GE Healthcare IT

Technical Publications

Direction 2043710-001
Revision 3

Centricity™ PACS Version 3.0.5
DICOM CONFORMANCE STATEMENT

GE Healthcare
Information Technologies

REVISION HISTORY

Revision	Date	Author	Description
1	August 15, 2008	Vijay Reddy	Initial revision for Centricity™ PACS 3.0.5.
2	August 20, 2008	Vijay Reddy	Update the conformance statement with following newly support SOP Classes and Transfer Syntax for Centricity™ PACS Multi-frame True Color Secondary Capture Image Storage Multi-frame Grayscale Byte Secondary Capture Image Storage Standalone Curve Storage, 12-lead ECG Waveform Storage Encapsulated PDF Storage, General ECG Waveform Storage Hemodynamic Waveform Storage, GE Private Xeleris, Procedure Log Basic/Enhanced/Comprehensive SR, Mammography/Chest CAD SR and X0Ray Radiation Dose SR.
3	June 4, 2009	Mark Niggemann	Updated the conformance statement to incorporate feedback given by Herve Hoehn. Corrected formatting, table and figure references. Added pixel spacing information used by the Centricity™ PACS RA1000 Workstation in section 12.7. Updated branding references to be consistent with the usage of Centricity™ PACS, Centricity™ Enterprise Archive, and Centricity™ Enterprise Web.

TABLE OF CONTENTS

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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 compliance of the Centricity™ PACS DICOM Communication Server to DICOM Standards requirements for network communication for all SOP classes it supports. This part generally follows the DICOM Standard Conformance Statement as specified in the DICOM Standard, Part 2. General network operations are described in this section. In the places that individual real-work activities should be described, references to the following sections are made, instead of including all SOP classes in this part.

Section 3 (DICOM Storage Service (SCU) Conformance Statement) specifies compliance of the Centricity™ PACS SOP Instance Send functions to DICOM Standards requirements for Storage SOP Classes.

Section 4 (DICOM Storage Service (SCP) Conformance Statement) specifies the compliance of the Centricity™ PACS SOP Instance Receive functions to DICOM Standards requirements for Storage SOP Classes.

Section 5 (DICOM Query/Retrieve Service (SCU) Conformance Statement) specifies the compliance of the Centricity™ PACS information query and data retrieval functions to DICOM Standards requirements for Query and Retrieve SOP Classes.

Section 6 (DICOM Query/Retrieve Service (SCP) Conformance Statement) specifies the compliance of the Centricity™ PACS information query and data retrieval functions to DICOM Standards requirements for Query and Retrieve SOP Classes.

Section 7 (DICOM Storage Commitment Service Conformance Statement) specifies the compliance of the Centricity™ PACS SOP Instance Storage Commitment functions to DICOM Standards requirements for Storage Commitment SOP Classes.

Section 8 (DICOM Modality Performed Procedure Step SOP Class Conformance Statement) specifies the compliance of the Centricity™ PACS MPPS functions to DICOM Standards requirements for Modality Performed Procedure Step SOP Classes.

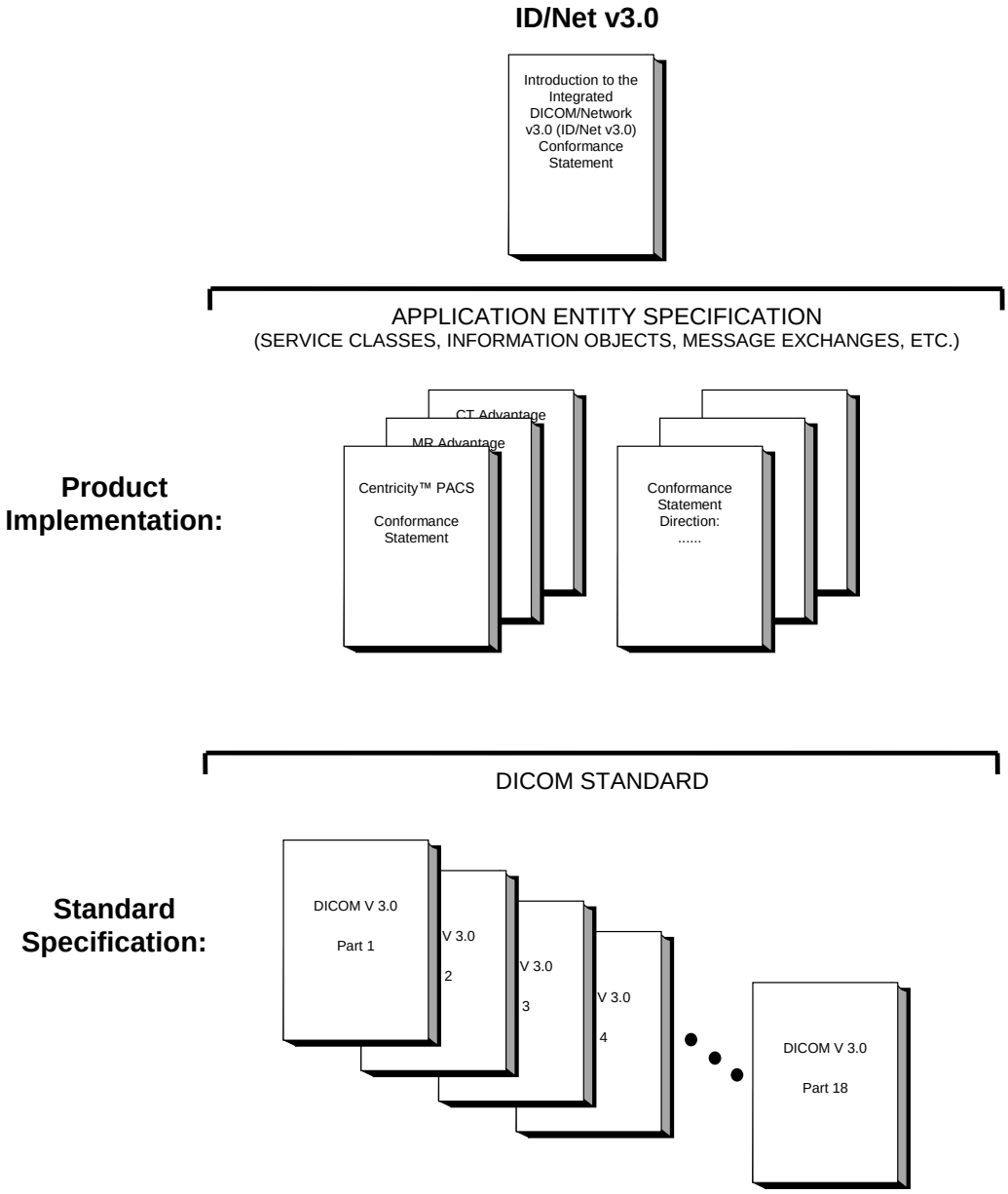
Section 9 (DICOM Instance Availability Notification (IAN) SOP Class Conformance Statement) specifies the compliance of the Centricity™ PACS IAN functions to DICOM Standards requirements for the Instance Availability Notification SOP Class.

Section 10 (DICOM Print Service Conformance Statement) contains a complete DICOM Standards Conformance Statement for the print service in the Centricity™ PACS.

Section 11 (DICOM General Purpose Worklist Service (SCP) Conformance Statement) specifies the compliance of the Centricity™ PACS GPWL functions to DICOM Standards requirements for General Purpose Worklist SOP Classes.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GE Conformance Statements and their relationship to the DICOM Conformance Statements is shown in the illustration below.



This document specifies the DICOM implementation supported by Centricity™ PACS. It is entitled:

Centricity™ PACS Version 3.0.5

DICOM Conformance Statement

Direction 2043710-001

This DICOM Conformance Statement documents the DICOM Conformance Statement and Technical Specification required interoperating with the GE network interface. The GE 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.

This DICOM Conformance Statement document does not include the DICOM Conformance Statements for the Centricity™ Enterprise Archive or Centricity™ Enterprise Web. These Conformance Statements are available as separate documents. Refer to the GE Web Site: http://www.ge.com/dicom.

Introductory information, which is applicable to all GE Conformance Statements, is described in the following GE document:

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

Conformance Statement

Direction: 2118780

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

For more information regarding the DICOM Standard, 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 North 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 that are used in that Standard.

1.4 SCOPE AND FIELD OF APPLICATION

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

includes a DICOM Conformance Statement and is necessary to ensure proper processing and interpretation of GE medical data exchanged using DICOM. The GE Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GE devices are capable of using different Information Object Definitions. For example, a GE 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 GE implementation. If the user encounters unspecified private data elements while parsing a GE 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 GE 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 ensure this could 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 are applicable to all GE Conformance Statements is included in the GE Document, *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*.

Additional references used in this Conformance Statement document are listed in Table 1-1.

TABLE 1-1. ADDITIONAL REFERENCE DOCUMENTS

Document Name	Organization	Document Number(s)
Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement	GE Medical Systems	Direction: 2118780
GE PACS Broker v2.0 (Modality Worklist Interfaces) DICOM Conformance Statement	GE Medical Systems	Direction: 2016498-200
Digital Imaging and Communications in Medicine (DICOM), 18 Parts, 2004 Edition.	National Electrical Manufacturers Association (NEMA)	PS 3.1-2004 through PS 3.18-2004
ASCII Graphic Character Set. ISO 646, USA Version X3.4 - 1968	Information Processing Society of Japan/Information Technology Standards Commission of Japan (IPSJ/ITSCJ)	ISO-IR-6
Japanese Katakana Character Set JIS C6220-1969	IPSJ/ITSCJ	ISO-IR-13
Japanese Version of ISO 646 for Roman Characters JIS C6220-1969	IPSJ/ITSCJ	ISO-IR-14
Japanese Character Set JIS C 6226-1983	IPSJ/ITSCJ	ISO-IR-87
96-Character Graphic Character Set. Right-hand Part of Latin Alphabet No.1 ISO 8859/1, ECMA-94	IPSJ/ITSCJ	ISO-IR-100
Korean Graphic Character Set, Korean Standard KSC 5601-1987	IPSJ/ITSCJ	ISO-IR-149
CCITT Chinese Set	IPSJ/ITSCJ	ISO-IR-165

1.7 RELATED DICOM CONFORMANCE STATEMENTS

Modality Worklist service is optionally available using the Centricity™ PACS Broker but its DICOM Conformance Statement is not included in this document. For more information, refer to the GE PACS Broker DICOM Conformance Statement. Refer to Table 1-1.

1.8 DEFINITIONS

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

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

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™ PACS and runs on the Centricity™ PACS DAS (DICOM Application Services) subsystem.

1.9 SYMBOLS, TERMS AND ABBREVIATIONS

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

Additional abbreviations and terms used in this Conformance Statement document are listed below:

TERM	DESCRIPTION
CPS	DICOM Print Server
DAS	DICOM Application Services
GP-PPS	General Purpose Performed Procedure Steps
GP-SPS	General Purpose Scheduled Procedure Steps
GPWL	General Purpose Worklist
IAN	Instance Availability Notification
ID/Net	Integrated DICOM/Network
MPPS	Modality Performed Procedure Step
PACS	Picture Archiving and Communications System
Q/R	Query/Retrieve
RIS	Radiology Information System
UL service-provider	DICOM Upper Layer Service Provider
UL service-user	DICOM Upper Layer Service User
WKS	Workstation

2. NETWORK CONFORMANCE STATEMENT

2.1 INTRODUCTION

Centricity™ PACS provides (image and non-image) data management and archival services. 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 workstations, etc.):

- Receive DICOM Storage SOP Instances from an acquisition modality for data storage.
- Service long-term Storage Commitment requests for the SOP Instances. These SOP Instances can be already sent to the PACS previously or delivered at a later time after the Storage Commitment Request.
- Send DICOM Storage SOP Instances to an external system for data distribution.
- Service information query and data retrieval to the Patient / Study / Series / SOP Instances maintained in the Centricity™ PACS system.
- Initiate information query and data retrieval to the Patient / Study / Series / SOP Instances maintained in another DICOM entity and load them into the Centricity™ PACS system.

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

Centricity™ PACS also supports the DICOM Print as SCU. The DICOM Print Service has been implemented in a separate subsystem other than the DICOM Server. Section 10 includes a complete DICOM Standards Conformance Statement for the Print Service.

Note: In this document, we use the term “DICOM Storage SOP Instance” or “SOP Instance” in places where the term “Image” is usually used. A SOP Instance generally refers to a DICOM Standards Composite IOD, which can be an image or non-image data set. The SOP class to which an instance is associated determines the data type of the instance in the most cases. For more details, the reader is referred to DICOM PS 3.3 and PS 3.4.

Centricity™ PACS supports a RIS interface to receive study orders as well as patient / study updates. Alternatively, the Centricity™ PACS Exam Manager operator can also create a study order directly in the database. The Centricity™ PACS Broker supports a DICOM Modality Worklist information query of the ordered studies from an acquisition modality. The modality includes the patient / study information received in the query responses to the DICOM Storage SOP instances it generates and sends these to the Storage AE of the DICOM Server.

After receiving the DICOM SOP instances, the Storage AE will match the SOP instances to the associated study in the Centricity™ PACS database, using the patient / study information embedded in the data sets of the instances. Using the worklist query is highly recommended for all acquisition modalities. If a modality cannot support the worklist query, it usually relies on the operator’s input for the patient / study information. Without the use of a Modality Worklist, manual errors increase the number of mismatching SOP instances to the studies in the Centricity™ PACS database significantly.

A block diagram of the GE PACS System is shown in Figure 2-1.

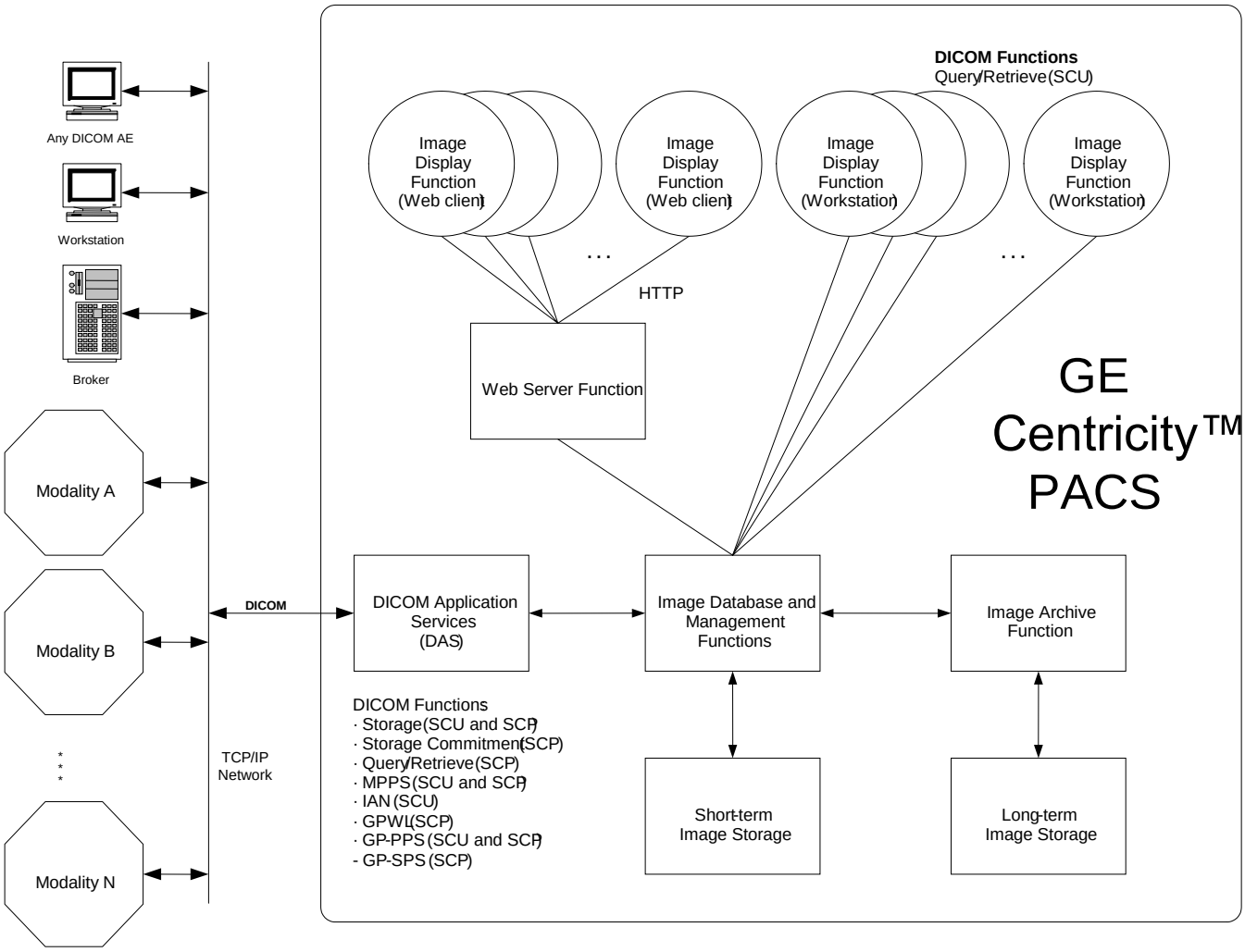


FIGURE 2-1, BLOCK DIAGRAM OF GE CENTRICITY™ PACS SYSTEM

2.2 IMPLEMENTATION MODEL

Centricity™ PACS provides a number of DICOM Standard as well as private services with separate DICOM Application Entities (AEs) of the DICOM Server:

- SOP Instance Storage and Commitment Application Entity (Storage AE)
- SOP Instance Send Application Entity (Send AE)
- Information Query and Data Retrieve Application Entity as an SCU (Q/R SCU AE)
- Information Query and Data Retrieve Application Entity as an SCP (Q/R SCP AE)
- General Purpose Worklist Application Entity (GPWL AE)

In this document, the term "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™ PACS and runs on the Centricity™ PACS DAS (DICOM Application Services) subsystem.

The DICOM Server is automatically started when the Centricity™ PACS DAS is booted.

The following subsections give the implementation data flow diagrams of these AEs.

2.2.1 Application Data Flow Diagrams

2.2.1.1 Application Data Flow Diagram of Storage AE

The Storage AE implements both the SCP role of the DICOM Storage SOP Class and the SCP role of the DICOM Storage Commitment SOP Class.

The SCP role of the DICOM Storage SOP Class is responsible for receiving DICOM Storage SOP Instances from a remote AE.

The SCP role of the DICOM Storage Commitment SOP Class is responsible for the support of long-term Storage Commitment Request from a remote AE.

There is no local real-world activity required for the Storage AE to respond incoming DICOM associations to receive SOP Instances and/or Storage Commitment Requests. The Storage AE is always waiting for an incoming association and will automatically respond a Verification request.

After receiving a SOP Instance, the Storage AE will start the following local real-world activities:

- Match the received SOP Instances to an ordered study, or create a new study (unordered study) if no match is found. This is referred to as the Study Profiling procedure, see Section 4.2.1.
- Store the received SOP Instances in the Centricity™ PACS storage system, for use within Centricity™ PACS and for archiving.

Note: The Storage AE always saves the successfully received SOP Instances, so that they will be archived. However, the Storage AE does not guarantee that the data will be archived. The remote AE submitting data to the Storage AE should verify the data archiving commitment by sending a Storage Commitment Request– in the same association it sent the SOP Instances or in another dedicated, separate association.

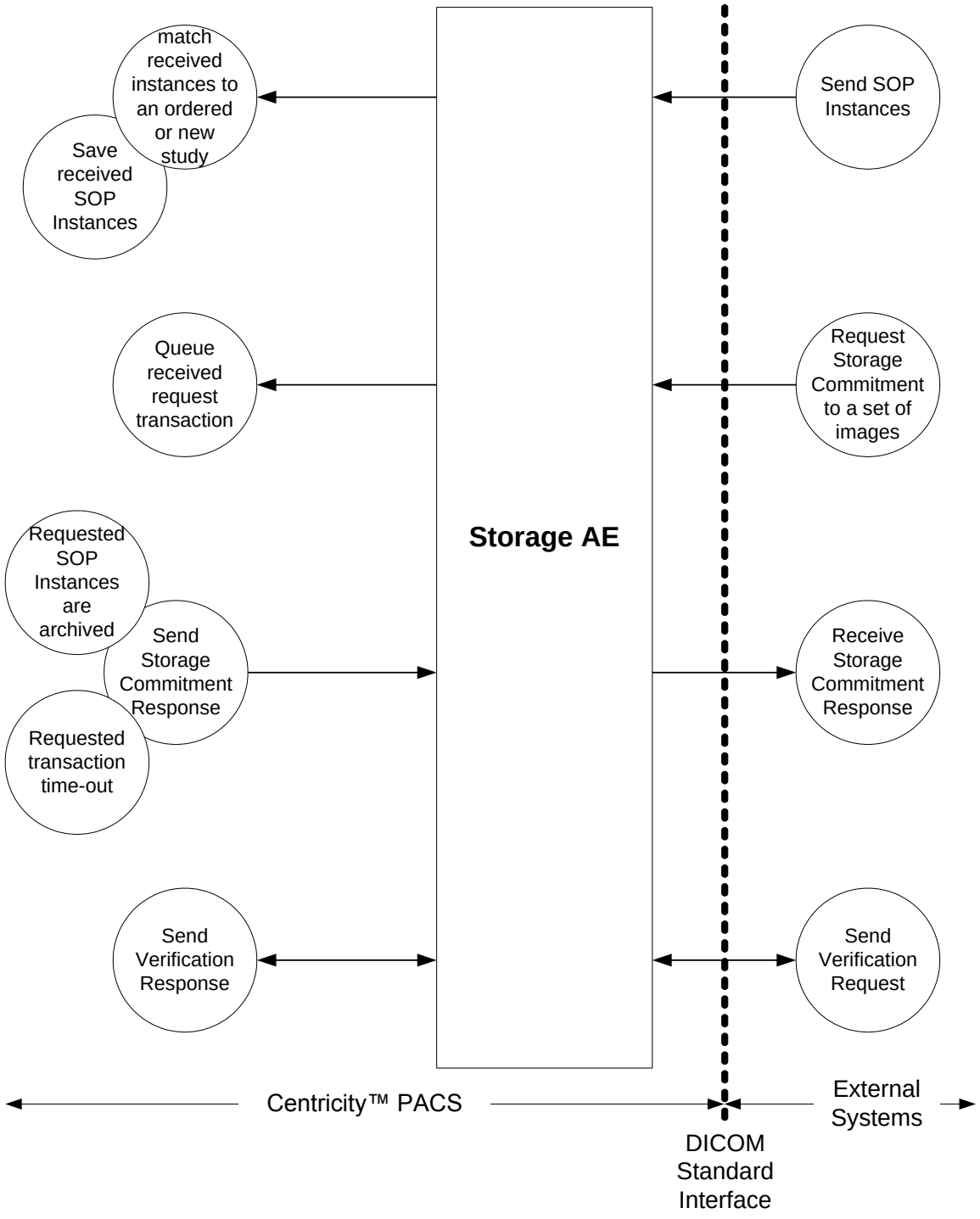


FIGURE 2-2. DATA FLOW DIAGRAM OF STORAGE AE

After receiving a Storage Commitment Request, the request transaction is queued into the Centricity™ PACS database (Storage Commitment Queue) and a timer of a configured time-out value (see Section 2.6.5) associated with the transaction is started. The Storage AE periodically polls all outstanding Storage

Commitment Transactions in the queue, and will send a Storage Commitment Result back to the remote AE in the following two cases:

- All images requested in one outstanding, queued Storage Commitment transaction have been successfully archived in the long-term archiving media.
- The pre-configured time-out is expired, but not all images requested in one outstanding, queued Storage Commitment transaction have been successfully archived.

The Storage AE supports a Storage Commitment Request for the SOP Instances unknown to the Centricity™ PACS at the moment that the request is received. The Storage AE assumes that these SOP Instances will be received at a later time.

The Storage AE also supports the Modality Performed Procedure Step SOP Class as an SCP, as shown in the following figure:

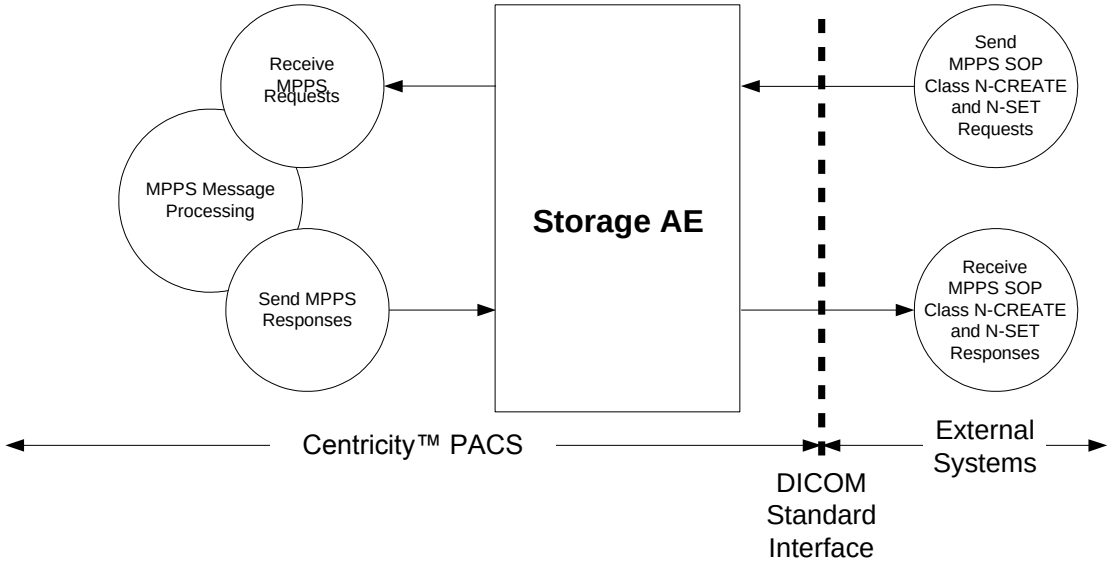


FIGURE 2-3. DATA FLOW DIAGRAM OF STORAGE AE – MPPS SCP FUNCTIONALITY

2.2.1.2 Application Data Flow Diagram of Send AE

The Send AE implements the SCU roles of the DICOM Storage SOP Classes for sending DICOM Storage SOP Instances to a remote AE.

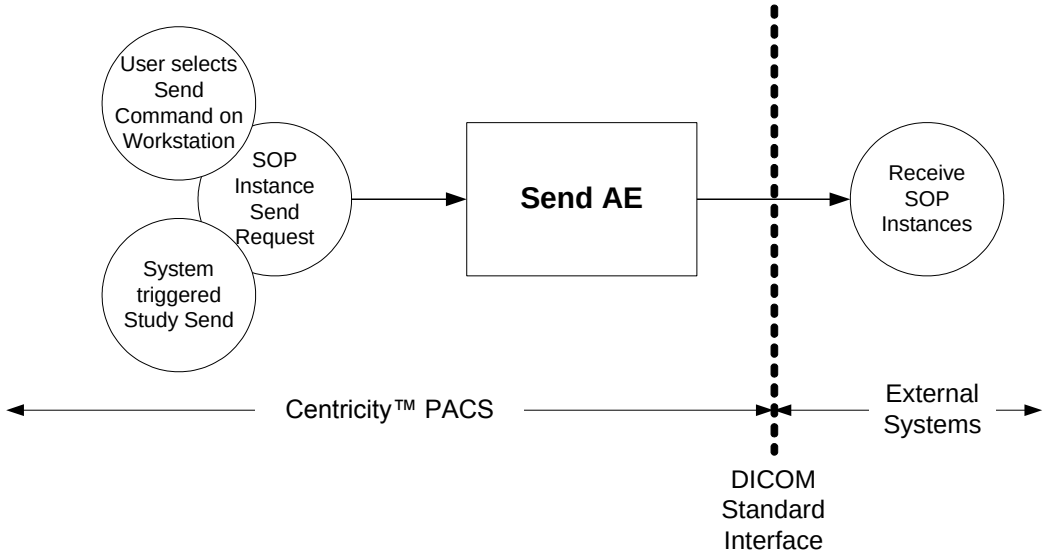


FIGURE 2-4. DATA FLOW DIAGRAM OF SEND AE

There are two real-world activities, which will cause the Send AE to initiate a DICOM association to a remote DICOM AE for sending SOP Instances:

- A user selected the "Send Exam" command on the Centricity™ PACS RA1000 Workstation for a specified study to a specified destination DICOM AE.
- A study changed its status to a particular value, which is pre-configured in the Centricity™ PACS to trigger a DICOM Send of the study to a specified destination DICOM AE.

