID	0008,1155	UI	1, SPEC	-

Name	Tag	VR	Definition	Comment
Study Instance UID	0020,000D	UI	1, SPEC	-
Study ID	0020,0010	SH	2, SPEC	-
Patient Study Module				
Admitting Diagnoses Description	0008,1080	LO	2, SPEC	-
Patient's Weight	0010,1030	DS	1, SPEC	-
Occupation	0010,2180	SH	2, SPEC	-
General Series Module				
Series Date	0008,0021	DA	1, AUTO	-
Series Time	0008,0031	TM	1, AUTO	-
Series Description	0008,103E	LO	2, AUTO	-
Performing Physician's Name	0008,1050	PN	2, USER	-
Operator's Name	0008,1070	PN	2E, AUTO	-
Referenced Study Component Sequence	0008,1111	SQ	1, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1, AUTO	-
>Referenced SOP Instance UID	0008,1155	UI	1, AUTO	-
Body Part Examined	0018,0015	CS	1, SPEC	Applied Value(s): ABDOMEN, ANKLE, BREAST, CHEST, CLAVICLE, COCCYX, CSPINE, ELBOW, EXTREMITY, FOOT, HAND, HIP, KNEE, LSPINE, PELVIS, SHOULDER, SKULL, SSPINE, TSPINE
Protocol Name	0018,1030	LO	1, SPEC	-
Patient Position	0018,5100	CS	1, SPEC	-
Series Instance UID	0020,000E	UI	1, AUTO	-
Series Number	0020,0011	IS	1, AUTO	-
Laterality	0020,0060	CS	2C, SPEC	-
Performed Procedure Step Start Date	0040,0244	DA	1, SPEC	-
Performed Procedure Step Start Time	0040,0245	TM	1, SPEC	-
Performed Procedure Step ID	0040,0253	SH	1, SPEC	-
Performed Procedure Step Description	0040,0254	LO	2, SPEC	-
Performed Action Item Code Sequence	0040,0260	SQ	2, SPEC	-
>Code Value	0008,0100	SH	1, SPEC	-
>Coding Scheme Designator	0008,0102	SH	1, SPEC	-
>Coding Scheme Version	0008,0103	SH	1C, SPEC	-
>Code Meaning	0008,0104	LO	1, SPEC	-
>Context Group Local Version	0008,0107	DT	1C, SPEC	-
>Code Set Extension Flag	0008,010B	CS	1, SPEC	Applied Value(s): N, Y
>Code Set Extension Creator UID	0008,010D	UI	1C, SPEC	-
Request Attributes Sequence	0040,0275	SQ	2, SPEC	-
>Scheduled Procedure Step Description	0040,0007	LO	2, SPEC	-
>Scheduled Procedure Step ID	0040,0009	SH	1, SPEC	-
>Requested Procedure ID	0040,1001	SH	1, SPEC	-
Comments on the Performed Procedure Steps	0040,0280	ST	2, SPEC	-
General Equipment Module				
Manufacturer	0008,0070	LO	1, CONF	Applied Value(s): Philips Medical Systems
Institution Name	0008,0080	LO	1, CONF	-
Station Name	0008,1010	SH	1, CONF	-
Institutional Department Name	0008,1040	LO	2, AUTO	-

Name	Tag	VR	Definition	Comment
Manufacturer's Model Name	0008,1090	LO	1, AUTO	Applied Value(s): Achieva, Intera, Panorama 1.0T
Device Serial Number	0018,1000	LO	1, AUTO	-
Software Version(s)	0018,1020	LO	1, AUTO	-
SC Equipment Module				
Modality	0008,0060	CS	1, AUTO	Applied Value(s): MR
Conversion Type	0008,0064	CS	1, AUTO	Applied Value(s): WSD
Secondary Capture Device ID	0018,1010	LO	2, AUTO	-
Secondary Capture Device Manufacturer	0018,1016	LO	2, AUTO	-
Secondary Capture Device Manufacturer's Model Name	0018,1018	LO	2, AUTO	-
Secondary Capture Device Software Version(s)	0018,1019	LO	2, AUTO	-
Video Image Format Acquired	0018,1022	SH	2, AUTO	-
Digital Image Format Acquired	0018,1023	LO	2, AUTO	-
General Image Module				
Image Type	0008,0008	CS	1, AUTO	-
Content Date	0008,0023	DA	1, AUTO	-
Content Time	0008,0033	TM	1, AUTO	-
Acquisition Number	0020,0012	IS	1, AUTO	-
Instance Number	0020,0013	IS	1, AUTO	-
Patient Orientation	0020,0020	CS	2CE, AUTO	-
Image Comments	0020,4000	LT	2E, AUTO	-
Lossy Image Compression	0028,2110	CS	1, AUTO	Applied Value(s): 00
Image Pixel Module				
Samples per Pixel	0028,0002	US	1, AUTO	Applied Value(s): 1, 3
Photometric Interpretation	0028,0004	CS	1, IMPL	Applied Value(s): MONOCHROME2, RGB
Planar Configuration	0028,0006	US	1C, AUTO	-
Rows	0028,0010	US	1, AUTO	-
Columns	0028,0011	US	1, AUTO	-
Pixel Aspect Ratio	0028,0034	IS	1, AUTO	Applied Value(s): (1,1)
Bits Allocated	0028,0100	US	1, AUTO	-
Bits Stored	0028,0101	US	1, AUTO	-
High Bit	0028,0102	US	1, AUTO	-
Pixel Representation	0028,0103	US	1, AUTO	-
Pixel Data	7FE0,0010	OW	1, AUTO	-
SC Image Module				
Date of Secondary Capture	0018,1012	DA	2, AUTO	-
Time of Secondary Capture	0018,1014	TM	2, AUTO	-
Overlay Plane Module				
Overlay Rows	6000,0010	US	1, AUTO	-
Overlay Columns	6000,0011	US	1, AUTO	-
Overlay Description	6000,0022	LO	2E, AUTO	-
Overlay Type	6000,0040	CS	1, AUTO	Applied Value(s): G, R
Overlay Subtype	6000,0045	LO	2E, AUTO	-
Overlay Origin	6000,0050	SS	1, AUTO	-
Overlay Bits Allocated	6000,0100	US	1, AUTO	-
Overlay Bit Position	6000,0102	US	1, AUTO	-
ROI Area	6000,1301	IS	2E, AUTO	-
ROI Mean	6000,1302	DS	2E, AUTO	-
ROI Standard Deviation	6000,1303	DS	2E, AUTO	-

