Technical Publications

Direction 2019295-298
Revision 2

Centricity Cardiology Data Management System 4.1
DICOM CONFORMANCE STATEMENT

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GE Medical Systems

REVISION HISTORY

Revision	Date	Description
1	JULY 21, 2005	Creation
2	AUGUST 27, 2007	Added Comprehensive SR to Table 2-1 and Table 3-1

TABLE OF CONTENTS

3.   DICOM STORAGE SERVICE CLASS (SCP ROLE) CONFORMANCE STATEMENT.3-1

1. INTRODUCTION

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction) describes the overall structure, intent, and references for this Conformance Statement.

Section 2 (Network Conformance Statement) specifies the GEMS equipment compliance to the DICOM requirements for the implementation of Networking features.

Section 3 (DICOM Storage Service Class (SCP) Conformance Statement) specifies the compliance of the Centricity DMS to DICOM Standards requirements for Storage SOP Classes.

Section 4 (DICOM Retrieve Service Class (SCU) Conformance Statement) specifies the compliance of the Centricity DMS to DICOM Standards requirements for Retrieve SOP Class.

Section 5 (Modality Worklist Service Class (SCP) Conformance Statement) specifies the compliance of the Centricity DMS to DICOM Standards requirements for Modality Worklist SOP Class.

Section 6 (Modality Performed Procedure Step Service Class (SCP) Conformance Statement) specifies the compliance of the Centricity DMS to DICOM Standards requirements for Modality Performed Procedure Step SOP Class.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship with the DICOM Conformance Statements is shown in the Illustration below.

ID/Net v3.0

Introduction to the
Integrated
DICOM/Network
v3.0 (ID/Net v3.0)
Conformance
Statement
Direction: 2118780
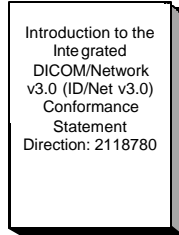
APPLICATION ENTITY SPECIFICATION
(SERVICE CLASSES, INFORMATION OBJECTS, MESSAGE EXCHANGES, ETC.)

**Product
Implementation:**

CT Advantage

MR Advantage

Centricity Data
Management
System 4.0

Direction:
2019295-298

......
Conformance
Statement
Direction:
......
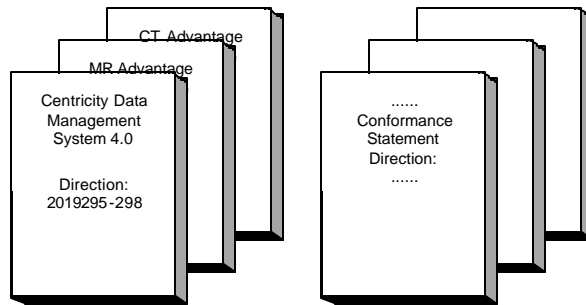
DICOM STANDARD

**Standard
Specification:**

DICOM

Part 1

DM

2

DM

3

DM

4

DICOM

Part 16
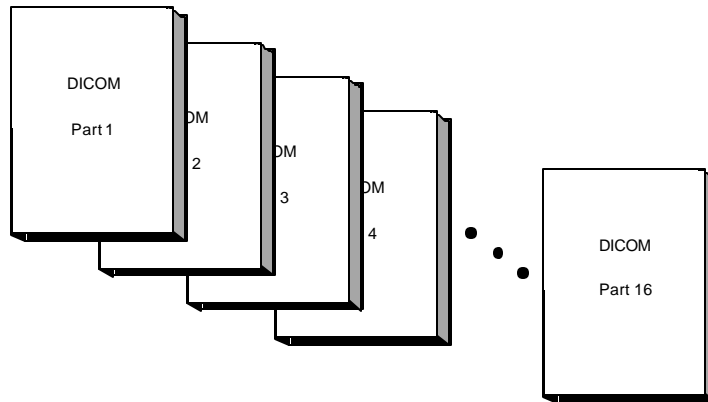
This document specifies the DICOM implementation. It is entitled:

Centricity Cardiology DMS DICOM Service 4.1

DICOM Conformance Statement

Direction 2019295-298

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)

Conformance Statement

Direction: 2118780

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.

The GEMS Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM Part 8 standard.

For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For more information regarding DICOM, copies of the Standard may be obtained on the Internet at http://medical.nema.org. Comments on the Standard may be addressed to:

DICOM Secretariat
NEMA
1300 N. 17th Street, Suite 1847
Rosslyn, VA 22209
USA
Phone: +1.703.841.3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM Standard and with the terminology and concepts which are used in that Standard.

If readers are unfamiliar with DICOM terminology they should first refer to the document listed below, then read the DICOM Standard itself, prior to reading this DICOM Conformance Statement document.

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)

Conformance Statement

Direction: 2118780

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an

unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM v3.0. The GEMS Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS Data Set, the user is well advised to ignore those data elements (per the DICOM standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEMS devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** – GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM Standards. DICOM will incorporate new features and technologies and GE may follow the evolution of the Standard. The GE protocol is based on DICOM as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM. **In addition, GE reserves the right to discontinue or make changes to the support of communications features, on its products, as described by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standards. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standards change and GE products are enhanced to support these changes.

- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

A list of references which is applicable to all GEMS Conformance Statements is included in the Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.

1.7 DEFINITIONS

A set of definitions which is applicable to all GEMS Conformance Statements is included in the Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.

1.8 SYMBOLS AND ABBREVIATIONS

A list of symbols and abbreviations which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

Addition definitions used in this Conformance Statement document are listed below:

Centricity DMS – Refers to Centricity Cardiology Data Management System 4.1

DICOM Server - "The DICOM Server" refers to all of its DICOM Application Entities for their common properties and behaviors. The DICOM Server is a software module of Centricity DMS and runs on the Centricity DMS Interface Console subsystem.

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

Centricity DMS provides (image and non-image) data management. It implements a DICOM Communication Server (denoted DICOM Server for short in this document) for the following services to external systems (e.g., acquisition modalities, review stations, etc.):

- Receive DICOM Storage SOP Instances from an acquisition modality for data storage.

- Initiate data retrieval to the SOP Instance maintained in another DICOM entity and load it the Centricity DMS system.

- Service information query for Modality Worklist information maintained in the Centricity DMS system.

- Receive Performed Procedure Step updates from a modality

- Forward Performed Procedure Step messages to another DICOM entity (IHE PPS Manager)

The DICOM Server creates a number of DICOM Application Entities (AEs) to support these services. Each DICOM AE will be dedicated to one or more SOP Classes, as explained in the rest of the document.

2.2 IMPLEMENTATION MODEL

Centricity DMS provides a several separate DICOM Application Entities (AEs) for the DICOM Server, which include:

- SOP Instance Storage Application Entity as an SCP (Storage AE)

- SOP Instance Retrieve Application Entity as an SCU (Retrieve AE)

- Modality Worklist and Modality Performed Procedure Step Application Entity as an SCP (MWL/MPPS AE)

- Modality Performed Procedure Step Application Entity as an SCU (MPPS Forward AE)

2.2.1 Application Data Flow Diagrams

2.2.1.1 Application Data Flow Diagram for Storage AE

The Storage AE implements the DICOM Storage SOP Class as an SCP and will receive DICOM Storage SOP Instances from a remote AE. The Storage AE is always waiting for an incoming association and will automatically respond to a Verification request.
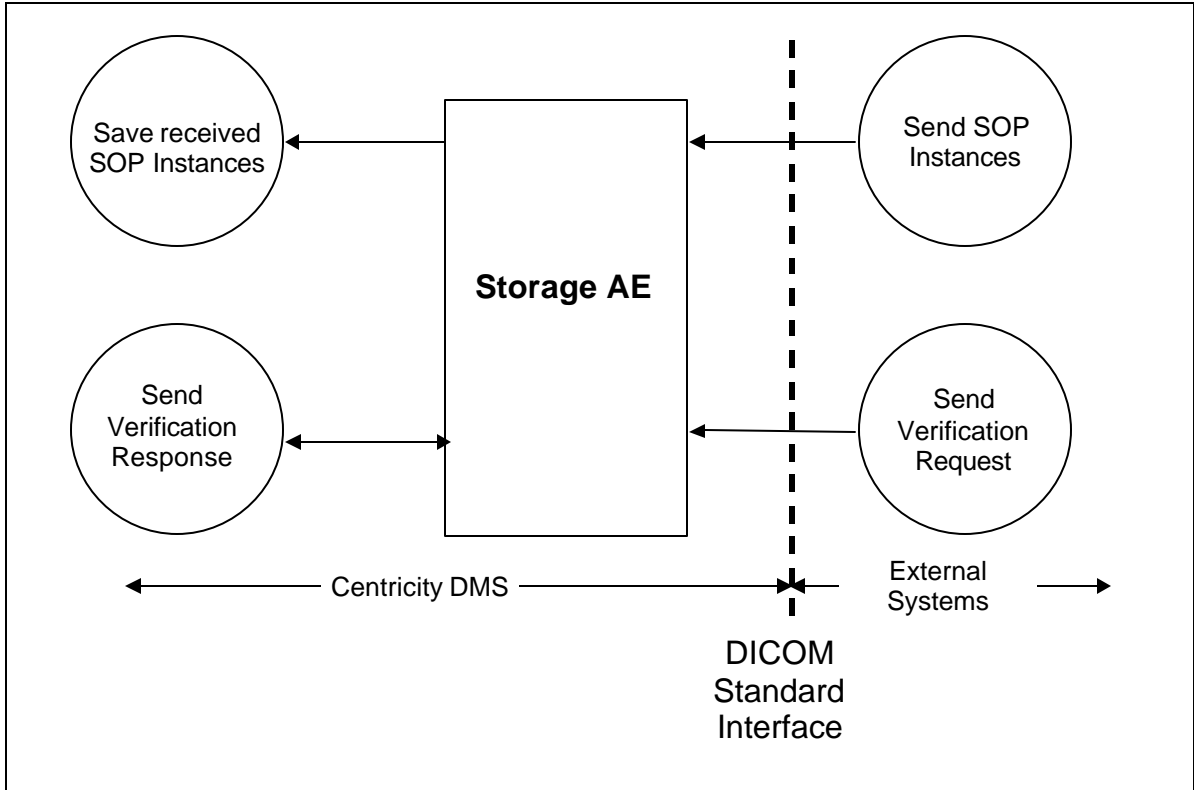
FIGURE 2-1: DATA FLOW DIAGRAM OF STORAGE AE

Send SOP Instance is an activity, which sends one or more DICOM images to the Centricity DMS DICOM Service.

