ClearCanvas ImageServer

DICOMConformance Statement

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1. COMFORMANCE STATEMENT OVERVIEW

The ClearCanvas ImageServeris a DICOM server. The ImageServersoftware is composed of a web based interface used for administration and viewing of images and a Windows service. The ImageServer has a scalable design that allows it to run on a single server or a cluster of servers.

Note that the ImageServer is released as three different editions:

- ClearCanvas ImageServer, Community Edition
- ClearCanvas ImageServer, Team Edition
- ClearCanvas ImageServer, Veterinary Team Edition (marketed as DigitalVet Manager)

The ImageServer supports long term storage of images, waveforms, reports, and measurements. It also supports querying of its contents by remote systems, and retrieval of the stored objects. It also contains a rules engine for defining retention times of studies, compression of online studies, and auto-routing of studies to other DICOM devices.

In addition to listing the DICOM network services supported by the ImageServer, the following table also tells which types of images can be viewed in the ImageServer Web GUI.

Table 1-1
NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)	**Viewing**
Image Transfer			
Computed Radiography Image Storage	Yes	Yes	Yes
CT Image Storage	Yes	Yes	Yes
Digital Intra-oral X-Ray Image Storage – For Presentation	Yes	Yes	Yes
Digital Intra-oral X-Ray Image Storage – For Processing	Yes	Yes	Yes
Digital Mammography X-Ray Image Storage – For Presentation	Yes	Yes	Yes
Digital Mammography X-Ray Image Storage – For Processing	Yes	Yes	Yes
Digital X-Ray Image Storage – For Presentation	Yes	Yes	Yes
Digital X-Ray Image Storage – For Processing	Yes	Yes	Yes
Enhanced CT Image Storage	Yes	Yes	Limited
Enhanced MR Image Storage	Yes	Yes	Limited
Enhanced XA Image Storage	Yes	Yes	Limited
Enhanced XRF Image Storage	Yes	Yes	Limited
Hardcopy Grayscale Image Storage SOP Class (Retired)	Yes	Yes	No

Hardcopy Color Image Storage SOP Class (Retired)	Yes	Yes	No
MR Image Storage	Yes	Yes	Yes
Multi-frame 1 Color Secondary Capture Image Storage	Yes	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	Yes	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	Yes	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	Yes	Yes	No
Nuclear Medicine Image Storage (Retired)	Yes	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes	Yes
Ophthalmic Photography 16 Bit Image Storage	Yes	Yes	Yes
Ophthalmic Photography 8 Bit Image Storage	Yes	Yes	Yes
Ophthalmic Tomography Image Storage	Yes	Yes	No
Positron Emission Tomography Image Storage	Yes	Yes	Yes
RT Image Storage	Yes	Yes	Yes
Secondary Capture Image Storage	Yes	Yes	Yes
Ultrasound Image Storage	Yes	Yes	Yes
Ultrasound Image Storage (Retired)	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage (Retired)	Yes	Yes	Yes
Video Endoscopic Image Storage	Yes	Yes	No
Video Microscopic Image Storage	Yes	Yes	No
Video Photographic Image Storage	Yes	Yes	No
VL Endoscopic Image Storage	Yes	Yes	No
VL Microscopic Image Storage	Yes	Yes	No
VL Photographic Image Storage	Yes	Yes	No
VL Slide-Coordinates Microscopic Image Storage	Yes	Yes	No
X-Ray 3D Angiographic Image Storage	Yes	Yes	No
X-Ray 3D Craniofacial Image Storage	Yes	Yes	No
X-Ray Angiographic Bi-Plane Image Storage (Retired)	Yes	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes	Yes

X-Ray Radiofluoroscopic Image Storage	Yes	Yes	Yes
Query/Retrieve			
Study Root Information Model FIND	No	Yes	
Study Root Information Model MOVE	No	Yes	
Patient Root Information Model FIND	No	Yes	
Patient Root Information Model MOVE	No	Yes	
Waveforms, Notes, Reports, Measurements Transfer			
12-lead ECG Waveform Storage	Yes	Yes	No
Ambulatory ECG Waveform Storage	Yes	Yes	No
Basic Text SR	Yes	Yes	No
Basic Voice Audio Waveform Storage	Yes	Yes	No
Blending Softcopy Presentation State Storage SOP Class	Yes	Yes	No
Cardiac Electrophysiology Waveform Storage	Yes	Yes	No
Chest CAD SR	Yes	Yes	No
Color Softcopy Presentation State Storage SOP Class	Yes	Yes	No
Comprehensive SR	Yes	Yes	No
Deformable Spatial Registration Storage	Yes	Yes	No
Encapsulated CDA Storage	Yes	Yes	No
Encapsulated PDF Storage	Yes	Yes	No
Enhanced SR	Yes	Yes	No
General ECG Waveform Storage	Yes	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	Yes	Yes	Yes, Key Object Selections Only
Hemodynamic Waveform Storage	Yes	Yes	No
Key Object Selection Document	Yes	Yes	Yes, Images Only
Mammography CAD SR	Yes	Yes	No
MR Spectroscopy Storage	Yes	Yes	No
Procedure Log Storage	Yes	Yes	No
Pseudo-Color Softcopy Presentation State Storage SOP Class	Yes	Yes	No
Raw Data Storage	Yes	Yes	No
Real World Value Mapping Storage	Yes	Yes	No
RT Beams Treatment Record Storage	Yes	Yes	No
RT Brachy Treatment Record Storage	Yes	Yes	No
RT Dose Storage	Yes	Yes	No
RT Ion Beams Treatment Record Storage	Yes	Yes	No

RT Ion Plan Storage	Yes	Yes	No
RT Plan Storage	Yes	Yes	No
RT Structure Set Storage	Yes	Yes	No
RT Treatment Summary Record Storage	Yes	Yes	No
Segmentation Storage	Yes	Yes	No
Spatial Fiducials Storage	Yes	Yes	No
Spatial Registration Storage	Yes	Yes	No
Standalone Curve Storage (Retired)	Yes	Yes	No
Standalone Modality LUT Storage (Retired)	Yes	Yes	No
Standalone Overlay Storage (Retired)	Yes	Yes	No
Standalone PET Curve Storage (Retired)	Yes	Yes	No
Standalone VOI LUT Storage (Retired)	Yes	Yes	No
Stereometric Relationship Storage	Yes	Yes	No
Stored Print Storage SOP Class (Retired)	Yes	Yes	No
X-Ray Radiation Dose SR	Yes	Yes	No

2. TABLE OF CONTENTS

3. INTRODUCTION

3.1 REVISION HISTORY

Document Version	Date of Issue	Author	Description
1.0	December 11, 2008	Steve Wranovsky	Version for Final Review
1.1	July 1, 2009	Steve Wranovsky	Version for Final Review, updates for 1.5 Web Release
1.2	February 22, 2010	Steve Wranovsky	Version for Final review, updates for 2.0 Web Release
1.3	May 19, 2011	Steve Wranovsky	Version for final review, updates for the 3.5 Team Edition Release
1.4	September 11, 2011	Steve Wranovsky	Updates for 4.0 Team Edition Release
1.5	November 22, 2011	Steve Wranovsky	Updates for 5.0 Team Edition Release. Includes support for PDF MIME type.
1.6	January 20, 2011	Steve Wranovsky	Updates for 6.0 Veterinary Team Edition Release. Includes support for Veterinary Tags in queries.
1.7	March 12, 2012	Thanh Huynh	Updates for 6.1 Team Edition Release. Includes information on Character Set support in C-FIND SCP.
1.72	November 1, 2012	Thanh Huynh	Updates for 6.2 Team Edition Release. Corrected the list of supported transfer syntaxes.

