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MedDream version 8.8.1

CONFORMANCE STATEMENT

MedDream PACS functionalities (version 7.3.8)

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1 Introduction

MedDream PACS is a DICOM 3.0 compliant PACS (Picture Archive and Communication System) application thatcombines the following components in one machine or one box:

- A DICOM server.
- A PACS server which uses open source MySQL database.
- A Web server which uses open source Apache 2.0 HTTP server and PHP (recursive acronym for "PHP: Hypertext Preprocessor") scripts.
- A optional HL7 interface to receive and send HL7 messages via Lower Level Transport Protocol (LLTP)

The benefits of MedDream PACS over the traditional PACS servers are:

- It is low cost (Premium Edition) since it uses open source MySQL database and Apache web servers.
- It makes the life of a PACS administrator a lot easier since there is only ONE instead of multiple servers or boxes to maintain.
- Users can freely choose their favorite server platform or hardware, whether it is a PC, workstation, fully-fledged server with RAID disk arrays or even a laptop, to install and run MedDream PACS server software.
- Users can freely choose their favorite operating system software, whether it is Linux, Mac OS X, Windows 2008/2012 Server or Vista/Windows 7/Windows 8/Windows 10.
- Archiving of the PACS database is just as simple as backing up files on a regular server, which makes MedDream PACS fit seamlessly into the rest of IT infrastructure of the entire organization. A PACS administrator has the freedom to choose their favorite backup solutions, software and/or archive media.

This implementation of MedDream PACS server is designed to provide the following features:

- The application serves as a short-term archive for images. It accepts images from external sources and stores them for later retrieval.
- MedDream PACS uses DICOM as the interface to external conforming clients. The DICOM server acceptsDICOM association requests for the purpose of storing images and for image query and retrieve. MedDream PACS server will initiate DICOM association requests for the purpose of sending images to an external server, querying remote application entities, or printing images to remote Dicom printers. MedDream PACS server does not respond to any other type of network communication.
- MedDream PACS uses Apache Web server as the interface for viewing and managing the PACS database,and for reviewing images on-line through a web browser.
- The Premium Edition of MedDream PACS Server supports **Automatic Image Routing Table**, where userscan define routing entries based on the following criteria:

Field	Description
Source Application Entity (AE) Title	Images received from the matching Source AE Title will be routed to the destination AE automatically based on the specified **Schedule** below.
Key Attribute Tag	Currently, the **Patient ID** (0010,0020), **Referring Physician's Name** (0008,0090) and **Protocol Name** (0018,1030) key tags are supported. Users can define a matching pattern string with wild-card characters including '*' and '?', so that if the received image attribute matches with the specified pattern string, MedDream PACS Server Premium Edition will automatically route the received image to the destination AE based on the specified **Schedule** below.
Destination AE Title	This is the destination AE where the received images will be routed.
Schedule	Route **Immediately** (as soon as received), a **[From, To]** window, or based on a fixed **24-hour clock**.
Auto Purge	Whether or not to purge received images after they have been routed successfully to the destination AE(s).

- The Premium Edition of MedDream PACS Server supports querying remote DICOM Modality Worklist(**DMWL**) SCP applications and displaying the query results through the web user interface.

- The Premium Edition of MedDream PACS Server supports receiving event notifications sent by remote Detached Study Management SCP applications, as well as querying remote Detached Study Management SCP applications for study related information.

- The Premium Edition of MedDream PACS Server supports storage of DICOM V3.0 Strucutre Reports(**SR**), as well as presentation of the Structure Reports through the web user interface.

- The Premium Edition of MedDream PACS Server supports DICOM Media Storage Services and File Format (PS 3.10) as a File Set Creator (**FSC**) and File Set Reader (**FSR**) of the **General Purpose CD-R and DVD Interchange Profiles**. From the MedDream PACS web user interface, users can export selectedpatients/studies in the MedDream PACS database to a local directory using DICOM standard directory formats (**DICOMDIR**), which can later be archived into CD-R/RW or DVD-R/RW/RAM for media interchange. Uses can also import external patients/studies from a DICOM Media Storage Service compliant directory or CD/DVD media into the MedDream PACS database.

- The Premium Edition of MedDream PACS Server Supports the **Automatic Purging Storage Directories** feature by allowing the user to define a set of Low-Water and High-Water Marks in terms of disk usage percentage for MedDream PACS Server archive directories. If **Enabled** by the user and the disk usage percentage of the archive directories has dropped below the user-defined **Low-Water Mark**, MedDream PACS Server Premium Edition will start to purge older studies stored in the archive directories,by the order of the date the studies were received, until the disk usage percentage has risen above the user- defined **High-Water Mark**. User can also specify optionally a **Destination Folder** to move aged studies instead of permanently delete the aged studies.

- The Premium Edition of MedDream PACS Server supports printing both color and grayscale images toDicom compliant remote printers from the MedDream PACS Server web user interface.

- The Premium Edition of MedDream PACS Server supports synchronizing its local database with remote studies stored on external application entities based on user-specified schedule (s). Users can also selectwhether to synchronize all remote studies or only those recent studies received in the past N days.

2 Implementation Model

MedDream PACS Server provides for storage, query/retrieval and management of Dicom formatted images and reports. It runs on the following platforms:

- Windows 2008/2012 Server
- Windows Vista/Windows 7/Windows 8/Windows 10
- Linux (Premium Edition)
- Mac OS X (Premium Edition)

as a background process (service) that accepts association requests from external applications. MedDream PACS server employs a configurable thread pool to service requesting applications. MedDream PACS server will initiate aDICOM C-STORE association in response to either a C-MOVE request from an external application, user forwarding requests entered from the web user interface, or matches with automatic image routing table entries. MedDream PACS server is started automatically when Windows starts up, users which have Windows Administrator's privilege can stop and re-start MedDream PACS server process manually from the "Services" tablet of the Windows Control Panel.

The following parameters of the MedDream PACS server are configurable by executing the '*SETUP.EXE*' programduring Installation, or by modifying the Windows Registry values manually under the following key for Windows platforms:

HKEY_LOCAL_MACHINE\\SOFTWARE\\RainbowFish Software\\MedDream PACS\\${AeTitle}

or by modifying the **"${AeTitle}.ini"** configuration file under the directory where MedDream PACS Server is installed for Linux/MacOS platforms

Registry Value Name	Description	Value Type	Default
ApplicationEntityTitle	Application Entity (AE) title of MedDreamPACS Server	String	MyAeTitle
ServerPortNumber	TCP port number MedDream PACS Serverlistens to	DWORD	1234
LogDirectory	Directory path where MedDream PACS Serversaves the log files	String	'*log*' sub-directory where MedDream PACS Server isinstalled
Database	Name of MySQL database created for MedDream PACS Server	String	Same as AE title of MedDream PACS Server
StorageFormat	Storage format for received images. Either '***DicomPart10***' format or '***Native***' format without the DICOM header.	String	DicomPart10

Table 1 Configurable Parameters For MedDream PACS Server

2.1 Application Data Flow Diagram

Figure 1 shows the relationship of MedDream PACS server to external applications. As noted above, MedDreamPACS server does not initiate any action except in response to requests which are received either via DICOM associations or from the web user interface.