Note: The trigger mechanism and the configuration method for these triggers are beyond the scope of this document.

The Send AE also supports the Modality Performed Procedure Step SOP Class as an SCU, as shown in the following figure:

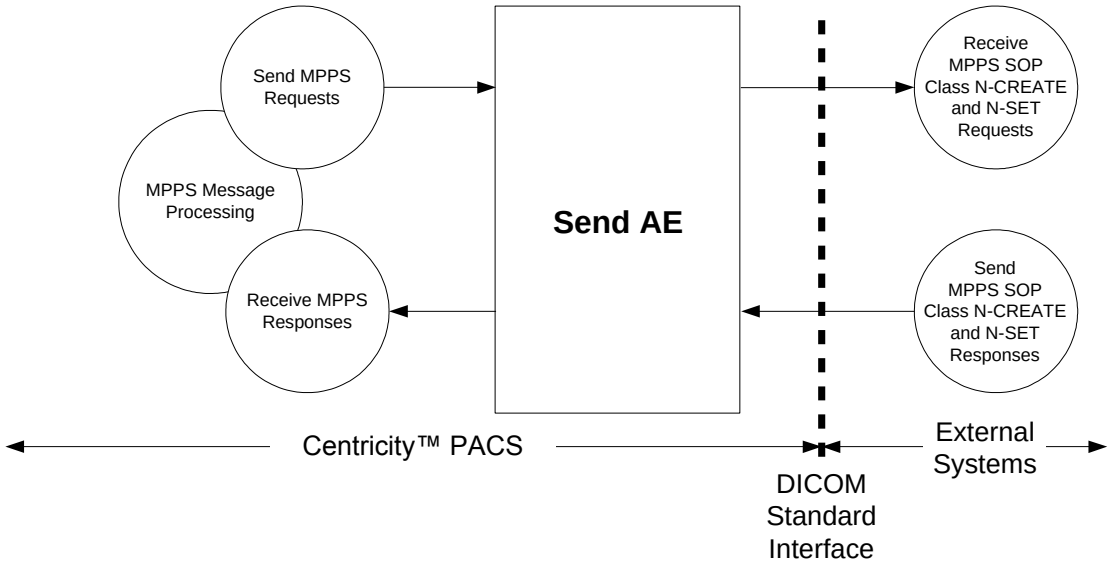


FIGURE 2-5. DATA FLOW DIAGRAM OF SEND AE – MPPS SCU FUNCTIONALITY

The Send AE also supports the Instance Availability Notification SOP Class as an SCU, as shown in the following figure:

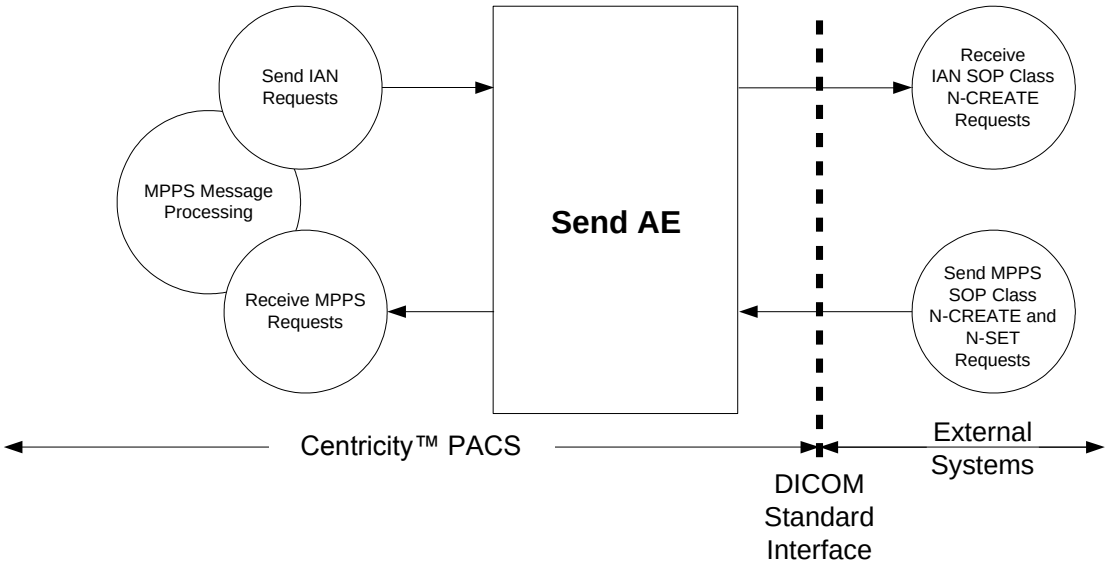


FIGURE 2-6. DATA FLOW DIAGRAM OF SEND AE – IAN SCU FUNCTIONALITY

The Send AE also supports the General Purpose Performed Procedure Step SOP Class as an SCU, as shown in the following figure:

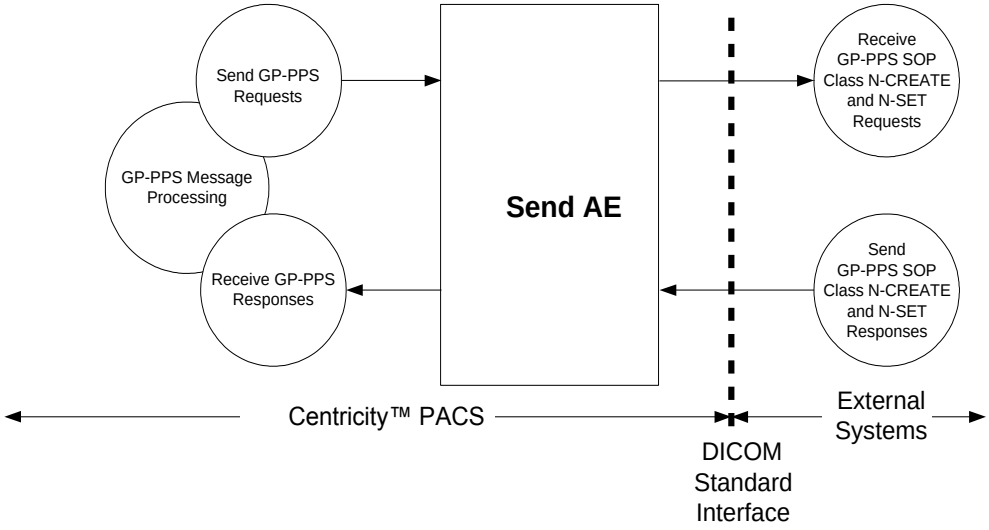


FIGURE 2-7. DATA FLOW DIAGRAM OF SEND AE – GP-PPS SCU FUNCTIONALITY

2.2.1.3 Application Data Flow Diagram of Query/Retrieve (Q/R) SCU Functionality

The Q/R SCU AE implements the SCU role of the DICOM Query/Retrieve SOP Classes for the Centricity™ PACS to query a remote AE for Patient / Study / Series / SOP Instance information, as well as to retrieve the SOP Instances from the remote AE.

The Q/R SCU AE works in conjunction with the Storage AE to retrieve the SOP Instances into Centricity™ PACS.

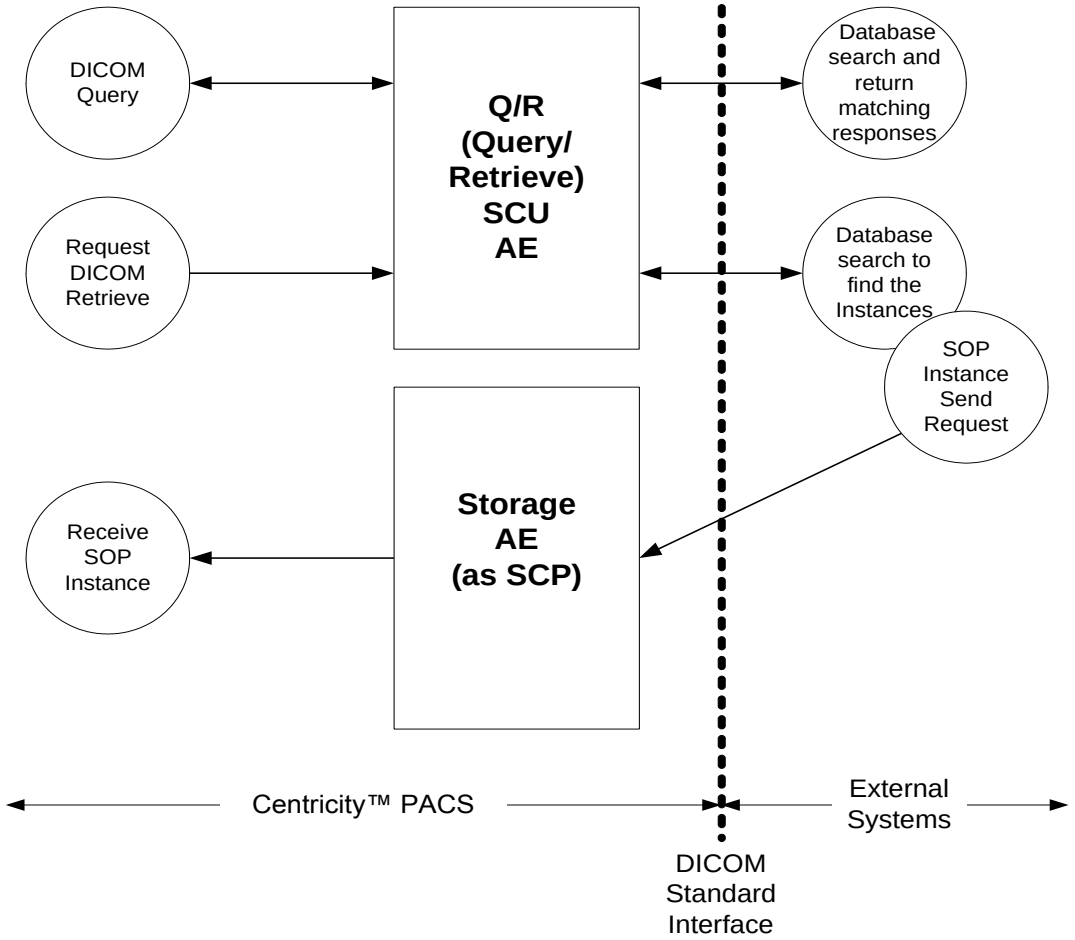


FIGURE 2-8. DATA FLOW DIAGRAM OF Q/R SCU FUNCTIONALITY

There are real-world activities, which will cause the Q/R SCU AE to initiate a DICOM association to a remote DICOM AE for querying the remote AE's database and retrieving studies or series from the remote AE:

- A user opens up the Query/Retrieve dialog box on the Centricity™ PACS RA1000 Workstation, selects a specific destination DICOM AE, enters search criteria data into key attribute fields and selects the "Query" button on the Centricity™ PACS RA1000 Workstation. The query can only be done at the Study level.
- The destination DICOM AE responds with none, one, or more exams that match the search criteria.

After issuing the DICOM Query request, the Q/R SCU AE will allow the following local real-world activities:

- A user will select a specific study or series from the matched results returned by the specified destination DICOM AE, and then select the "Retrieve" button on the Centricity™ PACS RA1000 Workstation.
- The destination DICOM AE responds by sending the selected study to the Centricity™ PACS.

2.2.1.4 Application Data Flow Diagram of Query/Retrieve (Q/R) SCP AE

The Q/R SCP AE implements the SCP role of the DICOM Query/Retrieve SOP Classes for a remote AE to query the Patient / Study / Series / SOP Instance information, as well as to retrieve the SOP Instances from Centricity™ PACS.

As the DICOM Query/Retrieve SCP for data retrieval, the Q/R SCP AE also implements the SCU role of the Storage SOP Classes for the SOP Instances move sub-operations.

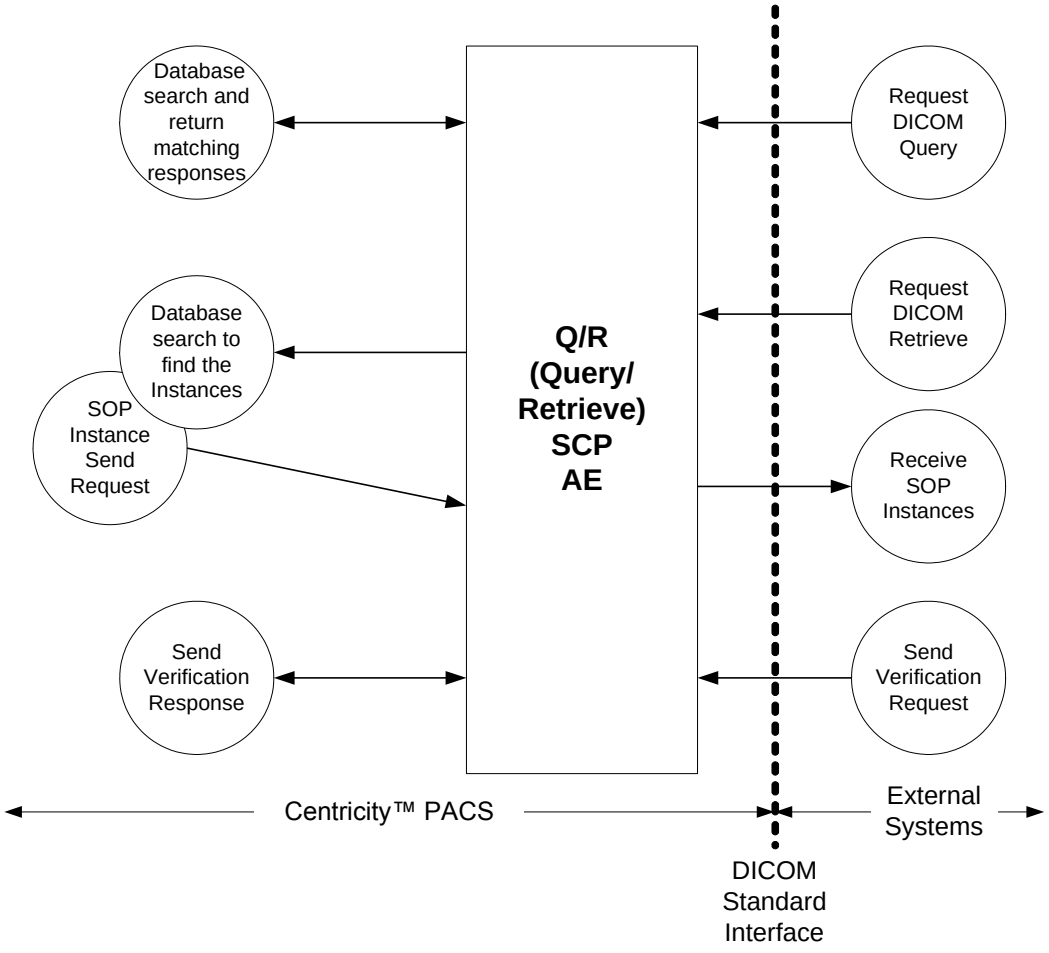


FIGURE 2-9. DATA FLOW DIAGRAM OF Q/R SCP AE

There is no real-world activity required for the Q/R SCP AE to respond to incoming DICOM associations for DICOM Query and Retrieve. The Q/R SCP AE is always waiting for an incoming association and will automatically respond to a DICOM Verification request.

After receiving a DICOM Query request, the Q/R SCP AE will start the following local real-world activities:

- Search for the requested data attributes on the Patient / Study / Series / SOP Instance levels in the Centricity™ PACS database, as specified in the Query request and using the matching criteria specified in the Query request.
- Return all matching responses.

After receiving a DICOM Retrieve request, the Q/R SCP AE will start the following local real-world activities:

- Search for the SOP Instances records on the Patient / Study / Series / SOP Instance level in the Centricity™ PACS database, as specified in the Retrieve request and using the matching criteria specified in the Retrieve request.
- Locate the data files of the found SOP Instances in the Centricity™ PACS storage sub-system. Fetch the data from the long-term archiving sub-system if necessary.
- If the data files can be located, initiate a separate DICOM association to send these files to the destination AE as specified in the received Retrieve request.

2.2.1.5 Application Data Flow Diagram of General Purpose Worklist (GPWL) SCP AE

The GPWL SCP AE implements the SCP role of the DICOM General Purpose Worklist SOP Classes for a remote AE to query the General Purpose Schedule Procedure Steps, as well as to claim the GP-SPS message from Centricity™ PACS to work upon.

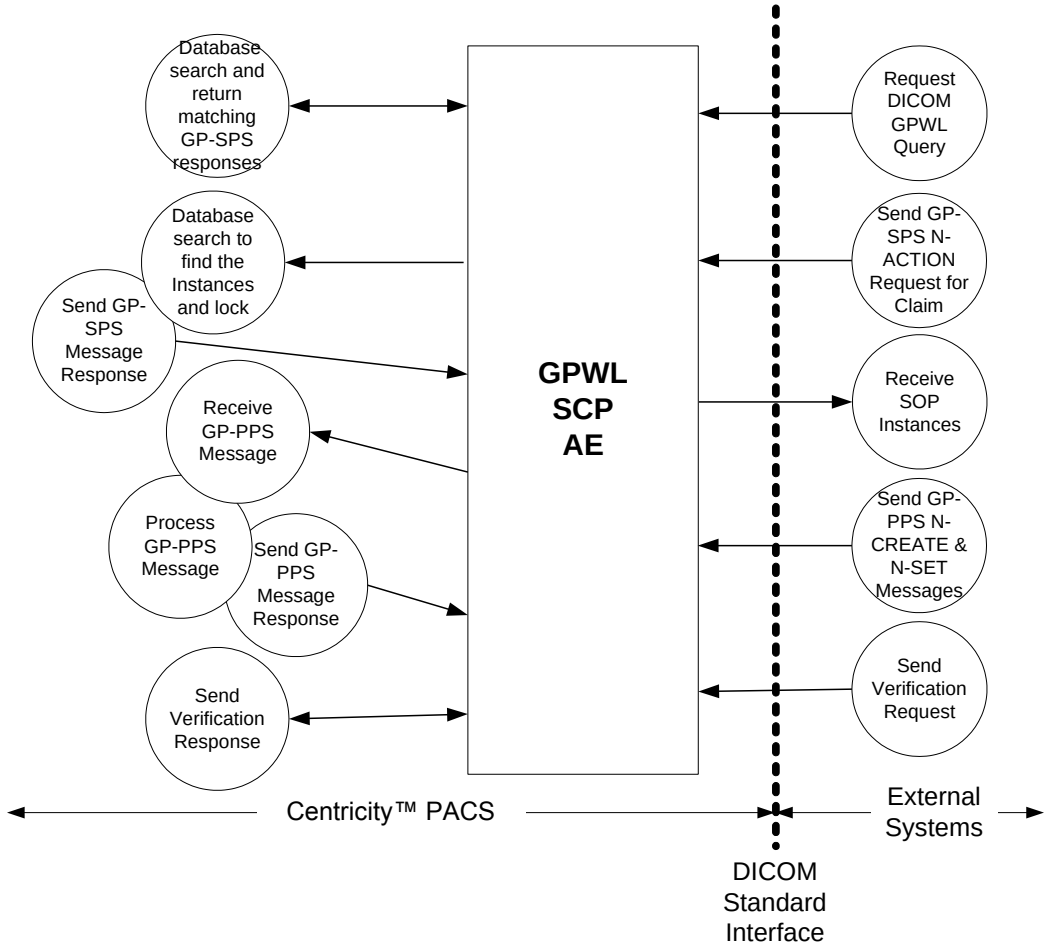


FIGURE 2-10. DATA FLOW DIAGRAM OF GPWL SCP AE

There is no real-world activity required for the GPWL SCP AE to respond to incoming DICOM associations for DICOM General Purpose Worklist. The GPWL SCP AE is always waiting for an incoming association and will automatically respond to a DICOM Verification request.

After receiving a DICOM General Purpose Worklist request, the GPWL SCP AE will start the following local real-world activities:

- Search for the requested data attributes in the Centricity™ PACS database, as specified in the Query request and using the matching criteria specified in the Query request.
- Construct the General Purpose Scheduled Procedure Steps messages.
- Return all GP-SPS messages.

After receiving a DICOM General Purpose Schedule Procedure Step request, the GPWL SCP AE will start the following local real-world activities:

- Process the GP-SPS message and validate the state of Workitem, which it is transitioning.
- Search the correct Workitem and lock the workitems which have the status of "SCHEDULED"

- Based on the Status of GP-SPS locates the workitems with the status of INPROGRESS update the status of Workitem appropriately.

After receiving a DICOM General Purpose Performed Procedure Step request, the GPWL SCP AE will start the following local real-world activities:

- Receive a DICOM General Purpose Performed Procedure Step SOP Class N-CREATE request and create a GP-PPS object in Centricity™ PACS.
- Receive one or more DICOM General Purpose Performed Procedure Step SOP Class N-SET requests and update the requested GP-PPS object in Centricity™ PACS, as long as the GP-PPS object status has not reached a final state of "COMPLETED" or "DISCONTINUED".

2.2.2 Functional Definitions of AEs

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

2.2.2.1 Storage AE

The Storage AE supports the following application-level functions:

- Receive SOP instances from a remote DICOM AE.
- Relate each received instance to an ordered / scheduled study in the Centricity™ PACS database by matching the Patient / Study information in the instance's data set to the information of the database.
- If no matching can be found, create a new (unordered) study by directly using the Patient / Study information in the received data set and relate the SOP instance to the created study.

Note: When relating a SOP Instance to an ordered study, the Storage AE may alter the values of some data elements using the values of the counterpart data fields of the matched study in the Centricity™ PACS database. In addition, the SOP Instances may be also changed by the Patient / Study update information received from RIS or entered by the Centricity™ PACS Exam Manager operator. Centricity™ PACS does not create a new SOP Instance for these data changes. A later DICOM Query or Retrieve request from remote AE will receive the SOP Instance with some data elements changed, or may not find the submitted SOP Instance if the changed data elements are used as the searching keys. A list of the data elements that may undergo data coercion is given in Section 4.2.3. Data coercion is performed for data correction purposes.

- Store the Patient, Study, Series, and SOP Instance relationship permanently in the Centricity™ PACS database.
- Store the SOP instances in the PACS storage system, for use within Centricity™ PACS and for long-term archiving.

Note: Centricity™ PACS will properly save and archive all SOP Instances successfully received via the Storage AE. However, Centricity™ PACS cannot guarantee that all received SOP Instances can be properly displayed and printed. Section 4.2.4 lists the detailed application-level functions that Centricity™ PACS is able to support for the successfully received SOP Instances.

- Receive a DICOM Storage Commitment Request from a remote AE.

- Create a job (transaction) and add it in the Centricity™ PACS Storage Commitment Queue. The job is identified by the transaction UID in the received request and associated with a timer of a configurable time-out value (see Section 2.6.5).
- Poll the Storage Commitment Queue for a job, which is either completed or time-out.
- Send Storage Commitment Result to remote AE.
- Respond to a DICOM Verification (Echo) request from a remote AE.
- Receive a DICOM Modality Performed Procedure Step SOP Class N-CREATE request and create a MPPS object in Centricity™ PACS.
- Receive one or more DICOM Modality Performed Procedure Step SOP Class N-SET requests and update the requested MPPS object in Centricity™ PACS, as long as the MPPS object status has not reached a final state of "COMPLETED" or "DISCONTINUED".

2.2.2.2 Send AE

The Send AE supports the following application-level functions:

- Send all SOP Instances of a study, which are maintained in Centricity™ PACS, to a remote AE.
- Send a specific series of a study and its associated SOP Instances, which are maintained in Centricity™ PACS, to a remote AE.
- Send a specific SOP Instance from a specific series of a study, which is maintained in Centricity™ PACS, to a remote AE.
- Queue all received MPPS and GP-PPS messages and forward these to one or more configured, peer DICOM applications.
- Send Instance Availability Notification (IAN) messages to one or more configured, peer DICOM applications.

Note: Due to the data coercion, the SOP Instances sent to a remote AE may be different from the originally received SOP Instances in certain data elements. See Section 4.2.3 for possible data corrections in Centricity™ PACS.

2.2.2.3 Q/R SCU AE

The Q/R SCU AE supports the following application-level functions:

- Generate a DICOM Query request at Study or Series levels to a remote AE.
- Receive all matched data sets from the remote AE.
- Generate a DICOM Retrieve request at Study or Series levels to a remote AE.
- Receive all matched and found SOP Instances from the remote AE and store into Centricity™ PACS.

2.2.2.4 Q/R SCP AE

The Q/R SCP AE supports the following application-level functions:

- Receive a DICOM Query request at Patient / Study / Series / SOP Instance levels from a remote AE.
- Search for the data attributes in the Centricity™ PACS database that match the requested matching keys
- Respond to the remote AE by returning all matched data sets

Note: Due to the data coercion, the values of certain returned keys in the Query responses may be different from the values of the corresponding data element in the SOP Instances originally sent the Storage AE. See Section 4.2.3 for possible data corrections in Centricity™ PACS.

- Receive a DICOM Retrieve request at Patient / Study / Series / SOP Instance levels from a remote AE
- Find the requested SOP Instances in Centricity™ PACS, against both the on-line storage subsystem and the long-term archiving subsystem.
- Send the matched and found SOP Instances to the specified destination AE.

Note: Due to the data coercion, the SOP Instances moved to a remote AE may be different from the originally received SOP Instances in certain data elements. See Section 4.2.3 for possible data corrections in Centricity™ PACS.

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

2.2.2.5 GPWL SCP AE

The GPWL SCP AE supports the following application-level functions:

- Receive a DICOM GPWL Query request from a remote AE.
- Search for the data attributes in the Centricity™ PACS database that match the requested matching keys
- Respond to the remote AE by returning all matched GP-SPS data sets which are online in storage.
- Receive a DICOM GP-SPS N-ACTION request for claiming a workitem from remote AE
- Search for the workitem in Centricity™ PACS database that match the GP-SPS SOP Instance UID and lock the workitem
- Receive a DICOM Retrieve request at Patient / Study / Series / SOP Instance levels from a remote AE
- Find the requested SOP Instances in Centricity™ PACS, against both the on-line storage subsystem and the long-term archiving subsystem.
- Send the matched and found SOP Instances to the specified destination AE.

- Receive one or more DICOM General Purpose Scheduled Procedure Step SOP Class N-ACTION requests with a status of "SUSPENDED" or "SCHEDULED" or "COMPLETED", "DISCONTINUED".
- Receive a DICOM General Purpose Performed Procedure Step SOP Class N-CREATE request and create a GP-PPS object in Centricity™ PACS.
- Receive one or more DICOM General Purpose Performed Procedure Step SOP Class N-SET requests and update the requested GP-PPS object in Centricity™ PACS, as long as the GP-PPS object status has not reached a final state of "COMPLETED" or "DISCONTINUED".
- Respond to a DICOM Verification (Echo) request from a remote AE.

2.2.3 Sequencing of Real-World Activities

Not applicable.

2.2.4 Patient Identifier Cross-Referencing Policies

Centricity™ PACS may be deployed in a hospital enterprise where multiple patient identifier (PID) Assigning Authorities exist. The PID and its Assigning Authority typically originate from within the PID-3 data element of an HL7 patient Admissions/registration, Discharge or Transfer (ADT) message. The Assigning Authority information may further flow down to image acquisition through the DICOM Modality Worklist via the attribute, Issuer of Patient ID (0010,0021), in the Patient Identification Module. This attribute, Issuer of Patient ID (0010,0021), is not included in the Patient Module in Composite SOP Instances in DICOM 2003 standards. DICOM Change Proposal 422 (CP 422), "Add Issuer of Patient ID to Patient Module", has been created to address this issue and it is in the ballot stage.

