



**PacsCube and MammoSmart Product Line
DICOM Conformance Statement**

October 18, 2005
Version 1.1



CONTENTS

1.0	Introduction	4
1.1	Scope and Field of Application	4
1.2	References and Definitions	4
1.3	Symbols and Abbreviations	4
1.4	Revision Number	4
1.5	Considerations	4
2.0	Implementation Model	5
2.1	Application Data Flow Diagram	5
2.2	Functional Definitions of Application Entities	5
2.3	Sequencing of Real World Activities	6
3.0	Application Entity Specifications	6
3.1	AE Specifications for DCS's DICOM Services	6
3.1.1	Association Establishment Policies	8
3.1.1.1	General	8
3.1.1.2	Number of Associations	8
3.1.1.3	Asynchronous Nature	8
3.1.1.4	Implementation Identifying Information	8
3.1.1.5	Association Initiation Policy	8
3.2	Receive Images from a Remote System (C-STORE SCP)	9
3.2.1	Associated Real World Activity	9
3.2.2	Accepted Presentation Contexts	9
3.2.3	SOP Specific Conformance Statement for SOP Storage Class	10
3.2.4	Presentation Context Acceptance Criterion	10
3.3	Send Images to a Remote System (C-STORE SCU)	10
3.3.1	Associated Real World Activity	10
3.3.2	Proposed Presentation Contexts	10
3.3.4	SOP Specific Conformance Statement for Image Storage SOP Class	11
3.4	Querying the DICOM Databases of DCS Applications (C-FIND SCP)	11
3.4.1	Associated Real World Activity	12
3.4.2	Accepted Presentation Contexts	12
3.4.3	SOP Specific Conformance Statement for SOP Class Query	12
3.4.4	Presentation Context Acceptance Criterion	13
3.5	Query Remote Image Databases (C-FIND SCU)	13
3.5.1	Associated Real World Activity	13
3.5.2	Proposed Presentation Contexts	13
3.5.3	Support Query Tags	13
3.6	Query Remote Results Databases (C-FIND SCU)	14
3.6.1	Presentation Context Table - Mitra Report Management	15

3.6.2	SOP Specific Conformance - Mitra Report Management	15
3.7	Retrieve from the DCS Server (C-MOVE SCP)	15
3.7.1	Associated Real World Activity	16
3.7.2	Accepted Presentation Contexts	16
3.7.3	SOP Specific Conformance Statement for SOP Class Retrieve	16
3.7.4	Presentation Context Acceptance Criterion	16
3.8	Retrieve from a Remote System (C-MOVE SCU)	16
3.8.1	Associated Real World Activity	16
3.8.2	Proposed Presentation Contexts	16
3.8.3	Verify the Committed Storage of Images on a Remote System	16
3.8.4	Association Acceptance Policy	17
3.9	Verify Communication with a Remote System (DICOM ECHO SCP)	17
3.9.1	Associated Real World Activity	17
3.9.2	Proposed Presentation Contexts	17
3.9.3	SOP Specific Conformance Statement for SOP Verification Class	17
3.10	Verify Communication with a Remote System (DICOM ECHO SCU)	17
3.10.1	Associated Real World Activity	17
3.10.2	Accepted Presentation Contexts	17
3.10.3	SOP Specific Conformance Statement for SOP Class Verification	18
3.10.4	Presentation Context Acceptance Criterion	18
3.11	DCS's DICOM Media Services (IHE PDI MEDIA Interchange)	18
3.11.1	Real World Activity: Display Directory of CD-R Disk	18
3.11.2	Real World Activity: Read Images from CD-R Disk	19
3.11.3	Image Export for CD-R Recording	20
4.0	Communication Profile	20
4.1	Supported Communication Stacks	20
4.2	OSI Stack	20
4.3	TCP/IP Stack	20
4.4	Point-to-Point Stack	20
5.0	Extensions/Specializations/Privatizations	20
5.1	Standard Extended/Specialized/Private SOPs	20
5.2	Private Transfer Syntaxes	20
6.0	Configuration	20
6.1	AE Title/Presentation Address Mapping	201
6.2	Configuration Parameters	21
7.0	Support of Extended Characters Sets	21

1.0 Introduction

1.1 Scope and Field of Application

This document is the DICOM Conformance Statement for DatCard's (DCS) DICOM Store Server software application which is the foundation for the PacsCube™ and MammoSmart™ product lines. Contained in this statement are detailed descriptions of how the DCS Server with other Medical Imaging devices and applications that conform to the DICOM 3.0 standard.

