



eXpēdo™

Version 2.3

DICOM 3.0 Conformance Statement

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1. Introduction

This document describes the conformance of the Expedo Application Suite to the DICOM 3.0 Standard.

1.1 Revision History

Revision	Author	Reason	Date
1	Matthew Gray	Created	5/20/2006
2	Matthew Gray	Updated	6/29/2006

1.2 Audience

This document is intended for anybody who would like to learn about how Expedo can integrate with their institution's existing medical products. A general understanding of DICOM connectivity principles will be helpful when reading this document.

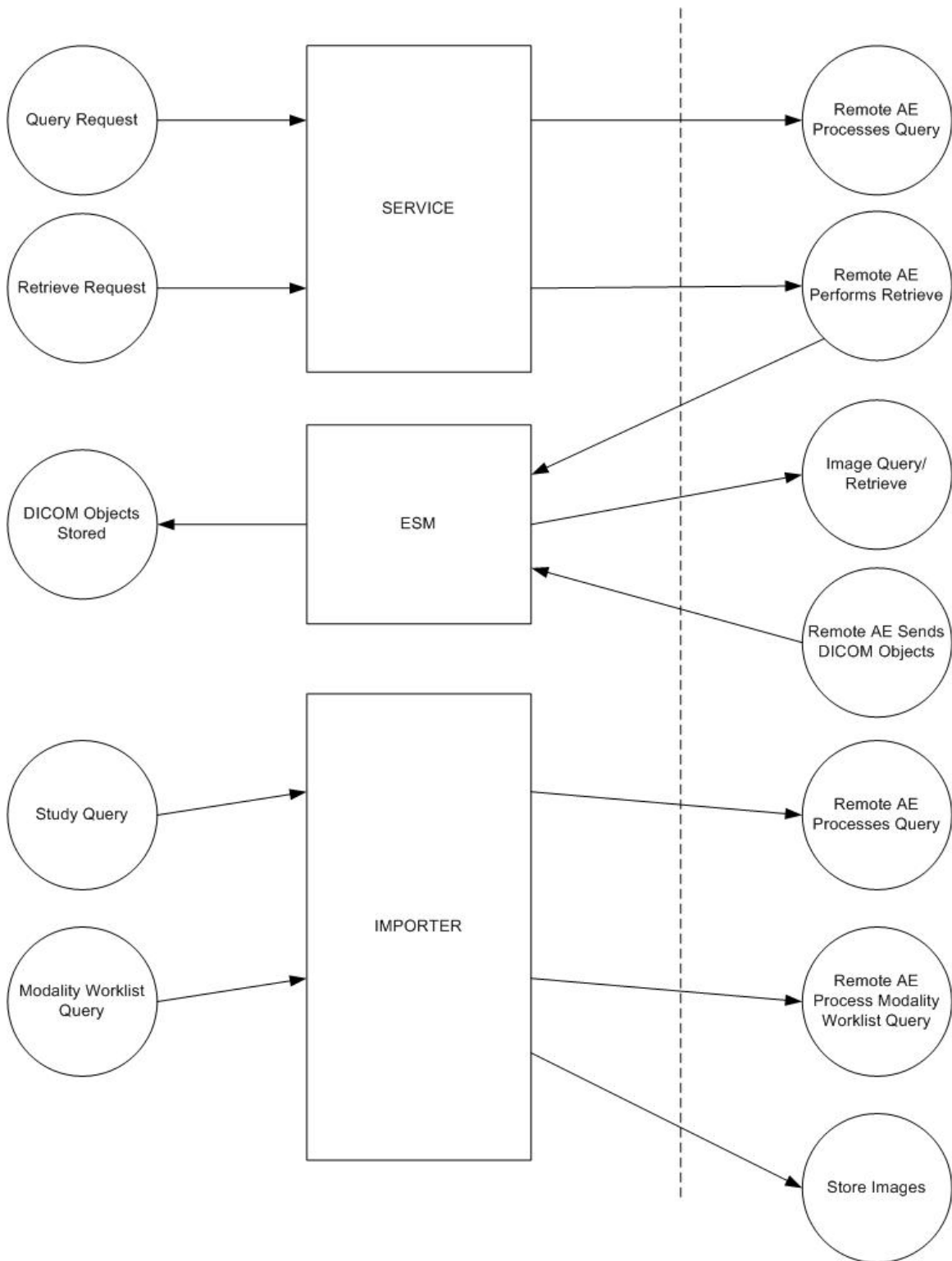
1.3 Definitions and Abbreviations

SERVICE	The Expedo Windows Service
ESM	The Expedo Store Manager Service
IMPORTER	The Expedo Media Importer Application

2. Networking

2.1 Implementation Model

2.1.1 Application Data Flow Diagram



2.1.2 Functional Definition of AEs

2.1.2.1 Functional Definition of SERVER Application Entity

The Expedo Service (SERVER) application entity is an application that runs in the background as a Windows Service on the host operating system. This application watches for incoming images written to the disk by the Expedo Store Manager (ESM) application entity. SERVER acts as a File Set Reader. Based on the configuration of the system, SERVER decides what to do with these DICOM objects. Typically, SERVER will be set up to create DICOM compliant removable media with these objects.