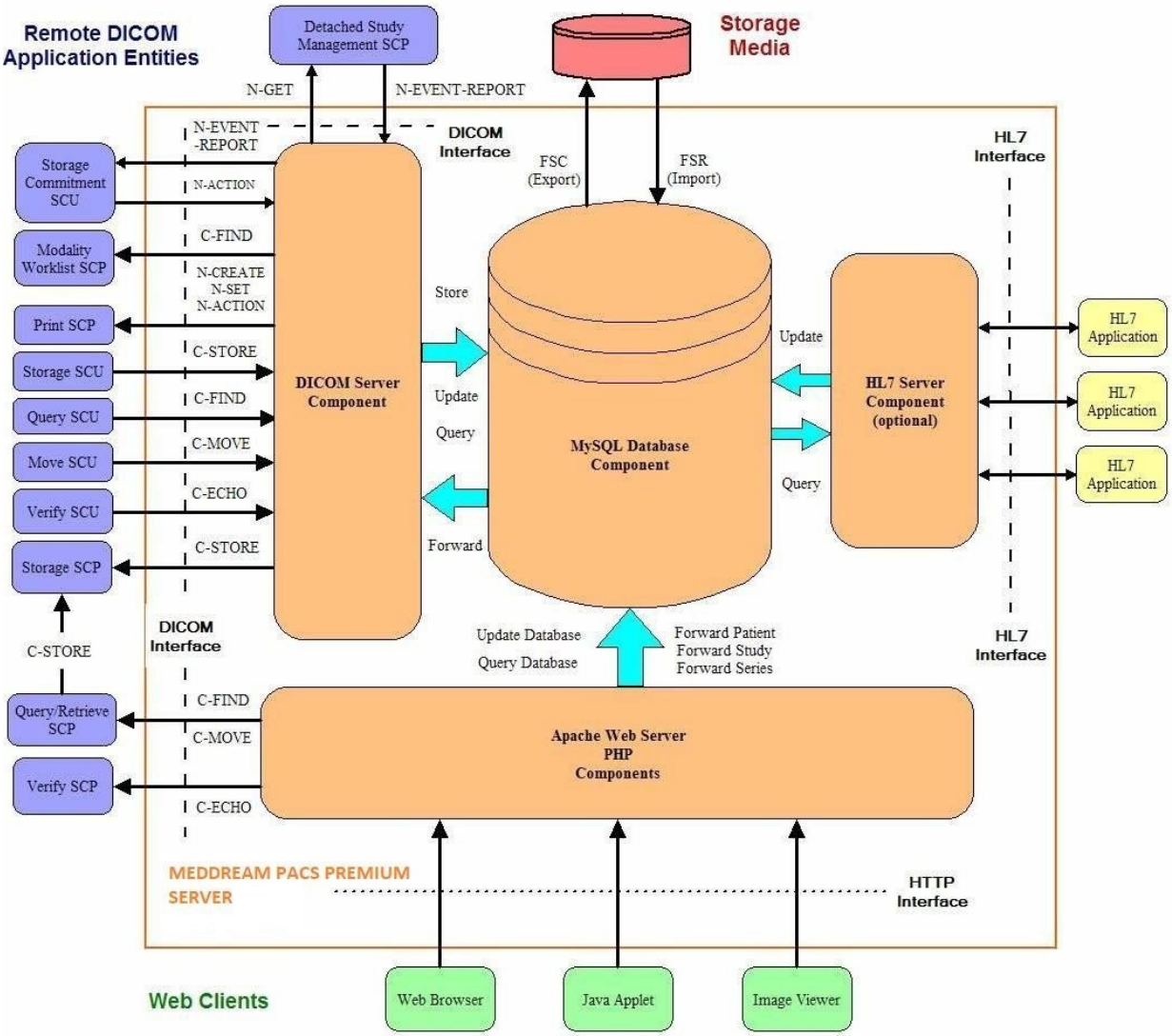

Figure 1 MedDream PACS Server Implementation Model

2.2 Functional Definition of Application Entities

MedDream PACS server waits for another application to connect to the TCP/IP port number specified when the application is initiated. When a DICOM association request is received, MedDream PACS server uses a MySQLdatabase table and the following logic to verify the incoming request:

- MedDream PACS server is permissive when verifying the Called Application Entity Title of the incomingassociation request. It does not reject an incoming association request based on the specified Called Application Entity Title.
- PaceOne server queries the '***applentity***' table to verify if there is a row whose '***title***' field matches (case insensitive) with the Calling Application Entity Title of the incoming request.
- If there is a match, MedDream PACS server then verifies that the matching application entity has access tothe MySQL database, by querying the '***allowaccess***' field of the '***applentity***' table.
- If '***allowaccess***' field is Enabled (non-zero), MedDream PACS server then proceeds to service the incomingassociation request.
- If '***allowaccess***' field is Disabled ('***0***') or no matching application entity is found for the Calling Application Entity Title, MedDream PACS server will reject the incoming association request from this application entity.

2.3 Sequencing of Real-World Activities

See the Association Initiation and Acceptance Policy sections below on real-world activities for all SOP classes supported by MedDream PACS Server.

3 AE Specifications

MedDream PACS server is started automatically when Windows starts up, or user can manually stop and re-start MedDream PACS server from the 'Services' tablet of the Windows Control Panel. MedDream PACS server uses a configurable thread pool to service all DICOM 3.0 protocol I/O processing. The number of threads in the thread pool has a default value of 2, and can be configured by modifying the following Registry value for Windows platforms:

HKEY_LOCAL_MACHINE\\SOFTWARE\\RainbowFish Software\\MedDream PACS\\${AeTitle}\\ThreadPoolSize

Or by modifying the following variable in the **"${AeTitle}.ini"** configuration file under the directory where MedDream PACS Server is installed for Linux/MacOS platforms:

ThreadPoolSize = 2

NOTE: Setting a large value for the number of threads in the thread pool does not necessarily increase the overall performance of MedDream PACS server. It is recommended to set the size of thread pool to be twice the number of available processors or CPU's in the system. MedDream PACS server needs to be re-started if the size of thread poolis modified.