2.2.1.2 Application Data Flow Diagram of Retrieve AE

The Retrieve AE implements the SCU role of the DICOM Retrieve SOP Class to retrieve the SOP Instances from a remote AE. The Retrieve AE works in conjunction with the Storage AE to retrieve the SOP Instances into Centricity DMS.
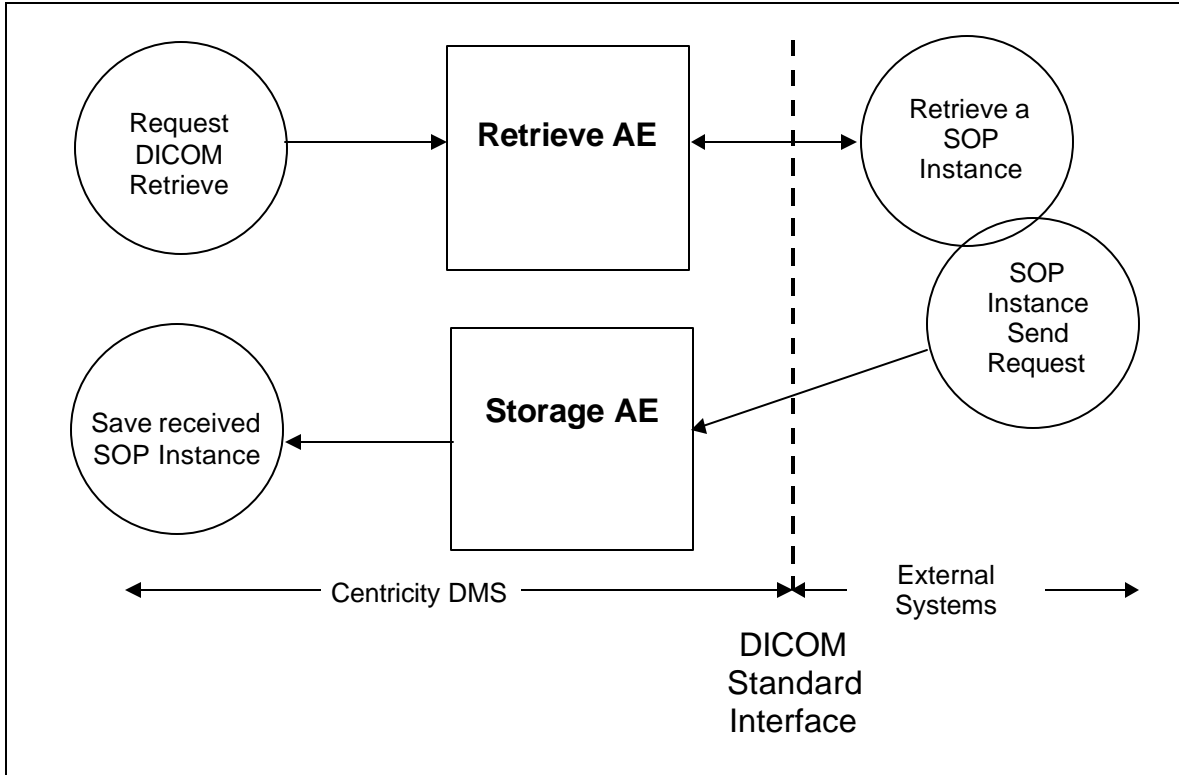
FIGURE 2-2: DATA FLOW DIAGRAM OF RETRIEVE AE

There are real–world activities, which will cause the Retrieve AE to retrieve studies from the remote AE:

1. Centricity DMS receives SOP Instances from a remote AE to the Storage AE

2. Centricity DMS deletes the SOP Instances from the system do to space limitations making the images offline

3. A user opens the Image Control tab on an imaging module, and clicks an image that is marked as offline

4. This triggers the Retrieve AE to send a C-MOVE for the SOP Instance to a remote AE

5. The remote AE responds by sending the selected SOP Instance to the Storage AE.

2.2.1.3   Application Data Flow Diagram of MWL/MPPS AE
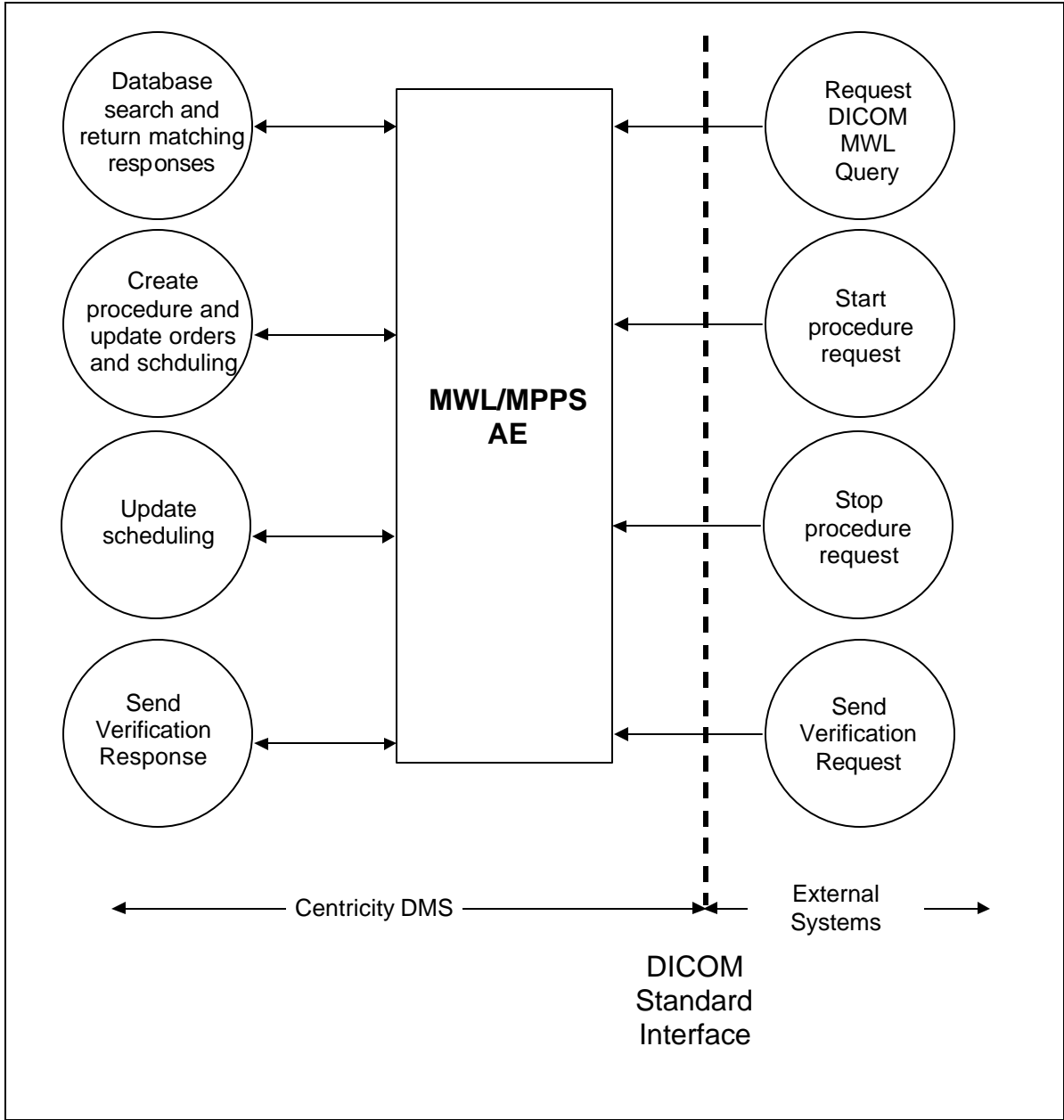
FIGURE 2-3: DATA FLOW DIAGRAM OF MWL/MPPS AE

There is no real-world activity required for the MWL/MPPS AE to respond to incoming DICOM associations. It is always waiting for an incoming association and will automatically respond to a DICOM Verification request.

After receiving DICOM Modality Worklist request, the MWL/MPPS AE will start the following local real-world activities:

1. Search for the requested data attributes on the Order / Scheduling / Patient data in the Centricity DMS database, as specified in the C-FIND request and using the matching criteria specified.

2. Return all matching responses.

After receiving DICOM Modality Performed Procedure Step request, the MWL/MPPS AE will start the following local real-world activities:

1. If the message is an N-CREATE, Centricity will create a procedure from that data and update or insert into scheduling.

2. If the message is an N-SET, Centricity DMS will update scheduling.

3. All Modality Performed Procedure Step requests (N-CREATE and N-SET) will be inserted into a queue used by the MPPS Forward AE.