SERVICE implements Query/Retrieve FIND/MOVE as an SCU to allow users to select and choose specific studies for media creation. SERVICE also implements various other SCU operations to retrieve report information. SERVER can create DICOM Structured Reports objects from this information and include them on the created removable media.

The basic functionality for SERVICE is configurable via a graphical user interface. Advanced DICOM settings can be configured in various other XML files. SERVICE logs its messages to a plain text file on the local file system. The nature of the logging is highly configurable. SERVICE can be managed like a normal Windows Service or managed through a monitoring application that is part of the Expedo Application Suite. This monitoring application can also monitor the log files.

2.1.2.2 Functional Definition of ESM Application Entity

The Expedo Store Manager (ESM) application entity is an application that runs as a background service on the Microsoft Windows operating system. This application can be started or stopped interactively by the user by using the standard methods of managing Windows Services. There is also a monitoring application that exists as part of the Expedo Application Suite that can be used to manage and monitor the service and view its log files. ESM writes log messages to various log files and to the system event log. Multiple log levels are supported and are configurable by editing XML configuration files. ESM logging can be turned up high enough so that the contents of all messages are written to local dump files.

ESM listens for incoming connections and will accept presentation contexts for various Image Storage and Verification SOP Classes. When a verification request is received, a verification response will be returned. When an Image Storage (C-STORE-RQ) request is received, the message will be written in Part 10 format to the local file system, decompressed if necessary, and then a response (C-STORE-RSP) will be returned.

An additional options for ESM is support for query and retrieve as an SCP. When this option is enable, ESM will respond to query and retrieve requests from remote AEs. The contents of the query and retrieve are determined by the data that is stored locally in the system. For example, when data is sent to ESM, it can be stored for a given period of

time. During this time, this information is made available to other AEs via DICOM query and retrieve.

2.1.2.3 Functional Definition of IMPORTER Application Entity

The Expedo Import Utility (IMPORTER) application entity that runs as a native Win32 application on the Microsoft Windows Operating System. IMPORTER is a user-interactive application that allows users to import Part 10 DICOM files from removable into a remote Image Storage SCP. During the import operation, the user is given the opportunity to change the demographic information of the imported objects from either user-entered values, values from a Query/Retrieve SCP, or from a Modality Worklist Management SCP. IMPORTER receives all of its configuration information from a remote webservice. IMPORTER uses Study Root Query/Retrieve, Modality Worklist Management, and Image Storage as an SCU. Importer is also an FSR.

2.2 AE Specifications

2.2.1 SERVICE AE Specification

2.2.1.1 SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

2.2.1.2 Association Policies

2.2.1.2.1 General

2.2.1.2.2 Number of Associations

The total number of associations allows is dependant upon the underlying operating system.

2.2.1.2.3 Asynchronous Nature

Multiple outstanding operations over a single association is not supported.

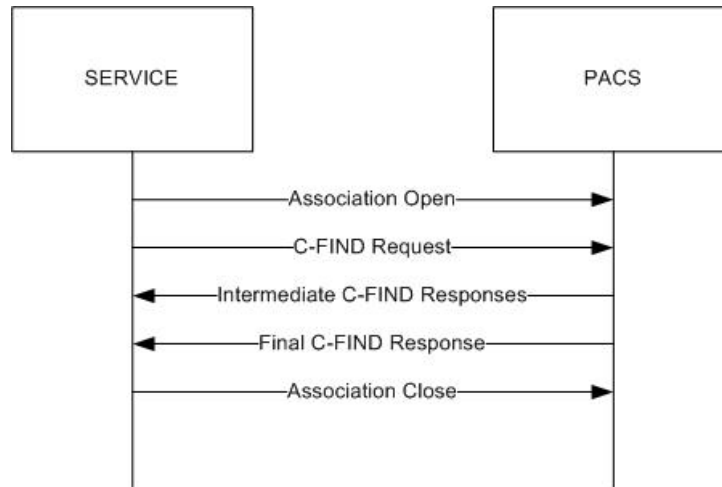
2.2.1.2.4 Implementation Identifying Information

Implementation Class Name	Dicom.Net
Implementation Class UID	1.2.840.114191.2.167964272

2.2.1.3 Association Initiation Policy

2.2.1.3.1 Activity - Query

2.2.1.3.1.1 Description and Sequencing of Activities



The user of client applications of the Expedo Software Suite can request queries for study and patient demographic data from SERVICE. SERVICE is responsible for processing the user request, performing the necessary DICOM communication, and then relaying the status of the request back to the calling application.

