
Philips Medical Systems

DICOM

CONFORMANCE STATEMENT



Mx8000-IDT V2.5

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1. INTRODUCTION

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1. Mx-Series Scanners and Workstation

This conformance statement refers to a MX family of products (scanners and MxView workstation) that are based on the same communication software. This document refers to each of the above products as a *System*. Unless otherwise indicated (e.g., *Scanner Only* or *MxView Only*), all the described services refer to both the scanners and the workstation.

1.2. Scope and Field of Application

The scope of this DICOM Conformance Statement is to facilitate data exchange with equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices. This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

1.3. Intended Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

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

1.4. Contents and Structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

1.5. Used Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4. The word Philips in this document refers to Philips Medical Systems.

1.6. References

[DICOM] The Digital Imaging and Communications in Medicine

(DICOM) standard (NEMA PS 3.X):
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Va. 22209, United States of America

1.7. Important Note to the Reader

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

➤ **Interoperability**

Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.

It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

➤ **Validation**

Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.

Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

➤ **New versions of the DICOM Standard**

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

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

1.8. General Acronyms and Abbreviations.

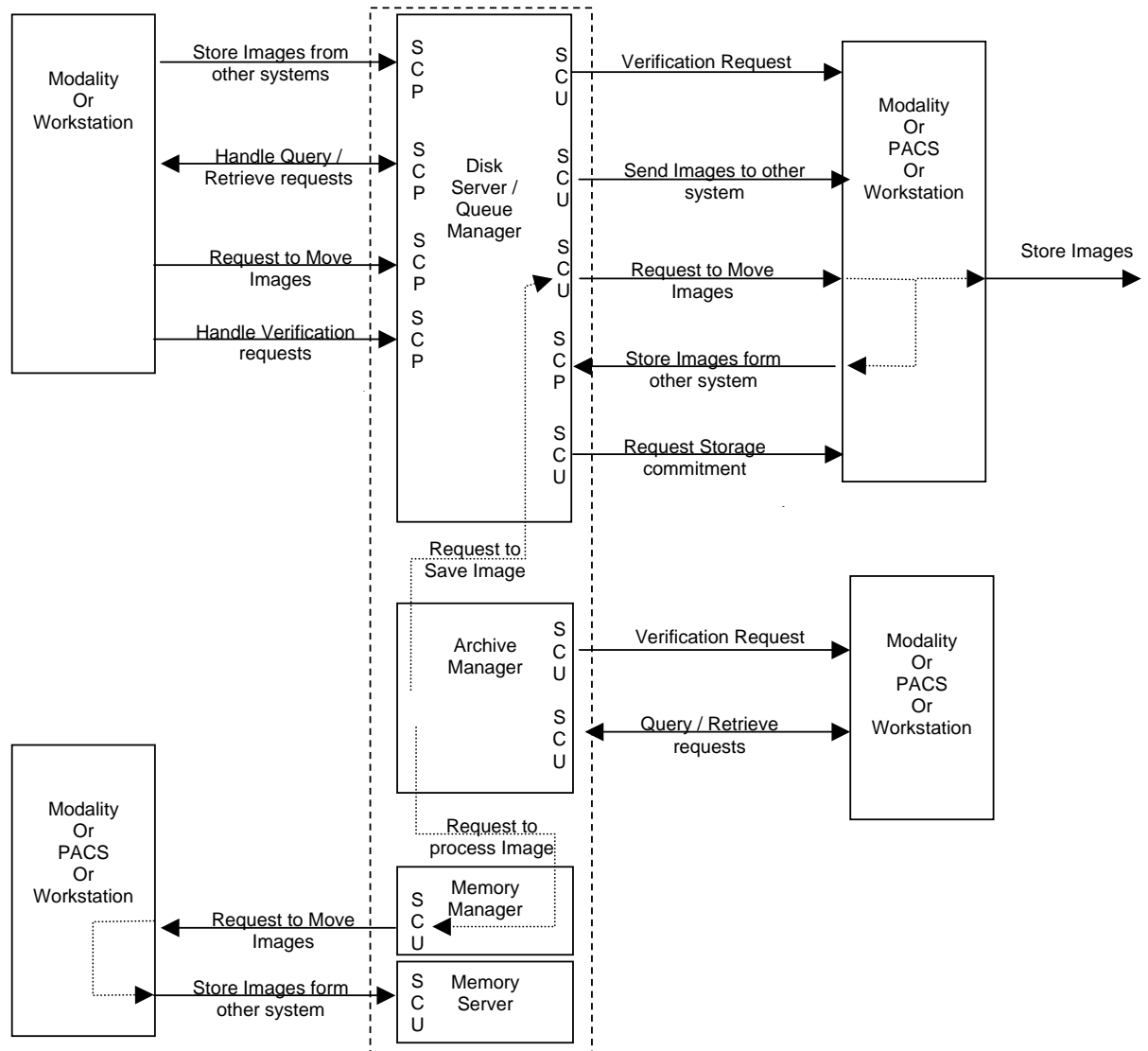
The following acronyms and abbreviations are used in the document.

- ACC American College of Cardiology
- AE Application Entity
- ACR American College of Radiology
- ANSI American National Standard Institute
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- ELE Explicit VR Little Endian
- EBE Explicit VR Big Endian
- ILE Implicit VR Little Endian
- IOD Information Object Definition
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- RIS Radiology Information System
- RWA Real World Activity
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet protocol
- UID Unique Identifier

2. IMPLEMENTATION MODEL

The *System* communication is based on the DICOM v3.0 standard. This enables the *System* to communicate with any DICOM v3.0 compliant products (e.g., scanners, workstations, HIS/RIS Mx-Views, hardcopy units). The *System* can function both as a server and as a client. Thus it can send and retrieve images from other stations, and other stations can retrieve and send images to and from the *System*. Images are transferred in the DICOM v3.0 protocol based on TCP/IP as a transport layer.

The *System* can serve as a gateway between non-DICOM equipment to the DICOM world. One such example is the *System* being used as a gateway between a DICOM Print Management Service Class user and a non-DICOM hardcopy device such as 3M-952 LMI.



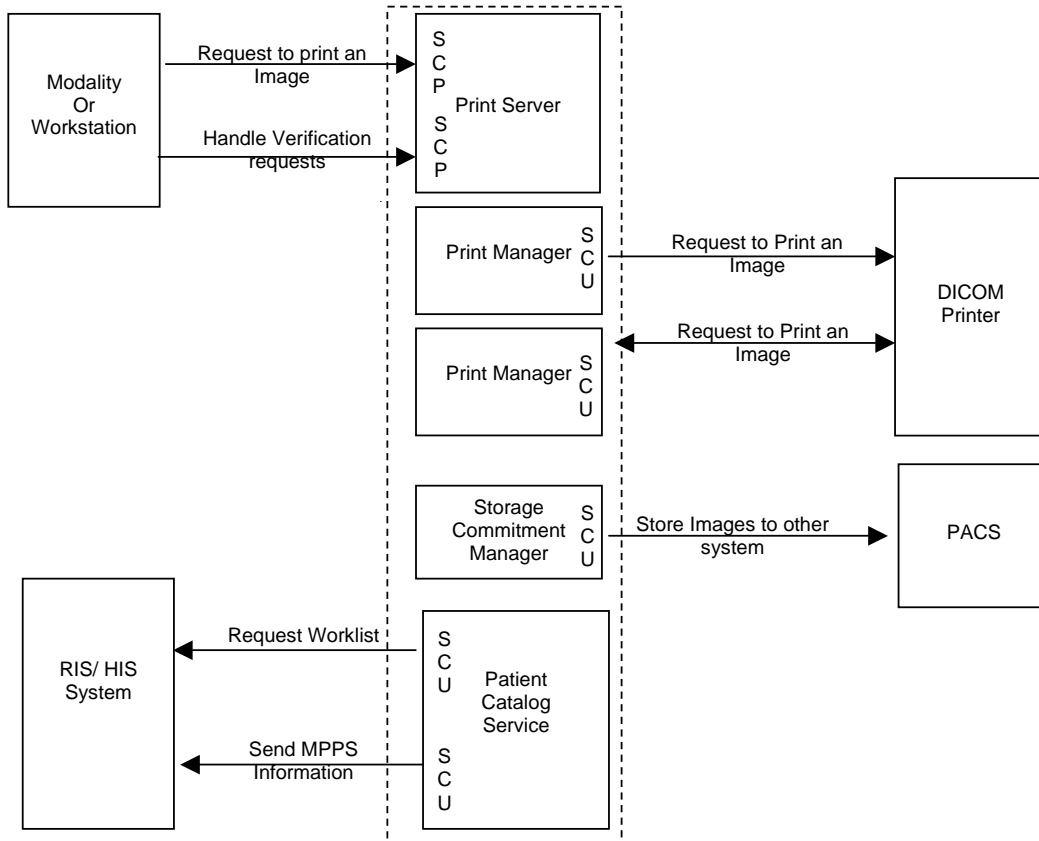


Figure 1: the system in a DICOM network.

2.1. Application Data Flow Diagram

The system implements and provides DICOM services using the following Application Entities:

- Patient Catalog Service (*Scanner Only*)
- Disk-Server/Queue-Manager
- Archive-Manager
- Memory-Manager
- Memory-Server
- Print-Server
- Print-Manager
- DentaCT-Print
- StorageComm-Manager
- Media AE (*MxView Only*)

2.1.1. Patient Catalog Service

(*Scanner Only.*)

This AE is an SCU used to connect to HIS/RIS systems. With this server, the scanning software obtains the scheduled study information from the HIS/RIS system, and reports the study start/finish conditions back to HIS/RIS.

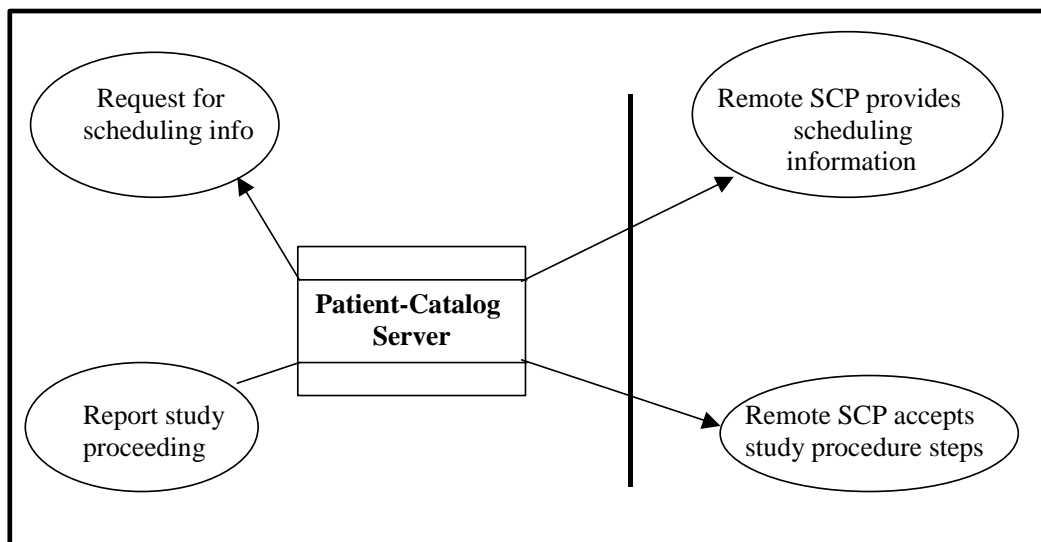


Figure 2: Illustration of Patient catalog Activities.

2.1.2. Disk-Server/Queue-Manager

Disk-Server provides the interface to the database of the images stored on the local hard disk. The same AE may be used (with a configurable different AE title) to access the local EOD (removable Erasable Optical Disk) or different local hard disk folders. Acting as an SCU Disk-Server sends images to the remote system. Acting as an SCP it provides DICOM Verification, Storage and Query/Retrieve services for remote systems.

Queue-Manager is an SCU used to initiate moving of images between databases. To initiate move from a local database it invokes the appropriate Disk-Server. The Queue-Manager is also allows the operator to control transfer requests status. The following figure provides an illustration of the Disk-Server and Queue-Manager activities:

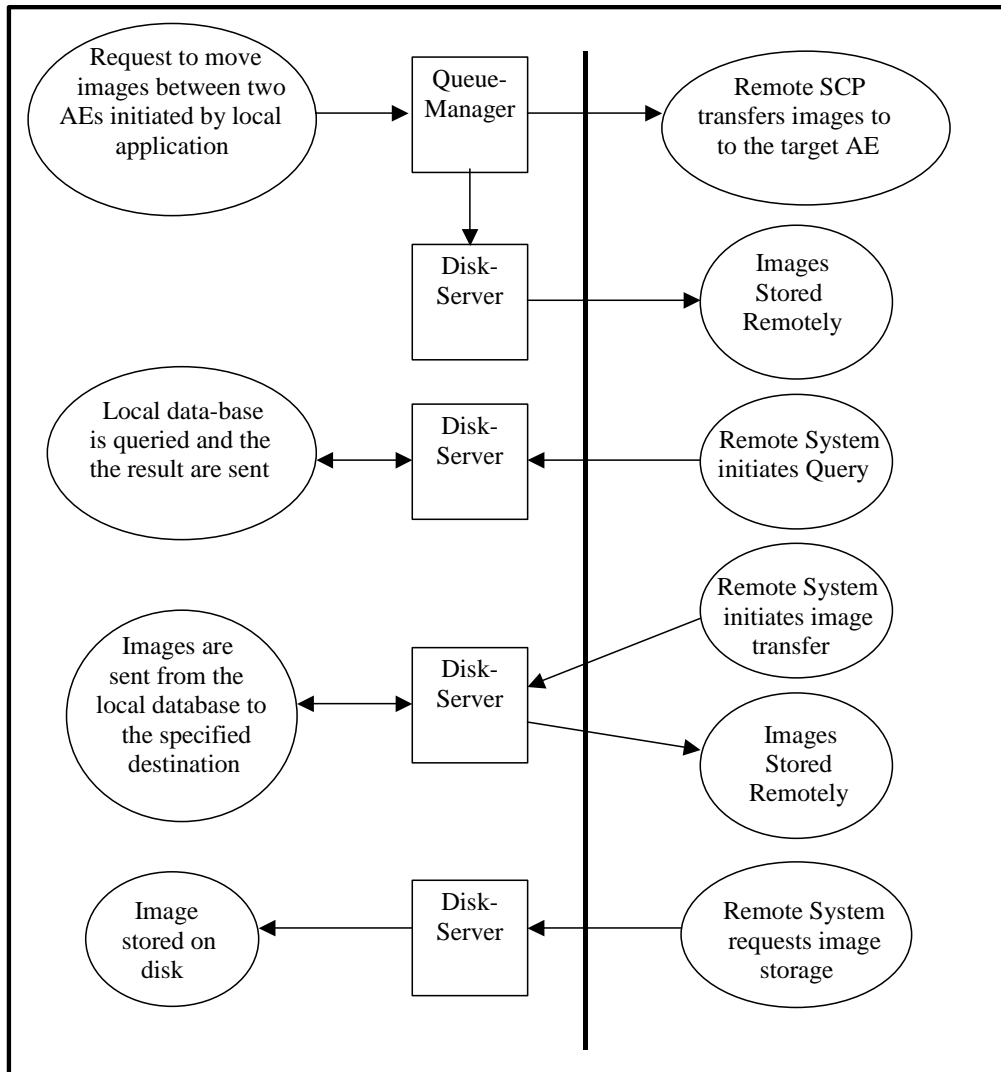


Figure 3: Illustration of Disk-Server Activities.