Name	Tag	VR	Definition	Comment
Overlay Label	6000,1500	LO	2E, AUTO	-
Overlay Data	6000,3000	OW	1, AUTO	-
SOP Common Module				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 13, ISO_IR 100, ISO 2022 IR 13, ISO 2022 IR 87, ISO 2022 IR 100, ISO 2022 IR 159
Instance Creation Date	0008,0012	DA	1, AUTO	-
Instance Creation Time	0008,0013	TM	1, AUTO	-
Instance Creator UID	0008,0014	UI	1, AUTO	-
SOP Class UID	0008,0016	UI	1, AUTO	Applied Value(s): 1.2.840.10008.5.1.4.1.1. 7
SOP Instance UID	0008,0018	UI	1, AUTO	-

8.1.1.3. Grayscale Softcopy Presentation State Storage SOP Class

Table 69: Modules of the Grayscale Softcopy Presentation State Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient	ALWAYS
	Patient Medical	ALWAYS
Study	General Study	ALWAYS
	Patient Study	ALWAYS
Series	General Series	ALWAYS
	Presentation Series	ALWAYS
Equipment	General Equipment	ALWAYS
Presentation State	Overlay Plane	MAYBE – Required if an Overlay is to be applied to referenced images
	Displayed Area	ALWAYS
	Graphic Annotation	MAYBE – Required if Graphic Annotations are to be applied to referenced images
	Spatial Transformation	MAYBE – Required if Rotation or Flipping are to be applied to referenced images
	Graphic Layer	ALWAYS
	Modality LUT	MAYBE – Required if a Modality LUT is to be applied to referenced images
	Softcopy Presentation LUT	ALWAYS
	Overlay/Curve Activation	ALWAYS
	Softcopy VOI LUT	ALWAYS
	Presentation State	ALWAYS
SOP Common	ALWAYS	

Table 70: Created Grayscale Softcopy Presentation State Storage SOP Class Attributes

Name	Tag	VR	Definition	Comment
Patient Module				
Patient's Name	0010,0010	PN	1, SPEC	-
Patient ID	0010,0020	LO	1, SPEC	-

Name	Tag	VR	Definition	Comment
Patient's Birth Date	0010,0030	DA	1, SPEC	-
Patient's Sex	0010,0040	CS	1, SPEC	Applied Value(s): F, M, O
Ethnic Group	0010,2160	SH	2, SPEC	-
Patient Comments	0010,4000	LT	2, SPEC	-
Patient Medical Module				
Medical Alerts	0010,2000	LO	2, SPEC	-
Contrast Allergies	0010,2110	LO	2, SPEC	-
Additional Patient History	0010,21B0	LT	2, SPEC	-
Pregnancy Status	0010,21C0	US	2, SPEC	Applied Value(s): 0001, 0002, 0003, 0004
Special Needs	0038,0050	LO	2, SPEC	-
Patient State	0038,0500	LO	2, SPEC	-
General Study Module				
Study Date	0008,0020	DA	1, SPEC	-
Study Time	0008,0030	TM	1, SPEC	-
Accession Number	0008,0050	SH	1, SPEC	-
Referring Physician's Name	0008,0090	PN	2, SPEC	-
Study Description	0008,1030	LO	2, SPEC	-
Procedure Code Sequence	0008,1032	SQ	1C, SPEC	If present in original study.
>Code Value	0008,0100	SH	1, SPEC	-
>Coding Scheme Designator	0008,0102	SH	1, SPEC	-
>Coding Scheme Version	0008,0103	SH	1C, SPEC	-
>Code Meaning	0008,0104	LO	1, SPEC	-
>Context Group Local Version	0008,0107	DT	1C, SPEC	-
>Code Set Extension Flag	0008,010B	CS	1, SPEC	Applied Value(s): N, Y
>Code Set Extension Creator UID	0008,010D	UI	1C, SPEC	-
Referenced Study Sequence	0008,1110	SQ	1C, SPEC	If present in original study.
>Referenced SOP Class UID	0008,1150	UI	1, SPEC	-
>Referenced SOP Instance UID	0008,1155	UI	1, SPEC	-
Study Instance UID	0020,000D	UI	1, SPEC	-
Study ID	0020,0010	SH	2, SPEC	-
Patient Study Module				
Admitting Diagnoses Description	0008,1080	LO	2, SPEC	-
Patient's Weight	0010,1030	DS	1, SPEC	-
Occupation	0010,2180	SH	2, SPEC	-
General Series Module				
Series Date	0008,0021	DA	1, AUTO	-
Series Time	0008,0031	TM	1, AUTO	-
Series Description	0008,103E	LO	2, AUTO	-
Operator's Name	0008,1070	PN	2E, AUTO	-
Referenced Study Component Sequence	0008,1111	SQ	1, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1, AUTO	-
>Referenced SOP Instance UID	0008,1155	UI	1, AUTO	-
Body Part Examined	0018,0015	CS	1, SPEC	Applied Value(s): ABDOMEN, ANKLE, BREAST, CHEST, CLAVICLE, COCCYX, CSPINE, ELBOW, EXTREMITY, FOOT, HAND, HIP, KNEE, LSPINE, PELVIS, SHOULDER, SKULL, SSPINE, TSPINE

Name	Tag	VR	Definition	Comment
Protocol Name	0018,1030	LO	1, SPEC	-
Patient Position	0018,5100	CS	1, SPEC	-
Series Instance UID	0020,000E	UI	1, AUTO	-
Series Number	0020,0011	IS	1, AUTO	-
Laterality	0020,0060	CS	2C, SPEC	-
Performed Procedure Step Start Date	0040,0244	DA	1, SPEC	-
Performed Procedure Step Start Time	0040,0245	TM	1, SPEC	-
Performed Procedure Step ID	0040,0253	SH	1, SPEC	-
Performed Procedure Step Description	0040,0254	LO	2, SPEC	-
Performed Action Item Code Sequence	0040,0260	SQ	2, SPEC	-
>Code Value	0008,0100	SH	1, SPEC	-
>Coding Scheme Designator	0008,0102	SH	1, SPEC	-
>Coding Scheme Version	0008,0103	SH	1C, SPEC	-
>Code Meaning	0008,0104	LO	1, SPEC	-
>Context Group Local Version	0008,0107	DT	1C, SPEC	-
>Code Set Extension Flag	0008,010B	CS	1, SPEC	Applied Value(s): N, Y
>Code Set Extension Creator UID	0008,010D	UI	1C, SPEC	-
Request Attributes Sequence	0040,0275	SQ	2, SPEC	-
>Scheduled Procedure Step Description	0040,0007	LO	2, SPEC	-
>Scheduled Procedure Step ID	0040,0009	SH	1, SPEC	-
>Requested Procedure ID	0040,1001	SH	1, SPEC	-
Comments on the Performed Procedure Steps	0040,0280	ST	2, SPEC	-
Presentation Series Module				
Modality	0008,0060	CS	1, AUTO	Applied Value(s): PR
General Equipment Module				
Manufacturer	0008,0070	LO	1, CONF	Applied Value(s): Philips Medical Systems
Institution Name	0008,0080	LO	1, CONF	-
Station Name	0008,1010	SH	1, CONF	Same as the Host Name.
Institutional Department Name	0008,1040	LO	2, AUTO	-
Manufacturer's Model Name	0008,1090	LO	1, AUTO	Applied Value(s): Achieva, Intera, Panorama 1.0T
Device Serial Number	0018,1000	LO	1, AUTO	-
Software Version(s)	0018,1020	LO	1, AUTO	-
Overlay Plane Module				
Overlay Rows	6000,0010	US	1, AUTO	-
Overlay Columns	6000,0011	US	1, AUTO	-
Overlay Description	6000,0022	LO	2E, AUTO	-
Overlay Type	6000,0040	CS	1, AUTO	Applied Value(s): G, R
Overlay Subtype	6000,0045	LO	2E, AUTO	-
Overlay Origin	6000,0050	SS	1, AUTO	-
Overlay Bits Allocated	6000,0100	US	1, AUTO	Applied Value(s): 1
Overlay Bit Position	6000,0102	US	1, AUTO	Applied Value(s): 0
ROI Area	6000,1301	IS	2E, AUTO	-
ROI Mean	6000,1302	DS	2E, AUTO	-
ROI Standard Deviation	6000,1303	DS	2E, AUTO	-
Overlay Label	6000,1500	LO	2E, AUTO	-
Overlay Data	6000,3000	OW	1, AUTO	-
Displayed Area Module				
Displayed Area Selection Sequence	0070,005A	SQ	1, IMPL	-
>Referenced Image Sequence	0008,1140	SQ	1C, IMPL	-

