



ClearCanvas ImageServer DICOM Conformance Statement

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1. CONFORMANCE STATEMENT OVERVIEW

The ClearCanvas ImageServer is a DICOM server. The ImageServer software 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 four different editions:

- ClearCanvas ImageServer, Community Edition
- ClearCanvas ImageServer, Team Edition
- ClearCanvas ImageServer, Cleome 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 | | | |
| Breast Tomosynthesis Image Storage | Yes | Yes | Yes |
| 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 | Yes |
| Enhanced MR Image Storage | Yes | Yes | Yes |
| Enhanced PET Image Storage | Yes | Yes | Yes |

| | | | |
|--|-----|-----|---------|
| Enhanced US Volume Storage | Yes | Yes | Yes |
| Enhanced XA Image Storage | Yes | Yes | Yes |
| Enhanced XRF Image Storage | Yes | Yes | Yes |
| 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 | Yes |
| Multi-frame Grayscale Byte Secondary Capture Image Storage | Yes | Yes | Yes |
| Multi-frame Grayscale Word Secondary Capture Image Storage | Yes | Yes | Yes |
| Multi-frame Single Bit Secondary Capture Image Storage | Yes | Yes | Yes |
| 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 | Yes |
| 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 | Limited |
| Video Microscopic Image Storage | Yes | Yes | Limited |
| Video Photographic Image Storage | Yes | Yes | Limited |
| VL Endoscopic Image Storage | Yes | Yes | Yes |
| VL Microscopic Image Storage | Yes | Yes | Yes |
| VL Photographic Image Storage | Yes | Yes | Yes |
| VL Slide-Coordinates Microscopic Image Storage | Yes | Yes | Yes |

| | | | |
|--|-----|-----|---------------------------------|
| X-Ray 3D Angiographic Image Storage | Yes | Yes | Yes |
| X-Ray 3D Craniofacial Image Storage | Yes | Yes | Yes |
| 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 |

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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. |
| 1.8 | October 3, 2012 | Thanh Huynh | Updated list of transfer syntaxes supported by STORAGE-SCP and STORAGE-SCU. |
| 1.9 | February 27, 2013 | Steve Wranovsky | Added C-FIND-SCU for Webstation priors search and publishing of Key Images from Webstation. |
| 2.0 | April 02, 2013 | Thanh Huynh | Added Breast Tomosynthesis Image Storage support. |
| 2.1 | July 25, 2013 | Steve Wranovsky | Added Enhanced US Volume Storage support. |
| 2.2 | January 12, 2014 | Steve Wranovsky | Updates for 11.0 Cleome. Added viewing of enhanced objects, Enhanced PET Support, and private attributes documentation. |

| | | | |
|-----|-----------------|-----------------|--|
| 2.3 | August 26, 2014 | Steve Wranovsky | Updates for 11.0 Cleome and Team Edition. Changed RT Dose to be an Image SOP for storage services. |
|-----|-----------------|-----------------|--|

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 Statement are 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 Association Negotiation 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 Association Negotiation 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 Association Negotiation 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 for Standards |
| 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 |
| 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 |