3.1 AE MedDream PACS Server - Specification

MedDream PACS server provides Standard Conformance to the following DICOM 3.0 SOP Classes as a SCU:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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
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
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Image Storage	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
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
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3

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
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
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
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 Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
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
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Patient Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Modality Worklist Info Model - FIND	1.2.840.10008.5.1.4.31
Detached Study Management	1.2.840.10008.3.1.2.3.1
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta	1.2.840.10008.5.1.1.18
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59

Table 2 SOP Classes Supported by MedDream PACS Server as a SCU

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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
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
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Image Storage	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
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
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3
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
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
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
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 Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
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

MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Patient Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Patient Root Query/Retrieve Info Model - GET	1.2.840.10008.5.1.4.1.2.1.3
Study Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Study Root Query/Retrieve Info Model - GET	1.2.840.10008.5.1.4.1.2.2.3
Patient/Study Only Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2
Patient/Study Only Query/Retrieve Info Model - GET	1.2.840.10008.5.1.4.1.2.3.3
Modality Worklist Info Model - FIND	1.2.840.10008.5.1.4.31
Storage Commitment Push Model	1.2.840.10008.1.20.1
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3
Modality Performed Procedure Step Retrieve	1.2.840.10008.3.1.2.3.4
Modality Performed Procedure Step Notification	1.2.840.10008.3.1.2.3.5
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59

Table 3 SOP Classes Supported by MedDream PACS Server as a SCP

3.2 Association Establishment Policies

3.2.1 General

The DICOM Application Context Name (ACN) proposed by MedDream PACS Server is fixed: "*1.2.840.10008.3.1.1*". The maximum PDU size which can be transmitted by MedDream PACS server is fixed at 32 Kbytes. The maximum PDU size which can be received by MedDream PACS server is up to 32 Kbytes.

3.2.2 Number of Associations

The number of simultaneous associations which can be accepted by MedDream PACS server are limited only by thekernel parameters of underlying TCP/IP implementation and resource utilization of the computer where MedDream PACS server is installed. MedDream PACS server utilizes a thread pool to service each association request that it

receives. Therefore, MedDream PACS server can have multiple simultaneous connections, and there is no inherent limitation on the total number of simultaneous associations which a MedDream PACS server can maintain.

3.2.3 Asynchronous Nature

MedDream PACS server does not support asynchronous operations and will not perform asynchronous window negotiation.

3.2.4 Implementation Identifying Information

MedDream PACS server provides the following implementation class UID:

1.2.826.0.1.3680043.2.737

MedDream PACS server provides the following implementation version name:

MEDDREAM PACS01AUG03

3.3 Association Initiation Policy

MedDream PACS server will attempt to initiate associations in response to user requests from the web user interfaceto verify DICOM connection status (C-ECHO) to remote Application Entity (AE).

MedDream PACS server will attempt to initiate associations in response to user requests from the web user interfaceto query and retrieve (C-FIND) remote Query/Retrieve SCP applications.

MedDream PACS server will attempt to initiate associations in response to C-MOVE requests from other Application Entities. MedDream PACS server will only initiate associations in response to valid C-MOVE requestsfor images that are stored in the MySQL database.

MedDream PACS server will attempt to initiate associations in response to user selected forwarding requests from the web user interface, where users can select one or more patient(s), study(s) or series to forward (C-STORE) to a remote destination application entity (AE).

The Premium Edition of MedDream PACS server can also initiate associations to remote destination AE(s) automatically based on the automatic routing table. Users can define entries in the automatic routing table which consist of a source AE title, destination AE title and a schedule, so that the images received from the specified source AE will be automatically forwarded (C-STORE) to one of more destination AE(s) based on the specified schedule, either as soon as received (Immediately) or on a particular 24-hour clock interval., e.g., 7:00 p.m.

MedDream PACS Server Premium Edition can initiate Modality Worklist - FIND requests to remote Modality Worklist SCP applications, either in response to unsolicited Study Scheduled N-EVENT-REPORT notifications, or by querying the Worklist SCP regularly based on a configurable polling interval. Users can also initiate Modality Worklist - FIND request by clicking on the ***Get Worklist*** link from the web user interface.

3.3.1 Real-World Activity - Verification

3.3.1.1 Associated Real-World Activity - Verification

From the MedDream PACS Server web user interface, users can select the '***Application Entity***' Page to display a list of defined application entities (AE). If the TCP port number for an AE is defined, a ***Ping*** link will be displayed in the '***Verify Connection***' column. Clicking on the ***Ping*** link will initiate a C-ECHO request to the TCP port number of

the corresponding AE. A confirmation message will be displayed if the C-ECHO request is successfully acknowledged by the remote AE, otherwise a timeout error or any error response from the remote AE will be displayed.

3.3.1.2 Proposed Presentation Contexts - Verification

Table 4 below shows the presentation contexts that are proposed by MedDream PACS server for verification operations.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 4 Presentation Context For Initiating Verification Requests

3.3.1.3 SOP Specific Conformance Statement - Verification

MedDream PACS Server provides standard conformance for DICOM SOP Verification class.

3.3.2 Real-World Activity - Query/Retrieve

3.3.2.1 Associated Real-World Activity - Query/Retrieve

From the MedDream PACS Server web user interface, users can select the '***Application Entity***' Page to display a list of defined application entities (AE). If the TCP port number for an AE is defined, a ***Query/Retrieve*** link will be displayed in the '***Remote Exams***' column. Clicking on the ***Query/Retrieve*** link will initiate a C-FIND request to the TCP port number of the corresponding AE. Any matching patients and/or studies returned by the remote AE will be displayed, otherwise a timeout error or any error response from the remote AE will be displayed.

3.3.2.2 Proposed Presentation Contexts - Query/Retrieve

Table 5 shows the presentation contexts used by MedDream PACS server when initiating C-FIND requests toremote Query/Retrieve SCP applications.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 5 Presentation Contexts When Initiating Query/Retrieve Requests

3.3.2.3 SOP Specific Conformance Statement - Query/Retrieve

Table 6 below contains the key matching methods supported by MedDream PACS Server when initiating C-FINDrequests to remote Query/Retrieve SCP applications:

Key Matching Methods	Description	Supported By MedDream PACS
SV	Single Value Matching	Yes
UM	Universal Matching	Yes
WC	Wild-Card Matching	Premium Edition only
DR	Date Range Matching	Premium Edition only