2.2.1.4   Application Data Flow Diagram of MPPS Forward AE
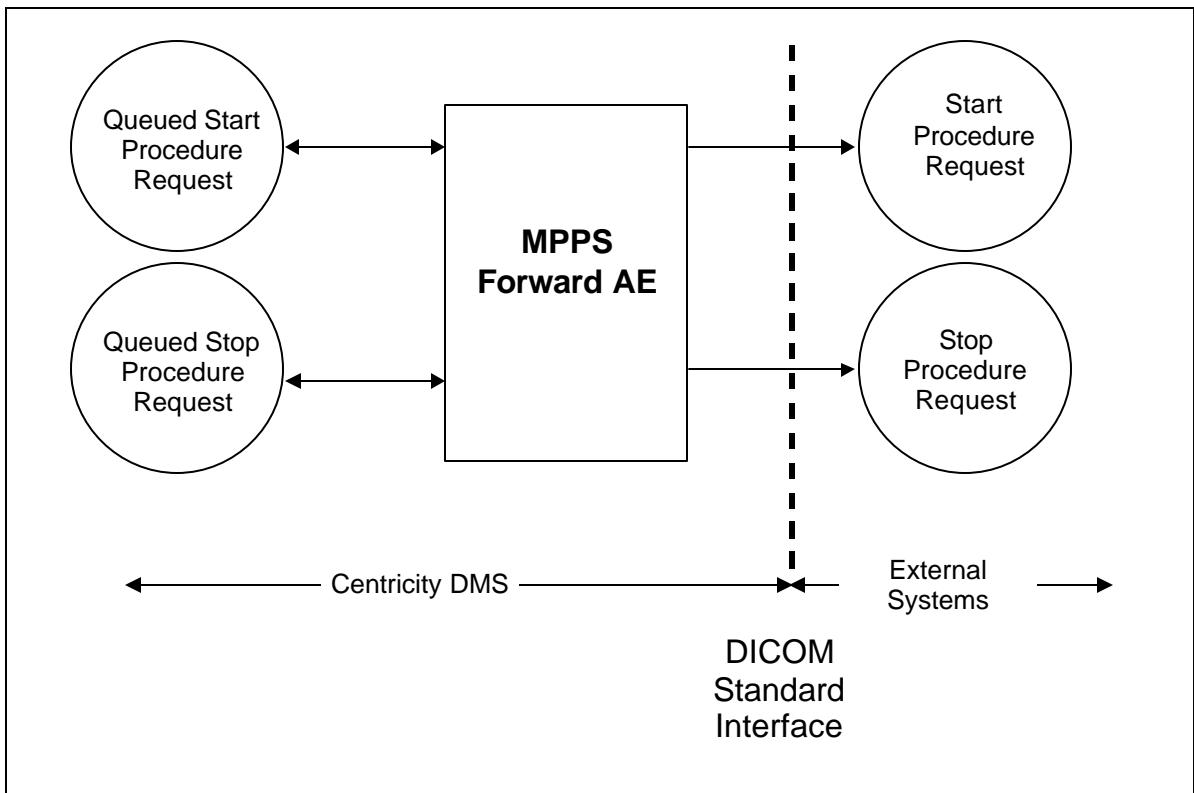
FIGURE 2-4: DATA FLOW DIAGRAM OF MPPS FORWARD AE

There is no real-world activity required for the MPPS Forward AE to forward Modality Performed Procedure Step requests to remote AEs. It is continually polling the queues for new requests and will automatically forward these requests.

After retrieving a queued Modality Performed Procedure Step request, the MPPS Forward AE will start the following local real-world activities:

1. Determine if there are any conditional routes for initial MPPS SCU that sent the message

2. Forward the current request (N-CREATE or N-SET) to the configured static and conditional routes

2.2.2 Functional Definition of AE's

The DICOM Application Entities of Centricity DMS initiate or receive the DICOM associations to support a number of application functions for the DMS system.

2.2.2.1 Storage AE

The Storage AE supports the following application-level functions:

- Receive SOP instances from a remote DICOM AE.
- Associate the SOP Instance to a scheduled study in the Centricity DMS database by matching the Study Instance UID to the information in the database.
- Create a new study by using the Patient / Study information in the received data set and relate the SOP instance to the created study.
- Store the Patient, Study, Series, and SOP Instance relationship permanently in the Centricity DMS database.
- Store the SOP instances in the DMS storage system, for use within Centricity DMS.
- Respond to a DICOM Verification (C-ECHO) request from a remote AE.

2.2.2.2 Retrieve AE

The Retrieve AE supports the following application-level functions:

- Generates a DICOM Retrieve request (C-MOVE) at the Image level to a remote AE.
- Storage AE will receive (C-STORE) found SOP Instance from the remote AE.

2.2.2.3 MWL/MPPS AE

The MWL/MPPS AE supports the following application-level functions:

- Receive a DICOM MWL request (C-FIND) from a remote AE.
- Search for the data in the Centricity DMS database that match the requested matching keys
- Respond to the remote AE by filling in all keys (matching and return)
- Receive a DICOM MPPS N-CREATE request from a remote AE.
- Associate the SOP Instance to an scheduled study in the Centricity DMS database by matching the Study Instance UID in the database or create the scheduled event if one does not exist
- Create a new study by using the Patient / Study information from the received data set.
- Receive a DICOM MPPS N-SET and update the corresponding scheduled event
- Respond to a DICOM Verification (C-ECHO) request from a remote AE.

2.2.2.4 MPPS Forward AE

The MPPS Forward AE supports the following application-level functions:

- Retrieve a new message from the queue
- Create the appropriate Modality Performed Procedure Step request (N-CREATE or N-SET) based on information in queue
- Send Modality Performed Procedure Step request to remote AE

2.2.3 Sequencing of Real-World Activities

Not applicable.

2.3   AE SPECIFICATIONS

2.3.1 Storage AE

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCP**:

TABLE 2-1: SCP CONFORMANCE LIST OF SOP CLASSES FOR STORAGE AE

SOP Class Name	SOP Class UID
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Verification SOP Class	1.2.840.10008.1.1

2.3.2 Retrieve AE

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU**:

TABLE 2-2: SCU CONFORMANCE LIST OF SOP CLASSES FOR RETRIEVE AE

SOP Class Name	SOP Class UID
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2

2.3.3 MWL/MPPS AE

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCP**:

TABLE 2-3: SCP CONFORMANCE LIST OF SOP CLASSES FOR MWL/MPPS AE

SOP Class Name	SOP Class UID
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3
Verification SOP Class	1.2.840.10008.1.1

2.3.4 MPPS Forward AE

This Application Entity provides Standard Conformance to the following DICOM SOP Classes as an **SCU**:

TABLE 2-4: SCU CONFORMANCE LIST OF SOP CLASSES FOR MPPS FORWARD AE

SOP Class Name	SOP Class UID
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3

2.3.5 Association Establishment Policies

This section describes the common behaviours of all AEs of the DICOM Server with respect to the DICOM network association establishment. Specific behaviours of each individual AE will be described in Sections 2.3.6 and 2.3.7.

2.3.5.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Name	UID
Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length of PDU negotiation is included in all association establishment requests. The Maximum Length of PDU for an association initiated by the Centricity DMS DICOM Service and is configurable for only MWL/MPPS AE and MPPS Forward AE (see Section 2.6.7):

Maximum Length of PDU	28,672 bytes

The DICOM Server does not support SOP class Extended Negotiation in any DICOM associations its AEs accept.

The maximum number of Presentation Context Items that will be proposed is 8.

The user information Items sent by this product are:

- Maximum Length of PDU
- Implementation Class UID
- Implementation Version Name

2.3.5.2 Number of Associations

The DICOM Server is able to initiate and accept multiple DICOM associations at a time to perform DIMSE service elements. The maximum number of simultaneous associations accepted by each AE is configurable on the DICOM Server.

2.3.5.3 Asynchronous Nature

None of the DICOM Server AE's support asynchronous operations. All operations will be performed synchronously.

2.3.5.4 Implementation Identifying Information

All AEs of the DICOM Server provide the same Implementation Class UID, which is:

Implementation Class UID	1.2.840.113619.6.209

All AEs of the DICOM Server provide the same Implementation Version Name, which is:

Implementation Version Name	CentricityDMS4.0

2.3.6 Association Initiation Policy

All AEs of the DICOM Server can be configured to initiate association establishment only to remote AEs defined in a Remote AE list for the initiation of DICOM associations. The Remote AEs are specified with the Remote AE Titles as well as the network presentation addresses in the remote AE lists configured for the DICOM Server (see Section 2.6.1).

The calling AE Titles can be configured for each AE of the DICOM Server.

2.3.6.1 Real-World Activity: DICOM Retrieve Request to Remote AE

The Retrieve AE supports the C-MOVE request operation for this service. In addition, the Storage AE will support the sub-operation C-STORE message to receive the requested SOP Instances.

For the DICOM Conformance Statement of this service, please refer to Section 4.1.

2.3.6.2 Real-World Activity: DICOM Modality Performed Procedure Step Request to Remote AE

The MPPS Forward AE supports the N-CREATE and N-SET request operation for this service.

After the MWL/MPPS AE receives an N-CREATE or N-SET request it is cached by our system. Periodically the MPPS Forward AE will check for cached N-CREATE and N-SET requests to forward to external systems (like a PACS). The MPPS Forward will establish its association using its AE Titles

configured and it will not try to recreate the association received by the originating SCU. The entire message is replicated as received without data coercion. This document will not describe the "Information Modules" for the MPPS Forward because the data is not generated by DMS. If you need more information about the "Information Modules" please reference the DICOM Conformance Statement for the originating DICOM device (MacLab, Vivid, etc.)

2.3.7 Association Acceptance Policy

Each AE of the DICOM Server accepts incoming association requests on their dedicated TCP port numbers as defined in the configuration database (see Section 2.6.1). They will accept an association, if at least one proposed Presentation Context is acceptable.

The DICOM Server will accept the first transfer syntax listed for the same Abstract Syntax, if a remote AE offers multiple Presentation Contexts per association.

All AEs of the DICOM Server can be configured to accept association requests only from specified remote AEs defined in a Remote AE list database (see Section 2.6.1). This helps restrict the access to the Storage AE, and MWL/MPPS AE.

The called AE Titles can be configured for each AE of the DICOM Server.

The DICOM Server will check both the calling and called AE Tiles for the acceptance of an incoming association.

Association request can be rejected with the following status codes and reasons:

       a.) 1 – DICOM UL service-user

       b.) 2 – DICOM UL service-provider (ASCE related function)

       c.) 3 – DICOM UL service-provider (Presentation related function)

TABLE 2-4: ASSOCIATION REJECT STATUS CODES AND REASONS

Result	Source	Reason/Diag	Explanation
1 – rejected-transient	b	1 – no-reason-given	An error occurred while trying to accept an association. An association request with the same parameters may succeed at a later time.
2 – rejected-transient	c	2 – local-limit-exceeded	The (configurable) maximum number of simultaneous associations has been reached. An association request with the same parameters may succeed at a later time.
1 – rejected-permanent	a	2 – application-context-name-not-supported	The association requested contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.
1 – rejected-permanent	a	7 – called-AE-title-not recognized	The association request contained an unrecognized Called AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made.
1 – rejected-permanent	a	3 – calling-AE-title-not-recognized	The association request contained an unrecognized Calling AE Title. An association request with the same parameters will not succeed at a later time unless configuration changes are made.