Centricity™ PACS handles the Patient ID attribute (0010,0020) in the following way:

- If the Issuer of Patient ID (0010,0021) attribute does not exist or is blank in Composite SOP Instances, PPS messages or DICOM query keys, the attribute, Patient ID (0010,0020), will be used with a pre-configured Assigning Authority for processing.
- If the Issuer of Patient ID (0010,0021) attribute does exist and contains a known Assigning Authority, this Assigning Authority will be used with the Patient ID (0010,0020) attribute for processing.
- If the Issuer of Patient ID (0010,0021) attribute does exist but contains an unknown Assigning Authority, the patient information in Composite SOP Instances, PPS messages or DICOM query keys will be treated as unknown or invalid.

Centricity™ PACS also assigns a globally unique code to each Assigning Authority. This unique code is stored in a DICOM private tag (0905,xx30) with owner string "GEIIS". Centricity™ PACS will set this private tag when SOP Instances are acquired into the PACS. The DICOM attribute, Issuer of Patient ID (0010,0021), will also be updated, if necessary, to contain the correct Assigning Authority information and to remain in sync with the value in the private tag (0905,xx30) when SOP Instances are sent out of the PACS.

2.3 STANDARD SPECIFICATION

2.3.1 Send AE

The Send AE provides the Standard Conformance to the following DICOM Standard SOP Classes and Private SOP Classes as an SCU:

TABLE 2-1. SCU CONFORMANCE LIST OF SOP CLASSES FOR SEND AE

SOP Class Name	SOP Class UID	SOP Class Type
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Standard
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Standard
Digital X-Ray Image Storage (for presentation)	1.2.840.10008.5.1.4.1.1.1.1	Standard
Digital X-Ray Image Storage (for processing)	1.2.840.10008.5.1.4.1.1.1.1.1	Standard
Digital Mammography X-Ray Image Storage (for presentation)	1.2.840.10008.5.1.4.1.1.1.2	Standard
Digital Mammography X-Ray Image Storage (for processing)	1.2.840.10008.5.1.4.1.1.1.2.1	Standard
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Standard
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Standard
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Standard
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Standard
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Standard
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Standard
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Standard
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Standard
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Standard
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Standard
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Standard
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Standard
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Standard
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Standard
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Standard
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Standard
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Standard
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Standard
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Standard
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Standard
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Standard
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Standard
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Standard
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Standard
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Standard
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Standard
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Standard
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Standard
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Standard
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Standard
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Standard

SOP Class Name	SOP Class UID	SOP Class Type
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Standard
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Standard
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Standard
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Standard
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Standard
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Standard
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Standard
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Standard
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Standard
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Standard
Instance Availability Notification SOP Class	1.2.840.10008.5.1.4.33	Standard
GE Private 3D Model Storage	1.2.840.113619.4.26	Private
GE Private Xeleris	1.2.840.113619.4.27	Private
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Private

2.3.2 Storage AE

The Storage AE provides the Standard Conformance to the following DICOM Standard SOP Classes and Private SOP Classes as an SCP:

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

SOP Class Name	SOP Class UID	SOP Class Type
Verification (Echo)	1.2.840.10008.1.1	Standard
Storage Commitment Push Model	1.2.840.10008.1.20.1	Standard
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Standard
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Standard
Digital X-Ray Image Storage (for presentation)	1.2.840.10008.5.1.4.1.1.1.1	Standard
Digital X-Ray Image Storage (for processing)	1.2.840.10008.5.1.4.1.1.1.1.1	Standard
Digital Mammography X-Ray Image Storage (for presentation)	1.2.840.10008.5.1.4.1.1.1.2	Standard
Digital Mammography X-Ray Image Storage (for processing)	1.2.840.10008.5.1.4.1.1.1.2.1	Standard
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Standard
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Standard
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Standard
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Standard
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Standard
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Standard
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Standard
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Standard
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Standard
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Standard
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Standard
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Standard
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Standard
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Standard

SOP Class Name	SOP Class UID	SOP Class Type
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Standard
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Standard
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Standard
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Standard
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Standard
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Standard
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Standard
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Standard
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Standard
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Standard
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Standard
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Standard
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Standard
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Standard
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Standard
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Standard
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Standard
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Standard
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Standard
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Standard
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Standard
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Standard
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Standard
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Standard
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Standard
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Standard
GE Private 3D Model Storage	1.2.840.113619.4.26	Private
GE Private Xeleris	1.2.840.113619.4.27	Private
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Private

2.3.3 Q/R SCU AE

The Q/R SCU AE provide the Standard Conformance to the following DICOM Standard SOP Classes as SCU:

TABLE 2-3. SCU CONFORMANCE LIST OF SOP CLASSES FOR Q/R SCU AE

SOP Class Name	SOP Class UID	SOP Class Type
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Standard
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Standard

The Storage AE provides Standard Conformance to the DICOM Standard SOP Classes listed in Table 2-2 as SCP for the C-STORE sub-operations initiated in a C-MOVE context.

2.3.4 Q/R SCP AE

The Q/R SCP AE provide the Standard Conformance to the following DICOM Standard SOP Classes as SCP:

TABLE 2-4. SCP CONFORMANCE LIST OF SOP CLASSES FOR Q/R SCP AE

SOP Class Name	SOP Class UID	SOP Class Type
Verification (Echo)	1.2.840.10008.1.1	Standard
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Standard
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Standard
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Standard
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Standard
Patient/Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Standard
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Standard

The Q/R SCP AE provides Standard Conformance to any of the storage DICOM SOP Classes listed in Table 2-1 as SCU for the C-STORE sub-operations initiated in a C-MOVE context.

2.3.5 GPWL SCP AE

The GPWL SCP AE provides the Standard Conformance to the following DICOM Standard SOP Classes as SCP:

TABLE 2-5. SCP CONFORMANCE LIST OF SOP CLASSES FOR GPWL SCP AE

SOP Class Name	SOP Class UID	SOP Class Type
Verification (Echo)	1.2.840.10008.1.1	Standard
General Purpose Worklist Management Meta SOP Class	1.2.840.10008.5.1.4.32	Standard
General Purpose Worklist Information Model – FIND SOP Class	1.2.840.10008.5.1.4.32.1	Standard
General Purpose Scheduled Procedure Step SOP Class	1.2.840.10008.5.1.4.32.2	Standard
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Standard

2.3.6 Association Establishment Policies

This section describes the common behaviors of all AEs of the DICOM Server with respect to the DICOM network association establishment. Specific behaviors of each individual AE will be described in Sections 2.3.7 and 2.3.8.

2.3.6.1 General

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

Name	UID
DICOM 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 proposed for all associations initiated by the DICOM Server is configurable (see Section 2.6.7) up to:

Maximum Length of PDU	28,672 Bytes

The number given above (28,672 bytes) is also the Maximum Length of PDU in all DICOM associations that the DICOM Server can accept.

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

The Storage AE of the DICOM Server will propose (SCU/SCP) Role Selection Negotiation in a DICOM association it initiates for sending the Storage Commitment Result.

Other AEs of the DICOM Server will not propose (SCU/SCP) Role Selection Negotiation in any DICOM associations they initiate.

The user information items sent by the AEs of the DICOM Server are:

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

2.3.6.2 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 DICOM associations that can be initiated and accepted are configurable for the DICOM Server, but not for separate AEs (see Section 2.6.2).

Table 2-6 shows how the relationship between the separate AEs and the maximum number of simultaneous DICOM associations that the DICOM Server can support. The numbers in Table 2-6 are the default values.

TABLE 2-6. THE DEFAULT MAXIMUM NUMBER OF SIMULTANEOUS ASSOCIATIONS SUPPORTED BY THE AES OF THE DICOM SERVER

AE	Association Purpose	Default Maximum Number of Associations	
		Initiation	Acceptance
Send AE	Send SOP Instances and MPPS, GP-PPS and IAN messages	2	—
Storage AE	Send Storage Commitment Result	1	—
Storage AE	Receive SOP Instances, MPPS messages and Storage Commitment Requests	—	See Note
Q/R SCU AE	Initiate Query or Retrieve Requests	1 per WKS	—
Q/R SCU AE	Sub-ops for receiving SOP Instances (for Retrieve Requests)	—	See Note
Q/R SCP AE	Receive (Service) Query or Retrieve Requests	—	See Note
Q/R SCP AE	Sub-ops for sending SOP Instances (for Retrieve Requests)	See Note	—
GPWL SCP AE	Receive GP-SPS and GP-PPS Messages	—	See Note
GPWL SCP AE	Receive (Service) GPWL Query Request	—	See Note

Note: There can be a total of 25 outstanding associations for these areas combined.

As shown in Table 2-6**,** by default, the DICOM Server is able to initiate totally two simultaneous associations for sending the SOP Instances. This includes execution of the Image Send commands issued by the Centricity™ PACS system or users. For the Storage Commitment Result, the Storage AE will always initiate one single association.

By default, the DICOM Server is able to support a maximum 25 simultaneous associations for receiving SOP Instances and Storage Commitment Requests, as well as for servicing Query and Retrieve requests. This includes all additional associations required for sending SOP Instances as the store sub-operations resulting from servicing a DICOM Retrieve request. The DICOM Server does not restrict the number of maximum simultaneous associations individually for the separate services and serves the incoming associations on a first-come-first-serve basis, until the configured maximum number is reached.

Note: Centricity™ PACS supports multiple instances of the DICOM Server running simultaneously. If the number of simultaneous associations supported by a single DICOM Server is not sufficient, multiple Centricity™ PACS DAS subsystems can be configured.

2.3.6.3 Asynchronous Nature

None of the DICOM Server AEs support asynchronous operations. All operations will be performed synchronously.

2.3.6.4 Implementation Identifying Information

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

Implementation Class UID	1.2.840.113619.6.94

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

Implementation Version Name	CENTRICITY_3.0

2.3.6.5 Timers

2.3.6.5.1 Association Timers

The DICOM Server supports an association timer for an association that the DICOM Server plays the role of association initiator.

The association timer starts when the association request is sent, and stops when the association is established.

2.3.6.5.2 Operation Inactivity Timer

The DICOM Server supports an operation inactivity timer in each association.

For the role of association initiator, the operation inactivity timer re-starts every time a DIMSE service request has been issued.

For the role of association acceptor, the operation inactivity timer re-starts every time a DIMSE service response has been sent.

2.3.7 Association Initiation Policies

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.

2.3.7.1 Real-World Activity: Send SOP Instance(s) to Remote AE

The Send AE will perform a C-STORE operation to support this real-world activity.

A list of remote AE can be configured, so that the Send AE will initiate associations only to these AEs for sending SOP Instances. This includes the C-STORE sub-operation association initiation within a C-MOVE association. This configuration capability allows the user control of the valid DICOM Retrieve destinations.

For the DICOM Conformance Statement of this operation, please refer to Section 3.1 (page 3–35).

2.3.7.2 Real-World Activity: Send Storage Commitment Result to Remote AE

The Storage AE will perform N-EVENT-REPORT operation to support this real-world activity.

The Storage AE will initiate associations only to remote AE, which previously requested a DICOM Storage Commitment transaction.

For the DICOM Conformance Statement of this operation, please refer to Section 7.2 (page 7–91).

2.3.7.3 Real-World Activity: Send MPPS, GP-PPS messages to Remote AE

The Send AE will perform N-CREATE-RQ and N-SET-RQ operations to support this real-world activity.

A list of remote AEs can be configured, so that the Send AE will initiate associations only to those AEs that are to receive MPPS, GP-PPS messages. This configuration capability allows the user control of the valid DICOM destinations.

For the DICOM Conformance Statement of this operation, please refer to Section 8.2 (page 8–99).

2.3.7.4 Real-World Activity: Send IAN messages to Remote AE

The Send AE will perform N-CREATE-RQ operations to support this real-world activity.

A list of remote AEs can be configured, so that the Send AE will initiate associations only to those AEs that are to receive IAN messages. This configuration capability allows the user control of the valid DICOM destinations.

For the DICOM Conformance Statement of this operation, please refer to Section 9.1(page 9–102).

2.3.7.5 Real-World Activity: DICOM Query Request to Remote AE

The Q/R SCU AE supports the C-FIND Request operation for this service.

For the DICOM Conformance Statement of this service, please refer to Section 5.1 (page 5–72).

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

The Q/R SCU AE supports the C-MOVE Request operation for this service. In addition, the Storage AE will support the sub-operation C-STORE messages to receive the requested SOP Instances.

For the DICOM Conformance Statement of this service, please refer to Section 5.2 (page 5–75).

2.3.8 Association Acceptance Policies

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

The DICOM Server can be configured to accept one or more particular transfer syntaxes for the same Abstract Syntax, if a remote AE offers multiple Presentation Contexts per association. The default value is that the DICOM Server will only accept one transfer syntax for a particular Abstract Syntax.

All AEs of the DICOM Server can be configured to accept association requests only from specific remote AEs defined in a Remote AE list (see Section 2.6.1). The remote AEs are specified with the AE Titles as well as with the network presentation addresses in the Remote AE list, configured for the DICOM Server (see Section 2.6.1). This behavior of the DICOM Server helps the user to control the remote AE's access for data archiving, Storage Commitment and Query/Retrieve services of Centricity™ PACS.

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 Titles for the acceptance of an incoming association.

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

TABLE 2-7. ASSOCIATION REJECT STATUS CODES AND REASONS

Result	Source	Reason	Description
Rejected (transient)	UL service-provider	Temporary congestion	Resource limitation: process creation failed, memory allocation failed, etc.
Rejected (transient)	UL service-provider	Centricity™ PACS internal service down	Database network connection down, image storage network connection down, etc.
Rejected (permanent)	UL service-user	Application Context Name not supported	Incorrect (unknown) Application Context Name
Rejected (permanent)	UL service-user	Calling AE Title unknown or not supported	The calling AE Title is not included in the configuration list, or the calling AE is not supported by the called AE Title.
Rejected (permanent)	UL service-user	Called AE Title unknown or not supported	The called AE Title is unknown to the DICOM Server, or the called AE is not supported by the calling AE Title.

2.3.8.1 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 of this service, please refer to Section 4.1 (page 4–48).

2.3.8.2 Real-World Activity: Receive DICOM Storage Commitment Request from Remote AE

The Storage AE supports the N-ACTION operation for this service.

For the DICOM Conformance Statement of this service, please refer to Section 7.1 (page 7–89).

2.3.8.3 Real-World Activity: Receive DICOM MPPS messages from Remote AE

The Storage AE supports the N-CREATE and N-SET operations for this service.

For the DICOM Conformance Statement of this service, please refer to Section 8.1 (page 8-71).

2.3.8.4 Real-World Activity: Receive DICOM Query Request from Remote AE

The Q/R SCP AE supports the C-FIND operation for this service.

For the DICOM Conformance Statement of this service, please refer to Section 6.1 (page 6–78).

2.3.8.5 Real-World Activity: Receive DICOM Retrieve Request from Remote AE

The Q/R SCP AE supports the C-MOVE operation for this service. In addition, the Q/R SCP AE will perform a sub-operation C-STORE to transmit the requested SOP Instances.

For the DICOM Conformance Statement of this service, please refer to Section 6.2 (page 6–86).

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

The Storage AE, Q/R SCP AE, and GPWL SCP AE support the C-ECHO operation for this service.

For the DICOM Conformance Statement of this service, please refer to Section 4.1 (page 4–48) and Section 6.1 (page 6–78).

2.3.8.7 Real-World Activity: Receive DICOM GPWL Query Request from Remote AE

The GPWL SCP AE supports the C-FIND operation for this service.

For the DICOM Conformance Statement of this service, please refer to Section 11 (page 11–116).

2.3.8.8 Real World Activity: Receive DICOM GP-PPS messages from Remote AE

The GPWL SCP AE supports the N-CREATE and N-SET operations for this service.

For the DICOM Conformance Statement of this service, please refer to Section 11 (page 11–116).

2.3.8.9 Real World Activity: Receive DICOM GP-SPS messages from Remote AE

The GPWL SCP AE supports the N-ACTION operation for this service.

For the DICOM Conformance Statement of this service, please refer to Section 11 (page 11–116).

2.4 COMMUNICATION PROFILES

2.4.1 Supported Communication Stacks

DICOM Upper Layer (DICOM PS 3.8) is supported by 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™ PACS 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

Not supported.

2.4.4 Point-to-Point Stack

Not supported.

2.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

2.5.1 Extension / Specialization SOP Classes

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

The DICOM Server does not support any Specialization SOP Classes.

2.5.2 Privatized SOP Classes

The DICOM Server supports the following Private SOP Classes:

SOP Class Name	SOP Class UID
GE Private 3D Model Storage	1.2.840.113619.4.26
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30

2.5.3 Privatized Transfer Syntax

The DICOM Server supports the following Private Transfer Syntax:

Transfer Syntax Name	UID
GE Private Compress Express	2.16.840.1.113709.1.2.2

This Private Transfer Syntax has been applied for the DICOM Server to propose and accept the Presentation Contexts for all DICOM Standards Storage SOP Classes that the DICOM Server supports (see Sections 3 and 4). It uses Explicit VR and Big Endian format for the data set encoding, and the GE proprietary CompressXpress™ and TruRez™ image compression algorithms for the pixel data compression. No pixel data encapsulation is applied.

It is expected that other vendors' applications will ignore all Presentation Contexts proposed with the GE Private Compress Express Transfer Syntax.

2.6 CONFIGURATION

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

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, Storage Commitment Requests and MPPS messages

AE Titles of the Storage AE for sending Storage Commitment Results

AE Titles of the Send AE for sending SOP Instances and MPPS and IAN messages

AE Titles of the Q/R SCU AE for sending DICOM Query and Retrieve requests (one per Centricity™ PACS RA1000 Workstation)

AE Titles of the Q/R SCP AE for servicing DICOM Query and Retrieve requests

AE Titles of the Q/R SCP AE for sending SOP Instances in response to a C-MOVE operation

AE Titles of the GPWL SCP AE for servicing DICOM General Purpose Worklist Query requests, GP-SPS messages, GP-PPS messages

2.6.1.2 Remote AE Title

AE Titles of the remote AEs that the DICOM Server will interact with, for receiving and sending SOP Instances and MPPS messages, serving Storage Commitment Requests, serving GPWL, GP-SPS, and GP-PPS requests and Query/Retrieve requests.

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

AE Name

IP addresses

TCP Port Number

2.6.2 Maximum Simultaneous Associations

The maximum number of simultaneous associations that the Send AE and Storage AE (for Storage Commitment result) can initiate is configurable. The default value is 3. This number excludes the Q/R SCU AE since each Centricity™ PACS RA1000 Workstation can initiate a separate association for a Query or Retrieve operation.

The maximum number of simultaneous associations that the Storage AE and Q/R SCU AE can accept and that the Q/R SCP AE can initiate or accept is configurable. The default value is 25.

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 and MPPS messages and to request Storage Commitment to the Storage AE.

A list of remote AEs that are permitted to query Patient / Study / Series / SOP Instances information and to retrieve SOP Instances from the Q/R SCP AE.

A list of remote AEs that are permitted to send GPWL, GP-SPS, and GP-PPS messages to the GPWL SCP AE.

2.6.4 AE Title / Association Initiation Mapping

A local mechanism is provided to configure:

A list of remote AEs, to which the Storage AE, Send AE and the Q/R SCP AE can initiate an association to send SOP Instances and MPPS messages.

2.6.5 Server Time-Out

Association operation inactivity time-out is 10 Minutes.

Storage Commitment job time-out by default is 120 Hours.

2.6.6 Message Validation

The Storage AE can validate incoming DICOM messages to see if the messages conform to the DICOM Standards. A configuration option turns this checking on or off.

2.6.7 Maximum PDU Size Accepted

The Maximum Length of PDU negotiated by the DICOM Server is configurable up to the maximum value of 28,672 bytes.

2.7 SUPPORT FOR EXTENDED CHARACTER SETS

The DICOM Server supports the following character sets:

ISO-IR-100 (ISO 8859-1), 96-Character Graphic Character Set. Right-hand Part of Latin Alphabet.

ISO-IR-13, Japanese Katakana Character Set

ISO-IR-87, Japanese Character Set

ISO-IR-149, Korean Graphic Character Set

In some Application Entities of the DICOM Server, restrictions may apply to the extended character sets, see sub-sections “Extended Character Sets” in Sections 3 to 6 and Section 8 for the Extended Character Sets support scopes for each Application Entity.

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:

Firewall or router protections to ensure that only approved external hosts have network access to the product.

Firewall or router protections to ensure that the product only has network access to approved external hosts and services.

Any communications with external hosts and services outside the locally secured environment use appropriate secure network channels (such as a Virtual Private Network (VPN)).

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

This section describes the Conformance Statement for the data sending functions supported in Centricity™ PACS. They are implemented in the Send AE as the SCU role of the DICOM Storage SOP Classes.

3.1 SEND STORAGE SOP INSTANCE TO REMOTE AE

The Send AE initiates a DICOM association for sending DICOM Storage SOP instances to a remote AE by performing the C-STORE operations.

The Send AE is able to initiate multiple DICOM associations to remote AEs simultaneously. The maximum number of concurrent associations that the Send AE can initiate for sending the SOP Instances, is configurable (see Section 2.6.2 and Table 2-6).

3.1.1 Associated Real-World Activities

The Send AE will initiate a DICOM association for sending one or more SOP instances to a remote AE in response to the following real-world activities:

A user initiated a DICOM Send command for a specified study with a specified destination AE on the Centricity™ PACS RA1000 Workstation.

The Centricity™ PACS has been configured to send a study to a specified destination AE when the study's status changes to a specified value, and this condition occurs.

3.1.2 Proposed Presentation Contexts

Table 3-1 shows the Presentation Contexts proposed by the Send AE after the real-world activity "Send DICOM Instance" (refer to Figure 2-4) has been performed.

TABLE 3-1. PROPOSED PRESENTATION CONTEXTS FOR SEND AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification (Echo)	1.2.840.10008.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Verification (Echo)	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Verification (Echo)	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCU	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
GE Private 3D Model Storage	1.2.840.113619.4.26	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
GE Private 3D Model Storage	1.2.840.113619.4.26	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
GE Private 3D Model Storage	1.2.840.113619.4.26	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
GE Private 3D Model Storage	1.2.840.113619.4.26	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
GE Private Xeleris	1.2.840.113619.4.27	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
GE Private Xeleris	1.2.840.113619.4.27	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
GE Private Xeleris	1.2.840.113619.4.27	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
GE Private Xeleris	1.2.840.113619.4.27	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCU	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

In order to send a SOP Instance, the Send AE requires that the transfer syntax of the SOP Instance match one of the transfer syntaxes that the SCP selected for the accepted Presentation Context. If no transfer syntaxes match, the Send AE will be not able to send the SOP Instance.

3.1.2.1 SOP Specific Conformance Statement for All Storage SOP Classes

The Send AE provides standard conformance to the DICOM Standard Storage Service Class as SCU for all storage SOP classes listed in Table 3-1.

The Send AE will invoke DIMSE C-STORE service element to perform the SOP Instance Send operation.

All optional elements, which exist in the Storage SOP Instance, will be sent. The existence of optional elements depends on the equipment sending images to Centricity™ PACS.

All private elements, which exist in the Storage SOP Instance, will be sent. The existence of private elements depends on the equipment sending images to Centricity™ PACS.

Non-DICOM images stored on Centricity™ PACS will be converted to a DICOM Secondary Capture SOP Class, and transmitted by performing the C-STORE operation.

The Send AE does not use the C-STORE priority attribute.

Note: As pointed out previously, SOP Instances sent to the remote AE may have undergone correction / modification in certain data elements. A list of the data elements that may undergo data coercion is given in Section 4.2.3.

The implementation of the Send AE can perform multiple C-STORE operations over one single association. The Send AE will propose all Presentation Contexts as the list of SOP Instances to be sent dictates, and send all SOP Instances as long as the required Presentation Contexts are accepted.

Upon receiving a C-STORE-RSP containing a "Success" status, the Send AE will perform the next C-STORE operation. The association will be maintained if possible.

Upon receiving a C-STORE-RSP containing a "Refused" status, the Send AE will terminate the association. The remaining SOP Instances are not transmitted.

Upon receiving a C-STORE-RSP which contains either an "Error" or Warning" status, the Send AE will consider the current request to be failed, but will continue to attempt to send the remaining SOP Instances on the same association.

If any of the timers (see Section 2.3.6.5) expires, the connection is closed and the operation in progress is considered failed.

In any case, the SOP Instances sent are always retained in Centricity™ PACS.

3.1.3 Extended Character Sets

The DICOM Server may perform a data coercion in a SOP Instance sent out, in order to update the data set with the information maintained in the Centricity™ PACS database. The Patient's Name (0010,0010) may be multi-valued to include Ideographic and Phonetic name groups in addition to Alphabetic Name. This will be done if the receiving AE has been configured to intend to receive these additional names and these are available in Centricity™ PACS database. While the Alphabetic Name is always encoded with the ISO-IR-100 character set, the Ideographic and Phonetic Names can be encoded with other dual-byte character sets as listed in Section 2.7. In the current release, the DICOM Server will not add text information encoded with extended character sets into other data elements.

See Centricity™ PACS service documentation for the peer AE configuration method.

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

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

4.1 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 service 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 2-6).

4.1.1 Associated Real-World Activities

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

A physician orders a study for the patient at RIS. At the time the study is ordered, the RIS sends the study order and patient information to Centricity™ PACS, which subsequently creates an ordered study and expects to receive SOP Instances associated with this study.

The patient arrives in the Radiology department for the study. Either the modality is able to query the Modality Worklist from the Centricity™ PACS Broker or from a RIS 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.

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™ PACS.

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 4.2.1.

4.1.2 Acceptable Presentation Contexts

Table 4-1 shows the Presentation Contexts acceptable for the Storage AE for receiving DICOM Storage SOP Instances.

TABLE 4-1. ACCEPTABLE PRESENTATION CONTEXTS FOR STORAGE AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
X-Ray Angiographic Bi-plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Radiotherapy Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Radiotherapy Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Radiotherapy Beams Treatment Storage	1.2.840.10008.5.1.4.1.1.481.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Radiotherapy Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Ultrasound 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
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Multi-Frame Grayscale Word Secondary Capture	1.2.840.10008.5.1.4.1.1.7.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCP	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Visible Light Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
GE Private 3D Model Storage	1.2.840.113619.4.26	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
GE Private 3D Model Storage	1.2.840.113619.4.26	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
GE Private 3D Model Storage	1.2.840.113619.4.26	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
GE Private 3D Model Storage	1.2.840.113619.4.26	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
GE Private Xeleris	1.2.840.113619.4.27	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
GE Private Xeleris	1.2.840.113619.4.27	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
GE Private Xeleris	1.2.840.113619.4.27	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
GE Private Xeleris	1.2.840.113619.4.27	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	GE Private Compress Express	2.16.840.1.113709.1.2.2	SCP	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

4.1.2.1 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.

4.1.2.1.1 Transfer Syntax Selection Policies

The two "Transfer Syntax" columns in Table 4-1 list all transfer syntaxes that the Storage AE can accept for the DICOM Presentation Contexts proposed for the specified Abstract Syntaxes.

The DICOM Server can be configured to accept one or several or all of these transfer syntaxes, for each Abstract Syntax, according to the transfer syntax selection rules specified in Section 2.3.8.

If several transfer syntaxes are present in a Presentation Context, the Storage AE will select a transfer syntax in the order as listed in Table 4-1.

4.1.2.2 SOP Specific Conformance Statement for Verification Service Class

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

4.1.2.3 SOP Specific Conformance Statement for Storage Commitment SOP Class

The Storage AE also accepts Presentation Context for the DICOM Storage Commitment Push Model SOP Class. For the Conformance Statement for this behavior, the reader is referred to Section 7.1.

4.1.2.4 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.

4.1.2.4.1 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™ PACS 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 4.2.1 and 4.2.2.

Note: The Study Profiling procedure can cause changes of certain data elements in the SOP Instances. Centricity™ PACS does not regenerate a new SOP instance for the data coercion. A remote AE may receive the same SOP instance with certain data elements changed at a later time. A list of data elements that may be corrected, as well as the correction reasons, are given in Section 4.2.3.

The Study Profiling procedure has been designed to optimize its performance when a remote AE sends all SOP Instances of a study in one association (regardless of the image order in series and the series order in study). This is, however, not a required condition. The SCP is able to handle any form and any order of SOP Instances transmission either in one single association or in multiple association. But the performance of the SCP (because the AE operation is synchronized with the Study Profiling procedure) will not be optimum.

