

DICOM CONFORMANCE STATEMENT

FOR

CANON SURGICAL C-ARM SYSTEM

SXT series

Model SXT-2000A

(CXVIEW 3.0.1)

CANON MEDICAL SYSTEMS CORPORATION

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1. Conformance Statement Overview

Table 1-1 provides an overview of the network services supported by CXView3.

**Table 1-1
Network Services**

Category	SOP Classes	Service User (SCU)	Service Provider (SCP)
Transfer	XRF Image Storage	Yes	No
	XA Image Storage	Yes	No
Storage Commitment	Storage Commitment Push Model	Yes	No
Workflow Management	Modality Worklist Information Model – Find	Yes	No
	Modality Performed Procedure Step	Yes	No
Print Management	Basic Grayscale Print Management	Yes	No

Table 1-2 provides an overview of the Media Storage Application Profiles supported by CXView3.

**Table 1-2
Medial Services**

Category	Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
CD-R	XRF Image CD-R	Yes	Yes
	XA Image CD-R	Yes	Yes
	General Purpose CD-R	Yes	Yes
DVD	XRF-Image DVD-R	Yes	Yes
	XA-Image DVD-R	Yes	Yes
	General Purpose DVD-R	Yes	Yes

Table 1-3 provides an overview of the IOD's, SOP class UID and transfer syntaxes supported by CXView3.

**Table 1-3
Supported IOD's, SOP Classes and Transfer Syntaxes**

Information Object Definition (IOD)	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

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3. Introduction

3.1 Revision History

REV.	Date of Issue	Author	Description
-	2017/02/17	JWKIM EKSHIN	Initial
A	2018/1/4	Canon Medical Systems	Change of company name

3.2 Intended Audience

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

3.3 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard. Abbreviations and terms are as follows:

AE	Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
CD-R	Compact Disk Recordable
DIMSE	DICOM Message Service Element
DVD	A trademark of the DVD forum that is not an abbreviation
DVD-R	DVD Recordable
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
IE	Information Entity
IOD	Information Object Definition
MPPS	Modality Performed Procedure Step
MWM	Modality Worklist Management
PDU	Protocol Data Unit
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
UID	Unique Identifier

3.4 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality. This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Canon Medical Systems and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between CXView3 and others.

- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM standard will evolve to meet the users' future requirements. Therefore CXView3 reserves the right to make changes to its products or to discontinue its delivery.

3.5 References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.20, 2011.

4. Networking

4.1 Implementation Model

4.1.1 Application Data Flow

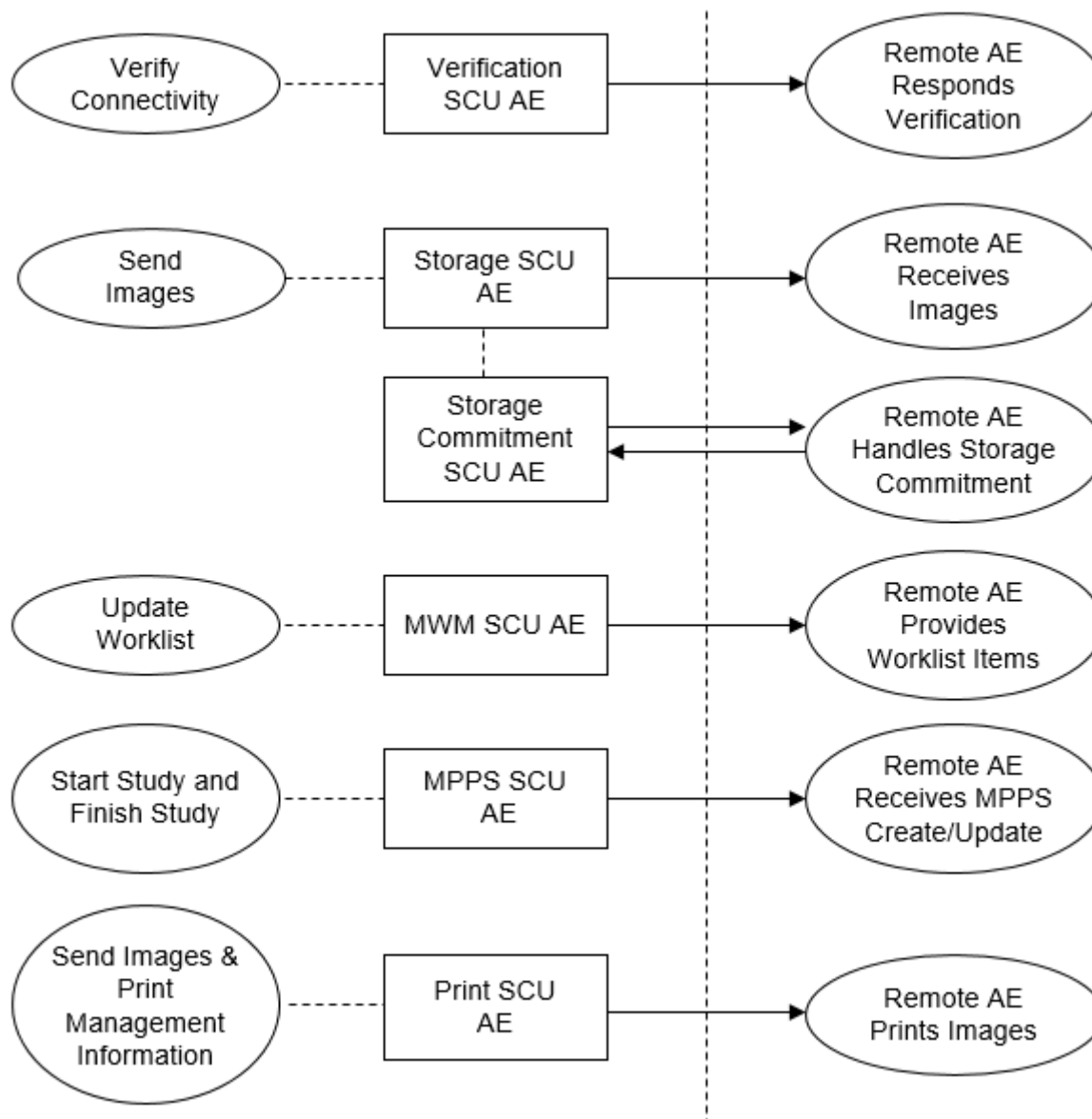


FIGURE4.1-1

Application Data Flow Diagram

- The Verification SCU AE issues a C-ECHO to verify a DICOM connection to a remote AE. It is associated with the local real-world activity "Verify Connectivity". "Verify Connectivity" is performed via the Configuration Menu (for DICOM).
- The Storage SCU AE sends images to a remote AE. It is associated with the local real-world activity "Send Images". "Send Images" is performed upon user request for specific images selected.
- The MWM SCU AE receives Worklist information from a remote AE. It is associated with the local real-world activity "Update Worklist". When the "Update Worklist" is performed the MWM SCU AE queries a remote AE for worklist items and provides the set of worklist items matching the query

request. "Update Worklist" is performed as a result of an operator request and an automatic request.

- Receiving the storage commitment request from the Storage SCU AE, the Storage Commitment SCU AE will request Storage Commitment
- The MPPS SCU AE sends MPPS information to a remote AE. It is associated with the local real-world activity "Acquire Instances". When the "Acquire Instances" is performed the MPPS SCU AE creates and updates Modality Performed Procedure Step instances managed by a remote AE. Acquisition of images will result in automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of an operator action.
- The Print SCU AE prints images on a remote AE (Printer). It is associated with the local real-world activity "Send Images & Print Management Information". "Send Images & Print Management Information" creates a print-job within the print queue containing one or more virtual film sheets composed from images selected by the user.

4.1.2 Functional Definition of AE's

4.1.2.1 Functional Definition of Verification SCU AE

The Verification SCU AE issues a C-ECHO to verify a DICOM connection to a remote AE. It is performed via the Configuration Menu (for DICOM). The Verification SCU AE can be issue a C-ECHO to verify a DICOM connection to a remote AE with "ping" function.

4.1.2.2 Functional Definition of Storage SCU AE

The existence of a send-job queue entry with associated network destination will activate the Storage SCU AE. An Association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the image transfer fails, the Storage SCU AE will not retry this send-job automatically.

4.1.2.3 Functional Definition of Storage Commitment SCU AE

Receiving the storage commitment request from the Storage SCU AE, the Storage Commitment SCU AE will request Storage Commitment and if a commitment is successfully obtained will record this information in the local database

4.1.2.4 Functional Definition of MWM SCU AE

The MWM SCU AE attempts to download a worklist from a remote node. If the MWM SCU AE establishes an Association to a remote AE, it will transfer patient's information and worklist items via the open Association. The results will be displayed in a separate list. The patient's information will be used for the patient registration.

4.1.2.5 Functional Definition of MPPS SCU AE

The MPPS SCU AE performs the creation of an MPPS instance automatically when a study started. Further updates on the MPPS data can be performed automatically or interactively after finish study.

4.1.2.6 Functional Definition of Print AE

The existence of a print-job in the print queue will activate the Print SCU AE. An association is established with the printer and the printer's status determined. If the printer is operating normally, the film sheets described within the print-job will be printed. If the printer is not operating normally, this print-job can be canceled or restarted by the user operations.

4.1.3 Sequence of Real-World Activities

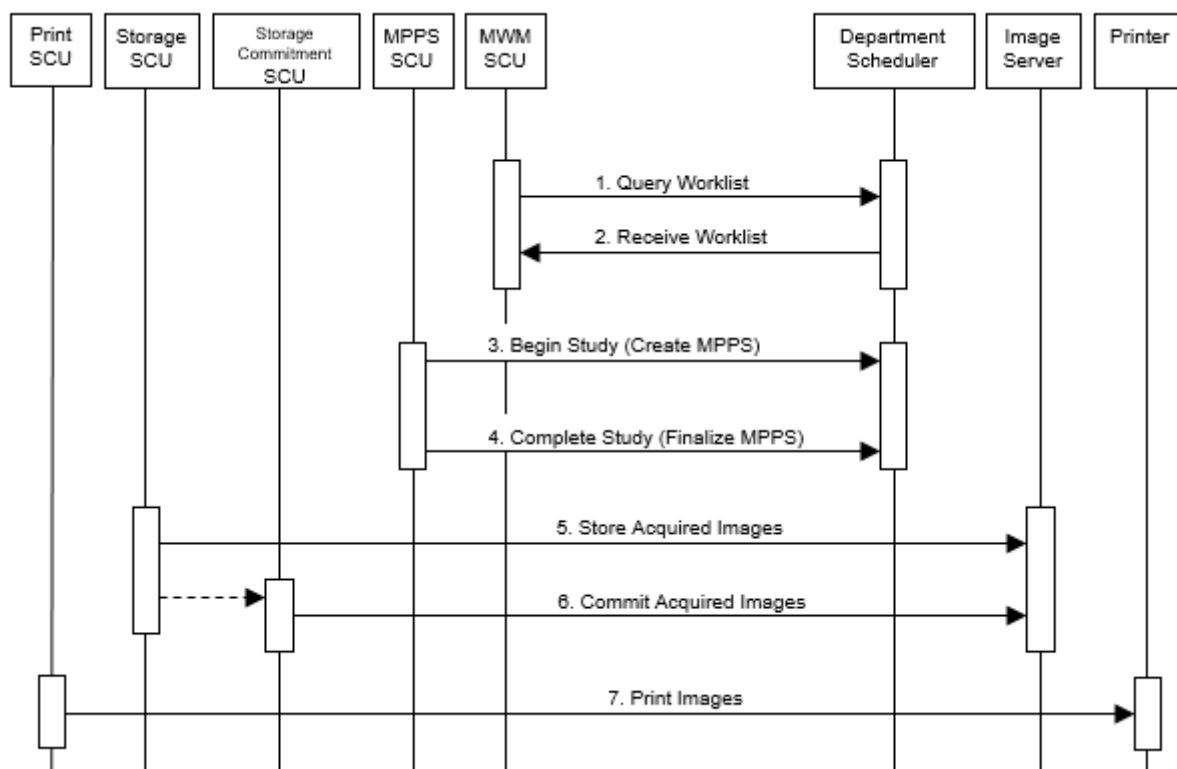


Figure 4.1-2
Sequence of Real World Activities

Under typical scheduled workflow conditions the sequencing constraints illustrated in the above figure apply:

1. Query Worklist.
2. Select Work-item from Worklist.
3. Start Acquisition and Create MPPS.
4. Complete Acquisition and Finalize MPPS.
5. Store Acquired Images.
6. Commit Acquired Images
7. Print Images.