The intended user of this document is involved with software design and system integration. It is understood that this individual is familiar with the concepts and terms used throughout this document. Readers unfamiliar with the DICOM 3.0 standard should consult the actual documentation prior to examining this conformance statement.

1.2 References and Definitions

All necessary references and definitions have been taken from the Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 13 (NEMA PS 3.1-13).

1.3 Symbols and Abbreviations

All symbols and abbreviations used herein are described in the Digital Imaging and Communications in Medicine (DICOM) standard, parts 1 through 13 (NEMA PS 3.1-13). Regarding corporate terms, the name eFilm Medical used in this document refers to eFilm Medical Inc., and the name eFilm shall be understood to mean eFilm Workstation.

1.4 Revision Number

Version	Date	Description
1.0	December 15, 2004	First Release
1.1	October 18, 2005	Update for Structure Reporting

1.5 Considerations

Readers should note the following points:

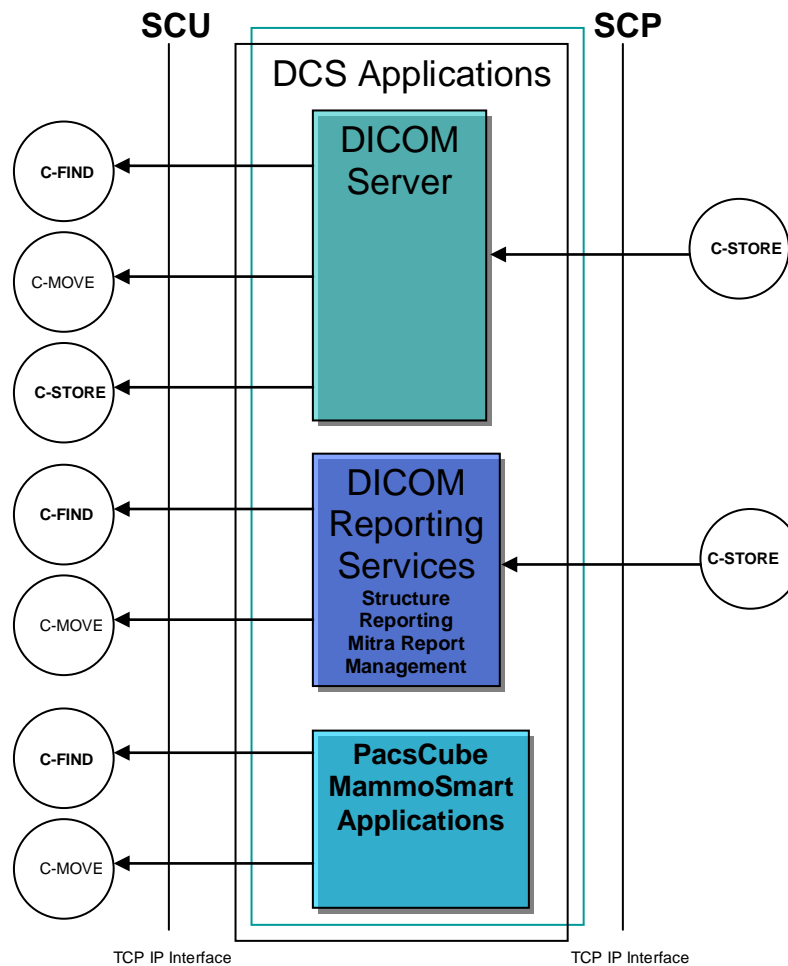
- This document on its own should not be interpreted as a guarantee of connectivity between DCS DICOM products and any equipment and/or applications offered by other vendors.
- Integration of DCS's DICOM products with the equipment and/or applications of different vendors are outside the scope of the DICOM 3.0 standard and product conformance statements. Integration and interoperability of different equipment/applications are the sole responsibility of the user.
- In the case of any possible connectivity inferred by a user to exist between DCS's DICOM Server and another product, the user is responsible for testing and verifying the inferred connectivity.
- Future changes to the DICOM 3.0 standard may require alterations to be made to PacsCube. DatCard Systems reserves the right to modify DCS's server architecture as needed, in order to meet changing standards.

- The user should ensure that any existing DICOM equipment also changes with the future developments of the DICOM standards. Failure to keep pace with any alterations in the DICOM standards may result in decreased or lost connectivity.
- All trade names mentioned in this document are recognized.