3.2 AUDIENCE

This document is written for the people that need to understand how ClearCanvas ImageServer will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3 REMARKS

The scope of this DICOM Conformance Statement is to facilitate integration between the ClearCanvas ImageServer and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

— The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.

— Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4 TERMS AND DEFINITIONS

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association – a network communication channel set up between *Application Entities*.

Attribute – – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile – the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).

Module – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.

Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.

Service Class Provider (SCP) – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU) – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).

Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 BASICS OF DICOM COMMUNICATION

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statementare highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects,each of which is called an *Abstract Syntax* for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called *Presentation Contexts.* The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the AssociationNegotiation also allows the devices to agree on *Roles* – which one is the *Service Class User* (SCU– client) and which is the*Service Class Provider* (SCP– server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The AssociationNegotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no AssociationNegotiation possible, they both use a *Media Application Profile* that specifies "pre-negotiated" exchange media format, Abstract Syntax, and Transfer Syntax.

3.6 ABBREVIATIONS

Abbreviations should be listed here. These may be taken from the following list, deleting terms that are not used within the Conformance Statement, and adding any additional terms that are used:

AE	Application Entity
AET	Application Entity Title
CAD	Computer Aided Detection
CDA	Clinical Document Architecture
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
CR	Computed Radiography
CT	Computed Tomography
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DNS	Domain Name System
DX	Digital X-ray
GSPS	Grayscale Softcopy Presentation State
HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
Ipv4	Internet Protocol version 4
Ipv6	Internet Protocol version 6
ISO	International Organization forStandards
IO	Intra-oral X-ray
JPEG	Joint Photographic Experts Group
LUT	Look-up Table
MPEG	Moving Picture Experts Group
MG	Mammography (X-ray)

MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance Imaging
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NM	Nuclear Medicine
NTP	Network Time Protocol

- Optional (Key Attribute)

OP	Ophthalmic Photography
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit
R	Required (Key Attribute)
RF	Radiofluoroscopy
RIS	Radiology Information System.
RT	Radiotherapy
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
UL	Upper Layer
US	Ultrasound
VL	Visible Light
VR	Value Representation
XA	X-ray Angiography

3.7 REFERENCES

NEMA PS3 Digital Imaging and Communications in Medicine(DICOM) Standard, available free at http://medical.nema.org/

4. NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

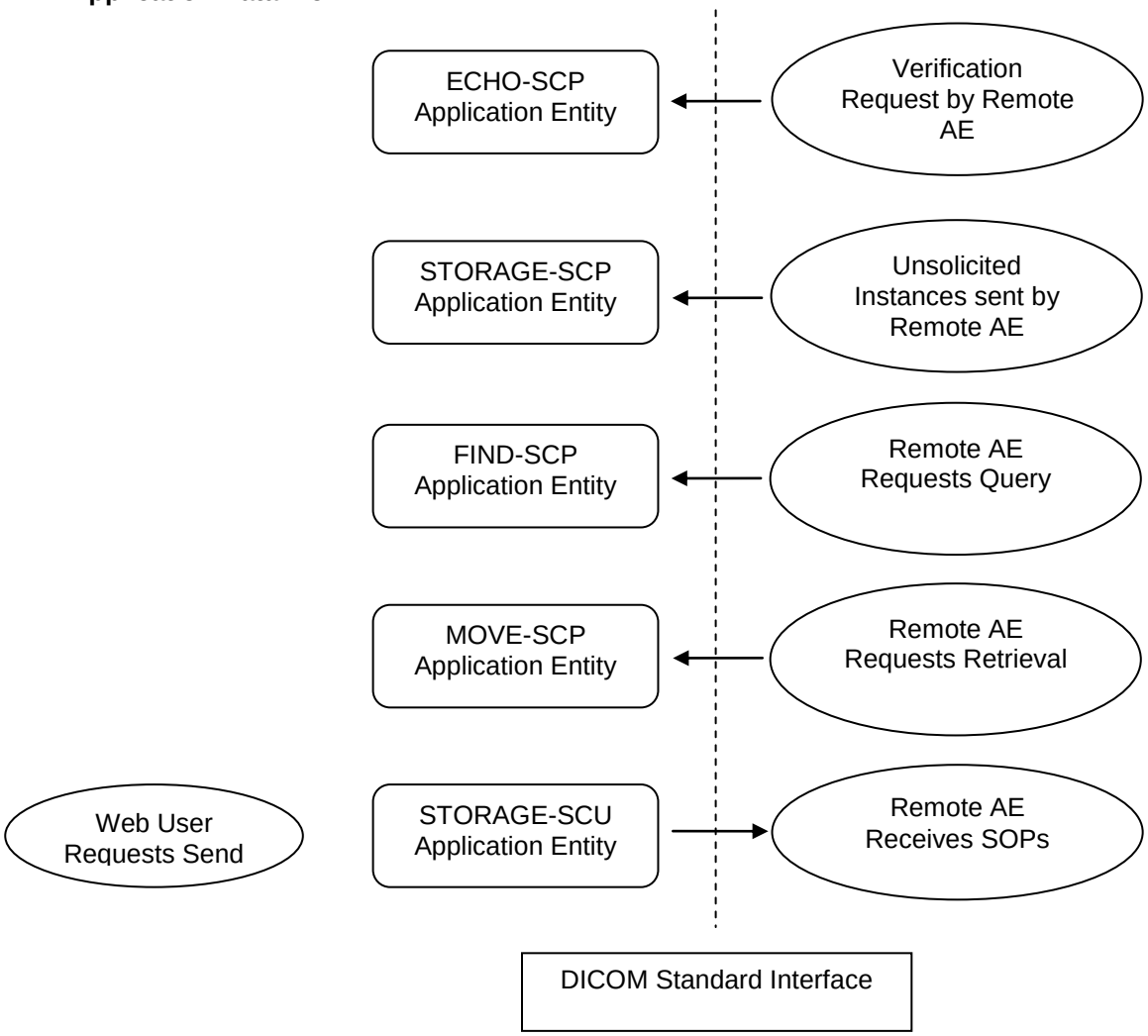

Figure 4.1-1
IMPLEMENTATION MODEL

The application is a .NET application that provides a Web based user interface, internal database and network listener that spawns additional threads as necessary to handle incoming connections.