Table 6 Key Matching Methods Used When Initiating C-FIND Requests

Level	Description	Tag	Matching Method	Type
Patient	Patient Name	0010 0010	SV,UM,WC	R
	Patient ID	0010 0020	SV,UM,WC	U
	Patient´s Birth Date	0010 0030	SV,UM,DR	O
	Patient´s Birth Time	0010 0032		O
	Patient´s Sex	0010 0040		O
	Patient´s Age	0010 1010		O
	Patient´s Size	0010 1020		O
	Patient´s Weight	0010 1030		O
	Number of Patient Related Studies	0020 1200		O
	Number of Patient Related Series	0020 1202		O
	Number of Patient Related Instances	0020 1204		O
Study	Study Date	0008 0020	SV,UM,DR	R
	Study Time	0008 0030	SV,UM	R
	Accession Number	0008 0050	SV,UM,WC	R
	Referring Physician Name	0008 0090		O
	Study Description	0008 1030		O
	Study Instance UID	0020 000D	SV,UM	U
	Study ID	0020 0010	SV,UM,WC	R
	Number of Study Related Series	0020 1206		O
	Number of Study Related Instances	0020 1208		O
Series	Series Date	0008 0021	SV,UM,DR	O
	Series Time	0008 0031	SV,UM	O
	Modality	0008 0060	SV,UM,WC	R
	Body Part Examined	0018 0015		O

	Series Instance UID	0020 000E	SV,UM	U
	Series Number	0020 0011	SV,UM	R
	Number of Series Related Instances	0020 1209		O
Image	SOP Class UID	0008 0016	SV,UM	O
	SOP Instance UID	0008 0018	SV,UM	U
	Instance Number	0020 0013	SV,UM	R
	Overlay Number	0020 0022		O
	Curve Number	0020 0024		O
	LUT Number	0020 0026		O
	Samples Per Pixel	0028 0002		O
	Rows	0028 0010		O
	Columns	0028 0011		O
	Bits Allocated	0028 0100		O
	Bits Stored	0028 0101		O
	Pixel Representation	0028 0103		O

Table 7 Keys Used by MedDream PACS for Patient Root Information Model

3.3.3 Real-World Activity - Move Request From An External Node

3.3.3.1 Associated Real-World Activity - Move Request

The associated Real-World activity is a C-MOVE request received from an external application. If an application successfully establishes an association with the MedDream PACS server and makes a valid C-MOVE request that identifies one or more images known by the MedDream PACS server, the MedDream PACS server will query the '***applentity***' MySQL database table to see if a matching entry can be found for the specified destination application entity title. If a match is found, the MedDream PACS server will initiate an association with the destination application entity specified in the incoming C-MOVE request.

3.3.3.2 Proposed Presentation Contexts - Move Request

In response to a C-MOVE request, MedDream PACS server builds a complete list of images to be moved. The list includes the SOP class of each image to be moved. MedDream PACS server extracts the unique SOP classes from the image lists and proposes a set of presentation contexts that includes one presentation context for each unique SOP class identified in the image list. Thus, the association request may have a single presentation context or multiple presentation contexts. Each presentation context contains the abstract syntax that identifies one image class as found in the image list.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See Proposed Transfer	See Proposed Transfer	SCU	None

		Syntaxes below	Syntaxes below		
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None

Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Digital X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Digital X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Digital Mammography X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Digital Mammography X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See Proposed Transfer	See Proposed Transfer	SCU	None

		Syntaxes below	Syntaxes below		
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None

Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See Proposed Transfer Syntaxes below	See Proposed Transfer Syntaxes below	SCU	None

Table 8 Presentation Contexts Supported By MedDream PACS Server as C-STORE SCU

3.3.3.3 Proposed Transfer Syntaxes - Move Request

MedDream PACS Server Basic Edition only supports Implicit VR Little Endian Transfer Syntax. Some images may have been stored by the MedDream PACS server with private elements whose encoding scheme is unknown by the MedDream PACS server. These elements will be transmitted by MedDream PACS server exactly as they were received (in Implicit VR Little Endian Transfer Syntax), so they should be unaltered upon transmission.

MedDream PACS Server Premium Edition supports the following additional transfer syntaxes:

Transfer Syntax Name	Transfer Syntax UID
Implicit VR, Little Endian (DICOM Default)	1.2.840.10008.1.2
Explicit VR, Little Endian	1.2.840.10008.1.2.1
Explicit VR, Big Endian	1.2.840.10008.1.2.2
Explicit VR, JPEG Lossless, Non-hierarchical, First-order prediction (Process 14)	1.2.840.10008.1.2.4.70
Explicit VR, JPEG Lossless (Process 14)	1.2.840.10008.1.2.4.57
Explicit VR, JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
Explicit VR, JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
RLE Lossless	1.2.840.10008.1.2.5
MPEG2 Image Compression	1.2.840.10008.1.2.4.100

MPEG4 AVC/H.264 Image Compression	1.2.840.10008.1.2.4.102
MPEG4 Image Compression	1.2.840.10008.1.2.4.103
JPEG 2000 Part-1 Lossless Only Compression	1.2.840.10008.1.2.4.90
JPEG 2000 Part-1 Lossless Or Lossy Compression	1.2.840.10008.1.2.4.91
JPEG-LS Lossless Compression	1.2.840.10008.1.2.4.80
JPEG-LS Near-Lossless Compression	1.2.840.10008.1.2.4.81

Table 9 Transfer Syntaxes Supported by MedDream PACS Server Premium Edition as C-STORE SCU

3.3.3.4 SOP Specific Conformance Statement - Move Request

All C-STORE operations are in the context of a C-MOVE request from an external application. MedDream PACS server sends one C-MOVE response message for each attempted C-STORE operation. MedDream PACS server does not attempt any extended negotiation. MedDream PACS server does not delete any elements from the files it transfers. Therefore the set of optional elements depends entirely on the contents of the files which were originally stored on the MedDream PACS server.

In the event that MedDream PACS server receives an unsuccessful C-STORE response, MedDream PACS server will continue sending the remaining images in the requested set.

3.3.4 Real-World Activity - User Forwarding

3.3.4.1 Associated Real-World Activity - User Forwarding

From the MedDream PACS web user interface, users can select one or more patient(s), study(s) or series while browsing through the list, if the current user has '***Forward***' privilege (Premium Edition) or '***Modify***' privilege (Basic Edition) enabled, there will be a **Forward** button displayed below the listed patient, study or series list. Users can click on the **Forward** button and then select a destination AE title from a drop-down list of application entities currently defined in the '***applentity***' table.

3.3.4.2 Proposed Presentation Contexts - User Forwarding

Same as Section 3.3.3.2.

3.3.4.3 Proposed Transfer Syntaxes - User Forwarding

Same as Section 3.3.3.3.

3.3.4.4 SOP Specific Conformance Statement - User Forwarding

Same as Section 3.3.3.4.