Name	Tag	VR	Definition	Comment
>>Referenced SOP Class UID	0008,1150	UI	1, IMPL	-
>>Referenced SOP Instance UID	0008,1155	UI	1, IMPL	-
>Displayed Area Top Left Hand Corner	0070,0052	SL	1, IMPL	-
>Displayed Area Bottom Right Hand Corner	0070,0053	SL	1, IMPL	-
>Presentation Size Mode	0070,0100	CS	1, IMPL	Applied Value(s): MAGNIFY, SCALE TO FIT
>Presentation Pixel Spacing	0070,0101	DS	1C, IMPL	Applied Value(s): (0.0, 0.0)
>Presentation Pixel Aspect Ratio	0070,0102	IS	1C, IMPL	Applied Value(s): (1, 1)
>Presentation Pixel Magnification Ratio	0070,0103	IS	1C, IMPL	Applied Value(s): 1.0
>Zoom Mode	2001,103F	CS	2, IMPL	-
Graphic Annotation Module				
Graphic Annotation Sequence	0070,0001	SQ	1, IMPL	-
>Referenced Image Sequence	0008,1140	SQ	1C, IMPL	-
>>Referenced SOP Class UID	0008,1150	UI	1, IMPL	-
>>Referenced SOP Instance UID	0008,1155	UI	1, IMPL	-
>Graphic Layer	0070,0002	CS	1, IMPL	-
>Text Object Sequence	0070,0008	SQ	1C, IMPL	-
>>Anchor Point Annotation Units	0070,0004	CS	1, IMPL	Applied Value(s): DISPLAY, PIXEL
>>Unformatted Text Value	0070,0006	ST	1, IMPL	-
>>Anchor Point	0070,0014	FL	1, IMPL	-
>>Anchor Point Visibility	0070,0015	CS	1, IMPL	Applied Value(s): N, Y
>Graphic Object Sequence	0070,0009	SQ	1C, IMPL	-
>>Graphic Annotation Units	0070,0005	CS	1, IMPL	Applied Value(s): DISPLAY, PIXEL
>>Graphic Dimensions	0070,0020	US	1, IMPL	Applied Value(s): 2
>>Number of Graphics Points	0070,0021	US	1, IMPL	-
>>Graphic Data	0070,0022	FL	1, IMPL	-
>>Graphic Type	0070,0023	CS	1, IMPL	Applied Value(s): CIRCLE, ELLIPSE, INTERPOLATED, POINT, POLYLINE
>>Graphic Filled	0070,0024	CS	1, IMPL	Applied Value(s): N, Y
Spatial Transformation Module				
Image Horizontal Flip	0070,0041	CS	1, IMPL	-
Image Rotation	0070,0042	US	1, IMPL	-
Graphic Layer Module				
Graphic Layer Sequence	0070,0060	SQ	1, IMPL	-
>Graphic Layer	0070,0002	CS	1, IMPL	-
>Graphic Layer Order	0070,0062	IS	1, IMPL	-
Modality LUT Module				
Rescale Intercept	0028,1052	DS	1, SPEC	-
Rescale Slope	0028,1053	DS	1, SPEC	-
Rescale Type	0028,1054	LO	1, SPEC	Applied Value(s): cm/sec, milliradians, milliseconds, mm^2/sec, normalized, seconds, US
Softcopy Presentation LUT Module				
Presentation LUT Shape	2050,0020	CS	1, AUTO	-
Overlay/Curve Activation Module				
Overlay Activation Layer	6000,1001	CS	1, AUTO	Applied Value(s): 1
Softcopy VOI LUT Module				
Softcopy VOI LUT Sequence	0028,3110	SQ	1, AUTO	-

Name	Tag	VR	Definition	Comment
>Referenced Image Sequence	0008,1140	SQ	1C, AUTO	-
>>Referenced SOP Class UID	0008,1150	UI	1, AUTO	-
>>Referenced SOP Instance UID	0008,1155	UI	1, AUTO	-
>Window Center	0028,1050	DS	1, AUTO	-
>Window Width	0028,1051	DS	1, AUTO	-
Presentation State Module				
Referenced Series Sequence	0008,1115	SQ	1, AUTO	-
>Referenced Image Sequence	0008,1140	SQ	1C, AUTO	-
>>Referenced SOP Class UID	0008,1150	UI	1, AUTO	-
>>Referenced SOP Instance UID	0008,1155	UI	1, AUTO	-
>Series Instance UID	0020,000E	UI	1, AUTO	-
Shutter Presentation Value	0018,1622	US	1C, AUTO	Applied Value(s): 0
Instance Number	0020,0013	IS	1, AUTO	-
Presentation Label	0070,0080	CS	1, AUTO	Applied Value(s): AS LAST SEEN, NEW AT IMPORT
Presentation Description	0070,0081	LO	2, AUTO	-
Presentation Creation Date	0070,0082	DA	1, AUTO	-
Presentation Creation Time	0070,0083	TM	1, AUTO	-
Presentation Creator's Name	0070,0084	PN	2, AUTO	Same as Manufacturer's Model Name.
SOP Common Module				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 13, ISO_IR 100, ISO 2022 IR 13, ISO 2022 IR 87, ISO 2022 IR 100, ISO 2022 IR 159
Instance Creation Date	0008,0012	DA	1, AUTO	-
Instance Creation Time	0008,0013	TM	1, AUTO	-
Instance Creator UID	0008,0014	UI	1, AUTO	-
SOP Class UID	0008,0016	UI	1, AUTO	Applied Value(s): 1.2.840.10008.5.1.4.1.1. 11.1
SOP Instance UID	0008,0018	UI	1, AUTO	-

