# MxView

## Version 3.5

DICOM Conformance Statement

*Marconi Medical Systems*

November 6, 2000

## Table Of Contents

# Introduction

## Mx-Series Scanners and Workstation

This conformance statement refers to a family of products that are based on the same communication software: the MxView workstation and the Mx8000/Mx8000D scanners. This document refers to each of the above products as a ***System***. Unless otherwise indicated, all the described services refer to both the scanners and the workstation.

**MxView** is a radiology-oriented multi-modality image processing workstation that provides quick processing, analysis, manipulation, display, storage and retrieval of images from different modalities.

**Mx8000** and **Mx8000D** are multi-slice spiral CT scanner that also support processing, analysis, manipulation, display, storage and retrieval of images from different modalities, similar to the MxView workstation.

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 systems, 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 *MxTwin* scanner and DICOM networks. Another example is the *System* being a gateway between a DICOM Print Management Service Class user and a non-DICOM hardcopy device such as 3M-952 LMI.

# About this Document

This document provides the DICOM Conformance Statement for the *System* implementation of the DICOM-3.0 standard. Conformance Statement defines the subset of options selected from those offered by the DICOM v3.0 standard. Copies of the DICOM v3.0 standard may be obtained by written request or phone by contacting:

NEMA Publication
2101 L Street, NW, Suite 300
Washington, DC 20037 USA
Phone: (202) 457-8474

It is assumed that the reader of this document is familiar with the DICOM v3.0 standard and with the terminology and concepts that are used in the standard.

# Important Remarks

The use of this Conformance Statement, in conjunction with the DICOM v3.0 standard, is intended to facilitate communication with the *System*. However, by itself, it is not sufficient to ensure that inter-operation will be successful. The user needs to proceed with caution and be aware of at least the following issues:

- It is the user's responsibility to analyze the applications requirements and to design a solution that integrates the System properly with the network. The integration of any DICOM compliant device into an existing network goes beyond the scope of the standard.
- Testing the complete range of possible interactions between the System and other devices should not be overlooked by the user. This includes the accuracy of the image data once it has crossed the interface between the System and the other device, and the suitability of the image data for the intended applications. Such a validation is required before any clinical use is performed.
- Evolution of the DICOM v3.0 standard may require changes to devices that have implemented it, such as the System. The user should ensure that other DICOM products in the network are also updated as the standard evolves.

If the user encounters unspecified private data elements while parsing a data set coming from the *System*, the user is well advised to ignore those data elements (per the DICOM v3.0 standard). Unspecified private data element information is subject to change without notice.

# Document Revision History

| Date | Product Release | Internal Revision | Major changes |
|---|---|---|---|
| 15-Oct-99 | N/A | 2.0 | Initial combined document for scanner and workstation |
| 20-Oct-99 | MxView 2.7.1 and 3.0;<br>Mx8000 V1.6 | 2.1 | Add DentaCT-Print Application Entity |
| 30-Dec-99 | Mx8000 V2.0 | 2.2 | Change name Picker to Marconi<br>Add Modality Worklist Management Service Class<br>Add MPPS Service Class<br>Add Storage Commitment Service Class (Push) |
| 14-May-00 | MxView 3.01 | 2.3 | Change name to Marconi for MxView V3.01 |
| 18-Oct-00 | Mx8000 V2.03 | 2.3.1 | Add Mx8000D scanner<br>Remove unsupported modalities<br>List all attributes for C-Find request in Archive Manager |
| 06-Nov-00 | MxView 3.5 | 2.4 | Add Storage Commitment as separate AE (incl. response on separate association)<br>Add Storage Commitment to MxView<br>Add support for CR, XA, RF<br>Corrections according to VA and IHE-Y2 requirements<br>Combine Disk-Server and Queue-Manager AEs<br>Update Configuration section (5.2) |
| | | | |

# 1. Implementation Model

The *System* uses the DICOM protocol to enable the following functions:

- Query remote data bases
- Retrieve images from remote data bases
- Store images to remote data bases
- Film images on a remote printer server
- Connect to HIS/RIS systems (Scanner only)

The *System* also uses the DICOM protocol to implement a number of internal services:

- Access to its local data base and removable storage devices
- Access to an MxTwin scanner
- Loading of image to its memory
- Printing on non-DICOM 3M-type printers

## 1.1 Application Data Flow Diagram

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

1. Disk-Server/Queue-Manager
2. Archive-Manager
3. Memory-Manager
4. Memory-Server
5. Print-Server
6. Print-Manager
7. DentaCT-Print
8. Patient-Catalog Server (*Scanner only*)
9. StorageComm-Manager
10. MxTwin-Server

### 1.1.1 Disk-Server/Queue-Manager

Disk-Server provides the interface to the data base 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:

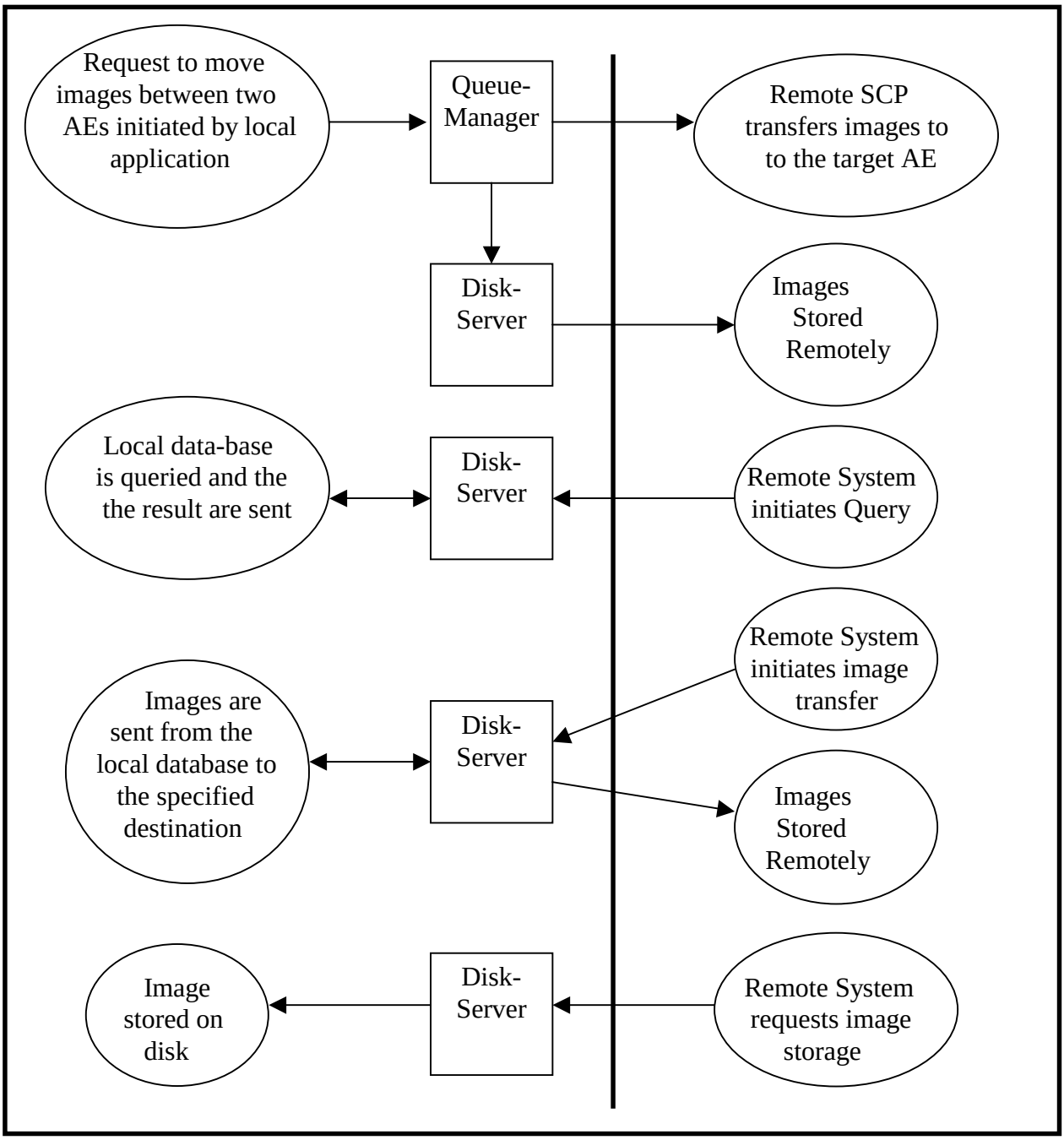

**Figure 1: Illustration of Disk-Server Activities.**

### 1.1.2 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:

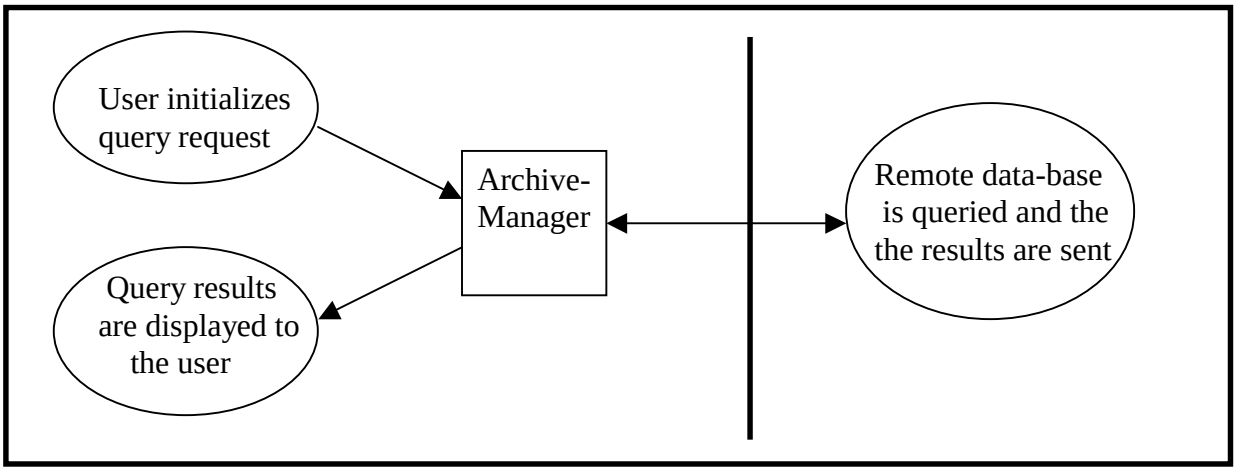


**Figure 2: Illustration of Archive-Manager Activities.**

### 1.1.3 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:

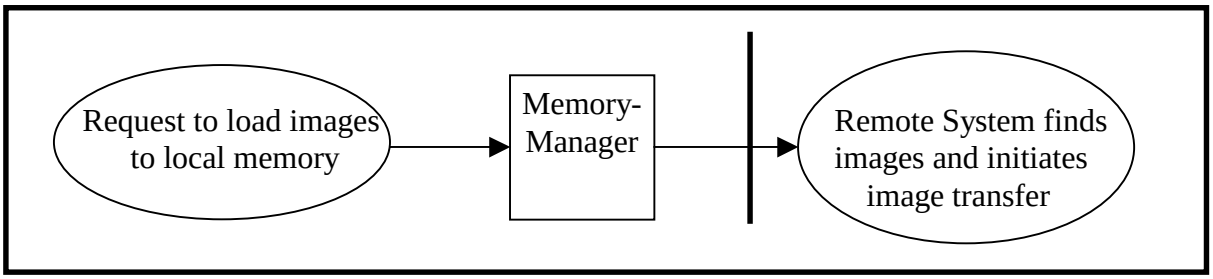


**Figure 3: Illustration of Memory-Manager Activities.**

### 1.1.4 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:

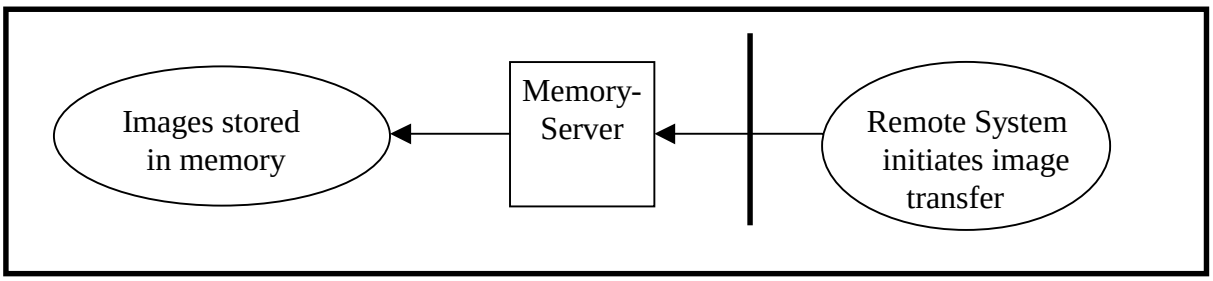

**Figure 4: Illustration of Memory-Manager Activities.**

### 1.1.5 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:

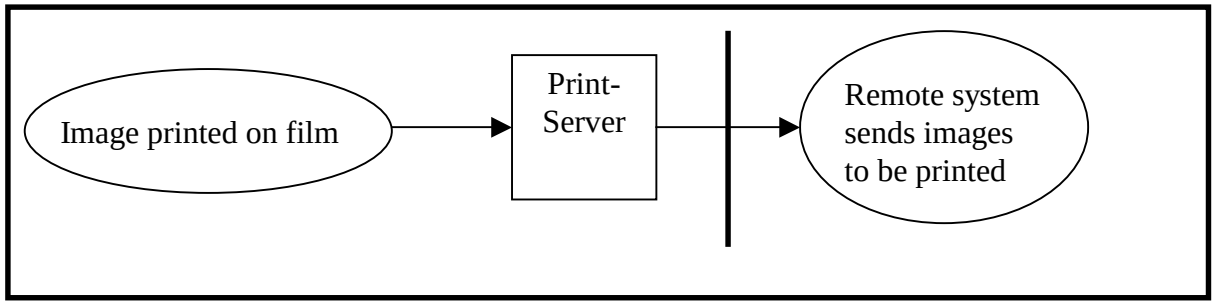