3.3.5 Real-World Activity - Automatic Routing (Premium Edition only)

3.3.5.1 Associated Real-World Activity - Automatic Routing

MedDream PACS Server Premium Edition supports automatic image routing based on entries defined in the Automatic Routing table. When an image is received by MedDream PACS Server, it will query the Automatic Routing table to see if there is an entry matches with the source application entity (AE) title. If a match is found, then the received image will be forwarded to the destination AE title specified for the matching source AE title,

based on the schedule specified for the matching entry. If there are multiple matches (multiple destination AEs defined for the same source AE), then the received image will be forwarded to multiple destination AEs based on the corresponding schedule.

Users can add, delete and modify entries in the Automatic Routing table from the MedDream PACS Server web user interface, given that the logged-in user has the required '***Modify***' privilege enabled.

3.3.5.2 Proposed Presentation Contexts - Automatic Routing

Same as Section 3.3.3.2.

3.3.5.3 Proposed Transfer Syntaxes - Automatic Routing

Same as Section 3.3.3.3.

3.3.5.4 SOP Specific Conformance Statement - Automatic Routing

Same as Section 3.3.3.4.

3.3.6 Real-World Activity - Modality Worklist Management

3.3.6.1 Associated Real-World Activity - Modality Worklist Management

From the MedDream PACS Server web user interface, users can select the '***Application Entity***' Page to display a list of defined application entities (AE). If the TCP port number for an AE is defined and the remote AE has been defined as Modality Worklist SCP (**'worklistScp'** column set to **'True'** in the ***'applentity'*** table), a ***Get Worklist*** link will be displayed in the '***Modality Worklist***' column. Clicking on the ***Get Worklist*** link will initiate a Modality Worklist - FIND request to the TCP port number of the corresponding AE. Any matching result returned by the remote Modality Worklist SCP will be displayed, otherwise a timeout error or any error response from the remote AE will be displayed.

MedDream PACS Server Premium Edition can also receive unsolicited Study-Scheduled N-EVENT-REPORT notifications. MedDream PACS Server will then send Modality Worklist - FIND commands to query all configuredModality Worklist SCP application entities for the corresponding study.

MedDream PACS Server Premium Edition also polls any configured Modality Worklist SCP application entities toupdate the **Worklist** table on a regular basis. The default polling interval is 10 minutes, which can be changed by modifying the following Registry value for Windows platforms:

HKEY_LOCAL_MACHINE\\SOFTWARE\\RainbowFish Software\\MedDream PACS\\${AeTitle}\\WorklistPollInterval

Or by modifying the following variable in the **"${AeTitle}.ini"** configuration file under the directory where MedDream PACS Server is installed for Linux/MacOS platforms:

WorklistPollInterval = 10

where *${AeTitle}* is the AE title assigned for MedDream PACS Server.

NOTE: Change the polling interval value to zero(0) will disable automatic polling of Modality Worklist SCP applications.

3.3.6.2 Proposed Presentation Contexts - Modality Worklist Management

Table 10 below shows the presentation contexts that are proposed by MedDream PACS server for Modality Worklist - FIND operations.

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

Table 10 Presentation Context For Initiating Modality Worklist - FIND Requests

3.3.6.3 SOP Specific Conformance Statement - Modality Worklist Management

Table 11 below contains the key matching methods supported by MedDream PACS Server when initiating ModalityWorklist-FIND requests to remote Worklist SCP applications:

Key Matching Methods	Description	Supported By MedDream PACS
SV	Single Value Matching	Premium Edition only
UM	Universal Matching	Premium Edition only
WC	Wild-Card Matching	Premium Edition only
DR	Date Range Matching	Premium Edition only

Table 11 Key Matching Methods Used When Initiating Modality Worklist-FIND Requests

Module	Description	Tag	Matching Method	Return Type
Scheduled Procedure Step	Scheduled Procedure Step Sequence	0040 0100		1
	>Modality	0008,0060	UM,WC	1
	>Scheduled Station AE Title	0040 0001	UM,WC	1
	>Scheduled Procedure Step Start Date	0040 0002	SV,UM,DR	1
	>Scheduled Procedure Step Start Time	0040 0003	UM	1
Requested Procedure	Requested Procedure ID	0040 1001	UM,WC	1
	Requested Procedure Description	0032 1060		1C
	Study Instance UID	0020 000D		1
	Referenced Study Sequence	0008 1110		2
	>Referenced SOP Class UID	0008 1150		1C
	>Referenced SOP Instance UID	0008 1155		1C
Imaging Service Request	Accession Number	0008 0050	SV,UM,WC	2
	Referring Physician´s Name	0008 0090	UM	2
	Requesting Physician´s Name	0032 1032		2
Patient Identification	Patient´s Name	0010 0010	SV,UM,WC	1
	Patient ID	0010 1020	SV,UM,WC	1
Patient Demographic	Patient´s Birth Date	0010 1030	SV,UM,DR	2
	Patient´s Sex	0010 1040	SV,UM	2

Table 12 Keys Used by MedDream PACS Server Premium Edition for Modality Worklist - FIND Requests

3.3.7 Real-World Activity - Printing

3.3.7.1 Associated Real-World Activity - Printing

After logging into the MedDream PACS Server web user interface, if the '***Print***' privilege has been enabled, thecurrent user can select a list of patients, studies, series or images, and click on the **Print** button.

The user can then select the destination remote printer, make any appropriate changes to the print parameters, then click on the **Print** button to send the selected patients, studies, series or images to the printer.

3.3.7.2 Proposed Presentation Contexts - Printing

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta	1.2.840.1000.8.5.1.1.9	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta	1.2.840.1000.8.5.1.1.18	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 13 Presentation Context For Printing

3.3.7.3 Proposed Transfer Syntaxes - Printing

See Table 13 above.