8.1.1.4. Patient Root Query/Retrieve Information Model – FIND SOP Class

Table 71: Created Patient Root Query/Retrieve Information Model – FIND SOP Class Attributes

Name	Tag	VR	Definition	Comment
Patient Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): PATIENT
Patient's Name	0010,0010	PN	2, USER	Filter value.
Patient ID	0010,0020	LO	2E, AUTO	Not Filter value.
Patient's Birth Date	0010,0030	DA	2, USER	Filter value.
Patient's Sex	0010,0040	CS	2E, AUTO	-
Ethnic Group	0010,2160	SH	2E, AUTO	-
Study Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100

Name	Tag	VR	Definition	Comment
Study Date	0008,0020	DA	2E, AUTO	-
Study Time	0008,0030	TM	2E, AUTO	-
Accession Number	0008,0050	SH	2E, AUTO	-
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): STUDY
Study Description	0008,1030	LO	2E, AUTO	-
Patient ID	0010,0020	LO	1, SPEC	Filter value.
Study Instance UID	0020,000D	UI	2E, AUTO	-
Study ID	0020,0010	SH	2E, AUTO	-
Performed Procedure Step Start Date	0040,0244	DA	2, USER	Filter value.
Performed Procedure Step Status	0040,0252	CS	2, USER	Filter value.
Performed Procedure Step Description	0040,0254	LO	2, USER	Filter value.
Private Creator Group 2001	2001,0010	LO	1, AUTO	Applied Value(s): Philips Imaging DD 001
Examination Source	2001,1063	CS	2E, AUTO	-
Series Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100
Series Date	0008,0021	DA	2E, AUTO	-
Series Time	0008,0031	TM	2E, AUTO	-
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): SERIES
Modality	0008,0060	CS	2E, AUTO	-
Series Description	0008,103E	LO	2E, AUTO	-
Patient ID	0010,0020	LO	1, SPEC	Filter value.
Body Part Examined	0018,0015	CS	2E, AUTO	-
Protocol Name	0018,1030	LO	2E, AUTO	-
Study Instance UID	0020,000D	UI	1, SPEC	-
Series Instance UID	0020,000E	UI	2E, AUTO	-
Series Number	0020,0011	IS	2E, AUTO	-
Number of Series Related Instances	0020,1209	IS	2E, AUTO	-
Image Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100
SOP Instance UID	0008,0018	UI	2E, AUTO	-
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): IMAGE
Patient ID	0010,0020	LO	1, SPEC	-
Study Instance UID	0020,000D	UI	1, SPEC	-
Series Instance UID	0020,000E	UI	1, SPEC	-
Instance Number	0020,0013	IS	2E, AUTO	-

8.1.1.5. Patient Root Query/Retrieve Information Model – MOVE SOP Class

Table 72: Created Patient Root Query/Retrieve Information Model – MOVE SOP Class Attributes

Name	Tag	VR	Definition	Comment
Series Level				
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): SERIES
Patient ID	0010,0020	LO	1, SPEC	-
Study Instance UID	0020,000D	UI	1, SPEC	-
Series Instance UID	0020,000E	UI	1, SPEC	-

8.1.1.6. Study Root Query/Retrieve Information Model – FIND SOP Class

Table 73: Created Study Root Query/Retrieve Information Model – FIND SOP Class Attributes

Name	Tag	VR	Definition	Comment
Study Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100
Study Date	0008,0020	DA	2E, AUTO	-
Study Time	0008,0030	TM	2E, AUTO	-
Accession Number	0008,0050	SH	2E, AUTO	-
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): STUDY
Study Description	0008,1030	LO	2E, AUTO	-
Patient's Name	0010,0010	PN	2, USER	Filter value.
Patient ID	0010,0020	LO	2, USER	Filter value
Patient's Birth Date	0010,0030	DA	2, USER	Filter value.
Patient's Sex	0010,0040	CS	2E, AUTO	-
Ethnic Group	0010,2160	SH	2E, AUTO	-
Study Instance UID	0020,000D	UI	2E, AUTO	-
Study ID	0020,0010	SH	2E, AUTO	-
Performed Procedure Step Start Date	0040,0244	DA	2, USER	Filter value.
Performed Procedure Step Status	0040,0252	CS	2, USER	Filter value.
Performed Procedure Step Description	0040,0254	LO	2, USER	Filter value.
Private Creator Group 2001	2001,0010	LO	1, AUTO	Applied Value(s): Philips Imaging DD 001
Examination Source	2001,1063	CS	2E, AUTO	-
Series Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100
Series Date	0008,0021	DA	2E, AUTO	-
Series Time	0008,0031	TM	2E, AUTO	-
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): SERIES
Modality	0008,0060	CS	2E, AUTO	-
Series Description	0008,103E	LO	2E, AUTO	-
Body Part Examined	0018,0015	CS	2E, AUTO	-
Protocol Name	0018,1030	LO	2E, AUTO	-
Study Instance UID	0020,000D	UI	1, SPEC	-
Series Instance UID	0020,000E	UI	2E, AUTO	-
Series Number	0020,0011	IS	2E, AUTO	-
Number of Series Related Instances	0020,1209	IS	2E, AUTO	-
Image Level				
Specific Character Set	0008,0005	CS	1, AUTO	Applied Value(s): ISO_IR 100
SOP Instance UID	0008,0018	UI	2E, AUTO	-
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): IMAGE
Study Instance UID	0020,000D	UI	1, SPEC	-
Series Instance UID	0020,000E	UI	1, SPEC	-
Instance Number	0020,0013	IS	2E, AUTO	-

8.1.1.7. Study Root Query/Retrieve Information Model – MOVE SOP Class

Table 74: Created Study Root Query/Retrieve Information Model – MOVE SOP Class Attributes

Name	Tag	VR	Definition	Comment
Series Level				
Query/Retrieve Level	0008,0052	CS	1, AUTO	Applied Value(s): SERIES
Study Instance UID	0020,000D	UI	1, SPEC	-
Series Instance UID	0020,000E	UI	1, SPEC	-

8.1.1.8. Storage Commitment Push Model SOP Class

Table 75: Modules of the Storage Commitment Push Model SOP Class

Information Entity	Module Name	Usage
-	SOP Common	NEVER
-	Storage Commitment	ALWAYS