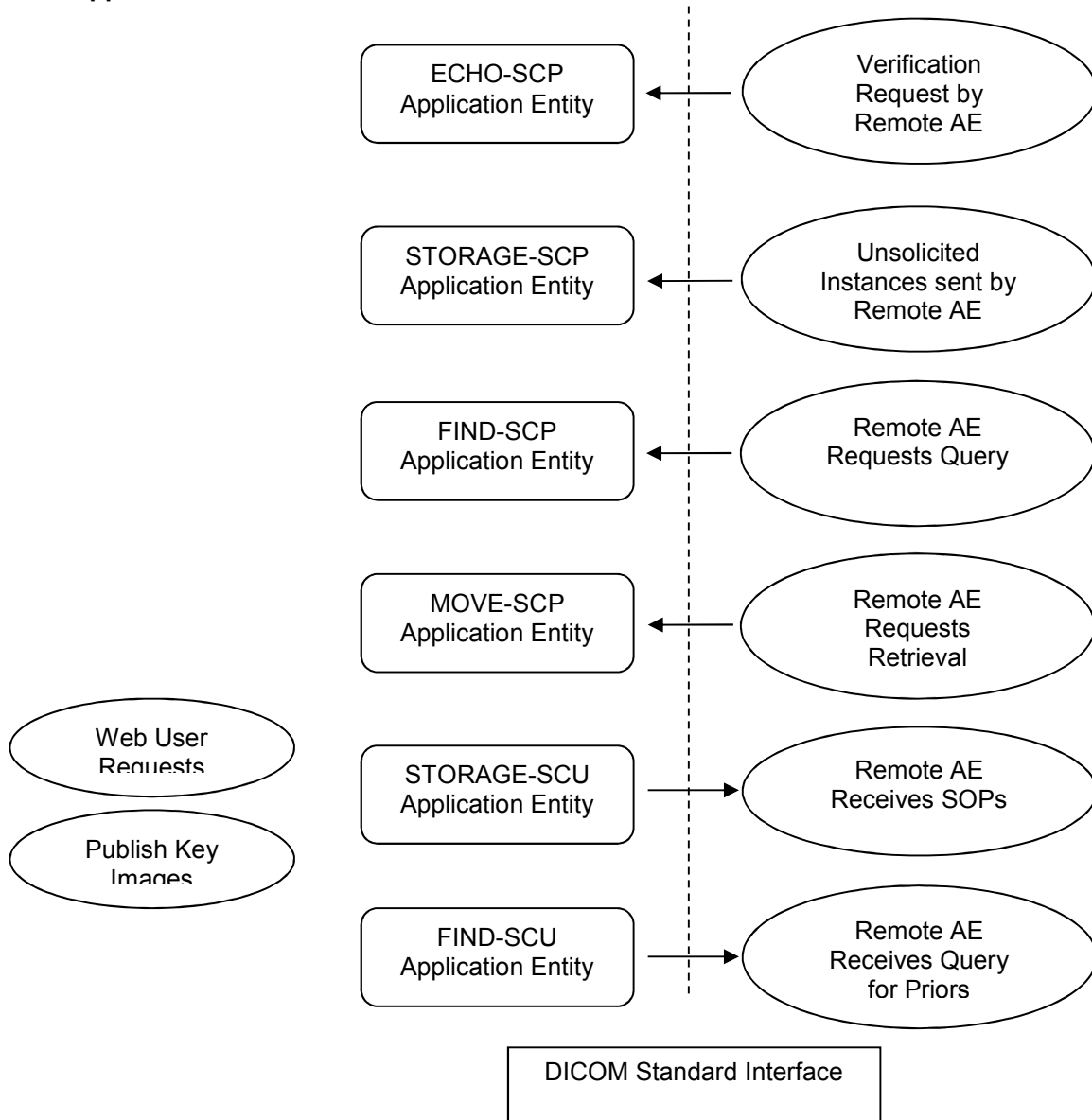
3.7 REFERENCES

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
- FIND-SCU, which queries for prior studies

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). STORAGE-SCU is also activated in the Cleome Edition when Key Images are created in the Webstation and the study for which the Key Images was received from an AE marked as a Priors Server.

4.1.2.6 FIND-SCU

FIND-SCU is only activated in the Team and Cleome Editions. When a user views a study in the Webstation, a find will be performed against Aes marked as Priors Servers to find prior studies related to the current study being viewed.

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 through the 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-SCP prefers 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 |
|--|--------------------------------|
| Breast Tomosynthesis Image Storage | 1.2.840.10008.5.1.4.1.1.13.1.3 |
| 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 PET Image Storage | 1.2.840.10008.5.1.4.1.1.130 |
| Enhanced US Volume Storage | 1.2.840.10008.5.1.4.1.1.6.2 |
| 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 |
| RT Dose Storage | 1.2.840.10008.5.1.4.1.1.481.2 |
| 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 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 (20pprox...) |
|---------------------------|--------------------|

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. Note that it is possible to configure the ImageServer to only accept the Implicit VR Little Endian transfer syntax for each of the Image and Non-Image SOP Classes. This configuration can be done through the ImageServer database and is in some cases needed to address interoperability issues.

**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]): Default Transfer Syntax for Lossless JPEG Image Compression | 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 |

NOTE: The RT Structure Set Storage SOP Class is configured to only support the Implicit VR Little Endian transfer syntax during association negotiation. DICOM Correction Proposal 548 notes an issue with the RT Structure Set IOD where it can have attributes of a length that cannot be encoded in the Explicit VR Little Endian transfer syntax.

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 method for 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-SCP accepts but never initiates associations.

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

| | |
|---------------------------|-------------------|
| Maximum PDU size received | 114kB (23pprox..) |
|---------------------------|-------------------|

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-SCP will 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 (29pprox..) |
|---------------------------|-------------------|

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 instances to 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 performed through 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-SCP will behave as described in the Table below when generating the C-MOVE response command message.