2.2.1.3.1.2 Proposed Presentation Contexts

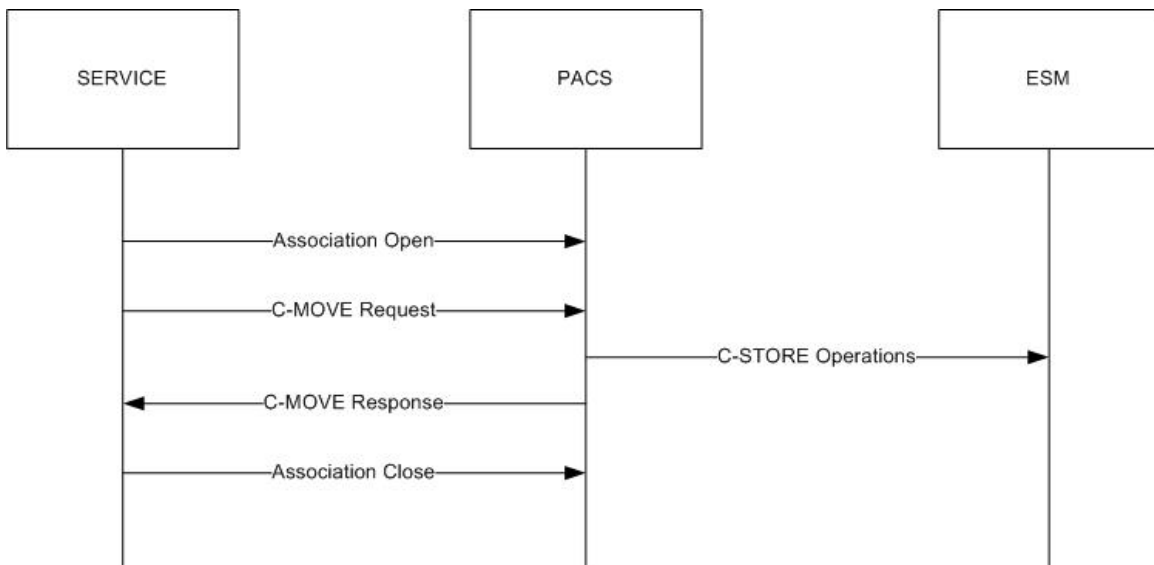
Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.3.1.3 SOP Specific Conformance for Query

SERVICE provides Standard Conformance for Study Root Query/Retrieve - FIND.

2.2.1.3.2 Activity - Retrieve

2.2.1.3.2.1 Description and Sequencing of Activities



The user will use one of the Expedo Client Applications to request retrieval of studies. SERVICE will process this request and execute the proper DICOM communication to make the request happen. The C-MOVE requests issued by SERVICE will have a move destination that points to ESM. When ESM receives the results from the request move operation, SERVICE will notice these instances and take the appropriate action. SERVICE will process the C-MOVE response and send information about it back to the calling application.

2.2.1.3.2.2 Proposed Presentation Contexts

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

2.2.1.3.2.3 SOP Specific Conformance for Retrieve

SERVICE provides Standard Conformance for Study Root Move.

2.2.1.4 Association Acceptance Policy

SERVICE will not accept associations.

2.2.2 ESM AE Specification

The ESM application entity provides Standard Conformance to the following SOP Classes:

2.2.2.1 SOP Classes

SOP Class Name	Sop Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes
Study Root Query/Retrieve IM - FIND	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Study Root Query/Retrieve IM - MOVE	1.2.840.10008.5.1.4.1.2.2.2	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	Yes	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Yes	Yes
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Yes	Yes
Key Image Object Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	Yes
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	Yes	Yes
Stored Print Storage	1.2.840.10008.5.1.1.29	Yes	Yes
Digital Mammography Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes
12-Lead ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes
Ambulatory ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes
Cardiac Electrophysiology Waveform	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes
Basic Voice Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	Yes
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	Yes	Yes
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Yes	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes
VL Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes
VL Slide	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes

Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Yes	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	Yes
Stored Print Storage	1.2.840.10008.5.1.1.27	Yes	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes
Ophthalmic Photography IOD 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes
Ophthalmic Photography IOD 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	Yes
Stereometric Relationship Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes

2.2.2.2 Association Policies

2.2.2.2.1 General

The only proposed application context is for DICOM 3.0

Application Context Name	1.2.840.10008.3.1.1.1
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2.2.2.2.2 Number of Associations

The number of associations is limited by the number of connections allow by the underlying operating system.