Other workflow situations (e.g. unscheduled procedure steps) will have other sequencing constraints. Some activities may be omitted according to situations.

4.2 AE Specifications

4.2.1 Verification SCU AE Specification

4.2.1.1 SOP Classes

The Verification SCU AE provides Standard Conformance to the following SOP Classes:

**TABLE 4.2-1
SOP CLASSES FOR THE VERIFICATION SCU AE**

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No

4.2.1.2 Association Policies

4.2.1.2.1 General

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

**TABLE 4.2-2
DICOM Application Context FOR THE verification SCU AE**

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

4.2.1.2.2 Number of Associations

The Verification SCU AE initiates one association at a time.

**TABLE 4.2-3
Number of Associations Initiated for THE verification SCU AE**

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

4.2.1.2.3 Asynchronous Nature

The Verification SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**TABLE 4.2-4
Asynchronous Nature for THE verification SCU AE**

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.1.2.4 Implementation Identifying Information

The implementation information for the Verification SCU AE is:

**Table 4.2-5
DICOM Implementation Class and Version for THE verification SCU AE**

Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Verify Connectivity

4.2.1.3.2 Description and Sequencing of Activities

The Verification SCU AE attempts to initiate a new association in order to issue a verification request (C-ECHO) if needed.

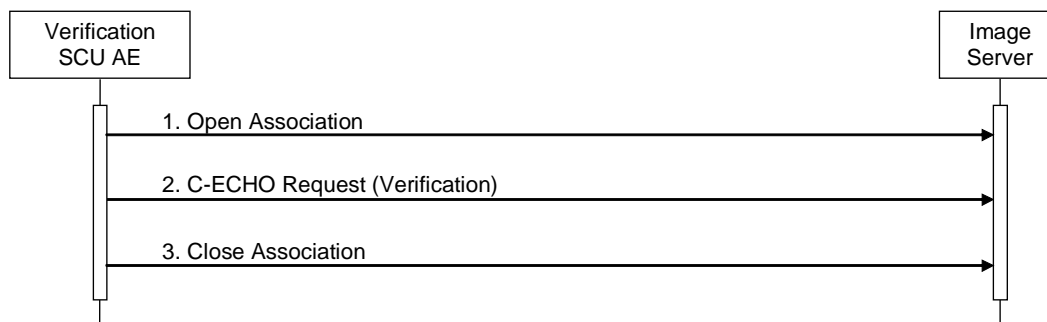


FIGURE 4.2-1

Sequencing of Activity – Verify CONNECTIVITY

A possible sequence of interactions between the Verification SCU AE and an Image Server (e.g. a storage or archive device supporting the Verification SOP Classes as an SCP) is illustrated in the Figure above:

1. The Verification SCU AE opens an association with the Image Server.
2. The Verification SCU AE issues a verification request (C-ECHO) and the Image Server replies with a C-ECHO response (status success).
3. The Verification SCU AE closes the association with the Image Server.

4.2.1.3.3 Proposed Presentation Contexts

The Verification SCU AE will propose the Presentation Contexts shown in the following table:

Table 4.2-6

Proposed Presentation Contexts for Activity Verify CONNECTIVITY

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

4.2.1.3.3.1 SOP Specific Conformance for Verification SOP Class

The Verification SCU AE provides standard conformance to the Verification Service Class as an SCU.

The behavior of Verification SCU AE when encountering status codes in a C-ECHO response is summarized in the table below:

**Table 4.2-7
VERIFICATION Response Status Handling Behavior**

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The Verification SCU AE judges the remote AE is present and active on the network.

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

**Table 4.2-8
VERIFICATION Communication Failure Behavior**

Exception	Behavior
Association aborted by the SCP or network layers	The failure reason is logged and reported to the user.

4.2.2 Storage SCU AE Specification

4.2.2.1 SOP Classes

The Storage SCU AE provides Standard Conformance to the following SOP Classes:

Table 4.2-9
SOP Classes for the Storage SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No

4.2.2.2 Association Policies

4.2.2.2.1 General

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

Table 4.2-10
DICOM Application Context for the Storage SCU AE

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

4.2.2.2.2 Number of Associations

The Storage SCU AE can initiate only one association at a time for each destination to which a transfer request is being processed in the active job queue list. Up to four jobs, that images will be sent to the different remote hosts, will be active at a time, the other remains pending until the active job is completed or failed.

Table 4.2-11
Number of Associations Initiated for the Storage SCU AE

Maximum number of simultaneous Associations	1
---	---

4.2.2.2.3 Asynchronous Nature

The Storage SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

TABLE 4.2-12
Asynchronous Nature for the Storage SCU AE

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.2.2.4 Implementation Identifying Information

The implementation information for the Storage SCU AE is:

Table 4.2-13
DICOM Implementation Class and Version for the Storage SCU AE

Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

4.2.2.3 Association Initiation Policy

4.2.2.3.1 Description and Sequencing of Activities

The Storage SCU AE attempts to initiate a new Association in order to issue a Storage request (C-STORE). If the job contains one image, then single C-STORE request will be issued over one Association. For multiple images, multiple C-STORE requests will be issued over one Associations. If the image transfer fails, the Storage SCU AE will not retry this send-job automatically.

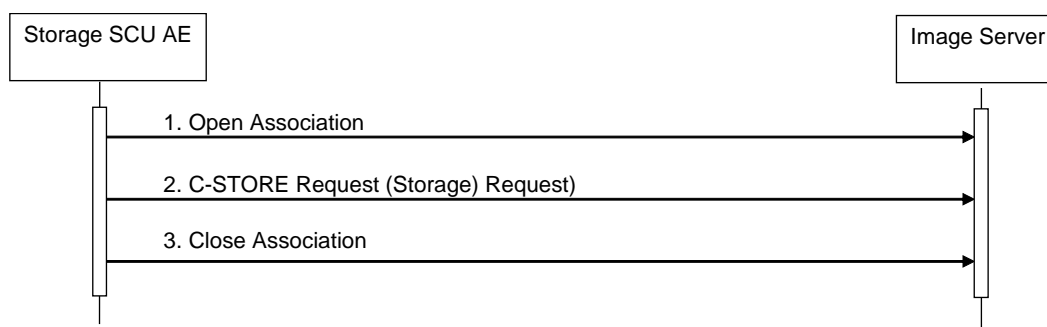


Figure 4.2-2
Sequence of Activity – Sending Images

A possible sequence of interactions between the Storage SCU AE and an Image Server (e.g. a storage or archive device supporting the Storage SOP Classes as an SCP) is illustrated in the Figure above:

1. The Storage SCU AE opens an Association with the Image Server.
2. Acquired images are transmitted to the Image Server using a Storage request (C-STORE) and the Image Server replies with a C-STORE response (status success).
3. The Storage SCU AE closes the Association with the Image Server.

4.2.2.3.2 Proposed Presentation Contexts

The Storage SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**Table 4.2-14
Proposed Presentation Context for Activity – Sending Images**

Abstract Syntax		Transfer Syntax		Role	Ext. Neg
Name	UID	Name	UID		
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
X-ray RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

The Storage SCU AE provides standard conformance to the Storage Service Class as an SCU. The behavior of Storage SCU AE when encountering status codes in a C-STORE response is summarized in the Table below:

**Table 4.2-15
C-STORE Response Status Handling Behavior**

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.
Refused	Out of Resources	A7xxH	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure.
Error	Data Set does not match SOP Class	A9xxH	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Error	Cannot Understand	CxxxH	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Warning	Coercion of Data Elements	B000H	Image transmission is considered successful if it is configured that the status would be considered successful.
Warning	Data Set does not match SOP Class	B007H	Image transmission is considered successful if it is configured that the status would be considered successful.
Warning	Elements Discarded	B006H	Image transmission is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application.

The behavior of Storage SCU AE during communication failure is summarized in the Table below:

**Table 4.2-16
C-STORE Communication Failure Behavior**

Exception	Behavior
-----------	----------

Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
--	---

If the image transfer fails, the Storage SCU AE will not retry this send-job automatically.

The contents of Image Storage SOP Instances created by the Storage SCU AE conform to the DICOM Image IOD definitions and are described in the next chapter.

4.2.3 Storage Commitment SCU AE Specification

4.2.3.1 SOP Classes

The Storage Commitment SCU AE provides Standard Conformance to the following SOP Classes:

TABLE 4.2-17
SOP Classes for THE Storage commitment SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No

4.2.3.2 Association Policies

4.2.3.2.1 General

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

4.2.3.2.2 Number of Associations

The Storage Commitment SCU AE initiates one Association at a time.

TABLE 4.2-18
Number of Associations Initiated for THE Storage commitment SCU AE

Maximum number of simultaneous Associations	1
---	---

The Storage Commitment SCU AE accepts Associations to receive N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class.

TABLE 4.2-19
Number of Associations Accepted for THE Storage commitment SCU AE

Maximum number of simultaneous Associations	1
---	---

4.2.3.2.3 Asynchronous Nature

The Storage Commitment SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

TABLE 4.2-20
Asynchronous Nature for THE Storage commitment SCU AE

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.3.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-21
DICOM Implementation Class and Version for THE Storage commitment SCU AE**

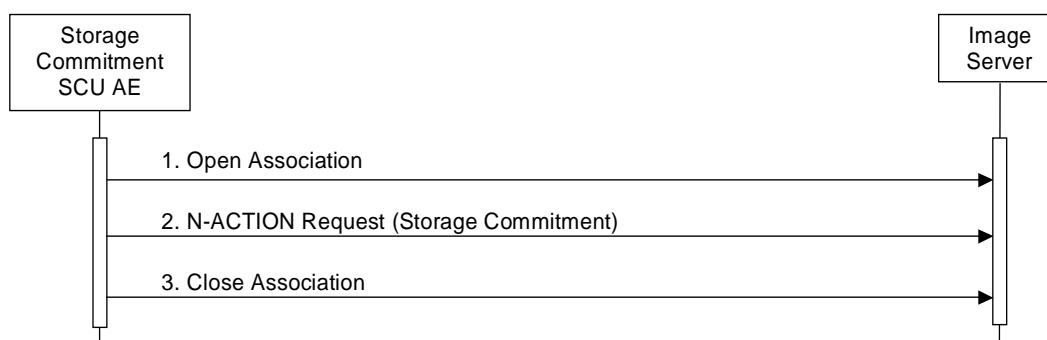
Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

4.2.3.3 Association Initiation Policy

4.2.3.3.1 Activity – Commit Sent Images

4.2.3.3.1.1 Description and Sequencing of Activities

If the remote AE is configured as a Storage Commitment SCP AE, the Storage Commitment SCU AE will transmit a single Storage Commitment request (N-ACTION) over another Association after each image have been sent. Upon receiving the N-ACTION response the Storage Commitment SCU AE will release the Association. The notification of Storage commitment (N-EVENT-REPORT) will be received over a separate Association.