2.0 Implementation Model

2.1 Application Data Flow Diagram

The Implementation Model for DCS's applications is depicted below:



2.2 Functional Definitions of Application Entities

- **DCS DICOM Server** - acts primarily as the DICOM SCP storage component of DICOM objects. The DCS server can additionally act as a DICOM SCU in performing C-FIND, C-MOVE and C-STORE requests; however, its typical function is as a storage facility.

- **DCS DICOM Reporting Server** – This server acts as both a DICOM SCP storage server in the storage of DICOM Structured Report objects and as a DICOM SCU for the requesting of DICOM Structured Reports. In addition it can perform C-FIND requests as an DICOM SCU using Mitra’s private SOP Class Detached Visit/Results Management in fetching both visit and result information.
- **DCS PacsCube/MammoSmart Applications** – These applications act as a DICOM SCU’s in requesting information for the creation of portable media.

A number of DICOM services are provided by DCS’s DICOM application, run as services within (Windows 2000/2003/XP) process. All DCS DICOM SCP Services starts when the system is started, and shuts down when the system is turned off.

All communications and image transfer with the remote application is accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

Below is a table of the functions supported by DCS’s DICOM Server application entities:

SCU	SCP
<ul style="list-style-type: none"> ▪ Verification and Storage SOP classes ▪ Query and Retrieve SOP classes ▪ Mitra’s Private SOP classes for Detached Results Management. 	<ul style="list-style-type: none"> ▪ Verification, Storage, Query/Retrieve SOP class

2.3 Sequencing of Real World Activities

Not applicable.

3.0 Application Entity Specifications

3.1 AE Specifications for DCS’s DICOM Services

The DCS DICOM applications provide support for the following DICOM V3.0 SOP Classes as a SCP or SCU depending on the application:

SOP Classes as SCU	
SOP Class UID	SOP Class Name
Verification	
1.2.840.10008.1.1	Verification
Storage	
1.2.840.10008.5.1.4.1.1.1	CR Image Storage
1.2.840.10008.5.1.4.1.1.2	CT Image Storage
1.2.840.10008.5.1.4.1.1.1.1	DX Image Storage (Presentation)
1.2.840.10008.5.1.4.1.1.1.1.1	DX Image Storage (Raw)
1.2.840.10008.5.1.4.1.1.4	MR Image Storage
1.2.840.10008.5.1.4.1.1.6	US Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.6.1	US Image Storage



1.2.840.10008.5.1.4.1.1.3	US Multi-Frame Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.3.1	US Multi-Frame Image Storage
1.2.840.10008.5.1.4.1.1.7	SC Image Storage
1.2.840.10008.5.1.4.1.1.2	MG Storage (Presentation)
1.2.840.10008.5.1.4.1.1.2.1	MG Storage (Raw)
1.2.840.10008.5.1.4.1.1.5	NM Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.20	NM Image Storage
1.2.840.10008.5.1.4.1.1.12.1	XA Image Storage
1.2.840.10008.5.1.4.1.1.12.2	RF Image Storage
1.2.840.10008.5.1.4.1.1.12.3	XA Biplane Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.128	Standard PET Image Storage
1.2.840.10008.5.1.4.1.1.481.1	RT Image Storage
1.2.840.10008.5.1.4.1.1.88.11	Basic Text SR
Query/Retrieve	
1.2.840.10008.5.1.4.1.2.2.1	Study Root Query/Retrieve Model – FIND
1.2.840.10008.5.1.4.1.2.2.2	Study Root Query/Retrieve Model – MOVE

The DCS DICOM server provides support for the following DICOM 3.0 SOP Classes as an SCP:

SOP Classes as SCP	
SOP Class UID	SOP Class Name
Verification	
1.2.840.10008.1.1	Verification
Storage	
1.2.840.10008.5.1.4.1.1.1	CR Image Storage
1.2.840.10008.5.1.4.1.1.2	CT Image Storage
1.2.840.10008.5.1.4.1.1.1.1	DX Image Storage (Presentation)
1.2.840.10008.5.1.4.1.1.1.1.1	DX Image Storage (Raw)
1.2.840.10008.5.1.4.1.1.4	MR Image Storage
1.2.840.10008.5.1.4.1.1.6	US Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.6.1	US Image Storage
1.2.840.10008.5.1.4.1.1.3	US Multi-Frame Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.3.1	US Multi-Frame Image Storage
1.2.840.10008.5.1.4.1.1.7	SC Image Storage
1.2.840.10008.5.1.4.1.1.2	MG Storage (Presentation)
1.2.840.10008.5.1.4.1.1.2.1	MG Storage (Raw)
1.2.840.10008.5.1.4.1.1.5	NM Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.20	NM Image Storage
1.2.840.10008.5.1.4.1.1.12.1	XA Image Storage
1.2.840.10008.5.1.4.1.1.12.2	RF Image Storage
1.2.840.10008.5.1.4.1.1.12.3	XA Biplane Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.128	Standard PET Image Storage
1.2.840.10008.5.1.4.1.1.481.1	RT Image Storage
Query/Retrieve	
1.2.840.10008.5.1.4.1.2.2.1	Study Root Query/Retrieve Model - FIND
1.2.840.10008.5.1.4.1.2.2.2	Study Root Query/Retrieve Model - MOVE

3.1.1 Association Establishment Policies

3.1.1.1 General

The DCS DICOM applications Context Name (ACN) that is always proposed by the DCS DICOM server is 1.2.840.10008.3.1.1. The server shall offer a maximum PDU size of 16kB (16384 bytes) upon association initiation, and accept maximum PDU sizes up to 16kB (16384 bytes) on associations initiated by remote applications. There is no limit on the number of Presentation Context Items that will be proposed.

3.1.1.2 Number of Associations

DCS DICOM applications can support multiple associations simultaneously, both as an SCP and as an SCU. As an SCP, the DICOM Server will listen for incoming associations and spawn a new process (a server "child") to manage each request. This ability means it is possible for DCS DICOM to receive both images and query/retrieve requests from multiple SCUs simultaneously. By default, the maximum number of simultaneous associations is limited to 10. Users may increase this value as needed; however, one should expect performance to degrade if the maximum number of simultaneous associations is increased significantly beyond 10.

As an SCU, the DCS Server can send images to multiple SCPs simultaneously, spawning a new thread for each destination.

3.1.1.3 Asynchronous Nature

The DCS DICOM applications do not support asynchronous operations. All operations will be performed synchronously.

3.1.1.4 Implementation Identifying Information

The Implementation Class UID is: 1.2.826.0.1.3680043.2.50.1

The version name is: DCS.

3.1.1.5 Association Initiation Policy

The DCS DICOM applications initiate associations for the following activities:

- Sending images from the local server database to a remote system.
- Queries of remote database contents.
- Retrieval of images from a remote database to the local server database.

3.2 Receive Images from a Remote System (C-STORE SCP)

This section describes how the DCS applications respond to a DICOM SCU C-STORE request. This section applies to the following DCS applications:

- DCS's DICOM Server
- DCS's DICOM Reporting Server

3.2.1 Associated Real World Activity

A remote system pushes (i.e., sends) images to the DCS Server. Upon completion of the transfer, the images are available locally and stored within Server database.

3.2.2 Accepted Presentation Contexts

Presentation Context Table for Receive from a Remote System				
Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	See Below	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See Below	SCP	None
DX Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See Below	SCP	None
DX Image Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.1.1	See Below	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See Below	SCP	None
US Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	See Below	SCP	None
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Below	SCP	None
US Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	See Below	SCP	None
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Below	SCP	None
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	See Below	SCP	None
MG Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	See Below	SCP	None
MG Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.2.1	See Below	SCP	None
NM Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See Below	SCP	None
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	See Below	SCP	None
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See Below	SCP	None
XA Biplane Image Storage(Retired)	1.2.840.10008.5.1.4.1.1.12.3	See Below	SCP	None
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See Below	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	See Below	SCP	None

Transfer Syntaxes for Receive from Remote System	
Name	UID
Implicit VR, Little Endian	1.2.840.10008.1.2
Explicit VR, JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
Explicit VR, JPEG Baseline (Process 4)	1.2.840.10008.1.2.4.51
Explicit VR, JPEG Lossless, NH,FOP (Process 14)	1.2.840.10008.1.2.4.70
RLE Lossless	1.2.840.10008.1.2.5

3.2.3 SOP Specific Conformance Statement for SOP Storage Class

The DCS applications conform to the SOP's of the Storage SOP Class at Level 2 (full). No elements are discarded or coerced by the DCS AE. In the case of a successful C-STORE operation the object has successfully been written to disk in the DCS database. If an image is sent with the same SOP Instance UID (0008, 0018) as one that already exists on the DCS AE, the new image will replace the old image and the database will be updated accordingly.