As part of the Study Profiling procedure, the Storage AE can change the status of study for the last received image to "verified" when the calling AE (SCU) closes an association. This behavior is controlled by the called AE Title selected by the remote AE. See Section 4.2.2 for more information.

Note: When a study is "verified" in Centricity™ PACS, it cannot receive any more images and the study can be read by a radiologist. The SOP Instances sent to a "verified" study (including additional new images or re-transmission of old images) will be either rejected or placed to a newly created study, depending on the called AE Title of the Storage AE receiving the instances (Section 4.2.2).

The SCP can validate the received SOP Instances against the DICOM Standards for data integrity. This feature can be configured as turned-on or -off (see Section 2.6.6).

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, with the Explicit VR Big Endian transfer syntax. The SCP will store all unknown data elements as "unknown VR (UN)". Therefore, besides the data change / correction mentioned above, certain data elements may be recomputed for the sake of the data storage, like group length, sequence length, etc.

If any of timers (see Section 2.3.6.5) expires, the connection is closed and the operation in progress is considered failed.

The SCP will abort the association with an A-ABORT when processing of Store Requests cannot be completed because the Centricity™ PACS storage or database subsystem is not functioning (see Section 4.1.2.4.4).

4.1.2.4.2 Storage of SOP Instance Data Elements in Database

After having matched a SOP instance to the Patient / Study in the Centricity™ PACS database via the Study Profiling procedure (see Sections 4.2.1 and 4.2.2), certain data elements of the Storage SOP instance are saved in the database. The data elements saved in the Centricity™ PACS database may be subject to data coercion due to the Study Profiling procedure or Patient / Study update either by information received from RIS or manually performed by the Centricity™ PACS Exam Manager operator.

In addition, some data fields of Centricity™ PACS 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 4-2. 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	40 Char	The Patient's Name will be first converted to the database format (see Section 4.2.1) and then truncated if the size exceeds the size allowed by the database. No warning returned to the SCU.

*: This restriction applies to the Alphabetic Name group if the Patient's Name data element in a received data set is multi-valued. An UTF-8 text string up to 255 bytes in the Centricity™ PACS database is supported for both the Ideographic and Phonetic Name groups. This guarantees that these name groups are not truncated.

4.1.2.4.3 SOP Instance Storage and Abnormal Association Termination

4.1.2.4.3.1 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™ PACS:

If the Storage SCU requested association release (A-RELEASE) and received A-RELEASE response from the Storage SCP, all successfully transmitted SOP Instances (messages) in the association have been stored in the Centricity™ PACS on-line storage system persistently.

If the Storage SCU issues an association abort (A-ABORT) or receives a provider-initiated abort (A-P-ABORT), the success or failure of the Storage SCP to retain any object sent on the association is undefined.

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.

The Storage SCU (remote AE) is strongly recommended to use the DICOM Storage Commitment service to verify the permanent storage status of the submitted SOP instances (see Section 7).

4.1.2.4.4 C-STORE Response Status

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

TABLE 4-3. 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™ PACS database.	None
Refused	A700	Out of Resources	Processing of Store Requests cannot be completed because the Centricity™ PACS storage or database subsystem is not functioning.	None

Service Status	Status Code	Further Meaning	Status Code Sending Explanation	Related Fields Sent Back to SCU
Error	A900	Data Set does not match SOP Class	The following generally required data elements are either missing or do not match the SOP Class: SOP Instance UID SOP Class UID Study Instance UID Series Instance UID	None
	C000	Cannot Understand	The processing of Store Requests cannot be completed due to the failure of Study Profiling (e.g., no match found and the called AE Title is unable to create a new Patient / Study).	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.

4.1.3 Extended Character Sets

The use of extended character sets is fully supported. A received SOP Instance can be stored, archived and retrieved with all text information encoded with any supported character sets.

When adding the text information from the received data set to the Centricity™ PACS database, however, only the Person Name data elements are supported for all character sets listed in Section 2.7. Other text information will not be added to the database if they are encoded with any character set other than ISO-IR-6 or ISO-IR-100 (but these text strings still remain in the data sets, which are stored and archived).

4.2 IMPORTANT REMARKS TO STORAGE AE (SCP ROLE)

4.2.1 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™ PACS 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.

Note: A comprehensive description of the Study Profiling process is beyond the scope of this document. See product documents of Centricity™ PACS for more information.

4.2.1.1 Data Elements Applied for Patient / Study Matching

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

TABLE 4-4. 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)

Attribute Name	Tag
Referenced Study Sequence	(0008,1110)
> Referenced SOP Class UID	(0008,1150)
> Referenced SOP Instance UID	(0008,1155)
Request Attributes Sequence	(0040,0275)
> Requested Procedure ID	(0040,1001)
Accession Number	(0008,0050)
Study Instance UID	(0020,000D)
Study ID	(0020,0010)
Study Date	(0008,0020)
Study Time	(0008,0030)
Modality	(0008,0060)

Not all of these data elements are always used for a Study Profiling process. The Storage AE supports a number of separate AE Titles, which choose a subset of these data elements for a particular Study Profiling algorithm. Section 4.2.2 gives these AE Titles along with other properties of a Study Profiling process, like the ability of creating a new study if a matching to the existing studies failed.

4.2.1.2 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's Name is a null length value in terms of patient / study matching.

If the Alphabetic Name is provided with character set ISO-IR-13, a transliteration process is applied to convert it into the representation of ISO-IR-6. The transliteration is performed according to the Table-II specification in the Japanese Dictionaries.

4.2.1.3 Patient's Name Format Conversion

Before the data elements of a SOP instance are used to search for or create data in the Centricity™ PACS database, Patient's Names supplied by the calling AE (Storage SCU) are first converted to upper case. They are then translated from DICOM format to the normal format used in reading worklists. For example, the DICOM formatted name "Last^First^Middle^Prefix^Suffix" becomes "LAST, FIRST MIDDLE PREFIX SUFFIX".

Notice that a comma has been added between the first and last names specified in the DICOM format. If a complete DICOM name comes in with no separators (^), then no comma is added to the name. In this case, the DICOM formatted name "Last First Middle Prefix Suffix" becomes "LAST FIRST MIDDLE PREFIX SUFFIX".

Note: The Person Name Conversion is performed only in the Centricity™ PACS database. This does not affect the format of the person name in the DICOM data set of the SOP Instances stored and archived in the Centricity™ PACS.

In the Centricity™ PACS database, a Patient's Name complex is separated with the Last Name and the Rest Name including First Name, Middle Name, Prefix and Suffix, and the comma ',' is used as delimiter.

As described in Section 4.1.2.4.2, the Patient's Name string will be truncated if it exceeds the allowed size (refer to Table 4-2).

4.2.1.4 Verified and Canceled Study

If a study matched by the Study Profiling process has a (PACS internal) status "verified" or "canceled", no more SOP Instances can be added to it. This will cause the Storage AE either to reject the received SOP Instance, or to create a new (unordered) study to host the SOP Instance, depending on the capability of the called AE Title, see Section 4.2.2.

The solution for this problem is to "un-verify" the study if it is "verified", or to recover the study if it is "canceled", prior to sending the SOP Instances to the study. See Centricity™ PACS product documents for more information about these operations.

4.2.2 Behavior of AE Title Selected by SCU

A number of AE Titles can be configured for the Storage AE to support different algorithms for the Study Profiling of the received SOP Instances.

The Centricity™ PACS system allows selection of the following elements to configure a Study Profiling algorithm (a Storage AE Title):

- A number of DICOM data elements listed in Table 4-4.
- The database fields that the DICOM data elements should be mapped to.
- A comparison operation used to match the DICOM data elements to the database fields, e.g., simple match, wildcard matching, etc.

The specified Storage AE Title will use the defined algorithm to perform the Study Profiling process for all images sent to it.

In addition to specify the matching elements for the Study Profiling algorithm, the following features can be defined for the specific Storage AEs, too:

- Patient / Exam Creation Ability. If the matching defined the Study Profiling algorithm failed or the matched exam is already "verified", a new patient and / or (unordered) study can be created in the Centricity™ PACS database to host these unmatched images. Disabling the Patient / Exam Creation ability causes the images to be rejected if the matching failed. If this ability is enabled, the Storage AE will use the data elements in the DICOM header of the received images to create the patient and / or exam objects.
- Automatic Study Verification. The automatic study verification refers to the ability to change the status of a study to "verified" after successful completion of one DICOM association, if the study receives one or more SOP instances in the association. The study states are defined interior the Centricity™ PACS system. When a study is "verified" in the Centricity™ PACS database, no more Storage SOP instances may be placed into the study.

Using different Study Profiling algorithms via different AE Titles is mainly to help coping with different behaviors of the imaging modalities to get the patient / study data entered and therefore to include these data items in the generated SOP instances.

The ability of configuring the specific Storage AE Titles refers to the Dynamic Profiling function of Centricity™ PACS. See Centricity™ PACS Product Documentation for more information.

4.2.3 Coercion of Data Elements

Centricity™ PACS supports an interface to customer HIS/RIS systems or uses Centricity™ PACS Exam Manager to perform necessary RIS functions. The RIS information is always assumed by Centricity™ PACS (either a real RIS or Centricity™ PACS Exam Manager) to contain more accurate Patient and Study data than the data received from the acquisition systems via DICOM Composite SOP Instances. Therefore, the RIS information is always used to correct any data entry errors. This data error correction is propagated to all DICOM Storage SOP Instances maintained in Centricity™ PACS.

Another reason causing the change of the data elements in the SOP Instances is the Study Profiling. As long as a SOP Instance is matched to an existing study in the Centricity™ PACS database, all data attributes of the study (as well as its upper-associated Patient) are propagated to the SOP Instance. This is because the Storage AE more trusts the "RIS data".

Also the Study Instance UID, Series Instance UID and SOP Instance UID can be changed, if they conflict with the UID values already used in the Centricity™ PACS database to identify another (Study, Series or SOP Instance) object.

Table 4-5 lists all data elements of the SOP Instances that may undergo a data correction in Centricity™ PACS. They can be different from the original values when a remote AE retrieves them from the Q/R SCP AE of the DICOM Server.

TABLE 4-5. DATA ELEMENT COERCION OF THE SOP INSTANCES

Attribute Name	Tag	Change Reason
Patient ID	(0010,0020)	SOP Instance is associated to another patient, or wrong Patient ID is included in the data set
Patient's Name*	(0010,0010)	Wrong data in data set. Most likely manual input.
Patient's Birth Date	(0010,0030)	Wrong data in data set. Most likely manual input.
Patient's Sex	(0010,0040)	Wrong data in data set. Most likely manual input.
Other Patient IDs	(0010,1000)	Data corrected or supplemented
Study Instance UID**	(0020,000D)	SOP Instance is associated to another study
Accession Number	(0008,0050)	Wrong data in data set. Most likely manual input.
Study Date	(0008,0020)	Study with multiple steps performed on different device, Centricity™ PACS takes the earliest study date / time.
Study Time	(0008,0030)	See above.
Referring Physician's Name	(0008,0090)	Wrong data in data set. Most likely manual input.
Study Description	(0008,1030)	Study with multiple steps performed on different device, Centricity™ PACS can only take one.
Requested Procedure ID	(0040,1001)	Data corrected or supplemented
Series Instance UID**	(0020,000E)	Bad Series Instance UID in the data set
Series Number	(0020,0011)	User specific reasons.
SOP Instance UID**	(0008,0018)	Bad SOP Instance UID in the data set
Instance Number	(0020,0013)	User specific reasons.
Number of Images in Acquisition	(0020,1002)	User specific reasons.
Request Attributes Sequence	(0040,0275)	
>Requested Procedure ID	(0040,1001)	No data or wrong data in the dataset
Procedure Code Sequence	(0008,1032)	No data or Invalid data in dataset. Most likely manual input.
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	

Attribute Name	Tag	Change Reason
>Code Meaning	(0008,0104)	

*: Patient's Name may be multi-valued and encoded with an extended character set. See Section 3.1.3.

**: If these UID values are changed, the original UID values are saved in the data set as private tags. See section 12 for more information.

4.2.4 Supported Uses of SOP Instances

Usually, Centricity™ PACS is applied in the radiology practice for image data management, storage, archiving, display, print, and distribution.

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

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

4.2.5 Data Storage

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

4.2.5.1 Data Archiving

Centricity™ PACS will archive all successfully received SOP Instances in its long-term archiving subsystem. The storage duration in the long-term archiving subsystem is permanent.

Note: Although a permanent storage function is always provided for the received SOP Instances, a remote AE is strongly recommended to use the DICOM Storage Commitment Push Model SOP class to verify the archiving status of the submitted SOP Instances.

4.2.5.2 Information Query and Data Retrieval

Centricity™ PACS allows a remote AE to query the information and to retrieve the data sets of all stored and archived SOP Instances, using the DICOM Query/Retrieve SOP Classes.

Centricity™ PACS performs an information query always against the data maintained in the database.

Centricity™ PACS performs a data retrieval always against both the on-line storage subsystems and the long-term archiving subsystems.

Note: A remote AE may be unable to query and retrieve the SOP Instances using the original values in certain matching keys as sent to Centricity™ PACS previously, because of the data coercion. See Section 4.2.3.

4.2.5.3 Data Display

Centricity™ PACS RA1000 Workstation and Centricity™ Enterprise Web clients are able to display an image SOP Instance if it meets the conditions specified in Table 4-6.

TABLE 4-6. CONDITIONS FOR IMAGE SOP INSTANCE DISPLAY

Name	Tag	Description	
SOP Class UID	(0008,0016)	The SOP class UID of the SOP Instance must be one of the following:	
		1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Storage
		1.2.840.10008.5.1.4.1.1.1.1	Digital X-Ray Image Storage - For Presentation
		1.2.840.10008.5.1.4.1.1.1.1.1	Digital X-Ray Image Storage - For Processing
		1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography X-Ray Image Storage - For Presentation
		1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography X-Ray Image Storage - For Processing
		1.2.840.10008.5.1.4.1.1.1.3	Digital Intra-oral X-Ray Image Storage - For Presentation
		1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra-oral X-Ray Image Storage - For Processing
		1.2.840.10008.5.1.4.1.1.2	Computed Tomography Image Storage
		1.2.840.10008.5.1.4.1.1.3	Ultrasound Multi-Frame Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multi-Frame Image Storage
		1.2.840.10008.5.1.4.1.1.4	Magnetic Resonance Image Storage
		1.2.840.10008.5.1.4.1.1.5	Nuclear Medicine Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.6	Ultrasound Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage
		1.2.840.10008.5.1.4.1.1.7	Secondary Capture Image Storage
		1.2.840.10008.5.1.4.1.1.7.2	Multi-frame Grayscale Byte Secondary Capture Image Storage
		1.2.840.10008.5.1.4.1.1.7.3	Multi-Frame Grayscale Word Secondary Capture
		1.2.840.10008.5.1.4.1.1.7.4	Multi-frame True Color Secondary Capture Image Storage
		1.2.840.10008.5.1.4.1.1.12.1	X-Ray Angiographic Image Storage
		1.2.840.10008.5.1.4.1.1.12.2	X-Ray Radiofluoroscopic Image Storage
		1.2.840.10008.5.1.4.1.1.12.3	X-Ray Angiographic Bi-plane Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.20	Nuclear Medicine Image Storage
		1.2.840.10008.5.1.4.1.1.128	Positron Emission Tomography Image Storage
		1.2.840.10008.5.1.4.1.1.481.1	Radiotherapy Image Storage

Name	Tag	Description	
		1.2.840.10008.5.1.4.1.1.11.1	Grayscale Softcopy Presentation State Storage SOP Class
		1.2.840.10008.5.1.4.1.1.88.59	Key Object Selection Document
Photometric Interpretation	(0028,0004)	The image SOP Instance must contain one of the following Photometric Interpretation values: • MONOCHROME1 • MONOCHROME2 • RGB • YBR_FULL** • YBR_FULL_422**	

***: Centricity™ Enterprise Web clients are able to display the YBR_FULL and YBR_FULL_422 color images only if these are sent to the Centricity™ PACS using the DICOM JPEG Baseline (Process 1) Transfer Syntax.*

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

4.2.5.4 DICOM Data Element List

Centricity™ PACS RA1000 Workstation and Centricity™ Enterprise Web clients are able to display a list of data elements in an image SOP Instance. All data elements with a group number less than 0x7FE0 can be listed.

Text information encoded with any character sets listed in Section 2.7 can be displayed, provided that the Centricity™ PACS RA1000 Workstation or Centricity™ Enterprise Web clients platform is appropriately configured. For the requirements for the platform configuration, see Centricity™ PACS documentation.

4.2.5.5 Data Print

Centricity™ PACS Print Server is able to print an image SOP Instance if it meets the conditions specified in Table 4-7.

TABLE 4-7. CONDITIONS FOR IMAGE SOP INSTANCE PRINT

Name	Tag	Description	
SOP Class UID	(0008,0016)	The SOP class UID of the SOP Instance must be one of the following:	
		1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Storage
		1.2.840.10008.5.1.4.1.1.1.1	Digital X-Ray Image Storage - For Presentation
		1.2.840.10008.5.1.4.1.1.1.1.1	Digital X-Ray Image Storage - For Processing
		1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography X-Ray Image Storage - For Presentation
		1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography X-Ray Image Storage - For Processing
		1.2.840.10008.5.1.4.1.1.1.3	Digital Intra-oral X-Ray Image Storage - For Presentation

		1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra-oral X-Ray Image Storage - For Processing
		1.2.840.10008.5.1.4.1.1.2	Computed Tomography Image Storage
		1.2.840.10008.5.1.4.1.1.3	Ultrasound Multi-Frame Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.3.1	Ultrasound Multi-Frame Image Storage
		1.2.840.10008.5.1.4.1.1.4	Magnetic Resonance Image Storage
		1.2.840.10008.5.1.4.1.1.5	Nuclear Medicine Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.6	Ultrasound Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage
		1.2.840.10008.5.1.4.1.1.7	Secondary Capture Image Storage
		1.2.840.10008.5.1.4.1.1.7.2	Multi-frame Grayscale Byte Secondary Capture Image Storage
		1.2.840.10008.5.1.4.1.1.7.3	Multi-Frame Grayscale Word Secondary Capture
		1.2.840.10008.5.1.4.1.1.7.4	Multi-frame True Color Secondary Capture Image Storage
		1.2.840.10008.5.1.4.1.1.12.1	X-Ray Angiographic Image Storage
		1.2.840.10008.5.1.4.1.1.12.2	X-Ray Radiofluoroscopic Image Storage
		1.2.840.10008.5.1.4.1.1.12.3	X-Ray Angiographic Bi-plane Image Storage (Retired)
		1.2.840.10008.5.1.4.1.1.20	Nuclear Medicine Image Storage
		1.2.840.10008.5.1.4.1.1.128	Positron Emission Tomography Image Storage
		1.2.840.10008.5.1.4.1.1.481.1	Radiotherapy Image Storage
Photometric Interpretation	(0028,0004)	The image SOP Instance must contain one of the following Photometric Interpretation values: • MONOCHROME1 • MONOCHROME2 • RGB* • YBR_FULL* • YBR_FULL_422*	

**: The color images are converted to a grayscale representation by extracting the brightness component and printed on a grayscale printer. Centricity™ PACS does not support color printers.*

Centricity™ PACS is unable to print any non-image SOP Instance, e.g., curves.

5. DICOM QUERY/RETRIEVE SERVICE CLASS (SCU ROLE) CONFORMANCE STATEMENT

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

The AE title of the Query/Retrieve SCU function is different from the AE title of the Query/Retrieve SCP function. Each Centricity™ PACS RA1000 Workstation requires a unique AE title for the Query/Retrieve SCU function.

5.1 DICOM QUERY REQUEST TO REMOTE AE

The Q/R SCU AE can initiate a DICOM Query request to a remote AE at any time.

The Q/R SCU AE initiates a DICOM association for sending a DICOM Query Request to a remote AE by performing a C-FIND operation. The Q/R SCU AE can only communicate with one remote AE at a time.

5.1.1 Associated Real-World Activities

The user of a Centricity™ PACS RA1000 Workstation may want to view exams known to exist on a remote DICOM entity or may want to query a remote DICOM entity to determine if exams exist on that device. The user may also initiate a query simply to view the data provided in the query return keys. Based on the data supplied in the return keys, the user may or may not choose to retrieve the actual exams.

The Centricity™ PACS RA1000 Workstation user fills out the Query/Retrieve Dialog box, specifying key attributes to search for. The user then initiates the Query request. Attribute matching can be used instead of fully specified information to allow flexible queries.

The following real-world activities are associated with the C-FIND service element (request role) (refer to Figure 2-8):

- Issue a request to a remote AE to search for patients or studies in the remote AE's database.
- Receive the matched data sets in C-FIND responses from the remote AE.

5.1.2 Proposed Presentation Contexts

Table 5-1 shows the Presentation Context proposed by the Q/R SCU AE. The Q/R SCU AE supports three standard transfer syntaxes for the C-FIND operation.

TABLE 5-1. PROPOSED PRESENTATION CONTEXTS FOR Q/R SCU AE (C-FIND OPERATION)

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

The Study Root Query/Retrieve Information Model – FIND SOP classes listed in Table 5-1 can use any of three different Transfer Syntaxes (i.e. Explicit VR Big Endian, Explicit VR Little Endian or Implicit VR Little Endian).

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

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

5.1.2.1.1 General Behavior

The Q/R SCU AE uses the DIMSE service element C-FIND to generate a DICOM Query to a remote AE as follows:

- The Q/R SCU AE generates a DICOM Query at the Study Level as specified in the supported DICOM Query/Retrieve Information Model (refer to Table 5-1), and receives the found data sets in the C-FIND response.
- The Q/R SCU AE assumes that the remote AE is accessible and functional. If the C-FIND operation fails, the Centricity™ PACS RA1000 Workstation opens up a dialog box informing the user of the error.
- The Q/R SCU AE supports Optional Keys. The specific Optional Keys that are supported are: Modalities in Study and Referring Physician's Name.
- The Q/R SCU AE supports Attribute Matching in the creation of the C-FIND request. The following types of matching are supported: Single Value, List of UID, Universal, Wild Card, Range and Sequence.
- The Q/R SCU AE only generates hierarchical queries. It does not generate relational queries.
- The Q/R SCU AE does not make use of the Specific Character Set (0008,0005) attribute when encoding queries or interpreting responses.

- The Q/R SCU AE does not save the DICOM Query results. They are displayed at the Centricity™ PACS RA1000 Workstation, but they are not saved on the Workstation or within the Centricity™ PACS.
- The Q/R SCU AE can only query one unique DICOM entity (i.e. Remote AE) at a time.
- The Q/R SCU AE does not support the issuance of the C-FIND-CANCEL request.

5.1.2.1.2 Study Root Information Model Definition

5.1.2.1.2.1 Study Level - Key Attributes Supported

The Study Level Key Attributes returned by the Q/R SCU AE for a Query are specified in Table 5-2.

The Optional Keys that the Q/R SCU AE supports are: Modalities in Study and Referring Physician's Name.

The user can search for studies based on any combination of these key attributes. These same attributes will be returned and displayed to the Workstation user.

TABLE 5-2. STUDY LEVEL KEY ATTRIBUTES

Description	Tag
Study Instance UID	(0020,000D)
Study ID	(0020,0010)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Modalities in Study	(0008,0061)
Referring Physician's Name	(0008,0090)

5.1.2.1.2.2 Series Level - Key Attributes Supported

The Series Level Key Attributes returned by the Q/R SCU AE for a Study Root Query are specified in Table 5-3. These attributes will be returned and displayed to the Workstation user.

TABLE 5-3. SERIES LEVEL KEY ATTRIBUTES

Description	Tag
Patient ID	(0010,0020)
Modality	(0008,0060)
Series Number	(0020,0011)
Series Instance UID	(0020,000E)
Number of Series Related Instances	(0020,1209)
Scheduled Procedure Step ID (SPS ID)	(0040,0009)
Performed Procedure Step Start Date	(0040,0244)
Performed Procedure Step Start Time	(0040,0245)

Description	Tag
Request Attributes Sequence	(0040,0275)
Requested Procedure ID (RP ID)	(0040,1001)

5.1.3 Extended Character Sets

The Q/R SCU AE does not make use of the Specific Character Set (0008,0005) attribute when encoding C-FIND queries or interpreting C-FIND responses.

5.2 DICOM RETRIEVE REQUEST TO REMOTE AE

The Q/R SCU AE can initiate a DICOM Retrieve request to a remote AE after a DICOM Query Request has been performed.

The Q/R SCU 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.

5.2.1 Associated Real-World Activities

After the user of a Centricity™ PACS RA1000 Workstation has completed a DICOM Query operation to a remote AE and received a successful response, the Centricity™ PACS RA1000 Workstation will display a list of one or more studies that matched the initial Query criteria. The user may then select one of these studies or series and then initiate a retrieval request of this information from the remote AE. This action will initiate a C-MOVE request which will trigger the transfer of images from the remote system to the local database of the Centricity™ PACS. Note that the Centricity™ PACS RA1000 Workstation front-end application initiates the C-MOVE operation while the DAS 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™ PACS but shall not be stored on the Centricity™ PACS RA1000 Workstation itself.

The following real-world activities are associated with the C-MOVE service element (request role) (refer to Figure 2-8):

- Generate a C-MOVE request to a remote AE to retrieve the studies, series, or SOP instances in the remote AE's database.
- Receive the images in C-STORE requests from the remote AE.
- Generate C-STORE responses to the remote AE.
- Receive the C-MOVE response from the remote AE.
- The Storage AE will match the received Storage SOP instances to patients and studies in the Centricity™ PACS database via the Study Profiling procedure. Refer to Section 4.1.2.4.1.

5.2.2 Proposed Presentation Contexts - Q/R SCU AE

Table 5-4 shows the Presentation Context proposed by the Q/R SCU AE. The Q/R SCU AE supports three standard transfer syntaxes for the C-MOVE operation.

TABLE 5-4. PROPOSED PRESENTATION CONTEXTS FOR Q/R SCU AE (C-MOVE OPERATION)

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

The Study Root Query/Retrieve Information Model – MOVE SOP classes 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).

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

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

5.2.2.1.1 General Behavior

The Q/R SCU AE uses the DIMSE service element C-MOVE to generate a DICOM Query to a remote AE as follows:

- The Q/R SCU 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 list of attributes returned in the previous Query operation for the selected study or series.
- The remote AE shall initiate an association for the C-STORE request to the DAS. The DAS shall respond to the association request.
- The remote AE shall generate a C-STORE request to the DAS on a separate association.
- The DAS shall receive the SOP Instance and store it into the Centricity™ PACS. The DAS shall generate a C-STORE response to the remote AE indicating a successful or unsuccessful transfer and store of the SOP Instance.

- The remote AE may periodically send a C-MOVE response to the Q/R SCU AE with a "Pending" status and a count of the number of remaining, completed, failed and warning C-STORE sub-operations.
- Steps 3 through 5 are repeated until all SOP Instances of the selected study or series are sent and loaded into the Centricity™ PACS.
- The remote AE shall generate a final C-MOVE response to the Q/R SCU AE with a "Success" status.
- The Q/R SCU AE does not support the issuance of the C-MOVE-CANCEL request.

5.2.3 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 found SOP Instances into Centricity™ PACS.

Refer to Table 4-1 in Section 4.1.2.

As shown in Table 4-1, 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.

5.2.3.1 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 4.1.

5.2.4 Extended Character Sets

The Q/R SCU AE does not make use of the Specific Character Set (0008,0005) attribute when encoding C-MOVE queries 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 4.1.3.

6. DICOM QUERY/RETRIEVE SERVICE CLASS (SCP ROLE) CONFORMANCE STATEMENT

This section describes the Conformance Statement for information query and data retrieval functions supported in Centricity™ PACS. They are implemented in the Q/R SCP AE as the SCP role of the DICOM Query/Retrieve SOP Classes.

The AE title of the Query/Retrieve SCP function is different from the AE title of the Query/Retrieve SCU function.

6.1 DICOM QUERY REQUEST FROM REMOTE AE

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

The Q/R SCP AE is able to accept multiple DICOM associations simultaneously. The maximum number of concurrent associations that the Q/R SCP AE can accept for serving DICOM Query requests is configurable (see Section 2.6.2 and Table 2-6).