**FIGURE 4.2-3
Sequencing of Activity – COMMIT IMAGES**

A possible sequence of interactions between the Storage Commitment SCU AE and an Image Server (e.g. a storage or archive device supporting the Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above:

1. The Storage Commitment SCU AE opens an Association with the Image Server.
2. A Storage Commitment request (N-ACTION) is transmitted to the Image Server to obtain Storage Commitment of previously transmitted image. The Image Server replies with an N-ACTION response indicating the request has been received and is being processed.
3. The Storage Commitment AE closes the Association with the Image Server.

NOTE: The N-EVENT-REPORT will be sent over a separate Association initiated by the Image Server

4.2.3.3.1.2 Proposed Presentation Contexts

The Storage Commitment SCU AE is capable of proposing the Presentation Contexts shown in the following table:

**Table 4.2-22
Proposed Presentation Contexts for Activity Commitment send images**

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.3.3.1.3 SOP Specific Conformance for Storage Commitment SOP Class**4.2.3.3.1.3.1 Storage Commitment Operations (N-ACTION)**

The Storage Commitment SCU AE provides standard conformance to the Storage Commitment Service Class as an SCU.

The Storage Commitment SCU AE will request storage commitment for instances of the Storage SOP Classes if the remote AE is configured as a Storage Commitment SCP AE and a presentation context for the Storage Commitment Push Model has been accepted.

The behavior of Storage SCU Commitment AE when encountering status codes in a N-ACTION response is summarized in the Table below:

TABLE 4.2-23
Commitment N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The request for storage commitment is considered successfully sent. A timer is started which will expire if no N-EVENT-REPORT for the Transaction UID is received within a configurable timeout period.
*	*	Any other status code.	The Association is aborted using A-ABORT and the request for storage commitment is marked as failed.

The behavior of Storage Commitment AE during communication failure is summarized in the Table below:

TABLE 4.2-24
Storage Commitment Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.

4.2.3.4 Association Acceptance Policy

4.2.3.4.1 Activity – Receive Storage Commitment Response

4.2.3.4.1.1 Description and Sequencing of Activities

The Storage Commitment SCU AE will accept Associations in order to receive responses to a Storage Commitment Request.

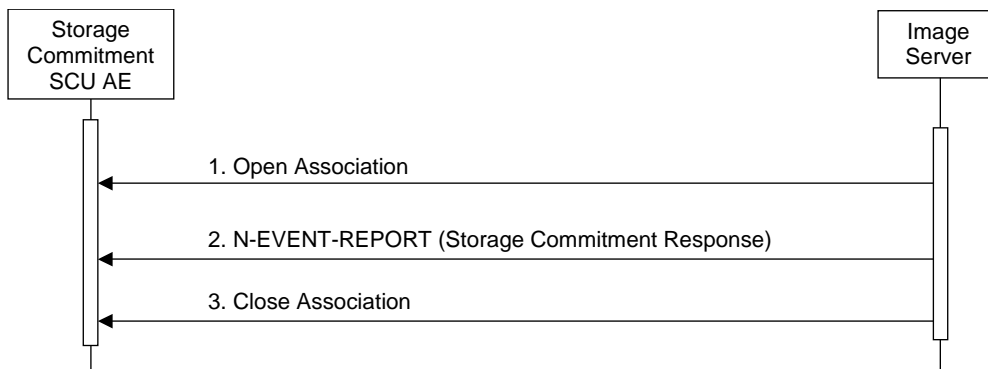


FIGURE 4.2-4
Sequencing of Activity - Receive Storage Commitment Response

A possible sequence of interactions between the Storage Commitment SCU AE and an Image Server (e.g. a storage or archive device supporting Storage Commitment SOP Classes as an SCP) is illustrated in the Figure above:

1. The Image Server opens a new Association with the Storage Commitment SCU AE.
2. The Image Server sends an N-EVENT-REPORT request notifying the Storage SCU AE of the status of a previous Storage Commitment Request. The Storage SCU AE replies with a N-EVENT-REPORT response confirming receipt.
3. The Image Server closes the Association with the Storage Commitment SCU AE.

The Storage Commitment SCU AE may reject Association attempts as shown in the Table below. The Result, Source and Reason/Diag columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU. The contents of the Source column is abbreviated to save space and the meaning of the abbreviations are:

- a) 1 – DICOM UL service-user
- b) 2 – DICOM UL service-provider (ASCE related function)
- c) 3 – DICOM UL service-provider (Presentation related function)

**TABLE 4.2-25
Association Rejection Reasons**

Result	Source	Reason / Diag	Explanation
2 – rejected-transient	C	2 – local-limit-exceeded	The maximum number of simultaneous Associations has been reached. An Association request with the same parameters may succeed at a later time.
2 – rejected-transient	C	1 – temporary-congestion	No Associations can be accepted at this time due to the real-time requirements of higher priority activities (e.g. during image acquisition no Associations will be accepted) or because insufficient resources are available (e.g. memory, processes, threads). An Association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The Association request contained an unsupported Application Context Name. An Association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not-recognized	The Association request contained an unrecognized Called AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association initiator is incorrectly configured and attempts to address the Association acceptor using the wrong AE Title.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The Association request contained an unrecognized Calling AE Title. An Association request with the same parameters will not succeed at a later time unless configuration changes are made. This rejection reason normally occurs when the Association acceptor has not been configured to recognize the AE Title of the Association initiator.
1 – rejected-permanent	b	1 – no-reason-given	The Association request could not be parsed. An Association request with the same format will not succeed at a later time.

4.2.3.4.1.2 Accepted Presentation Contexts

The Storage Commitment SCU AE will accept Presentation Contexts as shown in the Table below.

TABLE 4.2-26
Acceptable Presentation Contexts for Activity Receive Storage Commitment Response

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

A Presentation Context for the Storage Commitment Push Model will only be proposed if the remote AE is configured as a Storage Commitment SCP AE.

4.2.3.4.1.3 SOP Specific Conformance for Storage Commitment SOP Class

4.2.3.4.1.3.1 Storage Commitment Notifications (N-EVENT-REPORT)

The Storage Commitment SCU AE provides standard conformance to the Storage Commitment Service Class as an SCU.

The behavior of Storage Commitment SCU AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below.

TABLE 4.2-27
Storage Commitment N-EVENT-REPORT Behaviour

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	The Storage Commitment SCU AE permits the operator(s) to delete the Referenced SOP Instances under Referenced SOP Sequence (0018, 1199), or deletes the Instances from the local database automatically.
Storage Commitment Request Complete – Failures Exist	2	The Storage Commitment SCU AE requests the Storage SCU AE to send the Referenced SOP Instances under Failed SOP Sequence (0018, 1198).

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table below.

TABLE 4.2-28
Acceptable Presentation Contexts for Activity Receive Storage Commitment Response

Service Status	Further Meaning	Status Code	Reasons
Success	Success	0000	The storage commitment result has been successfully received.
Failure	Unrecognized Operation	0211H	The Transaction UID in the N-EVENT-REPORT request is not recognized (was never issued within an N-ACTION request).
Failure	Resource Limitation	0213H	The Transaction UID in the N-EVENT-REPORT request has expired (no N-EVENT-REPORT was received within a configurable time limit).
Failure	No Such Event Type	0113H	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
Failure	Processing Failure	0110H	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902).
Failure	Invalid Argument Value	0115H	One or more SOP Instance UIDs with the Referenced SOP Sequence (0008,1199) or Failed SOP Sequence (0008,1198) was not included in the Storage Commitment Request associated with this Transaction UID. The unrecognized SOP Instance UIDs will be returned within the Event Information of the N-EVENT-REPORT response.

4.2.4 MWM SCU AE Specification

4.2.4.1 SOP Classes

The MWM SCU AE provides Standard Conformance to the following SOP Classes:

TABLE 4.2-29 SOP Classes for THE MWM SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No

4.2.4.2 Association Policies

4.2.4.2.1 General

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

**TABLE 4.2-30
DICOM Application Context for THE MWM SCU AE**

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

4.2.4.2.2 Number of Associations

The MWM SCU AE initiates one Association at a time for a Worklist request.

**TABLE 4.2-31
Number of Associations Initiated for THE MWM SCU AE**

Maximum number of simultaneous Associations	1
---	---

4.2.4.2.3 Asynchronous Nature

The MWM SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

**TABLE 4.2-32
Asynchronous Nature for THE MWM SCU AE**

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.4.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

**TABLE 4.2-33
DICOM Implementation Class and Version for THE MWM SCU AE**

Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

4.2.4.3 Association Initiation Policy

4.2.4.3.1 Activity – Update Worklist

4.2.4.3.1.1 Description and Sequencing of Activities

The request for a “Update Worklist” is initiated by user interaction, i.e. pressing the buttons “Get” at the time of previous “Update Worklist”. Upon initiation of the request, the MWM SCU AE will build an Identifier for the C-FIND request, will initiate an association to send the request and will wait for Worklist responses. After retrieval of all responses, the MWM SCU AE will access the local database to update patient demographic data. The results will be displayed in a separate list. The MWM SCU AE will initiate an Association in order to issue a C-FIND request according to the Modality Worklist Information Model.

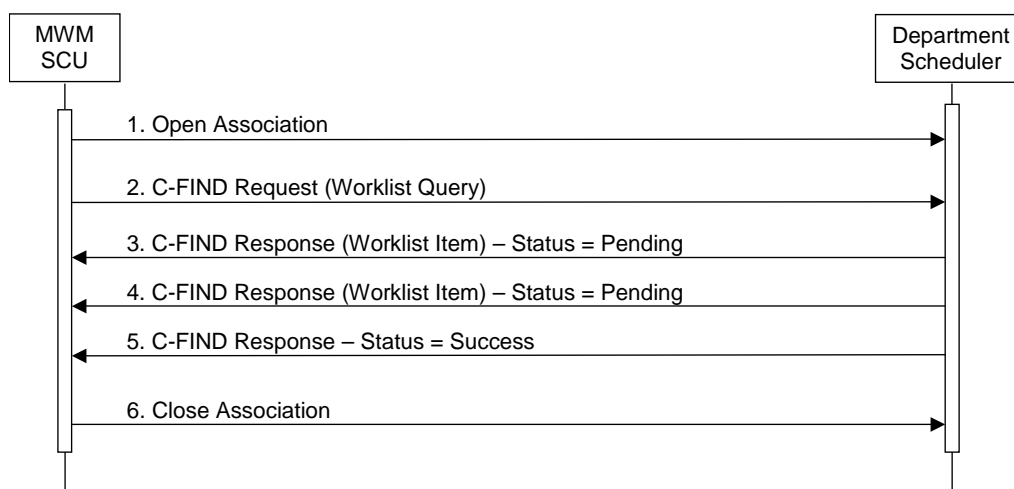


Figure 4.2-5
Sequencing of Activity – Update Worklist

A possible sequence of interactions between the MWM SCU AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the Modality Worklist SOP Class as an SCP) is illustrated in the Figure above:

1. The MWM SCU AE opens an association with the Department Scheduler
2. The MWM SCU AE sends a C-FIND request to the Department Scheduler containing the Worklist Query attributes.
3. The Department Scheduler returns a C-FIND response containing the requested attributes of the first matching Worklist Item.
4. The Department Scheduler returns another C-FIND response containing the requested attributes of the second matching Worklist Item.
5. The Department Scheduler returns another C-FIND response with status Success indicating that no further matching Worklist Items exist. This example assumes that only 2 Worklist items match the Worklist Query.
6. The MWM SCU AE closes the association with the Department Scheduler.