2.1.3. Archive-Manager

This AE is an SCU used to query the contents of remote databases. The results are presented to the user on the screen. The following figure provides an illustration of Archive-Manager activities:

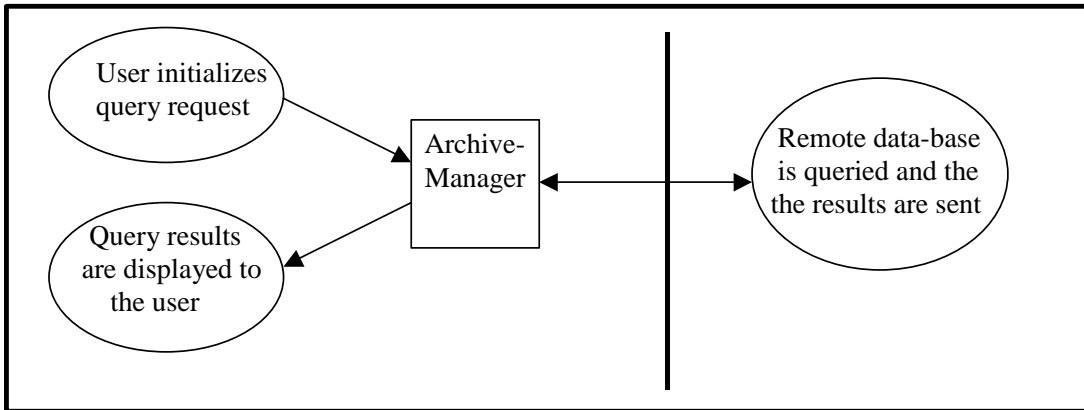


Figure 4: Illustration of Archive-Manager Activities.

2.1.4. Memory-Manager

This AE is an SCU used to request from the remote system to load images to the local system memory. The following figure provides an illustration of Memory-Manager activities:

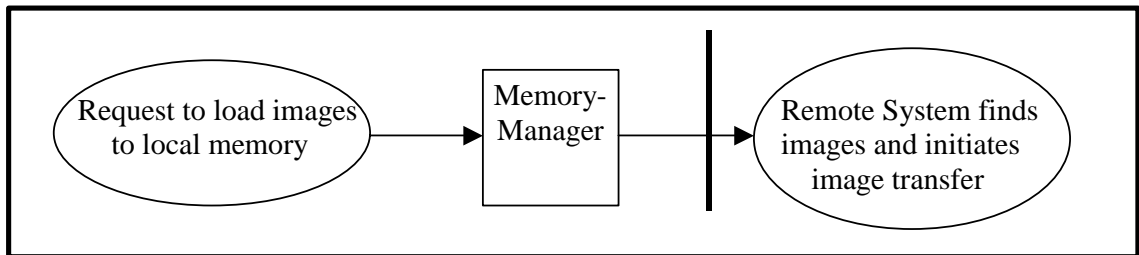


Figure 5: Illustration of Memory-Manager Activities.

2.1.5. Memory-Server

This AE serves as the interface to the *system's* memory by providing the DICOM Storage service. It is used by the *system* to load images to its own memory. The *system* assigns this AE as the target AE of C-MOVE requests it issues when loading images from remote systems. The following figure provides an illustration of Memory-Server activities:

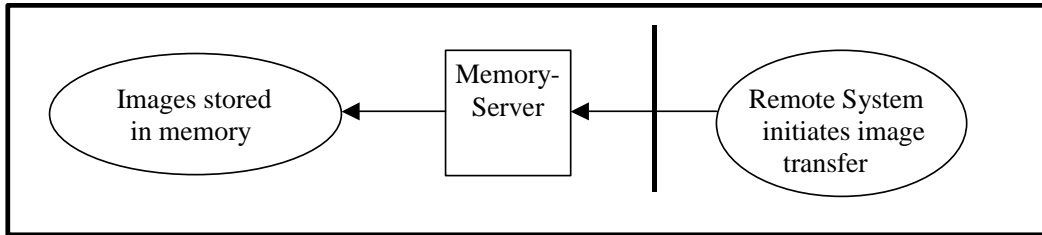


Figure 6: Illustration of Memory-Server Activities.

2.1.6. Print-Server

This AE enables an SCU to print on a non-DICOM printer by providing it the services of a DICOM Print Management service class. The following figure provides an illustration of Print-Server activities:

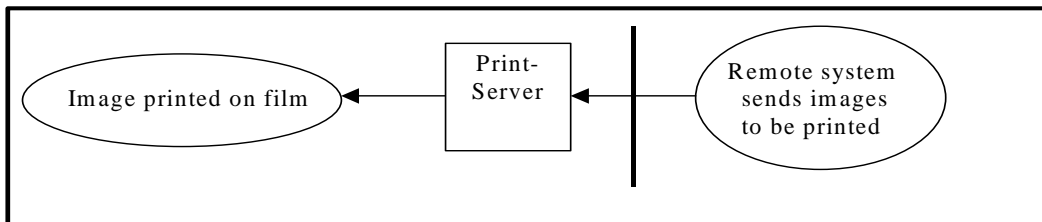


Figure 7: Illustration of Print-Server Activities.

2.1.7. Print-Manager

Print-Manager is an SCU used to film the images (from MasterFilm application). The following figure provides an illustration of Print-Manager activities:

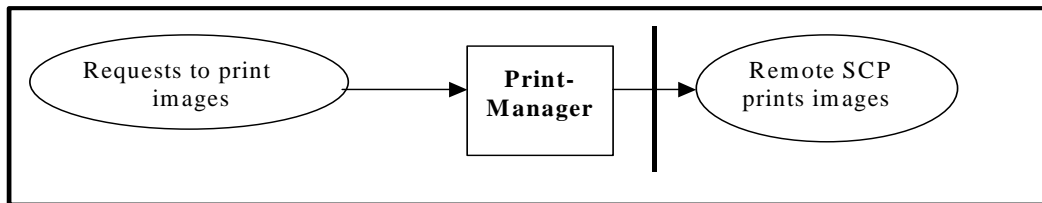


Figure 8: Illustration of Print-Manager Activities.

2.1.8. DentaCT-Print

This AE is an SCU used to print images from the DentaCT application on imagers. The following figure provides an illustration of DentaCT-Print activities:

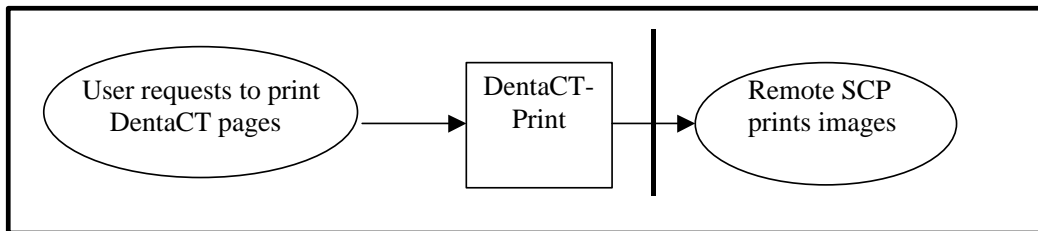


Figure 9: Illustration of DenatCT-Print Activities.

2.1.9. StorageComm-Manager

StorageComm-Manager is used to support Storage Commitment Service Class both as SCU and SCP. The following figure provides an illustration of StorageComm-Manager:

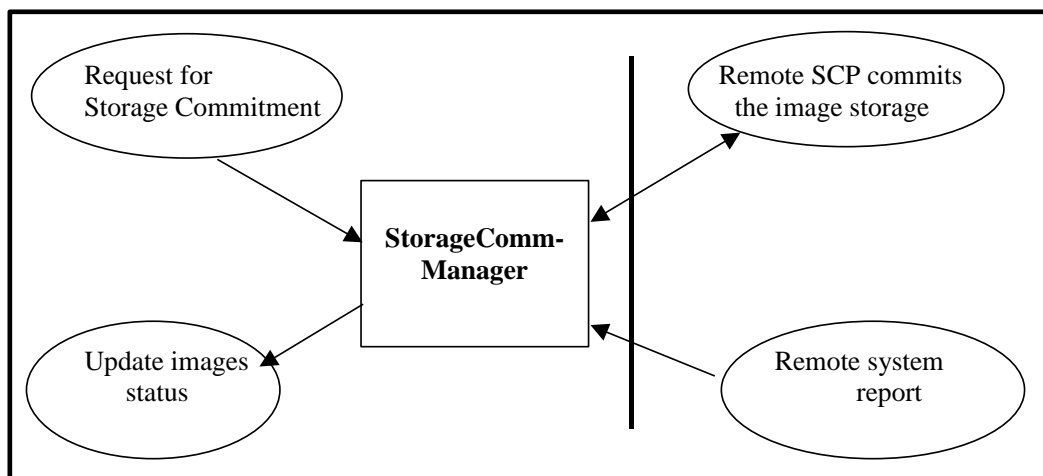


Figure 10: Illustration of StorageComm-Manager Activities

2.1.10. Media AE

(MxView Only)

The Media AE can create DICOM Media CD according the CT/MR media profile.

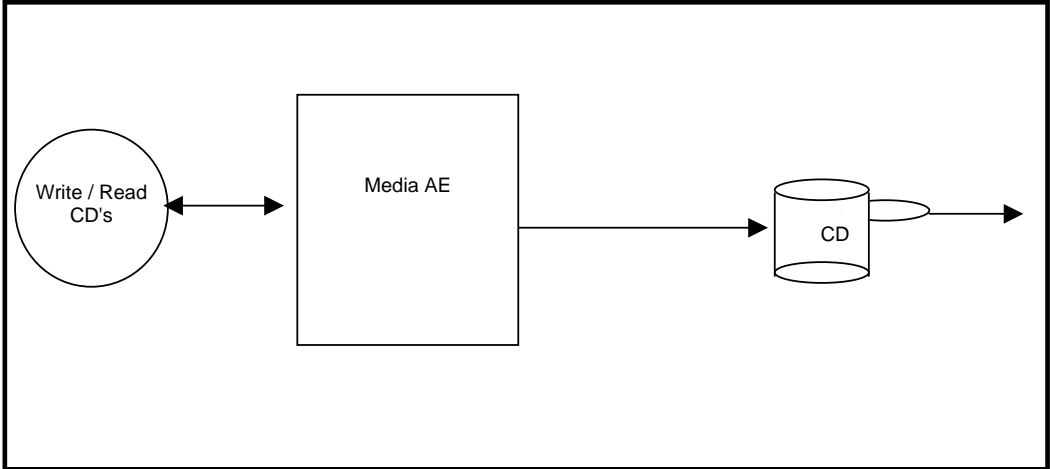


Figure 11: Illustration of Media AE Activities

2.2. Functional definition of Application Entities

2.2.1. Patient-Catalog Server

(Scanner Only.)

The **Patient-Catalog Server** allows scanner software to communicate with a remote HIS/RIS system. The Patient-Catalog Server gets requests from the Study program responsible for carrying out the whole scanning procedure (using non-DICOM protocol).

The server translates these internal requests into DICOM Modality Worklist Management and MPPS Services Class commands. The Patient-Catalog Server can perform the following activities:

- Establish an association with a remote AE.
- Release an association with a remote AE.
- Issue a C-Find request to get Modality Worklist Management scheduling information.
- Issue a N-Create and N-Set requests to notify HIS/RIS by means of MPPS Service Class

2.2.2. Disk-Server/Queue-Manager

Disk-Server waits for another application to connect at the presentation address configured for its AE title. **Disk-Server** will accept associations with Presentation Contexts for Service Object Pair (SOP) classes of the Storage, Query-Retrieve (C-MOVE and C-FIND only) and Verification Service Classes.

When performing a Storage Service Class, **Disk-Server** will receive images and store them into the *system's* local database.

When performing Query-Retrieve Service Class (C-FIND), **Disk-Server** will query its local database according to the request's parameters, and will send the results to the issuer.

When performing Query-Retrieve Service Class (C-MOVE), **Disk-Server** will issue a C-STORE (to the target AE) for every image found according to the request.

The **Queue-Manager** is responsible for transferring images between devices in batch mode. The **Queue-Manager** gets transfer requests from the **Memory-Manager** and the **Archive-Manager** (using a proprietary non-DICOM protocol). It performs these requests using the Query-Retrieve Service Class (C-MOVE). The **Queue-Manager** can perform the following activities:

- Establish an association with a remote AE.
- Release an association with a remote AE.
- Issue a C-MOVE request (using the Study Root model) for any desired target AE.

2.2.3. Archive-Manager

The **Archive-Manager** is a GUI (Graphical User-Interface) based application. It enables the user to perform queries using the DICOM protocol. The **Archive-Manager** lets the user select from a list of devices. It uses a configuration file to

associate each device with a DICOM Application Entity. Using the GUI, the user can initiate the following activities:

- Establish an association with a remote AE.
- Release an association with a remote AE.
- Query for studies (using the Study Root model).
- Query for series (using the Study Root model).
- Query for images (using the Study Root model).
- Verify connection to a remote AE

2.2.4. Memory-Manager

The **Memory-Manager** is responsible for loading images into memory. The **Memory-Manager** gets requests from local image processing and display applications to load images to the memory. It performs these requests using the Query-Retrieve Service Class (C-MOVE only). The **Memory-Manager** can perform the following activities:

- Establish an association with a remote AE.
- Release an association with a remote AE.
- Issue a C-MOVE request (using the Study Root model) where the target AE is **Memory-Server**.