Lossy J-PEG images will be stored in compressed form by default when received by the DCS Server and will only be uncompressed for viewing.

C-STORE RESPONSE CODES			
Service Status	Status Description	Status Code (0000,0900)	Related Fields
Error	Cannot understand: The message was not properly DICOM encoded, or the SOP class unrecognized. The request was not processed.	C010	None
Success	Success	0000	None

3.2.4 Presentation Context Acceptance Criterion

No criterion.

3.3 Send Images to a Remote System (C-STORE SCU)

This section applies to sending images to a remote system using as a DICOM C-STORE SCU. This section applies to the DCS applications:

- DCS's DICOM Server

3.3.1 Associated Real World Activity

The user selects one or more studies from the search dialog and clicks the Send button. A list of

AEs appear, from which the user selects one.

3.3.2 Proposed Presentation Contexts

Presentation Context Table for Send to Remote System					
Abstract Syntax		Transfer Syntax	Role	Extended Negotiation	
Name	UID				
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	See Below	SCU	None	
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See Below	SCU	None	
DX Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	See Below	SCU	None	
DX Image Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.1.1	See Below	SCU	None	
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See Below	SCU	None	
US Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	See Below	SCU	None	
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Below	SCU	None	
US Multi-Frame Image	1.2.840.10008.5.1.4.1.1.3	See Below	SCU	None	

Storage (Retired)				
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Below	SCU	None
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	See Below	SCU	None
MG Storage (Presentation)	1.2.840.10008.5.1.4.1.1.2	See Below	SCU	None
MG Storage (Raw)	1.2.840.10008.5.1.4.1.1.2.1	See Below	SCU	None
NM Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	See Below	SCU	None
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	See Below	SCU	None
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See Below	SCU	None
XA Biplane Image Storage(Retired)	1.2.840.10008.5.1.4.1.1.12.3	See Below	SCU	None
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See Below	SCU	None
Standard PET Image Storage	1.2.840.10008.5.1.4.1.1.128	See Below	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See Below	SCU	None

Transfer Syntaxes for Send to Remote System	
Name	UID
Implicit VR, Little Endian	1.2.840.10008.1.2
Explicit VR, JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50 ²
Explicit VR, JPEG Baseline (Process 4)	1.2.840.10008.1.2.4.51 ²
Explicit VR, JPEG Lossless, NH,FOP (Process 14)	1.2.840.10008.1.2.4.70 ²
RLE Lossless	1.2.840.10008.1.2.5 ³

² Only if the image is already stored in specified syntax, and proposed in addition to ILE.

³ Only if the image being sent is already stored as an RLE Lossless-compressed image.

3.3.4 SOP Specific Conformance Statement for Image Storage SOP Class

Images stored in DCS's database that are to be sent to remote systems are converted to instances of the corresponding SOP Storage class(es). Images are then sent sequentially to the remote system(s). When sending multiple images to one remote system, a new association is negotiated for each study. DCS applications will propose the transfer syntax of the stored SOP instance, and the default, Implicit VR, Little Endian (ILE). That is, if the SOP instance is stored using a compressed syntax, DCS applications have the ability to decompress it into the ILE syntax for receivers that cannot process compressed images. RLE-compressed images are the only exception in which case DCS applications will only propose the RLE Lossless syntax when sending.

3.4 Querying the DICOM Databases of DCS Applications (C-FIND SCP)

This section applies to a remote system querying DCS DICOM applications as a C-FIND SCP. The following DCS applications apply to this section:

- DCS's DICOM Server

3.4.1 Associated Real World Activity

A remote system queries a DCS application database to determine what studies are present on the system.

3.4.2 Accepted Presentation Contexts

Presentation Context Table for Remote Query of DCS Application Databases					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Root Query Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None

3.4.3 SOP Specific Conformance Statement for SOP Class Query

The DCS applications supports C-Find response values as defined in DICOM v.3.0 Part 4. All Required (R) and Unique (U) Study, Series, and Image level keys are supported for Study Root Query/Retrieve information model. In addition, certain Optional (O) keys are supported. The following tables outline the supported keys. Please note that DCS Server does not support relational queries.