Conceptually, the network services may be modeled as the following separate Aes, though in fact all the Aes share a single (configurable) AE Title:

— ECHO-SCP, which responds to verification requests

— STORAGE-SCP, which receives incoming composite instances

— FIND-SCP, which receives incoming queries for lists of studies

— MOVE-SCP, which responds to requests for studies

— STORAGE-SCU, which sends outbound composite instances

4.1.2 Functional Definitions of AE's

4.1.2.1 ECHO-SCP

ECHO-SCP waits in the background for connections, will accept associations with Presentation Contexts for the SOP Class of the Verification Service Class, and will respond successfully to echo requests.

4.1.2.2 STORAGE-SCP

STORAGE-SCP waits in the background for connections, will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class, and will store the received instances to the local database where they may subsequently be listed and viewed through the user interface.

4.1.2.3 FIND-SCP

FIND- SCP waits in the background for connections, will accept associations with Presentation Contexts for the SOP Class of the Study Root Query/Retrieve Information Model – FIND Service Class or the Patient Root Query/Retrieve Information Model – FIND Service Class, and will respond successfully to query requests.

4.1.2.4 MOVE-SCP

MOVE-SCP waits in the background for connections, will accept associations with Presentation Contexts for the SOP Class of the Study Root Query/Retrieve Information Model – MOVE Service Class or the Patient Root Query/Retrieve Information Model – MOVE Service Class, and will respond successfully to retrieve requests by initiating storage of instances to the remote Application Entity.

4.1.2.5 STORAGE-SCU

STORAGE-SCU is activated through the user interface when a user selects studies from the local database and requests that they be sent to a remote AE (selected from a pre-configured list).

4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background and are not dependent on any sequencing.

All SCU activities are initiated throughthe user interface, with the exception of STORAGE-SCU which is also initiated by MOVE-SCP in order to store the requested instances.

4.2 AE SPECIFICATIONS

4.2.1 ECHO-SCP

4.2.1.1 SOP Classes

ECHO-SCP provides Standard Conformance to the following SOP Class(es):

Table 4.2-1
SOP CLASSES SUPPORTED BY ECHO-SCP

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

4.2.1.2 Association Policies

4.2.1.2.1 General

ECHO-SCP accepts but never initiates associations.

Table 4.2-2
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR ECHO-SCP

Maximum PDU size received	114kB (approximate)

4.2.1.2.2 Number of Associations

Table 4.2-3
NUMBER OF ASSOCIATIONS AS A SCP FOR ECHO-SCP

Maximum number of simultaneous associations	Unlimited

4.2.1.2.3 Asynchronous Nature

ECHO-SCP will only allow a single outstanding operation on an Association. Therefore, ECHO-SCP will not perform asynchronous operations window negotiation.

4.2.1.2.4 Implementation Identifying Information

Table 4.2-4
DICOM IMPLEMENTATION CLASS AND VERSION FOR ECHO-SCP

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

4.2.1.3 Association Initiation Policy

ECHO-SCP does not initiate associations.

4.2.1.4 Association Acceptance Policy

When ECHO-SCP accepts an association, it will respond to echo requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be rejected.

4.2.1.4.1 Activity – Receive Echo Request

4.2.1.4.1.1 Description and Sequencing of Activities

As requests are received, they are responded to immediately.

4.2.1.4.1.2 Accepted Presentation Contexts

Table 4.2-5
ACCEPTABLE PRESENTATION CONTEXTS FOR ECHO-SCP AND RECEIVE ECHO REQUEST

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

4.2.1.4.1.2.1 Extended Negotiation

No extended negotiation is performed.

4.2.1.4.1.3 SOP Specific Conformance

4.2.1.4.1.3.1 SOP Specific Conformance to Verification SOP Class

ECHO-SCP provides standard conformance to the Verification Service Class.

4.2.1.4.1.3.2 Presentation Context Acceptance Criterion

ECHO-SCP will only accept a Presentation Context compatible with the one listed in Table 4.2-5.

4.2.1.4.1.3.3 Transfer Syntax Selection Policies

If proposed, ECHO-SCPprefers the Explicit VR Little Endian Transfer Syntax.

ECHO-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same method for selecting a Transfer Syntax for each.

4.2.2 STORAGE-SCP

4.2.2.1 SOP Classes

STORAGE-SCP provides Standard Conformance to the following SOP Class(es):

Table 4.2-6
IMAGE SOP CLASSES SUPPORTED BY STORAGE-SCP

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1
Hardcopy Grayscale Image Storage SOP Class (Retired)	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage SOP Class (Retired)	1.2.840.10008.5.1.1.30
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Multi-frame 1 Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20

Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2

Table 4.2-7
NON-IMAGE SOP CLASSES SUPPORTED BY STORAGE-SCP

SOP Class Name	SOP Class UID
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22

General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
Standalone Curve Storage (Retired)	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage (Retired)	1.2.840.10008.5.1.4.1.1.10
Standalone Overlay Storage (Retired)	1.2.840.10008.5.1.4.1.1.8
Standalone PET Curve Storage (Retired)	1.2.840.10008.5.1.4.1.1.129
Standalone VOI LUT Storage (Retired)	1.2.840.10008.5.1.4.1.1.11
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3
Stored Print Storage SOP Class (Retired)	1.2.840.10008.5.1.1.27
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67

4.2.2.2 Association Policies

4.2.2.2.1 General

STORAGE-SCP accepts but never initiates associations.

Table 4.2-8
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR STORAGE-SCP

Maximum PDU size received	114kB (approx..)

4.2.2.2.2 Number of Associations

Table 4.2-9
NUMBER OF ASSOCIATIONS AS A SCP FOR STORAGE-SCP

Maximum number of simultaneous associations	Unlimited

4.2.2.2.3 Asynchronous Nature

STORAGE-SCP will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCP will not perform asynchronous operations window negotiation.

4.2.2.2.4 Implementation Identifying Information

Table 4.2-10
DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCP

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

4.2.2.3 Association Initiation Policy

STORAGE-SCP does not initiate associations.

4.2.2.4 Association Acceptance Policy

When STORAGE-SCP accepts an association, it will respond to storage requests.If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be rejected.

4.2.2.4.1 Activity – Receive Storage Request

4.2.2.4.2 Description and Sequencing of Activities

As instances are received, they are copied to the local file system and a record inserted into the local database. The STORAGE-SCP is configurable as to how it handles duplicate SOP Instances. It can Reject, ignore, or compare the SOP instances to the duplicates and display the differences in the web GUI.

4.2.2.4.2.1 Accepted Presentation Contexts

Table 4.2-11 contains the transfer syntaxes supported for Image SOP Classes and Table 4.2-12 contains the transfer syntaxes supported for Non-Image SOP Classes.