Table 76: Created Storage Commitment Push Model SOP Class Attributes

Name	Tag	VR	Definition	Comment
Storage Commitment Module				
Referenced Study Component Sequence	0008,1111	SQ	1, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1, SPEC	-
>Referenced SOP Instance UID	0008,1155	UI	1, SPEC	-
Transaction UID	0008,1195	UI	1, AUTO	-
Referenced SOP Sequence	0008,1199	SQ	1, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	1, SPEC	-
>Referenced SOP Instance UID	0008,1155	UI	1, SPEC	-

8.1.1.9. Modality Performed Procedure Step SOP Class

Table 77: Modules of the Modality Performed Procedure Step SOP Class – N-CREATE

Information Entity	Module Name	Usage
Study	Performed Procedure Step Relationship	ALWAYS
	Performed Procedure Step Information	ALWAYS
	Image Acquisition Results	ALWAYS
	Radiation Dose	NEVER
	Billing and Material Management Code	NEVER
General	SOP Common	ALWAYS

Table 78: Created Modality Performed Procedure Step SOP Class N-CREATE Attributes

Name	Tag	VR	Definition	Comment
SOP Common Module				
Specific Character Set	0008,0005	CS	2, IMPL	Applied Value(s): ISO_IR 13, ISO_IR 100, ISO 2022 IR 13, ISO 2022 IR 87, ISO 2022 IR 100, ISO 2022 IR 159
Performed Procedure Step Relationship Module				
Referenced Patient Sequence	0008,1120	SQ	2, AUTO	Always empty
Patient's Name	0010,0010	PN	1, MWL / USER	-
Patient ID	0010,0020	LO	1, MWL / USER	-
Patient's Birth Date	0010,0030	DA	1, MWL / USER	-
Patient's Sex	0010,0040	CS	1, MWL / USER	Applied Value(s): F, M, O
Scheduled Step Attribute Sequence	0040,0270	SQ	1, AUTO	-
>Accession Number	0008,0050	SH	2, MWL / USER	-
>Referenced Study Sequence	0008,1110	SQ	2E, AUTO	-
>Study Instance UID	0020,000D	UI	1, AUTO	-
>Requested Procedure Description	0032,1060	LO	2, MWL	-
>Scheduled Procedure Step Description	0040,0007	LO	2, MWL	-
>Scheduled Action Item Code Sequence	0040,0008	SQ	2E, AUTO	-
>Scheduled Procedure Step ID	0040,0009	SH	2, MWL	-
>Requested Procedure ID	0040,1001	SH	2, MWL	-
Performed Procedure Step Information Module				
Procedure Code Sequence	0008,1032	SQ	2E, AUTO	Attribute always empty.
Performed Station AE Title	0040,0241	AE	1, CONFIG	-
Performed Station Name	0040,0242	SH	2, CONFIG	-
Performed Location	0040,0243	SH	2, CONFIG	-
Performed Procedure Step Start Date	0040,0244	DA	1, AUTO	-
Performed Procedure Step Start Time	0040,0245	TM	1, AUTO	-
Performed Procedure Step End Date	0040,0250	DA	2, AUTO	-
Performed Procedure Step End Time	0040,0251	TM	2, AUTO	-
Performed Procedure Step Status	0040,0252	CS	1, AUTO	Applied Value(s): IN PROGRESS
Performed Procedure Step ID	0040,0253	SH	1, SPEC	-
Performed Procedure Step Description	0040,0254	LO	2, MWL / USER	-
Performed Procedure Type Description	0040,0255	LO	2E, AUTO	-
Image Acquisition Results Module				
Modality	0008,0060	CS	1, AUTO	Applied Value(s): MR
Study ID	0020,0010	SH	2, MWL / USER	-
Performed Action Item Code Sequence	0040,0260	SQ	2, IMPL	-
>Code Value	0008,0100	SH	1, MWL / USER	-

Name	Tag	VR	Definition	Comment
>Coding Scheme Designator	0008,0102	SH	1, MWL / USER	-
>Coding Scheme Version	0008,0103	SH	2, MWL / USER	-
>Code Meaning	0008,0104	LO	2, MWL / USER	-
Performed Series Sequence	0040,0340	SQ	2E, AUTO	-

Table 79: Modules of the Modality Performed Procedure Step SOP Class – N-SET

Information Entity	Module Name	Usage
Study	Performed Procedure Step Relationship	NEVER
	Performed Procedure Step Information	ALWAYS
	Image Acquisition Results	ALWAYS
	Radiation Dose	NEVER
	Billing and Material Management Code	NEVER
General	SOP Common	NEVER

Table 80: Created Modality Performed Procedure Step SOP Class N-SET Attributes

Name	Tag	VR	Definition	Comment
Performed Procedure Step Information Module				
Performed Procedure Step End Date	0040,0250	DA	1, AUTO	-
Performed Procedure Step End Time	0040,0251	TM	1, AUTO	-
Performed Procedure Step Status	0040,0252	CS	1, IMPL	Applied Value(s): COMPLETED, DISCONTINUED
Performed Procedure Step Description	0040,0254	LO	2, MWL / USER	-
Image Acquisition Results Module				
Performed Action Item Code Sequence	0040,0260	SQ	2, IMPL	-
>Code Value	0008,0100	SH	1, MWL / USER	-
>Coding Scheme Designator	0008,0102	SH	1, MWL / USER	-
>Coding Scheme Version	0008,0103	SH	2, MWL / USER	-
>Code Meaning	0008,0104	LO	2, MWL / USER	-
Performed Series Sequence	0040,0340	SQ	2, IMPL	-
>Retrieve AE Title	0008,0054	AE	2E, AUTO	-
>Series Description	0008,103E	LO	2, SPEC	-
>Performing Physician's Name	0008,1050	PN	2E, AUTO	-
>Operator's Name	0008,1070	PN	2E, AUTO	-
>Referenced Image Sequence	0008,1140	SQ	2, IMPL	Empty while in progress.
>>Referenced SOP Class UID	0008,1150	UI	1, IMPL	-
>>Referenced SOP Instance UID	0008,1155	UI	1, IMPL	-
>Protocol Name	0018,1030	LO	1, SPEC	-
>Series Instance UID	0020,000E	UI	2, SPEC	-
>Referenced Standalone SOP Instance Sequence	0040,0220	SQ	2E, AUTO	-

8.1.1.10. Modality Worklist Information Model – FIND SOP Class

Table 81: Modules of the Modality Worklist Information Model – FIND SOP Class

Information Entity	Module Name	Usage
Patient	Patient Relationship	NEVER
	Patient Identification	ALWAYS
	Patient Demographic	ALWAYS
	Patient Medical	ALWAYS
Visit	Visit Relationship	NEVER
	Visit Identification	NEVER
	Visit Status	ALWAYS
	Visit Admission	NEVER
Study	Scheduled Procedure Step	ALWAYS
	Requested Procedure	ALWAYS
	Imaging Service Request	ALWAYS
General	SOP Common	NEVER