4.2.4.3.1.2 Proposed Presentation Contexts

The MWM SCU AE will propose Presentation Contexts as shown in the following table:

**Table 4.2-34
Proposed Presentation Contexts for Activity Update Worklist**

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.4.3.1.3 SOP Specific Conformance for Modality Worklist SOP Class

The MWM SCU AE provides standard conformance to the Modality Worklist SOP Class as an SCU.

The behavior of the MWM SCU when encountering status codes in a Modality Worklist C-FIND response is summarized in the Table below.

**Table 4.2-35
Modality Worklist C-FIND Response Status Handling Behavior**

Service Status	Further Meaning	Status Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Worklist items are available for display or further processing.
Refused	Out of Resources	A700H	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Identifier does not match SOP Class	A900H	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Failed	Unable to Process	CxxxH	The Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.
Cancel	Matching terminated due to Cancel request	FE00H	If the query was cancelled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the worklist query is marked as failed. The status meaning is logged and reported to the user if an interactive query.
Pending	Matches are continuing	FF00H	The worklist item contained in the Identifier is collected for later display or further processing.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01H	The worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation.
*	*	Any other status code.	The Association is aborted using A-ABORT and the worklist is marked as failed. The status meaning is logged and reported to the user if an interactive query. Any additional error information in the Response will be logged.

The behavior of the MWM SCU AE during communication failure is summarized in the Table below.

TABLE 4.2-36
Modality Worklist Communication Failure Behavior

Exception	Behavior
Association aborted by the SCP or network layers	The worklist query is marked as failed. The reason is logged and reported to the user if an interactive query.

The Table below provides a description of the MWM SCU AE Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

**TABLE 4.2-37
WORKLIST REQUEST IDENTIFIER**

Module Name Attribute Name	Tag	VR	M	R	D	IOD
SOP Common						
Specific Character Set	(0008,0005)	CS		x		x
Scheduled Procedure Step						
Scheduled Procedure Step Sequence	(0040,0100)	SQ		x		
> Scheduled Station AETitle	(0040,0001)	AE	S	x		
> Scheduled Station Name	(0040,0010)	LO		x		
> Scheduled Procedure Step Location	(0040,0011)	SH		x		
> Scheduled Procedure Step Start Date	(0040,0002)	DA	S, R	x		
> Scheduled Procedure Step Start Time	(0040,0003)	TM		x		
> Scheduled Procedure Step End Date	(0040,0004)	DA		x		
> Scheduled Procedure Step End Time	(0040,0005)	TM		x		
> Scheduled Performing Physician's Name	(0040,0006)	PN		x		x
> Scheduled Procedure Step Description	(0040,0007)	SH		x		
> Scheduled Protocol Code Sequence	(0040,0008)	SQ		x		
>> Code Value	(0008,0100)	SH		x		
>> Coding Scheme Designator	(0008,0102)	SH		x		
>> Coding Scheme Version	(0008,0103)	SH		x		
>> Code Meaning	(0008,0104)	LO		x		
> Scheduled Procedure Step ID	(0040,0009)	SH		x		
> Scheduled Procedure Step Status	(0040,0020)	CS		x		
> Comments on Scheduled Procedure Step	(0040,0400)	LT		x		
> Modality	(0008,0060)	CS	S	x	x	x
> Requested Contrast Agent	(0032,1070)	LO		x		
> Pre-Medication	(0040,0012)	LO		x		
Requested Procedure						
Requested Procedure ID	(0040,1001)	SH		x	x	x
Reason for the Requested Procedure	(0040,1002)	LO		x		
Requested Procedure Comments	(0040,1400)	LT		x		
Requested Procedure Code Sequence	(0032,1064)	SQ	x	x		
> Code Value	(0008,0100)	SH		x		
> Coding Scheme Designator	(0008,0102)	SH		x		
> Coding Scheme Version	(0008,0103)	SH		x		
> Code Meaning	(0008,0104)	LO		x		
Referenced Study Sequence	(0008,1110)	SQ		x		
>Referenced SOP Class UID	(0008,1150)	UI		x		
>Referenced SOP Instance UID	(0008,1155)	UI		x		
Requested Procedure Description	(0032,1060)	LO		x		
Study Instance UID	(0020,000D)	UI		x	x	x
Requested Procedure Priority	(0040,1003)	SH		x		
Patient Transport Arrangements	(0040,1004)	LO		x		
Requested Procedure Location	(0040,1005)	LO		x		
Confidentiality Code	(0040,1008)	LO		x		
Reporting Priority	(0040,1009)	SH		x		
Names of Intended Recipients of Results	(0040,1010)	PN		x		

Imaging Service Request						
Imaging Service Request Comments	(0040,2400)	LT		x		
Requesting Physician	(0032,1032)	PN		x		
Referring Physician's Name	(0008,0090)	PN		x	x	
Requesting Service	(0032,1033)	LO		x		x
Accession Number	(0008,0050)	SH	x	x	x	
Issue Date of Imaging Service Request	(0040,2004)	DA		x		x
Issue Time of Imaging Service Request	(0040,2005)	TM		x		
Order Entered By	(0040,2008)	PN		x		
Order Enters Location	(0040,2009)	SH		x		
Order Callback Phone Number	(0040,2010)	SH L		x		
Placer Order Number / Imaging Service Request	(0040,2016)	O L		x		
Filler Order Number / Imaging Service Request	(0040,2017)	O		x		
Visit Relationship						
Referenced Patient Sequence	(0008,1120)	SQ		x		
>Referenced SOP Class UID	(0008,1150)	UI		x		
>Referenced SOP Instance UID	(0008,1155)	UI		x		
Visit Identification						
Institution Name	(0008,0080)	LO		x		x
Institution Address	(0008,0081)	ST		x		
Admission ID	(0038,0010)	LO		x		
Visit Status						
Visit Status ID	(0038,0008)	CS				
Current Patient Location	(0038,0300)	LO		x		
Patient's Institution Residence	(0038,0400)	LO				
Visit Comments	(0038,4000)	LT				
Visit Admission						
Route of Admissions	(0038,0016)	LO		x		
Admitting Date	(0038,0020)	DA		x		
Admitting Time	(0038,0021)	TM		x		
Patient Identification						
Patient's Name	(0010,0010)	PN	x	x		x
Patient ID	(0010,0020)	LO	x	x	x	x
Issuer of Patient ID	(0010,0021)	LO		x	x	
Other Patient IDs	(0010,1000)	LO		x		
Other Patient Names	(0010,1001)	PN		x		
Patient's Birth Name	(0010,1005)	PN		x		
Patient's Mother's Birth Name	(0010,1060)	PN		x		
Medical Record Locator	(0010,1090)	LO		x		

Patient Demographic						
Patient's Age	(0010,1010)	AS		x	x	
Occupation	(0010,2180)	SH		x		
Confidentiality Constraint Description on patient data	(0040,3001)	LO		x		
Patient's Birth Date	(0010,0030)	DA	x	x	x	x
Patient's Birth Time	(0010,0032)	TM		x		
Patient's Sex	(0010,0040)	CS	x	x	x	x
Patient's Size	(0010,1020)	DS		x		
Patient's Weight	(0010,1030)	DS		x		
Patient's Address	(0010,1040)	LO		x		
Military Rank	(0010,1080)	LO		x		
Branch of Service	(0010,1081)	LO		x		
Country Residence	(0010,2150)	LO		x		
Region of Residence	(0010,2152)	LO		x		
Patient's Telephone Number	(0010,2154)	SH		x		
Ethnic Group	(0010,2160)	SH		x		
Patient's Religious Reference	(0010,21F0)	LO		x		
Patient Comment	(0010,4000)	LT		x		x
Patient Medical						
Medical Alerts	(0010,2000)	LO		x		
Allergies	(0010,2110)	LO		x		
Smoking Status	(0010,21A0)	CS		x		
Additional Patient History	(0010,21B0)	LT		x		
Pregnancy Status	(0010,21C0)	US		x		
Last Menstrual Date	(0010,21D0)	DA		x		
Special Needs	(0038,0050)	LO		x		
Patient State	(0038,0500)	LO		x		

The above table should be read as follows:

- Module Name: The name of the associated module for supported worklist attributes.
- Attribute Name: Attributes supported to build the MWM SCU AE Worklist Request Identifier.
- Tag: DICOM tag for this attribute.
- VR: DICOM VR for this attribute.
- M: Matching keys for (automatic) Worklist Update. An "S" will indicate that the MWM SCU AE will supply an attribute value for Single Value Matching, a "R" will indicate Range Matching and an "x" will indicate Wildcard Matching. This setting can be selected the device user interface. The system's default setting is described in the above table.
- R: Return keys. An "x" will indicate that the MWM SCU AE will supply this attribute as Return Key with zero length for Universal Matching. This setting can be configured using the service tool. The system's default setting is described in the above table.
- D: Displayed keys. An "x" indicates that this worklist attribute is displayed to the user during a patient registration dialog. For example, Patient Name will be displayed when registering the patient prior to an examination. This setting can be configured using the service tool. The system's default setting is described in the above table.
- IOD: An "x" indicates that this Worklist attribute is included into all Object Instances created during performance of the related Procedure Step. This setting can be configured using the service tool. The system's default setting is described in the above table.

4.2.4.4 Association Acceptance Policy

The MWM SCU AE does not accept Associations.

4.2.5 MPPS SCU AE Specification

4.2.5.1 SOP Classes

The MPPS SCU AE provides Standard Conformance to the following SOP Classes:

TABLE 4.2-38
SOP Classes for THE MPPS SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

4.2.5.2 Association Policies

4.2.5.2.1 General

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

TABLE 4.2-39
DICOM Application Context for THE MPPS SCU AE

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

4.2.5.2.2 Number of Associations

The MPPS SCU AE initiates one Association at a time.

TABLE 4.2-40
Number of Associations Initiated for THE MPPS SCU AE

Maximum number of simultaneous Associations	1
---	---

4.2.5.2.3 Asynchronous Nature

The MPPS SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

TABLE 4.2-41
Asynchronous Nature for THE MPPS SCU AE

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.5.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

TABLE 4.2-42
DICOM Implementation Class and Version for THE MPPS SCU AE

Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

4.2.5.3 Association Initiation Policy

4.2.5.3.1.1 Activity – Acquire Instances

4.2.5.3.1.2 Description and Sequencing of Activities

The MPPS SCU AE performs the creation of a MPPS Instance automatically when the user starts the study. Further updates on the MPPS data can be performed when the user completes the study.