Table 4.2-11
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE-SCP AND RECEIVE STORAGE REQUEST FOR IMAGE SOP CLASSES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See Table 4.2-6	See Table 4.2-6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		RLE Lossless	1.2.840.10008.1.2.5	SCP	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCP	None

		JPEG Baseline (Process 1):	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Lossless, non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCP	None
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91	SCP	None

Table 4.2-12
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE-SCP AND RECEIVE STORAGE REQUEST FOR NON-IMAGE SOP CLASSES

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See Table 4.2-7	See Table 4.2-7	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

4.2.2.4.2.1.1 Extended Negotiation

No extended negotiation is performed, though STORAGE-SCP:

— is a Level 2 Storage SCP (Full – does not discard any data elements)

— does not support digital signatures

— In some cases, it may coerce the Patient Name, Patient ID, Issuer of Patient ID, Patient Birth Date, Patient Sex, and Accession Number fields.See section 8.1.1 for details.

4.2.2.4.2.2 SOP Specific Conformance

4.2.2.4.2.2.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCP provides standard conformance to the Storage Service Class.

4.2.2.4.2.2.2 Presentation Context Acceptance Criterion

STORAGE-SCP will always accept any Presentation Context for the supported SOPClasses with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.2.4.2.2.3 Transfer Syntax Selection Policies

The STORAGE-SCP will prefer Explicit Transfer Syntaxes over Implicit Transfer Syntaxes and it prefers lossless compressed Transfer Syntaxes over lossy compressed Transfer Syntaxes.

STORAGE-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same methodfor selecting a Transfer Syntax for each.

4.2.2.4.2.2.4 Response Status

STORAGE-SCP will behave as described in the Table below when generating the C-STORE response command message.

Table 4.2-13
RESPONSE STATUS FOR STORAGE-SCP AND RECEIVE STORAGE REQUEST

Service Status	Further Meaning	Status Codes	Reason
Failure	Refused: Out of Resources	A700	STORAGE-SCP does not have an online filesystem with sufficient space to store the incoming instance or the Study is currently being processed and cannot accept new instances at this time, or the study has been lossy compressed and cannot accept new instances.
	Duplicate SOP Instance	0111	The SOP Instance has been received already and the STORAGE-SCP is configured to reject duplicates.
	Attribute Value Out of Range	0116	SOP Instance UID, Study Instance UID, or Series Instance UID are longer than allowed by DICOM (greater than 64 characters)
	Processing Failure	0110	A failure was encountered when processing the SOP Instance or the study in which the SOP Instance belongs is Nearline and a new SOP Instance cannot be accepted.
Success		0000	

4.2.3 FIND-SCP

4.2.3.1 SOP Classes

FIND-SCP provides Standard Conformance to the following SOP Class(es):

Table 4.2-14
SOP CLASSES SUPPORTED BY FIND-SCP

SOP Class Name	SOP Class UID
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1

4.2.4.2 Association Policies

4.2.3.1.1 General

FIND-SCPaccepts but never initiates associations.

Table 4.2-15
Maximum PDU size received as a SCP for FIND-SCP

Maximum PDU size received	114kB (22pprox..)

4.2.3.1.2 Number of Associations

Table 4.2-16
Number of Associations as a SCP for FIND-SCP

Maximum number of simultaneous associations	Unlimited

4.2.3.1.3 Asynchronous Nature

FIND-SCP will only allow a single outstanding operation on an Association. Therefore, FIND-SCP will not perform asynchronous operations window negotiation.

4.2.3.1.4 Implementation Identifying Information

Table 4.2-17
DICOM Implementation Class and Version for FIND-SCP

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

4.2.3.2 Association Initiation Policy

FIND-SCP does not initiate associations.

4.2.3.3 Association Acceptance Policy

When FIND-SCP accepts an association, it will respond to query requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be rejected.

4.2.3.3.1 Activity – Receive Query Request

4.2.3.3.1.1 Description and Sequencing of Activities

When a query is received, the local database is queried for the result set.

4.2.3.3.1.2 Accepted Presentation Contexts

Table 4.2-18
Acceptable Presentation Contexts for FIND-SCP and Incoming Query from Remote AE

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See Table 4.2-14	See Table 4.2-14	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

4.2.3.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

In particular, relational queries are not supported.

4.2.3.3.1.3 SOP Specific Conformance

4.2.3.3.1.3.1 SOP Specific Conformance to C-FIND SOP Classes

FIND-SCP provides standard conformance to the supported C-FIND SOP Classes.

Only those attributes that are requested are returned in a C-FIND response. Some optional requested attributes will be returned for Patient Root queries as per Table 4.2-19. Note that all attributes are not available in all Editions of the ImageServer.

Table 4.2-19
PATIENT ROOT RESPONSE IDENTIFIER FOR FIND-SCP

Name	Tag	Types of Matching	Software Edition
PATIENT Level			
Patient ID	(0010,0020)	S,*,U	
Patient's Name	(0010,0010)	S,*,U	
Issuer of Patient ID	(0010,0021)	S,*,U	
Patient's Sex	(0010,0040)	S,*,U	
Patient's Birth Date	(0010,0030)	R,U	
Patient Breed Description	(0010,2292)	NONE	Veterinary Team
Patient Breed Code Sequence	(0010,2293)	NONE	Veterinary Team
> Code Value	(0008,0100)	NONE	Veterinary Team
> Coding Scheme Designator	(0008,0102)	NONE	Veterinary Team
> Code Meaning	(0008,0104)	NONE	Veterinary Team
Patient Species Description	(0010,2201)	NONE	Veterinary Team
Patient Species Code Sequence	(0010,2202)	NONE	Veterinary Team
> Code Value	(0008,0100)	NONE	Veterinary Team
> Coding Scheme Designator	(0008,0102)	NONE	Veterinary Team
> Code Meaning	(0008,0104)	NONE	Veterinary Team
Responsible Person	(0010,2297)	S,*,U	Veterinary Team
Responsible Person Role	(0010,2298)	NONE	Veterinary Team
Responsible Organization	(0010,2299)	S,*,U	Veterinary Team
Number of Patient Related Studies	(0020,1200)	NONE	
Number of Patient Related Series	(0020,1202)	NONE	
Number of Patient Related Instances	(0020,1204)	NONE	
STUDY Level			

Study Instance UID	(0020,000D)	UNIQUE	
Study ID	(0020,0010)	S,*,U	
Study Description	(0008,1030)	S,*,U	
Modalities In Study	(0008,0061)	S,*,U	
Study Date	(0008,0020)	S,U,R	
Study Time	(0008,0030)	R,U	
Accession Number	(0008,0050)	S,*,U	
Referring Physician's Name	(0008,0090)	S,*,U	
Number Of Study Related Series	(0020, 1206)	S,*,U	
Number Of Study Related Instances	(0020, 1208)	S,*,U	
SERIES Level			
Series Instance UID	(0020, 000E)	UNIQUE	
Modality	(0008, 0060)	S,*,U	
Series Description	(0008, 103E)	S,*,U	
Series Number	(0020, 0011)	S,*,U	
Performed Procedure Step Start Date	(0040,0244)	R, U	
Performed Procedure Step Start Time	(0040,0245)	R, U	
Request Attributes Sequence	(0040,0275)	NONE	
>Scheduled Procedure Step ID	(0040,0009)	NONE	
>Requested Procedure ID	(0040,1001)	NONE	
Number Of Series Related Instances	(0020, 1209)	S,*,U	
IMAGE Level			
Sop Instance UID	(0008, 0018)	UNIQUE	
The FIND-SCP supports queries for any Image Level DICOM attribute with the exception of Pixel Data.			
Common to all query levels			
Specific Character Set	(0008,0005)	N/A	

Only those attributes that are requested are returned in a C-FIND response. Some optional requested attributes will be returned for Study Root queries as per Table 4.2-20. Note that all attributes are not available in all Editions of the ImageServer.