Table 82: Created Modality Worklist Information Model – FIND SOP Class Attributes

Name	Tag	VR	Definition	Comment
Patient Identification Module				
Patient's Name	0010,0010	PN	2E, AUTO	-
Patient ID	0010,0020	LO	2E, AUTO	-
Other Patient IDs	0010,1000	LO	2E, AUTO	-
Patient Demographic Module				
Patient's Birth Date	0010,0030	DA	2E, AUTO	-
Patient's Sex	0010,0040	CS	2E, AUTO	-
Patient's Weight	0010,1030	DS	2E, AUTO	-
Ethnic Group	0010,2160	SH	2E, AUTO	-
Patient Comments	0010,4000	LT	2E, AUTO	-
Patient Medical Module				
Medical Alerts	0010,2000	LO	2E, AUTO	-
Contrast Allergies	0010,2110	LO	2E, AUTO	-
Additional Patient History	0010,21B0	LT	2E, AUTO	-
Pregnancy Status	0010,21C0	US	2E, AUTO	-
Visit Status Module				
Current Patient Location	0038,0300	LO	2E, AUTO	-
Scheduled Procedure Step Module				
Scheduled Procedure Step Sequence	0040,0100	SQ	1, AUTO	-
>Modality	0008,0060	CS	2, USER	Can be used as matching key.
>Requested Contrast Agent	0032,1070	LO	2E, AUTO	-
>Scheduled Station AE Title	0040,0001	AE	2, USER	Can be used as matching key.
>Scheduled Procedure Step Start Date	0040,0002	DA	2, USER	Can be used as range matching key.
>Scheduled Procedure Step Start Time	0040,0003	TM	2E, AUTO	-
>Scheduled Procedure Step End Date	0040,0004	DA	2E, AUTO	-
>Scheduled Procedure Step End Time	0040,0005	TM	2E, AUTO	-
>Scheduled Performing Physician's Name	0040,0006	PN	2E, AUTO	-
>Scheduled Procedure Step Description	0040,0007	LO	2E, AUTO	-
>Scheduled Action Item Code Sequence	0040,0008	SQ	1, AUTO	-

Name	Tag	VR	Definition	Comment
>>Code Value	0008,0100	SH	2E, AUTO	-
>>Coding Scheme Designator	0008,0102	SH	2E, AUTO	-
>>Coding Scheme Version	0008,0103	SH	2E, AUTO	-
>>Code Meaning	0008,0104	LO	2E, AUTO	-
>Scheduled Procedure Step ID	0040,0009	SH	2E, AUTO	-
>Scheduled Station Name	0040,0010	SH	2E, AUTO	-
>Scheduled Procedure Step Location	0040,0011	SH	2E, AUTO	-
>Pre-Medication	0040,0012	LO	2E, AUTO	-
>Scheduled Procedure Step Status	0040,0020	CS	2E, AUTO	-
>Comments on the Scheduled Procedure Step	0040,0400	LT	2E, AUTO	-
Requested Procedure Module				
Referenced Study Sequence	0008,1110	SQ	1, AUTO	-
>Referenced SOP Class UID	0008,1150	UI	2E, AUTO	-
>Referenced SOP Instance UID	0008,1155	UI	2E, AUTO	-
Study Instance UID	0020,000D	UI	2E, AUTO	-
Requested Procedure Description	0032,1060	LO	2E, AUTO	-
Requested Procedure Code Sequence	0032,1064	SQ	1, AUTO	-
>Code Value	0008,0100	SH	2E, AUTO	-
>Coding Scheme Designator	0008,0102	SH	2E, AUTO	-
>Coding Scheme Version	0008,0103	SH	2E, AUTO	-
>Code Meaning	0008,0104	LO	2E, AUTO	-
Requested Procedure ID	0040,1001	SH	2E, AUTO	-
Names of Intended Recipients of Results	0040,1010	PN	2E, AUTO	-
Requested Procedure Comments	0040,1400	LT	2E, AUTO	-
Imaging Service Request Module				
Accession Number	0008,0050	SH	2, USER	Can be used as matching key.
Referring Physician's Name	0008,0090	PN	2E, AUTO	-
Requesting Physician	0032,1032	PN	2E, AUTO	-
Requesting Service	0032,1033	LO	2E, AUTO	-
Imaging Service Request Comments	0040,2400	LT	2E, AUTO	-

8.1.1.11. Basic Film Session SOP Class

Table 83: Modules of the Basic Film Session SOP Class – N-CREATE

Information Entity	Module Name	Usage
General	SOP Common	NEVER
Print Management	Basic Film Session Presentation	ALWAYS
	Basic Film Session Relationship	NEVER

Table 84: Created Basic Film Session SOP Class N-CREATE Attributes

Name	Tag	VR	Definition	Comment
Basic Film Session Presentation Module				
Number of Copies	2000,0010	IS	1, IMPL / USER	Between 1 and 99. Applied Value(s): 1
Medium Type	2000,0030	CS	1, IMPL	Applied Value(s): BLUE FILM

8.1.1.12. Basic Film Box SOP Class

Table 85: Modules of the Basic Film Box SOP Class – N-CREATE

Information Entity	Module Name	Usage
General	SOP Common	NEVER
Print Management	Basic Film Box Presentation	ALWAYS
	Basic Film Box Relationship	ALWAYS

Table 86: Created Basic Film Box SOP Class N-CREATE Attributes

Name	Tag	VR	Definition	Comment
Basic Film Box Presentation Module				
Image Display Format	2010,0010	ST	1, CONF	Applied Value(s): COL, CUSTOM, CUSTOM\1, ROW, SLIDE, STANDARD, STANDARD\1,1, SUPERSLIDE
Film Orientation	2010,0040	CS	1, CONF	Applied Value(s): PORTRAIT
Film Size ID	2010,0050	CS	1, CONF	Applied Value(s): 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, 8INX10IN
Magnification Type	2010,0060	CS	1, CONF	Applied Value(s): CUBIC
Smoothing Type	2010,0080	CS	1, AUTO	SCP specific. Applied Value(s): 140
Border Density	2010,0100	CS	1, AUTO	The desired density in hundredths of OD. Applied Value(s): BLACK
Empty Image Density	2010,0110	CS	1, AUTO	<i> where <i> represents the desired density in hundredths of OD. Applied Value(s): BLACK
Min Density	2010,0120	US	1, CONF	Maximum density of the images on the film, expressed in hundredths of OD. If Max Density is higher than maximum printer density than Max Density is set to maximum printer density.
Max Density	2010,0130	US	1, CONF	Minimum density of the images on the film, expressed in hundredths of OD. If Min Density is lower than minimum printer density than Min Density is set to minimum printer density.
Trim	2010,0140	CS	1, CONF	Applied Value(s): NO
Configuration Information	2010,0150	ST	1, CONF	LUT.
Basic Film Box Relationship Module				
Referenced Film Session Sequence	2010,0500	SQ	1, AUTO	Parent Film Session.
>Referenced SOP Class UID	0008,1150	UI	1, AUTO	Applied Value(s): 1.2.840.10008.5.1.1.1
>Referenced SOP Instance UID	0008,1155	UI	1, AUTO	-