The MPPS SCU AE will initiate an Association to issue an:

- N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation, or an:
- N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

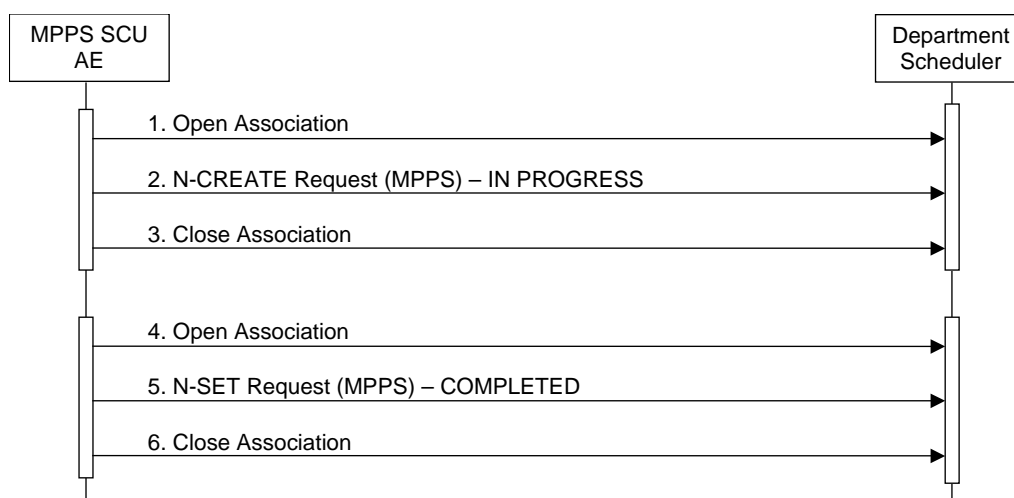


FIGURE 4.2-6
Sequencing of Activity – Acquire INSTANCES

A possible sequence of interactions between the MPPS SCU AE and a Department Scheduler (e.g. a device such as a RIS or HIS which supports the MPPS SOP Class as an SCP) is illustrated in the Figure above:

1. The MPPSSCU AE opens an association with the Department Scheduler
2. The MPPSSCU AE sends an N-CREATE request to the Department Scheduler to create an MPPS instance with status of “IN PROGRESS” and create all necessary attributes. The Department Scheduler acknowledges the MPPS creation with an N-CREATE response (status success).
3. The MPPSSCU AE closes the association with the Department Scheduler.
4. The MPPSSCU AE opens an association with the Department Scheduler.
5. The MPPSSCU AE sends an N-SET request to the Department Scheduler to update the MPPS instance with status of “COMPLETED” or “DISCONTINUED” and set all necessary attributes. The Department Scheduler acknowledges the MPPS update with an N-SET response (status success).
6. The MPPSSCU AE closes the association with the Department Scheduler.

4.2.5.3.1.3 Proposed Presentation Contexts

The MPPS SCU AE will propose Presentation Contexts as shown in the following Table:

**TABLE 4.2-43
PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY ACQUIRE IMAGES**

Abstract Syntax		Transfer Syntax		Role	Ext. Nego.
Name	UID	Name	UID		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.5.3.1.4 SOP Specific Conformance for MPPS SOP Class

The MPPS SCU AE provides standard conformance to the Modality Performed Procedure Step SOP Class as an SCU.

The behavior of the MPPS SCU AE when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in the Table below.

**TABLE 4.2-44
MPPS N-CREATE / N-SET RESPONSE STATUS HANDLING BEHAVIOR**

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Failure	Processing Failure – Performed Procedure Step Object may no longer be updated	0110H	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. Additional information in the Response will be logged (i.e. Error Comment and Error ID).
Warning	Attribute Value Out of Range	0116H	The MPPS operation is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user.

The behavior of the MPPS SCU AE during communication failure is summarized in the Table below:

**Table 4.2-45
MPPS COMMUNICATION FAILURE BEHAVIOR**

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and MPPS is marked as failed. The reason is logged and reported to the user.
Association aborted by the SCP or network layers	The MPPS is marked as failed. The reason is logged and reported to the user.

Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The Table below provides a description of the MPPS N-CREATE and N-SET request identifiers sent by the MPPS SCU AE. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An “x” indicates that an appropriate value will be sent. A “Zero length” attribute will be sent with zero length.

**TABLE 4.2-46
MPPS N-CREATE / N-SET REQUEST IDENTIFIER**

Attribute Name	Tag	VR	N-CREATE	N-SET
Specific Character Set	(0008,0005)	CS	Created, if an extended or replacement character set is used. Refer to 5. Support of Character Sets	
Performed Procedure Step Relationship				

Scheduled Step Attributes Sequence	(0040,0270)	SQ	Always Set	
> Study Instance UID	(0020,000D)	UI	From Modality Worklist	
> Referenced Study Sequence	(0008,1110)	SQ	Zero or more items	
>> Referenced SOP Class UID	(0008,1150)	UI	x	
>> Referenced SOP Instance UID	(0008,1155)	UI	x	
> Accession Number	(0008,0050)	SH	From Modality Worklist	
> Requested Procedure ID	(0040,1001)	SH	From Modality Worklist	
> Requested Procedure Description	(0032,1060)	LO	From Modality Worklist	
> Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist	
> Scheduled Procedure Step Description	(0040,0007)	LO	x	
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	Zero or more items	
>>Code Value	(0008,0100)	SH	x	
>>Coding Scheme Designator	(0008,0102)	SH	x	
>>Coding Scheme Version	(0008,0103)	SH	x	
>>Code Meaning	(0008,0104)	LO	x	
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input	
Patient ID	(0010,0020)	LO	From Modality Worklist or user input.	
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input.	
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input.	
Referenced Patient Sequence	(0008,1120)	SQ	Zero or more items	
>Referenced SOP Class UID	(0008,1150)	UI	x	
>Referenced SOP Instance UID	(0008,1155)	UI	x	
Performed Procedure Step Information				
Performed Procedure Step ID	(0040,0253)	SH	Automatically created.	
Performed Station AE Title	(0040,0241)	AE	From Modality Worklist	
Performed Station Name	(0040,0242)	SH	From Modality Worklist	
Performed Location	(0040,0243)	SH	From Modality Worklist	
Performed Procedure Step Start Date	(0040,0244)	DA	Actual start date	
Performed Procedure Step Start Time	(0040,0245)	TM	Actual start time	
Performed Procedure Step Status	(0040,0252)	CS	IN PROGRESS	COMPLETED or DISCONTINUED
Performed Procedure Step Description	(0040,0254)	LO	From Modality Worklist.	
Performed Procedure Type Description	(0040,0255)	LO	x	
Procedure Code Sequence	(0008,1032)	SQ	Zero or more items	
>>Code Value	(0008,0100)	SH	x	
>>Coding Scheme Designator	(0008,0102)	SH	x	
>>Coding Scheme Version	(0008,0103)	SH	x	
>>Code Meaning	(0008,0104)	LO	x	
Performed Procedure Step End Date	(0040,0250)	DA	Zero length	Actual end date
Performed Procedure Step End Time	(0040,0251)	TM	Zero length	Actual end time

Comments on the Performed Procedure Steps	(0040,0280)	ST	Zero length	x
Image Acquisition Results				
Modality	(0008,0060)	CS	XA or RF	
Study ID	(0020,0010)	SH	From Modality Worklist or automatically created.	
Performed Protocol Code Sequence	(0040,0260)	SQ	Zero or more items	Zero or more items
>>Code Value	(0008,0100)	SH	x	x
>>Coding Scheme Designator	(0008,0102)	SH	x	x
>>Coding Scheme Version	(0008,0103)	SH	x	x
>>Code Meaning	(0008,0104)	LO	x	x
Performed Series Sequence	(0040,0340)	SQ	Zero or more items	One or more items
> Performing Physician's Name	(0008,1050)	PN	x	From Modality Worklist or user input
> Protocol Name	(0018,1030)	LO	x	Automatically created
> Operator's Name	(0008,1070)	PN		x
> Series Instance UID	(0020,000E)	UI	x	Automatically created
> Series Description	(0008,103E)	LO	x	x
> Retrieve AE Title	(0008,0054)	AE	x	x
> Referenced Image Sequence	(0008,1140)	SQ	x	Zero or more items
>> Referenced SOP Class UID	(0008,1150)	UI	x	x
>> Referenced SOP Instance UID	(0008,1155)	UI	x	x
> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	SQ	x	Zero or more items
>> Referenced SOP Class UID	(0008,1150)	UI	x	x
>> Referenced SOP Instance UID	(0008,1155)	UI	x	x

4.2.6 Print SCU AE Specification

4.2.6.1 SOP Classes

The Print SCU AE provides Standard Conformance to the following Meta SOP Classes:

TABLE 4.2-47
META SOP Classes for THE PRINT SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Yes	No

The above Meta SOP Classes are defined by the following set of supported SOP Classes:

TABLE 4.2-48
SOP Classes for THE PRINT SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No

4.2.6.2 Association Policies

4.2.6.2.1 General

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

TABLE 4.2-49
DICOM Application Context for THE PRINT SCU AE

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

4.2.6.2.2 Number of Associations

The Print SCU AE can initiate up to one Associations at a time.

TABLE 4.2-50
Number of Associations Accepted for THE PRINT SCU AE

Maximum number of simultaneous Associations	1
---	---

4.2.6.2.3 Asynchronous Nature

The Print SCU AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

TABLE 4.2-51
Asynchronous Nature for THE PRINT SCU AE

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.6.2.4 Implementation Identifying Information

The implementation information for the Print SCU AE is:

TABLE 4.2-52
DICOM Implementation Class and Version for THE PRINT SCU AE

Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

4.2.6.3 Association Initiation Policy

4.2.6.3.1.1 Activity – Send Images & Print Management Information

4.2.6.3.1.2 Description and Sequencing of Activities

A user composes images onto film sheets and requests them to be sent to a specific hardcopy device. The user can select the desired film format and number of copies.