3.3.7.4 SOP Specific Conformance Statement - Printing

MedDream PACS Server supports the following required print SOP classes for the Basic Grayscale/Color Management Meta classes:

SOP Class Name	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Basic Color Image Box	1.2.840.10008.5.1.1.4.1
Printer	1.2.840.10008.5.1.1.16

Table 14 Required SOP Classes for Basic Grayscale/Color Print Management Meta Classes

SOP Class Name	SOP Class UID
Basic Annotation Box	1.2.840.10008.5.1.1.15

Table 15 Optional SOP Classes for Basic Grayscale/Color Print Management Meta Classes

3.3.7.4.1 Conformance for Basic Film Session SOP Class

MedDream PACS Server supports the following attributes for N-CREATE command of the Basic Film Session SOPclass:

N-CREATE Attributes of the Basic Film Session SOP class

Tag	Description	Possible Values
(2000,0010)	Number of Copies	1 - 99
(2000,0020)	Print Priority	LOW, MED, HIGH
(2000,0030)	Medium Type	BLUE FILM, CLEAR FILM, PAPER
(2000,0040)	Film Destination	MAGAZINE, PROCESSOR, BIN_i
(2000,0050)	Film Session Label	MedDream PACS-YYYY.MM.DD.MM.HH.SS

Table 16 Supported Attributes for N-CREATE of the Basic Film Session SOP class

3.3.7.4.2 Conformance for SOP Class Basic Film Box

MedDream PACS Server supports the following attributes for N-CREATE command of the Basic Film Box SOP class:

N-CREATE Attributes of the Basic Film Box SOP class		
Tag	**Description**	**Possible Values**
(2010,0010)	Image Display Format	STANDARD\C,R; R1,R2,R3; C1,C2,C3; SLIDE; SUPERSLIDE
(2010,0030)	Annotation Display Format ID	Printer secific annotation display format string
(2010,0040)	Film Orientation	LANDSCAPE, PORTRAIT
(2010,0500)	Referenced Film Session Sequence	
(0008,1150)	> Referenced SOP Class UID	
(0008,1155)	> Referenced SOP Instance UID	

Table 17 Supported Attributes for N-CREATE of the Basic Film Box SOP class

3.3.7.4.3 Conformance for SOP Class Basic Grayscale Image Box

MedDream PACS Server supports the following attributes for N-SET command of the Basic Grayscale Image BoxSOP class:

N-SET Attributes of the Basic Grayscale Image Box SOP class		
Tag	**Description**	**Possible Values**
(2020,0010)	Image Position	1,2,...
(2020,0110)	Preformatted Grayscale Image Sequence	
(0028,0002)	>Samples Per Pixel	
(0028,0004)	>Photometric Interpretation	MONOCHROME1, MONOCHROME2
(0028,0010)	>Rows	>0
(0028,0011)	>Columns	>0
(0028,0034)	>Pixel Aspect Ratio	1
(0028,0100)	>Bits Allocated	8,16
(0028,0101)	>Bits Stored	8,12
(0028,0102)	>High Bit	7,11
(0028,0103)	>Pixel Representation	0
(7FE0,0010)	>Pixel Data	

Table 18 Supported Attributes for N-SET of the Basic Grayscale Image Box SOP class

3.3.7.4.4 Conformance for SOP Class Printer

MedDream PACS Server supports the following attributes for N-GET command of the Printer Box SOP class:

N-GET Attributes of the Printer SOP class	
Tag	**Description**
(0008,0070)	Manufacturer
(0008,1090)	Manufacturer Model Name
(0018,1000)	Device Serial Number
(0018,1020)	Software Versions
(0018,1200)	Date Last Calibration
(0018,1201)	Last Calibration
(2110,0010)	Printer Status
(2110,0020)	Printer Status Info
(2110,0030)	Printer Name

Table 19 Supported Attributes for N-GET of the Printer SOP class

3.3.7.4.5 Conformance for Basic Annotation Box SOP Class

MedDream PACS Server supports the following attributes for N-GET command of the Basic Annotation Box SOPClass:

N-GET Attributes of the Printer SOP class	
Tag	**Description**
(2030,0010)	Annotation Position
(2030,0020)	Text String

Table 20 Supported Attributes for N-GET of the Basic Annotation Box SOP Class

3.3.8 Real-World Activity - Remote Synchronization

3.3.8.1 Associated Real-World Activity - Remote Synchronization

MedDream PACS Server Premium Edition supports synchronizing its local database with remote studies stored onexternal application entities, based on user-specified synchronization schedules for the remote AE.

When adding or modifying an application entity, if the remote AE supports Dicom Query/Retrieve functions as a SCP, i.e., the '***Query/Retrieve SCP***' checkbox is selected, users can select whether to enable or disable remote-synchronization for this remote AE, and whether to synchronize with all remote studies or only those recent studies received within the last N days on the remote AE.

Users can add, delete and modify synchronization schedules (up to 24 per remote AE) from the MedDream PACSServer web user interface, provided that the logged-in user has the required '***Modify***' privilege enabled.

3.3.8.2 Proposed Presentation Contexts - Remote Synchronization

Same as Section 3.3.2.2.

3.3.8.3 Proposed Transfer Syntaxes - Remote Synchronization

Same as Section 3.3.2.2.

3.3.8.4 SOP Specific Conformance Statement - Remote Synchronization

Same as Section 3.3.2.3.

3.3.9 Real World Activity - Detached Study Management

MedDream PACS server accepts unsolicited N-EVENT-REPORT notifications sent from Detached Study Management SCP application entities. MedDream PACS Server will then issue N-GET request back to the remoteSCP to get more information for the corresponding study.

Additionally, upon receipt of the ***Study Scheduled*** event notification sent from the Detached Study Management SCP, MedDream PACS Server will initiate a Modality Worklist - FIND request to configured Modality Worklist SCP application entity(s) to query about the corresponding study information contained in the event report.

3.3.9.1 Associated Real World Activity - Detached Study Management

When MedDream PACS Server receives any Detached Study Management N-EVENT-REPORT notifications sent from a Detached Study Management SCP AE, it will first validate the association request by checking the remote AE title against the internal ***'applentity'*** table. If access is ***Enabled*** in the ***'applentity'*** table, the association request will be accepted and the event notification will be processed. Otherwise, the association request will be rejected by MedDream PACS Server and this event notification will not be processed.

3.3.9.2 Presentation Context Table - Detached Study Management

Table 21 shows the presentation contexts that may be accepted by MedDream PACS server for Detached StudyManagement N-EVENT-REPORT notifications.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Detached Study Management	1.2.840.10008.3.1.2.3.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 21 Acceptable Presentation Contexts for MedDream PACS Server for Detached Study Management

3.3.9.3 SOP Specific Conformance for SOP Class - Detached Study Management

MedDream PACS Server supports the following attributes in the N-EVENT-REPORT-RQ notification sent from aDetached Study Management SCP application entity:

Event Type Name	Attribute Name	Tag
Study Created	Instance Creation Date	0008 0012
	Referenced Patient Sequence	0008 1120
	>Referenced SOP Class UID	0008 1150
	>Referenced SOP Instance UID	0008 1155
	Referenced Visit Sequence	0008 1125
	>Referenced SOP Class UID	0008 1150
	>Referenced SOP Instance UID	0008 1155
	Instance Creation Time	0008 0013
	Instance Creator UID	0008 0014
	Study Status ID	0032 000A
Study Scheduled	Specific Character Set	0008 0005
	Referenced Patient Sequence	0008 1120
	>Referenced SOP Class UID	0008 1150
	>Referenced SOP Instance UID	0008 1155
	Referenced Visit Sequence	0008 1125
	>Referenced SOP Class UID	0008 1150
	>Referenced SOP Instance UID	0008 1155
	Scheduled Study Start Date	0032 1000
	Scheduled Study Start Time	0032 1001
	Scheduled Study Location	0032 1020
	Scheduled Study Location Application Entity Title	0032 1021
	Requested Procedure Description	0032 1060
	Requested Procedure Code Sequence	0032 1064
	>Code Value	0008 0100
	>Coding Scheme Designator	0008 0102
	>Code Meaning	0008 0104
Patient Arrived	Study Arrival Date	0032 1040
	Study Arrival Time	0032 1041
Study Started	Study Date	0008 0020
	Study Time	0008 0030
Study Completed	Referenced Performed Procedure Step Sequence	0008 1111
	>Referenced SOP Class UID	0008 1150
	>Referenced SOP Instance UID	0008 1155
	Study Completed Date	0032 1050
	Study Completed Time	0032 1051
Study Verified	Referenced Performed Procedure Step Sequence	0008 1111
	>Referenced SOP Class UID	0008 1150
	>Referenced SOP Instance UID	0008 1155
	Study Verified Date	0032 0032

	Study Verified Time	0032 0033
Study Read	Study Read Date	0032 0034
	Study Read Time	0032 0035
Study Deleted		

Table 22 Detached Study Management N-Event-Report Notification Attributes

Service Status	Further Meaning	Status Codes	Description
Sucess	Sucess	0x0000	Operation performed properly

Table 23 Detached Study Management N-EVENT-REPORT-RSP Status Codes

3.3.9.4 Presentation Context Acceptance Criterion - Detached Study Management

MedDream PACS server will accept any number of Detached Study Management SOP classes that are listed in Table 21 above, provided that the requesting application is allowed access to the MedDream PACS server (via the '***applentity***' MySQL database table). The MedDream PACS server defines no limit on the number of presentation contexts accepted. In the event that the MedDream PACS server runs out of resources when trying to accept multiplepresentation contexts, MedDream PACS server will reject the association request.

MedDream PACS server does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

3.3.9.5 Transfer Syntax Selection Policies - Detached Study Management

MedDream PACS Server only supports the Implicit VR Little Endian transfer syntax when accepting Detached Study Management N-EVENT-REPORT requests. Any proposed presentation context which includes the Implicit VR Little Endian transfer syntax will be accepted with the Implicit VR Little Endian transfer syntax. Any proposed presentation context that does not include the Implicit VR Little Endian transfer syntax will be rejected.

3.3.10 Real-World Activity - Storage Commitment Push Model

3.3.10.1 Associated Real-World Activity - Storage Commitment Push Model

From the **Application Entity** page of MedDream PACS Server, if a remote AE is configured as a **Storage Commitment Report SCP** and the "**Request Storage Commitment Report for Dicom images sent to this SCP**" option is enabled for this remote AE, then MedDream PACS Server will request Dicom Storage Commitment Report(via the **N-ACTION-RQ** command) for any Dicom SOP instance sent to this remote AE.

3.3.10.2 Proposed Presentation Contexts - Storage Commitment Push Model

Table 24 below shows the presentation contexts that are proposed by MedDream PACS server for Storage Commitment Push Model requests.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 24 Presentation Context For Sending Storage Commitment Push Model Requests

3.3.10.3 SOP Specific Conformance Statement - Storage Commitment Push Model

MedDream PACS Server supports the following elements for this SOP class as an SCU:

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Table 25 Storage Commitment Push Model Request (N-ACTION-RQ) Message

3.3.10.3.1 Storage Commitment Results

After receiving the Dicom Storage Commitment Report request sent from MedDream PACS Server, the remote AEwill respond by sending the Storage Commitment Report for the requested SOP instances in the form of Dicom N-EVENT-REPORT messages back to MedDream PACS Server. The N-EVENT-REPORT contains the Transaction UID value contained in the initiating N-ACTION-RQ request sent from MedDream PACS Server. The N-EVENT-REPORT is sent on a separate association from the initiating N-ACTION-RQ request.

MedDream PACS Server supports the Event Report Information as specified in Table 26 below:

Action Type Name	Event Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
Storage Commitment Request Complete - Failure Exist	2	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Failed SOP Sequence	(0008,1198)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		>Failure Reason	(0008,1197)

Table 26 Storage Commitment Push Model Event Report (N-EVENT-REPORT) Message

- Report Initiated - MedDream PACS Server has initiated the Storage Commitment Report (N-ACTION-RQ)for the SOP instances of this study
- Partially Committed - Storage Commitment Report (N-EVENT-REPORT) has been received for the SOP instances of this study, but not all instances have been committed successfully by the remote AE

- Fully Committed - Storage Commitment Report (N-EVENT-REPORT) has been received for the SOP instances of this study, and all instances have been committed successfully by the remote AE

3.4 Association Acceptance Policy

MedDream PACS server accepts associations for the purpose of storing images in its MySQL database or for thepurpose of performing query/retrieve operations on the images that have been previously stored.

MedDream PACS server will only accept association requests from applications that have been defined during configuration. In addition, the MedDream PACS server will only store images sent by application entities that have been enabled in the '***applentity***' MySQL database table.

3.4.1 Real World Activity - Verification

MedDream PACS server accepts associations from applications that wish to perform a verification (C-ECHO)operation on the MedDream PACS server.

3.4.1.1 Associated Real World Activity - Verification

The real-world activity associated with the C-ECHO request is that an external application wishes to verify network or server operation without initiating any actual work.

3.4.1.2 Presentation Context Table - Verification

Table 27 shows the presentation contexts that may be accepted by MedDream PACS server for verification operations.

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

Table 27 Acceptable Presentation Contexts for MedDream PACS Server for Verification

3.4.1.3 SOP Specific Conformance for SOP Class - Verification

MedDream PACS Server provides standard conformance for DICOM SOP Verification class.

3.4.1.4 Presentation Context Acceptance Criterion - Verification

MedDream PACS server will accept any number of verification SOP classes that are listed in Table 3 above, provided that the requesting application is allowed access to the MedDream PACS server (via the '***applentity***' MySQL database table). The MedDream PACS server defines no limit on the number of presentation contexts accepted. In the event that the MedDream PACS server runs out of resources when trying to accept multiple presentation contexts, MedDream PACS server will reject the association request.

MedDream PACS server does not check for duplicate presentation contexts and will accept duplicate presentationcontexts.

3.4.1.5 Transfer Syntax Selection Policies - Verification

MedDream PACS Server only supports the Implicit VR Little Endian transfer syntax when accepting verification requests. Any proposed presentation context which includes the Implicit VR Little Endian transfer syntax will be accepted with the Implicit VR Little Endian transfer syntax. Any proposed presentation context that does not include the Implicit VR Little Endian transfer syntax will be rejected.