Table 4.2-20
STUDY ROOT RESPONSE IDENTIFIER FOR FIND-SCP

Name	Tag	Types of Matching	Software Edition
STUDY Level			
Study Instance UID	(0020,000D)	UNIQUE	
Patient ID	(0010,0020)	S,*,U	
Patient's Name	(0010,0010)	S,*,U	
Patient's Birth Date	(0010,0030)	R,U	

Patient's Sex	(0010,0040)	S,*,U	
Patient Breed Description	(0010,2292)	NONE	Veterinary Team
Patient Breed Code Sequence	(0010,2293)	NONE	Veterinary Team
> Code Value	(0008,0100)	NONE	Veterinary Team
> Coding Scheme Designator	(0008,0102)	NONE	Veterinary Team
> Code Meaning	(0008,0104)	NONE	Veterinary Team
Patient Species Description	(0010,2201)	NONE	Veterinary Team
Patient Species Code Sequence	(0010,2202)	NONE	Veterinary Team
> Code Value	(0008,0100)	NONE	Veterinary Team
> Coding Scheme Designator	(0008,0102)	NONE	Veterinary Team
> Code Meaning	(0008,0104)	NONE	Veterinary Team
Responsible Person	(0010,2297)	S,*,U	Veterinary Team
Responsible Person Role	(0010,2298)	NONE	Veterinary Team
Responsible Organization	(0010,2299)	S,*,U	Veterinary Team
Study ID	(0020,0010)	S,*,U	
Study Description	(0008,1030)	S,*,U	
Modalities In Study	(0008,0061)	S,*,U	
Study Date	(0008,0020)	S,U,R	
Study Time	(0008,0030)	R,U	
Accession Number	(0008,0050)	S,*,U	
Referring Physician's Name	(0008,0090)	S,*,U	
Number Of Study Related Series	(0020, 1206)	S,*,U	
Number Of Study Related Instances	(0020, 1208)	S,*,U	
SERIES Level			
Series Instance UID	(0020, 000E)	UNIQUE	
Modality	(0008, 0060)	S,*,U	
Series Description	(0008, 103E)	S,*,U	
Series Number	(0020, 0011)	S,*,U	
Performed Procedure Step Start Date	(0040,0244)	R, U	
Performed Procedure Step Start Time	(0040,0245)	R, U	
Request Attributes Sequence	(0040,0275)	NONE	
>Scheduled Procedure Step ID	(0040,0009)	NONE	
>Requested Procedure ID	(0040,1001)	NONE	
Number Of Series Related Instances	(0020, 1209)	S,*,U	
IMAGE Level			
Sop Instance UID	(0008, 0018)	UNIQUE	
The FIND-SCP supports queries for any Image Level DICOM attribute with the exception of Pixel Data.			
Common to all query levels			
Specific Character Set	(0008,0005)	N/A	

Types of Matching:

An “S” indicates the identifier attribute uses Single Value Matching, an “R” indicates Range Matching, a “*”indicates wildcard matching, a ‘U’ indicates Universal Matching, and an ‘L’ indicates that UID lists are sent. “NONE” indicates that no matching is supported, but that values for this Element are requested to be returned (i.e. universal matching), and “UNIQUE” indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

FIND-SCP can be configured to limit the maximum number of responses sent to a single C-FIND-RQ. If the maximum limit is reached, the ImageServer will log a warning message and return a Success status to the client.

Specific Character Set may or may not be included in the C-FIND responses. If present in the response, Specific Character Set can be used to identify character sets other than the default character set used for encoding the other attributes in the response. The C-FIND SCP may return responses with a different Specific Character Set other than that requested by the SCU. C-FIND SCP may also be configured to always encode the responses using UTF-8 (ISO-IR 192).

4.2.3.3.1.3.2 Presentation Context Acceptance Criterion

FIND-SCPwill always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.3.3.1.3.3 Transfer Syntax Selection Policies

FIND-SCP will prefer explicit transfer syntaxes over implicit transfer syntaxes.

FIND-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same method for selecting a Transfer Syntax for each.

4.2.3.3.1.3.4 Response Status

FIND-SCP will behave as described in Table 4.2-29 in response to the status returned in the C-FIND response command message(s).

Table 4.2-21
RESPONSE STATUS FOR FIND-SCP AND RECEIVE QUERY REQUEST

Service Status	Further Meaning	Status Codes	Behavior
Failure	Unable to process	C000	Sent if internal database query is unsuccessful
	Identifier does not match SOP Class	A900	Sent if an invalid query retrieve level is set.
Failure	Unable to process	C000	Sent if internal database query is unsuccessful
Cancel	Matching terminated due to Cancel request	FE00	Sent when a C-CANCEL-RQ is received.

Success	Matching is complete	0000	Sent
Pending	Matches are continuing – Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Sent

4.2.4 MOVE-SCP

4.2.4.1 SOP Classes

MOVE-SCP provides Standard Conformance to the following SOP Class(es):

Table 4.2-22
SOP CLASSES SUPPORTED BY MOVE-SCP

SOP Class Name	SOP Class UID
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient Root Query/Retrieve INFORMATION Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2

4.2.4.2 Association Policies

4.2.4.2.1 General

MOVE-SCP accepts but never initiates associations.

Table 4.2-23
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR MOVE-SCP

Maximum PDU size received	114kB (27pprox..)

4.2.4.2.2 Number of Associations

Table 4.2-24
NUMBER OF ASSOCIATIONS AS A SCP FOR MOVE-SCP

Maximum number of simultaneous associations	Unlimited

4.2.4.2.3 Asynchronous Nature

MOVE-SCP will only allow a single outstanding operation on an Association. Therefore, MOVE-SCP will not perform asynchronous operations window negotiation.

4.2.4.2.4 Implementation Identifying Information

Table 4.2-25
DICOM IMPLEMENTATION CLASS AND VERSION FOR MOVE-SCP

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

4.2.4.3 Association Initiation Policy

MOVE-SCP initiates an association with the AE specified as the Move Destination in the MOVE request, in order to store the requested instances. The remote AE must be in the application's pre-configured AE list.

4.2.4.4 Association Acceptance Policy

When MOVE-SCP accepts an association, it will respond to move requests. If configured, the association will be rejected if the Calling AE Title is not pre-configured in the database.

4.2.4.4.1 Activity – Receive Move Request

4.2.4.4.1.1 Description and Sequencing of Activities

As requests are received,a STORAGE-SCU operation is initiated to send the requested instancesto the specified remote AE.