2.2.5. Memory-Server

Memory-Server waits for another application to connect at the presentation address configured for its AE title. **Memory-Server** will accept associations with Presentation Contexts for SOP classes of the Storage and Verification Service Classes. It will receive images on these Presentation Contexts and load them into the *system's* memory.

2.2.6. Print-Server

Print-Server waits for another application to connect at the presentation address configured for its AE title. **Print-Server** will accept associations with Presentation Context for the Print Management and Verification Service Classes. It may receive images from one or more SCUs.

2.2.7. Print-Manager

The **Print-Manager** is a Graphical User Interface (GUI) based application. It enables the user to print predefined images using the DICOM protocol. The user can specify as a printing destination one of several predefined printers. The user can also modify some of the printing parameters such as the film size and format.

2.2.8. DenatCT-Print

The **DentaCT-Print** is a part of the DenatCT application. It enables the user to print the images generated by this application using the DICOM protocol. The user can specify as a printing destination one of several predefined printers. The user can also modify some of the printing parameters such as the film size and format.

2.2.9. StorageComm-Manager

StorageComm Manager is responsible to issue and support the storage commitment service both as SCU and SCP. When some storage device server is

configured as supports this service, **StorageComm Manager** establishes association with the specified AE title and sends storage commitment (N-ACTION) request using push model. After that, it may accept storage commitment (N-EVENT-REPORT) request on the same association or by establishing another association.

2.2.10. Media AE

(MxView Only)

The Media AE is responsible for the reading, updating and recording of DICOM Media. The system can read, update and record DICOM Media CD-R's.

2.3. Sequencing of Real World Activities

Real world activities of the **Print-Server** and the **Print-Manager** are sequenced as required to meet the definition of the Print-Management Service Class. SCUs can modify and/or delete previously defined film boxes (i.e., not only the currently open one).

3. AE SPECIFICATIONS

3.1. Patient Catalog Sever Specifications

(Scanner Only)

Patient Catalog Server provides Standard Conformance to the following DICOM V3.0 SOP Classes as both an SCU.

Table 1. SOP classes supported as SCU

| SOP Class Name | SOP Class UID |
|--|-------------------------|
| Modality Performed Procedure Step SOP Class | 1.2.840.10008.3.1.2.3.3 |
| Modality Worklist Information Model - FIND SOP Class | 1.2.840.10008.5.1.4.31 |

3.1.1. Association Establishment Policies

3.1.1.1. General

The maximum Protocol Data Unit (PDU) size that the Disk-Server will use is configurable, with a minimum of 2K bytes.

3.1.1.2. Number of Associations

Patient-Catalog can have maximum two simultaneous connections. **Patient-Catalog** initiates one association when Modality Worklist and MPPS services are configured on the same SCP and two associations otherwise.

3.1.1.3. Asynchronous Nature

Patient-Catalog will only allow a single outstanding operation on an association. Therefore **Patient-Catalog** will not perform asynchronous operations window negotiation.

3.1.1.4. Implementation Identifying Information

Patient Catalog Server provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.1.2. Association Initiation by Real-World Activity

3.1.2.1. User Clicks on HIS/RIS Icon

3.1.2.1.1. Associated Real World Activity

Patient-Catalog initiates an association when the user clicks on the HIS/RIS icon in the Toolbar.

3.1.2.1.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2 are proposed by the **Patient-Catalog**.

Table 2. Proposed Presentation Contexts for Patient-Catalog

| Name | Abstract Syntax | | Name | Transfer Syntax | | Role | Ext. Neg. |
|--------------------|-------------------------|-----|------|---------------------|-----|------|-----------|
| | UID | UID | | UID | UID | | |
| Modality Performed | 1.2.840.10008.3.1.2.3.3 | | ILE | 1.2.840.10008.1.2 | | SCU | None |
| Procedure Step | | | ELE | 1.2.840.10008.1.2.1 | | | |
| | | | EBE | 1.2.840.10008.1.2.2 | | | |

3.1.2.1.3. SOP Specific Conformance Statement for Modality Worklist Information Model FIND

The following tables list the supported attributes by the Patient Catalog server.

Table 3. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Patient Identification Module

| Attribute Name | Tag | Note |
|----------------------|-----------|------|
| Patient's Name | 0010,0010 | |
| Patient ID | 0010,0020 | |
| Other Patient IDs | 0010,1000 | |
| Patient's Weight | 0010,1030 | |
| Patient's Birth Name | 0010,1005 | |

Table 4. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Patient Demographic Module

| Attribute Name | Tag | Note |
|--|-----------|------|
| Patient's Birth Date | 0010,0030 | |
| Patient's Sex | 0010,0040 | |
| Patient's Age | 0010,1010 | |
| Ethnic Group | 0010,2160 | |
| Patient Comments | 0010,4000 | |
| Confidentially Constrain On Patient Data | 0040,3001 | |

Table 5. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Patient Medical Module

| Attribute Name | Tag | Note |
|----------------------------|-----------|------|
| Medical Alerts | 0010,2000 | |
| Constant Allergies | 0010,2110 | |
| Additional Patient History | 0010,21B0 | |
| Special Needs | 0038,0050 | |

Table 6. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Visit Status Module

| Attribute Name | Tag | Note |
|-----------------------------|-----------|------|
| Referenced Patient Sequence | 0008,1120 | |
| Admission ID | 0038,0100 | |
| Patient State | 0038,0500 | |
| Current Patient Location | 0038,0300 | |

Table 7. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Scheduled Procedure Step Module

| Attribute Name | Tag | Note |
|--|-----------|------|
| Scheduled Procedure Step Sequence | 0040,0100 | |
| >Modality | 0008,0060 | |
| >Scheduled Station AE Title | 0040,0001 | |
| >Scheduled Procedure Step Start Date | 0040,0002 | |
| >Scheduled Procedure Step Start Time | 0040,0003 | |
| >Scheduled Performing Physician's Name | 0040,0006 | |
| >Scheduled Procedure Step Description | 0040,0007 | |
| >Scheduled Action Item Code Sequence | 0040,0008 | |
| >>Code Value | 0008,0100 | |
| >>Coding Scheme Designator | 0008,0102 | |
| >>Code Meaning | 0008,0104 | |
| >Scheduled Procedure Step ID | 0040,0009 | |
| >Scheduled Procedure Step Location | 0040,0011 | |

Table 8. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Requested Procedure Module

| Attribute Name | Tag | Note |
|---|-----------|------|
| Study Instance UID | 0020,000D | |
| Requested Procedure Description | 0032,1060 | |
| Requesting Service | 0032,1033 | |
| Requested Procedure Code Sequence | 0032,1064 | |
| >Code Value | 0008,0100 | |
| >Coding Scheme Designator | 0008,0102 | |
| >Code Meaning | 0008,0104 | |
| Requested Procedure ID | 0040,1001 | |
| Names of Intended Recipients of Results | 0040,1010 | |
| Requested Procedure Comments | 0040,1400 | |

Table 9. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Imaging Service Request Module

| Attribute Name | Tag | Note |
|----------------------------------|-----------|------|
| Accession Number | 0008,0050 | |
| Referring Physician's Name | 0008,0090 | |
| Referenced Study Sequence | 0008,1110 | |
| Requesting Physician | 0032,1032 | |
| Requesting Service | 0032,1033 | |
| Imaging Service Request Comments | 0040,2400 | |

Table 10. Modality Worklist Information Model - FIND SOP Class - C-FIND-RQ - Sop Common Module

| Attribute Name | Tag | Note |
|------------------------|-----------|------|
| Specific Character Set | 0008,0005 | |

3.1.2.2. Request from Study

3.1.2.2.1. Associated Real World Activity

Patient-Catalog initiates an association when it receives a request from the Study program to notify HIS/RIS about procedure execution/completion.

3.1.2.2.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.19 are proposed by the **Patient-Catalog**.

Table 11. Proposed Presentation Contexts

| Name | Abstract Syntax | | Name | Transfer Syntax | | Role | Ext. Neg. |
|--------------------|-------------------------|--|------|---------------------|--|------|-----------|
| | UID | | | UID | | | |
| Modality Performed | 1.2.840.10008.3.1.2.3.3 | | ILE | 1.2.840.10008.1.2 | | SCU | None |
| Procedure Step | | | ELE | 1.2.840.10008.1.2.1 | | | |
| | | | EBE | 1.2.840.10008.1.2.2 | | | |

3.1.2.2.3. SOP Specific Conformance Statement for MPPS N-CREATE

Patient-Catalog provides standard conformance to the DICOM V3.0 MPPS Service Class as an SCU for the following SOP Class: UID = 1.2.840.10008.3.1.2.3.3.

Table 12. Modality Performed Procedure Step SOP Class - N-SET-RQ - Image Acquisition Results Module

| Attribute Name | Tag | Note |
|-------------------------------|-----------|------|
| Performed Series Sequence | 0040,0340 | |
| >Retrieve AE Title | 0008,0054 | |
| >Series Description | 0008,103E | |
| >Performing Physician's Name | 0008,1050 | |
| >Operator's Name | 0008,1070 | |
| >Referenced Image Sequence | 0008,1140 | |
| >>Referenced SOP Class UID | 0008,1150 | |
| >>Referenced SOP Instance UID | 0008,1155 | |
| >Protocol Name | 0018,1030 | |
| >Series Instance UID | 0020,000E | |

Table 13. Modality Performed Procedure Step SOP Class - N-SET-RQ - Performed Procedure Step Information Module

| Attribute Name | Tag | Note |
|-----------------------------------|-----------|------|
| Performed Procedure Step End Date | 0040,0250 | |

| Attribute Name | Tag | Note |
|-----------------------------------|-----------|------|
| Performed Procedure Step End Time | 0040,0251 | |
| Performed Procedure Step Status | 0040,0252 | |

Table 14. Modality Performed Procedure Step SOP Class - N-CREATE-RQ - Sop Common Module

| Attribute Name | Tag | Note |
|------------------------|-----------|------|
| Specific Character Set | 0008,0005 | |

Table 15. Modality Performed Procedure Step SOP Class - N-CREATE-RQ - Image Acquisition Results Module

| Attribute Name | Tag | Note |
|-------------------------------------|-----------|------|
| Modality | 0008,0060 | |
| Study ID | 0020,0010 | |
| Performed Action Item Code Sequence | 0040,0260 | |
| >Code Value | 0008,0100 | |
| >Coding Scheme Designator | 0008,0102 | |
| >Code Meaning | 0008,0104 | |
| Performed Series Sequence | 0040,0340 | |

Table 16. Modality Performed Procedure Step SOP Class - N-CREATE-RQ - Performed Procedure Step Information Module

| Attribute Name | Tag | Note |
|--------------------------------------|-----------|------|
| Procedure Code Sequence | 0008,1032 | |
| Performed Station AE Title | 0040,0241 | |
| Performed Station Name | 0040,0242 | |
| Performed Location | 0040,0243 | |
| Performed Procedure Step Start Date | 0040,0244 | |
| Performed Procedure Step Start Time | 0040,0245 | |
| Performed Procedure Step End Date | 0040,0250 | |
| Performed Procedure Step End Time | 0040,0251 | |
| Performed Procedure Step Status | 0040,0252 | |
| Performed Procedure Step ID | 0040,0253 | |
| Performed Procedure Step Description | 0040,0254 | |
| Performed Procedure Type Description | 0040,0255 | |

Table 17. Modality Performed Procedure Step SOP Class - N-CREATE-RQ - Performed Procedure Step Relationship Module

| Attribute Name | Tag | Note |
|------------------------------|-----------|---|
| Referenced Patient Sequence | 0008,1120 | |
| >Referenced SOP Class UID | 0008,1150 | Applied Value(s): 1.2.840.10008.3.1.2.1.1 |
| >Referenced SOP Instance UID | 0008,1155 | |
| Patient's Name | 0010,0010 | |
| Patient ID | 0010,0020 | |

| Attribute Name | Tag | Note |
|---------------------------------------|-----------|---|
| Patient's Birth Date | 0010,0030 | |
| Patient's Sex | 0010,0040 | |
| Scheduled Step Attribute Sequence | 0040,0270 | |
| >Accession Number | 0008,0050 | |
| >Referenced Study Sequence | 0008,1110 | |
| >>Referenced SOP Class UID | 0008,1150 | Applied Value(s): 1.2.840.10008.3.1.2.3.1 |
| >>Referenced SOP Instance UID | 0008,1155 | |
| >Study Instance UID | 0020,000D | |
| >Requested Procedure Description | 0032,1060 | |
| >Scheduled Procedure Step Description | 0040,0007 | |
| >Scheduled Action Item Code Sequence | 0040,0008 | |
| >>Code Value | 0008,0100 | |
| >>Coding Scheme Designator | 0008,0102 | |
| >>Code Meaning | 0008,0104 | |
| >Scheduled Procedure Step ID | 0040,0009 | |
| >Requested Procedure ID | 0040,1001 | |

3.1.3. Association Acceptance Policy

Patient-Catalog never accepts an association.

3.2. Disk-Server/Queue-Manager Specifications

Disk-Server and **Queue-Manager** work closely together and can be configured to act as a single Application Entity (i.e., having the same AE Title) or as different Application Entities. In order to simplify the description they are described in this document as a single Application Entity. Depending on configuration, multiple copies of **Disk-Server** may be running simultaneously, each representing the same Application Entity.

Disk-Server and **Queue-Manager** provide Standard Conformance to the following DICOM V3.0 SOP Classes as both an SCU and an SCP:

Table 18. SOP classes supported as SCU and SCP

| SOP Class Name | SOP Class UID |
|---|-------------------------------|
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 |
| MR Image Storage | 1.2.840.10008.5.1.4.1.1.4 |
| Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.20 |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 |
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.12.1 |
| X-Ray Radiofluoroscscopy Image Storage | 1.2.840.10008.5.1.4.1.1.12.2 |
| Study Root Q/R Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 |
| General ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.2 |

The following DICOM V3.0 SOP Classes as an SCP only:

Table 19. SOP classes supported as SCP

| SOP Class Name | SOP Class UID |
|---|-----------------------------|
| Verification | 1.2.840.10008.1.1 |
| Study Root Q/R Information Model - FIND | 1.2.840.10008.5.1.4.1.2.2.1 |

Note: XA (X-Ray Angiographic) images are supported for storage only (not for viewing)

3.2.1. Association Establishment Policies

3.2.1.1. General

The maximum Protocol Data Unit (PDU) size that the Disk-Server will use is configurable, with a minimum of 2K bytes.