6.1.1 Associated Real-World Activities

The following real-world activities are associated with the C-FIND service element (response role) (refer to Figure 2-9):

- Search for patients, studies, series, or SOP instances in the Centricity™ PACS database.
- Send the found data sets in C-FIND responses to the remote AE.

6.1.2 Acceptable Presentation Contexts

Table 6-1 shows the Presentation Contexts acceptable by the Q/R SCP AE.

TABLE 6-1. ACCEPTABLE PRESENTATION CONTEXTS FOR Q/R SCP AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification (Echo)	1.2.840.10008.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Verification (Echo)	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Verification (Echo)	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
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	SCP	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Patient/Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient/Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient/Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

6.1.2.1 Presentation Context Acceptance Criterion

The Q/R SCP 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 Transfer Syntax Selection Policies

The DICOM Server can be configured to accept one or several or all of these transfer syntaxes, for each Abstract Syntax, according to the transfer syntax selection rules specified in Section 2.3.8.

If several transfer syntaxes are present in a Presentation Context, the Q/R SCP 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 Q/R SCP AE provides standard conformance to the DICOM Verification Service Class as a SCP.

6.1.2.3 SOP Specific Conformance Statement for Query/Retrieve Information Model – FIND SOP Classes

The Q/R SCP AE provides standard conformance to the DICOM Query/Retrieve Information Model – FIND SOP Classes as a SCP.

6.1.2.3.1 General Behavior

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

- The Q/R SCP AE supports a DICOM Query at all levels of Patient / Study / Series / SOP Instance as specified in the supported DICOM Query/Retrieve Information Models (Table 6-1), and return the found data sets in C-FIND response.
- The Q/R SCP AE only uses the keys of supported type "Matching" (see Sections 6.1.2.3.5 and 6.1.2.3.6) to perform the database search. Values in keys of type "Returned" will be ignored and will be filled in with data found from the database.
- Any unsupported key (not included in Sections 6.1.2.3.5 and 6.1.2.3.6) will be ignored. No corresponding data element will be returned at all.
- The Q/R SCP AE only supports hierarchical query. No relational query is supported.
- The Q/R SCP AE searches for the data set using the matching keys specified in the C-FIND request against the Centricity™ PACS database.
- The Q/R SCP AE does not provide any value for the data element Storage Media File-Set ID. At the moment, the Centricity™ PACS system does not support any DICOM Media Storage SOP class.
- The Q/R SCP AE will ignore the data element Priority in a DICOM Query request.

Note: Due to the data coercion of the SOP Instances as described in Section 4.2.3, the return data elements can be different from the values in the DICOM Storage SOP Instances originally sent to the Storage AE.

6.1.2.3.2 Data Query to Centricity™ PACS Database

When a query specifies a searching key for a person name, the Q/R SCP AE will perform an automatic data conversion. The Q/R SCP AE converts the DICOM person name format to the person name format used in the Centricity™ PACS database as specified in Section 4.2.1.3, and forces a case-insensitive search in the database.

The Q/R SCP AE reserves the right to reject any query which would cause extremely large compute or I/O intensive operations during the search such as a query matching all studies in the database.

In general, the Q/R SCP AE will always return a limited number of responses to the remote Q/R SCU, if the submitted query may potentially generate a large number of matches in the database. The maximum number of returned query responses is configurable.

6.1.2.3.3 Image Availability Query to Centricity™ PACS

Centricity™ PACS supports the Instance Availability attribute (0008,0056) which defines how rapidly a composite object instance(s) become available for transmission from Centricity™ PACS after a C-MOVE retrieval request.

This attribute pertains to the set of composite object instances available at the Query/Retrieve Level specified in the identifier of the C-FIND request (e.g. Patient, Study, Series, Composite Object Instance). When some composite instances are less rapidly available than others, the Centricity™ PACS shall return the availability status of the least rapidly available instance.

Centricity™ PACS will provide one of three possible values for this attribute:

- "ONLINE" which means the instances are immediately available, or

- "NEARLINE" which means the instances need to be retrieved from relatively slow media such as optical disk or tape, or
- "OFFLINE" which means the instances need to be retrieved by manual intervention (e.g. need to load a tape into a tape library).

The contents of the Instance Availability attribute (0008,0056) that is returned by Centricity™ PACS, in the C-FIND response, for any of the four Query/Retrieve levels, is defined in Table 6-2.

TABLE 6-2. INSTANCE AVAILABILITY ATTRIBUTE CONTENTS

Q/R SCP Level	Contents of the Instance Availability attribute (0008,0056) in a C-FIND response
Patient	The availability status (ONLINE, NEARLINE, OFFLINE) of the least available SOP instance of all studies and all series for a particular patient.
Study	The availability status (ONLINE, NEARLINE, OFFLINE) of the least available SOP instance of a study and one or more series for a particular patient.
Series	The availability status (ONLINE, NEARLINE, OFFLINE) of the least available SOP instance of a series for a particular patient
Composite Object Instance	The availability status (ONLINE, NEARLINE, OFFLINE) of the specific SOP Instance being requested or matched.

The Centricity™ PACS will not return the Instance Availability attribute (0008,0056) in the C-FIND response if there was no match or if an error occurred (e.g. Database inconsistency problem, etc.)

6.1.2.3.4 Matching Operations

6.1.2.3.4.1 Date and Time Keys Matching Operations

The Q/R SCP AE supports a DICOM Query request using any matching operations in a date or time matching key specified in the DICOM PS 3.4, as listed in Table 6-3.

TABLE 6-3. DATE AND TIME MATCHING OPERATIONS

Specification	Key Value Description
NONE	No key or no key value was specified
EQ	<value> ; match all occurrences of value
GE	<value>- ; match all occurrences of value and subsequent values
LE	-<value> ; match all occurrences of prior to and including value
RANGE	<value1>-<value2> ; match all occurrences between value1 and value2 inclusive.

Because Centricity™ PACS saves the date and time values in one single field in the database, an arbitrarily independent search for the date and time keys in a DICOM Query request cannot be supported. For a combination of the date and time matching keys, the Q/R SCP AE will interpret the performed date and time joint matching as indicated in Table 6-4.

TABLE 6-4. DATE AND TIME JOINT MATCHING OPERATIONS PERFORMED BY THE SCP

Date Specification (See Table 6-3)	Time Specification (See Table 6-3)	Operation Performed
NONE	NONE	Search not qualified by date and time (ignored)

Date Specification (See Table 6-3)	Time Specification (See Table 6-3)	Operation Performed
NONE	EQ, GE, LE, RANGE	Search not qualified by date and time (ignored)
EQ, GE, LE, RANGE	NONE	Search using date specification only
EQ	EQ, GE, LE, RANGE	Search using specified date and time
GE, LE, RANGE	EQ, GE, LE, RANGE	Search using date specification only

6.1.2.3.4.2 Other Keys Matching Operations

The Q/R SCP AE supports Single Value matching for all keys of a supported type "Matching", see Section 6.1.2.3.5.

The Q/R SCP AE supports Wild Card matching for all text valued keys of a supported type "Matching", see Section 6.1.2.3.5.

The Q/R SCP AE supports UID List matching for all UID keys of a supported type "Matching", see Section 6.1.2.3.5.

The Q/R SCP AE supports Sequence matching.

The Q/R SCP AE supports Range matching for the Date and Time keys (see Section 6.1.2.3.4)

6.1.2.3.5 Patient Root Information Model Definition

This section specifies the use of the DICOM Patient Root Query/Retrieve Information Model for matching keys and returned keys supported in a DICOM Query request.

Sections 6.1.2.3.5.1 through 6.1.2.3.5.5 define what attributes are supported for a DICOM query. Table 6-5 specifies the usage definitions for each attribute.

TABLE 6-5. QUERY KEY USAGE

Usage	Description of Term
Matching	Matching is supported. The data contained within this attribute is used as search criteria by the Q/R SCP AE and entries from the PACS database that match the value are returned to the remote Q/R SCU. Per DICOM definition, all matching attributes will also be returned by the Q/R SCP AE to the remote Q/R SCU.
Partial Matching	Partial matching is supported. Explanations will be given on a per key basis.
Returned	Returning of values is supported. These attributes are provided by the Q/R SCP to the remote Q/R SCU in the Query responses. The DICOM Standard defines which attributes should be returned.

6.1.2.3.5.1 Patient Level - Key Attributes Supported

The Patient Level Key Attributes are specified in Table 6-6.

TABLE 6-6. PATIENT LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Patient's Name*	(0010,0010)	Matching

Description	Tag	Usage
Patient ID	(0010,0020)	Matching
Patient's Birth Date	(0010,0030)	Returned
Patient's Sex	(0010,0040)	Returned
Other Patient IDs	(0010,1000)	Returned
Ethnic Group	(0010,2160)	Returned

*: The Q/R SCP AE accepts a multi-valued Patient's Name data element as a matching key, if the Alphabetic Name is fully qualified. If the Alphabetic Name is partially qualified, only a single-valued Patient's Name element can be used as a matching key.

6.1.2.3.5.2 Study Level - Key Attributes Supported

The Study Level Key Attributes are specified in Table 6-7.

TABLE 6-7. STUDY LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Issuer of Patient ID	(0010,0021)	Matching
Study Instance UID	(0020,000D)	Matching
Study ID	(0020,0010)	Matching
Accession Number	(0008,0050)	Matching (see Note below)
Study Date	(0008,0020)	Matching See Section 6.1.2.3.4
Study Time	(0008,0030)	Partial Support See Section 6.1.2.3.4
Modalities In Study	(0008,0061)	Matching
Referring Physician's Name	(0008,0090)	Matching
Number of Study Related Series	(0020,1206)	Returned
Number of Study Related Instances	(0020,1208)	Returned
Study Description	(0008,1030)	Returned
Procedure Code Sequence	(0008,1032)	Matching
>Code Value	(0008,0100)	Matching
>Code Meaning	(0008,0104)	Matching

Note: In the case of the Accession Number attribute, either the Order Number or the Medical Record Number (MRN) can be returned in this data element. The default value is Order Number. The selection of which parameter is returned is controlled by the Broker and DAS configuration.

6.1.2.3.5.3 Series Level - Key Attributes Supported

The Series Level Key Attributes are specified in Table 6-8.

TABLE 6-8. SERIES LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Modality	(0008,0060)	Matching
Series Number	(0020,0011)	Matching
Series Instance UID	(0020,000E)	Matching
Number of Series Related Instances	(0020,1209)	Returned
Series Description	(0008,103E)	Returned

Description	Tag	Usage
Body Part Examined	(0018,0015)	Matching
Request Attribute Sequence	(0040,0275)	
>Request Procedure ID	(0040,1001)	Matching

6.1.2.3.5.4 SOP Instance Level - Key Attributes Supported

The SOP Instance Level Key Attributes are specified in Table 6-9.

TABLE 6-9. SOP INSTANCE LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Instance Number	(0020,0013)	Matching
SOP Instance UID	(0008,0018)	Matching
SOP Class UID	(0008,0016)	Matching

6.1.2.3.5.5 Image Specific Level - Key Attributes Supported

The Image Specific Level Key Attributes are specified in Table 6-10.

TABLE 6-10. IMAGE SPECIFIC LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Rows	(0028,0010)	Returned
Columns	(0028,0011)	Returned
Bits Allocated	(0028,0100)	Returned
Number of Frames	(0028,0008)	Returned

6.1.2.3.5.6 Presentation State Specific Level – Key Attributes Supported

The Presentation State Specific Level Key Attributes are specified in Table 6-11.

TABLE 6-11. PRESENTATION STATE SPECIFIC LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Presentation Label	(0070,0080)	Returned
Presentation Description	(0070,0081)	Returned
Presentation Creation Date	(0070,0082)	Returned
Presentation Creation Time	(0070,0083)	Returned
Presentation Creator's Name	(0070,0084)	Returned
Referenced Series Sequence	(0008,1115)	Returned
>Series Instance UID	(0020,000E)	Returned
>Referenced Image Sequence	(0008,1140)	Returned
>>Referenced SOP Class UID	(0008,1150)	Returned
>>Referenced SOP Instance UID	(0008,1155)	Returned

6.1.2.3.5.7 Key Image Note Instance Specific Level – Key Attributes Supported

The Key Image Note Instance Specific Level Key Attributes are specified in Table 6-12.

TABLE 6-12. KEY IMAGE NOTE SPECIFIC LEVEL KEY ATTRIBUTES

Description	Tag	Usage
Content Date	(0008,0023)	Returned
Content Time	(0008,0033)	Returned
Observation Date Time	(0040,A032)	Returned
Referenced Request Sequence	(0040,A370)	
>Study Instance UID	(0020,000D)	Returned
>Accession Number	(0008,0050)	Returned
>Requested Procedure ID	(0040,1000)	Returned
>Requested Procedure Code Sequence	(0032,1064)	
>>Code Value	(0008,0100)	Returned
>>Code Meaning	(0008,0104)	Returned
Concept Name Code Sequence	(0040,A043)	
>Code Value	(0008,0100)	Returned
>Coding Scheme Designator	(0008,0102)	Returned
>Coding Scheme Version	(0008,0103)	Returned
>Code Meaning	(0008,0104)	Returned

6.1.2.3.6 Study Root Information Model Definition

The Study Level Key Attributes supported are the same as those listed in Section 6.1.2.3.5.1 and Section 6.1.2.3.5.2.

The Series Level Key Attributes supported are the same as those listed in Section 6.1.2.3.5.3.

The SOP Instance Level Key Attributes supported are the same as those listed in Section 6.1.2.3.5.4.

The Image Specific Level Key Attributes supported are the same as those listed in Section 6.1.2.3.5.5.

6.1.3 Extended Character Sets

The Q/R SCP AE may include a multi-valued Patient's Name element in the query responses, if the query requesting AE has been configured to intend to receive the multi-valued names and these are available in Centricity™ PACS database. While the Alphabetic Name is always encoded with the ISO-IR-100 character set, the Ideographic and Phonetic Names can be encoded with other dual-byte character sets as listed in Section 2.7. In the current release, the Q/R SCP AE will not include text information encoded with extended character sets in any other data elements of the query responses.

See Centricity™ PACS service documentation for the peer AE configuration method.

6.2 DICOM RETRIEVE REQUEST FROM REMOTE AE

The Q/R SCP AE constantly listens for incoming associations to service a DIMSE C-MOVE operation issued from a remote AE.

The Q/R SCP AE accepts associations for finding the SOP Instances and sends the found SOP Instances to the destination AE specified in the C-MOVE operation, as Query/Retrieve SCP.

The Q/R SCP AE initiates associations in response to requests to move images, as DICOM Storage SCU.

The Q/R SCP AE is able to accept multiple DICOM associations simultaneously. The maximum number of concurrent associations that the Q/R SCP AE can accept for serving DICOM Retrieve requests, is configurable.

6.2.1 Associated Real-World Activities

The following real-world activities are associated with the C-MOVE service element (response role) (refer to Figure 2-8):

- Search for the information of the requested SOP Instances in the Centricity™ PACS database and gain the access to the data files of the SOP Instances.
- Send found SOP Instances to the specified remote AE specified in the DICOM Retrieve request, if the data files are accessible.
- Send C-MOVE-RSP to the calling remote AE.

6.2.2 Acceptable Presentation Contexts

See Table 6-1 in Section 6.1.2.

6.2.2.1 Presentation Context Acceptance Criterion

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

6.2.2.1.1 Transfer Syntax Selection Policies

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

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

The DICOM Server can be configured to accept one or several or all of these transfer syntaxes, for each Abstract Syntax, according to the transfer syntax selection rules specified in Section 2.3.8.

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

6.2.2.2 SOP Specific Conformance Statement for Query/Retrieve Information Model – MOVE SOP Classes

The Q/R SCP AE provides standard conformance to the DICOM Query/Retrieve Information Model – MOVE SOP Classes as SCP.

- The Q/R SCP AE searches for the requested SOP Instances in Centricity™ PACS database as specified by the Unique Key values in C-MOVE-RQ. If no requested SOP instances can be found then the Q/R SCP AE will return C-MOVE-RSP to the calling AE with a status Success. The response will equal zero for the number of completed, failed, and warning sub-operations.

- All SOP Instances requested in a C-MOVE-RQ will be sent to the destination AE over a single association. The Q/R SCP AE sends a C-MOVE-RSP with the Pending status to the SCU periodically with a configurable time interval.
- A C-MOVE-RSP will contain the number remaining, completed, failed, and warning C-STORE sub-operations.
- The Q/R SCP AE will ignore the data element Priority, if it is included in the C-MOVE request.

6.2.3 Proposed Presentation Contexts

The Q/R SCP AE initiates a DICOM association to the data move destination AE to perform the DIMSE C-STORE operation for sending the found SOP Instances.

The Q/R provides the exact same Conformance Statement for this DICOM Storage SCU Role as described in Section 3.1.

Note: Due to the data coercion of the SOP Instances as described in Section 4.2.3, the retrieved SOP Instances can contain certain data elements with different values from the SOP Instances sent to Centricity™ PACS originally.

6.2.4 Extended Character Sets

The Q/R SCP AE may perform a data coercion in a SOP Instance sent to the data retrieval requesting AE, in order to update the data set with the information maintained in the Centricity™ PACS database. The Patient's Name (0010,0010) may be multi-valued to include Ideographic and Phonetic name groups in addition to Alphabetic Name. This will be done if the receiving AE has been configured to intend to receive these additional names and these are available in Centricity™ PACS database. While the Alphabetic Name is always encoded with ISO-IR-100 character set, the Ideographic and Phonetic Names can be encoded with other dual-byte character sets as listed in Section 2.7. In the current release, the DICOM Server will not add text information encoded with extended character sets into other data elements.

See Centricity™ PACS service documentation for the peer AE configuration method.

7. DICOM STORAGE COMMITMENT SERVICE CLASS (SCP ROLE) CONFORMANCE STATEMENT

This section describes the Conformance Statement for the Storage Commitment functions supported in Centricity™ PACS. They are implemented in the Storage AE as the SCP role of the DICOM Storage Commitment SOP Classes. The Storage AE's SCP implementation of the Storage Commitment Service Class supports the Storage Commitment Push Model SOP Class.

7.1 RECEIVE STORAGE COMMITMENT REQUEST FROM REMOTE AE

The Storage AE constantly listens for incoming associations in order to receive a Storage Commitment Request (as well as DICOM Storage SOP Instances) from a remote AE.

The Storage AE is able to accept a Presentation Context for the Storage Commitment Push Model SOP Class either in a dedicated association, or in a single association together with Presentation Contexts for DICOM Storage SOP Classes. The behavior of the Storage AE with respect to the Storage Commitment service is the same in the both cases.

The Storage AE is able to service multiple DICOM associations simultaneously. The maximum number of concurrent associations that the Storage AE can accept is configurable (see Section 2.6.2 and Table 2-6).

7.1.1 Associated Real-World Activities

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

- The Storage AE places a job (transaction) in the Centricity™ PACS Storage Commitment Queue. The job includes all SOP instances requested for Storage Commitment, as well as the calling DICOM AE Title. For each job, a timer is started when it is added to the Storage Commitment Queue.
- The Storage AE constantly polls the queue for a job which response can be sent back to the original requester.

Note: Other components of Centricity™ PACS will process the Storage Commitment Queue and update the status of the jobs (pending or completed or failed or time-out). This is beyond the scope of this Conformance Statement document.

7.1.2 Acceptable Presentation Contexts

See Table 4-1 in Section 4.1.2.

7.1.2.1 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.

7.1.2.1.1 Transfer Syntax Selection Policies

The two "Transfer Syntax" columns in Table 4-1 list all transfer syntaxes that the Storage AE can accept for the DICOM Presentation Contexts proposed for the Abstract Syntax DICOM Storage Commitment Push Model SOP Class. The three transfer syntaxes are: Explicit VR Big Endian, Explicit VR Little Endian and Implicit VR Little Endian.

The DICOM Server can be configured to accept one or several or all of these transfer syntaxes, for each Abstract Syntax, according to the transfer syntax selection rules specified in Section 2.3.8.

If several transfer syntaxes are present in a Presentation Context, the Storage AE will select a transfer syntax in the order as listed in Table 4-1.

7.1.2.2 SOP Specific Conformance Statement for Storage Commitment Push Model SOP Class

The Storage AE provides standard conformance to the DICOM Storage Commitment Service as an SCP. The Storage AE uses the DIMSE service element N-ACTION to receive a Storage Commitment Request.

The Storage AE supports the data elements listed in Table 7-1 as part of the data set in a received N-ACTION request.

TABLE 7-1. DATA ELEMENTS SUPPORTED IN STORAGE COMMITMENT REQUEST

Data Element	Tag	Description
Transaction UID	(0008,1195)	UID to identify this request
Referenced SOP Sequence	(0008,1199)	A list of SOP instances to be requested for Storage Commitment
> Referenced SOP Class UID	(0008,1150)	SOP Class UID of the instance
> Referenced SOP Instance UID	(0008,1155)	SOP Instance UID of the instance

The Storage AE will ignore the data elements listed in Table 7-2 if they are included in a Storage Commitment Request.

TABLE 7-2. DATA ELEMENTS IGNORED IN STORAGE COMMITMENT REQUEST

Data Element	Tag	Description
Referenced Performed Procedure Step Sequence (formerly known as Referenced Study Component Sequence)	(0008,1111)	The Study Component that contains all SOP instances listed in the referenced SOP sequence.

The Storage AE will accept a Storage Commitment Request for both referenced SOP Instances already received (known objects) and not yet received at this moment (unknown objects). If the unknown objects are received and archived successfully at a later time (before the Storage Commitment jog timer expires), a success response will be sent to the requester.

The Storage AE will return a Success Status Code in N-ACTION-RSP to indicate that the Storage Commitment transaction is received successfully and queued in Centricity™ PACS for processing. A Storage Commitment Result will be sent to the remote AE via N-EVENT-REPORT operation.

The Storage AE will return a Failure Status Code in N-ACTION-RSP to indicate that the receipt of the Storage Commitment transaction failed or the transaction cannot be processed. No Storage Commitment Result will be sent to the remote AE.

7.1.2.3 N-ACTION Response Status

The Storage AE will return the standard status codes in N-ACTION-RSP message as specified in DICOM PS 3.7.

7.2 SEND STORAGE COMMITMENT RESULT TO REMOTE AE

The Storage AE initiates a DICOM association to send a DICOM Storage Commitment Result notification to a remote AE, in response to a previously received Storage Commitment Request.

The Storage AE will always initiate a new DICOM association to send the Storage Commitment Result. It will never send a Storage Commitment Result in the same DICOM association in which a DICOM Storage Commitment Request was received.

The Storage AE will always initiate one single DICOM association for sending the Storage Commitment Result simultaneously. Multiple Storage Commitment Results will be sent subsequently.

7.2.1 Associated Real-World Activity

The following real-world activity will cause the Storage AE to initiate a DICOM association for sending a DICOM Storage Commitment Result (refer to Figure 2-2):

- The Storage AE periodically polls the Centricity™ PACS Storage Commitment Queue and gets a job, which is pending, completed, or timed-out.

7.2.2 Proposed Presentation Contexts

The Storage AE will propose the Presentation Context listed in Table 7-3 for sending a Storage Commitment Result to a remote AE.

TABLE 7-3. PROPOSED PRESENTATION CONTEXTS FOR STORAGE AE AND STORAGE COMMITMENT RESULT

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	SCU/SCP Role Selection
Storage Commitment Push Model	1.2.840.10008.1.20.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	SCU/SCP Role Selection
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	SCU/SCP Role Selection

The column "Transfer Syntax" in Table 7-3 list all transfer syntaxes that the Storage AE can propose for the Abstract Syntax Storage Commitment Push Model SOP Class. The DICOM Server can be configured to propose the Presentation Contexts with one or several or all of these transfer syntaxes.

The Storage AE will propose SCU/SCP Role Selection negotiation for the Presentation Contexts of the Storage Commitment Push Model SOP Class.

7.2.2.1 SOP Specific Conformance Statement for Storage Commitment Push Model SOP Class

The Storage AE will invoke the N-EVENT-REPORT operation in a newly created association to send the Storage Commitment Result to the remote AE in response to a previously received Storage Commitment Request.

The Storage AE can send one or more Storage Commitment Results over a single association.

The Storage AE always initiates a separate, dedicated association to send Storage Commitment Results. It will never send Storage Commitment Results over the same association that a Storage Commitment Request was received on.

The Storage AE does not support the optional Storage Media File-Set ID and Storage Media File-Set UID in the Storage Commitment Result. The Storage AE does not support the optional Retrieve AE Title Attribute in the Storage Commitment Result.

7.2.2.1.1 Storage Commitment Result - Success

The Storage AE will use the Event Type ID value 1 (Storage Commitment Request Successful) to send a Success Storage Commitment Result, and include the data elements listed in Table 7-4 in the data part of N-EVENT-REPORT-RQ.

TABLE 7-4. DATA ELEMENTS INCLUDED IN SUCCESS STORAGE COMMITMENT RESULT

Data Element	Tag	Description
Transaction UID	(0008,1195)	UID to identify this Storage Commitment transaction.
Referenced SOP Sequence	(0008,1199)	A list of SOP instances to be committed for long-term archiving in Centricity™ PACS. This sequence should match the requested sequence in the corresponding Storage Commitment Request.
> Referenced SOP Class UID	(0008,1150)	SOP Class UID of the instance
> Referenced SOP Instance UID	(0008,1155)	SOP Instance UID of the instance

Centricity™ PACS guarantees the long-term archiving of the committed SOP Instances. A remote AE can retrieve the SOP Instance from Centricity™ PACS via the Q/R SCP AE of the DICOM Server.

Note: Due to the data coercion of the SOP Instances as described in Section 4.2.3, the SOP Instance UID of an object may be altered. In this case, Centricity™ PACS is unable to send a success response to the Storage Commitment Request, even if the altered object has been successfully archived.

7.2.2.1.2 Storage Commitment Result - Failure

The Storage AE will use the Event Type ID value 2 (Storage Commitment Request Complete – Failure Exists) to send a Failure Storage Commitment Result and include the data elements listed in Table 7-5 in the data part of N-EVENT-REPORT-RQ.

TABLE 7-5. DATA ELEMENTS INCLUDED IN FAILURE STORAGE COMMITMENT RESULT

Data Element	Tag	Description
Transaction UID	(0008,1195)	UID to identify this Storage Commitment transaction.

Data Element	Tag	Description
Referenced SOP Sequence	(0008,1199)	A list of SOP instances that are successfully committed for long-term archiving in Centricity™ PACS
> Referenced SOP Class UID	(0008,1150)	SOP Class UID of the instance
> Referenced SOP Instance UID	(0008,1155)	SOP Instance UID of the instance
Failed SOP Sequence	(0008,1198)	A list of SOP instances that are NOT committed for long-term archiving in Centricity™ PACS
> Referenced SOP Class UID	(0008,1150)	SOP Class UID of the instance
> Referenced SOP Instance UID	(0008,1155)	SOP Instance UID of the instance
> Failure Reason	(0008,1197)	Reason that the SOP Instance is not committed for long-term archiving.

The Storage AE only supports the Failure Reasons listed in Table 7-6 and will return one of these reasons in the Failure Storage Commitment Result.

TABLE 7-6. FAILURE CODES SUPPORTED BY THE STORAGE AE

Failure Code	Failure Reason	Description
0110H	Processing Failure	Requested SOP Instances are failed for archiving or the PACS installation site is designated not to archive data permanently.
0112H	No such object instance	Requested SOP Instances cannot be found in the Centricity™ PACS database (still not yet received when the job timer expired).
0213H	Resource Limitation	Requested SOP Instances cannot be archived because of the lack of resources (archiving media, etc.).

8. DICOM MODALITY PERFORMED PROCEDURE STEP SERVICE CLASS (SCU AND SCP ROLE) CONFORMANCE STATEMENT

This section describes the Conformance Statement for the MPPS management functions supported in Centricity™ PACS. They are implemented using the Storage AE for the MPPS SCP role and the Send AE for the MPPS SCU role of the DICOM Modality Performed Procedure Step SOP Class.

The Centricity™ PACS MPPS SCP role supports the creating and updating of MPPS objects based on MPPS creating and updating messages received from a remote MPPS SCU or created by PACS. Once created, MPPS objects must be either COMPLETED or DISCONTINUED via N-SET requests.