4.2.4.4.1.2 Proposed Presentation Contexts

Table 4.2-26
ACCEPTABLE PRESENTATION CONTEXTS FOR MOVE-SCP AND RECEIVE RETRIEVE REQUEST

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See Table 4.2-22	See Table 4.2-22	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

4.2.4.4.1.2.1 Extended Negotiation

No extended negotiation is performedthrough MOVE-SCP.

In particular, relational retrievals are not supported.

4.2.4.4.1.3 SOP Specific Conformance

4.2.4.4.1.3.1 SOP Specific Conformance to C-MOVE SOP Classes

MOVE-SCP provides standard conformance to the supported C-MOVE SOP Classes.

The Patient Root and Study Root information models are supported.

The move is performed to the destination AE Title specified in the original request. . If the destination AE does not exist in the application's pre-configured list, the store operations are not performed.

Table 4.2-27
PATIENT ROOT REQUEST IDENTIFIER FOR MOVE-SCP

Name	**Tag**	**Unique, Matching or Return Key**
PATIENT level		
Patient ID	(0010,0020)	U
STUDY level		

Study Instance UID	(0020,000D)	U
SERIES level		
Study Instance UID	(0020,000D)	U
Series Instance UID	(0020,000E)	U
IMAGE level		
Study Instance UID	(0020,000D)	U
Series Instance UID	(0020,000E)	U
Sop Instance UID	(0008,0018)	U

Table 4.2-28
STUDY ROOT REQUEST IDENTIFIER FOR MOVE-SCP

Name	Tag	Unique, Matching or Return Key
STUDY level		
Study Instance UID	(0020,000D)	U
SERIES level		
Study Instance UID	(0020,000D)	U
Series Instance UID	(0020,000E)	U
IMAGE level		
Study Instance UID	(0020,000D)	U
Series Instance UID	(0020,000E)	U
Sop Instance UID	(0008,0018)	U

4.2.4.4.1.3.2 Presentation Context Acceptance Criterion

MOVE-SCP will only accept a Presentation Context compatible with the one listed in Table 4.2-26.

4.2.4.4.1.3.3 Transfer Syntax Selection Policies

MOVE–SCP prefers explicit transfer syntaxes over implicit transfer syntaxes.

MOVE –SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same method for selecting a Transfer Syntax for each.

4.2.4.4.1.3.4 Response Status

MOVE-SCPwill behave as described in the Table below when generating the C-MOVE response command message.

Table 4.2-29
RESPONSE STATUS FOR MOVE-SCPAND SEND TO REMOTE AE REQUEST

Service Status	Further Meaning	Status Codes	Related Fields	Behavior
Failure	Refused: Out of Resources – Unable to perform	A702	(0000,1020) (0000,1021) (0000,1022)	The selected retrieve objects are not online, and cannot be retrieved at this

	sub-operations		(0000,1023)	time.
	Refused: Move Destination unknown	A801	(0000,0902)	Sent if the destination AE Title has not been preconfigured, or a connection failure occurs when connecting to the destination AE.
	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)	Sent when the Query/Retrieve Level is not present or is invalid
	Unable to process	C000	(0000,0901) (0000,0902)	Sent if the local database query fails or an internal exception occurred during processing
	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Sent if Move association is cancelled Sub-operations are also cancelled
	Sub-operations Complete – One or more Failures	B000	(0000,1020) (0000,1022) (0000,1023)	Sent
Success	Sub-operations Complete – No Failures	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Sent
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Sent for every 5 C-STORE operations completed by STORAGE-SCU.

4.2.4.4.1.3.5 Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate association, the question of failure of operations on the other association(s) must be considered.

MOVE-SCPinitiates a C-STORE sub-operation for each request. The responses from the MOVE-SCP are purely dependent on the success or failure of the C-STORE sub-operations, not on any explicit action by MOVE-SCP.

Whether or not the remote AE accepts the C-STORE sub-operations is beyond the control of MOVE-SCU.

If the association on which the C-MOVE was issued is aborted for any reason, the C-STORE sub-operations will continue.

If the C-MOVE operation is canceled by the remote AE, MOVE-SCP will also attempt to cancel the corresponding C-STORE sub-operation.

4.2.5 STORAGE-SCU

4.2.5.1 SOP Classes

STORAGE-SCU provide Standard Conformance to the following SOP Class(es):

Table 4.2-30
IMAGE SOP CLASSES SUPPORTED BY STORAGE-SCU

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Digital Intra-oral X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Digital Mammography X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1
Hardcopy Grayscale Image Storage SOP Class (Retired)	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage SOP Class (Retired)	1.2.840.10008.5.1.1.30
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Multi-frame 1 Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1

VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2
X-Ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2

Table 4.2-31
NON-IMAGE SOP CLASSES SUPPORTED BY STORAGE-SCU

SOP Class Name	SOP Class UID
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2

RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
Standalone Curve Storage (Retired)	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage (Retired)	1.2.840.10008.5.1.4.1.1.10
Standalone Overlay Storage (Retired)	1.2.840.10008.5.1.4.1.1.8
Standalone PET Curve Storage (Retired)	1.2.840.10008.5.1.4.1.1.129
Standalone VOI LUT Storage (Retired)	1.2.840.10008.5.1.4.1.1.11
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3
Stored Print Storage SOP Class (Retired)	1.2.840.10008.5.1.1.27
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67

4.2.5.2 Association Policies

4.2.5.2.1 General

STORAGE-SCU initiates but never accepts associations.

Table 4.2-32
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR STORAGE-SCU

Maximum PDU size received	114kB (33pprox..)

4.2.5.2.2 Number of Associations

Table 4.2-33
NUMBER OF ASSOCIATIONS AS A SCP FOR STORAGE-SCU

Maximum number of simultaneous associations	Unlimited by default, or as configured for the remote DICOM Application Entity through the ImageServer web GUI's Device Configuration

4.2.5.2.3 Asynchronous Nature

STORAGE-SCU will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCU will not perform asynchronous operations window negotiation.

4.2.5.2.4 Implementation Identifying Information

Table 4.2-34
DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCU

Implementation Class UID	1.3.6.1.4.1.25403.1.1.1
Implementation Version Name	Dicom 0.1

4.2.5.3 Association Initiation Policy

STORAGE-SCU attempts to initiate a new association for each study, or group of studies, selected by the user (e.g. one association per user-initiated send operation). When initiated by MOVE-SCP, one association is initiated per move request. For move requests initiated from the web interface, one association is used per study. For move requests initiated by auto-routing rules, multiple associations may be used to send a single study.

4.2.5.3.1 Activity – Send Storage Request

4.2.5.3.1.1 Description and Sequencing of Activities

For each instance selected from the user interface to be transferred, a single attempt will be made to transmit it to the selected remote AE. If the send fails, for whatever reason, no retry will be performed, and an attempt will be made to send the next instance.