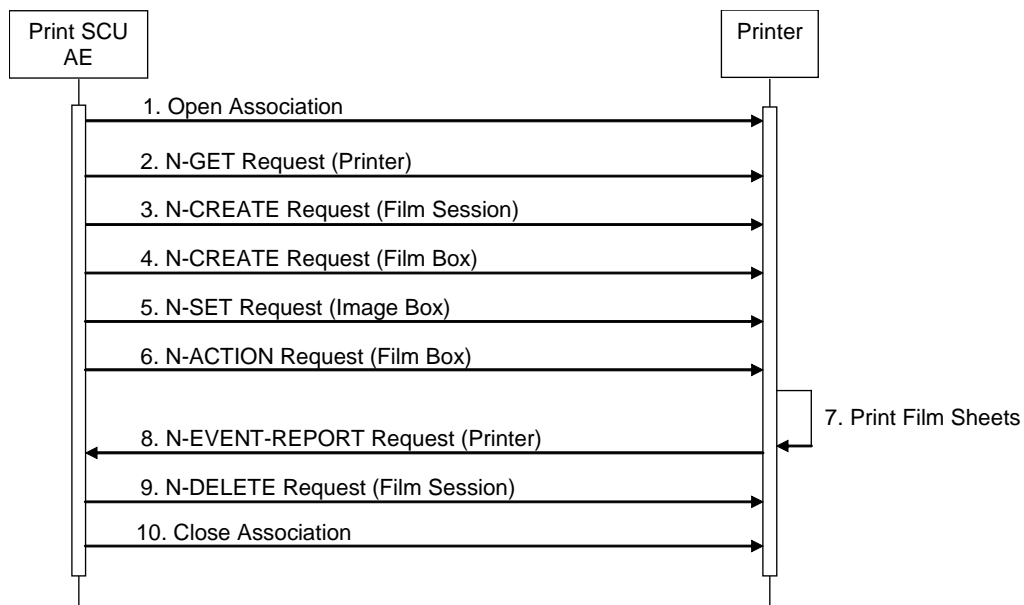


Figure 4.2-7 Sequencing of Activity – SEND Images & PRINT MANAGEMENT INFORMATION

A typical sequence of DIMSE messages sent over an association between the Print SCU AE and a Printer is illustrated in the Figure above:

1. The Print SCU AE opens an Association with the Printer.
2. N-GET on the Printer SOP Class is used to obtain current printer status information.
3. N-CREATE on the Film Session SOP Class creates a Film Session.
4. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session.
5. N-SET on the Image Box SOP Class transfers the contents of the film sheet to the printer.
6. N-ACTION on the Film Box SOP Class instructs the Printer to print the Film Box.
7. The Printer prints the requested number of film sheets.
8. The Printer asynchronously reports its status via N-EVENT-REPORT notification (Printer SOP Class). The printer can send this message at any time. The Print SCU AE does not require the N-EVENT-REPORT to be sent. The Print SCU AE is capable of receiving an N-EVENT-REPORT notification at any time during an association.
9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.
10. The Print SCU AE closes the Association with the Printer.

4.2.6.3.1.3 Proposed Presentation Contexts

The Print SCU AE is capable of proposing the Presentation Contexts shown in the Table below:

Table 4.2-53

Proposed Presentation Contexts for Activity SEND Images & PRINT MANAGEMENT INFORMATION

Abstract Syntax		Transfer Syntax		Role	Ext. Nego.
Name	UID	Name	UID		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.6.3.1.4 Common SOP Specific Conformance for all Print SOP Classes

The general behavior of the Print SCU AE during communication failure is summarized in the Table below. This behavior is common for all SOP Classes supported by the Print SCU AE.

Table 4.2-54

PRINT Communication Failure Behavior

Exception	Behavior
Association aborted by the SCP or network layers	The print-job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.

4.2.6.3.1.5 SOP Specific Conformance for Printer SOP Class

The Print SCU AE supports the following DIMSE operations and notifications for the Printer SOP Class:

- N-GET

- N-EVENT-REPORT

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.6.3.1.5.1 Printer SOP Class Operations (N-GET)

The Print SCU AE uses the Printer SOP Class N-GET operation to obtain information about the current printer status. The attributes obtained via N-GET are listed in the Table below:

**Table 4.2-55
Printer SOP Class N-GET Request Attributes**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Printer Status	(2110,0010)	CS	Provided by Printer	ALWAYS	Printer
Printer Status Info	(2110,0020)	CS	Provided by Printer	ALWAYS	Printer

The Printer Status information is evaluated as follows:

1. If Printer status (2110,0010) is NORMAL, the print-job continues to be printed.
2. If Printer status (2110,0010) is FAILURE, the printjob is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job control application.
3. If Printer status (2110,0010) is WARNING, the print job continues to be printed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the jobcontrol application.
4. If Printer status (2110,0010) is empty, the printjob continues to be printed. The contents of Printer Status Info (2110,0020) is logged as NOT READY and reported to the user via the job control application.

The behavior of The Print SCU AE when encountering status codes in a N-GET response is summarized in the Table below:

**Table 4.2-56
Printer SOP Class N-GET Response Status Handling Behavior**

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The request to get printer status information was success.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.6.3.1.5.2 Printer SOP Class Notifications (N-EVENT-REPORT)

The Print SCU AE is capable of receiving an N-EVENT-REPORT request at any time during an association.

The behavior of The Print SCU AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below:

**TABLE 4.2-57
Printer SOP Class N-EVENT-REPORT BEHAVIOUR**

Event Type Name	Event Type ID	Behavior
Normal	1	The print-job continues to be printed.
Warning	2	The print-job continues to be printed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.
Failure	3	The print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.
*	*	An invalid Event Type ID will cause a status code of 0113H to be returned in a N-EVENT-REPORT response.

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table below:

**Table 4.2-58
Printer SOP Class N-EVENT-REPORT Response Status Reasons**

Service Status	Further Meaning	Status Code	Reasons
Success	Success	0000	The notification event has been successfully received.
Failure	No Such Event Type	0113H	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
Failure	Processing Failure	0110H	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902).

4.2.6.3.1.6 SOP Specific Conformance for the Film Session SOP Class

The Print SCU AE supports the following DIMSE operations for the Film Session SOP Class:

- N-CREATE
- N-DELETE

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.6.3.1.6.1 Film Session SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

Table 4.2-59
Film Session SOP Class N-CREATE Request Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Copies	(2000,0010)	IS	1 ..99	ALWAYS	User
Print Priority	(2000,0020)	CS	LOW, MED or HIGH	ALWAYS	User
Medium Type	(2000,0030)	CS	BLUE FILM, CLEAR FILM or PAPER	ALWAYS	User
Film Session Label	(2000,0050)	SH	User Configuration	ALWAYS	CONFIG
Owner ID	(2100,0160)	LO	User Configuration	ALWAYS	CONFIG

The behavior of The Print SCU AE when encountering status codes in a N-CREATE response is summarized in the Table below:

Table 4.2-60
Film Session SOP Class N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Warning	Attribute Value Out of Range	0116H	The N-CREATE operation is considered successful if it is configured that the status would be considered successful.
Warning	Attribute List Error	0107H	The N-CREATE operation is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.6.3.1.6.2 Film Session SOP Class Operations (N-DELETE)

The behavior of The Print SCU AE when encountering status codes in a N-DELETE response is summarized in the Table below:

Table 4.2-61
Printer SOP Class N-DELETE Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.6.3.1.7 SOP Specific Conformance for the Film Box SOP Class

The Print SCU AE supports the following DIMSE operations for the Film Box SOP Class:

- N-CREATE
- N-ACTION

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.6.3.1.7.1 Film Box SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

**Table 4.2-62
Film Box SOP Class N-CREATE Request Attributes**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Display Format	(2010,0010)	CS	STANDARD1,1	ALWAYS	Auto
Referenced Film Session Sequence	(2010,0500)	SQ		ALWAYS	Auto
>Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.1.2	ALWAYS	Auto
>Referenced SOP Instance UID	(0008,1155)	UI	From created Film Session SOP Instance	ALWAYS	Auto
Film Orientation	(2010,0040)	CS	PORTRAIT or LANDSCAPE	ALWAYS	User
Film Size ID	(2010,0050)	CS	Set configurable. The printer defines default. User values = A4 8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN	ALWAYS	User
Magnification Type	(2010,0060)	CS	REPLICATE, BILINEAR, CUBIC or NONE	ALWAYS	User
Min Density	(2010,0120)	US	Userconfigurable.0 .. 9999	ALWAYS	User
Max Density	(2010,0130)	US	Userconfigurable.0..9999	ALWAYS	User

The behavior of the Print SCU AE when encountering status codes in a N-CREATE response is summarized in the Table below:

**Table 4.2-63
Film Box SOP Class N-CREATE Response Status Handling Behavior**

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Warning	Requested Min Density or Max Density outside of printer's operating range	B605H	The N-CREATE operation is considered successful if it is configured that the status would be considered successful.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.6.3.1.7.2 Film Box SOP Class Operations (N-ACTION)

An N-ACTION Request is issued to instruct the Print SCP to print the contents of the Film Box. The Action Reply argument in an N-ACTION response is not evaluated.

The behavior of The Print SCU AE when encountering status codes in a N-ACTION response is summarized in the Table below:

**Table 4.2-64
Film Box SOP Class N-ACTION Response Status Handling Behavior**

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully. The film has been accepted for printing.
Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page)	B603H	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604H	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size is larger than Image Box size. The image has been cropped to fit.	B609H	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60AH	The N-ACTION operation is considered successful if it is configured that the status would be considered successful.
Failure	Unable to create Print Job SOP Instance; print queue is full.	C602H	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Image size is larger than Image Box size.	C603H	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Combined Print Image Size is larger than Image Box size.	C613H	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.6.3.1.8 SOP Specific Conformance for the Grayscale Image Box SOP Class

The Print SCU AE supports the following DIMSE operations for the Grayscale Image Box SOP Class:

- N-SET

Details of the supported attributes and status handling behavior are described in the following subsections.

4.2.6.3.1.8.1 Grayscale Image Box SOP Class Operations (N-SET)

The attributes supplied in an N-SET Request are listed in the Table below:

**Table 4.2-65
Grayscale Image Box SOP Class N-SET Request Attributes**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Position	(2020,0010)	US	Based on the image display format.	ALWAYS	Auto
Polarity	(2020,0020)	CS	NORMAL, REVERSE	ALWAYS	CONFIG

Basic Grayscale Image Sequence	(2020,0110)	SQ	Sequence	ALWAYS	Auto
>Samples Per Pixel	(0028,0002)	US	1	ALWAYS	Auto
>Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	Auto
>Rows	(0028,0010)	US	Configuration	ALWAYS	Auto
>Columns	(0028,0011)	US	Configuration	ALWAYS	Auto
>Pixel Aspect Ratio	(0028,0034)	IS	Configuration	ANAP	Auto
>Bits Allocated	(0028,0100)	US	Configuration	ALWAYS	Auto
>Bits Stored	(0028,0101)	US	Configuration	ALWAYS	Auto
>High Bit	(0028,0102)	US	Configuration	ALWAYS	Auto
>Pixel Representation	(0028,0103)	US	0whichrepresents Unsignedinteger.	ALWAYS	Auto
>Pixel Data	(7FE0,0010)	OB		ALWAYS	Auto

The behavior of the Print SCU AE when encountering status codes in a N-SET response is summarized in the Table below:

Table 4.2-66
GRAYSCALE Image Box SOP Class N-SET Response Status Handling Behavior

Service Status	Further Meaning	Status Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully. Image successfully stored in Image Box.
Warning	Image size is larger than Image Box size. The image has been demagnified.	B604H	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Warning	Requested Min Density or Max Density outside of printer's operating range.	B605H	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size is larger than Image Box size. The image has been cropped to fit.	B609H	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Warning	Image size or Combined Print Image Size is larger than Image Box size. The image or combined Print Image has been decimated to fit.	B60AH	The N-SET operation is considered successful if it is configured that the status would be considered successful.
Failure	Image size is larger than Image Box size.	C603H	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Insufficient memory in printer to store the image.	C605H	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
Failure	Combined Print Image Size is larger than Image Box size.	C613H	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.
*	*	Any other status code.	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.

4.2.6.4 Association Acceptance Policy

The Print SCU AE does not accept Associations.