2.2.2.2.3 Asynchronous Nature

Multiple outstanding operations over a single association are not supported.

2.2.2.2.4 Implementation Identifying Information

Implementation Class Name	Dicom.Net
Implementation Class UID	1.2.840.114191.2.167964272

2.2.2.3 Association Initiation Policy

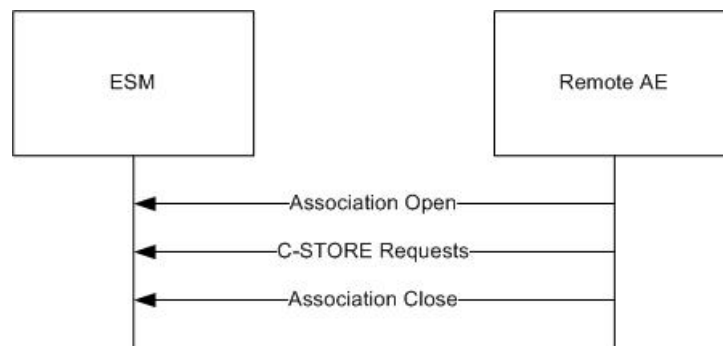
ESM will only initiate associations for C-STORE operations after a C-MOVE is requested.

2.2.2.4 Association Acceptance Policy

ESM will accept associations those SOP classes listed in section 2.2.2.1.

2.2.2.4.2 Activity - Image Storage

2.2.2.4.2.1 Description and Sequencing of Activities



When a remote SCU requests image storage, ESM will turn the message streams into a Part 10 file and store it on the local file system.

2.2.2.4.2.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See Note	See Note	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	See Note	See Note	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Note	See Note	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See Note	See Note	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Note	See Note	SCP	None
Secondary Capture	1.2.840.10008.5.1.4.1.1.7	See Note	See Note	SCP	None

Image Storage					
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See Note	See Note	SCP	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See Note	See Note	SCP	None
Key Image Object Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.59	See Note	See Note	SCP	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See Note	See Note	SCP	None
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See Note	See Note	SCP	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See Note	See Note	SCP	None
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2.1	See Note	See Note	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1.1	See Note	See Note	SCP	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See Note	See Note	SCP	None
Stored Print Storage	1.2.840.10008.5.1.1.29	See Note	See Note	SCP	None
Digital Mammography Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See Note	See Note	SCP	None
12-Lead ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.1	See Note	See Note	SCP	None
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	See Note	See Note	SCP	None
Ambulatory ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.3	See Note	See Note	SCP	None
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	See Note	See Note	SCP	None
Cardiac Electrophysiology Waveform	1.2.840.10008.5.1.4.1.1.9.3.1	See Note	See Note	SCP	None
Basic Voice Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.1	See Note	See Note	SCP	None
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See Note	See Note	SCP	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See Note	See Note	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See Note	See Note	SCP	None
X-Ray Radiofluoroscopic	1.2.840.10008.5.1.4.1.1.12.2	See Note	See Note	SCP	None

Image Storage					
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See Note	See Note	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See Note	See Note	SCP	None
VL Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.2	See Note	See Note	SCP	None
VL Slide	1.2.840.10008.5.1.4.1.1.77.1.3	See Note	See Note	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See Note	See Note	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	See Note	See Note	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	See Note	See Note	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	See Note	See Note	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See Note	See Note	SCP	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See Note	See Note	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See Note	See Note	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See Note	See Note	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See Note	See Note	SCP	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See Note	See Note	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See Note	See Note	SCP	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See Note	See Note	SCP	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See Note	See Note	SCP	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See Note	See Note	SCP	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See Note	See Note	SCP	None
Ophthalmic Photography IOD 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See Note	See Note	SCP	None
Ophthalmic Photography IOD 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	See Note	See Note	SCP	None
Stereometric Relationship Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	See Note	See Note	SCP	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See Note	See Note	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See Note	See Note	SCP	None

Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See Note	See Note	SCP	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See Note	See Note	SCP	None
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	See Note	See Note	SCP	None

Note - For each abstract syntax, any of the transfer syntaxes in 2.2.2.3.2.4 is acceptable.

2.2.2.4.2.3 Presentation Context Acceptance Policy

Only one Presentation Context will be accepted for a given Abstract Syntax.