4.2.5.3.1.2 Proposed Presentation Contexts

Table 4.2-35
PROPOSED PRESENTATION CONTEXTS FOR STORAGE-SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
See Table 4.2-30 (Image SOP Classes)	See Table 4.2-30 (Image SOP Classes)	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		RLE Lossless	1.2.840.10008.1.2.5	SCU	None
		JPEG Baseline (Process 1):	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
		JPEG Lossless, non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	1.2.840.10008.1.2.4.70	SCU	None
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	None
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91	SCU	None
See Table 4.2-31 (Non-Image SOP Classes)	See Table 4.2-31 (Non-Image SOP Classes)	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

STORAGE-SCU will propose Presentation Contexts only for the SOP Class(es) of the instances that are to be transferred.

For each SOP Class being transferred, STORAGE-SCU will propose two Presentation Contexts. One containing the transfer syntax that the SOP class is encoded on for the server, and a second Presentation Context using the uncompressed transfer syntaxes. When the server cannot decompress an image because it does not have the appropriate codec(s), the second Presentation Context (uncompressed syntaxes) is not proposed.

4.2.5.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

4.2.5.3.1.3 SOP Specific Conformance

4.2.5.3.1.3.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCU provides standard conformance to the Storage Service Class.

4.2.5.3.1.3.2 Presentation Context Acceptance Criterion

STORAGE-SCU does not accept associations.

4.2.5.3.1.3.3 Transfer Syntax Selection Policies

STORAGE-SCU prefers to send each instance using its current Transfer Syntax, and will find the first Presentation Context where the Transfer Syntax was accepted. In the case where the Transfer Syntax was not accepted by the remote STORAGE-SCP, STORAGE-SCU will check for the acceptance of Explicit VR Little Endian and Implicit VR Little Endian, in that order. If STORAGE-SCU cannot change the Transfer Syntax, the sub-operation will fail and it will not store the instance.

Response Status

STORAGE-SCU will behave as described in the Table below in response to the status returned in the C-STORE response command message.

Table 4.2-36
RESPONSE STATUS FOR STORAGE-SCU AND RECEIVE STORAGE REQUEST

Service Status	Further Meaning	Status Codes	Behavior
Failure	Refused: Out of Resources	A7xx	Status logged.
	Data Set does not match SOP Class	A9xx	Status logged.
	Cannot understand	Cxxx	Status logged.
Warning	Coercion of Data Elements	B000	Status logged.
	Data Set does not match SOP Class	B007	Status logged.
	Elements Discarded	B006	Status logged.
Success		0000	Ignored

4.2.5.4 Association Acceptance Policy

STORAGE-SCU does not accept associations.

4.3 NETWORK INTERFACES

4.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP executes; which is dependent on the underlying operating system and hardware.

4.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

The ImageServer supports a limited subset of DICOM Web Access to DICOM Objects (WADO). The following MIME types are supported:

Table 4.3-1
WADO MIME TYPES

application/dicom	The entire DICOM object is returned.
application/clearcanvas	The raw pixel data as encoded in the DICOM object on the server is returned. This may be compressed or uncompressed pixel data.
application/clearcanvas-header	A subset of the entire DICOM object is returned. Note that the pixel data will never be returned in the object.
application/pdf	For Encapsulated PDF Storage objects, the encapsulated PDF document is returned.

The following table contains the WADO parameters that are supported by the ImageServer WADO server.

Table 4.3-2
WADO PARAMETERS SUPPORTED

requestType	Must be WADO
studyUID	The Study Instance UID of the requested image.
seriesUid	The Series Instance UID of the requested image.
objectUid	The SOP Instance UID of the requested image.
frameNumber	Only supported for application/clearcanvas MIME type.
contentType	The MIME types as specified in Table 4.3-1.

The URL for accessing the WADO server is structured as follows:

```
http://<host>:1000/wado/<serverAE>?requestType=WADO
```

By default, the WADO server listens on port 1000. Note also that the AE title of the Server Partition being connected to must be included in the URL.

4.3.3 IPv4 and IPv6 Support

By default, this product supports IPv4. When configured, it will also support IPv6. It does not utilize any of the optional configuration identification or security features of IPv6.

4.4 CONFIGURATION

All configuration is performed through the use of configuration files stored in pre-defined locations that are specific to the underlying operating system.

4.4.1 AE Title/Presentation Address Mapping

The Calling AE Title of the local application is configurable in the configuration file. The mapping of the logical name by which remote AEs are described in the user interface to Called AE Titles as well as presentation address (hostname or IP address and port number) is configurable in the configuration file.

4.4.2 Parameters

Table 4.4-1
CONFIGURATION PARAMETERS TABLE

Parameter	Configurable	Default Value
General Parameters		
PDU size	No	N/A
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	Yes	10 seconds
General DIMSE level time-out values	No	30 seconds
Time-out waiting for response to TCP/IP connect() request. (Low-level timeout)	Yes	10 seconds
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	Yes	30 seconds
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	Yes	30 seconds
Send Buffer Size (TCP/IP socket)	Yes	118341 bytes
Receive Buffer Size (TCP/IP socket)	Yes	118341 bytes
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None
AE Specific Parameters (all AEs)		
Size constraint in maximum object size	No	None
Maximum PDU size the AE can receive	Yes	116794bytes
Maximum PDU size the AE can send	Yes	116794 bytes
AE specific DIMSE level time-out values	No	30 seconds
Number of simultaneous Associations by Service and/or SOP Class	N/A	N/A
SOP Class support	No	All supported SOP Classes always proposed and accepted
Transfer Syntax support	No	All supported Transfer Syntaxes always proposed

Parameter	Configurable	Default Value
General Parameters		
		and accepted
Other parameters that are configurable	No	None

5. MEDIA INTERCHANGE

The ImageServer does not support any form of Media Interchange.

6. SUPPORT OF CHARACTER SETS

6.1 OVERVIEW

The application supports all extended character sets defined in the DICOM 2008standard, including single-byte and multi-byte character sets as well as code extension techniques using ISO 2022 escapes.

Support extends to correctly decoding and displaying the correct symbol for all names and strings received over the network, and in the local database.

No specific support for sorting of strings other than in the default character set is provided in the Web GUI. All strings are converted to Unicode before display.

6.2 CHARACTER SETS

In addition to the default character repertoire, the Defined Terms for Specific Character Set in Table 6.2-1 are supported:

Table 6.2-1
SUPPORTED SPECIFIC CHARACTER SET DEFINED TERMS

Character Set Description	Defined Term
Latin alphabet No. 1	ISO_IR 100
Latin alphabet No. 2	ISO_IR 101
Latin alphabet No. 3	ISO_IR 109
Latin alphabet No. 4	ISO_IR 110
Cyrillic	ISO_IR 144
Arabic	ISO_IR 127
Greek	ISO_IR 126
Hebrew	ISO_IR 138
Latin alphabet No. 5	ISO_IR 148
Japanese	ISO_IR 13
Thai	ISO_IR 166
Unicode in UTF-8	ISO-IR 192
Default repertoire	ISO 2022 IR 6

Latin alphabet No. 1	ISO 2022 IR 100
Latin alphabet No. 2	ISO 2022 IR 101
Latin alphabet No. 3	ISO 2022 IR 109
Latin alphabet No. 4	ISO 2022 IR 110
Cyrillic	ISO 2022 IR 144
Arabic	ISO 2022 IR 127
Greek	ISO 2022 IR 126
Hebrew	ISO 2022 IR 138
Latin alphabet No. 5	ISO 2022 IR 148
Thai	ISO 2022 IR 166
Japanese	ISO 2022 IR 13
Japanese	ISO 2022 IR 87
Japanese	ISO 2022 IR 159
Korean	ISO 2022 IR 149
Chinese (Simplified) Extended	GB18030

6.3 CHARACTER SET CONFIGURATION

Whether or not characters are displayed correctly depends on the presence of font support in the underlying operating system. Typically it may be necessary for the user to add one of the “all Unicode” fonts to their system configuration in order to correctly display characters that would not typically be used in the default locale.