**Figure 5: Illustration of Print-Server Activities.**

### 1.1.6 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:

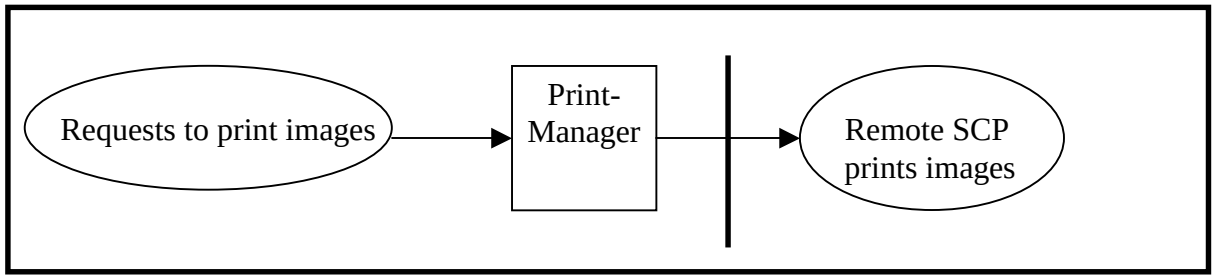


**Figure 6: Illustration of Print-Manager Activities.**

### 1.1.7 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:

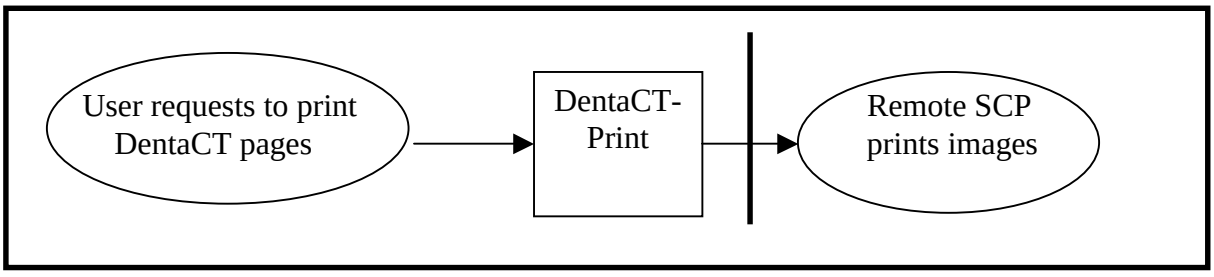


**Figure 7: Illustration of DenatCT-Print Activities.**

## 1.1.8 Patient-Catalog Server

*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. The following figure provides an illustration of Patient-Catalog activities:

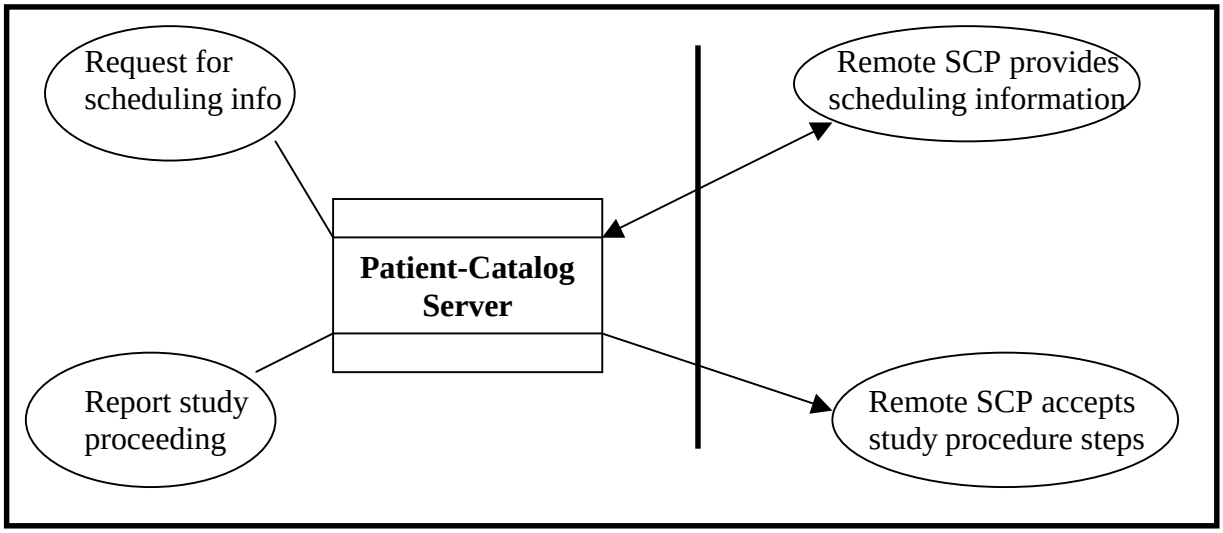


**Figure 8: Illustration of Patient-Catalog Server Activities.**

## 1.1.9 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:

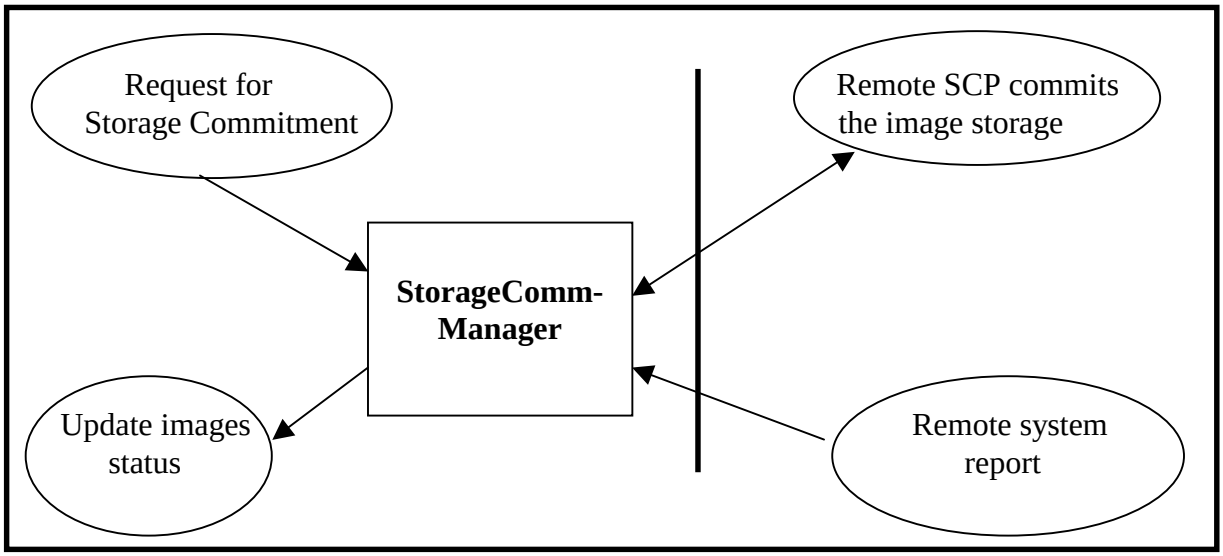


**Figure 9: Illustration of StorageComm-Manager Activities.**

### 1.1.10 MxTwin-Server

This AE serves as a gateway to an MxTwin CT-LAN station (e.g., OmniView, MxTwin, etc.). This SCP enables a Service Class User (SCU) to access the CT-LAN station's database (hard disk). This SCP provides DICOM Query-Retrieve services. The same AE may be used (with a configurable different AE title) to access the CT-LAN station's EOD. The following figure provides an illustration of MxTwin-Server activities:

# 1.2 Functional Definitions of AE's

## 1.2.1 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 data-base.

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.

## 1.2.2 Archive-Manager

The **Archive-Manager i**s 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

## 1.2.3 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.**

### 1.2.4 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.

### 1.2.5 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.

### 1.2.6 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.

### 1.2.7 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.

### 1.2.8 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 requests 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

### 1.2.9 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.

### 1.2.10 MxTwin-Server

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

When performing Query-Retrieve Service Class (C-FIND), **MxTwin-Server** will query its associated *MxTwin* CT-LAN station data base according to the request's parameters (using the proprietary *MxTwin* protocol), and will send the results to the issuer.

When performing Query-Retrieve Service Class (C-MOVE), **MxTwin-Server** will retrieve the images from the *MxTwin* CT-LAN station (using proprietary *MxTwin* protocol), and will issue a C-STORE (to the target AE) for every image in the request.

## 1.3 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).

# 2. AE Specifications

## 2.1 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:

| 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 | 1.2.840.10008.5.1.4.1.1.7.12.1 |
| X-Ray Radiofluoroscopy Image Storage | 1.2.840.10008.5.1.4.1.1.7.12.2 |
| Study Root Q/R Information Model – MOVE | 1.2.840.10008.5.1.4.1.2.2.2 |

and to the following DICOM V3.0 SOP Classes as an SCP only:

| 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 |

### 2.1.1 Association Establishment Policies

#### 2.1.1.1 General

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

#### 2.1.1.2 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 *System.*.

### 2.1.1.3 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.

### 2.1.1.4 Implementation Identifying Information

**Disk-Server/Queue-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.

## 2.1.2 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.

### 2.1.2.1 Image Transfer to the Remote System

#### 2.1.2.1.1 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.

#### 2.1.2.1.2 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 2.1: Proposed Presentation Contexts for Disk-Server**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |

| | | | | | |
|---|---|---|---|---|---|
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Implicit VR Little Endian<br>DICOM Explicit VR Little Endian<br>DICOM Explicit VR Big Endian | 1.2.840.10008.1.2<br>1.2.840.10008.1.2.1<br>1.2.840.10008.1.2.2 | SCU | None |

#### 2.1.2.1.2.1 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

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.