8.1.1.13. Basic Grayscale Image Box SOP Class

Table 87: Modules of the Basic Grayscale Image Box SOP Class – N-SET

Information Entity	Module Name	Usage
General	SOP Common	NEVER
Print Management	Image Box Pixel Presentation	ALWAYS

Table 88: Created Basic Grayscale Image Box SOP Class N-SET Attributes

Name	Tag	VR	Definition	Comment
Image Box Pixel Presentation Module				
Magnification Type	2010,0060	CS	1, CONF	Applied Value(s): CUBIC
Smoothing Type	2010,0080	CS	1, CONF	SCP specific. Applied Value(s): 140
Image Position	2020,0010	US	1, AUTO	Applied Value(s): 1
Polarity	2020,0020	CS	1, AUTO	Applied Value(s): NORMAL
Preformatted Grayscale Image Sequence	2020,0110	SQ	1, AUTO	-
>Samples per Pixel	0028,0002	US	1, AUTO	Applied Value(s): 1
>Photometric Interpretation	0028,0004	CS	1, AUTO	Applied Value(s): MONOCHROME2
>Rows	0028,0010	US	1, IMPL	Depending on the selected printer type and film size.
>Columns	0028,0011	US	1, IMPL	Depending on the selected printer type and film size.
>Pixel Aspect Ratio	0028,0034	IS	1, AUTO	Applied Value(s): (1,1)
>Bits Allocated	0028,0100	US	1, AUTO	Applied Value(s): 8
>Bits Stored	0028,0101	US	1, AUTO	Applied Value(s): 8
>High Bit	0028,0102	US	1, AUTO	Applied Value(s): 7
>Pixel Representation	0028,0103	US	1, AUTO	Applied Value(s): 0x0000
>Pixel Data	7FE0,0010	OW	1, AUTO	-

8.1.1.14. Printer SOP Class

Table 89: Modules of the Printer SOP Class – N-GET

Information Entity	Module Name	Usage
General	SOP Common	NEVER
Print Management	Printer	ALWAYS

Table 90: Created Printer SOP Class N-GET Attributes

Name	Tag	VR	Definition	Comment
Printer Module				
Manufacturer	0008,0070	LO	2CE, AUTO	Initial message only.
Manufacturer's Model Name	0008,1090	LO	2CE, AUTO	Initial message only.
Device Serial Number	0018,1000	LO	2CE, AUTO	Initial message only.
Software Version(s)	0018,1020	LO	2CE, AUTO	Initial message only.

Name	Tag	VR	Definition	Comment
Printer Status	2110,0010	CS	2CE, AUTO	Final message only.
Printer Status Info	2110,0020	CS	2CE, AUTO	Final message only.
Printer Name	2110,0030	LO	2CE, AUTO	Initial message only.

8.1.1.15. Media Storage Directory Storage SOP Class

Table 91: Modules of the Media Storage Directory Storage SOP Class

Information Entity	Module Name	Usage
Media	File-set Identification	ALWAYS
	Directory Information	ALWAYS

Table 92: Created Media Storage Directory Storage SOP Class Attributes

Name	Tag	VR	Definition	Comment
File-set Identification Module				
File-set ID	0004,1130	CS	1, AUTO	-
Directory Information Module				
Offset of the First Directory Record of the Root Directory Entity	0004,1200	UL	1, AUTO	-
Offset of the Last Directory Record of the Root Directory Entity	0004,1202	UL	1, AUTO	-
File-set Consistency Flag	0004,1212	US	1, AUTO	-
Directory Record Sequence	0004,1220	SQ	2, AUTO	-
> Offset of the Next Directory Record	0004,1400	UL	1, AUTO	-
> Record In-use Flag	0004,1410	US	1, AUTO	-
> Offset of Referenced Lower-Level Directory Entity	0004,1420	UL	1, AUTO	-
> Directory Record Type	0004,1430	CS	1, AUTO	-
> Private Record UID	0004,1432	UI	1C, AUTO	-
> Referenced File ID	0004,1500	CS	1C, AUTO	-
> MRDR Directory Record Offset	0004,1504	UL	1C, AUTO	-
> Referenced SOP Class UID in File	0004,1510	UI	1C, AUTO	-
> Referenced SOP Instance UID in File	0004,1511	UI	1C, AUTO	-
> Referenced Transfer Syntax UID in File	0004,1512	UI	1C, AUTO	-
> Patient Keys				
> Patient's Name	0010,0010	PN	1, SPEC	-
> Patient ID	0010,0020	LO	1, SPEC	-
> Patient's Birth Date	0010,0030	DA	1, SPEC	-
> Patient's Sex	0010,0040	CS	1, SPEC	-
> Study Keys				
> Study Date	0008,0020	DA	1, SPEC	-
> Study Time	0008,0030	TM	1, SPEC	-
> Accession Number	0008,0050	SH	2, SPEC	-
> Study Description	0008,1030	LO	2, SPEC	-
> Study Instance UID	0020,000D	UI	1, SPEC	-
> Study ID	0020,0010	SH	1, SPEC	-
> Performed Procedure Step Start Date	0040,0244	DA	2, SPEC	-
> Performed Procedure Step Description	0040,0254	LO	2, SPEC	-