2.2.2.4.2.4 Transfer Syntax Selection Policy

The precedence of selected Transfer Syntaxes is configurable in ESM configuration files. The transfer syntax with the highest precedence (1 being the highest) will be accepted as the transfer syntax for the particular presentation context. The supported transfer syntaxes are:

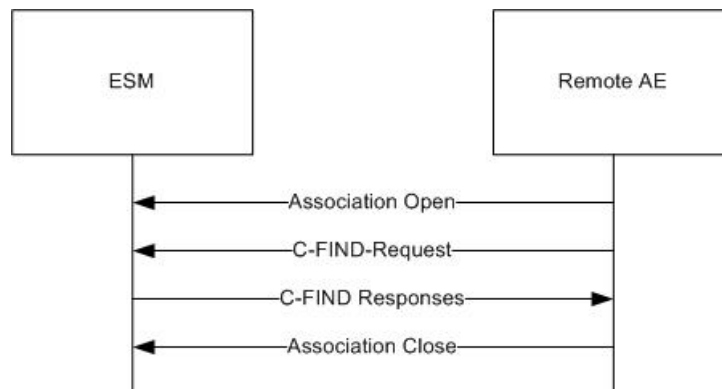
Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian	1.2.840.10008.1.2.1
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Big Endian	1.2.840.10008.1.2.2
JPEG Baseline	1.2.840.10008.1.2.4.50

2.2.2.4.2.5 SOP Specific Conformance for Image Storage

ESM provides Standard Conformance to Image Storage SOP Classes.

2.2.2.4.3 Activity - Image Query

2.2.2.4.3.1 Description and Sequencing of Activities



When a remote SCU requests study information with C-FINDs, ESM will respond with the appropriate C-FIND-RQs.

2.2.2.4.3.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve IM - FIND	1.2.840.10008.5.1.4.1.2.2.1	See Note	See Note	SCP	None

Note - For each abstract syntax, any of the transfer syntaxes in 2.2.2.3.2.4 is acceptable.

2.2.2.4.3.3 Presentation Context Acceptance Policy

Only one Presentation Context will be accepted for a given Abstract Syntax.

2.2.2.4.3.4 Transfer Syntax Selection Policy

The precedence of selected Transfer Syntaxes is configurable in ESM configuration files. The transfer syntax with the highest precedence (1 being the highest) will be accepted as the transfer syntax for the particular presentation context. The supported transfer syntaxes are:

Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian	1.2.840.10008.1.2.1
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Big Endian	1.2.840.10008.1.2.2
JPEG Baseline	1.2.840.10008.1.2.4.50

2.2.2.4.3.5 SOP Specific Conformance for Image Query

ESM provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP. ESM supports all mandatory Unique and Required Matching Keys. In addition to these keys, optional keys are also supported. See tables 2.2.2.4.3.5-1 and 2.2.2.4.3.5-2

Table 2.2.2.4.3.5-1 C-FIND Patient Level Attributes

Description	Tag
Patient Name	0010,0010
Patient ID (MRN)	0010,0020
Patient Birthdate	FIXME
Patient Sex	FIXME

Table 2.2.2.4.3.5-2 C-FIND Study Level Attributes

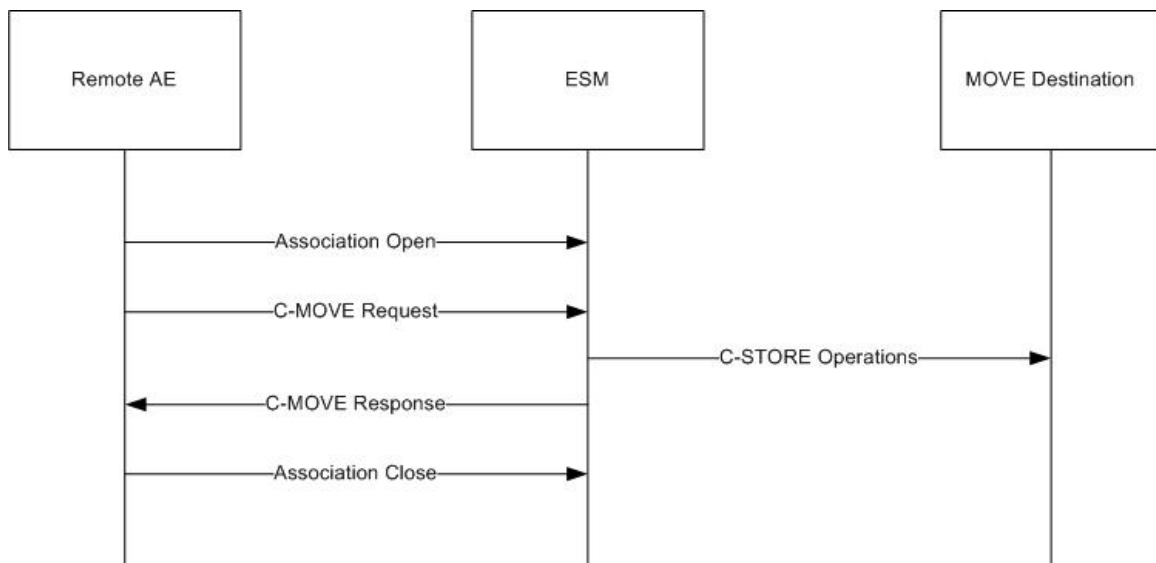
Description	Tag
Study Instance UID	0020,000D
Study ID	0020,0010
Study Date	0008,0020
Study Time	0008,0010
Accession Number	0008,0050
Study Description	FIXME