2.3.7.1 Real-World Activity: Receive DICOM SOP Instances from Remote AE

The Storage AE supports the C-STORE operation for this service.

For the DICOM Conformance Statement for this service, please refer to Section 3.1.

2.3.7.2 Real-World Activity: DICOM Modality Worklist Request from Remote AE

The MWL/MPPS AE supports the C-FIND operation for this service.

For the DICOM Conformance Statement for this service, please refer to Section 5.1.

2.3.7.3 Real-World Activity: DICOM Modality Performed Procedure Step Request from Remote AE

The MWL/MPPS AE supports both N-SET and N-CREATE operations for this service.

For the DICOM Conformance Statement of this service, please refer to Section 6.1.

2.3.7.4 Real-World Activity: DICOM Verification (Echo) Request from Remote AE

Storage AE, and MWL/MPPS AE support the C-ECHO operation.

2.4 COMMUNICATION PROFILES

2.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)

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

2.4.2 TCP/IP Stack

TCP/IP Network Communication is supported as specified in DICOM PS 3.8

2.4.2.1 Physical Media Support

The GE AEs are unconstrained to the physical medium over which TCP/IP message traffic is carried. Various network interfaces are supported, including but not limited to: 10-BaseT Ethernet, 100-BaseT Ethernet, 1000-BaseT Ethernet and ATM OC-3.

The physical media supported depends on network cabling and interfaces equipment available at the Centricity DMS installation site and interface equipment commercially available.

An equipment list and configuration information for the physical media supported is available upon request.

2.4.3 OSI Stack

OSI stack not supported

2.4.4 Point-to-Point Stack

Not supported.

2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.5.1 Extended /Specialized SOPs

The DICOM Server supports the extensions to the DICOM Standard Storage SOP Classes as listed in Table 2-1. Private or standard extended data elements will be accepted for storage.

The DICOM Server does not support any Specialization SOP Classes.

2.5.2 Private SOP Classes

Not supported.

2.5.3 Private Transfer Syntaxes

Not supported.

2.6 CONFIGURATION

The exact method for configuring each configuration item is specified in other Centricity DMS documentation. The following sections only describe some items that are configurable.

NOTE: GE FIELD ENGINEERING MUST PERFORM/MAINTAIN ALL CENTRICITY CARDIOLOGY DMS DICOM CONFIGURATION SETTINGS.

2.6.1 AE Title/Presentation Address Mapping

2.6.1.1 Local AE Title

- AE Titles of the Storage AE for receiving SOP Instances

- AE Titles of the MWL/MPPS AE for servicing DICOM Modality Worklist and Modality Performed Procedure Step requests

- AE Title of the MPPS Forward AE for forwarding Modality Perform Procedure Step requests

2.6.1.2 Remote AE Title

AE Titles of the remote AEs that the DICOM Server will interact with, for receiving SOP Instances, servicing DICOM Modality Worklist requests and DICOM Performed Procedure Step requests. Also, there will be a list of remote AE Titles used during Modality Performed Procedure Step request forwarding.

2.6.1.3 AE Title / Presentation Address Mapping

A local mechanism is provided to configure an AE Title / Presentation Address mapping table. This table contains the following data items for each AE entry:
- AE Title
- TCP/IP addresses
- TCP Port Number

2.6.2 Maximum Simultaneous Associations

There is no configuration for Retrieve AE since each Centricity DMS Client can initiate a separate association for a Retrieve operation.

The maximum number of simultaneous associations that the Storage AE, and MWL/MPPS AE can accept is configurable and the default value is 10. The maximum number of simultaneous associations that the MPPS Forward AE can open is also configurable with a default value of 5.

2.6.3 AE Title / Accepted Association Mapping

A local mechanism is provided to configure:

- A list of remote AEs that are permitted to send SOP Instances to the Storage AE.
- A list of remote AEs that are permitted to query Modality Worklist Information and to perform Modality Performed Procedure Step updates to the MWL/MPPS AE.

2.6.4 AE Title / Association Initiation Mapping

A local mechanism is provided to configure:

A list of remote AEs to which the Retrieve AE can initiate an association to request a SOP Instance is configurable.

A list of remote AEs to which the MPPS Forward AE can initiate a Modality Performed Procedure Step request is configurable.

2.6.5 Server Time-out

The MWL/MPPS AE has the following configurable timeout values

Name	Description	Default Value
Listen Timeout	Maximum time the SCP will wait for an incoming association.	10 seconds
Network Read Timeout	Maximum time the SCP will wait for an incoming message over the association.	120 seconds

2.6.6 Message Validation

Not supported.

2.6.7 Maximum PDU Size Accepted

DICOM Service	Maximum Length of PDU	Configurable
Storage AE	16,384 bytes	No
Retrieve AE	16,384 bytes	No
MWL/MPPS AE	28,672 bytes	Yes, with no maximum
MPPS Forward AE	28,672 bytes	Yes, with no maximum

2.7 SUPPORT OF EXTENDED CHARACTER SETS

The DICOM Server supports the following character sets:

- ISO-IR 6 (ISO 646), ASCII Graphic Character Set
- ISO-IR 100 (ISO 8859-1), 96-Character Graphic Character Set. Right-hand Part of Latin Alphabet.
- ISO-IR 192 (ISO 10646), Unicode in UTF-8

2.8 CODES AND CONTROLLED TERMINOLOGY

The product uses no coded terminology.

2.9 SECURITY PROFILES

The product does not conform to any defined DICOM Security Profiles.

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

1. Firewall or router protections to ensure that only approved external hosts have network access to the product.
2. Firewall or router protections to ensure that the product only has network access to approved external hosts and services.
3. Any communications with external hosts and services outside the locally secured environment

3. DICOM STORAGE SERVICE CLASS (SCP ROLE) CONFORMANCE STATEMENT

This section describes the Conformance Statement for the data receiving functions supported in Centricity DMS. They are implemented in the Storage AE as the SCP role of the DICOM Storage SOP Classes.

3.1 RECEIVE STORAGE SOP INSTANCE FROM REMOTE AE

The Storage AE constantly listens for incoming associations to receive DICOM Storage SOP instances from a remote AE.

The Storage AE is able to serve multiple DICOM associations simultaneously. The maximum number of concurrent associations that the Storage AE can accept for receiving the SOP Instances, is configurable (see Section 2.6.2 and Table 2-5).

3.1.1 Associated Real-World Activities

The following real-world activities are associated with the Receive Storage SOP Instance operation (refer to Figure 2-1):

1. The patient arrives in the Radiology department for the study. Either the modality is able to query the Modality Worklist from the Centricity DMS MWL/MPPS AE or some other system, or a technologist manually enters the patient / study information into the modality. The technologist then performs the study on the patient.

2. Based on the patient / study information, the modality generates the DICOM Storage SOP instances as the results of the study and sends these to the Storage AE of Centricity DMS.

3. The Storage AE matches the DICOM objects received from the modality to an ordered study in the database. This is referred to as Study Profiling, see Section 3.2.1.

4. Respond to a DICOM Verification (Echo) request from a remote AE.

3.1.2 Acceptable Presentation Contexts

Table 3-1 shows the Presentation Contexts acceptable for the Storage AE for receiving DICOM Storage SOP Instances.

TABLE 3-1. ACCEPTABLE PRESENTATION CONTEXTS FOR STORAGE AE

Presentation Context Table – Accepted					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
US Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	RLE Lossless	1.2.840.10008.1.2.5	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline (Process 1) JPEG Lossless Hierarch. First-order prediction	1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.70	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1			SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2			SCP	None
NM Image Storage	1.2.840.10008.5.1.4.1.1.20			SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33			SCP	None
Verification (Echo)	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

3.1.2.1.1.1 Presentation Context Acceptance Criterion

The Storage AE evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

3.1.2.1.1.2 Transfer Syntax Selection Policies

The two "Transfer Syntax" columns in Table 3-1 list all transfer syntaxes that the Storage AE can accept for the DICOM Presentation Contexts proposed for the specified Abstract Syntaxes.

As shown in Table 3-1, all 7 SOP Classes listed in the table can use any of six different Transfer Syntaxes (i.e. Implicit VR Little Endian, Explicit VR Little Endian, Explicit VR Big Endian, RLE Lossless, JPEG Lossless Hierarch. First-order prediction, or JPEG Baseline (Process 1)). The last SOP class listed in Table 3-1 can use any of three different Transfer Syntaxes (i.e. Explicit VR Big Endian, Explicit VR Little Endian or Implicit VR Little Endian).

If several transfer syntaxes are present in a Presentation Context, the Storage AE will select the first transfer syntax sent by the Send AE.

3.1.2.2 SOP Specific Conformance Statement for Verification Service Class

The Storage AE provides standard conformance to the DICOM Verification Service Class as an SCP.

3.1.2.3   SOP Specific Conformance Statement for All Storage SOP Classes

The Storage AE provides standard conformance to the DICOM Storage Service Class as SCP.

No specialized Storage SOP Classes can be accepted.

3.1.2.3.1   General Behavior for all Storage SOP Classes

The SCP conforms to the DICOM Storage SOP Classes at Level 2 (full) as specified in DICOM PS 3.4, Appendix B.4.1. No elements are discarded.

All private data elements (including Unknown VR data element) will be accepted and stored as is.

The SCP will match the received Storage SOP instances to patients and studies in the Centricity DMS database via Study Profiling procedure. The Study Profiling behavior of the SCP depends on the called AE Title that the remote AE selected to request the association. See Sections 3.2.1.

The SCP will ignore the value of the C-STORE priority attribute.

If the SCP accepts a received SOP Instance for storage, the instance is stored in the file format as specified in DICOM PS 3.10.

3.1.2.3.2   Storage of SOP Instance Data Elements in Database

After having matched a SOP instance to the Patient / Study in the Centricity DMS database via the Study Profiling procedure (see Sections 3.2.1), certain data elements of the Storage SOP instance are saved in the database. These values may later be changed via HIS.

In addition, some data fields of Centricity DMS database have a smaller size than the size specified in the DICOM Standard. Any data values exceeding the field size of the database will be truncated.