The preceding table lists the levels supported for the Patient/Study Query/Retrieve information model. For a Study Root Query/Level Retrieve, the DCS applications support the following keys:

Study Root Query/Retrieve: Supported Keys			
Data Level	Description	Tag	Type
Patient	SOP Class UID	(0008,0016)	O
Patient	Patient Name	(0010,0010)	R
Patient	Patient ID	(0010,0020)	R
Patient	Patient Date of Birth	(0010,0030)	O
Patient	Patient Sex	(0010,0040)	O
Study	SOP Class UID	(0008,0016)	O
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Study Accession Number	(0008,0050)	R
Study	Patient Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Study Referring MD's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Institutional Department Name	(0008,1040)	O
Study	Patient Date of Birth	(0010,0030)	O
Study	Patient Sex	(0010,0040)	O
Study	Series Modality	(0008,0060)	R
Series	SOP Class UID	(0008,0016)	O
Series	Series Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Series Description	(0008,103E)	O

Image	SOP Class UID	(0008,0016)	O
Image	Image Number	(0020,0013)	R
Image	Image SOP Instance UID	(0008,0018)	U

In addition, the DCS Server also supports the following types of attribute matching:

- Single Value Matching
- Universal Matching
- Wild Card Matching
- Range Matching

3.4.4 Presentation Context Acceptance Criterion

The DCS applications will accept all presentation contexts which match those of the preceding table (above, preceding page). No specific acceptance and/or prioritization rules are required.

3.5 Query Remote Image Databases (C-FIND SCU)

This section applies to the querying of a remote DICOM database as a C-FIND SCU. The following DCS applications apply to this section:

- DCS' DICOM Server
- DCS's DICOM Reporting Server
- DCS's PacsCube/MammoSmart applications

3.5.1 Associated Real World Activity

The user requests a list of studies and or results to include StudyInstanceUID or a SeriesInstanceUID or a SOPInstanceUID from the results of a C-Find request.

3.5.2 Proposed Presentation Contexts

Presentation Context Table for Remote Database Query					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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

3.5.3 Support Query Tags

The DCS applications supports a variety of tags of which many are configurable and support C-FIND response values as defined in DICOM v.3.0 Part 4. All

Required (R) and Unique (U) Study, Series, and Image level keys are supported for Study Root Query/Retrieve information model. In addition, certain Optional (O) keys are supported. For a Study Root Query/Retrieve the following keys are supported:

Study Root Query/Retrieve: Supported Keys			
Data Level	Description	Tag	Type
Patient	SOP Class UID	(0008,0016)	O
Patient	Patient Name	(0010,0010)	R
Patient	Patient ID	(0010,0020)	R
Patient	Patient Date of Birth	(0010,0030)	O
Patient	Patient Sex	(0010,0040)	O
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Study Accession Number	(0008,0050)	R
Study	Patient Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Study Referring MD's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Patient Date of Birth	(0010,0030)	O
Study	Patient Sex	(0010,0040)	O
Study	Institutional Department Name	(0008,1040)	O
Study	Number of Study related Instances	(0020,1208)	O
Series	Series Description	(0008,103E)	O
Series	Series Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Number of Series Related Instances	(0020,1209)	O
Image	Image Number	(0020,0013)	R
Image	Image SOP Instance UID	(0008,0018)	U

3.6 Query Remote Results Databases (C-FIND SCU)

This section applies to querying a remote results database server using Mitra's private SOP Class. This section pertains to Mitra Brokers, GE Brokers, Phillips EasyLink Broker and Siemens SIENET Imaging Workflow Management (PacsLink) broker using the following DCS application:

- DCS's Reporting Server
- DCS's PacsCube/MammoSmart applications

SOP Class	SOP Class UID
Mitra Report Management	1.2.840.113532.3500.8

3.6.1 Presentation Context Table - Mitra Report Management

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Mitra Report Info Model - FIND	1.2.840.113532.3500.8	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

3.6.2 SOP Specific Conformance - Mitra Report Management

Message Field	Tag	Matching Key Type SCU	Return Key Type SCU
Accession Number	(0008, 0050)	Yes	Yes
Patient's Name	(0010, 0010)	Yes	Yes
Patient ID	(0010, 0020)	Yes	Yes
Patient's Birth Date	(0010, 0030)	Yes	Yes
Requested Procedure Description	(0032, 1060)	Yes	Yes
Requested Procedure Code Sequence	(0032, 1064)	Yes	Yes
Requested Procedure ID	(0040, 1001)	Yes	Yes
Results ID Issuer	(4008, 0042)	No	Yes
Interpretation Approval Time	(4008, 0013)	No	Yes
Physicians Approving Interpretation	(4008, 0014)	No	Yes
Interpretation Recorded Date	(4008, 0100)	No	Yes
Interpretation Recorded Time	(4008, 0101)	No	Yes
Interpretation Recorder	(4008, 0102)	No	Yes
Interpretation Transcriber	(4008, 010A)	No	Yes
Interpretation Text	(4008,010B)	No	Yes
Interpretation Author	(4008, 010C)	No	Yes
Interpretation Diagnosis Description	(4008, 0115)	No	Yes
Interpretation ID	(4008, 0200)	No	Yes
Interpretation Status ID	(4008, 0212)	No	Yes
Impressions	(4008,0300)	No	Yes