Name	Tag	VR	Definition	Comment
> Series Keys				
> Series Date	0008,0021	DA	2, SPEC	-
> Series Time	0008,0031	TM	2, SPEC	-
> Modality	0008,0060	CS	1, SPEC	-
> Protocol Name	0018,1030	LO	2, SPEC	-
> Series Instance UID	0020,000E	UI	1, SPEC	-
> Series Number	0020,0011	IS	1, SPEC	-
> Image Keys				
> Image Type	0008,0008	CS	2, SPEC	-
> SOP Class UID	0008,0016	UI	2, SPEC	-
> SOP Instance UID	0008,0018	UI	2, SPEC	-
> Referenced Image Sequence	0008,1140	SQ	2, SPEC	-
>> Referenced SOP Class UID	0008,1150	UI	2, SPEC	-
>> Referenced SOP Instance UID	0008,1155	UI	2, SPEC	-
> Instance Number	0020,0013	IS	1, SPEC	-
> Image Position (Patient)	0020,0032	DS	2, SPEC	-
> Image Orientation (Patient)	0020,0037	DS	2, SPEC	-
> Frame of Reference UID	0020,0052	UI	2, SPEC	-
> Photometric Interpretation	0028,0004	CS	2, SPEC	-
> Rows	0028,0010	US	2, SPEC	-
> Cols	0028,0011	US	2, SPEC	-
> Pixel Spacing	0028,0030	DS	2, SPEC	-
> Bits Stored	0028,0101	US	2, SPEC	-
> High Bit	0028,0102	US	2, SPEC	-
> Presentation Keys				
> SOP Instance UID	0008,0018	UI	2, SPEC	-
> Referenced Series Sequence	0008,1115	SQ	1, SPEC	-
>> Referenced Image Sequence	0008,1140	SQ	1C, SPEC	If available.
>>> Referenced SOP Class UID	0008,1150	UI	1, SPEC	-
>>> Referenced SOP Instance UID	0008,1155	UI	1, SPEC	-
>> Series Instance UID	0020,000E	UI	1, SPEC	-
> Instance Number	0020,0013	IS	1, SPEC	-
> Content Label	0070,0080	CS	1, SPEC	-
> Content Description	0070,0081	LO	2, SPEC	-
> Presentation Creation Date	0070,0082	DA	1, SPEC	-
> Presentation Creation Time	0070,0083	TM	1, SPEC	-
> Content Creator's Name	0070,0084	PN	2, SPEC	-
> Private Keys				
> Private Creator Group 2001	2001,0010	LO	1, AUTO	-
> Number of Echoes	2001,1014	SL	2, SPEC	-
> Number of Phases MR	2001,1017	SL	2, SPEC	-
> Number of Slices MR	2001,1018	SL	2, SPEC	-
> Reconstruction Number MR	2001,101D	IS	2, SPEC	-
> Scanning Technique Description MR	2001,1020	LO	2, SPEC	-
> Echo Time Display MR	2001,1025	SH	2, SPEC	-
> Stack Sequence	2001,105F	SQ	2, SPEC	-
>> Stack Number Of Slices	2001,102D	SS	2, SPEC	-
>> Stack Radial Angle	2001,1032	FL	2, SPEC	-
>> Stack Radial Axis	2001,1033	CS	2, SPEC	-
>> Stack Slice Number	2001,1035	SS	2, SPEC	-
>> Stack Type	2001,1036	CS	2, SPEC	-
> Examination Source	2001,1063	CS	2, SPEC	-
> Private Creator Group 2005	2005,0010	LO	1, AUTO	-
> Number of Chemical Shift	2005,1020	SL	2, SPEC	-

Name	Tag	VR	Definition	Comment
> Syncra Scan Type	2005,10A1	CS	2, SPEC	-

8.1.2. Usage of Attributes from Received IOD's

The MR System will only function correctly on native images. It is not the intention to operate on non-native images other than Secondary Captures.

8.1.3. Attribute Mapping

The following table shows the relation between MWL and MPPS attributes and image storage attributes.

Table 93: Correlation of DICOM Object

Nr.	Level	Attribute	MWL Find Tag	MPPS Create Tag	Related Store Tag	MPPS Set Tag
1	Patient	Patient's Name	0010,0010	0010,0010	0010,0010	-
2		Patient ID	0010,0020	0010,0020	0010,0020	-
3		Patient's Birth Date	0010,0030	0010,0030	0010,0030	-
4		Patient's Sex	0010,0040	0010,0040	0010,0040	-
5	Study	Accession Number	0008,0050	0008,0050	0008,0050	-
6		Study Instance UID	0020,000D	0020,000D	0020,000D	-
7		Request Procedure Description	0032,1060	-	-	-
8		Request Procedure ID	0040,1001	0040,1001	0040,1001	-
9	Exam	Code Value	0008,0100	-	-	-
10		Code Scheme Designator	0008,0102	-	-	-
11		Code Meaning	0008,0104	-	-	-
12		Scheduled Procedure Step Description	0040,0007	0040,0007	0040,0007	-
13		Scheduled Procedure Step ID	0040,0009	0040,0009	0040,0009	-
14		Examination Comments	-	0040,0280	0040,0280	0040,0280
15		Series / Image / Grayscale softcopy presentation state	Performed Series Sequence	-	-	-
16	>Referenced Image Sequence		-	-	-	0008,1140
17	>>Referenced SOP Class UID		-	-	0008,0016	0008,1150
18	>>Referenced SOP Instance UID		-	-	0008,0018	0008,1155
19	>Referenced Stand Alone SOP Inst. Seq for the grayscale softcopy presentation state objects		-	-	-	0040,0220
20	>>Referenced SOP Class UID		-	-	0008,0016	0008,1150
21	>>Referenced SOP Instance UID		-	-	0008,0018	0008,1155
22	>Series Protocol Name		-	-	0018,1030	0018,1030
23	>Series Description		-	-	0008,103E	0008,103E
24	>Series Instance UID		-	-	0020,000E	0020,000E

8.1.4. Coerced/Modified fields

The Network AE will only import MR images and Presentation State objects that were created on an MR System. These imported images may be coerced or modified and are to be used for reference only; it is not the intention to export them again.

8.2. Data Dictionary of Private Attributes

Refer to section 8.1.1.

8.3. Coded Terminology and Templates

The MR System has no specific support for coded terminology or templates.

8.4. Grayscale Image consistency

The MR System has no specific support for any DICOM Grayscale Standard Display Function.

8.5. Standard Extended/Specialized/Private SOPs

8.5.1. Standard Extended MR Image SOP Class

The following standard extensions are applied for the MR Image Storage SOP class. See also the overview of the applied MR Image IOD in section 8.1.1.1.

Table 94: Applied Standard Extensions

Module	Note
Patient Medical Module	-
Study Classification Module	-
Study Scheduling Module	-
Requested Procedure Module	Additional attribute: Requested Contrast Agent
Imaging Service Request Module	-
Performed Procedure Step Information Module	-
Billing and Material Management Code Module	-
General Series Module	Additional attributes in Referenced Performed Procedure Step Sequence: >Specific Character Set >Instance Creation Date >Instance Creation Time >Instance Creator UID >Instance Number
Modality LUT Module	Present if configured. Must be applied when viewing the image.
Private Group	Private MR attributes.

8.5.2. Private SOP Classes

The MR System system supports private SOP classes; for the C-STORE services these private SOP classes are listed in the following table.

Table 95: Supported Private SOP Classes as SCU and SCP by the MR System

SOP Class Name	UID
Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1
Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2

8.6. Private Transfer Syntaxes

The MR System does not support any private transfer syntaxes.