TABLE 3-2. DATA ELEMENTS MAY BE TRUNCATED IN THE DATABASE

Data Element	DICOM Size	Database Size	Behavior
Patient ID	64 Char	32 Char	The characters exceeding the size allowed by the database will be truncated. No warning returned to the SCU.
Patient's Name	64 Char	46 Char	The Patient's Name will be first converted to the database format (see Section 3.2.1) and then truncated if the size exceeds the size allowed by the database. No warning returned to the SCU.

3.1.2.3.3   SOP Instance Storage and Abnormal Association Termination

3.1.2.3.3.1   SOP Instance Storage by SCP

It is possible for the Storage SCP (Storage AE) to fail in a manner where the cached data is unrecoverable, such as a power failure. The Storage SCU (remote AE) should use the following rules to decide if the transmitted SOP Instances have been stored safely in Centricity DMS:

- If an association is terminated because of any network operation failure or time-out, the success or failure of the Storage SCP to retain any object sent on the association is undefined.

3.1.2.3.4 C-STORE Response Status

The Storage SCP will return the following status codes in C-STORE-RSP message:

TABLE 3-3. STATUS CODES RETURNED IN C-STORE-RSP

Service Status	Status Code	Further Meaning	Status Code Sending Explanation	Related Fields Sent Back to SCU
Success	0000	Image Accepted	Image successfully profiled to a Study object in the Centricity database.	None
Refused	A700	Out of Resources	Processing of C-STORE requests cannot be completed because the Centricity DMS storage or database subsystem is not functioning.	None

If a status code of Refused or Error is returned in a C-STORE-RSP, the success or failure of the SCP to retain the SOP Instance transmitted in the corresponding C-STORE-RQ is undefined.

3.1.3 Extended Character Sets

The list of supported character sets is listed in **Section 2.7**.

3.2 IMPORTANT REMARKS TO STORAGE AE (SCP ROLE)

3.2.1 Study Profiling

The Storage AE will perform the Study Profiling process for each received Storage SOP Instance, in order to relate it to an ordered study object in the Centricity™ database. The process is performed by matching the Patient / Study level data elements in the data set of the SOP instance to the Patient / Study object existing in the database.

3.2.1.1 Data Elements Applied for Patient / Study Matching

Table 3-4 lists the data elements of a SOP instance used to match it to a study (of a patient) in the Centricity DMS database.

TABLE 3-4. DATA ELEMENTS USED IN STUDY PROFILING

Attribute Name	Tag
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Patient's Birth Date	(0010,0030)
Patient's Sex	(0010,0040)
Study Instance UID	(0020,000D)
Study Date	(0008,0020)
Study Time	(0008,0030)
Modality	(0008,0060)

3.2.1.2   Extended Character Sets in Patient's Name Text Encoding

If the Patient's Name data element in a received data set is multi-valued, only the Alphabetic Name group is applied for the patient / study matching. Other name groups are ignored for the data matching purpose. If the Alphabetic Name is absent but other name groups exist, the data set is treated as if the Patient Name is a null length value in terms of patient / study matching.

3.2.1.3   Patient's Name Format Conversion

Before the data elements of a SOP instance are used to search for or create data in the Centricity DMS database, Patient's Names supplied by the calling AE (Storage SCU) are first converted to upper case. Then the Patient's Name is extracted into First Name, Last Name and Middle Initial using the separator (^) to indicate where each piece starts and stops.

For example, the DICOM formatted name "Last^First^Middle^Prefix^Suffix" first becomes " LAST^FIRST^MIDDLE^PREFIX^SUFFIX". Now the data is mapped into the DMS fields and truncated if it exceeds the allowed size:

Field	Size	Example
Last Name	25	LAST
First Name	20	FIRST
Middle Initial	1	M

If a complete DICOM name comes in with no separators (^), then the entire Patient Name is assigned to the Last Name field. In this case, the DICOM formatted name "Last First Middle Prefix Suffix" becomes "LAST FIRST MIDDLE PREFIX SUFFIX".

3.2.2   Coercion of Data Elements

Not supported.

3.2.3   Supported Uses of SOP Instances

The DICOM Conformance Statement information specifies which DICOM Storage SOP Classes are supported by the Centricity DICOM Server as an SCP, i.e., they can be received by Centricity DMS. This does not automatically confirm that all SOP Instances can be displayed or processed in a certain application.

This section gives the information of the supported uses of the received SOP Instances in Centricity DMS.

3.2.3.1   Data Storage

Centricity DMS will store all successfully received SOP Instances in its on-line storage subsystem.

3.2.3.2   Data Display

Centricity DMS Clients are able to display an image SOP Instance if it meets the conditions specified in Table 3-5.

TABLE 3-5. CONDITIONS FOR IMAGE SOP INSTANCE DISPLAY

Name	Tag	Description
Modality Code	(0008,0060)	The image SOP Instance must contain one of the following Modality Code values: • NM • XA • US • IVUS
Photometric Interpretation	(0028,0004)	The image SOP Instance must contain one of the following Photometric Interpretation values: • MONOCHROME1 • MONOCHROME2 • Palette Color • RGB • YBR_FULL • YBR_FULL_422

Centricity DMS is unable to display any non-image SOP Instance, e.g., curves.

4. DICOM RETRIEVE SERVICE CLASS (SCU) CONFORMANCE STATEMENT

This section describes the Conformance Statement for information query and data retrieval functions supported in Centricity DMS. They are implemented in the Retrieve AE as the SCU role of the DICOM Retrieve SOP Classes.

The AE title will masquerade to be the AE Title of the SCP that the SOP Instance was originally sent to. This is done transparently for the Centricity DMS user and only the server has to be configured not each Centricity DMS Client.

4.1 DICOM RETRIEVE REQUEST TO REMOTE AE

The Retrieve AE initiates a DICOM association for sending a DICOM Retrieve request to a remote AE by performing a C-MOVE operation.

The Storage AE accepts associations in response to remote AE requests to move and store images, as a DICOM Storage SCP.

4.1.1 Associated Real-World Activities

When an image is offline, the user may click on an offline image which will then initiate a retrieval request of this SOP Instance from the remote AE. This action will initiate a C-MOVE request that will trigger the transfer of images from the remote system to the local database of the Centricity DMS. Note that the Centricity DMS Client front-end application initiates the C-MOVE operation while the DICOM Server responds to the resulting C-STORE operations. This type of operation is known in DICOM terminology as a "Three Device Move".

The SOP Instances shall eventually be stored within the Centricity DMS but shall not be stored on the Centricity DMS Client itself.

The following real-world activities are associated with the C-MOVE service element (request role) (Refer to Figure 2-2):

1. Generate a C-MOVE request to a remote AE to retrieve the specified SOP instances in the remote AE's database.

2. Receive the image in C-STORE requests from the remote AE.

3. Generate C-STORE responses to the remote AE.

4. Receive the C-MOVE response from the remote AE.

4.1.2 Proposed Presentation Contexts

Table 4-1 shows the Presentation Context proposed by the Retrieve AE. The Retrieve AE supports three standard transfer syntaxes for the C-MOVE operation.

TABLE 4-1. PROPOSED PRESENTATION CONTEXTS FOR RETRIEVE AE (C-MOVE OPERATION)

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
SOP Class	**UID**	**Name List**	**UID List**		**Negotiation**
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

The Study Root Query/Retrieve Information Model – MOVE SOP class listed in Table 5-4 can use any of three different Transfer Syntaxes (i.e. Explicit VR Big Endian, Explicit VR Little Endian or Implicit VR Little Endian).

4.1.2.1 SOP Specific Conformance Statement for Study Root Query/Retrieve Information Model as an SCU (MOVE)

The Retrieve AE provides standard conformance to the DICOM Study Root Query/Retrieve Information Model, as an SCU, according to the defined C-MOVE behaviors.

4.1.2.1.1 General Behavior

1. The Retrieve AE shall generate a C-MOVE request to the remote AE. The "Move Destination" parameter of the C-MOVE request shall contain the AE title of the Storage AE. The "Identifier" parameter of the C-MOVE request shall contain the attributes from the selected SOP Instance.

2. The remote AE shall initiate an association for the C-STORE request to the Storage AE. The Storage AE shall respond to the association request.

3. The remote AE shall generate a C-STORE request to the Storage AE on a separate association.

4. The Storage AE shall receive the SOP Instance and store it into the Centricity DMS. The Storage AE shall generate a C-STORE response to the remote AE indicating a successful or unsuccessful transfer and store of the SOP Instance.

5. The remote AE shall generate a final C-MOVE response to the Retrieve AE with a success or failure status.

4.1.3 Accepted Presentation Contexts - Storage SCP AE

The remote AE initiates a DICOM association to the Storage AE to perform the DIMSE C-STORE operations for sending the requested SOP Instances into Centricity DMS.

Refer to Table 3-1 in Section 3.1.2.

As shown in Table 3-1, the Storage AE can accept any of the transfer syntaxes listed for the various Storage SOP classes. The DICOM Server can be configured to accept the Presentation Contexts with one or several or all of these transfer syntaxes.

4.1.3.1 SOP Specific Conformance Statement for All Storage SOP Classes

The Storage AE provides the same Conformance Statement for this DICOM Storage SCP Role as described in Section 3.1.

4.1.4 Extended Character Sets

The Retrieve AE does not make use of the Specific Character Set (0008,0005) attribute when encoding C-MOVE requests or interpreting C-MOVE responses.

The Storage AE (as an SCP) does make use of the Specific Character Set (0008,0005) attribute when interpreting C-STORE requests or encoding C-STORE responses. Refer to **Section 2.7**.

5. MODALITY WORKLIST SERVICE CLASS (SCP) CONFORMANCE STATEMENT

This section describes the Conformance Statement for information query functions supported in Centricity DMS. They are implemented in the MWL/MPPS AE as the SCP role of the Modality Worklist Service Class.

5.1 DICOM MODALITY WORKLIST RETRIEVE REQUEST FR0M A REMOTE AE

The MWL/MPPS AE constantly listens for incoming associations in order to service a Modality Worklist Service Class request from a remote AE.