There is default timeout of 60 sec before Dicom association release during Copy operation (when issuing C-Store and C-Move Dicom requests).

3.2.1.2. Number of Associations

The number of simultaneous associations that will be accepted by **Disk-Server** is limited only by the kernel parameters of the underlying TCP/IP implementation. **Disk-Server** will spawn a new process for each connection request it receives.

Therefore, **Disk-Server** can have multiple simultaneous connections, and there are no inherent limitations on the number of simultaneous associations that the Application Entity represented by **Disk-Server** can maintain.

Disk-Server/Queue-Manager can initiate multiple simultaneous connections. The maximal number of simultaneous associations is limited by the configuration of the *system*. **Disk-Server/Queue-Manager** will not initiate more than one association per each remote AE configured as an SCP in *the system*.

3.2.1.3. Asynchronous Nature

Disk-Server/Queue-Manager will only allow a single outstanding operation on an association. Therefore **Disk-Server/Queue-Manager** will not perform asynchronous operations window negotiation.

3.2.1.4. Implementation Identifying Information

Disk-Server/Queue-Manager provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.2.2. Association Initiation by Real-World Activity

Disk-Server will attempt to initiate a new association when requested to send images to the remote system, as part of a C-MOVE Command. **Queue-Manager** will attempt to initiate a new association when requested to perform image transfer (Move) from the remote system.

3.2.2.1. Image Transfer to the Remote system

3.2.2.1.1. Associated Real-World Activity

The associated Real-World Activity is a request for retrieval of images from the disk and storage of the images to a remote system using a C-STORE command.

3.2.2.1.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.1 are proposed by **Disk-Server** (Explicit VR Transfer Syntaxes for a specific AE target may be restricted using the configuration utility):

Table 20. Proposed Presentation Contexts for Disk-Server

| Name | Abstract Syntax | | Name | Transfer Syntax | | Role | Ext. Neg. |
|----------|----------------------------|-----|------|---------------------|-----|------|-----------|
| | UID | UID | | UID | UID | | |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | | ILE | 1.2.840.10008.1.2 | SCU | None | |
| | | | ELE | 1.2.840.10008.1.2.1 | | | |
| | | | EBE | 1.2.840.10008.1.2.2 | | | |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | | ILE | 1.2.840.10008.1.2 | SCU | None | |
| | | | ELE | 1.2.840.10008.1.2.1 | | | |
| | | | EBE | 1.2.840.10008.1.2.2 | | | |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | | ILE | 1.2.840.10008.1.2 | SCU | None | |
| | | | ELE | 1.2.840.10008.1.2.1 | | | |
| | | | EBE | 1.2.840.10008.1.2.2 | | | |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | | ILE | 1.2.840.10008.1.2 | SCU | None | |
| | | | ELE | 1.2.840.10008.1.2.1 | | | |
| | | | EBE | 1.2.840.10008.1.2.2 | | | |

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-------------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.2.2.1.2.1. SOP Specific Conformance Statement for Storage SOP Class

Disk-Server provides standard conformance to the DICOM V3.0 Storage Service Class as an SCU for the following SOP Classes:

- CT Image Storage, UID = 1.2.840.10008.5.1.4.1.1.2.
- MR Image Storage, UID = 1.2.840.10008.5.1.4.1.1.4.
- CR Image Storage, UID = 1.2.840.10008.5.1.4.1.1.1
- NM Image Storage, UID = 1.2.840.10008.5.1.4.1.1.20
- SC Image Storage, UID = 1.2.840.10008.5.1.4.1.1.7.
- XA Image Storage, UID = 1.2.840.10008.5.1.4.1.1.12.1
- RF Image Storage, UID = 1.2.840.10008.5.1.4.1.1.12.2
- General ECG Waveform Storage, UID = 1.2.840.10008.5.1.4.1.1.9.1.2

Multiple C-STORE operations can be performed over a single association. Upon receiving a C-STORE confirmation containing a successful status, this implementation will perform the next C-STORE operation (if this operation is the result of the Series Level Move request). The association will be kept open if possible.

Any unsuccessful status, returned in the C-STORE confirmation, results in termination of the sending further C-Store requests (if any in the queue), reporting of error to the *system* log file, and returning of a status code of **A702** ("Refused") in the C-MOVE confirmation.

There are no timeouts implemented in this process.

The Mx8000 systems create CT Images, in annex 1 a detailed description of the created object is defined. The Mx8000 systems create the following private attributes as defined in Annex 3.

3.2.2.2. Image Transfer from the Remote System

3.2.2.2.1. Associated Real World Activity

Queue-Manager initiates an association when some application asks for image transfer from a specified source device to a specified target device. If **Queue-**

Manager fails to move all the required images, it waits for some configurable duration and then retries to initiate the association.

3.2.2.2.2. Proposed Presentation Contexts

The following Presentation Contexts are proposed by **Queue-Manager** (Explicit VR Transfer Syntaxes for a specific AE target may be restricted using the configuration utility):

Table 21. Proposed Presentation Contexts for Queue-Manager

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-----------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.2.2.2.2.1. SOP Specific Conformance Statement for Study Root MOVE

Queue-Manager provides standard conformance to the DICOM V3.0 Query/Retrieve Service Class as an SCU for the following SOP Class: Study Root Query/Retrieve Information Model - FIND, UID=1.2.840.10008.5.1.4.1.2.2.2.

3.2.3. Association Acceptance Policy

Disk-Server places no limitations on the number of simultaneous connections it will support. However, it is possible to control that may connect to **Disk-Server** during the *system* configuration process.

3.2.3.1. Remote System Requests Verification

A remote system requests verification from **Disk-Server** using the C-ECHO command.

3.2.3.1.1. Associated Real World Activity

Disk-Server performs the Verification Service Class by responding with C-ECHO-RSP.

3.2.3.1.2. Presentation Context Table

The following Presentation Contexts are acceptable to the **Disk-Server**.

Table 2.3: Acceptable Presentation Contexts for Disk-Server

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.2.3.1.2.1. SOP Specific Conformance to Verification SOP Class

Disk-Server provides standard conformance to the DICOM V3.0 Verification Service Class as an SCP for the Verification SOP Class, UID=1.2.840.10008.1.1.

3.2.3.1.3. **Presentation Context Acceptance Criterion**

Disk-Server will accept any Presentation Context from Table 2.3.

3.2.3.1.4. **Transfer Syntax Selection Policies**

Disk-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.2.3.2. **Remote System Requests Image Storage**

A remote *system* requests image storage from **Disk-Server** using the C-STORE command.

3.2.3.2.1. **Associated Real World Activity**

The Real World activity associated with the C-STORE operation is the storage of the image in the disk. **Disk-Server** will issue a failure status if it is unable to store the image in the disk.

3.2.3.2.2. **Presentation Context Table**

Any of the Presentation Contexts shown in Table 2.3 is acceptable to the **Disk-Server**:

3.2.3.2.2.1. **SOP Specific Conformance to Storage SOP Class**

Disk-Server provides standard conformance to the DICOM V3.0 Storage Service Class as an SCP for the following SOP Classes:

- CT Image Storage, UID=1.2.840.10008.5.1.4.1.1.2.
- MR Image Storage, UID=1.2.840.10008.5.1.4.1.1.4.
- CR Image Storage, UID = 1.2.840.10008.5.1.4.1.1.1
- NM Image Storage, UID = 1.2.840.10008.5.1.4.1.1.20
- SC Image Storage, UID=1.2.840.10008.5.1.4.1.1.7.
- XA Image Storage, UID = 1.2.840.10008.5.1.4.1.1.12.1
- RF Image Storage, UID = 1.2.840.10008.5.1.4.1.1.12.2
- General ECG Waveform Storage, UID = 1.2.840.10008.5.1.4.1.1.9.1.2

Disk-Server conforms to the SOPs of the Storage Service Class at Level 2 (Full). In case of a successful C-STORE, the stored image may be accessed by the **Disk-Server**.

The user of the *system*, who can delete any image using the Archive Manager application, determines the duration of the storage. An auto-delete mechanism can be utilized to remove the least recently accessed images in order to make room for new ones. This mechanism is optional and is controlled by user configurable parameters.

Disk-Server will not coerce any attribute except for the following: pixel data (0x7FE0, 0x0010) of type OW is converted to OB when bits allocated (0x0028, 0x0100) equal 8.

All our viewing applications can support only canonical form of CT images as follows:

- Rescale slope: 1
- Rescale intercept: -1000
- Bits Allocated: 16
- Bits Stored: 12
- High Bit: 11

All other CT images that are not in the canonical form will be translated to it.

If **Disk-Server** returns one of the following status codes, it means that the C-STORE has been unsuccessful:

- **A700** - General refusal status.
- **A701** - Out of disk space.
- **B000** - General warning status.
- **C000** - General failure status.

Recovery from this condition is the responsibility of the **Disk-Server**.

3.2.3.2.3. **Presentation Context Acceptance Criterion**

Disk-Server will accept any Presentation Context from Table 2.4.

Table 22. Acceptable Presentation Contexts for Disk-Server

| Name | Abstract Syntax | Name | Transfer Syntax | Role | Ext. Neg. |
|-----------|-------------------------------|------|---------------------|------|-----------|
| | UID | | UID | | |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | ILE | 1.2.840.10008.1.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | ILE | 1.2.840.10008.1.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | ILE | 1.2.840.10008.1.2 | SCP | None |

| Name | Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|----------|-----------------|------------------------------|-----------------|---------------------|------|-----------|
| | Name | UID | Name | UID | | |
| SC Image | | 1.2.840.10008.5.1.4.1.1.7 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| SC Image | | 1.2.840.10008.5.1.4.1.1.7 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| XA Image | | 1.2.840.10008.5.1.4.1.1.12.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| XA Image | | 1.2.840.10008.5.1.4.1.1.12.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| XA Image | | 1.2.840.10008.5.1.4.1.1.12.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| RF Image | | 1.2.840.10008.5.1.4.1.1.12.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| RF Image | | 1.2.840.10008.5.1.4.1.1.12.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| RF Image | | 1.2.840.10008.5.1.4.1.1.12.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |

3.2.3.2.4. *Transfer Syntax Selection Policies*

Disk-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.2.3.3. Remote System Requests Image Transfer

A remote system requests image transfer from **Disk-Server** using the C-MOVE command.

3.2.3.3.1. *Associated Real World Activity*

The Real World activity associated with the C-MOVE command is retrieval of images from the disk and storage of the images to a remote system using a C-STORE command.

Disk-Server will issue a failure status if it is unable to process the transfer request.

3.2.3.3.2. *Presentation Context Table*

Any of the Presentation Contexts shown in Table 2.4 is acceptable to the **Disk-Server**:

Table 23. Acceptable Presentation Contexts for Disk-Server

| Name | Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-----------------|-----------------------------|-----------------|---------------------|------|-----------|
| | Name | UID | Name | UID | | |
| Study Root MOVE | | 1.2.840.10008.5.1.4.1.2.2.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| Study Root MOVE | | 1.2.840.10008.5.1.4.1.2.2.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| Study Root MOVE | | 1.2.840.10008.5.1.4.1.2.2.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |

3.2.3.3.2.1. *SOP Specific Conformance to Study Root MOVE*

Disk-Server provides standard conformance to the DICOM V3.0 Query/Retrieve Service Class as an SCP for the following SOP Class: Study Root Query/Retrieve Information Model - MOVE, UID=1.2.840.10008.5.1.4.1.2.2.2. Prioritization of C-MOVE requests is not supported.

Disk-Server does not support relational C-MOVE requests. All images requested in the C-MOVE will be sent over a single association (the association will not be established and torn down for each image).

If **Disk-Server** returns one of the following status codes, it means that the C-MOVE has been unsuccessful:

- **A702** - Refused. Unable to perform sub operation (due to failure of a C-STORE).
- **A802** - Refused. Move destination unknown.
- **A700** - General refusal status.
- **B000** - General warning status.
- **C000** - General failure status.

3.2.3.3.3. Presentation Context Acceptance Criterion

Disk-Server will accept any Presentation Context from Table 2.4.

3.2.3.3.4. Transfer Syntax Selection Policies

Disk-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.2.3.4. Remote System Initiates Query Request

A remote system initiates query request using the C-FIND command.

3.2.3.4.1. Associated Real World Activity

The Real World activity associated with the C-FIND command is an examination of the disk content. **Disk-Server** will issue a failure status if it is unable to process the query request.

3.2.3.4.2. Presentation Context Table

Any of the Presentation Contexts shown in Table 2.5 is acceptable to the **Disk-Server**:

Table 24. Acceptable Presentation Contexts for Disk-Server

| Name | Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-----------------------------|-----|---------------------|-----|------|-----------|
| | Name | UID | Name | UID | | |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | ILE | 1.2.840.10008.1.2 | SCP | None | |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None | |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None | |

3.2.3.4.2.1. SOP Specific Conformance to Study Root FIND

Disk-Server provides standard conformance to the DICOM V3.0 Query/Retrieve Service Class as an SCP for the following SOP Class: Study Root Query/Retrieve Information Model - FIND, UID=1.2.840.10008.5.1.4.1.2.2.1.

Disk-Server does not support Relational Search.

All Required (R) and Unique (U) Study, Series and Image level keys for the Study Root Query/Retrieve Information Model are supported. **Disk-Server** supports the following optional keys:

- Image Type (0008,0008)
- Instance Creation Date (0008,0012)
- Instance Creation Time (0008,0013)
- SOP Class UID (0008,0016)
- Series Date (0008,0021)
- Image Date (0008,0023)
- Series Time (0008,0031)
- Image Time (0008,0033)
- Contrast Bolus Agent (0018,0010)
- Scan Options (0018,0022)
- Slice Thickness (0018,0050)
- Gantry/Detector Tilt (0018,1120)
- Acquisition Number (0020,0012)
- Image Position (0020,0032)
- Image Number (0020, 0033)
- Image Orientation (0020,0037)
- Frame Of Reference UID (0020,0052)
- Slice Location (0020,1041)
- Rows (0028,0010)
- Columns (0028,0011)
- Samples Per Pixel (0028, 0002)
- Pixel Spacing (0028,0030)
- Bits Allocated (0028, 0100)

Unsupported fields will not be returned in the C-FIND response.

C-FIND-CANCEL is supported. However, some C-FIND responses may be forwarded before the C-FIND-CANCEL takes effect.

If **Disk-Server** returns one of the following status codes, it means that the C-FIND has been unsuccessful:

- **A700** - General refusal status.
- **B000** - General warning status.
- **C000** - General failure status.