**Table 4.2-29
RESPONSE STATUS FOR MOVE-SCP AND SEND TO REMOTE AE REQUEST**

| Service Status | Further Meaning | Status Codes | Related Fields | Behavior |
|----------------|--|--------------|--|--|
| Failure | Refused: Out of Resources – Unable to perform sub-operations | A702 | (0000,1020) (0000,1021) (0000,1022) (0000,1023) | The selected retrieve objects are not online, and cannot be retrieved at this 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 | A900 | (0000,0901) | Sent when the |

| | | | | |
|---------|--|------|--|--|
| | match SOP Class | | (0000,0902) | 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-SCP initiates 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 |
|------------------------------------|--------------------------------|
| Breast Tomosynthesis Image Storage | 1.2.840.10008.5.1.4.1.1.13.1.3 |

| | |
|--|----------------------------------|
| 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 PET Image Storage | 1.2.840.10008.5.1.4.1.1.130 |
| Enhanced US Volume Storage | 1.2.840.10008.5.1.4.1.1.6.2 |
| 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 |
| RT Dose Storage | 1.2.840.10008.5.1.4.1.1.481.2 |
| 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 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 (35pprox..) |
|---------------------------|-------------------|

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]): Default Transfer Syntax for Lossless JPEG Image Compression | 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.

4.2.6 FIND-SCU

4.2.6.1 SOP Classes

FIND-SCU provides Standard Conformance to the following SOP classes:

**Table 4.2-1
SOP CLASSES SUPPORTED BY FIND-SCU**

| SOP Class Name | SOP Class UID |
|--|-----------------------------|
| Study Root Query/Retrieve Information Model – FIND | 1.2.840.10008.5.1.4.1.2.2.1 |

4.2.6.2 Association Policies

4.2.6.2.1 General

FIND-SCU initiates but never accepts associations.

**Table 4.2-2
MAXIMUM PDU SIZE RECEIVED FOR FIND-SCU**

| | |
|---------------------------|-----------------|
| Maximum PDU size received | 114kB (approx.) |
|---------------------------|-----------------|

4.2.6.2.2 Number of Associations

**Table 4.2-3
NUMBER OF ASSOCIATIONS FOR FIND-SCU**

| | |
|---|---|
| Maximum number of simultaneous associations | Limited by the number of Webstation Clients |
|---|---|

4.2.6.2.3 Asynchronous Nature

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

4.2.6.2.4 Implementation Identifying Information

**Table 4.2-4
DICOM IMPLEMENTATION CLASS AND VERSION FOR FIND-SCU**

| | |
|-----------------------------|-------------------------|
| Implementation Class UID | 1.3.6.1.4.1.25403.1.1.1 |
| Implementation Version Name | Dicom 0.1 |

4.2.6.3 Association Initiation Policy

FIND-SCU attempts to initiate new associations for the purpose of locating prior studies when the user opens one or more studies for viewing.

4.2.6.3.1 Activity – Query for Prior Studies

4.2.6.3.1.1 Description and Sequencing of Activities

When one or more studies are opened for viewing by the user, an attempt is made to query the local partition each remote AE defined as a “Priors Server” in the Devices section of the Web GUI for each unique patient ID in the opened studies. If a query fails for whatever reason, the remaining queries will not be performed, and the user will be notified of the failure.

Studies discovered this way which were not specifically selected by the user are considered “prior studies” and are listed by the application to inform the user of their presence. In some configurations (namely, when the source AE of the prior study is a ClearCanvas ImageServer), the application also supports viewing the prior study.

The only parameter used in each query is the patient ID, with a wildcard character (asterisk) appended by default. A configurable algorithm exists that allows the patient ID query parameter to be modified before the query is executed, in order to maximize the number of studies returned in the results.

Similarly, because not all the results returned will belong to the patient, there is another configurable algorithm used to reconcile the patient ID in the returned study identifiers against those of the loaded studies. By default, the algorithm specifies that each patient ID in the results must match one of the patient IDs in the loaded studies exactly in order to be considered a true match. Studies returned in the results that cannot be reconciled are filtered out.

These algorithms are very flexible, but would typically only be used to trim whitespace and suffixes rather than making sweeping modifications. For obvious reasons, configuration of the algorithms should be done with great care, as it could result in false matches or in true matches being missed, which could adversely impact patient care.

4.2.6.3.1.2 Proposed Presentation Contexts

**Table 4.2-5
PROPOSED PRESENTATION CONTEXTS FOR FIND-SCU**

| Presentation Context Table | | | | | |
|----------------------------|-----------------|---------------------------|---------------------|------|----------------------|
| Abstract Syntax | | Transfer Syntax | | Role | Extended Negotiation |
| Name | UID | Name | UID | | |
| See Table 4.2-1 | See Table 4.2-1 | Explicit VR Little Endian | 1.2.840.10008.1.2.1 | SCU | None |
| | | Implicit VR Little Endian | 1.2.840.10008.1.2 | SCU | None |

4.2.6.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

In particular, relational queries are not supported.