The MWL/MPPS AE is able to serve multiple DICOM associations simultaneously. The maximum number of concurrent associations that the MWL/MPPS AE can accept is configurable (see Section 2.6.2 and Table 2-5).

5.1.1 Associated Real-World Activities

The following real-world activities are associated with the C-FIND service element (response role) (refer to Figure 2-3):

1. Search for the requested data attributes on the Scheduling / Patient attributes in the Centricity DMS database, as specified in the request and matching on the criteria specified.

2. Send the found data sets in C-FIND responses to the remote AE.

3. Respond to a DICOM Verification (C-ECHO) request from a remote AE.

5.1.2 Acceptable Presentation Contexts

TABLE 5-1. ACCEPTABLE PRESENTATION CONTEXTS FOR MWL/MPPS AE

Presentation Context Table – Accepted					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Modality Worklist Information Model - Find	1.2.840.10008.5.1.4.31	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCP	None
Verification (Echo)	1.2.840.10008.1.1			SCP	None

5.1.2.1.1.1 Presentation Context Acceptance Criterion

The MWL/MPPS AE evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

5.1.2.1.1.2 Transfer Syntax Selection Policies

The two "Transfer Syntax" columns in Table 5-1 list all transfer syntaxes that the MWL/MPPS AE can accept for the DICOM Presentation Contexts proposed for the specified Abstract Syntaxes.

The SOP class listed in Table 5-1 can use any of three different Transfer Syntaxes (i.e. Explicit VR Little Endian, Implicit VR Little Endian or Explicit VR Big Endian).

If several transfer syntaxes are present in a Presentation Context, the MWL/MPPS AE will select a transfer syntax in the order as listed in Table 5-1.

5.1.2.2 SOP Specific Conformance Statement for Verification Service Class

The MWL/MPPS AE provides standard conformance to the DICOM Verification Service Class as an SCP.

5.1.2.3 SOP Specific Conformance Statement for Modality Worklist Information Model - Find

The MWL/MPPS AE provides standard conformance to the Modality Worklist Information Model – Find as an SCP.

A specialized Modality Worklist Information Model - Find can be accepted. If a Modality Worklist Information Model – Find request is missing the Scheduled Procedure Step Sequence, DMS will query our Demographics database (HIS) and will not query scheduling.

5.1.2.3.1 General Behavior

The SCP uses the DIMSE service element C-FIND to serve a DICOM request from a remote AE as follows:

1. The MWL/MPPS AE supports a DICOM Query as specified in Table 5-1, and returns the found data sets in C-FIND response.

2. The MWL/MPPS AE only uses the keys of supported type matching (see Table 5.4-2 and Table 5.4-10) to perform the database search. Any unsupported key (not included in Table 5.4-2 and Table 5.4-10) will be ignored and will be filled in with data found from the database.

3. Range matching is supported for the Date and Time keys

4. The MWL/MPPS AE only supports hierarchical query. No relational query is supported.

5. The MWL/MPPS AE searches for the data set using the matching keys specified in the C-FIND request against the Centricity DMS database.

The MWL/MPPS AE will ignore the data element Priority in a DICOM request.

5.1.2.3.2 Data Query to Centricity DMS Database

When a query specifies a searching key for an attribute of type PN, the MWL/MPPS AE will perform an automatic data conversion. A PN will be broken up into separate fields that will are used in the Centricity DMS database (Last Name, First Name and Middle Initial). All PN attributes will result in a case-insensitive search in the database.

In general, the MWL/MPPS AE will always return the exact number of responses to a MWL SCU, where the submitted query may potentially generate a large number of matches in the database. The maximum number of returned query responses is not configurable at this time.

5.1.2.3.3   Response Status

The MWL/MPPS AE will return the following status codes in C-STORE-RSP message:

TABLE 5-2. STATUS CODES RETURNED IN C-FIND-RSP

Service Status	Status Code	Further Meaning	Status Code Sending Explanation	Related Fields Sent Back to SCU
Refused	A700	Out of Resources	Processing of C-Find request cannot be completed because the Centricity DMS database subsystem is not functioning.	None
Failed	C247	Unable to Process	An SCU requested a date and time range that does not appear to relate. Example, the SCU requested a date range (<date1>-<date2>) but requesting minimum time (<time1>-)	Offending Element (0000,0901)
Cancel	FE00	Request Cancelled	Matching terminated due to Cancel request from SCU	None
Success	0000	Complete	C-Find successfully returned all procedure step object in the Centricity database.	None
Pending	FF00	More Results	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys.	None
	FF01	More Results	Matches are continuing - Warning that one or more Optional Keys were not supported for existence for this Identifier	None

Please note that the service status of failed is configurable meaning that the "C247" value may change if desired. Also, it is possible to disable this status code and the MWL/MPPS AE will try to search on these inconsistent dates and times.

5.1.3 Extended Character Sets

The list of supported character sets is listed in Section 2.7.

5.2 CENTRICITY DMS MAPPING OF DICOM ENTITIES

The Centricity DMS maps DICOM Information Entities to local Information Entities in the product's database and user interface. MWL/MPPS AE will map the data as describe below by default. Please note that it is possible to change the DMS to DICOM mapping after the product has been installed at a hospital if required. Also, it is possible to add optional keys that were not evaluated during the development of the product.

TABLE 5.2-1
MAPPING OF DICOM ENTITIES TO CENTRICITY DMS ENTITIES

DICOM Service Entity	DMS Database

Scheduled Procedure Step	Scheduling
	Orders Schedule Procedure Step (Orders SPS)
Requested Procedure	Orders Requested Procedure (Orders RP)
Imaging Service Request	Order
Visit	Admission
Patient	Patient

5.3 WORKLIST QUERY MODULE TABLE

See DICOM PS 3.3 and PS 3.4 for a complete definition of the entities, modules, and attributes.

TABLE 5.3-1
MODALITY WORKLIST INFORMATION MODEL MODULES

Entity Name	Module Name	Reference
Scheduled Procedure Step	SOP Common	5.4.1
	Scheduled Procedure Step	5.4.2
Requested Procedure	Requested Procedure	5.4.3
Imaging Service Request	Imaging Service Request	5.4.4
Visit	Visit Identification	5.4.5
	Visit Status	5.4.6
	Visit Relationship	5.4.7
	Visit Admission	5.4.8
Patient	Patient Relationship	5.4.9
	Patient Identification	5.4.10
	Patient Demographic	5.4.11
	Patient Medical	5.4.12

5.4 WORKLIST QUERY MODULE DEFINITIONS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) for a description of each of the query key attributes contained within the Modality Worklist Information Model.

5.4.1 SOP Common Module

Note: "Not Used" = not mapped in database.

TABLE 5.4-1
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Use

Specific Character Set	(0008,0005)	O	1C	Not Used	

5.4.1.1 SOP Common Module Attribute Descriptions

5.4.1.1.1 Specific Character Set

The AE will ignore Specific Character Set and treat all text attributes as ISO-IR 6 (ASCII) data.

5.4.2 Scheduled Procedure Step Module

TABLE 5.4-2
SCHEDULED PROCEDURE STEP MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Scheduled Procedure Step Sequence	(0040,0100)	R	1	N/A	
>Scheduled Station AE Title	(0040,0001)	R	1	Scheduling	Single Value Matching, Universal Matching
>Scheduled Procedure Step Start Date	(0040,0002)	R	1	Scheduling	Single Value Matching, Range Matching, Universal Matching
>Scheduled Procedure Step Start Time	(0040,0003)	R	1	Scheduling	Single Value Matching, Range Matching, Universal Matching
>Scheduled Procedure Step End Date	(0040,0004)	O	3	N/A	
>Scheduled Procedure Step End Time	(0040,0005)	O	3	N/A	
>Modality	(0008,0060)	R	1	Scheduling	Single Value Matching, Universal Matching
>Scheduled Performing Physician's Name	(0040,0006)	R	2	Scheduling	Single Value Matching, Wild Card Matching, Universal Matching
>Scheduled Procedure Step Description	(0040,0007)	O	1C	Scheduling	
>Scheduled Station Name	(0040,0010)	O	2	Scheduling	
>Scheduled Procedure Step Location	(0040,0011)	O	2	Scheduling	
>Scheduled Protocol Code Sequence	(0040,0008)	O	1C	N/A	
>> *Code Value*	(0008,0100)	O	1C	Orders SPS	
>> *Coding Scheme Version*	(0008,0103)	O	3	N/A	Not Used
>> *Coding Scheme Designator*	(0008,0102)	O	1C	Orders SPS	
>> *Code Meaning*	(0008,0104)	O	3	Orders SPS	

>Pre-Medication	(0040,0012)	O	2C	N/A	Not Used
>Scheduled Procedure Step ID	(0040,0009)	O	1	Orders SPS	
>Requested Contrast Agent	(0032,1070)	O	2C	N/A	Not Used
>Scheduled Procedure Step Status	(0040,0020)	O	3	N/A	Not Used
>Comments on the Scheduled Procedure Step	(0040,0400)	O	3	N/A	Not Used

5.4.2.1   Scheduled Procedure Step Module Attribute Descriptions

5.4.2.1.1   Scheduled Station AE Title

5.4.3   Requested Procedure Module

TABLE 5.4-3
REQUESTED PROCEDURE MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Requested Procedure ID	(0040,1001)	O	1	Orders RP	
Requested Procedure Description	(0032,1060)	O	1C	Orders RP	
Requested Procedure Code Sequence	(0032,1064)	O	1C	N/A	
>> *Code Value*	(0008,0100)	O	1C	Orders RP	
>> *Coding Scheme Version*	(0008,0103)	O	3	N/A	Not Used
>> *Coding Scheme Designator*	(0008,0102)	O	1C	Orders RP	
>> *Code Meaning*	(0008,0104)	O	3	Orders RP	
Study Instance UID	(0020,000D)	O	1	Scheduling	
Referenced Study Sequence	(0008,1110)	O	2	N/A	
>Referenced SOP Class UID	(0008,1150)	O	1C	N/A	Use the UID Value for Detached Study Management SOP Class (1.2.840.10008.3.1.2.3.1)
>Referenced SOP Instance UID	(0008,1155)	O	1C	Scheduling	Same value as Study Instance IUD
Requested Procedure Priority	(0040,1003)	O	2	N/A	Not Used
Patient Transport Arrangements	(0040,1004)	O	2	N/A	Not Used