C-FIND SCP may also be configured to always encode the responses using UTF-8 (ISO-IR 192). The configuration option is specified in the ImageServer User’s Guide.

6.4 SECURITY PROFILES

None supported.

6.5 ASSOCIATION LEVEL SECURITY

None supported.

The system can be configured to only allow configured AEs to open an association.

6.6 APPLICATION LEVEL SECURITY

The Team Edition of the ImageServer supports Audit Trail logging according to the final text of DICOM Supplement 95. The following Audit messages are generated.

Table 7.3-1
Supported Audit Trail Messages

Audit Trail Message
ApplicationActivity
BeginTransferringDicomInstances
DicomInstancesAccessed
DicomInstancesTransferred
DicomStudyDeleted
Query
UserAuthentication

7. ANNEXES

7.1 IOD CONTENTS

7.1.1 Coerced/Modified fields

The following fields may be coerced, based on user input.

Table 8.1-3
SIGNIFICANT ELEMENTS IN EXPORTED COMPOSITE SOP INSTANCES

Module	Attribute Name	Tag ID	Value
Patient	Patient Name	(0010,0010)	STORAGE-SCP checks consistency of the tag with other images in the study and will coerce the value when specified through the application Web GUI.An auto coercion may also occur if the study was previously received with the proper usage of carats (^) in the patient name, and new incoming images for the study only differ by the removal of the carats. The images will be automatically updated to include the carats in the name. STORAGE-SCP will also automatically remove redundant space characters in names, such as extra padding characters.
	Patient ID	(0010,0020)	STORAGE-SCP checks consistency of the tag with other images in the study and will coerce the value when specified through the application Web GUI.
	Patient's Birth Date	(0010,0030)	STORAGE-SCP checks consistency of the tag with other images in the study and will coerce the value when specified through the application Web GUI.
	Patient's Sex	(0010,0040)	STORAGE-SCP checks consistency of the tag with other images in the study and will coerce the value when specified through the application Web GUI.
	Issuer of Patient ID	(0010,0021)	STORAGE-SCP checks consistency of the tag with other images in the study and will coerce the value when specified through the application Web GUI.
General Study	Accession Number	(0008,0050)	STORAGE-SCP checks consistency of the tag with other images in the study and will coerce the value when specified through the application Web GUI.
	Study Instance UID	(0020,000D)	STORAGE-SCP will remove trailing period characters on Study Instance UIDs before processing.
General Image	Derivation Description	(0008,2111)	When lossy compressing an image, the ImageServer will update the Derivation Description to reflect the method for compressing the image.
	Derivation Code Sequence	(008,9215)	When lossy compressing an image, the ImageServer will append a new Derivation Code Sequence reflecting how the image was compressed.
	Lossy Image Compression	(0028,2110)	When lossy compressing an image, the ImageServer will update or set the value of this tag to "01".
	Lossy Image	(0028,2112)	When lossy compressing an image, the ImageServer will

	Compression Ratio		set the value of this tag to the approximate compression ratio of the image.
	Lossy Image Compression Method	(0028,2114)	When lossy compressing an image, the ImageServer will set the value of this tag to reflect the type of compression being done on the image.
Image Pixel	Photometric Interpretation	(0028,0004)	Images with a value of PALETTE COLOR may be converted to RGB format upon compression (if configured to do so).
	Planar Configuration	(0028,0006)	Images with Planar Configuration set to 1 will have their pixel data modified and their Planar Configuration set to 0 on compression.
	High Bit	(0028,0102)	When the High Bit is set such that there are unused lower order bits in each pixel, during the compression process the ImageServer will right shift the pixels so the unused bits are the high order bits.
	Red Palette Color Lookup Table Descriptor	(0028,1101)	Tag may be removed upon compression when Photometric Interpretation is set to PALETTE COLOR.
	Green Palette Color Lookup Table Descriptor	(0028,1102)	Tag may be removed upon compression when Photometric Interpretation is set to PALETTE COLOR.
	Blue Palette Color Lookup Table Descriptor	(0028,1103)	Tag may be removed upon compression when Photometric Interpretation is set to PALETTE COLOR.
	Red Palette Color Lookup Table Data	(0028,1201)	Tag may be removed upon compression when Photometric Interpretation is set to PALETTE COLOR.
	Green Palette Color Lookup Table Data	(0028,1202)	Tag may be removed upon compression when Photometric Interpretation is set to PALETTE COLOR.
	Blue Palette Color Lookup Table Data	(0028,1203)	Tag may be removed upon compression when Photometric Interpretation is set to PALETTE COLOR.
	Pixel Data	(7fe0,0010)	Pixel Data may be modified upon compression when Photometric Interpretation is PALETTE COLOR, when an Overlay is embedded in the pixel data, when the High Bit is set such that there are unused low order bits, or when Planar Configuration is set to 1. Note also that in some cases during compression the ImageServer will mask out the unused bits in the pixel data.
Overlay Plane	Overlay Rows	(60xx,0010)	When compressing an image, the ImageServer will remove embedded overlays and move them to the Overlay Data tag. Overlay Rows will be updated, if necessary to include the rows in the overlay.
	Overlay Columns	(60xx,0011)	When compressing an image, the ImageServer will remove embedded overlays and move them to the Overlay Data tag. Overlay Columns will be updated, if necessary to include the columns in the overlay.

	Overlay Bits Allocated	(60xx,0100)	When compressing an image, the ImageServer will remove embedded overlays and move them to the Overlay Data tag. Overlay Bits Allocated will be updated to a value of 1 in this case.
	Overlay Bit Position	(60xx,0102)	When compressing an image, the ImageServer will remove embedded overlays and move them to the Overlay Data tag. Overlay Bit Position will be updated to a value of 0 in this case.
	Overlay Data	(60xx,3000)	When compressing an image, the ImageServer will remove embedded overlays and move them to the Overlay Data tag.

7.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

No private attributes are defined.

7.3 CODED TERMINOLOGY AND TEMPLATES

Not applicable.

7.4 GRAYSCALE IMAGE CONSISTENCY

Not applicable.

7.5 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

None

7.6 PRIVATE TRANSFER SYNTAXES

None.