### 2.1.2.2 Image Transfer from the Remote System

#### 2.1.2.2.1 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.

#### 2.1.2.2.2 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 2.2: 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

#### 2.1.2.2.2.1 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.

## 2.1.3 Association Acceptance Policy

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

### 2.1.3.1 Remote System Requests Verification

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

#### 2.1.3.1.1 Associated Real World Activity

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

#### 2.1.3.1.2 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| | | DICOM Explicit VR | 1.2.840.10008.1.2.2 | SCP | None |

| | | | | | |
|---|---|---|---|---|---|
| | | Big Endian | | | |

#### 2.1.3.1.2.1 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.

#### 2.1.3.1.3 Presentation Context Acceptance Criterion

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

#### 2.1.3.1.4 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).

### 2.1.3.2 Remote System Requests Image Storage

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

#### 2.1.3.2.1 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.

#### 2.1.3.2.2 Presentation Context Table

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

#### 2.1.3.2.2.1 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

**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.

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**.

#### 2.1.3.2.3 Presentation Context Acceptance Criterion

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

**Table 2.4: Acceptable Presentation Contexts for Disk-Server**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |

| | | | | | |
|---|---|---|---|---|---|
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.1.3.2.4 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).

### 2.1.3.3 Remote System Requests Image Transfer

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

#### 2.1.3.3.1 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.

#### 2.1.3.3.2 Presentation Context Table

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

**Table 2.4: Acceptable Presentation Contexts for Disk-Server**

| 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.1.3.3.2.1 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.

#### 2.1.3.3.3 Presentation Context Acceptance Criterion

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

#### 2.1.3.3.4 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).

### 2.1.3.4 Remote System Initiates Query Request

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

#### 2.1.3.4.1 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.

#### 2.1.3.4.2 Presentation Context Table

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

**Table 2.5: Acceptable Presentation Contexts for Disk-Server**

| 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.1.3.4.2.1 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.

#### 2.1.3.4.3 Presentation Context Acceptance Criterion

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

#### 2.1.3.4.4 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).

# 2.2 Archive-Manager Specifications

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

## 2.2.1 Association Establishment Policies

### 2.2.1.1 General

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

### 2.2.1.2 Number of Associations

**Archive-Manage**r 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.*

### 2.2.1.3 Asynchronous Nature

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

### 2.2.1.4 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.

## 2.2.2 Association Initiation by Real-World Activity

### 2.2.2.1 User Clicks on a Device Icon

#### 2.2.2.1.1 Associated Real World Activity

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

#### 2.2.2.1.2 Proposed Presentation Contexts

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

**Table 2.14: Proposed Presentation Contexts for Archive-Manager**

| 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

### 2.2.2.1.2.1 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:

| 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:

| 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:

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

### 2.2.2.2 Verify Connection

#### 2.2.2.2.1 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.

#### 2.2.2.2.2 Proposed Presentation Contexts

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

**Table 2.15: Proposed Presentation Contexts for Archive-Manager**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

##### 2.2.2.2.2.1 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.

## 2.2.3 Association Acceptance Policy

**Archive-Manager** never accepts an association.

# 2.3 Memory-Manager Specifications

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

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

## 2.3.1 Association Establishment Policies

### 2.3.1.1 General

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

### 2.3.1.2 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.*

### 2.3.1.3 Asynchronous Nature

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

### 2.3.1.4 Implementation Identifying Information

**Memory-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.

## 2.3.2 Association Initiation by Real-World Activity

### 2.3.2.1 Application Asks for Image Loading

#### 2.3.2.1.1 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.

#### 2.3.2.1.2 Proposed Presentation Contexts

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

**Table 2.15: 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

#### 2.3.2.1.2.1 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.

### 2.3.3 Association Acceptance Policy

**Memory-Manager** never accepts an association.

# 2.4 Memory-Server Specifications

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

| 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 |
| 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 Radiofluoroscopy Image Storage | 1.2.840.10008.5.1.4.1.1.7.12.2 |

## 2.4.1 Association Establishment Policies

### 2.4.1.1 General

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

### 2.4.1.2 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.

### 2.4.1.3 Asynchronous Nature

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

### 2.4.1.4 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.

## 2.4.2 Association Initiation by Real-World Activity

**Memory-Server** never initiates an association.

## 2.4.3 Association Acceptance Policy

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

### 2.4.3.1 Remote System Requests Verification

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

#### 2.4.3.1.1 Associated Real World Activity

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

#### 2.4.3.1.2 Presentation Context Table

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

**Table 2.10: Acceptable Presentation Contexts for Memory-Server**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Verification | 1.2.840.10008.1.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Verification | 1.2.840.10008.1.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

##### 2.4.3.1.2.1 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.

#### 2.4.3.1.3 Presentation Context Acceptance Criterion

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

#### 2.4.3.1.4 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).

### 2.4.3.2 Remote System Requests Image Transfer

A remote system requests image transfer from **Memory-Server** as a result of a C-MOVE command issued by the **Memory-Manager**.

#### 2.4.3.2.1 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.

#### 2.4.3.2.2 Presentation Context Table

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

#### 2.4.3.2.2.1 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

**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.

#### 2.4.3.2.3 Presentation Context Acceptance Criterion

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

**Table 2.11: 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| MR Image | 1.2.840.10008.5.1.4.1.1.4 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| NM Image | 1.2.840.10008.5.1.4.1.1.20 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| CR Image | 1.2.840.10008.5.1.4.1.1.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| SC Image | 1.2.840.10008.5.1.4.1.1.7 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| XA Image | 1.2.840.10008.5.1.4.1.1.12.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| RF Image | 1.2.840.10008.5.1.4.1.1.12.2 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.4.3.2.4 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).