Table 2.2.2.4.3.5-3 C-FIND Status Codes

Status	Meaning	Code	Description
Refused	Out of resources	A700	Out of resources
Failed	Identifier Mismatch	A900	Identifier/SOP Class mismatch
	Not Supported	C001	The query retrieve option is not enabled
	Peer Not Found	C002	The requested peer is not configured
	Volume Not Found	C003	The volume queried does not exist
	Not Responding	C004	The server or database is offline
	Other	C006	Other error condition encountered
Cancel	Request Cancelled	FE00	Cancelled
Pending	Pending	FF00	Pending
Success	Success	0000	Success

2.2.2.4.4 Activity - Image Retrieve

2.2.2.4.4.1 Description and Sequencing of Activities



When a remote SCU requests a move, ESM will perform each requested move by issuing C-STOREs to the specified move destination.

2.2.2.4.4.2 Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Query/Retrieve IM - MOVE	1.2.840.10008.5.1.4.1.2.2.2	See Note	See Note	SCP	None

Note - For each abstract syntax, any of the transfer syntaxes in 2.2.2.3.2.4 is acceptable.

2.2.2.4.4.3 Presentation Context Acceptance Policy

Only one Presentation Context will be accepted for a given Abstract Syntax.

2.2.2.4.4.4 Transfer Syntax Selection Policy

The precedence of selected Transfer Syntaxes is configurable in ESM configuration files. The transfer syntax with the highest precedence (1 being the highest) will be accepted as the transfer syntax for the particular presentation context. The supported transfer syntaxes are:

Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian	1.2.840.10008.1.2.1
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Big Endian	1.2.840.10008.1.2.2
JPEG Baseline	1.2.840.10008.1.2.4.50

2.2.2.4.4.5 SOP Specific Conformance for Image Retrieve

ESM provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP. ESM supports all mandatory Unique and Required Matching Keys. In addition to these keys, optional keys are also supported. See tables 2.2.2.4.4.5-1 and 2.2.2.4.4.5-2

Table 2.2.2.4.4.5-1 C-MOVE Patient Level Attributes

Description	Tag
Patient Name	0010,0010
Patient ID (MRN)	0010,0020
Patient Birthdate	0010,0030
Patient Sex	0010,0040

Table 2.2.2.4.4.5-2 C-MOVE Study Level Attributes

Description	Tag
Study Instance UID	0020,000D
Study ID	0020,0010
Study Date	0008,0020
Study Time	0008,0010

Accession Number	0008,0050
Study Description	0008,1030

Table 2.2.2.4.4.5-3 C-MOVE Status Codes

Status	Meaning	Code	Description
Refused	Out of resources	A700	Out of resources
Failed	Identifier Mismatch	A900	Identifier/SOP Class mismatch
	Not Supported	C001	The query retireve option is not enabled
	Peer Not Found	C002	The requested peer is not configured
	Volume Not Found	C003	The volume queried does not exist
	Not Responding	C004	The server or database is offline
	Not found	C005	One or more DICOM instance could not be found.
	Failed Response	C007	Error reading response from remote AE
Cancel	Request Cancelled	FE00	Cancelled
Pending	Pending	FF00	Pending
Success	Success	0000	Success

Note that the warning status B000 is never issued. If a failure occurs during export, the entire task is aborted.

2.2.3 IMPORTER AE Specification

This application provides Standard Conformance to the following SOP Classes.