8.1 RECEIVE MPPS CREATION AND UPDATE REQUESTS FROM REMOTE AE

The Storage AE constantly listens for incoming associations to receive a MPPS message (N-CREATE and N-SET) from a remote AE.

The Storage AE is able to accept a Presentation Context for the Modality Performed Procedure Step SOP Class either in a dedicated association, or in the same association shared by other Presentation Contexts. These include DICOM Storage (Section 4) as well as Storage Commitment SOP Classes. (Section 7).

The Storage AE is able to service multiple DICOM associations simultaneously. The maximum number of concurrent associations that the Storage AE can accept is configurable (see Section 2.6.2 and Table 2-6)

The Storage AE does not support the following DICOM SOP Classes relating to the MPPS management functionality:

- Modality Performed Procedure Step Retrieve SOP Class
- Modality Performed Procedure Step Notification SOP Class

8.1.1 Associated Real-World Activity

The following real-world activities are associated with the Receive MPPS Request operation (refer to Figure 2-3):

- The Storage AE will create a MPPS object or update a previously created MPPS object depending on the received DIMSE requests (N-CREATE or N-SET).
- The Storage AE will establish a link between a created MPPS object and its parent exam, to which the MPPS object contributes.
- The received DIMSE N-CREATE-RQ or N-SET-RQ messages are queued in the Centricity™ PACS MPPS Message Routing Queue for message forwarding, if one or more MPPS forwarding destinations have been configured in the system.

8.1.2 Accepted Presentation Context

See Table 4-1 in Section 4.1.2.

As shown in Table 4-1, the Storage AE can accept any of the three transfer syntaxes listed for the abstract syntax DICOM Modality Performed Procedure Step SOP Class. The DICOM Server can be configured to accept the presentation syntaxes with one or several or all of these transfer syntaxes.

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

The Storage AE provides standard conformance to the Modality Performed Procedure Step SOP Class as SCP. The Storage AE uses the DIMSE service element N-CREATE and N-SET to receive the MPPS messages.

After successfully receiving and processing a MPPS N-CREATE request, the Storage AE will create and maintain a MPPS object. The Storage AE will allow updates of the MPPS object's contents by receiving and processing DIMSE N-SET messages from a remote application (see Section 8.1.2.1.3), until the Performed Procedure Step Status attribute (0040,0252) is updated to either "COMPLETED" or "DISCONTINUED". Once this attribute has been set to either of these values, the Storage AE will no longer accept any updates to the MPPS object. The Centricity™ PACS may continue the workflow based on the configuration.

After the Performed Procedure Step Status attribute (0040,0252) has been updated to either "IN PROGRESS" or "COMPLETED" or "DISCONTINUED", the Storage AE may coerce Patient and Requested Procedure information. Refer to Section 4.2.3 for more explanation on data coercion.

The Storage AE does not persistently store MPPS objects. Once an MPPS object has had its Performed Procedure Step Status attribute (0040,0252) updated to either "COMPLETED" or "DISCONTINUED", and the corresponding MPPS message has been successfully forwarded to a remote AE, the Centricity™ PACS may delete this MPPS object.

8.1.2.1.1 Receiving DIMSE N-CREATE-RQ Messages

The Storage AE accepts a DIMSE N-CREATE-RQ message for creation of a MPPS object in the Centricity™ PACS. The Storage AE supports the following data elements in a received N-CREATE request:

TABLE 8-1. DATA ELEMENTS SUPPORTED IN MPPS N-CREATE REQUEST

Data Element	Tag	Description
Specific Character Set	(0008,0005)	
Performed Procedure Step Relationship		
Scheduled Step Attributes Sequence	(0040,0270)	
> Study Instance UID	(0020,000D)	
> Referenced Study Sequence	(0008,1110)	
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	
> Accession Number	(0008,0050)	
> Placer Order Number / Imaging Service Request	(0040,2016)	
> Filler Order Number / Imaging Service Request	(0040,2017)	
> Requested Procedure ID	(0040,1001)	
> Requested Procedure Description	(0032,1060)	
> Scheduled Procedure Step ID	(0040,0009)	
> Scheduled Procedure Step Description	(0040,0007)	
> Scheduled Protocol Code Sequence	(0040,0008)	
>> Code Value	(0008,0100)	

Data Element	Tag	Description
>> Coding Scheme Designator	(0008,0102)	
>> Coding Scheme Version	(0008,0103)	
>> Code Meaning	(0008,0104)	
Patient's Name	(0010,0010)	
Patient ID	(0010,0020)	
Patient's Birth Date	(0010,0030)	
Patient's Sex	(0010,0040)	
Referenced Patient Sequence	(0008,1120)	
> Referenced SOP Class UID	(0008,1150)	
> Referenced SOP Instance UID	(0008,1155)	
Performed Procedure Step Information		
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)	
> Code Value	(0008,0100)	
> Coding Scheme Designator	(0008,0102)	
> Coding Scheme Version	(0008,0103)	
> Code Meaning	(0008,0104)	
Performed Procedure Step End Date	(0040,0250)	
Performed Procedure Step End Time	(0040,0251)	
Comments on the Performed Procedure Step	(0040,0280)	
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	
> Code Value	(0008,0100)	
> Coding Scheme Designator	(0008,0102)	
> Coding Scheme Version	(0008,0103)	
> Code Meaning	(0008,0104)	
Image Acquisition Results		
Modality	(0008,0060)	
Study ID	(0020,0010)	
Performed Protocol Code Sequence	(0040,0260)	
> Code Value	(0008,0100)	
> Coding Scheme Designator	(0008,0102)	
> Coding Scheme Version	(0008,0103)	
> Code Meaning	(0008,0104)	
Performed Series Sequence	(0040,0340)	
> Performing Physician's Name	(0008,1050)	
> Protocol Name	(0018,1030)	
> Operator's Name	(0008,1070)	
> Series Instance UID	(0020,000E)	
> Series Description	(0008,103E)	
> Retrieve AE Title	(0008,0054)	
> Referenced Image Sequence	(0008,1140)	
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	
> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	

Data Element	Tag	Description
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	
> All other attributes from Performed Series Sequence		
All other attributes from Radiation Dose Module and Billing and Material Code Module		

After successfully receiving and processing a MPPS N-CREATE request, the Storage AE will create and maintain a MPPS object.

If the Affected SOP Instance UID attribute is supplied in the received N-CREATE request, the Storage AE will assign this SOP Instance UID to the newly created MPPS object.

If the Affected SOP Instance UID attribute is not supplied in the received N-CREATE request, the Storage AE will generate a new SOP Instance UID for the newly created MPPS object, and return this UID in the N-CREATE response message.

If the Scheduled Step Attribute step has one or more items in the received N-CREATE request, the Storage AE will profile all the items and link to the Performed Series Sequence.

The Storage AE will support the receiving of all MPPS messages, with instances of any Storage SOP Classes referenced. In other words, if the Storage AE does not support a particular Storage SOP Class (i.e. that SOP Class is not listed in Table 2-2), the Storage AE will still be able to receive the MPPS message that references instances of this SOP Class and forward the MPPS message on, if MPPS forwarding is enabled, as described in Section 8.2.

8.1.2.1.2 Sending DIMSE N-CREATE-RSP Messages

The Storage AE will return a Success Status Code in the N-CREATE-RSP message to indicate that a MPPS object has been successfully created.

The Storage AE will return a Failure Status Code in the N-CREATE-RSP message if the received N-CREATE-RQ message cannot be processed due to the Performed Procedure Step Status attribute (0040,0252) containing a value other than "IN PROGRESS".

The Storage AE returns the standard status codes in the N-CREATE-RSP message as specified in DICOM PS 3.7.

8.1.2.1.3 Receiving DIMSE N-SET-RQ Messages

The Storage AE accepts a DIMSE N-SET-RQ message for updates of a MPPS object created in the Centricity™ PACS by a previous N-CREATE request. The Storage AE supports the following data elements in a received N-SET request:

TABLE 8-2. DATA ELEMENTS SUPPORTED IN MPPS N-SET REQUEST

Data Element	Tag	Description
Performed Procedure Step Information		
Performed Procedure Step Status	(0040,0252)	
Performed Procedure Step Description	(0040,0254)	
Performed Procedure Type Description	(0040,0255)	

Data Element	Tag	Description
Procedure Code Sequence	(0008,1032)	
> Code Value	(0008,0100)	
> Coding Scheme Designator	(0008,0102)	
> Coding Scheme Version	(0008,0103)	
> Code Meaning	(0008,0104)	
Performed Procedure Step End Date	(0040,0250)	Attribute required for the Final State.
Performed Procedure Step End Time	(0040,0251)	Attribute required for the Final State.
Comments on the Performed Procedure Step	(0040,0280)	
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	
> Code Value	(0008,0100)	
> Coding Scheme Designator	(0008,0102)	
> Coding Scheme Version	(0008,0103)	
> Code Meaning	(0008,0104)	
Image Acquisition Results		
Performed Protocol Code Sequence	(0040,0260)	
> Code Value	(0008,0100)	
> Coding Scheme Designator	(0008,0102)	
> Coding Scheme Version	(0008,0103)	
> Code Meaning	(0008,0104)	
Performed Series Sequence	(0040,0340)	Attribute required for the Final State.
> Performing Physician's Name	(0008,1050)	Attribute required for the Final State.
> Protocol Name	(0018,1030)	Attribute required for the Final State.
> Operator's Name	(0008,1070)	Attribute required for the Final State.
> Series Instance UID	(0020,000E)	Attribute required for the Final State.
> Series Description	(0008,103E)	Attribute required for the Final State.
> Retrieve AE Title	(0008,0054)	Attribute required for the Final State.
> Referenced Image Sequence	(0008,1140)	
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	
> Referenced Non-Image Composite SOP Instance Sequence	(0040,0220)	
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	
> All other attributes from Performed Series Sequence		
All other attributes from Radiation Dose Module and Billing and Material Code Module		

After Centricity™ PACS creates a MPPS object per an N-CREATE request, a remote DICOM application can send one or more N-SET requests to update the MPPS object in Centricity™ PACS. The Storage AE accepts an N-SET-RQ message and updates the requested MPPS object as long as the current status of the Performed Procedure Step Status attribute (0040,0252) is "IN PROGRESS". The status of the MPPS object is updated per the attribute value specified for the Performed Procedure Step Status attribute (0040,0252) which are both included in the N-SET request.

A MPPS status of "COMPLETED" or "DISCONTINUED" is considered a "Final State" of a MPPS object. A N-SET request will be the last update request allowed to a created MPPS object, if it updates the status of the MPPS object to one of these two values. In the last N-SET request, there are a number of required attributes which must be present as specified in the "Description" column of Table 8-2. After a MPPS object has had its status changed to either "COMPLETED" or "DISCONTINUED, no further N-SET requests can be accepted for that MPPS object.

After updating the status of a MPPS object to "COMPLETED", Centricity™ PACS can trigger an action for workflow automation of the parent exam of the MPPS object, if the system is configured to do so.

The Send AE will support the sending of all MPPS messages, with instances of any Send SOP Classes referenced. In other words, if the Send AE does not support a particular Send SOP Class (i.e. that SOP Class is not listed in Table 2-1), the Send AE will still be able to send the MPPS message that references instances of this SOP Class, if MPPS forwarding is enabled, as described in Section 8.2.

8.1.2.1.4 Sending DIMSE N-SET-RSP Messages

The Storage AE will return a Success Status Code in the N-SET-RSP message to indicate that the MPPS object has been successfully updated.

The Storage AE will return a Failure Status Code in the N-SET-RSP message for the following reasons:

- The requested MPPS object cannot be found in Centricity™ PACS. Failure type = No such object instance.
- Required attributes are missing in the received N-SET-RQ message. Failure type = Missing attributes.
- The requested MPPS object has previously reached the final state ("COMPLETED" or "DISCONTINUED"). The Performed Procedure Step object may no longer be updated. Failure type = Processing failure.

The Storage AE returns the standard status codes in the N-SET-RSP message as specified in DICOM PS 3.7, as well as the following MPPS SOP Class specific error comment:

TABLE 8-3. N-SET STATUS FAILURE CODES SUPPORTED IN MPPS N-SET-RSP MESSAGE

Failure Code	Error Comment	Description
0110H	Performed Procedure Step Object may no longer be updated	One N-SET-REQ message has been received previously, which updated the MPPS object to one of the final states, "COMPLETED" and "DISCONTINUED".

8.2 SEND MPPS CREATION AND UPDATE REQUESTS TO REMOTE AE

The Send AE initiates a DICOM association to send (i.e. forward) MPPS messages to a remote AE.

The Send AE provides a guaranteed, reliable service for forwarding the received MPPS messages. Every received MPPS message will be forwarded to a remote AE(s). All received MPPS messages are forwarded with complete message fidelity/integrity.

The Send AE may initiate a single DICOM association for sending a MPPS message to multiple destinations.

Since the Storage AE does not support the reception of the following DICOM SOP Classes relating to the MPPS management functionality:

- Modality Performed Procedure Step Retrieve SOP Class
- Modality Performed Procedure Step Notification SOP Class

and since the Centricity™ PACS is simply a forwarder of MPPS messages, the Send AE does not support the sending of MPPS messages involving these two MPPS SOP Classes.

8.2.1 Associated Real-World Activity

The following real-world activity will cause the Send AE to initiate a DICOM association for sending MPPS messages (refer to Figure 2-5):

- There is a pending MPPS forwarding job in the Centricity™ PACS MPPS Message Routing Queue.

8.2.2 Proposed Presentation Context

The Send AE will propose the following Presentation Context in order to send MPPS N-CREATE and N-SET requests to a remote AE.

TABLE 8-4. PROPOSED PRESENTATION CONTEXT FOR MPPS SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

The Transfer Syntax column in Table 8-4 list all transfer syntaxes that the Send AE can propose for the Abstract Syntax "Modality Performed Procedure Step SOP Class". The DICOM Server can be configured to propose the Presentation Contexts with one or several or all of these transfer syntaxes.

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

The Centricity™ PACS does not, of itself, initiate the creation of a MPPS objects. It receives N-CREATE-RQ messages from the originating MPPS SCU (i.e. modality), creates an MPPS object, and forwards this N-CREATE-RQ message on to remote AEs. Similarly, the Centricity™ PACS does not, of itself, change the status of existing MPPS objects. It receives N-SET-RQ messages from the originating MPPS SCU (i.e. modality), updates the MPPS object, and forwards this N-SET-RQ message on to remote AEs.

The Send AE will periodically poll the MPPS Message Routing Queue, if one or more MPPS forwarding destinations have been configured in the system.

If MPPS forwarding is enabled by configuration, the Send AE will send the queued MPPS DIMSE N-CREATE-RQ or N-SET-RQ messages to the specified forwarding destination(s) in one or more associations negotiated with the Presentation Contexts shown in Table 8-4.

8.2.2.1.1 Sending DIMSE N-CREATE-RQ Messages

The Send AE will send a DIMSE N-CREATE-RQ message that may include all the attributes listed in Table . The list of attributes included in the N-CREATE-RQ message depends upon the list of attributes that were sent by the originating MPPS SCU (i.e. modality). The Centricity™ PACS does not add any attributes.

In all DIMSE N-CREATE-RQ messages sent by the Send AE, the Affected SOP Instance UID will be always filled in with a valid value, which is the same one used by the Centricity™ PACS system to create the MPPS object.

8.2.2.1.2 Sending DIMSE N-SET-RQ Messages

The Send AE will send a DIMSE N-SET-RQ message that may include all attributes listed in Table 8-2. The list of attributes included in the N-SET-RQ message depends upon the list of attributes that were sent by the originating MPPS SCU (i.e. modality). The Centricity™ PACS does not add any attributes.

8.2.2.1.3 Receiving DIMSE N-CREATE-RSP Messages

The Send AE is able to process all standard status codes in the DIMSE N-CREATE-RSP message received from the peer application, in response to the MPPS request (i.e. N-CREATE-RQ) message.

8.2.2.1.4 Receiving DIMSE N-SET-RSP Messages

The Send AE is able to process all standard status codes in the DIMSE N-SET-RSP messages received from the peer application, in response to the MPPS request (i.e. N-SET-RQ) message.

8.3 EXTENDED CHARACTER SETS

Only the following character sets are supported by the Storage AE and the Send AE for the DICOM Modality Performed Procedure Step SOP Class:

- ISO-IR-100 (ISO 8859-1)

No other extended character sets are supported.

9. DICOM INSTANCE AVAILABILITY NOTIFICATION (IAN) SERVICE CLASS (SCU ROLE) CONFORMANCE STATEMENT

This section describes the Conformance Statement for the Instance Availability Notification (IAN) functions supported in Centricity™ PACS. They are implemented using the Send AE for the Instance Availability Notification SCU role of the DICOM Instance Availability Notification SOP Class.

The Centricity™ PACS Instance Availability Notification SCU role supports the creation of IAN objects based on MPPS messages received from a remote MPPS SCU or created by PACS. Once created, MPPS objects must be either COMPLETED or DISCONTINUED via N-SET requests. An IAN message will only be created and sent after an MPPS with a status of COMPLETED has been received.

9.1 SEND IAN CREATION AND UPDATE REQUESTS TO REMOTE AE

The Send AE initiates a DICOM association to send an IAN message(s) to a remote AE. The Send AE initiates a DICOM association for each destination.

The Send AE provides a guaranteed, reliable service for sending an IAN message(s) to a remote AE. The remote AE must acknowledge the acceptance of the IAN message.

9.1.1 Associated Real-World Activity

The following real-world activities will cause the Send AE to initiate a DICOM association for sending IAN messages (refer to Figure 2-6):

- The Centricity™ PACS receives an MPPS message having a value for the attribute “Performed Procedure Step Status” (0040,0252) of “COMPLETED”, and all images referenced by the MPPS have been received by the PACS.
- An exam is Query/Retrieved into PACS.
- An exam is retrieved from long-term storage into short-term storage.
- An exam is verified in PACS.
- An exam is received into PACS as the result of a Centricity™ PACS-to-Centricity™ PACS (C2C) transfer.
- An exam is flushed off of the PACS’ short-term storage device(s).

9.1.2 Proposed Presentation Context

The Send AE will propose the following Presentation Context in order to send an IAN N-CREATE request to a remote AE.

TABLE 9-1. PROPOSED PRESENTATION CONTEXT FOR INSTANCE AVAILABILITY NOTIFICATION SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Instance Availability Notification SOP Class	1.2.840.10008.5.1.4.33	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Instance Availability Notification SOP Class	1.2.840.10008.5.1.4.33	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Instance Availability Notification SOP Class	1.2.840.10008.5.1.4.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

The Transfer Syntax column in Table 9-1 list all transfer syntaxes that the Send AE can propose for the Abstract Syntax "Instance Availability Notification SOP Class". The DICOM Server can be configured to propose the Presentation Contexts with one or several or all of these transfer syntaxes.

9.1.2.1 SOP Specific Conformance Statement for Instance Availability Notification SOP Class

The Centricity™ PACS receives DIMSE N-CREATE-RQ and N-SET-RQ messages from an originating MPPS SCU (i.e. modality). If IAN message creation has been enabled by configuration at the PACS, once an MPPS N-SET-RQ message with a status of "COMPLETED" is received and all associated images have been successfully received and stored into the PACS, the Send AE will generate an IAN N-CREATE-RQ message, and place it into a queue.

If a modality is not equipped to function as an MPPS SCU, Centricity™ PACS can be configured to generate MPPS messages. If IAN message creation is also enabled by configuration at the PACS, once all images associated with a study have been successfully received and stored into the PACS, the Send AE will generate an MPPS N-CREATE-RQ message and an IAN N-CREATE-RQ message, and place them into message queues.

The Send AE will periodically poll the IAN Message Routing Queue, if one or more IAN forwarding destinations have been configured in the system. The Send AE will send the queued IAN N-CREATE-RQ message to the specified forwarding destination(s) in one or more associations negotiated with the Presentation Contexts shown in Table 9-1.

9.1.2.1.1 Sending DIMSE N-CREATE-RQ Messages

The Send AE will send a DIMSE N-CREATE-RQ message that will include all the attributes listed in Table 9-2.

The Send AE supports the following data elements in a IAN N-CREATE request:

TABLE 9-2. DATA ELEMENTS SUPPORTED IN AN IAN N-CREATE REQUEST

Data Element	Tag	Description
Specific Character Set	(0008,0005)	Set to proper value(s) according to the current system locale, in particular the person name character sets supported, (e.g. ISO-IR-100.)
Referenced Performed Procedure Step Sequence	(0008,1111)	The sequence shall have 0 or 1 items for Centricity™ PACS. For new acquisitions, it shall reference the MPPS from modalities or Centricity™ PACS. For historical fetches from long-term archive, this sequence shall have 0 items.
>Referenced SOP Class UID	(0008,1150)	Always set to 1.2.840.10008.3.1.2.3.3 (Modality Performed Procedure Step SOP Class)
>Referenced SOP Instance UID	(0008,1155)	Copy from matched PPS SOP Instance UID.
>Performed Workitem Code Sequence	(0040,4019)	The sequence shall have 1 item.
>> Code Value	(0008,0100)	Always set to "110005".
>> Coding Scheme Designator	(0008,0102)	Always set to "DCM".
>> Code Meaning	(0008,0104)	Always set to "Interpretation".
Study Instance UID	(0020,000D)	Copy from matched Study Instance UID.
Referenced Series Sequence	(0008,1115)	Sequence of items where each item includes references to instances within the same series. One or more items shall be included in this sequence.
>Series Instance UID	(0020,000E)	Copy from matched Series Instance UID.
>Referenced SOP Sequence	(0008,1199)	Sequence of items where each item includes a reference to a single instance within this series. One or more items shall be included in this sequence.
>>Referenced SOP Class UID	(0008,1150)	Copy from matched SOP Class UID.
>>Reference SOP Instance UID	(0008,1155)	Copy from matched SOP Instance UID.
>>Instance Availability	(0008,0056)	Supported values are: • "ONLINE": If the SOP Instance is on any short-term storage device • "NEARLINE": If the SOP Instance is not available on any short-term storage device but is available on a local long-term storage device • "OFFLINE": If the SOP Instance is not available on any short-term or local long-term storage device but is available on a remote long-term storage device • "UNAVAILABLE": If the SOP Instance is not available on any short-term or long-term storage device
>>Retrieve AE Title	(0008,0054)	Always set to "GEPACS" or other configured DAS AE Title.

9.1.2.1.2 Receiving DIMSE N-CREATE-RSP Messages

The Send AE is able to process all standard status codes in the DIMSE N-CREATE-RSP message received from the peer application, in response to the IAN request (i.e. N-CREATE-RQ) message.

9.2 EXTENDED CHARACTER SETS

Only the following character sets are supported by the Send AE for the DICOM Instance Availability Notification SOP Class:

- ISO-IR-100 (ISO 8859-1)

No other extended character sets are supported.

10. CENTRICITY™ PACS DICOM CONFORMANCE STATEMENT FOR PRINT SERVICE

10.1 INTRODUCTION

Centricity™ PACS implements a DICOM Print Server (denoted CPS for short in this section) for the PACS users to print the images to a connected DICOM Printer SCP application. This Conformance Statement is completely independent of the other Conformance Statements specified in Sections 2 through 9 of this document.

10.2 IMPLEMENTATION MODEL

The CPS creates one single DICOM Application Entity to support the print service.

Multiple CPS instances can run in one Centricity™ PACS installation.

10.2.1 Application Data Flow Diagrams

The CPS AE implements the SCU role of the DICOM Basic Grayscale Print Management Meta SOP Class.

With this SCU role, the CPS AE is able to retrieve the printer information, to accept printer status event report and to print images.

The real-world activity that triggers the CPS AE to start an association for image print is an image print request issued by the Centricity™ PACS RA1000 Workstation user. However, the print job is performed in an asynchronous way, from the point of view of the Workstation user.

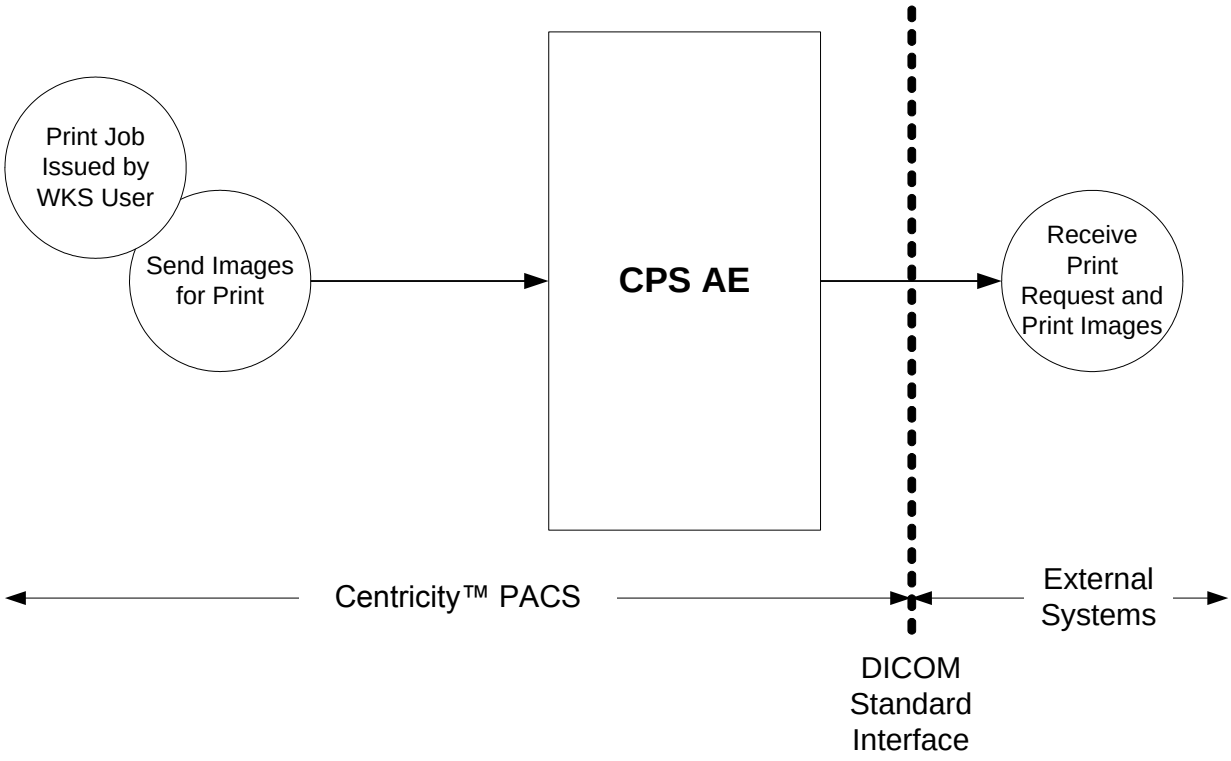


FIGURE 10-1. DATA FLOW DIAGRAM OF DICOM PRINT SERVER (CPS) AE

When starting a print job, the CPS AE attempts to send all images specified in the job to the DICOM Print SCP application for printing. The job will be removed, which indicates a successful completion of the job, only after all images are sent.

Note: With each print job performed, the CPS AE successfully sends all images as well as print formatting information specified in the job to the DICOM Print SCP application for printing. However, the CPS AE cannot guarantee that these images are printed. The user should check the DICOM Conformance Statement of the Print SCP application for the specified actions after a successful completion of a DICOM association.

10.2.2 Functional Definitions of AEs

The CPS AE supports the following application-level functions:

- Format a film sheet by filling the images into the film sheet according to the print format requested in the print job.
- Burn all (text and graphic) overlays into the image pixel data matrix.
- Perform all densitometry transforms to the image pixel data matrix as specified in the print job.
- Perform all spatial transforms to the image pixel data matrix as specified in the print job.
- Send the image pixel data matrix to the DICOM Print SCP application for print.

10.3 STANDARD SPECIFICATION

The CPS AE provides the Standard Conformance to the DICOM Basic Grayscale Print Management Meta SOP Class, which includes the SOP Classes listed in Table 10-1.