# 2.5 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:

| 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.

| 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 |

## 2.5.1 Association Establishment Policies

### 2.5.1.1 General

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

### 2.5.1.2 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 that the Application Entity represented by **Print-Server** can maintain.

### 2.5.1.3 Asynchronous Nature

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

### 2.5.1.4 Implementation Identifying Information

**Print-Server** 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.

## 2.5.2 Association Initiation by Real-World Activity

**Print-Server** never initiates an association.

## 2.5.3 Association Acceptance Policy

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

### 2.5.3.1 Remote system Requests Image Transfer

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

#### 2.5.3.1.1 Associated Real World Activity

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

#### 2.5.3.1.2 Presentation Context Table

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

**Table 2.12: Acceptable Presentation Contexts for Print-Server**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Verification | 1.2.840.10008.1.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Verification | 1.2.840.10008.1.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.5.3.1.2.1 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.

#### 2.5.3.1.3 Presentation Context Acceptance Criterion

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

#### 2.5.3.1.4 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).

### 2.5.3.2 Remote System Requests Image Transfer

A remote system requests image transfer 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.

#### 2.5.3.2.1 Associated Real World Activity

The Real World activity associated with the image printing request is the printing of the images on the printer which 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.

#### 2.5.3.2.2 Presentation Context Table

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

**Table 2.13: 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Basic Grayscale Print Mgt. | 1.2.840.10008.5.1.1.9 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |
| Print Job | 1.2.840.10008.5.1.1.14 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2. | SCP | None |
| Print Job | 1.2.840.10008.5.1.1.14 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Print Job | 1.2.840.10008.5.1.1.14 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

##### 2.5.3.2.2.1 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.

##### 2.5.3.2.2.2 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.

#### 2.5.3.2.2.3 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.

#### 2.5.3.2.2.4 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 which applies 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.

#### 2.5.3.2.2.5 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.

#### 2.5.3.2.2.6 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. After the films are printed or after a failure, the Print Job Instance is deleted.

The number of print jobs is limited only by the *System* 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.

### 2.5.3.2.3 Presentation Context Acceptance Criterion

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

### 2.5.3.2.4 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).

# 2.6 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:

| 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 |

## 2.6.1 Association Establishment Policies

### 2.6.1.1 General

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

### 2.6.1.2 Number of Associations

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

### 2.6.1.3 Asynchronous Nature

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

### 2.6.1.4 Implementation Identifying Information

**Print-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.

## 2.6.2 Association Initiation by Real-World Activity

### 2.6.2.1 User Selects a Printer

#### 2.6.2.1.1 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.

#### 2.6.2.1.2 Proposed Presentation Contexts

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

**Table 2.17 Proposed Presentation Contexts for Print-Manager**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |

#### 2.6.2.1.2.3 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.

## 2.6.3 Association Acceptance Policy

**Print-Manager** never accepts an association.

# 2.7 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:

| 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 |

## 2.7.1 Association Establishment Policies

### 2.7.1.1 General

**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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |
| Print Job | 1.2.840.10008.5.1.1.14 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

#### 2.7.2.1.2.1 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.

#### 2.7.2.1.2.2 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.

## 2.7.3 Association Acceptance Policy

**DentaCT-Print** never accepts an association.

# 2.8 Patient-Catalog Server Specifications

*Scanner Only.*

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

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

## 2.8.1 Association Establishment Policies

### 2.8.1.1 General

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

### 2.8.1.2 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.

### 2.8.1.3 Asynchronous Nature

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

### 2.8.1.4 Implementation Identifying Information

**Patient-Catalog** 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.

## 2.8.2 Association Initiation by Real-World Activity

### 2.8.2.1 User Clicks on HIS/RIS Icon

#### 2.8.2.1.1 Associated Real World Activity

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

#### 2.8.2.1.2 Proposed Presentation Contexts

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

**Table 2.19 Proposed Presentation Contexts for Patient-Catalog**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Modality Worklist Information Model-FIND | 1.2.840.10008.5.1.4.31 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

### 2.8.2.1.2.1 SOP Specific Conformance Statement for Modality Worklist Information Model FIND

**Patient-Catalog** provides standard conformance to the DICOM V3.0 Modality Worklist Service Class as an SCU for the following SOP Class: Modality Worklist Information Model -FIND, UID = 1.2.840.10008.5.1.4.31.

**Patient-Catalog** supports the following keys:

| Name | Tag | Type |
|---|---|---|
| Accession Number | (0008, 0050) | O |
| Referring Physician's Name | (0008, 0090) | O |
| Patient's Name | (0010, 0010) | R |
| Patient ID | (0010, 0020) | R |
| Patient's Birth Date | (0010, 0030) | O |
| Patient's Sex | (0010, 0040) | O |
| Other Patient IDs | (0010, 1000) | O |
| Patient's Age | (0010, 1010) | O* |
| Medical Alerts | (0010, 2000) | O* |
| Ethnic Group | (0010, 2160) | O* |
| Additional Patient History | (0010:21B0) | O* |
| Patient Comments | (0010:4000) | O* |
| Study Instance UID | (0020, 000D) | O |
| Requesting Physician | (0032:1032) | O |
| Requesting Service | (0032:1033) | O* |
| Requested Procedure Description | (0032:1060) | O |
| Requested Procedure Code Sequence | (0032:1064) | O* |
| >Code Value | (0008:0100) | O* |
| >Coding Scheme Designator | (0008:0102) | O* |
| >Code Meaning | (0008:0104) | O* |
| Current Patient Location | (0038:0300) | O* |
| Scheduled Procedure Step Sequence | (0040, 0100) | R |
| >Modality | (0008, 0060) | R |
| >Scheduled Station AE Title | (0040, 0001) | R |
| >Scheduled Procedure Step Start Date | (0040, 0002) | R |
| >Scheduled Procedure Step Start Time | (0040, 0003) | R |
| >Scheduled Performing Physician Name | (0040, 0006) | R |
| >Scheduled Procedure Step Description | (0040, 0007) | O |