3.7 Retrieve from the DCS Server (C-MOVE SCP)

This section applies to the sending of DICOM objects to remote DICOM systems as a C-MOVE SCP in a response to a C-MOVE SCU request. The following DCS applications apply to this section:

- DCS's DICOM Server

3.7.1 Associated Real World Activity

A remote system retrieves one or more studies from the DCS Server system.

3.7.2 Accepted Presentation Contexts

Presentation Context Table for Remote Retrieve from DCS Application Databases					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Root Query Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR, Little Endian	1.2.840.10008.1.2	SCP	None

3.7.3 SOP Specific Conformance Statement for SOP Class Retrieve

The DCS applications provides standard conformance.

3.7.4 Presentation Context Acceptance Criterion

The DCS applications will only accept requests for retrieval from those systems to which the application has been configured. No specific acceptance and/or prioritization rules are required.

3.8 Retrieve from a Remote System (C-MOVE SCU)

This section applies to sending C-MOVE requests to a remote system as a DICOM SCU and applies to the following applications.

- DCS's DICOM Server
- DCS's DICOM Reporting Server
- DCS's PacsCube/MammoSmart

3.8.1 Associated Real World Activity

The Remote requester, requests one or more studies/series/images from the C-Find response and then follows with a C-Move request for each object.

3.8.2 Proposed Presentation Contexts

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

3.8.3 Verify the Committed Storage of Images on a Remote System

The DCS applications do not yet support this function.

3.8.4 Association Acceptance Policy

The DCS applications accept associations for the activities listed below:

- DICOM communication verification between the DCS applications and a remote system.
- Image transfer from a remote system to the DCS applications.
- Processing remote system queries.
- Initiation of image transfer to a remote system in response to a request for retrieval.

The DCS applications will reject association requests from unknown AEs. Similarly, remote systems will reject DCS Server's association requests if the eFilm AE title is not correctly configured.

3.9 Verify Communication with a Remote System (DICOM ECHO SCP)

3.9.1 Associated Real World Activity

A request for one or more studies to be sent to a remote system.

3.9.2 Proposed Presentation Contexts

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.	SCU	None

3.9.3 SOP Specific Conformance Statement for SOP Verification Class

DCS applications provide standard conformance for DICOM communication verification.

3.10 Verify Communication with a Remote System (DICOM ECHO SCU)

3.10.1 Associated Real World Activity

The DCS applications will send an echo response to verification requests made by remote systems.

3.10.2 Accepted Presentation Contexts

Presentation Context Table				
Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Verification	1.2.840.10008.1.1	Implicit VR, Little Endian	SCP	None

3.10.3 SOP Specific Conformance Statement for SOP Class Verification

The DCS applications provides standard conformance for DICOM communication verification.

3.10.4 Presentation Context Acceptance Criterion

The DCS applications will accept all presentation contexts which match those of the preceding table (above). No specific acceptance and/or prioritization rules are required.

3.11 DCS's DICOM Media Services (IHE PDI MEDIA Interchange)

This section applies to the production, reading and importing of portable media. This section applies to the following DCS's applications:

- DCS's PacsCube/MammoSmart
- DCS's PacsCube CD Import

All DCS applications produce IHE PDI compliant DICOM Media. In addition all media conforms to DICOM Media Storage Service and File Format (PS 3.10) and the

Media Storage Application Profiles (PS 3.11) for reading images on CD-Recordable media.

The following application profile is supported by all DCS products:

Supported Application Profile	
Description	Identifier
General Purpose CD-R Image Interchange Profile	STD-GEN-CD

DCS applications, through its supported application profile (above), supports the real world activities listed below. Please note that some additional flexibility is also available.