3.2.3.4.3. Presentation Context Acceptance Criterion

Disk-Server will accept any Presentation Context from Table 2.5.

3.2.3.4.4. Transfer Syntax Selection Policies

Disk-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.

- DICOM Implicit VR Little Endian (Default).

3.3. Archive-Manager Specifications

Archive-Manager provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 25. SOP Classes supported as SCU

| SOP Class Name | SOP Class UID |
|---|-----------------------------|
| Verification | 1.2.840.10008.1.1 |
| Study Root Q/R Information Model – FIND | 1.2.840.10008.5.1.4.1.2.2.1 |

3.3.1. Association Establishment Policies

3.3.1.1. General

The maximum PDU size that the **Archive-Manager** will use is configurable, with a minimum of 2K byte.

3.3.1.2. Number of Associations

Archive-Manager can have multiple simultaneous connections. The maximal number of simultaneous associations that will be initiated by **Archive-Manager** is limited by the configuration of the *system*. **Archive-Manager** will not initiate more than one association per each AE configured as an SCP in the *system*.

3.3.1.3. Asynchronous Nature

Archive-Manager will only allow a single outstanding operation on an association. Therefore **Archive-Manager** will not perform asynchronous operations window negotiation.

3.3.1.4. Implementation Identifying Information

Archive-Manager provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.3.2. Association Initiation by Real-World Activity

3.3.2.1. User Clicks on a Device Icon

3.3.2.1.1. *Associated Real World Activity*

Archive-Manager initiates an association when the user clicks on one of the icons in the devices tool-bar.

3.3.2.1.2. *Proposed Presentation Contexts*

All the Presentation Contexts shown in Table 2.14 are proposed by **Archive-Manager**:

Table 26. Proposed Presentation Contexts for Archive-Manager

| Name | Abstract Syntax | | Name | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-----------------------------|-----------------------------|------|---------------------|-----|------|-----------|
| | UID | UID | | UID | UID | | |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | 1.2.840.10008.5.1.4.1.2.2.1 | ILE | 1.2.840.10008.1.2 | SCU | None | |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | 1.2.840.10008.5.1.4.1.2.2.1 | ELE | 1.2.840.10008.1.2.1 | | | |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | 1.2.840.10008.5.1.4.1.2.2.1 | ELE | 1.2.840.10008.1.2.2 | | | |

3.3.2.1.2.1. SOP Specific Conformance Statement for Study Root FIND

Archive-Manager provides standard conformance to the DICOM V3.0 Query/Retrieve Service Class as an SCU for the following SOP Class: Study Root Query/Retrieve Information Model - FIND, UID = 1.2.840.10008.5.1.4.1.2.2.1.

Archive-Manager supports the following **Study Level** keys:

Table 27. Study Level Keys

| Name | Tag | Type |
|--------------------------------|--------------|------|
| Study Date | (0008, 0020) | R |
| Study Time | (0008, 0030) | R |
| Accession Number | (0008, 0050) | R |
| Patient's Name | (0010, 0010) | R |
| Patient ID | (0010, 0020) | R |
| Study ID | (0020, 0010) | R |
| Study Instance UID | (0020, 000D) | U |
| Referring Physician's Name | (0008, 0090) | O |
| Modalities In Study | (0008, 0061) | O |
| Patient's Birth Date | (0010, 0030) | O |
| Patient's Sex | (0010, 0040) | O |
| Number Of Study Related Series | (0020, 1206) | O |
| Number Of Study Related Images | (0020, 1208) | O |

Archive-Manager supports the following **Series Level** keys:

Table 28. Series level Keys

| Name | Tag | Type |
|------------------------------------|--------------|------|
| Modality | (0008, 0060) | R |
| Series Number | (0020, 0011) | R |
| Series Instance UID | (0020, 000E) | U |
| Number Of Series Related Instances | (0020, 1209) | U |
| Series Description | (0020, 103E) | O |
| Series Date | (0008, 0021) | O |
| Series Time | (0008, 0031) | O |
| Protocol Name | (0018, 1030) | O |
| Body Part Examined | (0018, 0015) | O |
| Performed Proc Step Start Date | (0040, 0244) | O |
| Performed Proc Step Start Time | (0040, 0245) | O |

Archive-Manager supports the following **Image Level** keys:

Table 29. Image Level Keys

| Name | Tag | Type |
|------------------|--------------|------|
| Image Number | (0020, 0013) | R |
| SOP Instance UID | (0008, 0018) | U |

| Name | Tag | Type |
|------------------------|--------------|------|
| SOP Class UID | (0008, 0016) | O |
| Image Date | (0008, 0023) | O |
| Image Time | (0008, 0033) | O |
| Image Type | (0008, 0008) | O |
| Slice Location | (0020, 1041) | O |
| Rows | (0028, 0010) | O |
| Columns | (0028, 0011) | O |
| Contrast Bolus Agent | (0018, 0010) | O |
| Instance Creation Date | (0008, 0012) | O |
| Instance Creation Time | (0008, 0013) | O |
| Gantry/Detector Tilt | (0018, 1120) | O |
| Sequence Name | (0018, 0024) | O |
| Echo Number | (0018, 0086) | O |
| Trigger Time | (0018, 1060) | O |

3.3.2.2. Verify Connection

3.3.2.2.1. Associated Real World Activity

Archive-Manager initiates an association when the user points to one of the icons in the devices tool-bar, clicks the right mouse button and selects “Verify Connection” operation.

3.3.2.2.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.15 are proposed by **Archive-Manager**:

Table 30. Proposed Presentation Contexts for Archive-Manager

| Name | Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|--------------|-------------------|-----|-----------------|---------------------|------|-----------|
| | UID | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | | ILE | 1.2.840.10008.1.2 | SCU | None |
| Verification | 1.2.840.10008.1.1 | | ELE | 1.2.840.10008.1.2.1 | | |
| Verification | 1.2.840.10008.1.1 | | EBE | 1.2.840.10008.1.2.2 | | |

3.3.2.2.2.1. SOP Specific Conformance Statement for Verification

Archive-Manager provides standard conformance to the DICOM V3.0 Verification Service Class as an SCU for the Verification SOP Class, UID=1.2.840.10008.1.1.

3.3.3. Association Acceptance Policy

Archive-Manager never accepts an association.

3.4. Memory-Manager Specifications

Memory-Manager provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 31. SOP Classes supported as SCU

| SOP Class Name | SOP Class UID |
|---|-----------------------------|
| Study Root Q/R Information Model - MOVE | 1.2.840.10008.5.1.4.1.2.2.2 |

3.4.1. Association Establishment Policies

3.4.1.1. General

The maximum PDU size that the **Memory-Manager** will use is configurable, with a minimum of 2KBytes.

3.4.1.2. Number of Associations

Memory-Manager can have multiple simultaneous connections. The maximal number of simultaneous associations that will be initiated by **Memory-Manager** is limited by the configuration of the *system*. **Memory-Manager** will not initiate more than one association per each AE configured as an SCP in the *system*.

3.4.1.3. Asynchronous Nature

Memory-Manager will only allow a single outstanding operation on an association. Therefore **Memory-Manager** will not perform asynchronous operations window negotiation.

3.4.1.4. Implementation Identifying Information

Memory-Manager provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.4.2. Association Initiation by Real-World Activity

3.4.2.1. Application Asks for Image Loading

3.4.2.1.1. Associated Real World Activity

Memory-Manager initiates an association when an image processing application asks for image loading from a specified source device using a proprietary IPC protocol.

3.4.2.1.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.15 are proposed by **Memory-Manager**:

Table 32. Proposed Presentation Contexts for Archive-Manager

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-----------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.1 | ILE | 1.2.840.10008.1.2 | SCU | None |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.1 | ELE | 1.2.840.10008.1.2.1 | | |

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-----------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.1 | EBE | 1.2.840.10008.1.2.2 | | |

3.4.2.1.2.1. SOP Specific Conformance Statement for Study Root MOVE

Memory-Manager provides standard conformance to the DICOM V3.0 Query/Retrieve Service Class as an SCU for the following SOP Class: Study Root Query/Retrieve Information Model - FIND, UID=1.2.840.10008.5.1.4.1.2.2.2.

3.4.3. Association Acceptance Policy

Memory-Manager never accepts an association.

3.5. Memory-Server Specifications

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

Table 33. Supported SOP Classes as SCP

| SOP Class Name | SOP Class UID |
|--------------------------------------|--------------------------------|
| Verification | 1.2.840.10008.1.1 |
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 |
| MR Image Storage | 1.2.840.10008.5.1.4.1.1.4 |
| General ECG Waveform Storage | 1.2.840.10008.5.1.4.1.1.9.1.2 |
| Nuclear Medicine Image Storage | 1.2.840.10008.5.1.4.1.1.20 |
| Computed Radiography Image Storage | 1.2.840.10008.5.1.4.1.1.1 |
| Secondary Capture Image Storage | 1.2.840.10008.5.1.4.1.1.7 |
| X-Ray Angiographic Image Storage | 1.2.840.10008.5.1.4.1.1.7.12.1 |
| X-Ray Radiofluoroscapy Image Storage | 1.2.840.10008.5.1.4.1.1.7.12.2 |

Note: XA (X-Ray Angiographic) images are supported for storage only (not for viewing)

3.5.1. Association Establishment Policies

3.5.1.1. General

The maximum PDU size that the **Memory-Server** will use is configurable, with a minimum of 2K byte.

3.5.1.2. Number of Associations

The number of simultaneous associations that will be accepted by **Memory-Server** is limited only by the kernel parameters of the underlying TCP/IP implementation. **Memory-Server** will spawn a new process for each connection request it receives. Therefore, **Memory-Server** can have multiple simultaneous connections, and there are no inherent limitations on the number of simultaneous associations that the Application Entity represented by **Memory-Server** can maintain.

3.5.1.3. Asynchronous Nature

Memory-Server will only allow a single outstanding operation on an association. Therefore **Memory-Server** will not perform asynchronous operations window negotiation.

3.5.1.4. Implementation Identifying Information

Memory-Server provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.5.2. Association Initiation by Real-World Activity

Memory-Server never initiates an association.

3.5.3. Association Acceptance Policy

Memory-Server places no limitations on the number of simultaneous connections it will support. However, it is possible to control that may connect to **Memory-Server** during the *system's* configuration process.

3.5.3.1. Remote System Requests Verification

A remote system requests verification from **Memory-Server** using the C-ECHO command.

3.5.3.1.1. Associated Real World Activity

Memory-Server performs the Verification Service Class by responding with C-ECHO-RSP.

3.5.3.1.2. Presentation Context Table

Any of the Presentation Contexts shown in Table 2.10 is acceptable to **Memory-Server**:

Table 34. Acceptable Presentation Contexts for Memory-Server

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| Verification | 1.2.840.10008.1.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| Verification | 1.2.840.10008.1.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None |

3.5.3.1.2.1. SOP Specific Conformance to Verification SOP Class

Memory-Server provides standard conformance to the DICOM V3.0 Verification Service Class as an SCP for the Verification SOP Class, UID=1.2.840.10008.1.1.

3.5.3.1.3. Presentation Context Acceptance Criterion

Memory-Server will accept any Presentation Context from Table 2.10.

3.5.3.1.4. Transfer Syntax Selection Policies

Memory-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.5.3.2. Remote System Requests Image Transfer

A remote System may request image transfer from **Memory-Server**, as a result of a C-MOVE command issued by the **Memory-Manager**.

3.5.3.2.1. Associated Real World Activity

The Real World activity associated with the C-STORE operation is the storage of the image in the memory of the *system* upon which **Memory-Server** is running.

Memory-Server will issue a failure status if it is unable to store the image in the memory.

3.5.3.2.2. *Presentation Context Table*

Any of the Presentation Contexts shown in table 2.11 is acceptable to the **Memory-Server**:

3.5.3.2.2.1. SOP Specific Conformance to Verification SOP Class

Memory-Server provides standard conformance to the DICOM V3.0 Storage Service Class as an SCP for the following SOP Classes:

- CT Image Storage, UID=1.2.840.10008.5.1.4.1.1.2.
- MR Image Storage, UID=1.2.840.10008.5.1.4.1.1.4.
- CR Image Storage, UID = 1.2.840.10008.5.1.4.1.1.1
- NM Image Storage, UID = 1.2.840.10008.5.1.4.1.1.20
- SC Image Storage, UID=1.2.840.10008.5.1.4.1.1.7.
- XA Image Storage, UID = 1.2.840.10008.5.1.4.1.1.12.1
- RF Image Storage, UID = 1.2.840.10008.5.1.4.1.1.12.2
- General ECG Waveform Storage, UID = 1.2.840.10008.5.1.4.1.1.9.1.2

Memory-Server conforms to the SOPs of the Storage Service Class at Level 2 (Full). In case of a successful C-STORE, the stored image may be accessed by the **Memory-Manager**.

The user determines the duration of the storage.
 Recovery from this condition is the responsibility of the Memory-Manager.
 If Memory-Server returns one of the following status codes, it means that the C-STORE has been unsuccessful:

- **A700** -General refusal status.
- **B000** - General warning status.
- **C000** - General failure status.

3.5.3.2.3. Presentation Context Acceptance Criterion

Memory-Server will accept any Presentation Context from Table 2.11.

Table 35. Acceptable Presentation Contexts for Memory-Server

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-------------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | ILE | 1.2.840.10008.1.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | ILE | 1.2.840.10008.1.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None |

| Name | Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|----------|-----------------|------------------------------|-----------------|---------------------|------|-----------|
| | Name | UID | Name | UID | | |
| CR Image | | 1.2.840.10008.5.1.4.1.1.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| SC Image | | 1.2.840.10008.5.1.4.1.1.7 | ILE | 1.2.840.10008.1.2 | SCP | None |
| SC Image | | 1.2.840.10008.5.1.4.1.1.7 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| SC Image | | 1.2.840.10008.5.1.4.1.1.7 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| XA Image | | 1.2.840.10008.5.1.4.1.1.12.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| XA Image | | 1.2.840.10008.5.1.4.1.1.12.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| XA Image | | 1.2.840.10008.5.1.4.1.1.12.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| RF Image | | 1.2.840.10008.5.1.4.1.1.12.2 | ILE | 1.2.840.10008.1.2 | SCP | None |
| RF Image | | 1.2.840.10008.5.1.4.1.1.12.2 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| RF Image | | 1.2.840.10008.5.1.4.1.1.12.2 | EBE | 1.2.840.10008.1.2.2 | SCP | None |

3.5.3.2.4. *Transfer Syntax Selection Policies*

Memory-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.6. Print-Server Specifications

Print-Server provides Standard Conformance to the following DICOM V3.0 Meta SOP Classes and DICOM V3.0 SOP Classes as an SCP:

Table 36. Supported SOP Classes as SCP

| SOP Class Name | SOP Class UID |
|----------------------------------|------------------------|
| Verification | 1.2.840.10008.1.1 |
| Basic Grayscale Print Management | 1.2.840.10008.5.1.1.9 |
| Print Job | 1.2.840.10008.5.1.1.14 |

Support for the Basic Grayscale Print Management Meta SOP Class as an SCP also implies support for the following SOP Classes as an SCP. However, the **Print-Server** shall not accept individual Presentation Contexts for these SOP Classes.