TABLE 10-1. SCU CONFORMANCE LIST OF SOP CLASSES FOR DICOM PRINT SERVER (CPS) AE

SOP Class Name	SOP Class UID	SOP Class Type
Basic Film Session	1.2.840.10008.5.1.1.1	Standard
Basic Film Box	1.2.840.10008.5.1.1.2	Standard
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Standard
Printer	1.2.840.10008.5.1.1.16	Standard

10.3.1 Association Establishment Policies

The CPS AE initiates a network association to a DICOM Print SCP application for performing a print job, which may include one or more images.

10.3.1.1 General

The DICOM Application Context Name (ACN), which is always proposed by the CPS AE, is

Name	UID
DICOM Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length of PDU negotiation is included in an association establishment request. The Maximum Length of PDU proposed for all associations initiated by the CPS AE is configurable (see Section 2.6.7) up to:

Maximum Length of PDU	28,672 Bytes

The CPS AE does not propose SOP class Extended Negotiation in any DICOM association it initiates.

The CPS AE does not propose (SCU/SCP) Role Selection Negotiation in any DICOM association it initiates. The default role always applies; the CPS AE plays the SCU role because it initiates an association.

The user information items sent by the CPS AE include:

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

10.3.1.2 Number of Associations

The CPS AE is able to initiate multiple associations to different Print SCP Application Entities at a time to perform DIMSE service elements. The maximum number of simultaneous DICOM associations that can be initiated, is determined by the total number of the remote DICOM Print SCP Application Entities known to the CPS AE.

to each remote DICOM Print SCP Application Entity, the CPS will not initiate another association before the currently operating association is completed.

10.3.1.3 Asynchronous Nature

The CPS AE does not support asynchronous operations. All operations will be performed synchronously.

10.3.1.4 Implementation Identifying Information

The CPS AE provides the Implementation Class UID, which is:

Implementation Class UID	1.2.840.113619.6.94

The CPS AE provides the Implementation Version Name, which is:

Implementation Version Name	CENTRICITY_3.0

10.3.1.5 Timers

10.3.1.5.1 Association Timers

The CPS AE supports an association timer, which starts when the association request is sent, and stops when the association is established.

10.3.1.5.2 Operation Inactivity Timer

The CPS AE supports an operation inactivity timer, which re-starts every time a DIMSE service request has been issued.

10.3.2 Real-World Activity: Print Job

The CPS AE keeps polling the print job queue of the Centricity™ PACS system. If one print job is retrieved, it initiates an association to the DICOM Print SCP application specified in the job, as long as there is no association currently running with the requested DICOM Print SCP application.

If another job is currently being printed, then the print job waits until the other print job is completed, and then the job is printed.

Note: If several printers are served with one DICOM Print Server, which is able to support only one DICOM Application Entity, the CPS AE can operate only one association with the DICOM Print Server simultaneously.

10.3.2.1 Associated Read-World Activity

A Centricity™ PACS RA1000 Workstation user selects one or several or all images from an exam, and issues a print command. The user also specifies the film format as well as the printer that should perform the print job. Refer to Figure 10-1.

10.3.2.2 Proposed Presentation Contexts

The CPS AE will propose the Presentation Context listed in Table 10-2 to request a print service to a remote AE.

TABLE 10-2. PROPOSED PRESENTATION CONTEXTS FOR CPS AE AND PRINT IMAGES

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

The Basic Grayscale Print Management Meta SOP class listed in Table 10-2 can use any of three different Transfer Syntaxes (i.e. Explicit VR Big Endian, Explicit VR Little Endian or Implicit VR Little Endian).

The column "Transfer Syntax" in Table 10-2 list all transfer syntaxes that the CPS AE can propose for the Abstract Syntax Basic Grayscale Print Management Meta SOP Class. The CPS AE can be configured to propose the Presentation Context with one or several or all of these transfer syntaxes.

If multiple transfer syntaxes are chosen to be proposed in the Presentation Context, they are included in the order displayed in Table 10-2.

10.3.2.2.1 SOP Specific Conformance for Printer SOP Class

After a successful association negotiation, the CPS AE issues an N-GET-RQ message in order to retrieve the contents of the well-known Printer SOP Instance (SOP Instance UID is 1.2.840.10008.5.1.1.17).

The attributes list that the CPS AE requests is specified in Table 10-3.

TABLE 10-3. ATTRIBUTE LIST REQUESTED BY CPS AE IN N-GET OPERATION

Data Element	Tag	Description
Printer Status	(2110,0010)	Printer device status
Printer Status Info	(2110,0020)	Additional information about printer device
Printer Name	(2110,0030)	Printer name
Manufacturer	(0008,0070)	Manufacturer of the printer
Manufacturer's Model Name	(0008,1090)	Manufacturer's model name of the printer
Device Serial Number	(0018,1000)	Manufacturer's serial number of the printer
Software Version	(0018,1020)	Manufacturer's designation of software version of the printer
Date of Last Calibration	(0018,1200)	Date when the printer was last calibrated.
Time of Last Calibration	(0018,1201)	Time when the printer was last calibrated.

If the N-GET-RQ fails, the CPS AE will release the association and terminate the print job.

The CPS AE accepts N-EVENT-REPORT-RQ from the well-known Printer SOP instance at any time of the lifecycle of the print association.

The CPS will release the association if the Printer Status Info attribute contains one of the following values in either N-GET-RSP or N-EVENT-REPORT-RQ messages received from the called AE:

- "RECEIVER FULL"
- "NO RECEIVE MGZ"
- "PRINTER INIT"
- "SUPPLY EMPTY"
- "NO SUPPLY MGZ"
- "FILM JAM"

In these conditions, the CPS AE assumes that the called AE is not in a normal operating state to continue any print job sent to it. It is also assumed that a manual intervention is required, to correct this condition.

The CPS AE accepts an N-EVENT-REPORT-RSP including any standard event attributes and acknowledges the receipt of the message immediately by sending an N-EVENT-REPORT-RSP message to the well-known Printer SOP instance.

10.3.2.2.2 SOP Specific Conformance for Basic Film Session SOP Class

After a successful check of the Printer attributes (see Section 10.3.2.2.1), the CPS AE creates a Basic Film Session by invoking N-CREATE-RQ message. The data attributes listed in Table 10-4 are provided in the N-CREATE-RQ message.

TABLE 10-4. ATTRIBUTE LIST OF N-CREATE-RQ FOR CREATION OF BASIC FILM SESSION

Data Element	Tag	Value Sent by CPS AE
Number of Copies	(2000,0010)	Number of copies requested. The CPS AE sends value one (1) or two (2).
Print Priority	(2000,0020)	The default value sent by the CPS AE is MEDIUM. Three values can be sent: • LOW • MEDIUM • HIGH These are configured by the CPS user.
Medium Type	(2000,0030)	The default value sent by the CPS AE is CURRENT. Four values can be sent: • CURRENT • PAPER • CLEAR_FILM • BLUE_FILM These are configured by the CPS user.
Film Destination	(2000,0040)	The default value sent by the CPS AE is CURRENT. Three values can be sent: • CURRENT • MAGAZINE • PROCESSOR These are configured by the CPS user.

Data Element	Tag	Value Sent by CPS AE
Film Session Label	(2000,0050)	DICOM_PRINT
Memory Allocation	(2000,0060)	0

The CPS AE waits for receiving an N-CREATE-RSP message from the called AE as response to the Basic Film Session creation request. According to the received N-CREATE-RSP message, the CPS AE behaves as following:

- If the creation of the Basic Film Session fails, the CPS AE releases the association and terminates the print job.
- If the creation of the Basic Film Session succeeds, the CPS AE continues to create all film box instances for the print job. After completion of the print job, the CPS AE deletes the Basic Film Session instance by invoking an N-DELETE-RQ message.
- Except the N-DELETE-RQ message after completion of the entire print job, the CPS AE does not send any message to the created Basic Film Session instance. In particular, the CPS AE never executes the print job at the Basic Film Session level by invoking an N-ACTION-RQ message to the Basic Film Session instance.

10.3.2.2.3 SOP Specific Conformance for Basic Film Box SOP Class

After successful creation of a Basic Film Session instance, the CPS AE creates one Basic Film Box to the Basic Film Session instance. The attributes listed in Table 10-5 are provided in the N-CREATE-RQ message.

TABLE 10-5. ATTRIBUTE LIST OF N-CREATE-RQ FOR CREATION OF BASIC FILM BOX

Data Element	Tag	Value Sent by CPS AE
Image Display Format	(2010,0010)	STANDARD\C,R $1 \le C \le 4$ $1 \le R \le 6$
Referenced Film Session Sequence	(2010,0500)	
> Referenced SOP Class UID	(0008,1150)	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	UID returned by the called AE
Film Orientation	(2010,0040)	PORTRAIT
Film Size ID	(2010,0050)	One of the following values: • 8IN×10IN • 10IN×12IN • 10IN×14IN • 11IN×14IN • 14IN×14IN • 14IN×17IN • 24CM×24CM • 24CM×30CM These are configured by the CPS user.
Magnification Type	(2010,0060)	The default value sent by the CPS AE is CUBIC. Four values can be sent: • CUBIC • REPLICATE • BILINEAR • NONE These are configured by the CPS user.

Data Element	Tag	Value Sent by CPS AE
Maximum Density	(2010,0130)	The default value sent by the CPS AE is 264. Other values can be if configured by the CPS user. The maximum value can be sent is 400.
Configuration Information	(2010,0150)	A user-defined value can be sent. This value is configured according to the Conformance Statement of the called AE.
Border Density	(2010,0100)	The default value sent by the CPS AE is BLACK. Two values can be sent: • BLACK • WHITE These are configured by the CPS user.
Empty Image Density	(2010,0110)	The default value sent by the CPS AE is BLACK. Two values can be sent: • BLACK • WHITE These are configured by the CPS user.
Minimum Density	(2010,0120)	0
Trim	(2010,0140)	The default value sent by the CPS AE is YES. Two values can be sent: • YES • NO These are configured by the CPS user.

In the N-CREATE-RSP message sent to the CPS AE from the called AE, the CPS AE expects to receive a set of created Basic Grayscale Image Box instances. The number of the Basic Grayscale Image Box instances should match to the Image Display Format attribute sent to the called AE.

According to the received N-CREATE-RSP message, the CPS AE behaves as following:

- If the creation of the Basic Film Box fails, the CPS AE releases the association and terminates the print job.
- If the creation of the Basic Film Box succeeds, the CPS AE fills the created Image Boxes in the film box by sending the pixel data and other descriptive information (see Section 10.3.2.2.4). After successfully completion of setting all image boxes, the CPS AE invokes an N-ACTION-RQ message to the Basic Film Box to print the film sheet. Finally, the CPS AE deletes the Basic Film Box instance by sending an N-DELETE-RQ message to the called AE.
- If not all images have printed, the CPS AE will create another Basic Film Box instance and repeat the operations in the last step to print the rest images.

10.3.2.2.4 SOP Specific Conformance for Basic Grayscale Image Box SOP Class

For each Basic Grayscale Image Box created in the Basic Film Box (see Section 10.3.2.2.3), the CPS AE issues a single N-SET-RQ message if an image should be printed in that Basic Grayscale Image Box. No N-SET-RQ message is sent if a Basic Grayscale Image Box should be blank (no image is printed at this location on the film sheet).

The data attributes listed in Table 10-6 are provided in the N-SET-RQ message.

TABLE 10-6. ATTRIBUTE LIST OF N-SET-RQ FOR FILLING IN IMAGE BOX

Data Element	Tag	Value Sent by CPS AE
Image Position	(2020,0010)	An ordinal number of the image in the specified display format.
Basic Grayscale Image Sequence	(2020,0110)	
> Samples per Pixel	(0028,0002)	1
> Photometric Interpretation	(0028,0004)	MONOCHROME2
> Rows	(0028,0010)	Number of rows of the pixel matrix
> Columns	(0028,0011)	Number of columns of the pixel matrix
> Pixel Aspect Ratio	(0028,0034)	This data element is sent if its value is not 1\1.
> Bits Allocated	(0028,0100)	16 or 8
> Bits Stored	(0028,0101)	12 or 8
> High Bit	(0028,0102)	11 or 7
> Pixel Representation	(0028,0103)	0
> Pixel Data	(7FE0,0010)	Pixel data stream
Requested Image Size	(2020,0030)	Requested image width in mm. The CPS AE sends this data element only if the user requested a true-size image print.

10.4 COMMUNICATION PROFILES

10.4.1 Supported Communication Stacks

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

10.4.2 TCP/IP Stack

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

10.4.2.1 Physical Media Support

The Centricity™ PACS 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™ PACS installation site and interface equipment commercially available.

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

10.4.3 OSI Stack

Not supported.

10.4.4 Point-to-Point Stack

Not supported.

10.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

None.

10.6 CONFIGURATION

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

10.6.1 AE Title

The AE Title of the CPS can be configured by the user. If multiple CPS systems are used in the same Centricity™ PACS installation, they can be configured with different AE Titles.

10.6.2 IP Address and TCP Port Number

The IP Address and TCP Port Number of the CPS can be configured by the user. If multiple CPS systems are used in the same Centricity™ PACS installation, each CPS must be configured with a unique IP address.

10.6.3 CPS Time-Out

Association time-out

Association operation inactivity time-out

10.7 SUPPORT FOR EXTENDED CHARACTER SETS

The DICOM Print Server does not support any extended character sets:

10.8 CODES AND CONTROLLED TERMINOLOGY

The product uses no coded terminology.

10.9 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:

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

11. CENTRICITY™ PACS DICOM CONFORMANCE STATEMENT FOR GENERAL PURPOSE WORKLIST SERVICE

This section describes the conformance statement of the General Purpose Worklist Service function s supported in Centricity™ PACS. They are implemented in GPWL SCP AE as the SCP role of the DICOM General Purpose Worklist SOP classes.

11.1 DICOM GPWL SERVICE REQUEST FROM REMOTE AE

The GPWL SCP AE constantly listens for the incoming associations in order to service a DICOM General Purpose Worklist request from a remote AE.

The GPWL SCP AE is able to accept a Presentation Context for the General Purpose Worklist Meta SOP Class either in a dedicated association or in the same association shared by other Presentation Contexts. These include DICOM Storage (Section 4) as well as Storage Commitment SOP Classes. (Section 7).

The GPWL SCP AE is able to accept multiple DICOM associations simultaneously. The maximum number of concurrent associations that the GPWL SCP AE can accept for serving DICOM GPWL Query requests is configurable (see Section 2.6.2 and Table 2-6).

11.1.1 Associated Real-World Activities

The following real-world activities are associated with the GPWL service request operation (refer to Figure 2-10)

- Searches for the available workitems in the Centricity™ PACS database.
- Sends the found workitem dataset as a GPWL response to the remote AE.
- The GPWL AE will create a GP-SPS object or update a previously created GP-SPS object depending on the DIMSE requests (N-ACTION).
- The GPWL AE will establish a link between a created GP-SPS object and its parent exam, to which the GP-SPS(workitem) contributes.
- The GPWL AE will create a GP-PPS object of update a previously created GP-PPS object depending on the DIMSE requests(N-CREATE or N-SET)
- The received DIMSE N-CREATE-RQ or N-SET-RQ messages are queued in the Centricity™ PACS MPPS Message Routing Queue for message forwarding, if one or more GP-PPS forwarding destinations have been configured in the system.

11.1.2 Accepted Presentation Context

Table 11-1 shows the presentation contexts acceptable by the GPWL SCP AE

TABLE 11-1. ACCEPTABLE PRESENTATION CONTEXTS FOR GPWL SCP AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification (Echo)	1.2.840.10008.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Verification (Echo)	1.2.840.10008.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
Verification (Echo)	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
General Purpose Worklist Management Meta SOP Class	1.2.840.10008.5.1.4.32	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
General Purpose Worklist Management Meta SOP Class	1.2.840.10008.5.1.4.32	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
General Purpose Worklist Management Meta SOP Class	1.2.840.10008.5.1.4.32	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
General Purpose Worklist Information Model – FIND SOP Class	1.2.840.10008.5.1.4.32.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
General Purpose Worklist Information Model – FIND SOP Class	1.2.840.10008.5.1.4.32.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
General Purpose Worklist Information Model – FIND SOP Class	1.2.840.10008.5.1.4.32.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
General Purpose Scheduled Procedure Step SOP Class	1.2.840.10008.5.1.4.32.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
General Purpose Scheduled Procedure Step SOP Class	1.2.840.10008.5.1.4.32.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
General Purpose Scheduled Procedure Step SOP Class	1.2.840.10008.5.1.4.32.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

11.1.2.1 SOP Specific Conformance Statement for General Purpose Scheduled Procedure Step SOP Class

The GPWL AE provides the conformance to the General Purpose Scheduled Procedure Step SOP Class as SCP. The GPWL AE uses DIMSE service element N-ACTION to receive the GP-SPS messages.

After successfully receiving and processing the GP-SPS N-ACTION request, the GPWL AE will create and maintain a GP-SPS object with General Purpose Scheduled Procedure Step Status (0040,4001) as "IN-PROGRESS". GPWL SCP AE will only process the GP-SPS message with "IN-PROGRESS" status only if the attribute Input Availability Flag (0040,4020) as "COMPLETED" which indicates the availability of all composite SOP instance in the Attribute "Input Information Sequence" (0040,4021) are readily available to access in Centricity™ PACS. The GPWL AE will allow updates of the GP-SPS object's contents by receiving and processing the subsequent N-ACTION messages from the remote application until the General Purpose Scheduled Procedure Step Status (0040, 4001) is either "COMPLETED" or "DISCONTINUE".

If the GP-SPS object with General Purpose Scheduled Procedure Step Status (0040,4001) has "IN-PROGRESS" for a long period of time, Centricity™ PACS will clean the GP-SPS object based on the configuration, Similarly GP-SPS object in "DISCONTINUE" will also be cleaned. Based on the Centricity™ PACS configuration how long the GP-SPS object with the status of "COMPLETED" or "DISCONTINUE" will be persistent in the Centricity™ PACS database.

11.1.2.1.1 Receiving DIMSE N-ACTION-RQ Messages

The GPWL AE accepts a DIMSE N-ACTION-RQ message for creation of a GP-SPS object in the Centricity™ PACS. The GPWL AE supports the following data in the received N-ACTION request:

TABLE 11-2. DATA ELEMENTS SUPPORTED IN GP-SPS N-ACTION REQUEST

Data Element	Tag	Description
General Purpose Scheduled Procedure Step Status	(0040,4001)	
Transaction UID	(0008,1195)	
Actual Human Performers Sequence	(0040,4035)	
>Human Performer Code Sequence	(0040,4009)	
>>Code Value	(0008,0100)	
>>Coding Scheme designator	(0008,0102)	
>>Code Meaning	(0008,0104)	
>Human Performer's Name	(0040,4037)	
>Human Performer's Organization	(0040,4036)	

After successfully receiving and processing the GP-SPS N-ACTION request, the GPWL AE will create and maintain the GP-SPS object.

11.1.2.1.2 Sending DIMSE N-ACTION-RSP Messages

The GPWL AE will return a Success Status Code in the N-ACTION-RSP message to indicate that a GP-SPS object has been successfully created.

The GPWL AE will return a Failure Status Code in the N-ACTION-RSP message if the received N-ACTION-RQ message cannot be processed due to the General Purpose Schedule Procedure Step Status attribute (0040,4001) containing a value other than "IN PROGRESS" or already "IN-PROGRESS" or wrong transaction UID used for updating the GP-SPS message in Centricity™ PACS database.

The GPWL AE returns the standard status codes in the N-ACTION-RSP message as specified in DICOM PS 3.7.

11.1.2.2 SOP Specific Conformance Statement for General Purpose Procedure Step SOP Class

The GPWL AE provides standard conformance to the General Purpose Performed Procedure Step SOP Class as SCP. The GPWL AE uses the DIMSE service element N-CREATE and N-SET to receive the GP-PPS messages.

After successfully receiving and processing a GP-PPS N-CREATE request, the GPWL AE will create and maintain a GP-PPS object. The GPWL AE will allow updates of the GP-PPS object's contents by receiving and processing DIMSE N-SET messages from a remote application (see Section 11.1.2.2.3), until the General Purpose Performed Procedure Step Status attribute (0040,4002) is updated to either "COMPLETED" or "DISCONTINUED". Once this attribute has been set to either of these values, the GPWL AE will no longer accept any updates to the GP-PPS object. The Centricity™ PACS may continue the workflow based on the configuration.

After the General Purpose Performed Procedure Step Status attribute (0040,4002) has been updated to either "IN PROGRESS" or "COMPLETED" or "DISCONTINUED", the GPWL AE may coerce Patient and Requested Procedure information. Refer to Section 4.2.3 for more explanation on data coercion.

The GPWL AE does not persistently store GP-PPS objects. Once an GP-PPS object has had its General Purpose Performed Procedure Step Status attribute (0040,4002) updated to either "COMPLETED" or "DISCONTINUED", and the corresponding GP-PPS message has been successfully forwarded to a remote AE, the Centricity™ PACS may delete this GP-PPS object.

11.1.2.2.1 Receiving DIMSE N-CREATE-RQ Messages

The GPWL AE accepts a DIMSE N-CREATE-RQ message for creation of a GP-PPS object in the Centricity™ PACS. The GPWL AE supports the following data elements in a received N-CREATE request:

TABLE 11-3. DATA ELEMENTS SUPPORTED IN GP-PPS N-CREATE REQUEST

Data Element	Tag	Description
Specific Character Set	(0008,0005)	
General Purpose Performed Procedure Step Relationship		
Referenced Request Sequence	(0040,A370)	
>Study Instance UID	(0020,000D)	
>Referenced Study Sequence	(0008,1110)	
>>Referenced SOP Class UID	(0008,1150)	
>>Referenced SOP Instance UID	(0008,1155)	
>Accession Number	(0008,0050)	
>Requested Procedure Code Sequence	(0032,1064)	

Data Element	Tag	Description
>>Code Value	(0008,0100)	
>>Coding Scheme Designator	(0008,0102)	
>>Coding Scheme Version	(0008,0103)	
>>Code Meaning	(0008,0104)	
>Placer Order Number/Imaging Service Request	(0040,2016)	
>Filler Order Number/Imaging Service Request	(0040,2017)	
>Requested Procedure ID	(0040,1001)	
>Requested Procedure Description	(0032,1060)	
Referenced General Purpose Schedule Procedure Step Sequence	(0040,4016)	
>Referenced SOP Class UID	(0008,1150)	
>Referenced SOP Instance UID	(0008,1155)	
>Referenced General Purpose Scheduled Procedure Step Transaction UID	(0040,4023)	
Patient's Name	(0010,0010)	
Patient ID	(0010,0020)	
Patient's Birth Date	(0010,0030)	
Patient's Sex	(0010,0040)	
General Purpose Performed Procedure Step Information		
Actual Human Performers Sequence	(0040,4035)	
>Human Performer Code Sequence	(0040,4009)	
>>Code Value	(0008,0100)	
>>Coding Scheme Designator	(0008,0102)	
>>Coding Scheme Version	(0008,0103)	
>>Code Meaning	(0008,0104)	
>Human Performer's Name	(0040,4037)	
>Human Performer's Organization	(0040,4036)	
Performed Procedure Step ID	(0040,0253)	
Performed Station Name Code Sequence	(0040,4028)	
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Performed Station Class Code Sequence	(0040,4029)	
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Performed Station Geographic Location Code Sequence	(0040,4030)	
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Performed Processing Applications Code Sequence	(0040,4007)	
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Performed Procedure Step Start Date	(0040,0244)	
Performed Procedure Step Start Time	(0040,0245)	
General Purpose Performed Procedure Step Status	(0040,4002)	

Data Element	Tag	Description
Performed Procedure Step Description	(0040,0254)	
Comments on Performed Procedure Steps	(0040,0280)	
Performed Workitem Code Sequence	(0040,4019)	
>Code Value	(0008,0100)	
>Coding Scheme Designator	(0008,0102)	
>Coding Scheme Version	(0008,0103)	
>Code Meaning	(0008,0104)	
Performed Procedure Step End Date	(0040,0250)	
Performed Procedure Step End Time	(0040,0251)	
General Purpose Results		
Output Information Sequence	(0040,4033)	
>Study Instance UID	(0020,000D)	
>Referenced Series Sequence	(0008,1115)	
>>Series Instance UID	(0020,000E)	
>>Retrieve AE Title	(0008,0054)	
>>Referenced SOP Sequence	(0008,1199)	
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	

After successfully receiving and processing a GP-PPS N-CREATE request, the GPWL AE will create and maintain a GP-PPS object.

If the Affected SOP Instance UID attribute is supplied in the received N-CREATE request, the GPWL AE will assign this SOP Instance UID to the newly created GP-PPS object.

If the Affected SOP Instance UID attribute is not supplied in the received N-CREATE request, the GPWL AE will generate a new SOP Instance UID for the newly created GP-PPS object, and return this UID in the N-CREATE response message.

The GPWL AE will support the receiving of all GP-PPS messages, with instances of any Storage SOP Classes referenced. In other words, if the Storage AE does not support a particular Storage SOP Class (i.e. that SOP Class is not listed in Table 2-2), the GPWL AE will still be able to receive the GP-PPS message that references instances of this SOP Class and forward the GP-PPS message on, if GP-PPS forwarding is enabled, as described in Section 8.2.

11.1.2.2.2 Sending DIMSE N-CREATE-RSP Messages

The GPWL AE will return a Success Status Code in the N-CREATE-RSP message to indicate that a GP-PPS object has been successfully created.

The GPWL AE will return a Failure Status Code in the N-CREATE-RSP message if the received N-CREATE-RQ message cannot be processed due to the General Purpose Performed Procedure Step Status attribute (0040,4002) containing a value other than "IN PROGRESS" or Refused because Referenced General Purpose Scheduled Procedure Step Transaction UID does not match the Transaction UID of the N-ACTION request.

The GPWL AE returns the standard status codes in the N-CREATE-RSP message as specified in DICOM PS 3.7.

11.1.2.2.3 Receiving DIMSE N-SET-RQ Messages

The GPWL AE accepts a DIMSE N-SET-RQ message for updates of a GP-PPS object created in the Centricity™ PACS by a previous N-CREATE request. The GPWL AE supports the following data elements in a received N-SET request:

TABLE 11-4. DATA ELEMENTS SUPPORTED IN GP-PPS N-SET REQUEST

Data Element	Tag	Description
General Purpose Performed Procedure Step Status	(0040,4002)	
Performed Procedure Step Description	(0040,0254)	
Comments on Performed Procedure Steps	(0040,0280	
Performed Procedure Step End Date	(0040,0250)	
Performed Procedure Step End Time	(0040,0251)	
General Purpose Results		
Output Information Sequence	(0040,4033)	
>Study Instance UID	(0020,000D)	
>Referenced Series Sequence	(0008,1115)	
>>Series Instance UID	(0020,000E)	
>>Retrieve AE Title	(0008,0054)	
>>Referenced SOP Sequence	(0008,1199)	
>> Referenced SOP Class UID	(0008,1150)	
>> Referenced SOP Instance UID	(0008,1155)	

After Centricity™ PACS creates a GP-PPS object per an N-CREATE request, a remote DICOM application can send one or more N-SET requests to update the GP-PPS object in Centricity™ PACS. The GPWL AE accepts an N-SET-RQ message and updates the requested GP-PPS object as long as the current status of the General Purpose Performed Procedure Step Status attribute (0040,4002) is "IN PROGRESS". The status of the GP-PPS object is updated per the attribute value specified for the General Purpose Performed Procedure Step Status attribute (0040,4002) which are both included in the N-SET request.

A GP-PPS status of "COMPLETED" or "DISCONTINUED" is considered a "Final State" of a GP-PPS object. A N-SET request will be the last update request allowed to a created GP-PPS object, if it updates the status of the GP-PPS object to one of these two values. In the last N-SET request, there are a number of required attributes, which must be present as specified in the "Description" column of Table 11-4. After a GP-PPS object has had its status changed to either "COMPLETED" or "DISCONTINUED, no further N-SET requests can be accepted for that GP-PPS object.

The GPWL AE will support the sending of all GP-PPS messages, with instances of any Send SOP Classes referenced. In other words, if the Send AE does not support a particular Send SOP Class (i.e. that SOP Class is not listed in Table 2-1), the GPWL AE will still be able to send the GP-PPS message that references instances of this SOP Class, if GP-PPS forwarding is enabled,

11.1.2.2.4 Sending DIMSE N-SET-RSP Messages

The GPWL AE will return a Success Status Code in the N-SET-RSP message to indicate that the GP-PPS object has been successfully updated.