2.2.3.1 SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	Yes	No
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Yes	No
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Yes	No
Key Image Object Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.59	Yes	No
Digital Intra-oral X-Ray Image Storage	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	No

(Processing)			
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	Yes	No
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	Yes	No
Stored Print Storage	1.2.840.10008.5.1.1.29	Yes	No
Digital Mammography Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
12-Lead ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
Ambulatory ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
Cardiac Electrophysiology Waveform	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No
Basic Voice Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.1	Yes	No
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	Yes	No
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Yes	No
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
VL Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	No
VL Slide	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	No
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	No
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	No
Standalone PET Curve	1.2.840.10008.5.1.4.1.1.129	Yes	No

Storage			
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	No
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	No
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	Yes	No
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	No
Stored Print Storage	1.2.840.10008.5.1.1.27	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Ophthalmic Photography IOD 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	No
Ophthalmic Photography IOD 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	No
Stereometric Relationship Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	Yes	No

2.2.3.2 Association Policies

2.2.3.2.1 General

The application context name of DICOM 3.0 is the only context name proposed.

Application Context Name	1.2.840.10008.3.1.1.1
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2.2.3.2.2 Number of Associations

IMPORTER will only handle one open association at a time.

2.2.3.2.3 Asynchronous Nature

Multiple outstanding operations over a single associations is not supported.

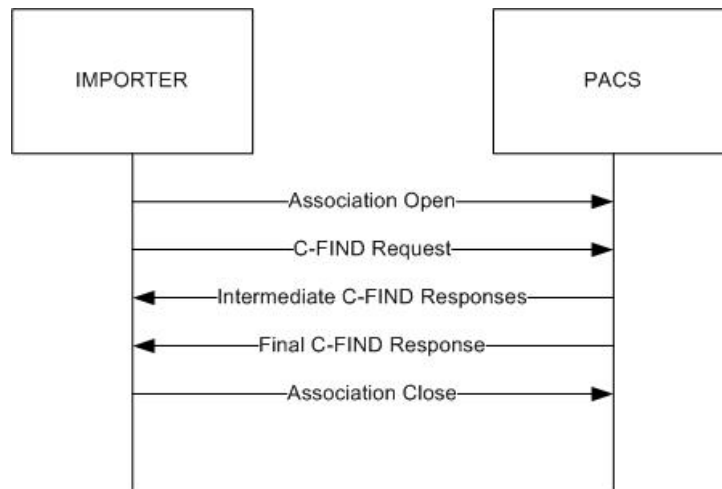
2.2.3.2.4 Implementation Identifying Information

Implementation Class Name	Dicom.Net
Implementation Class UID	1.2.840.114191.2.167964272

2.2.3.3 Association Initiation Policy

2.2.3.3.1 Activity - Query Modality Worklist

2.2.3.3.1.1 Description and Sequencing of Activities



Users can query modality worklists to retrieve demographic information for studies. The demographic information returned by the SCP can be used to change the values of studies that are exported.

2.2.3.3.1.2 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Modality Worklist Information	1.2.840.10008.5.1.4.31	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None

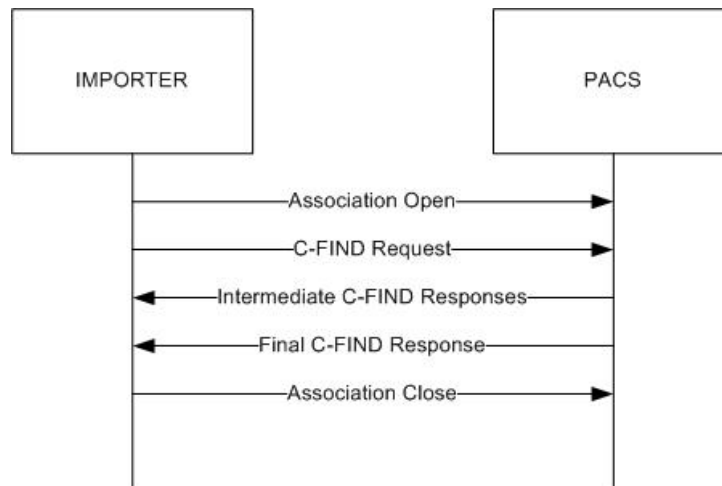
Model - FIND					
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

2.2.3.3.1.3 SOP Specific Conformance for Modality Worklist - FIND

C-FIND-RQs are never cancelled.

2.2.3.3.2 Activity - Query Demographic Data

2.2.3.3.2.1 Description and Sequencing of Activities



Users can query Query/Retrieve SCPs to obtain demographic information about patients and studies. This information can be used to change the values of exported studies.