Table 37. Supported SOP Classes in the Meta Basic Grayscale SOP class

| SOP Class Name | SOP Class UID |
|---------------------------|------------------------|
| Basic Film Session | 1.2.840.10008.5.1.1.1. |
| Basic Film Box | 1.2.840.10008.5.1.1.2. |
| Basic Grayscale Image Box | 1.2.840.10008.5.1.1.4 |
| Printer | 1.2.840.10008.5.1.1.16 |

3.6.1. Association Establishment Policies

3.6.1.1. General

The maximum PDU size that the Print-Server will use is configurable, with a minimum of 2K byte.

3.6.1.2. Number of Associations

The number of simultaneous associations that will be accepted by Print-Server is limited only by the kernel parameters of the underlying TCP/IP implementation. **Print-Server** will spawn a new process for each connection request it receives. Therefore, **Print-Server** can have multiple simultaneous connections, and there are no inherent limitations on the number of simultaneous associations, which the Application Entity represented, by **Print-Server** can maintain.

3.6.1.3. Asynchronous Nature

Print-Server will only allow a single outstanding operation on an association. Therefore **Print-Server** will not perform asynchronous operations window negotiation.

3.6.1.4. Implementation Identifying Information

Print-Server provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.6.2. Association Initiation by Real-World Activity

Print-Server never initiates an association.

3.6.3. Association Acceptance Policy

Print-Server places no limitations on the number of simultaneous connections it will support. However, it is possible to control that may connect to **Print-Server** during the *system's* configuration process.

3.6.3.1. Remote System Requests Verification

A remote system requests verification from the **Print-Server** by sending a C-ECHO command.

3.6.3.1.1. Associated Real World Activity

Print-Server performs the Verification Service Class by responding with C-ECHO-RSP.

3.6.3.1.2. Presentation Context Table

Any of the Presentation Contexts shown in Table 2.12 is acceptable to the **Print-Server**:

Table 38. Acceptable Presentation Contexts for Print-Server

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| Verification | 1.2.840.10008.1.1 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| Verification | 1.2.840.10008.1.1 | EBE | 1.2.840.10008.1.2.2 | SCP | None |

3.6.3.1.2.1. SOP Specific Conformance to Verification SOP Class

Print-Server provides standard conformance to the DICOM V3.0 Verification Service Class as an SCU for the Verification SOP Class, UID=1.2.840.10008.1.1.

3.6.3.1.3. Presentation Context Acceptance Criterion

Print-Server will accept any Presentation Context from Table 2.12.

3.6.3.1.4. Transfer Syntax Selection Policies

Print-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.6.3.2. Remote System Requests Image Print

A remote system requests image print from **Print-Server** by creating film sessions, film boxes and image boxes, changing their attributes and requesting the film boxes (or sessions) to be printed as defined in Part 4 of the standard.

3.6.3.2.1. Associated Real World Activity

The Real World activity associated with the image printing request is the printing of the images on the printer that is associated with the current **Print-Server** instance. **Print-Server** does not support attributes values that are not supported by the associated printer. The valid attributes values as well as the default values used for the associated printer are defined in a printer capabilities configuration file. **Print-Server** will issue a failure status if it is unable to handle the printing request properly.

3.6.3.2.2. Presentation Context Table

Any of the Presentation Contexts shown in Table 2.13 is acceptable to the **Print-Server**:

Table 39. Acceptable Presentation Contexts for Print-Server

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|----------------------------|------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | ILE | 1.2.840.10008.1.2 | SCP | None |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | EBE | 1.2.840.10008.1.2.2 | SCP | None |
| Print Job | 1.2.840.10008.5.1.1.14 | ILE | 1.2.840.10008.1.2 | SCP | None |
| Print Job | 1.2.840.10008.5.1.1.14 | ELE | 1.2.840.10008.1.2.1 | SCP | None |
| Print Job | 1.2.840.10008.5.1.1.14 | EBE | 1.2.840.10008.1.2.2 | SCP | None |

3.6.3.2.2.1. SOP Specific Conformance to Basic Grayscale Print Management Meta SOP Class

Print-Server provides standard conformance as an SCP to the DICOM V3.0 Basic Grayscale Print Management Meta SOP Class, UID=1.2.840.10008.5.1.1.9, which consists of the following SOP Classes:

- Basic Film Session, UID=1.2.840.10008.5.1.1.1.
- Basic Film Box, UID=1.2.840.10008.5.1.1.2.
- Basic Grayscale Image Box, UID=1.2.840.10008.5.1.1.4.
- Printer, UID=1.2.840.10008.5.1.1.16.

The Specific Conformance Statement for each of these SOP Classes is described in the subsequent sections.

3.6.3.2.2.2. SOP Specific Conformance to Basic Film Session SOP Class

Print-Server provides standard conformance to the DICOM V3.0 Basic Film Session SOP Class, UID=1.2.840.10008.5.1.1.1, as an SCP.

N-CREATE - is sent by the SCU to create a Basic Film Session instance before the Basic Film Boxes are created.

Supported Attributes:

- **Number of Copies** - (2000,0010). Supported values are: 1 to 99. Default value is: 1.

-
- **Print Priority** - (2000,0020). Supported values are: LOW, MEDIUM and HIGH. Default value is: LOW. Prioritization is supported by **Print-Server** regardless of the actual printer capabilities.
 - **Medium Type** - (2000,0030). Supported and default value is the one supported by the printer.
 - **Film Destination** - (2000,0040). Supported and default value is the one supported by the printer.
 - **Film Session Label** - (2000,0050). Any value is accepted but has no effect on the actual printing.
 - **Memory Allocation** - (2000,0060). Any value is accepted but has no effect on the actual printing.

If **Print-Server** returns one of the following status codes, it means that the N-CREATE has been unsuccessful.

- **0106** - Failure. Invalid attribute value. A list of invalid values is included in the response.
- **0210** - Failure. The previous film session has not been deleted.
- **B600** - Warning. Memory allocation is not supported.

N-SET - is used to update any attribute of the Basic Film Session instance subject to the limitations mentioned for N-CREATE.

If **Print-Server** returns one of the following status codes, it means that the N-SET has been unsuccessful:

- **0106** - Failure. Invalid attribute value. A list of invalid values is included in the response.
- **0210** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **B600** - Warning. Memory allocation is not supported.
- **C610** - Failure. Film Session has not been created.

N-DELETE - is used to delete all information describing the Basic Film Session. A status code **0112** is returned when the Film Session SOP Instance UID given is not in use, which results in a failure.

N-ACTION - is used to print a Film Session. The Film Boxes are printed in the order they were created. A Print Job SOP Instance is also created by the N-ACTION operation of the Film Session SOP Class.

If **Print-Server** returns one of the following status codes, it means that the N-ACTION has been unsuccessful:

- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **0211** - Failure. Unrecognized operation: the action type name is not PRINT.
- **0213** - Failure. Resource limitation.
- **B602** - Warning. Film session contains an empty film.

- **C600** - Failure. Film Session SOP instance hierarchy does not contain Film Box SOP Instances.
- **C610** - Failure. Film Session has not been created.

3.6.3.2.2.3. SOP Specific Conformance to Basic Film Box SOP Class

Print-Server provides standard conformance to the DICOM V3.0 Basic Film Box SOP Class, UID=1.2.840.10008.5.1.1.2, as an SCP.

N-CREATE - is sent by the SCU to create a Basic Film Box once a Film Session has been successfully created. The Basic Film Box contains the presentation parameters common for all images on a given sheet of film.

The 'SLIDE' 'SUPERSLIDE' and 'CUSTOM' Image Display Format attribute (2010,0010) values are not supported. All other attributes are supported according to the actual printer capabilities. Default values are also taken from the printer capabilities configuration file.

If **Print-Server** returns one of the following status codes, it means that the N-CREATE was unsuccessful.

- **0106** - Failure. Invalid attribute value. A list of invalid values is included in the response.
- **0111** - Failure. Film Box UID given is already in use.
- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **0120** - Failure. Mandatory attributes are missing. A list of missing tags is included in the response.
- **C610** - Failure. Film Session has not been created.

N-SET - is used to update the Basic Film Box instance. Any Film Box in the current Film Session may be updated.

If **Print-Server** returns one of the following status codes, it means that the N-SET has been unsuccessful:

- **0106** - Failure. Invalid attribute value. A list of invalid values is included in the response.
- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **C600** - Failure. Film Session SOP Instance hierarchy does not contain Film Box SOP Instances.
- **C610** - Failure. Film Session has not been created.

N-DELETE - is used to delete the Basic Film Box. Any Film Box in the current Film Session may be deleted.

If **Print-Server** returns one of the following status codes, it means that the N-DELETE was unsuccessful:

- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **C600** - Failure. Film Session SOP instance hierarchy does not contain Film Box SOP Instances.

N-ACTION - is used to print one or more copies of a single film of the Film Box. A Print Job SOP Instance is also created by the N-ACTION operation of the Film Box SOP Class.

If **Print-Server** returns one of the following status codes, it means that the N-ACTION has been unsuccessful:

- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **0211** - Failure. Unrecognized operation: the action type name is not PRINT.
- **0213** - Failure. Resource limitation.
- **B603** - Failure. Film Box is empty.
- **C600** - Failure. Film Session SOP instance hierarchy does not contain Film Box SOP Instances.
- **C610** - Failure. Film Session has not been created.

3.6.3.2.2.4. SOP Specific Conformance to Basic Grayscale Image Box SOP Class

Print-Server provides standard conformance to the DICOM V3.0 Basic Grayscale Image Box SOP Class, UID=1.2.840.10008.5.1.1.4, as an SCP.

The Basic Grayscale Image Box contains the presentation parameters and image pixel data that apply to a single image of a sheet of film. The N-SET DIMSE service is used to update the Basic Grayscale Image Box instance. Any Grayscale Image Box in the current Film Box may be updated.

If **Print-Server** returns one of the following status codes, it means that the N-SET has been unsuccessful:

- **0106** - Failure. Invalid attribute value. A list of invalid values is included in the response.
- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.
- **0120** - Failure. Mandatory attributes are missing. A list of missing tags is included in the response.
- **0213** - Failure. Resource limitation.
- **C600** - Failure. Film Session SOP instance hierarchy does not contain Film Box SOP Instances.
- **C610** - Failure. Film Session has not been created.

3.6.3.2.2.5. SOP Specific Conformance to Printer SOP Class

Print-Server provides standard conformance to the DICOM V3.0 Printer SOP Class, UID=1.2.840.10008.5.1.1.16, as an SCP.

The Printer SOP Class is implemented using the N-EVENT-REPORT and N-GET DIMSE services. N-EVENT-REPORT is used to report the changes of the printer status to the SCU in an asynchronous way. If **Print-Server** returns one of the following status codes, it means that the N-GET has been unsuccessful:

- **0117** - Failure. Invalid printer instance UID.

- **0110** - Failure. Processing failure - Can't read Printer Info File.

3.6.3.2.2.6. SOP Specific Conformance to Printer Job SOP Class

Print-Server provides standard conformance to the DICOM V3.0 Print Job SOP Class, UID=1.2.840.10008.5.1.1.14, as an SCP.

The Print Job SOP Class is created by a N-ACTION of the Film Session SOP Class or a N-ACTION of the Film Box SOP Class. The Print Job Instance is deleted after the films are printed or after a failure.

The number of printed jobs is limited only by the *system's* resources (mainly disk space).

The Print Job SOP Class is implemented using the N-EVENT-REPORT and N-GET DIMSE services. N-EVENT-REPORT is used to report execution status changes to the SCU in an asynchronous way. If **Print-Server** returns one of the following status codes, it means that the N-GET has been unsuccessful:

- **0112** - Failure. No such object instance: the Film Session SOP Instance UID given is not in use.

3.6.3.2.3. Presentation Context Acceptance Criterion

Print-Server will accept any Presentation Context from Table 2.13.

3.6.3.2.4. Transfer Syntax Selection Policies

Print-Server prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.7. Print-Manager Specifications

Print-Manager provides Standard Conformance to the following DICOM V3.0 Meta SOP Classes and DICOM V3.0 SOP as an SCU:

Table 40. Supported SOP Classes as SCU

| SOP Class Name | SOP Class UID |
|-------------------------------|----------------------------|
| Basic Grayscale Print Manager | 1.2.840.10008.5.1.1.9 |
| Basic Color Print Management | 1.2.840.10008.5.1.1.18 |
| Print Job | 1.2.840.10008.5.1.4.1.1.14 |

3.7.1. Association Establishment Policies

3.7.1.1. General

The maximum PDU size that the **Print-Manager** will use is configurable, with a minimum of 2K byte.

3.7.1.2. Number of Associations

Print-Manager can have only one open connection at a given time.

3.7.1.3. Asynchronous Nature

Print-Manager will only allow a single outstanding operation on an association. Therefore **Print-Manager** will not perform asynchronous operations window negotiation.

3.7.1.4. Implementation Identifying Information

Print-Manager provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.7.2. Association Initiation by Real-World Activity

3.7.2.1. User Selects a Printer

3.7.2.1.1. *Associated Real World Activity*

Print-Manager initiates an association when the user selects a new printer or when the film previewer is initialized. In case of printer selection, the previous association is closed.

3.7.2.1.2. *Proposed Presentation Contexts*

All the Presentation Contexts shown in Table 2.17 are proposed by **Print-Manager**.