Requested Procedure Location	(0040,1005)	O	3	N/A	Not Used
Confidentiality Code	(0040,1008)	O	3	N/A	Not Used
Reporting Priority	(0040,1009)	O	3	N/A	Not Used
Names of Intended Recipients of Results	(0040,1010)	O	3	N/A	Not Used
Reason for the Requested Procedure	(0040,1002)	O	3	N/A	Not Used
Requested Procedure Comments	(0040,1400)	O	3	N/A	Not Used

5.4.4 Imaging Service Request Module

TABLE 5.4-4
IMAGING SERVICE REQUEST MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Accession Number	(0008,0050)	O	2	Orders	
Requesting Physician	(0032,1032)	O	2	Orders	
Referring Physician's Name	(0008,0090)	O	2	Orders	
Requesting Service	(0032,1033)	O	3	N/A	Not Used
Reason for the Imaging Service Request	(0040,2001)	O	3	N/A	Not Used
Imaging Service Request Comments	(0040,2400)	O	3	N/A	Not Used
Issue Date of Imaging Service Request	(0040,2004)	O	3	Orders	Date the HL7 OBR message came into our system
Issue Time of Imaging Service Request	(0040,2005)	O	3	Orders	Time the HL7 OBR message came into our system
Placer Order Number / Imaging Service Request	(0040,2016)	O	3	HL7 OBR Segment Field PlacerOrderNumber.IDNUMBER	
Filler Order Number / Imaging Service Request	(0040,2017)	O	3	N/A	Not Used
Order entered by ...	(0040,2008)	O	3	N/A	Not Used
Order Enterer's Location	(0040,2009)	O	3	N/A	Not Used

Order Callback Phone Number	(0040,2010)	O	3	N/A	Not Used

5.4.5 Visit Identification

TABLE 5.4-5
VISIT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Admission ID	(0038,0010)	O	2	Orders	
Institution Name	(0008,0080)	O	3	N/A	Not Used
Institution Address	(0008,0081)	O	3	N/A	Not Used
Institution Code Sequence	(0008,0082)	O	3	N/A	Not Used
> *'Code Sequence Macro'*					
Issuer of Admission ID	(0038,0011)	O	3	N/A	Not Used

5.4.6 Visit Status

TABLE 5.4-6
VISIT STATUS MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Current Patient Location	(0038,0300)	O	2	N/A	Not Used
Visit Status ID	(0038,0008)	O	3	N/A	Not Used
Patient's Institution Residence	(0038,0400)	O	3	N/A	Not Used
Visit Comments	(0038,4000)	O	3	N/A	Not Used

5.4.7 Visit Relationship

TABLE 5.4-7
VISIT RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Referenced Patient Sequence	(0008,1120)	O	2	N/A	Not Used
>Referenced SOP Class UID	(0008,1150)	O	1C	N/A	Not Used
>Referenced SOP Instance UID	(0008,1155)	O	1C	N/A	Not Used

5.4.8 Visit Admission

TABLE 5.4-8
VISIT ADMISSION MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Referring Physician's Address	(0008,0092)	O	3	N/A	Not Used
Referring Physician's Phone Numbers	(0008,0094)	O	3	N/A	Not Used
Admitting Diagnoses Description	(0008,1080)	O	3	N/A	Not Used
Admitting Diagnoses Code Sequence	(0008,1084)	O	3	N/A	Not Used
> *'Code Sequence Macro'*					
Route of Admissions	(0038,0016)	O	3	N/A	Not Used
Admitting Date	(0038,0020)	O	3	N/A	Not Used
Admitting Time	(0038,0021)	O	3	N/A	Not Used

5.4.9 Patient Relationship

TABLE 5.4-9
PATIENT RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Referenced Visit Sequence	(0008,1125)	O	3	N/A	Not Used
>Referenced SOP Class UID	(0008,1150)	O	3	N/A	Not Used
>Referenced SOP Instance UID	(0008,1155)	O	3	N/A	Not Used
Referenced Patient Alias Sequence	(0038,0004)	O	3	N/A	Not Used
>Referenced SOP Class UID	(0008,1150)	O	3	N/A	Not Used
>Referenced SOP Instance UID	(0008,1155)	O	3	N/A	Not Used

5.4.10 Patient Identification

TABLE 5.4-10
PATIENT IDENTIFICATION MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Patient's Name	(0010,0010)	R	1	PatientName Field from PID Segment / Demographics	Single Value Matching, Wild Card Matching, Universal Matching
Patient ID	(0010,0020)	R	1	Internal PatientID Field from PID Segment / Demographics	Single Value Matching, Universal Matching
Issuer of Patient ID	(0010,0021)	O	3	N/A	Not Used
Other Patient Ids	(0010,1000)	O	3	N/A	Not Used
Other Patient Names	(0010,1001)	O	3	N/A	Not Used
Patient's Birth Name	(0010,1005)	O	3	N/A	Not Used

Patient's Mother's Birth Name	(0010,1060)	O	3	N/A	Not Used
Medical Record Locator	(0010,1090)	O	3	N/A	Not Used

5.4.11 Patient Demographic

TABLE 5.4-11
PATIENT DEMOGRAPHIC MODULE ATTRIBUTES

Attribute Name	Tag	Matching Key Type	Return Key Type	Mapped From	Remark/Matching Type
Patients Birth Date	(0010,0030)	O	2	DateTimeOfBirth Field from PID Segment / Demographics	
Patient's Sex	(0010,0040)	O	2	Sex Field from PID Segment / Demographics	
Patient's Weight	(0010,1030)	O	2	N/A	Not Used
Confidentiality constraint on patient data	(0040,3001)	O	2	N/A	Not Used
Patient's Size	(0010,1020)	O	3	N/A	Not Used
Patient's Address	(0010,1040)	O	3	N/A	Not Used
Patient's Age	(0010,1010)	O	3	N/A	Not Used
Occupation	(0010,2180)	O	3	N/A	Not Used
Patient's Birth Time	(0010,0032)	O	3	N/A	Not Used
Patient's Insurance Plan Code Sequence	(0010,0050)	O	3	N/A	Not Used
> *'Code Sequence Macro'*					
Patient's Primary Language Code Sequence	(0010,0101)	O	3	N/A	Not Used
> *'Code Sequence Macro'*					
> Patient's Primary Language Code Modifier Sequence	(0010,0102)	O	3	N/A	Not Used
>> *'Code Sequence Macro'*					

6. MODALITY PERFORMED PROCEDURE STEP SERVICE CLASS (SCP) CONFORMANCE STATEMENT

This section describes the Conformance Statement for the data receiving functions supported in Centricity PACS. They are implemented in the MWL/MPPS AE as the SCP role of the Modality Performed Procedure Step SOP Class.

6.1 DICOM MODALITY PERFORMED PROCEDURE STEP SOP CLASS FROM A REMOTE AE

The MWL/MPPS SCP AE constantly listens for incoming associations in order to service a DICOM Query request from a remote AE.

The MWL/MPPS AE is able to serve multiple DICOM associations simultaneously. The maximum number of concurrent associations that the MWL/MPPS AE can accept is configurable (see Section 2.6.2 and Table 2-5).

6.1.1 Associated Real-World Activities

The following real-world activities are associated with the Modality Performed Procedure Step SOP Class operation (refer to Figure 2-3):

1. Respond to a N-CREATE request

2. Respond to a N-SET request

3. Respond to a DICOM Verification (C-ECHO) request from a remote AE.

6.1.2 Acceptable Presentation Contexts

TABLE 6-1. ACCEPTABLE PRESENTATION CONTEXTS FOR MWL/MPPS AE

Presentation Context Table – Accepted					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCP	None
Verification (Echo)	1.2.840.10008.1.1			SCP	None

6.1.2.1.1.1 Presentation Context Acceptance Criterion

The MWL/MPPS AE evaluates each Presentation Context independently, and accepts any Presentation Context that matches an Abstract Syntax for any Real-World Activity.

6.1.2.1.1.2 Transfer Syntax Selection Policies

The two "Transfer Syntax" columns in Table 6-1 list all transfer syntaxes that the MWL/MPPS AE can accept for the DICOM Presentation Contexts proposed for the specified Abstract Syntaxes.

The SOP class listed in Table 6-1 can use any of three different Transfer Syntaxes (i.e. Explicit VR Little Endian, Implicit VR Little Endian or Explicit VR Big Endian).

If several transfer syntaxes are present in a Presentation Context, the MWL/MPPS AE will select a transfer syntax in the order as listed in Table 6-1.

6.1.2.2 SOP Specific Conformance Statement for Verification Service Class

The MWL/MPPS AE provides standard conformance to the DICOM Verification Service Class as an SCP.

6.1.2.3 SOP Specific Conformance Statement for Modality Performed Procedure Step SOP Class

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

No specialized Modality Performed Procedure Step SOP Class can be accepted.

6.1.2.3.1 General Behavior

The SCP uses the DIMSE service element N-CREATE to serve a DICOM request from a remote AE as follows:

1. Associate the SOP Instance to a scheduled event in the Centricity DMS database by matching the Study Instance UID in the database or create the scheduled event if one does not exist

2. Associate the scheduled event to an order if applicable

3. Create a new study in Centricity DMS database by using the Patient / Study information from the received data set.

4. Set the appropriate status back to the SCU indicating success or failure

The SCP uses the DIMSE service element N-SET to serve a DICOM request from a remote AE as follows:

1. Update the corresponding scheduled event

2. Set the appropriate status back to the SCU indicating success or failure

The SCP uses the DIMSE service element C-ECHO to serve a DICOM request from a remote AE as follows:

1. Respond to a DICOM Verification (C-ECHO) request from a remote AE

6.1.2.3.2 Data Elements to Centricity DMS Database

Patient Name and Patient ID may be truncated as specified in Section 3.1.2.3.2. Also, Patient Name will be converted as specified in Section 3.2.1.3.