Real World Activities		
Real World Activity	Role	SC Option
Display Directory of CD-R disk	FSR	Interchange
Read Image(s) from CD-R disk	FSR	Interchange

3.11.1 Real World Activity: Display Directory of CD-R Disk

DCS applications assume the role of FSR when reading the CD-R disk directory. Reading this directory will display an overview of the patients, studies, and images, organized in one of these ways:

Type of Query	
Type of Query	Levels
Study Root Query	Study

The user must supply at minimum the data for the Patient Name and Patient ID fields in order to display correctly the directory information. Reading the DICOMDIR contents is a standard feature of DCS applications. The following DICOMDIR keys are used for distinguishing between the objects.

DICOMDIR Keys Displayed by DCS's PacsCube CD Import Application			
Query Type	Level	Field	Tag
Study Root	Study	Patient Name	(0010,0010)
Study Root	Study	Patient ID	(0010,0020)
Study Root	Study	Modality	(0008,0060)
Study Root	Study	Study ID	(0020,0010)
Study Root	Study	Study Instance UID	(0020,000D)
Study Root	Study	Study Description	(0008,1030)

3.11.2 Real World Activity: Read Images from CD-R Disk

When reading images from a CD-R, DCS applications will assume the role of FSR. DICOM Part 10 Volume image import is standard. In order for DCS applications to store the images contained on a CD-R correctly, the following mandatory DICOM image attributes (DICOM Part 10) are required:

Mandatory Keys: DICOM Part 10 File Import		
IOD	Field	Tag
Patient	Patient Name	(0010,0010)
Patient	Patient ID	(0010,0020)
Study	Study ID	(0020,0010)
Study	Study UID	(0020,000D)
Series	Modality	(0008,0060)
Series	Series Number	(0020,0011)
Image	Referenced SOP Class UID in File	(0004,1510)
Image	Referenced SOP Instance UID in File	(0004,1511)
Image	Referenced Transfer Syntax UID in File	(0004,1512)
Image	Referenced File ID	(0004,1500)
Image	Image Number	(0020,0013)

DCS's applications can only import and read images from the following SOP classes:

Supported SOP Classes: DICOM Part 10 Import	
Name	UID
CR 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
DX Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1
DX Image Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.1.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
US Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
MG Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2
MG Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.2.1
NM Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
XA Biplane Image Storage(Retired)	1.2.840.10008.5.1.4.1.1.12.3
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Standard PET 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

The following transfer syntaxes are supported by DCS's applications when importing and reading CD-R images:

Supported Transfer Syntaxes: DICOM Part 10 Import	
Name	UID
Explicit VR, Little Endian	1.2.840.10008.1.2.1

3.11.3 Image Export for CD-R Recording

DCS applications, fully supports the General Purpose CD-R Image Interchange Profile as a File Set Creator that includes a *DICOMDIR on every piece of media*. The resultant CD-R will be fully compliant to DICOM and IHE. Multi-session writes are not supported.

4.0 Communication Profile

4.1 Supported Communication Stacks

DICOM Part 8 is supported by the DCS applications through TCP/IP.

4.2 OSI Stack

OSI stack is not supported by the DCS applications.

4.3 TCP/IP Stack

The TCP/IP stack supported by the DCS applications and is inherited from the host operating system (Windows 2000/XP/2003).

4.4 Point-to-Point Stack

The DCS Server does not support 50-pin ACR-NEMA connection.

5.0 Extensions/Specializations/Privatizations

5.1 Standard Extended/Specialized/Private SOPs

Not applicable.

5.2 Private Transfer Syntaxes

Not applicable.

6.0 Configuration

Local AE titles are configurable.

6.1 AE Title/Presentation Address Mapping

The local AE title can be configured by authorized personnel. Such personnel may change configurations through the settings of the Process Manager.

6.2 Configuration Parameters

The following fields are configurable for the local AE:

- Local AE Title for DICOM Images (default is PACSCUBE_SCP)
- Local AE Title for DICOM SR Objects (default is PACSCUBE_SR)
- Listening TCP/IP Port for DICOM Images (default port is 4006)
- Listening TCP/IP Port for DICOM SR Objects (default port is 5010)
- Number of simultaneous connections
- Priority of child processes

The following fields are configurable for any remote AE:

- Remote AE
- Remote TCP/IP Port
- Remote IP Address

7.0 Support of Extended Characters Sets

DCS applications provide multi-language user interfaces; however, DCS's DICOM Services only supports the use of the Japanese Character Repertoire, Unicode and Simplified Chinese in the applicable Value Representations, such as Patient's Name, Study Description and Series Description.