The GPWL AE will return a Failure Status Code in the N-SET-RSP message for the following reasons:

- The requested GP-PPS object cannot be found in Centricity™ PACS. Failure type = No such object instance.
- The requested GP-PPS object has previously reached the final state ("COMPLETED" or "DISCONTINUED"). The General Purpose Performed Procedure Step object may no longer be updated. Failure type = Processing failure.

The GPWL AE returns the standard status codes in the N-SET-RSP message as specified in DICOM PS 3.7

11.1.2.3 SOP Specific Conformance Statement for General Purpose Worklist Information SOP Class

The GPWL AE provides the conformance to the General Purpose Worklist Information SOP Class as SCP. The GPWL AE uses DIMSE service element C-FIND to receive the GP-SPS messages.

After successfully receiving and processing the GPWL Query C-FIND request, the GPWL AE will create workitems (i.e. GP-SPS) object with General Purpose Scheduled Procedure Step Status (0040,4001) as "SCHEDULED" based upon the Centricity™ PACS request procedure state and configuration.

The GPWL AE will receive and process the GPWL Query C-FIND request only for the following tasks in the attribute "Scheduled Workitem Code Sequence" (0040,4018). The task (i.e. workitems) are list in the following table:

SUPPORTED TASKS FOR THE GPWL SERVICE

Coding Scheme Designator (0008,0102)	Code Value (0008,0100)	Code Meaning (0008,0104)
DCM	110001	Image Processing
DCM	110002	Quality Control
DCM	110003	Computer Aided Diagnosis
DCM	110004	Computer Aided Detection
DCM	110005	Interpretation
DCM	110008	Print

For more information on the completed list of tasks supported by the General Purpose Worklist Meta SOP class, please refer to the PS3-16 CID 9231

11.1.2.3.1 Receiving DIMSE C-FIND-RQ Messages

The GPWL AE accepts a DIMSE C-FIND-RQ message for query the workitems(i.e. GP-SPS) object in the Centricity™ PACS. The GPWL AE supports the following data in the received C-FIND request:

TABLE 11-5. DATA ELEMENTS SUPPORTED IN GPWL C-FIND REQUEST

Description	Tag	Usage
Patient's Name*	(0010,0010)	Matching
Patient ID	(0010,0020)	Matching
Patient's Birth Date	(0010,0030)	Matching
Patient's Sex	(0010,0040)	Matching
Other Patient IDs	(0010,1000)	Matching
Ethnic Group	(0010,2160)	Matching
Issuer of Patient ID	(0010,0021)	Matching
Scheduled Procedure Step Start Date and Time	(0040,4005)	Matching
General Purpose Scheduled Procedure Step Status	(0040,4001)	Matching
Input Availability Flag	(0040,4020)	Matching
Scheduled Workitem Code Sequence	(0040,4018)	
>Code Value	(0008,0100)	Matching
>Coding Scheme Designator	(0008,0102)	Matching
>Code Meaning	(0008,0104)	Matching
Referenced Request Sequence	(0040,A370)	
>Requested Procedure ID	(0040,1001)	Matching

Description	Tag	Usage
>Accession Number	(0080,0050)	Matching
>Referenced Study Sequence	(0008,1110)	
>>Referenced SOP Instance UID	(0008,1155)	Matching

*: The Q/R SCP AE accepts a multi-valued Patient's Name data element as a matching key, if the Alphabetic Name is fully qualified. If the Alphabetic Name is partially qualified, only a single-valued Patient's Name element can be used as a matching key.

11.1.2.3.2 Sending DIMSE C-FIND-RSP Messages

The GPWL AE will send the a DIMSE C-FIND-RSP message that may include all the attributes listed in Table 11-6. The list of attributes added to the C-FIND-RSP are provided by the Centricity™ PACS database. Each item sent in the DIMSE C-FIND-RSP message is a workitem (i.e. GP-SPS data set) object with the General Purpose Scheduled Procedure Step Status (0040,4001) as "SCHEDULED".

TABLE 11-6. DATA ELEMENTS SUPPORTED IN GPWL C-FIND RESPONSE

Data Element	Tag	Usage
SOP Common		
SOP Instance UID	(0008,0018)	Returned
General Purpose Scheduled Procedure Step Information		
General Purpose Scheduled Procedure Step Status	(0040,4001)	Returned
Input Availability Flag	(0040,4020)	Returned
Scheduled Workitem Code Sequence	(0040,4018)	Returned
>Code Value	(0008,0100)	Returned
>Coding Scheme Designator	(0008,0102)	Returned
>Code Meaning	(0008,0104)	Returned
Scheduled Processing Applications Code Sequence	(0040,4004)	Returned
>Code Value	(0008,0100)	Returned
>Coding Scheme Designator	(0008,0102)	Returned
>Code Meaning	(0008,0104)	Returned
Scheduled Station Name Code Sequence	(0040,4025)	Returned
>Code Value	(0008,0100)	Returned
>Coding Scheme Designator	(0008,0102)	Returned
>Code Meaning	(0008,0104)	Returned
Scheduled Station Class Code Sequence	(0040,4026)	Returned
>Code Value	(0008,0100)	Returned
>Coding Scheme Designator	(0008,0102)	Returned
>Code Meaning	(0008,0104)	Returned
Scheduled Station Geographic Location Code Sequence	(0040,4027)	Returned
>Code Value	(0008,0100)	Returned
>Coding Scheme Designator	(0008,0102)	Returned
>Code Meaning	(0008,0104)	Returned
Scheduled Procedure Step Start Date And Time	(0040,4005)	Returned
Input Information Sequence	(0040,4021)	Returned
>Study Instance UID	(0020,000D)	Returned
>Referenced Series Sequence	(0008,1115)	Returned
>>Series Instance UID	(0020,000E)	Returned
>>Retrieve AE Title	(0008,0054)	Returned
>>Referenced SOP Sequence	(0008,1199)	Returned

Data Element	Tag	Usage
>>>Referenced SOP Class UID	(0008,1150)	Returned
>>>Referenced SOP Instance UID	(0008,1155)	Returned
General Purpose Scheduled Procedure Step Relationship		
Referenced Request Sequence	(0040,A370)	Returned
>Study Instance UID	(0020,000D)	Returned
Patient Identification		
Patients Name	(0010,0010)	Returned
Patient ID	(0010,0020)	Returned
Patient Demographic		
Patients Birth Date	(0010,0030)	Returned
Patients Sex	(0010,0040)	Returned

Several query return keys are not supported by the GPWL C-FIND response in Centricity™ PACS as the implementation of GPWL is designed to offer minimal support.

11.1.2.3.3 Matching Operations

11.1.2.3.3.1 Date and Time Keys Matching Operations

Refer to the Section 6.1.2.3.4.1

11.2 SEND GP-PPS CREATION AND UPDATE REQUESTS TO REMOTE AE

The Send AE initiates a DICOM association to send (i.e. forward) GP-PPS messages to a remote AE.

The Send AE provides a guaranteed, reliable service for forwarding the received GP-PPS messages. Every received GP-PPS message will be forwarded to a remote AE(s). All received GP-PPS messages are forwarded with complete message fidelity/integrity.

The Send AE may initiate a single DICOM association for sending a GP-PPS message to multiple destinations.

11.2.1 Associated Real-World Activity

The following real-world activity will cause the Send AE to initiate a DICOM association for sending GP-PPS messages (refer to Figure 2-7):

- There is a pending GP-PPS forwarding job in the Centricity™ PACS MPPS Message Routing Queue.

11.2.2 Proposed Presentation Context

The Send AE will propose the following Presentation Context in order to send GP-PPS N-CREATE and N-SET requests to a remote AE.

TABLE 11-7. PROPOSED PRESENTATION CONTEXT FOR GP-PPS SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
General Purpose Performed Procedure Step SOP Class	1.2.840.10008.5.1.4.32.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

The Transfer Syntax column in Table 11-7 list all transfer syntaxes that the Send AE can propose for the Abstract Syntax "General Purpose Performed Procedure Step SOP Class". The DICOM Server can be configured to propose the Presentation Contexts with one or several or all of these transfer syntaxes.

11.2.2.1 SOP Specific Conformance Statement for General Purpose Performed Procedure Step SOP Class

The Centricity™ PACS receives N-CREATE-RQ messages from the originating GP-PPS SCU (i.e. 3rd Party Workstation), creates an GP-PPS object, and forwards this N-CREATE-RQ message on to remote AEs. Similarly, the Centricity™ PACS does not, of itself, change the status of existing GP-PPS objects. It receives N-SET-RQ messages from the originating GP-PPS SCU (i.e. 3rd Party Workstation), updates the GP-PPS object, and forwards this N-SET-RQ message on to remote AEs.

The Send AE will periodically poll the MPPS Message Routing Queue, if one or more GP-PPS forwarding destinations have been configured in the system.

If GP-PPS forwarding is enabled by configuration, the Send AE will send the queued GP-PPS DIMSE N-CREATE-RQ or N-SET-RQ messages to the specified forwarding destination(s) in one or more associations negotiated with the Presentation Contexts shown in Table 11-7.

11.2.2.1.1 Sending DIMSE N-CREATE-RQ Messages

The Send AE will send a DIMSE N-CREATE-RQ message that may include all the attributes listed in Table 11-3. The list of attributes included in the N-CREATE-RQ message depends upon the list of attributes that were sent by the originating GP-PPS SCU (i.e. 3rd Party Workstation). The Centricity™ PACS does not add any attributes.

In all DIMSE N-CREATE-RQ messages sent by the Send AE, the Affected SOP Instance UID will be always filled in with a valid value by the Centricity™ PACS system.

11.2.2.1.2 Sending DIMSE N-SET-RQ Messages

The Send AE will send a DIMSE N-SET-RQ message that may include all attributes listed in Table 11-4. The list of attributes included in the N-SET-RQ message depends upon the list of attributes that were sent by the originating GP-PPS SCU (i.e. 3rd Party Workstation). The Centricity™ PACS does not add any attributes.

11.2.2.1.3 Receiving DIMSE N-CREATE-RSP Messages

The Send AE is able to process all standard status codes in the DIMSE N-CREATE-RSP message received from the peer application, in response to the GP-PPS request (i.e. N-CREATE-RQ) message.

11.2.2.1.4 Receiving DIMSE N-SET-RSP Messages

The Send AE is able to process all standard status codes in the DIMSE N-SET-RSP messages received from the peer application, in response to the GP-PPS request (i.e. N-SET-RQ) message.

11.3 EXTENDED CHARACTER SETS

Only the following character sets are supported by the GPWL AE and the Send AE for the DICOM General Purpose Worklist Meta SOP Class:

- ISO-IR-100 (ISO 8859-1)

No other extended character sets are supported.

12. ANNEXES

12.1 CREATED SOP INSTANCE (S)

This section specifies each IOD created by the Centricity™ PACS. It shall describe the Attribute names, tag, VR, and values. Following table gives overview of each IOD created by Centricity™ PACS:

SOP Class	SOP Class UID
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Image Availability Notification	1.2.840.10008.5.1.4.33

Following are the list of abbreviation used to represent the presence of the module and data source.

Module Presence

- VNAP Value Not Always Present
- ANAP Attribute Not Always Present
- ALWAYS Always Present with a value
- EMPTY Attribute is sent without a value

Data Source

- MWL the attribute value source Modality Worklist
- USER the attribute value source is from User input
- AUTO the attribute value is generated automatically
- MPPS the attribute value source Modality Performed Procedure Step
- CONFIG the attribute value source is a configurable parameter

12.1.1 Grayscale Softcopy Presentation State

IE	Module	Presence
Patient	Patient	ALWAYS
Study	General Study	ALWAYS
	Patient Study	ALWAYS
Series	General Series	ALWAYS
	Presentation Series	ALWAYS
Equipment	General Equipment	ALWAYS
Presentation State	Presentation State	ALWAYS
	Display Shutter	Only if Shutter applied
	Displayed Area	ALWAYS
	Graphic Annotation	Only if Graphic Annotations are present
	Spatial Transformation	Only if Spatial Transformation applied
	Graphic Layer	Only if Graphic Annotations are present
	Modality LUT	ALWAYS
	Softcopy VOI LUT	ALWAYS
	Softcopy Presentation LUT	ALWAYS
	SOP Common	ALWAYS
	Private Application	ALWAYS

12.1.2 Key Object Selection Document

IE	Module	Presence
Patient	Patient	ALWAYS
Study	General Study	ALWAYS
	Patient Study	ALWAYS
Series	Key Object Document Series	ALWAYS
Equipment	General Equipment	ALWAYS
Presentation State	Key Object Document	ALWAYS
	SOP Common	ALWAYS
	Private Application	ALWAYS

12.1.3 Instance Availability Notification

Module	Presence
SOP Common	ALWAYS
Instance Availability Notifications	ALWAYS

12.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

12.2.1 Image Thumbnails Added to DICOM Images

The DICOM standard specifies an Icon Image Sequence. However, this sequence does not support icon bit depths greater than 8 or true color (RGB) icons. The GE Private Image Thumbnail Sequence is an enhancement that incorporates this additional functionality.

12.2.1.1 Image thumbnail

Centricity™ PACS will create a thumbnail for each DICOM Image SOP Instance of the following Photometric Interpretation values:

- MONOCHROME1
- MONOCHROME2
- RGB

The thumbnail is derived from the original pixel data by downscaling the image size to 128 × 128 pixels or less, and added to the original SOP Instance with a private sequence data element in the DICOM Image SOP Instance.

One thumbnail is created per DICOM image. For a multi-frame image, only one thumbnail is created from the center frame. The number of the frame, which is used for the thumbnail creation, is included in the Image SOP Instance.

In Centricity™ PACS, the thumbnails are used by the Centricity™ Enterprise Web display application for image navigation when browsing through a set of images. With the information published in this Annexes, a DICOM application receiving the images from Centricity™ PACS can also explore the thumbnail data encoded in the Image SOP Instances.

12.2.1.2 Image thumbnail compression

The thumbnail is compressed with either 8-bit or 12-bit JPEG lossy compression format, depending on the stored pixel depth of the original images.

For all Image SOP Instances with the data element "Bits Stored" equal to or less then 8, the thumbnail image is stored one byte per pixel and compressed by JPEG 8-bit lossy compression.

For all Image SOP Instances with the data element "Bits Stored" equal to or less 12, the thumbnail image is stored two bytes per pixel and compressed by JPEG 12-bit lossy compression.

For all Image SOP Instances with the data element "Bits Stored" greater than 12, the pixel data of the thumbnail image is first shifted to fit into the 12-bit scope and then stored two bytes per pixel. The thumbnail is compressed by JPEG 12-bit lossy compression. The number of bits shifted is saved in the GE Private Image Thumbnail Sequence, as specified in Section 11.3.

All thumbnails are represented in the unsigned format (either one byte or two bytes (12-bit) integer). If an Image SOP Instance contains a signed pixel data element, the thumbnail pixel data will be offset to the unsigned scope. The offset added is saved in the GE Private Image Thumbnail Sequence, as specified in the next section.

12.2.1.3 Image thumbnail Encoding

Centricity™ PACS adds a private sequence data element (GE Private Image Thumbnail Sequence) to an Image SOP Instance for the thumbnail encoding. There is no change to the existing data attributes of the SOP Instance.

The GE Private Image Thumbnail Sequence is specified in Table 12-1.

TABLE 12-1. SPECIFICATION OF GE PRIVATE IMAGE THUMBNAIL SEQUENCE

Data Element	Tag	VR	VM	Description
Private Creator ID	(0009,00xx)	LO	1	"GEIIS". Reserve Element Numbers 0000-00FF of group 0009 in the SOP Instance.
GE Private Image Thumbnail Sequence	(0009,xx10)	SQ	1	Always only one item present
> Samples per Pixel	(0028,0002)	US	1	Copy from the original SOP Instance
> Photometric Interpretation	(0028,0004)	CS	1	Thumbnail Photometric Interpretation. Enumerated Values: • MONOCHROME1 • MONOCHROME2 • RGB
> Planar Configuration	(0028,0006)	US	1	Thumbnail Planar Configuration. Always 0, if present.
> Number of Frames	(0028,0008)	IS	1	Copy from the original SOP Instance. The thumbnail itself is always single frame.
> Rows	(0028,0010)	US	1	Thumbnail Rows of Image Matrix ≤ 128.
> Columns	(0028,0011)	US	1	Thumbnail Columns of Image Matrix ≤ 128.
> Bits Allocated	(0028,0100)	US	1	Copy from the original SOP Instance
> Bits Stored	(0028,0101)	US	1	Copy from the original SOP Instance. If this value is 8 or less, the thumbnail JPEG stream is 8-bit compressed, otherwise, it is 12-bit compressed.
> High Bit	(0028,0102)	US	1	Copy from the original SOP Instance
> Pixel Representation	(0028,0103)	US	1	Copy from the original SOP Instance
> Largest Image Pixel Value	(0028,0107)	US/ SS	1	Copy from the original SOP Instance
> Pixel Padding Value	(0028,0120)	US/ SS	1	Copy from the original SOP Instance
> Window Center	(0028,1050)	DS	1-n	Copy from the original SOP Instance
> Window Width	(0028,1051)	DS	1-n	Copy from the original SOP Instance
> Rescale Intercept	(0028,1052)	DS	1	Copy from the original SOP Instance
> Rescale Slope	(0028,1053)	DS	1	Copy from the original SOP Instance
> Private Creator ID	(0029,00xx)	LO	1	"GEIIS". Reserve Element Numbers 1000-10FF of group 0029 in this item.
> Shift Count	(0029,xx10)	UL	1	The number of bits that the pixel values were shifted down, in order to get them into the 12-bit range before JPEG compression.
> Offset	(0029,xx12)	UL	1	Value added to pixel values to convert them from signed to unsigned values before JPEG compression.
> Actual Frame Number	(0029,xx14)	UL	1	Actual frame number of image the thumbnail was generated from. For multi-frame images, this should represent the center frame. Only one thumbnail is created for the entire multi-frame image.
> Private Creator ID	(7FD1,00xx)	LO	1	"GEIIS". Reserve Element Numbers 1000-10FF of group 7FD1 in this item.
> GE IIS Compression Type	(7FD1,xx10)	UL	1	Centricity™ PACS internally used data compression code. Always 26 for thumbnail.

Data Element	Tag	VR	VM	Description
> Pixel Data	(7FE0,0010)	OB	1	8-bit or 12-bit JPEG lossy compressed thumbnail image pixel data stream.

Where: xx = 00 to FF

The GE Private Image Thumbnail Sequence includes a number of standard data elements directly copied from the original Image SOP Instance, to which the sequence is added. These data elements are marked as "**Copy from the original SOP Instance"** in the Description column of Table 12-1. These data elements provide the original pixel data context from which the thumbnail has been derived. Note that they do not contain the values specific to the thumbnail.

The GE Private Image Thumbnail Sequence uses a number of standard data elements to describe the properties of the thumbnail pixel data. Note that these data elements in this sequence really contain the values specific to the thumbnail, but not to the original image pixel data.

12.2.2 Private Data Elements of Original UID Values

When Centricity™ PACS changes the values of Study Instance UID, Series Instance UID and/or SOP Instance UID, the original UID values are saved as private data elements in the same data set, as shown in Table 12-2.

TABLE 12-2. PRIVATE DATA ELEMENTS FOR ORIGINAL UID VALUES

Data Element	Tag	VR	VM	Description
Private Creator ID	(0907,00xx)	LO	1	"GEIIS". Reserve Element Numbers 0000-00FF of group 0907 in the SOP Instance.
Original Study Instance UID	(0907,xx10)	UI	1	The value of the original Study Instance UID, which has been changed into the current value in (0020,000D).
Original Series Instance UID	(0907,xx20)	UI	1	The value of the original Series Instance UID, which has been changed into the current value in (0020,000E).
Original SOP Instance UID	(0907,xx30)	UI	1	The value of the original SOP Instance UID, which has been changed into the current value in (0008,0018).

Where: xx = 00 to FF

Centricity™ PACS changes the UID values for resolving any conflict of the UID values in the received data set to the UID values maintained in the Centricity™ PACS database.

12.2.3 Private Date Elements of Significant/ Reject/ Confidential

When Centricity™ PACS archives or sends out the SOP Instance the values of Significant, Reject, Confidential flag of the Image and Patient are saved as private data elements in the same data set, as shown in Table 12-3.

TABLE 12-3. PRIVATE DATA ELEMENTS FOR SIGNIFICANT/REJECT/CONFIDENTIAL VALUES

Data Element	Tag	VR	VM	Description
Private Creator ID	(0903,00xx)	LO	1	"GEIIS PACS". Reserve Element Numbers 0000-00FF of group 0903 in the SOP Instance.
Reject Image Flag	(0903,xx10)	UI	1	The value of 0 or 1 will be stored to indicate if the image is rejected or not.
Significant Flag	(0903,xx11)	UI	1	The value of 0 or 1 will be stored to indicate if the image is significant or not.
Confidential Flag	(0903,xx12)	UI	1	The value of 0 or 1 will be stored to indicate if the image belongs to a confidential patient.

Where: xx = 00 to FF

12.2.4 Private Date Elements of Grayscale Softcopy Presentation State IOD

When Centricity™ PACS creates the Grayscale Softcopy Presentation State IOD add the private annotations, shutter, etc., are saved as private data elements in the same data set, as shown in Table 12-4.

TABLE 12-4. PRIVATE DATA ELEMENTS FOR ANNOTATIONS/SHUTTER/ETC VALUES

Data Element	Tag	VR	VM	Description
Private Creator ID	(0071,00xx)	LO	1	"GEIIS_RA1000". Reserve Element Numbers 0000-00FF of group 0071 in the SOP Instance.
Annotation Modal Type	(0071,xx01)	CS	1	Eight possible values: ANGLE, ARROW, LINE, OVAL, POLYGON, RECT, SPINELABEL, and TEXT.
Private GSPS Type	(0071,xx10)	CS	1	2 possible values: DISPLAYLIST and NONDISPLAYLIST
Private Font Name	(0071,xx20)	ST	1	Font used for Text Annotation
Private Font Style	(0071,xx21)	US	1	Style code of the font used for Text Annotation
Private Font Size	(0071,xx22)	US	1	Point Size of the font used for Text Annotation
Annotation State View	(0071,xx23)	US	1	Index for an annotation that corresponds to the order it should appear in the statistics view display of the workstation.
Private ID	(0071,xx24)	US	1	ID assigned to an annotation.
Private Creator ID	(0019,00xx)	LO	1	"GEIIS_RA1000". Reserve Element Numbers 0000-00FF of group 0019 in the SOP Instance.
Private Shutter Shape	(0019,xx01)	CS	1	The actual shutter shape if it differs from the shape specified in the public Shutter Shape tag (0018,1600).
Private Creator ID	(0029,00xx)	LO	1	"GEIIS_RA1000". Reserve Element Numbers 0000-00FF of group 0029 in the SOP Instance.
Calibration Pixel Spacing User	(0029,xxA1)	ST	1	The user that calibrated and saved the pixel spacing for the image
Calibration Pixel Spacing Date	(0029,xxA2)	DA	1	The date the user calibrated the pixel spacing
Calibration Pixel Spacing Time	(0029,xxA3)	TM	1	The time the user calibrated the pixel spacing

Where: xx = 00 to FF

12.2.5 Private Date Elements of Compression Information

When Centricity™ PACS compresses the pixel data of the image, adds the private data element in the same data set with compression information, as shown in Table 12-5.

TABLE 12-5. PRIVATE DATA ELEMENTS COMPRESSION TYPE INFORMATION VALUES

Data Element	Tag	VR	VM	Description
Private Creator ID	(7FD1,00xx)	LO	1	"GEIIS". Reserve Element Numbers 0000-00FF of group 7FD1 in the SOP Instance.
Compression Type	(7FD1,xx10)	UL	1	Compression type used to encode the pixel data.
Frame Offsets	(7FD1,xx20)	UL	1-n	Frame Offset values.
Sub-band Level	(7FD1,xx30)	UL	1	Maximum sub-band levels in multi-resolution image.
Row Count Sub-Band	(7FD1,xx40)	UL	1-n	Row count for a level in multi-resolution image.
Column Count Sub-Band	(7FD1,xx50)	UL	1-n	Column Count for a level in multi-resolution image.
Byte Count sub-Band	(7FD1,xx60)	UL	1-n	Byte Count for a level in multi-resolution image.

Where: xx = 00 to FF

12.2.6 Private Date Elements of Assigning Authority Information

When Centricity™ PACS acquires, archives or sends out the SOP Instance the values of Assigning authority of the patient identifier are saved as private data elements in the same data set, as shown in Table 12-6.

TABLE 12-6. PRIVATE DATA ELEMENTS FOR GLOBAL ASSIGNING AUTHORITY VALUES

Data Element	Tag	VR	VM	Description
Private Creator ID	(0905,00xx)	LO	1	"GEIIS PACS". Reserve Element Numbers 0000-00FF of group 0903 in the SOP Instance.
Assigning Authority	(0905,xx10)	LO	1	Global Assigning Authority value.

Where: xx = 00 to FF

12.3 CODED TERMINOLOGY AND TEMPLATES

None

12.4 GRAYSCALE IMAGE CONSISTENCY

The high-resolution display monitor attached to Centricity™ PACS can be calibrated according to the Grayscale Standard Display Function (GSDF). The Service/Installation Tool is used together with a luminance meter to measure the Characteristic Curve of the display system and the current ambient light.

12.5 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

None

12.6 PRIVATE TRANSFER SYNTAXES

The DICOM Server supports the following Private Transfer Syntax:

TABLE 12-7. PRIVATE TRANSFER SYNTAX

Transfer Syntax Name	UID
GE Private Compress Express	2.16.840.1.113709.1.2.2

This Private Transfer Syntax has been applied for the DICOM Server to propose and accept the Presentation Contexts for all DICOM Standards Storage SOP Classes that the DICOM Server supports (see Sections 3 and 4). It uses Explicit VR and Big Endian format for the data set encoding, and the GE proprietary CompressXpress™ and TruRez™ image compression algorithms for the pixel data compression. No pixel data encapsulation is applied.

It is expected that other vendors' applications will ignore all Presentation Contexts proposed with the GE Private Compress Express Transfer Syntax.

12.7 PIXEL SPACING HANDLING

The Centricity™ PACS RA1000 Workstation supports use of the pixel spacing attributes described below for different types of images to calculate and display information about images, including region of interest (ROI) and measurement information. The user is strongly advised to verify the logic below is compatible with the pixel spacing information provided by the modalities used at their site.

12.7.1 User Calibrated Pixel Spacing

The Centricity™ PACS RA1000 Workstation allows a user to measure and calibrate the pixel spacing for an image and save it to a GSPS object in DICOM tag (0070,0101) Presentation Pixel Spacing. Furthermore the name of the user and date/time of the calibration are saved in private DICOM tags (0029,xxA1), (0029,xxA2), and (0029,xxA3) as shown in Table 12-4. User calibrated pixel spacing takes priority over all other pixel spacing handling.

12.7.2 Pixel Spacing for Ultrasound Images

Since ultrasound images have different pixel spacing per region, pixel spacing from a GSPS object is generally ignored unless it was for a user calibrated pixel spacing saved by the Centricity™ PACS RA1000 Workstation which is indicated by the presence of private DICOM tags (0029,xxA1), (0029,xxA2), and (0029,xxA3) shown in Table 12-4. If there is no user calibrated pixel spacing provided, the Centricity™

PACS RA1000 Workstation will utilize the region specific pixel spacing from the DICOM tag (0018,6011) Sequence of Ultrasound Regions.

12.7.3 Pixel Spacing for non-Ultrasound Images

If a GSPS object is applied to an image, the Centricity™ PACS RA1000 Workstation will utilize pixel spacing information from DICOM tag (0070,0101) Presentation Pixel Spacing if present and use it in place of any pixel spacing information from the image header.

If there is no user calibrated pixel spacing and no GSPS object applied to the image display, the next source of pixel spacing is from the image header.

The Centricity™ PACS RA1000 Workstation will check the image header of non-ultrasound images for existence of DICOM tag (0028,0030) Pixel Spacing. If that doesn't exist, it will check for DICOM tag (0018,1164) Imager Pixel Spacing. The order of checking can be reversed by setting a workstation configuration property.

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