| | | |
|---|---|---|
| >Scheduled Action Item Code Sequence | (0040:0008) | O |
| >>Code Value | (0008:0100) | O |
| >>Coding Scheme Designator | (0008:0102) | O |
| >>Code Meaning | (0008:0104) | O |
| >Scheduled Procedure Step ID | (0040, 0009) | O |
| >Scheduled Procedure Step Location | (0040, 0011) | O |
| Requested Procedure ID | (0040:1001) | O |
| Names of Intended Recipients of Results | (0040:1010) | O* |
| Requested Procedure Comments | (0040:1400) | O* |
| Imaging Service Request Comments | (0040:2400) | O* |
| Requested Procedure Description | (0032, 1060) | O |

***Note***: O* marks optional keys that are not explicitly defined in DICOM PS3.4-1999 for Modality Worklist Information Model.

## 2.8.2.2 Request from Study

### 2.8.2.2.1 Associated Real World Activity

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

### 2.8.2.2.2 Proposed Presentation Contexts

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

**Table 2.19 Proposed Presentation Contexts**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Modality Performed Procedure Step – N-CREATE | 1.2.840.10008.3.1.2.3.3 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |
| Modality Performed Procedure Step – N-SET | 1.2.840.10008.3.1.2.3.3 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

#### 2.8.2.2.2.1 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: MPPS Information Model N-CREATE, UID = 1.2.840.10008.3.1.2.3.3

Patient-Catalog supports the following keys:

- Scheduled Step Attribute Sequence (0040, 0270)
- Study Instance UID (0020, 000D)
- Referenced Study Sequence (0008, 1110)
- Accession Number (0008, 0050)
- Requested Procedure ID (0040, 1001)
- Requested Procedure Description (0032, 1060)
- Scheduled Procedure Step Description (0040, 0007)
- Scheduled Procedure Step ID (0040, 0009)
- Scheduled Action Item Code Sequence (0040,0008)
- Patient's Name (0010, 0010)
- Patient ID (0010, 0020)
- Patient's Birthrate (0010, 0030)
- Patient's Sex (0010, 0040)
- Referenced Patient Sequence (0008, 1120)
- Performed Procedure Step ID (0040, 0253)
- 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 Status (0040, 0252)
- Performed Procedure Step Description (0040, 0254)
- Performed Procedure Type Description (0040, 0255)
- Procedure Code Sequence (0008, 1032)
- Performed Procedure Step End Date (0040, 0250)
- Performed Procedure Step End Time (0040, 0251)
- Modality (0080, 0060)
- Study ID (0020, 0010)
- Performed Action Item Code Sequence (0040,0260)
- Performed Series Sequence (0040,0340)

#### 2.8.2.2.2.2 SOP Specific Conformance Statement for MPPS N-SET

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

**Patient-Catalog** supports the following keys:

- Performed Procedure Step Status (0040, 0252)
- Performed Procedure Step End Date (0040, 0250)
- Performed Procedure Step End Time (0040, 0251)
- Performed Series Sequence (0040,0340)
- Performing Physician's Name (0008,1050)
- Protocol Name (0018, 1030)
- Operators Name (0008, 1070)
- Series Instance UID (0020, 000E)
- Series Description (0008, 103E)
- Retrieve AE Title (0008, 0054)
- Referenced Image Sequence (0008, 1140)

## 2.8.3 Association Acceptance Policy

**Patient-Catalog** never accepts an association.

# 2.9 StorageComm-Manager Specifications

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

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

and to the following DICOM V3.0 SOP Classes as an SCP only:

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

## 2.9.1 Association Establishment Policies

### 2.9.1.1 General

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

### 2.9.1.2 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.

### 2.9.1.3 Asynchronous Nature

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

### 2.9.1.4 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.

## 2.9.2 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.

### 2.9.2.1 Image was Stored on the Remote Device with Storage Commitment

#### 2.9.2.1.1 Associated Real World Activity

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

#### 2.9.2.1.2 Proposed Presentation Contexts

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

**Table 2.16: 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

##### 2.9.2.1.2.1 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.

## 2.9.3 Association Acceptance Policy

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

### 2.9.3.1 Remote System Requests Verification

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

#### 2.9.3.1.1 Associated Real World Activity

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

#### 2.9.3.1.2 Presentation Context Table

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

**Table 2.3: Acceptable Presentation Contexts for StorageComm-Manager**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |

| | | | | | |
|---|---|---|---|---|---|
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.9.3.1.2.1 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.

#### 2.9.3.1.3 Presentation Context Acceptance Criterion

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

#### 2.9.3.1.4 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).

### 2.9.3.2 Remote System Storage Commitment Report

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

#### 2.9.3.2.1 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.

#### 2.9.3.2.2 Presentation Context Table

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

**Table 2.4: 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.9.3.2.2.1 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

### 2.9.3.2.3 Presentation Context Acceptance Criterion

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

### 2.9.3.2.4 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).

# 2.10 MxTwin-Server Specifications

**MxTwin-Server** provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

| SOP Class Name | SOP Class UID |
|---|---|
| CT Image Storage | 1.2.840.10008.5.1.4.1.1.2 |

and to the following DICOM V3.0 SOP Classes as an 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 |
| Study Root Q/R Information Model - MOVE | 1.2.840.10008.5.1.4.1.2.2.2 |

## 2.10.1 Association Establishment Policies

### 2.10.1.1 General

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

### 2.10.1.2 Number of Associations

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

### 2.10.1.3 Asynchronous Nature

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

### 2.10.1.4 Implementation Identifying Information

**MxTwin-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.

## 2.10.2 Association Initiation by Real-World Activity

**MxTwin-Server** initiates an association as part of an execution of a C-MOVE command.

### 2.10.2.1 Remote system Requests Image Transfer

A remote system requests image transfer from **MxTwin-Server** by sending a C-MOVE command.