Table 41. Proposed Presentation Contexts for Print-Manager

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|----------------------------|------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |
| Basic Color Print Mgt. | 1.2.840.10008.5.1.1.8 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |
| Print Job | 1.2.840.10008.5.1.1.14 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.7.2.1.2.1. SOP Specific Conformance Statement for Basic Grayscale Print Management Meta SOP Class

Print-Manager provides standard conformance as an SCU to the DICOM V3.0 Basic Grayscale Print Management Meta SOP Class, UID=1.2.840.10008.5.1.1.9, which consists of the following SOP Classes:

- Basic Film Session, UID=1.2.840.10008.5.1.1.1.
- Basic Film Box, UID=1.2.840.10008.5.1.1.2.
- Basic Grayscale Image Box, UID=1.2.840.10008.5.1.1.4.
- Printer, UID=1.2.840.10008.5.1.1.16.

3.7.2.1.2.2. SOP Specific Conformance Statement for Basic Colour Print Management Meta SOP Class

Print-Manager provides standard conformance as an SCU to the DICOM V3.0 Basic Color Print Management Meta SOP Class, UID=1.2.840.10008.5.1.1.18, which consists of the following SOP Classes:

- Basic Film Session, UID=1.2.840.10008.5.1.1.1.
- Basic Film Box, UID=1.2.840.10008.5.1.1.2.
- Basic ColorImage Box, UID=1.2.840.10008.5.1.1.4.1.
- Printer, UID=1.2.840.10008.5.1.1.16.

3.7.2.1.2.3. SOP Specific Conformance Statement for Print Job SOP Class

Print-Manager provides standard conformance as an SCU to the DICOM V3.0 Print Job SOP Class, UID=1.2.840.10008.5.1.1.14.

3.7.3. Association Acceptance Policy

Print-Manager never accepts an association.

3.8. DentaCT-Print Specifications

DentaCT-Print provides Standard Conformance to the following DICOM V3.0 Meta SOP Classes and DICOM V3.0 SOP as an SCU:

Table 42. Supported SOP Classes as SCU

| SOP Class Name | SOP Class UID |
|-------------------------------|----------------------------|
| Basic Grayscale Print Manager | 1.2.840.10008.5.1.1.9 |
| Print Job | 1.2.840.10008.5.1.4.1.1.14 |

3.8.1. Association Establishment Policies

3.8.1.1. General

The maximum PDU size that the DentaCT-Print will use is configurable, with a minimum of 2K byte.

3.8.1.2. Number of Associations

DentaCT-Print can have only one open connection at a given time.

3.8.1.3. Asynchronous Nature

DentaCT-Print will only allow a single outstanding operation on an association. Therefore DentaCT-Print will not perform asynchronous operations window negotiation.

3.8.1.4. Implementation Identifying Information

DentaCT-Print provides a single Implementation Class UID that is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.8.2. Association Initiation by Real-World Activity

3.8.2.1. User Selects a Printer

3.8.2.1.1. Associated Real World Activity

DentaCT-Print initiates an association when the user selects to print from the DentaCT application.

3.8.2.1.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.18 are proposed by DentaCT-Print.

Table 2.18 Proposed Presentation Contexts for DentaCT-Print

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|----------------------------|------------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |
| Print Job | 1.2.840.10008.5.1.1.14 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.8.2.1.2.1. SOP Specific Conformance Statement for Basic Grayscale Print Management Meta SOP Class

DentaCT-Print provides standard conformance as an SCU to the DICOM V3.0 Basic Grayscale Print Management Meta SOP Class, UID=1.2.840.10008.5.1.1.9, which consists of the following SOP Classes:

- Basic Film Session, UID=1.2.840.10008.5.1.1.1.
- Basic Film Box, UID=1.2.840.10008.5.1.1.2.
- Basic Grayscale Image Box, UID=1.2.840.10008.5.1.1.4.
- Printer, UID=1.2.840.10008.5.1.1.16.

3.8.2.1.2.2. SOP Specific Conformance Statement for Print Job SOP Class

DentaCT-Print provides standard conformance as an SCU to the DICOM V3.0 Print Job SOP Class, UID=1.2.840.10008.5.1.1.14.

3.8.3. Association Acceptance Policy

DentaCT-Print never accepts an association.

3.9. StorageComm-Manager Specifications

StorageComm-Manager provides Standard Conformance to the following DICOM V3.0 SOP Classes both as an SCU:

Table 43. SOP Classes supported as SCU

| SOP Class Name | SOP Class UID |
|-------------------------------|----------------------|
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 |

The following DICOM V3.0 SOP Classes as an SCP only:

Table 44. SOP Classes supported as SCU

| SOP Class Name | SOP Class UID |
|----------------|-------------------|
| Verification | 1.2.840.10008.1.1 |

3.9.1. Association Establishment Policies

3.9.1.1. General

The maximum PDU size, which the **StorageComm-Manager** will use, is configurable, with a minimum of 2K byte.

3.9.1.2. Number of Associations

The number of simultaneous associations that will be accepted by **StorageComm-Manager** is limited only by the kernel parameters of the underlying TCP/IP implementation. **StorageComm-Manager** will spawn a new process for each connection request it receives. Therefore, **StorageComm-Manager** can have multiple simultaneous connections, and there are no inherent limitations on the number of simultaneous associations that the Application Entity represented by **StorageComm-Manager** can maintain.

3.9.1.3. Asynchronous Nature

StorageComm-Manager will only allow a single outstanding operation on an association. Therefore **StorageComm-Manager** will not perform asynchronous operations window negotiation.

3.9.1.4. Implementation Identifying Information

StorageComm-Manager provides a single Implementation Class UID, which is 1.2.840.113704.7.0.2. The Application Context Name is 1.2.840.10008.3.1.1.1.

3.9.2. Association Initiation by Real-World Activity

StorageComm-Manager will attempt to initiate a new association when requested to commit the images that were stored on the remote device, which support the Storage Commitment Service.

3.9.2.1. Image was Stored on the Remote Device with Storage Commitment

3.9.2.1.1. Associated Real World Activity

The associated Real-World Activity is a response about successful completion of storage request from the remote storage device.

3.9.2.1.2. Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.16 are proposed by **StorageComm-Manager**:

Table 45. Proposed Presentation Contexts for StorageComm-Manager

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-------------------------------|----------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | ILE | 1.2.840.10008.1.2 | SCU | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.9.2.1.2.1. SOP Specific Conformance Statement for Storage Commitment Push Model

StorageComm-Manager provides standard conformance to the DICOM V3.0 Storage Commitment Service Class using Push Model as an SCU for the following SOP Class UID: 1.2.840.10008.1.20.1 and SOP Instance UID: 1.2.840.10008.1.20.1.1.

Multiple N-ACTION requests can be performed over a single association. Multiple N-EVENT-REPORT requests can be accepted over a single association.

After all N-ACTION requests that are waiting in the stack are issued, association will be closed with the timeout of 60 sec.

3.9.3. Association Acceptance Policy

StorageComm-Manager places no limitations on the number of simultaneous connections it will support.

3.9.3.1. Remote System Requests Verification

A remote system requests verification from **StorageComm-Manager** using the C-ECHO command.

3.9.3.1.1. Associated Real World Activity

StorageComm-Manager performs the Verification Service Class by responding with C-ECHO-RSP.

3.9.3.1.2. Presentation Context Table

The following Presentation Contexts are acceptable to the **StorageComm-Manager**.

Table 46. Acceptable Presentation Contexts for StorageComm-Manager

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-----------------|-------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.9.3.1.2.1. SOP Specific Conformance to Verification SOP Class

StorageComm-Manager provides standard conformance to the DICOM V3.0 Verification Service Class as an SCP for the Verification SOP Class, UID=1.2.840.10008.1.1.

3.9.3.1.3. Presentation Context Acceptance Criterion

StorageComm-Manager will accept any Presentation Context from Table 2.3.

3.9.3.1.4. Transfer Syntax Selection Policies

StorageComm-Manager prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.9.3.2. Remote System Storage Commitment Report

A remote system reports about storage commitment completion using the N-EVENT-REORT command.

3.9.3.2.1. Associated Real World Activity

The Real World activity associated with the N-EVENT-REORT operation is the completion of the storage commitment by the remote device. **StorageComm-Manager** will issue a failure status if it is unable to handle in proper way the storage commitment report event.

3.9.3.2.2. Presentation Context Table

The following Presentation Contexts are acceptable to the **StorageComm-Manager**.

Table 47. Acceptable Presentation Contexts for StorageComm-Manager

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|-------------------------------|----------------------|-----------------|---------------------|------|-----------|
| Name | UID | Name | UID | | |
| Storage Commitment Push Model | 1.2.840.10008.1.20.1 | ILE | 1.2.840.10008.1.2 | SCP | None |
| | | ELE | 1.2.840.10008.1.2.1 | | |
| | | EBE | 1.2.840.10008.1.2.2 | | |

3.9.3.2.2.1. SOP Specific Conformance to Storage Commitment Push Model

StorageComm-Manager provides standard conformance to the DICOM V3.0 Storage Commitment Service Class using Push Model as an SCP for the SOP Class UID: 1.2.840.10008.1.20.1

3.9.3.2.3. Presentation Context Acceptance Criterion

StorageComm-Manager will accept any Presentation Context from Table 2.4.

3.9.3.2.4. Transfer Syntax Selection Policies

StorageComm-Manager prefers an explicit Transfer Syntax encoding. If offered a choice of Transfer Syntax's in a Presentation Context, it will apply the following priorities to the choice of Transfer Syntax:

- DICOM Explicit VR Big Endian.
- DICOM Explicit VR Little Endian.
- DICOM Implicit VR Little Endian (Default).

3.10. Media AE Specification

(MxView Only)

AE provides Standard Conformance to the DICOM Media Storage Service and File Format (PS 3.10) and the Media Storage Application Profiles (PS 3.11).

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in the following table.

Table 48. Supported Application Profiles

| Application Profile | Identifier | Real World Activity | Role | SC Option |
|-----------------------|-------------|-------------------------------|------|-------------|
| CT/MR Studies on CD-R | STD-CTMR-CD | Write Images(s) on CD-R disk | FSC | Interchange |
| | | Read Images(s) from CD-R disk | FSR | Interchange |

3.10.1. Create file

3.10.1.1. Application Entity Title

The Application Entity title is registered into the DICOM File Meta Information header and is supported by the CD-writer (CD write option) acting as a FSC.

Application Entity Title: "Name of AE Title"

3.10.1.2. Real World activity

The SOP instances provided by the RWA are written to the CD-R media and a corresponding DICOMDIR is created.

3.10.1.3. Application Profiles

The following Table gives an overview of the supported SOP Classes for each Application Profiles.

Table 49. Conformance supported Application Profiles

| Application Profile Identifier | Supp. SOP Classes Name | UID | Supported Transfer Syntaxes Name | UID |
|--------------------------------|------------------------|--------------------------------|----------------------------------|---------------------|
| CT/MR Studies on CD-R | CT Image | 1.2.840.10008.5.1.4.1.1.2 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | MR Image | 1.2.840.10008.5.1.4.1.1.4 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | NM Image | 1.2.840.10008.5.1.4.1.1.2 0 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | CR Image | 1.2.840.10008.5.1.4.1.1.1 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |

| Application Profile Identifier | Supp. SOP Classes Name | UID | Supported Transfer Syntaxes Name | UID |
|--------------------------------|------------------------|-------------------------------|----------------------------------|---------------------|
| CT/MR Studies on CD-R | RF Image | 1.2.840.10008.5.1.4.1.1.1.2.2 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | SC Image | 1.2.840.10008.5.1.4.1.1.7 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |

3.10.1.4. DICOMDIR keys

Table 50. Supported attributes in the DICOMDIR

| Dicom Tag | Description |
|-----------|-----------------------------------|
| 0002:0001 | File Meta Information Version |
| 0002:0002 | UI Media Storage Sop Class UID |
| 0002:0003 | UI Media Storage Sop Instance UID |
| 0002:0010 | UI Transfer Syntax UID |
| 0002:0012 | UI Implementation Class UID |
| 0004:1130 | File Set ID |
| 0004:1200 | First Directory Record Offset |
| 0004:1202 | Last Directory Record Offset |
| 0004:1212 | File Set Consistency Flag |
| 0004:1220 | Directory Record Sequence |
| 0004:1400 | Offset Of The Next Dir Record |
| 0004:1410 | Record In Use Flag |
| 0004:1420 | Offset Of Ref Lower Level Dir Ent |
| 0004:1430 | Directory Record Type |
| 0010:0010 | Patient's Name |
| 0010:0020 | Patient ID |
| 0004:1400 | Offset Of The Next Dir Record |
| 0004:1410 | Record In Use Flag |
| 0004:1420 | Offset Of Ref Lower Level Dir Ent |
| 0004:1430 | Directory Record Type |
| 0004:1500 | Referenced File ID |
| 0008:0020 | Study Date |
| 0008:0030 | Study Time |
| 0008:0050 | Accession Number |
| 0008:1030 | Study Description |
| 0010:0010 | Patient's Name |
| 0010:0020 | Patient ID |

| Dicom Tag | Description |
|------------|-----------------------------------|
| 0020:000D | Study Instance UID |
| 0020:0010 | Study ID |
| 0020:1206 | Number Of Study Related Series |
| 0020:1208 | Number Of Study Related Images |
| 07A1:0010 | Implementor ID |
| 07A1: 1001 | Number Of Series In Study |
| 07A1: 1003 | Last Update Time |
| 07A1: 1004 | Last Update Date |
| 07A1: 1014 | Protection Flag |
| 0004:1400 | Offset Of The Next Dir Record |
| 0004:1410 | Record In Use Flag |
| 0004:1420 | Offset Of Ref Lower Level Dir Ent |
| 0004:1430 | Directory Record Type |
| 0004:1500 | Referenced File ID |
| 0008:0060 | Modality |
| 0018:1030 | Protocol Name |
| 0020:000E | Series Instance UID |
| 0020:0011 | Series Number |
| 0020:1209 | |
| 07A1:0010 | Implementor ID |
| 07A1: 1002 | Number Of Images In Series |
| 07A1: 1003 | Last Update Time |
| 07A1: 1004 | Last Update Date |
| 0004:1400 | Offset Of The Next Dir Record |
| 0004:1410 | Record In Use Flag |
| 0004:1420 | Offset Of Ref Lower Level Dir Ent |
| 0004:1430 | Directory Record Type |
| 0004:1500 | Referenced File ID |
| 0004:1510 | Referenced Sop Class UID In File |
| 0004:1511 | Ref Sop Instance UID In File |
| 0004:1512 | |
| 0008:0008 | Image Type |
| 0008:0012 | Instance Creation Date |
| 0008:0013 | Instance Creation Time |
| 0008:0016 | SOP Class UID |
| 0008:0018 | SOP Instance UID |
| 0008:0023 | Image Date |
| 0008:0033 | Image Time |
| 0018:0010 | Contrast/Bolus Agent |
| 0018:1120 | Gantry/Detector Tilt |
| 0020:0013 | Image Number |
| 0020:0052 | Frame of Reference UID |

| | |
|------------|--------------------|
| 0020:1041 | Slice Location |
| 0028:0002 | Samples per Pixels |
| 0028:0010 | Rows |
| 0028:0011 | Columns |
| 0028:0100 | Bits Allocated |
| 07A1:0010 | Implementor ID |
| 00E1: 1040 | Image Label |

3.10.2. Read file

3.10.2.1. Application Entity Title

The Application Entity title is registered into the DICOM File Meta Information header and is supported by the CD-writer (CD write option) acting as a FSR.