4.3 Network Interfaces

4.3.1 Physical Network Interface

This Product supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

TABLE 4.3-1
Supported Physical Network Interfaces

Ethernet 1000baseT
Ethernet 100baseT
Ethernet 10baseT

4.3.2 Additional Protocols

None.

4.4 CONFIGURATION

4.4.1 AE Title/Presentation Address Mapping

4.4.1.1 Local AE Titles

All local applications use the AE Titles and TCP/IP Ports configured via the Service/Installation. The Field Service Engineer can configure the TCP Port via the Service/Installation.

**Table 3.4-1
AE Title Configuration Table**

Application Entity	Default AE Title	Default TCP/IP Port
Verification SCU	Verify_SCU	Not Applicable
MWM SCU	MWL_SCU	
MPPS SCU	MPPS_SCU	
Print SCU	Print_SCU	
Storage SCU	Storage_SCU	
Storage Commitment SCU	LOCAL_SCP	104

4.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Titles, host names and port numbers of remote applications are configured using the Service/Installation.

5. Media Interchange

5.1 Implementation Model

5.1.1 Application Data Flow

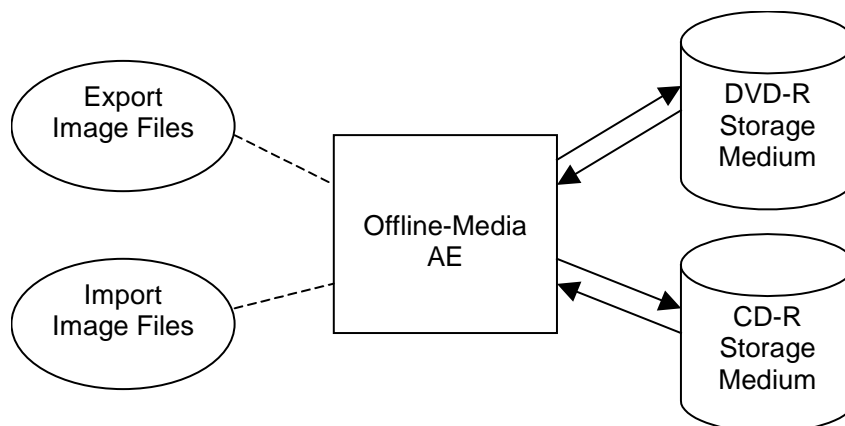


Figure 5.1-1
Application Data Flow Diagram for Media Storage

- The Offline-Media AE exports image files to a CD-R or a DVD-R Storage medium. It is associated with the local real-world activity “Export Image Files” performed upon user request.
- The Offline-Media AE imports image files from a CD-R or a DVD-R Storage medium. It is associated with the local real-world activity “Import Image Files” performed upon user request.

5.2 AE Specifications

5.2.1.1 Functional Definition of Offline-Media AE

The Offline-Media AE is performed upon user request for selected studies /series/images to/from an offline DICOM CD-R or DVD-R medium. It therefore performs the following tasks:

Export:

- Builds DICOM Information Objects.
- Creates a DICOMDIR file that represents the contents of the DICOM Information Objects to be recorded.
- Records DICOM Information Objects and the DICOMDIR file to the CD-R or the DVD-R medium.

Import:

- Reads the DICOMDIR file that represents the contents of the data as recorded.
- Displays the ordered list of studies/series/images, identifying information.
- Loads the selected studies/series/images from a CD-R or a DVD-R medium and displays them on the screen.

Note: The Offline-Media AE can update files created by the product itself.

5.2.2 Sequencing of Real-World Activities

5.2.2.1 Activity - Export Image Files

5.2.2.1.1 Activity-Export Image Files to CD-R

Operator requests to create new File-set(s) onto a new CD-R. The requests are placed in a queue and are executed in the background.

The operations for “Export Image Files” are described below:

- Step-1: Select the instance(s), series or studies on the local storage device to be created to the CD-R medium.
- Step-2: Select the image archiving.
- Step-3: Select the Virtual CD device as a destination.
- Step-4: Request to copy to the CD-R.

5.2.2.1.2 Activity-Export Image Files to DVD-R

Operator requests to create File-set(s) onto a new DVD-R. The requests are placed in a queue and are executed in the background.

The operations for “Export Image Files” are described below:

- Step-1: Select the instance(s), series or studies on the local storage device to be created to the DVD-R medium.
- Step-2: Select the image archiving.
- Step-3: Select the DVD device as a destination.
- Step-4: Request to copy to the DVD-R.

5.2.2.2 Activity - Import Image Files

Operator requests to retrieve File-set(s) on the CD-R or the DVD-R. The requests are placed in a queue and are executed in the background.

The operations for “Import Image Files” are described below:

- Step-1: Select the XA, RF Image(s), series or studies on the medium to be retrieved to the local storage device.
- Step-2: Select the data retrieval.
- Step-3: Select the local storage device as a destination.

5.2.3 File Meta Information for Implementation Class and Version

The implementation information written to the File Meta Header in each file is:

**TABLE 5.2-1
DICOM Implementation Class and Version for Media Storage**

File Meta Information Version	1
Implementation Class UID	1.3.6.1.4.1.43276.0.3.0.1
Implementation Version Name	CXView3.0.1

5.3 AE SPECIFICATIONS

5.3.1 Offline-Media AE Specification

The Offline-Media AE provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed below:

**Table 5.3-1
APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA**

Application Profiles Supported	Real World Activity	Role	SC Option
STD-GEN-CD, STD-GEN-DVD	Export Image Files	FSC	Interchange
STD-GEN-CD, STD-GEN-DVD	Import Image Files	FSR	Interchange

In case of DVD-R medium, the Application Profiles described above are provisionally adopted.

5.3.1.1 File Meta Information for the Application Entity

The Offline-Media AE does not set the Source Application Entity Title.

5.3.1.2 Real-World Activities

5.3.1.2.1 Activity – Export Image Files

The Offline-Media AE acts as an FSC using the interchange option when requested to export SOP Instances from the local database to a STD-GEN-CD, or a STD-GEN-DVD medium.

5.3.1.2.1.1 Media Storage Application Profiles

The Offline-Media AE supports the STD-GEN-CD and the STD-GEN-DVD Application Profile.

5.3.1.2.1.1.1 Options

The Offline-Media AE supports the SOP Classes and Transfer Syntaxes listed in the Table below for the STD-GEN-CD, the STD-GEN-DVD Application Profile as an FSC.

**Table 5.3-2
IODs, SOP Classes and Transfer Syntaxes for THE STD-GEN-CD AND THE STD-GEN-DVD PROFILE**

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
BasicDirectory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

5.3.1.2.1.2 Media Storage Application Profiles

The Offline-Media AE supports the STD-GEN-CD and the STD-GEN-DVD Application Profile.

5.3.1.2.1.2.1 Options

The Offline-Media AE supports the SOP Classes and Transfer Syntaxes listed in the Table below for the STD-GEN-CD and the STD-GEN-DVD Application Profile as an FSR.

Table 5.3-2

IODs, SOP Classes and Transfer Syntaxes for THE STD-GEN-CD AND THE STD-GEN-DVD PROFILE (FSR)

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Basic Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1
XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed	1.2.840.10008.1.2.1

5.4 Media Configuration

Not applicable to the Offline-Media AE.

6. Support of Character Sets

This product supports the following character sets:

- ISO-IR 100 (Latin alphabet No.1)
- ISO 2022 IR 87 (Japanese)

7. Security

This product does not support any specific security measures.

It is assumed that the product is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- a. Firewall or router protections to ensure that only approved external hosts have network access to the product.
- b. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.
- c. Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

8. Annexes

8.1 IOD Contents

8.1.1 Created SOP Instances

Table specifies the attributes of a XA,RF Image transmitted by the Storage SCU AE.

The following tables use a number of abbreviations. The abbreviations used in the “Presence of ...” column are:

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

The abbreviations used in the “Source” column:

MWM	the attribute value source Modality Worklist
USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter

8.1.1.1 XA Image IOD

Table 8.1-1
IOD of created XA IMAGE SOP Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7.1-3	ALWAYS
Study	General Study	Table 7.1-4	ALWAYS
Series	General Series	Table 7.1-5	ALWAYS
Equipment	General Equipment	Table 7.1-6	ALWAYS
Image	General Image	Table 7.1-7	ALWAYS
	Image Pixel	Table 7.1-8	ALWAYS
	Cine	Table 7.1-9	ANAP. Used when Cinerun was created
	Multi-frame	Table 7.1-10	ANAP. Used when Cinerun was created
	X-ray Image	Table 7.1-11	ALWAYS
	X-ray Acquisition	Table 7.1-12	ALWAYS
	XA Positioner	Table 7.1-13	ALWAYS
	Overlay Plane	Table 7.1-15	ANAP. Used when overlay requested by user in DICOM Store configuration and overlay available.
	VOI LUT	Table 7.1-16	ALWAYS
SOP Common	Table 7.1-17	ALWAYS	

8.1.1.2 RF Image IOD

Table 8.1-2
IOD of created RF IMAGE SOP Instances

IE	Module	Reference	Presence of Module
Patient	Patient	Table 7.1-3	ALWAYS
Study	General Study	Table 7.1-4	ALWAYS
Series	General Series	Table 7.1-5	ALWAYS
Equipment	General Equipment	Table 7.1-6	ALWAYS
Image	General Image	Table 7.1-7	ALWAYS
	Image Pixel	Table 7.1-8	ALWAYS
	Cine	Table 7.1-9	ANAP. Used when Cinerun was created
	Multi-frame	Table 7.1-10	ANAP. Used when Cinerun was created
	X-ray Image	Table 7.1-11	ALWAYS
	X-ray Acquisition	Table 7.1-12	ALWAYS
	XRF Positioner	Table 7.1-14	ALWAYS
	Overlay Plane	Table 7.1-15	ANAP. Used when overlay requested by user in DICOM Store configuration and overlay available.
	VOI LUT	Table 7.1-16	ALWAYS
SOP Common	Table 7.1-18	ALWAYS	

8.1.1.3 Common Modules

TABLE 8.1-3
Patient Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input. Values supplied via Modality Worklist will be entered as received. Maximum 64 characters.	ALWAYS	MWM/USER
Patient ID	(0010,0020)	LO	From Modality Worklist or user input. Maximum 64 characters.	ALWAYS	MWM/USER
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input	VNAP	MWM/USER
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input	ALWAYS	MWM/USER
Patient's Age	(0010,1010)	AS	Calculated from DoB input on base of actual Date	ALWAYS	AUTO
Patient Comments	(0010,4000)	LT	From User Input. Maximum 1024 characters.	ANAP	MWM/USER

Table 8.1-4
General Study Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	From Modality Worklist or generated by device	ALWAYS	MWM/AUTO
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	AUTO
Study Time	(0008,0030)	TM	<hhmmss>	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From Modality Worklist	VNAP	MWM/USER

Study ID	(0020,0010)	SH	Requested Procedure ID from Worklist or User Input	ALWAYS	MWM/ USER
Accession Number	(0008,0050)	SH	From Modality Worklist or user input	VNAP	MWM/ USER
Study Description	(0008,1030)	LO	From Modality Worklist or user input	VNAP	MWM/ USER