#### 2.10.2.1.1 Associated Real World Activity

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

#### 2.10.2.1.2 Proposed Presentation Contexts

All the Presentation Contexts shown in Table 2.6 are proposed by **MxTwin-Server**:

**Table 2.6: Proposed Presentation Contexts for MxTwin-Server**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| CT Image | 1.2.840.10008.5.1.4.1.1.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |
| | | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | | |
| | | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | | |

##### 2.10.2.1.2.1 SOP Specific Conformance Statement for Storage SOP Class

**MxTwin-Server** provides standard conformance to the DICOM V3.0 Storage Service Class as an SCU for the CT Image Storage SOP Class, UID=1.2.840.10008.5.1.4.1.1.2.

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. The association will be maintained if possible.

Any unsuccessful status, returned in the C-STORE confirmation, results in termination of the association over which the C-STORE has been sent, reporting of error to the *System* log file, and reporting of a status code of **A702** ("Refused") in the C-MOVE confirmation.

## 2.10.3 Association Acceptance Policy

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

### 2.10.3.1 Remote System Requests Verification

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

#### 2.10.3.1.1 Associated Real World Activity

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

#### 2.10.3.1.2 Presentation Context Table

Any of the Presentation Contexts shown in Table 2.7 is acceptable to **MxTwin-Server:**

**Table 2.7: Acceptable Presentation Contexts for MxTwin-Server**

| Abstract Syntax | | Transfer Syntax | | Role | Ext. Neg. |
|---|---|---|---|---|---|
| Name | UID | Name | UID | | |
| Verification | 1.2.840.10008.1.1 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Verification | 1.2.840.10008.1.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |

| | | | | | |
|---|---|---|---|---|---|
| Verification | 1.2.840.10008.1.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.10.3.1.2.1 SOP Specific Conformance to Verification SOP Class

**MxTwin-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.

#### 2.10.3.1.3 Presentation Context Acceptance Criterion

**MxTwin-Server** will accept any Presentation Context from Table 2.7.

#### 2.10.3.1.4 Transfer Syntax Selection Policies

**MxTwin-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).

### 2.10.3.2 Remote System Requests Image Transfer

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

#### 2.10.3.2.1 Associated Real World Activity

The Real World activity associated with the C-MOVE command is retrieval of images from the CT-LAN station and storage of the images to a remote system using a C-STORE command. **MxTwin-Server** will issue a failure status if it is unable to process the transfer request.

#### 2.10.3.2.2 Presentation Context Table

Any of the Presentation Contexts shown in Table 2.8 is acceptable for **MxTwin-Server:**

**Table 2.8: Acceptable Presentation Contexts for MxTwin-Server**

| 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Study Root MOVE | 1.2.840.10008.5.1.4.1.2.2.2 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.10.3.2.2.1 SOP Specific Conformance to Study Root MOVE

**MxTwin-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.

**MxTwin-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 **MxTwin-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. Moved destination unknown.
- **A700** - General refusal status.
- **B000** - General warning status.
- **C000** - General failure status.
- **C001** -CT-LAN Communication error.
- **C002** - CT-LAN protocol violation type 1.
- **C003** - CT-LAN station busy.
- **C004** -Image too big.
- **C005** - CT-LAN connection reset by CT.
- **C006** - CT timed out.
- **C007** - CT-LAN protocol violation type 2.

#### 2.10.3.2.3 Presentation Context Acceptance Criterion

**MxTwin-Server** will accept any Presentation Context from Table 2.8.

#### 2.10.3.2.4 Transfer Syntax Selection Policies

**MxTwin-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).

### 2.10.3.3 Remote System Initiates Query Request

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

#### 2.10.3.3.1 Associated Real World Activity

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

#### 2.10.3.3.2 Presentation Context Table

Any of the Presentation Contexts shown in Table 2.9 is acceptable for **MxTwin-Server:**

**Table 2.9: Acceptable Presentation Contexts for MxTwin-Server**

| 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 | DICOM Implicit VR Little Endian | 1.2.840.10008.1.2 | SCP | None |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | DICOM Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCP | None |
| Study Root FIND | 1.2.840.10008.5.1.4.1.2.2.1 | DICOM Explicit VR Big Endian | 1.2.840.10008.1.2.2 | SCP | None |

#### 2.10.3.3.2.1 SOP Specific Conformance to Study Root FIND

**MxTwin-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=1.2840.10008.5.1.4.1.2.2.1.

**MxTwin-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. **MxTwin-Server** supports the following optional keys:

- Image Date (0008,0023)
- Image Type (0008,0008)
- Slice Location (0020,1041)
- Rows (0028,0010)
- Columns (0028,0011)
- Study Time (0008,0030) (zero length)

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 **MxTwin-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.
- **C001** -CT-LAN Communication error.
- **C002** - CT-LAN protocol violation type 1.
- **C003** - CT-LAN station busy.
- **C005** - CT-LAN connection reset by CT.
- **C006** - CT timed out.
- **C007** - CT-LAN protocol violation type 2.

#### 2.10.3.3.3 Presentation Context Acceptance Criterion

**MxTwin-Server** will accept any Presentation Context from Table 2.9.

#### 2.10.3.3.4 Transfer Syntax Selection Policies

**MxTwin-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. Communication Profiles

## 3.1 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.

## 3.2 TCP/IP Stack

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

### 3.2.1 Physical Media Support

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

# 4. Extensions, Specializations, Privatizations of SOP Classes and Transfer Syntaxes

Not applicable

# 5. Configuration

## 5.1 AE Title/Presentation Address Mapping

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

## 5.2 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. Support of Extended Character Sets

No Extended Character Set is supported.