6.1.2.3.3 Data Validation

TABLE 6-2. N-CREATE VALIDATION TABLE

Attribute Name	Tag	Acceptable Values
Performed Procedure Step Status	(0040,0252)	"IN PROGRESS"

TABLE 6-3. N-SET VALIDATION TABLE

Attribute Name	Tag	Acceptable Values
Performed Procedure Step Status	(0040,0252)	"IN PROGRESS" "COMPLETED" "DISCONTINUED"

Each attribute will be evaluated against the list of acceptable values. If any of the attributes doesn't match one of the acceptable values, then the MWL/MPPS AE will return a status code of 0106.

6.1.2.3.4 Response Status

The MWL/MPPS AE will return the following status codes in N-CREATE-RSP message:

TABLE 6-4. STATUS CODES RETURNED IN N-CREATE-RSP

Service Status	Status Code	Further Meaning	Status Code Sending Explanation	Related Fields Sent Back to SCU
Refused	0213	Out of Resources	Processing of Store Requests cannot be completed because the Centricity DMS database subsystem is not functioning.	None
Failure	0106	Invalid Attribute	See 6.1.2.3.3	None
	0111	Duplicate SOP Instance	Event has already received N-CREATE message with this SOP Instance UID	None
	0117	Invalid Object Instance	The Affected SOP Instance UID was either missing from the command or it was NULL.	None
	0120	Missing Attribute	A required attriubte was missing	Attribute Identifier List (0000,1005)
	0121	Missing Attribute Value	A required attribute was NULL	Modification (no tag)
Success	0000	Complete	Database inserted/updated without error	None

The MWL/MPPS AE will return the following status codes in N-SET-RSP message:

TABLE 6-5. STATUS CODES RETURNED IN N-SET-RSP

Service Status	Status Code	Further Meaning	Status Code Sending Explanation	Related Fields Sent Back to SCU
Refused	0213	Out of Resources	Processing of Store Requests cannot be completed because the Centricity DMS database subsystem is not functioning.	None
Failure	0106	Invalid Attribute	See 6.1.2.3.3	None
	0110	Processing Failure	Received a prior N-SET message for this SOP Instance with a Performed Procedure Step Status of "DISCONTINUED" or "COMPLETED"	None
	0112	No Such Object Instance	Did not receive an N-CREATE message for this specific SOP Instance	None
	0117	Invalid Object Instance	TheRequested SOP Instance UID was either missing from the command or it was NULL.	None

Success	0000	Complete	Database updated without error	None

6.1.3 Extended Character Sets

The list of supported character sets is listed in Section 2.7.

6.2 MODALITY PERFORMED PROCEDURE STEP MODULE TABLE

See DICOM PS 3.3 and PS 3.4 for a complete definition of the entities, modules, and attributes.

TABLE 6.2-1
MODALITY PERFORMED PROCEDURE STEP MODULES

Module Name	Reference
SOP Common	6.3.1
Performed Procedure Step Relationship	6.3.2
Performed Procedure Step Information	6.3.3
Image Acquisition Results	6.3.4
Radiation Dose	6.3.5
Billing and Material Management Codes	6.3.6

6.3 MODALITY PERFORMED PROCEDURE STEP MODULE DEFINITIONS

Please refer to DICOM Standard PS 3.3. (Information Object Definitions) for a description of each of the attributes contained within the Modality Performed Procedure Step Information Object Definition.

6.3.1 SOP Common Module

TABLE 6.3-1
SOP COMMON MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Use
Specific Character Set	(0008,0005)	1C	1C	Not Used

6.3.2 Performed Procedure Step Relationship Module

TABLE 6.3-2
PERFORMED PROCEDURE STEP RELATIONSHIP MODULE ATTRIBUTES

Attribute Name	Tag	Type for SCU N-CREATE	Type for SCU N-SET	Used
Patient's Name	(0010,0010)	2	-	Used
Patient ID	(0010,0020)	2	-	Used

Patient's Birth Date	(0010,0030)	2	-	Used
Patient's Sex	(0010,0040)	2	-	Used
Referenced Patient Sequence	(0008,1120)	2	-	Not Used
>Referenced SOP Class UID	(0008,1150)			Not Used
>Referenced SOP Instance UID	(0008,1155)			Not Used
Scheduled Step Attributes Sequence	(0040,0270)	1	-	Not Used
>Study Instance UID	(0020,000D)	1	-	Used
>Referenced Study Sequence	(0008,1110)	2	-	Not Used
>>Referenced SOP Class UID	(0008,1150)			Not Used
>>Referenced SOP Instance UID	(0008,1155)			Not Used
>Accession Number	(0008,0050)	2	-	Not Used
>Placer Order Number/Imaging Service Request	(0040,2016)	3	-	Not Used
>Filler Order Number/Imaging Service Request	(0040,2017)	3	-	Not Used
>Requested Procedure ID	(0040,1001)	2	-	Used
>Requested Procedure Description	(0032,1060)	2	-	Used
>Scheduled Procedure Step ID	(0040,0009)	2	-	Used
>Scheduled Procedure Step Description	(0040,0007)	2	-	Not Used
>Scheduled Protocol Code Sequence	(0040,0008)	2	-	Not Used
>> *'Code Sequence Macro'*				Not Used

6.3.3 Performed Procedure Step Information Module

TABLE 6.3-3
PERFORMED PROCEDURE STEP INFORMATION MODULE ATTRIBUTES

Attribute Name	Tag	N-CREATE	N-SET	Use
Performed Station AE Title	(0040,0241)	1	-	Used
Performed Station Name	(0040,0242)	2	-	Not Used
Performed Location	(0040,0243)	2	-	Not Used
Performed Procedure Step Start Date	(0040,0244)	1	-	Used
Performed Procedure Step Start Time	(0040,0245)	1	-	Used
Performed Procedure Step ID	(0040,0253)	1	-	Not Used
Performed Procedure Step End Date	(0040,0250)	2	3	Used
Performed Procedure Step End Time	(0040,0251)	2	3	Used
Performed Procedure Step Status	(0040,0252)	1	3	Used
Performed Procedure Step Description	(0040,0254)	2	3	Not Used
Comments on the Performed Procedure Step	(0040,0280)	3	3	Not Used
Performed Procedure Type Description	(0040,0255)	2	3	Not Used
Procedure Code Sequence	(0008,1032)	2	3	Not Used
> *'Code Sequence Macro'*	(0040,2016)			Not Used
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	3	3	Not Used
> *'Code Sequence Macro'*				

6.3.4 Image Acquisition Results Module

TABLE 6.3-4
IMAGE ACQUISITION RESULTS MODULE ATTRIBUTES

Attribute Name	Tag	N-CREATE	N-SET	Use
Modality	(0008,0060)	1	-	Used
Study ID	(0020,0010)	2	-	Not Used
Performed Protocol Code Sequence	(0040,0260)	2	3	Not Used
> 'Code Sequence Macro'				
Performed Series Sequence	(0040,0340)	2	3	Not Used
>Performing Physician's Name	(0008,1050)	2	2	Not Used
>Operator's Name	(0008,1070)	2	2	Not Used
>Protocol Name	(0018,1030)	1	1	Not Used
>Series Instance UID	(0020,000E)	1	1	Not Used
>Series Description	(0008,103E)	2	2	Not Used
>Retrieve AE Title	(0008,0054)	2	2	Not Used
>Referenced Image Sequence	(0008,1140)	2	2	Not Used
>>Referenced SOP Class UID	(0008,1150)	1	1	Not Used
>>Referenced SOP Instance UID	(0008,1155)	1	1	Not Used
>Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	2	2	Not Used
>>Referenced SOP Class UID	(0008,1150)	1	1	Not Used
>>Referenced SOP Instance UID	(0008,1155)	1	1	Not Used

6.3.5 Radiation Dose Module

TABLE 6.3-5
RADIATION DOSE MODULE ATTRIBUTES

Attribute Name	Tag	Type from SCU N-CREATE	Type from SCU N-SET	Use
Anatomic Structure, Space or Region Sequence	(0008,2229)	3	3	Not Used
> 'Code Sequence Macro'	(0020,0010)	3	3	Not Used
Total Time of Fluoroscopy	(0040,0300)	3	3	Not Used
Total Number of Exposures	(0040,0301)	3	3	Not Used
Distance Source to Detector (SID)	(0018,1110)	3	3	Not Used

Distance Source to Entrance	(0040,0306)	3	3	Not Used
Entrance Dose	(0040,0302)	3	3	Not Used
Entrance Dose in mGy	(0040,8302)	3	3	Not Used
Exposed Area	(0040,0303)	3	3	Not Used
Image Area Dose Product	(0018,115E)	3	3	Not Used
Comments on Radiation Dose	(0040,0310)	3	3	Not Used
Exposure Dose Sequence	(0040,030E)	3	3	Not Used
>Radiation Mode	(0018,115A)	3	3	Not Used
>KVp	(0018,0060)	3	3	Not Used
>X-ray Tube Current in µA	(0018,8151)	3	3	Not Used
>Exposure Time	(0018,1150)	3	3	Not Used
>Filter Type	(0018,1160)	3	3	Not Used
>Filter Material	(0018,7050)	3	3	Not Used

6.3.6 Billing and Material Management Codes Module

TABLE 6.3-6
BILLING AND MATERIAL MANAGEMENT CODES MODULE ATTRIBUTES

Attribute Name	Tag	Type from SCU N-CREATE	Type from SCU N-SET	Use
Billing Procedure Step Sequence	(0040,0320)	3	3	Not Used
> *'Code Sequence Macro'*	(0020,0010)	3	3	Not Used
Film Consumption Sequence	(0040,0321)	3	3	Not Used
>Number of Films	(2100,0170)	3	3	Not Used
>Medium Type	(2000,0030)	3	3	Not Used
>Film Size ID	(2010,0050)	3	3	Not Used
Billing Supplies and Devices Sequence	(0040,0324)	3	3	Not Used
>Billing Item Sequence	(0040,0296)	3	3	Not Used
>> *'Code Sequence Macro'*	(0040,0303)	3	3	Not Used
>Quantity Sequence	(0040,0293)	3	3	Not Used
>>Quantity	(0040,0294)	3	3	Not Used
>>Measuring Units Sequence	(0040,0295)	3	3	Not Used
>>> *'Code Sequence Macro'*	(0018,115A)	3	3	Not Used