2.2.3.3.2.2 Proposed Presentation Contexts

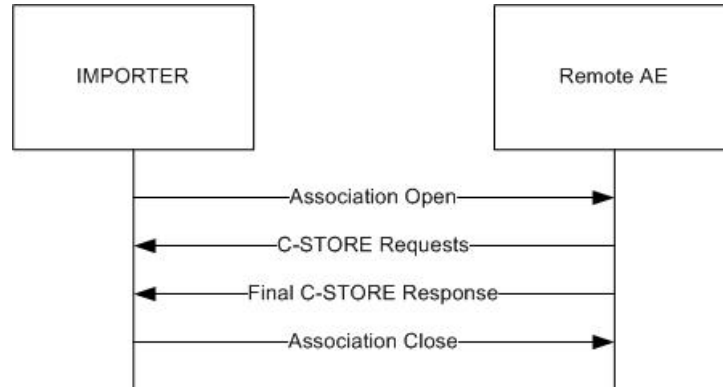
Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.3.3.2.3 SOP Specific Conformance for Query/Retrieve - FIND

Only study level queries are requested. C-FIND-RQs are never cancelled.

2.2.3.3.3 Activity - Export Images

2.2.3.3.3.1 Description and Sequencing of Activities



User will initiate image storage when they use the IMPORT application to export the selected studies from the removable media attached to the host computer.

2.2.3.3.3.2 Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See Note	See Note	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	See Note	See Note	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Note	See Note	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See Note	See Note	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Note	See Note	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See Note	See Note	SCU	None
Stand-alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	See Note	See Note	SCU	None
Stand-alone Curve Storage	1.2.840.10008.5.1.4.1.1.9	See Note	See Note	SCU	None
Key Image Object Storage SOP Class	1.2.840.10008.5.1.4.1.1.88.59	See Note	See Note	SCU	None
Digital Intra-oral X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	See Note	See Note	SCU	None
Digital Intra-oral X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	See Note	See Note	SCU	None
Digital X-Ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	See Note	See Note	SCU	None
Digital X-Ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2.1	See Note	See Note	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1.1	See Note	See Note	SCU	None
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	See Note	See Note	SCU	None
Stored Print Storage	1.2.840.10008.5.1.1.29	See Note	See Note	SCU	None

Digital Mammography Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See Note	See Note	SCU	None
12-Lead ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.1	See Note	See Note	SCU	None
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	See Note	See Note	SCU	None
Ambulatory ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.3	See Note	See Note	SCU	None
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	See Note	See Note	SCU	None
Cardiac Electrophysiology Waveform	1.2.840.10008.5.1.4.1.1.9.3.1	See Note	See Note	SCU	None
Basic Voice Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.1	See Note	See Note	SCU	None
Stand-alone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	See Note	See Note	SCU	None
Stand-alone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	See Note	See Note	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See Note	See Note	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See Note	See Note	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See Note	See Note	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See Note	See Note	SCU	None
VL Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.2	See Note	See Note	SCU	None
VL Slide	1.2.840.10008.5.1.4.1.1.77.1.3	See Note	See Note	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See Note	See Note	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	See Note	See Note	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	See Note	See Note	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	See Note	See Note	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	See Note	See Note	SCU	None
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	See Note	See Note	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See Note	See Note	SCU	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See Note	See Note	SCU	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See Note	See Note	SCU	None
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See Note	See Note	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See Note	See Note	SCU	None
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	See Note	See Note	SCU	None
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	See Note	See Note	SCU	None
Stored Print Storage	1.2.840.10008.5.1.1.27	See Note	See Note	SCU	None
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See Note	See Note	SCU	None
Ophthalmic Photography IOD 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See Note	See Note	SCU	None
Ophthalmic Photography IOD 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	See Note	See Note	SCU	None
Stereometric Relationship Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	See Note	See Note	SCU	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	See Note	See Note	SCU	None

Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	See Note	See Note	SCU	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	See Note	See Note	SCU	None
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	See Note	See Note	SCU	None
Encapsulated PDF Storage SOP Class	1.2.840.10008.5.1.4.1.1.104.1	See Note	See Note	SCU	None

Note -The transfer syntax proposed will be the same transfer syntax of the instance located on the imported storage media.

2.2.3.3.3 SOP Specific Conformance for Image Storage

IMPORTER provides standard conformance to the Image Storage SOP classes.

2.2.3.4 Association Acceptance Policy

IMPORTER does not accept associations

2.3 Physical Network Interfaces

2.3.1 Supported Communication Stacks

2.3.1.1 TCP/IP

The DICOM UpperLayer for Part 10 of the DICOM standard is supported using TCP/IP via Windows Sockets 2 or the TCP/IP implementation of the host operating system.

2.3.2 Physical Media

The physical medium used for communication is inconsequential to this implementation. Any physical medium supported by the host operating system is supported.

2.3.3 Additional Protocols

No additional protocols are supported.

3.4 Configuration

4. Media Storage

5. Support of Extended Character Sets

The Expedo Application Suite supports the character set: ISO_IR 100.