4.2.6.3.1.3 SOP Specific Conformance

4.2.6.3.1.3.1 SOP Specific Conformance to C-FIND SOP Classes

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

Only a single information model, Study Root, is supported and is only used at the highest level (STUDY).

No CANCEL requests are ever issued.

Unexpected attributes returned in a C-FIND response (those not requested) are discarded. Requested return attributes not returned by the SCP are ignored.

Specific Character Set is not included in the C-FIND request. If present in the response, Specific Character Set will be used to identify character sets other than the default character set for display of strings in the viewer.

For each "prior study" found, Retrieve AE Title is used to determine if the study can be streamed, and if so, the study will be loaded into the viewer in the same way as one(s) selected by the user.

**Table 4.2-6
STUDY ROOT REQUEST IDENTIFIER FOR FIND-SCU FOR QUERY FOR PRIOR STUDIES**

| Name | Tag | Types of Matching |
|--------------------|-------------|-------------------|
| STUDY Level | | |
| Study Instance UID | (0020,000D) | UNIQUE |
| Patient's ID | (0010,0020) | * |

| | | |
|-----------------------------------|-------------|-----|
| Patient's Name | (0010,0010) | U |
| Patient's Birth Date | (0010,0030) | U |
| Patient's Birth Time | (0010,0032) | U |
| Patient's Sex | (0010,0040) | U |
| Study Description | (0008,1030) | U |
| Modalities In Study | (0008,0061) | U |
| Study ID | (0020,0010) | U |
| Study Description | (0008,1030) | U |
| Study Date | (0008,0020) | U |
| Study Time | (0008,0030) | U |
| Accession Number | (0008,0050) | U |
| Referring Physician's Name | (0008,0090) | U |
| Number of Study Related Instances | (0020,1208) | U |
| Number of Study Related Series | (0020,1206) | U |
| SERIES Level | | |
| N/A | | |
| IMAGE Level | | |
| N/A | | |
| 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, an 'L' indicates that a UID list is sent, and "UNIQUE" indicates that this is the Unique Key for that query level.

4.2.6.3.1.3.2 Presentation Context Acceptance Criterion

FIND-SCU does not accept associations.

4.2.6.3.1.3.3 Transfer Syntax Selection Policies

FIND-SCU prefers Explicit VR Little Endian Transfer Syntax, which is always first in the proposed Presentation Context.

4.2.6.3.1.3.4 Response Status

**Table 4.2-7
RESPONSE STATUS FOR FIND-SCU AND QUERY REMOTE AE REQUEST**

| Service Status | Further Meaning | Status Codes | Behavior |
|----------------|---|--------------|---|
| Failure | N/A | Any | Association closed, message shown to user |
| Cancel | Matching terminated due to Cancel request | FE00 | Association closed, message shown to user |

| | | | |
|---------|--|------|--------------------|
| Success | Matching is complete - No final Identifier is supplied | 0000 | Association closed |
|---------|--|------|--------------------|

4.2.6.3.1.3.5 Association Acceptance Policy

FIND-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 |

| Parameter | Configurable | Default Value |
|--|--------------|--|
| General Parameters | | |
| SOP Class support | No | All supported SOP Classes always proposed and accepted |
| Transfer Syntax support | No | All supported Transfer Syntaxes always proposed 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 2008 standard, 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.

SECURITY

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 and Cleome Editions 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 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 Plane | 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. |
| | | | |

7.1.2 Created SOP Instances

The Cleome Edition of the ImageServer will create Grayscale Softcopy Presentation States, Color Softcopy Presentation States, Key Object selection Documents, and Encapsulated PDF Documents. Please see the ClearCanvas Workstation DICOM Conformance Statements for details on the content of these created IODs.

7.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

The following private attributes are utilized by the ImageServer as described in the table.

| Attribute Name | Tag | VR | VM | Description |
|---|-------------|----|----|--|
| ClearCanvas Encapsulated Document Group | (0043,0010) | LO | 1 | Private Creator Group. |
| ClearCanvas HL7 Message Control Id | (0043,1012) | LO | 1 | Private attribute placed in Encapsulated PDF documents that are generated from HL7 Messages. The field stores the Message Control Id of the message that generated the report. |

7.3 CODED TERMINOLOGY AND TEMPLATES

Not applicable.

7.4 GRAYSCALE IMAGE CONSISTENCY

Not applicable.

7.5 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

Secondary capture image SOP instances created by the application for the purposes of supporting key images conform to the Standard Extended SOP Class based on the Secondary Capture Image Storage SOP Class (1.2.840.10008.5.1.4.1.1.88.59). The contents of this Standard Extended SOP Class are described in the ClearCanvas Workstation DICOM Conformance Statement.

No specialized or private SOP classes are used.

7.6 PRIVATE TRANSFER SYNTAXES

None.