**Table 8.1-5
General Series Module of created SOP Instances**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	XA, RF	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmmss>	ALWAYS	AUTO
Performing Physician's Name	(0008,1050)	PN	user input or From Modality Worklist	ANAP	USER
Series Description	(0008,103E)	LO	user input	ANAP	USER
Operator's Name	(0008,1070)	PN	Operator field in Study list.Maximum 64 characters.	ANAP	USER
Body Part Examined	(0018,0015)	CS	user input	ANAP	USER

Table 8.1-6
General Equipment Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	From Configuration	ALWAYS	CONFIG
Institution Name	(0008,0080)	LO	From Configuration or Modality Worklist	ALWAYS	CONFIG / MWM
Institution Address	(0008,0081)	ST	From Configuration or Modality Worklist	VNAP	CONFIG / MWM
Station Name	(0008,1010)	SH	From Configuration	ALWAYS	CONFIG
Institution Department Name	(0008,1040)	LO	From Configuration or Modality Worklist	VNAP	CONFIG / MWM
Manufacturer's Model Name	(0008,1090)	LO	From Configuration	ALWAYS	AUTO
Software Version(s)	(0018,1020)	LO	From Configuration	ALWAYS	AUTO

Table 8.1-7
General Image Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by device	ALWAYS	AUTO
Content Date	(0008,0023)	DA	<yyyymmdd>	ALWAYS	AUTO
Content Time	(0008,0033)	TM	<hhmmss>	ALWAYS	AUTO
Image Type	(0008,0008)	CS	Set to "ORIGINAL\PRIMARY\SINGLEPLANE".	ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS	Generated by device	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS		VNAP	EMPTY
Acquisition Date	(0008,0022)	DA	<yyyymmdd>	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	<hhmmss>	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Set to "NO" when RF and XA objects stored.	ALWAYS	AUTO

Table 8.1-8
Image PIXEL Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Generated by device	ALWAYS	AUTO
Columns	(0028,0011)	US	Generated by device	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16	ALWAYS	AUTO
High Bit	(0028,0102)	US	15	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Spacing	(0028,0030)	DS	Generated by device	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OB	Generated by device	ALWAYS	AUTO

Table 8.1-9
Cine Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame Time	(0018,1063)	DS	Set when Angiography or fluoroscopy recording is performed	ANAP	AUTO
Start Trim	(0008,2142)	IS	Set to the frame rate of during acquisition.	ANAP	AUTO

Stop Trim	(0008,2143)	IS	Set to the frame rate of during acquisition.	ANAP	AUTO
Recommended Display Frame Rate	(0008,2144)	IS	Set to the frame rate of during acquisition.	ANAP	AUTO
Cine Rate	(0018,0040)	IS	Set to the frame rate of during acquisition.	ANAP	AUTO

Table 8.1-10
multi frame Module of created SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Frames	(0028,0008)	IS	Generated by device	ALWAYS	AUTO
Frame Incremental Pointer	(0028,0009)	AT	0x00181063	ALWAYS	AUTO

8.1.1.4 X-RAY Image Modules

Table 8.1-11
x-ray image Module of created XA, RF Image SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	DS	ORIGINAL\PRIMARY\SINGLEPLANE	ALWAYS	AUTO
Pixel Intensity Relationship	(0028,1040)	DS	LIN	ALWAYS	AUTO
Samples per Pixel	(0028,0002)	DS	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	DS	MONOCHROME2	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16	ALWAYS	AUTO
High Bit	(0028,0102)	US	15	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Calibration Sequence	(0018, 9455)	SQ		ANAP	AUTO
>Calibration Image	(0050,0004)	CS	NO	ANAP	AUTO

Table 8.1-12
x-ray ACQUISITION Module of created XA, RF Image SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
KVP	(0018,0060)	DS	Generated by device	ALWAYS	AUTO
Radiation Setting	(0018,1155)	CS	SC\GR	ALWAYS	AUTO
X-Ray Tube Current	(0018,1151)	IS	Generated by device	ALWAYS	AUTO
X-Ray Tube Current in μ As	(0018,8151)	DS	Generated by device	ALWAYS	AUTO
Exposure Time	(0018,1150)	IS	Generated by device	ALWAYS	AUTO
Exposure Time in μ As	(0018,8150)	DS	Generated by device	ALWAYS	AUTO
Grid	(0018,1166)	CS	From Configuration	ALWAYS	CONFIG
Imager Pixel Spacing	(0018,1164)	DS	From Configuration	ALWAYS	CONFIG
Image Area Dose Product	(0018,115E)	DS	Generated by device.	ANAP	AUTO

Table 8.1-13
POSITIONER Module of created XA Image SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
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Distance Source to Detector	(0018,1110)	DS	From Configuration	ALWAYS	CONFIG
Estimated Radiographic Magnification Factor	(0018,1114)	DS	1.0	VNAP	AUTO
Positioner Motion	(0018,1500)	CS	STATIC	ALWAYS	AUTO
Positioner Primary Angle	(0018,1510)	DS		VNAP	EMPTY
Positioner Secondary Angle	(0018,1511)	DS		VNAP	EMPTY
Positioner Primary Angle Increment	(0018,1520)	DS		VNAP	EMPTY
Positioner Secondary Angle Increment	(0018,1521)	DS		VNAP	EMPTY

Table 8.1-14
POSITIONER Module of created xRF Image SOP Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source
Distance Source to Detector	(0018,1110)	DS	From Configuration	ALWAYS	AUTO
Estimated Radiographic Magnification Factor	(0018,1114)	DS	1.0	ALWAYS	AUTO

**Table 8.1-15
OVERLAY Module of created XA, RF Image SOP Instances**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Overlay Rows	(60xx,0010)	US	Generated by device	ANAP	AUTO
Overlay Columns	(60xx,0011)	US	Generated by device	ANAP	AUTO
Overlay Type	(60xx,0040)	CS	Value set to "G ".	ANAP	AUTO
Overlay Origin	(60xx,0050)	SS	1,1	ANAP	AUTO
Overlay Bits Allocated	(60xx,0100)	US	1	ANAP	AUTO
Overlay Bit Position	(60xx,0102)	US	0	ANAP	AUTO
Overlay Data	(60xx,3000)	OB		ANAP	AUTO

The 6000 group overlay is the Annotation information markers, comments, and measurements. These overlays are only applicable to the XA and RF objects. The device does not support multi-frame overlays.

**Table 8.1-16
VOI/LUT Module of created XA, RF Image SOP Instances**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center	(0028,1050)	DS	Generated by device	ANAP	AUTO
Window Width	(0028,1051)	DS	Generated by device	ANAP	AUTO

**Table 8.1-17
SOP COMMON Module of created XA Image SOP Instances**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character set	(0008,0005)	CS	Refer to Section 5.	ANAP	CONFIG
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.12.1	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device	ALWAYS	AUTO

**Table 8.1-18
SOP COMMON Module of created RF Image SOP Instances**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character set	(0008,0005)	CS	Refer to Section5	ANAP	CONFIG
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.12.2	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device	ALWAYS	AUTO

8.1.2 Usage of Attributes from received IOD's

No SOP Class specific fields are required.

8.1.3 Attribute Mapping

The tables below show the relationships between attributes received via Modality Worklist, stored in acquired images.

The cell content conventions should be read as follows:

Copy:	The value will be copied from a corresponding source attribute of another DICOM object, as defined by the table column
Copy from: <DICOM attribute>	The source as specified in the referenced DICOM attribute will be used instead of using the DICOM attribute of the same row as the source.
Equal (internally generated)	The value will be internally generated which may be used in more than one DICOM object.

Table 8.1-19
SCHEDULED CASE - ATTRIBUTE MAPPING BETWEEN MODALITY WORKLIST, IMAGE AND MPPS

Attribute Name	Tag	Modality Worklist	Image IOD	MPPS IOD
Study Instance UID	(0020,000D)	Source	Copy	Scheduled Step Attributes Sequence (0040,0270)
Accession Number	(0008,0050)	Source	Copy	
Requested Procedure Description	(0032,1060)	Source	-	
Requested Procedure ID	(0040,1001)	Source	-	
Scheduled Procedure Step ID	(0040,0009)	Source	-	
Scheduled Procedure Step Description	(0040,0007)	Source	-	
Study ID	(0020,0010)	-	Copy from: Requested Procedure ID (0040,1001).	Copy from: Requested Procedure ID (0040,1001).
Performed Procedure Step ID	(0040,0253)	Source	-	Equal (internally generated).
Performed Procedure Step Start Date	(0040,0244)	Source	-	Equal (internally generated).
Performed Procedure Step Start Time	(0040,0245)	Source	-	Equal (internally generated).
Performed Procedure Step Description	(0040,0254)	Source	-	Copy from: Scheduled Procedure StepDescription (0040,0007).

Scheduled Performing Physician's Name	(0040,0006)	Source	-	-	
Performing Physician's Name	(0008,1050)	-	Copy from: Scheduled Performing Physician's Name (0040,0006).-	Performed Series Sequence (0040,0340)	Copy from: Scheduled Performing Physician's Name (0040,0006).

**Table 8.1-20
UNSCHEDULED CASE - ATTRIBUTE MAPPING BETWEEN IMAGE AND MPPS**

Attribute Name	Tag	Image IOD	MPPS IOD	
Study Instance UID	(0020,000D)	Equal (internally generated).	Scheduled Step Attributes Sequence (0040,0270)	Equal (internally generated).
Accession Number	(0008,0050)	Equal (internally generated).		Equal (internally generated).
Requested Procedure Description	(0032,1060)	-		Zero Length
Requested Procedure ID	(0040,1001)	-		Zero Length
Scheduled Procedure Step ID	(0040,0009)	-		Zero Length
Scheduled Procedure Step Description	(0040,0007)	-		Zero Length
Study ID	(0020,0010)	Equal (internally generated).	Equal (internally generated).	
Performed Procedure Step ID	(0040,0253)	-	-	
Performed Procedure Step Start Date	(0040,0244)	-	Equal (internally generated).	
Performed Procedure Step Start Time	(0040,0245)	-	Equal (internally generated).	
Performed Procedure Step Description	(0040,0254)	-	-	
Performing Physician's Name	(0008,1050)	-	Performed Series Sequence (0040,0340)	Zero Length

8.2 Data Dictionary of Private Attributes

This product reserves private attribute values in the group 0045 . The private attributes added to created SOP instances or directory records are listed in the following table;

**Table 8.2-1
DATA DICTIONARY OF PRIVATE ATTRIBUTES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Private Creator Code	(0045,00xx)	LO	CXVIEW3_INFO	ANAP	AUTO
Software Version	(0045,xx1B)	LO	Ex.)CXView3_3.0.1.xxxx	ANAP	AUTO
Image Information	(0045,xx20)	LO	Ex.) 0.2\0.2\0\0\0	ANAP	AUTO
kVp	(0045,xx26)	IS	Ex.) 40	ANAP	AUTO
mA	(0045,xx29)	DS	Ex.) 0.2	ANAP	AUTO
FPS	(0045,xx2A)	DS	Ex.) 0	ANAP	AUTO
Annotation data	(0045,xx2B)	OB		ANAP	AUTO

8.3 Controlled Terminology and Templates

Not applicable to this product

8.4 Grayscale Image Consistency

Not applicable to this product

8.5 Standard Extended/Specialized/Private SOP Classes

Not applicable to this product

8.6 Private Transfer Syntaxes

Not applicable to this product

8.7 Create a New SOP Instance UID

If any tag(s) are modified, issue a new SOP Instance UID.