Application Entity Title: "Name of AE Title"

3.10.2.2. Real World activity

The SOP instances provided by the RWA are read from the CD-R media.

3.10.2.3. Application Profiles

The following Table gives an overview of the supported SOP Classes for each Application Profiles.

Table 51. Conformance supported Application Profiles

| Application Profile Identifier | Supp. SOP Classes Name | UID | Supported Transfer Syntaxes Name | UID |
|--------------------------------|------------------------|-------------------------------|----------------------------------|---------------------|
| CT/MR Studies on CD-R | CT Image | 1.2.840.10008.5.1.4.1.1.2 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | MR Image | 1.2.840.10008.5.1.4.1.1.4 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | NM Image | 1.2.840.10008.5.1.4.1.1.20 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | CR Image | 1.2.840.10008.5.1.4.1.1.1 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | EGC Image | 1.2.840.10008.5.1.4.1.1.9.1.2 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |
| CT/MR Studies on CD-R | SC Image | 1.2.840.10008.5.1.4.1.1.7 | EBE | 1.2.840.10008.1.2.2 |
| | | | ELE | 1.2.840.10008.1.2.1 |
| | | | ILE | 1.2.840.10008.1.2 |

4. COMMUNICATION PROFILES

4.1. Supported Communications Stacks (Parts 8,9)

The *System* provides DICOM v3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.2. TCP/IP Stack

All the Application Entities in the *System* inherit their TCP/IP stack from the UNIX System upon which they operate.

4.2.1. Physical Media Support

➤ The *System* is indifferent to the physical medium over which TCP/IP operates.

5. EXTENSIONS/SPECIALIZATIONS/PRIVATISATIONS

5.1. Transfer syntax conversion

The *system* supports transfer syntax conversion according to the following table:

Table 52. Transfer Syntax Conversion

| Source Syntax | Destination Syntax | | |
|---------------|--------------------|-----|-----|
| | ILE | ELE | EBE |
| ILE | + | + | + |
| ELE | + | + | + |
| EBE | + | + | + |

5.2. Mapping between UI elements and DICOM attributes

Table 53. Mapping between UI elements and DICOM attributes

| DICOM Attribute name | Tag | UI Element | Note |
|-----------------------------|-------------|----------------|------|
| Patient Name | (0008,0012) | Patient | |
| Scheduled Procedure Step ID | (0040,0201) | Examination ID | |
| | | | |
| | | | |
| | | | |

6. CONFIGURATION

6.1. AE Title/Presentation Address Mapping

This mapping (including IP and port numbers) is defined during the *system* Network Configuration procedure.

6.2. Configurable Parameters

- Calling AE Titles
- Called AE Titles
- Maximum PDU size.
- Disable arbitrary Transfer Syntaxes to be proposed at the Association negotiation
- Disable generation of Icon Image sequence
- Disable generation of DICOM overlays (“burn-in” instead)

6.3. Un-Configurable Parameters

- There is not support for dots removal from Dicom Date attributes.
- Configurable option to remove private tags from the received images isn't supported.

7. SUPPORT OF EXTENDED CHARACTER SETS

7.1. Extended Character sets

The following extended character sets are supported (for Storage, Modality Worklist requests and MPPS Set):

1. Latin ISO_IR 100 ISO 8859-1 Latin Alphabet No. 1
Supplementary Set

ANNEX 1. Created CT Image

Table 54. CT Image Storage SOP Class - C-STORE-RQ - Patient Module

| Attribute Name | Tag | Note |
|-----------------------------|-----------|------|
| Patient's Name | 0010,0010 | |
| Patient ID | 0010,0020 | |
| Other Patient IDs | 0010,1000 | |
| Patient's Birth Date | 0010,0030 | |
| Referenced Patient Sequence | 0008,1120 | |
| Patient's Sex | 0010,0040 | |

Table 55. CT Image Storage SOP Class - C-STORE-RQ - General Study Module

| Attribute Name | Tag | Note |
|----------------------------|-----------|------|
| Study Date | 0008,0020 | |
| Study Time | 0008,0030 | |
| Accession Number | 0008,0050 | |
| Referring Physician's Name | 0008,0090 | |
| Study Description | 0008,1030 | |
| Study Instance UID | 0020,000D | |
| Referenced Study Sequence | 0008,1110 | |
| Procedure Code Sequence | 0008,1032 | |
| Study ID | 0020,0010 | |

Table 56. CT Image Storage SOP Class - C-STORE-RQ - Patient Study Module

| Attribute Name | Tag | Note |
|------------------|-----------|------|
| Patient's Weight | 0010,1030 | |
| Patient's Age | 0010,1010 | |

Table 57. CT Image Storage SOP Class - C-STORE-RQ - General Series Module

| Attribute Name | Tag | Note |
|--------------------------------------|-----------|----------------------|
| Modality | 0008,0060 | Applied Value(s): CT |
| Operator's Name | 0008,1070 | |
| Protocol Name | 0018,1030 | |
| Patient Position | 0018,5100 | |
| Series Instance UID | 0020,000E | |
| Series Number | 0020,0011 | |
| Series Description | 0008,103E | |
| Performed Procedure Step Description | 0040,0254 | |
| Laterality | 0020,0060 | |

Table 58. CT Image Storage SOP Class - C-STORE-RQ - Frame of Reference Module

| Attribute Name | Tag | Note |
|------------------------------|-----------|------|
| Frame of Reference UID | 0020,0052 | |
| Position Reference Indicator | 0020,1040 | |

Table 59. CT Image Storage SOP Class - C-STORE-RQ - General Equipment Module

| Attribute Name | Tag | Note |
|-------------------------------|-----------|--------------------------------|
| Manufacturer | 0008,0070 | Applied Value(s): Philips |
| Institution Name | 0008,0080 | |
| Institution Address | 0008,0081 | Applied Value(s): Haifa, MATAM |
| Station Name | 0008,1010 | |
| Institutional Department Name | 0008,1040 | |
| Manufacturer's Model Name | 0008,1090 | Applied Value(s): Mx8000 |
| Software Version(s) | 0018,1020 | |

Table 60. CT Image Storage SOP Class - C-STORE-RQ - General Image Module

| Attribute Name | Tag | Note |
|-----------------------------|------------|------|
| Image type | 0008,0008 | |
| Acquisition Date | 0008,0022 | |
| Content Date | 0008,0023 | |
| Acquisition Time | 0008,0032 | |
| Content Time | 0008,0033 | |
| Instance Number | 0020,0013 | |
| Image Comments | 0020,4000 | |
| Referenced Image Sequence | 0008,1140 | |
| Icon Image Sequence | 0088,0200 | |
| >Samples per Pixel | 0028,0002 | |
| >Photometric Interpretation | 0028,0004 | |
| >Rows | 0028,0010 | |
| >Columns | 0028,0011 | |
| >Pixel Aspect Ratio | 0028,0034 | |
| >Bits Allocated | 0028,0100 | |
| >Bits Stored | 0028,0101 | |
| >High Bit | 0028,0102 | |
| >Pixel Representation | 0028,0103 | |
| >Pixel Data | 7FE0, 0010 | |

Table 61. CT Image Storage SOP Class - C-STORE-RQ - Image Plane Module

| Attribute Name | Tag | Note |
|-----------------------------|-----------|------|
| Slice Thickness | 0018,0050 | |
| Image Position (Patient) | 0020,0032 | |
| Image Orientation (Patient) | 0020,0037 | |
| Slice Location | 0020,1041 | |
| Pixel Spacing | 0028,0030 | |

Table 62. CT Image Storage SOP Class - C-STORE-RQ - Image Pixel Module

| Attribute Name | Tag | Note |
|----------------------|------------|------|
| Rows | 0028,0010 | |
| Columns | 0028,0011 | |
| Pixel Representation | 0028,0103 | |
| Pixel Data | 7FE0, 0010 | |

Table 63. CT Image Storage SOP Class - C-STORE-RQ - Contrast/bolus Module

| Attribute Name | Tag | Note |
|---------------------------|-----------|------|
| Contrast/Bolus Agent | 0018,0010 | |
| Contrast/Bolus Route | 0018,1040 | |
| Contrast Flow Duration(s) | 0018,1047 | |
| Contrast Flow Rate(s) | 0018,1046 | |
| Contrast/Bolus Ingredient | 0018,1049 | |
| Contrast/Bolus Volume | 0018,1041 | |

Table 64. CT Image Storage SOP Class - C-STORE-RQ - Ct Image Module

| Attribute Name | Tag | Note |
|----------------------------|-----------|--|
| Image Type | 0008,0008 | Applied Value(s): ORIGINALPRIMARYAXIAL |
| Scan Options | 0018,0022 | |
| KVP | 0018,0060 | |
| Data Collection Diameter | 0018,0090 | |
| Reconstruction Diameter | 0018,1100 | |
| Gantry/Detector Tilt | 0018,1120 | |
| Table Height | 0018,1130 | |
| Rotation Direction | 0018,1140 | |
| Exposure Time | 0018,1150 | |
| X-Ray Tube Current | 0018,1151 | |
| Exposure | 0018,1152 | |
| Filter Type | 0018,1160 | |
| Convolution Kernel | 0018,1210 | |
| Acquisition Number | 0020,0012 | |
| Samples per Pixel | 0028,0002 | |
| Photometric Interpretation | 0028,0004 | |
| Bits Allocated | 0028,0100 | Applied Value(s): 16 |
| Bits Stored | 0028,0101 | Applied Value(s): 12, 13, 14, 15, 16 |
| High Bit | 0028,0102 | |
| Rescale Intercept | 0028,1052 | |
| Rescale Slope | 0028,1053 | |

Table 65. CT Image Storage SOP Class - C-STORE-RQ - Voi Lut Module

| Attribute Name | Tag | Note |
|----------------|-----|------|
|----------------|-----|------|

| Attribute Name | Tag | Note |
|----------------|-----------|------|
| Window Center | 0028,1050 | |
| Window Width | 0028,1051 | |

Table 66. CT Image Storage SOP Class - C-STORE-RQ - Sop Common Module

| Attribute Name | Tag | Note |
|------------------------|-----------|------|
| Instance Creation Date | 0008,0012 | |
| Instance Creation Time | 0008,0013 | |
| Specific Character Set | 0008,0005 | |
| SOP Class UID | 0008,0016 | |
| SOP Instance UID | 0008,0018 | |

Table 67. CT Image Storage SOP Class - C-STORE-RQ – Patient Medical Module

| Attribute Name | Tag | Note |
|----------------------------|-----------|------|
| Medical Alerts | 0010,2000 | |
| Additional Patient History | 0010,21B0 | |
| Contrast Allergies | 0010,2110 | |
| Special Needs | 0038,0050 | |
| Pregnancy Status | 0010,21C0 | |
| Patient State | 0038,0500 | |

Table 68. CT Image Storage SOP Class - C-STORE-RQ - Private Group

A detailed list can be found in Annex 3.

ANNEX 2. Created General EGC Image

Table 69. General EGC Image - Patient Module

| Attribute Name | Tag | Note |
|----------------------|-----------|------|
| Patient's Name | 0010,0010 | |
| Patient ID | 0010,0020 | |
| Patient's Birth Date | 0010,0030 | |
| Patient's Sex | 0010,0040 | |

Table 70. General EGC - General Study Module

| Attribute Name | Tag | Note |
|----------------------------|-----------|------|
| Study Date | 0008,0020 | |
| Study Time | 0008,0030 | |
| Accession Number | 0008,0050 | |
| Referring Physician's Name | 0008,0090 | |
| Study Instance UID | 0020,000D | |
| Study ID | 0020,0010 | |

Table 71. General EGC - General Series Module

| Attribute Name | Tag | Note |
|----------------|-----------|-----------------------|
| Modality | 0008,0060 | Applied Value(s): EGC |

Table 72. General EGC – Synchronization Module

| Attribute Name | Tag | Note |
|--|-----------|------|
| Synchronization Frame of Reference UID | 0020,0200 | |
| Synchronization Trigger | 0018,106A | |
| Synchronization Channel | 0018,106C | |
| Acquisition Time Synchronized | 0018,1800 | |

Table 73. General EGC - General Equipment Module

| Attribute Name | Tag | Note |
|----------------|-----------|---------------------------|
| Manufacturer | 0008,0070 | Applied Value(s): Philips |

Table 74. General EGC – Waveform Identification

| Attribute Name | Tag | Note |
|----------------------|-----------|------|
| Instance Number | 0020,0013 | |
| Content Date | 0008,0023 | |
| Content Time | 0008,0033 | |
| Acquisition Datetime | 0008,002A | |

Table 75. General EGC – Waveform Identification

| Attribute Name | Tag | Note |
|----------------------------------|------------|------|
| Waveform Sequence | 5400,0100 | |
| > Multiplex Group Time Offset | 0018,1068 | |
| > Waveform Originality | 003A, 0004 | |
| > Number of Waveform Channels | 003A, 0005 | |
| >Number of Waveform Samples | 003A, 0010 | |
| > Sampling Frequency | 003A, 001A | |
| > Channel Definition Sequence | 003A, 0200 | |
| >> Channel Source Sequence | 003A, 0208 | |
| >>Channel Sample Skew | 003A, 0215 | |
| >> Waveform Bits Stored | 003A, 021A | |
| > Waveform Bits Allocated | 5400,1004 | |
| > Waveform Sample Interpretation | 5400,1006 | |
| > Waveform Data | 5400,1010 | |

Table 76. General EGC – Acquisition Context

| Attribute Name | Tag | Note |
|------------------------------|-----------|------|
| Acquisition Context Sequence | 0040,0555 | |

Table 77. General EGC– Sop Common Module

| Attribute Name | Tag | Note |
|------------------|-----------|------|
| SOP Class UID | 0008,0016 | |
| SOP Instance UID | 0008,0018 | |