3.4.2 Real-Word Activity - Storage

MedDream PACS server accepts associations from applications that wish to store images using the C-STORE command.

3.4.2.1 Associated Real-World Activity - Storage

The associated Real-World activity associated with the C-STORE operation is the storage of the images on the disk of the system upon which the MedDream PACS server is running. Images are stored by writing the data set of the C-STORE command directly to disk, either with no further header or interpretation ("Native" format), or with the standard file header described in the DICOM 3.0 Part 10 document (DICOM Part 10 format). The above storage formats are configurable when MedDream PACS server is installed by running the '*SETUP.EXE*' program, they can also be modified later by changing the following Registry value for Windows platforms:

HKEY_LOCAL_MACHINE\\SOFTWARE\\RainbowFish Software\\MedDream PACS\\${AeTitle}\\StorageFormat

Or by modifying the following variable in the **"${AeTitle}.ini"** configuration file under the directory where MedDream PACS Server is installed for Linux/MacOS platforms:

StorageFormat= DicomPart10

to either "*DicomPart10*" or "*Native*" string values (case insensitive).

After an image is stored to disk, the MedDream PACS server updates the MySQL database with patient, study, seriesand image information; this MySQL database is used by the MedDream PACS server for query/retrieve operations, it is also used by the Apache web server to display patient, study, series, and image information, display stored images through a web browser, and maintain patient/study/series/ image tables for authorized users.

MedDream PACS server will issue a failure status if it is unable to store the image on disk, if the image does not conform to the IOD of the SOP class under which it was transmitted, or if the MedDream PACS server is not able to successfully update its MySQL database.

3.4.2.2 Presentation Context Table - Storage

The following Presentation Contexts shown in Table 28 are acceptable to the MedDream PACS server whenreceiving images.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None

Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See Transfer Syntax	See Transfer Syntax	SCP	None

		Selection Policies Below	Selection Policies Below		
Digital X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Digital X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Digital Mammography X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Digital Mammography X-ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None

VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	See Transfer Syntax	See Transfer Syntax	SCP	None

		Selection Policies Below	Selection Policies Below		
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	See Transfer Syntax Selection Policies Below	See Transfer Syntax Selection Policies Below	SCP	None

Table 28 Acceptable Presentation Contexts for the MedDream PACS Server

3.4.2.3 SOP Specific Conformance for SOP Class - Storage

The MedDream PACS server implements Level 2 (Full) conformance for the Storage SOP Class. The raw image files themselves are not modified.

In the event that an image is successfully stored by MedDream PACS server, it may be accessed by requesting associations with the MedDream PACS server and performing query/retrieve operations. MedDream PACS server can also display stored images to web browser clients through the Apache web server interface.

MedDream PACS server stores images for an indefinite period. The stored images, as well as stored patient, study, series and image database records can be deleted from the Apache web server interface by users authorized with UPDATE privilege to the MySQL database.

MedDream PACS server returns the following status codes in response to a C-STORE request:

Status Code	Status	Description
0000H	Success	Image successfully stored
A700H	Refused	Out of resources, unable to create local file
A701H	Refused	Out of resources, failed to access database
A702H	Refused	Out of resources, memory allocation error
A703H	Refused	Out of resources, conflict with existing patient ID
A900H	Error	Data set does not match SOP Class

C000H	Error	Cannot understand

Table 29 C-STORE-RSP Status Returned By MedDream PACS Server

HKEY_LOCAL_MACHINE\\SOFTWARE\\RainbowFish Software\\MedDream PACS\\${AeTitle}\\LogDirectory

Or by modifying the following variable in the **"${AeTitle}.ini"** configuration file under the directory where MedDream PACS Server is installed for Linux/MacOS platforms:

LogDirectory = /var/log/MedDream PACS

3.4.2.4 Presentation Context Acceptance Criterion - Storage

MedDream PACS server will accept any number of storage SOP classes that are listed in Table 28 above, provided that the requesting application is known to the MedDream PACS server and has been enabled to store images on theMySQL database (via the '***applentity***' MySQL database table).

MedDream PACS server defines no limit on the number of presentation contexts accepted. In the event that MedDream PACS server runs out of resources when trying to accept multiple presentation contexts, the MedDreamPACS server will reject the association request.

MedDream PACS server does not check for duplicate presentation contexts and will accept duplicate presentationcontexts in the association request.

3.4.2.5 Transfer Syntax Selection Policies - Storage

MedDream PACS Server Basic Edition only supports the Implicit VR Little Endian transfer syntax. Any proposed presentation context which includes the Implicit VR Little Endian transfer syntax will be accepted with the Implicit VR Little Endian transfer syntax. Any proposed presentation context that does not include the Implicit VR Little Endian transfer syntax will be rejected.

MedDream PACS Server Premium Edition supports the following additional transfer syntaxes:

Transfer Syntax Name	Transfer Syntax UID
Implicit VR, Little Endian (DICOM Default)	1.2.840.10008.1.2
Explicit VR, Little Endian	1.2.840.10008.1.2.1
Explicit VR, Big Endian	1.2.840.10008.1.2.2
Explicit VR, JPEG Lossless, Non-hierarchical, First-order prediction (Process 14)	1.2.840.10008.1.2.4.70
Explicit VR, JPEG Lossless (Process 14)	1.2.840.10008.1.2.4.57
Explicit VR, JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
Explicit VR, JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
RLE Lossless	1.2.840.10008.1.2.5
MPEG2 Image Compression	1.2.840.10008.1.2.4.100
MPEG4 AVC/H.264 Image Compression	1.2.840.10008.1.2.4.102
MPEG4 Image Compression	1.2.840.10008.1.2.4.103
JPEG 2000 Part-1 Lossless Only Compression	1.2.840.10008.1.2.4.90
JPEG 2000 Part-1 Lossless Or Lossy Compression	1.2.840.10008.1.2.4.91
JPEG-LS Lossless Compression	1.2.840.10008.1.2.4.80
JPEG-LS Near-Lossless Compression	1.2.840.10008.1.2.4.81

Table 30 Transfer Syntaxes Supported by MedDream PACS Server Premium Edition as C-STORE SCP

HKEY_LOCAL_MACHINE\\SOFTWARE\\RainbowFish Software\\MedDream PACS\\${AeTitle}\\PreferredXferSyntaxRx

Or by modifying the following variable in the **"${AeTitle}.ini"** configuration file under the directory where MedDream PACS Server is installed for Linux/MacOS platforms:

PreferredXferSyntaxRx = 1.2.840.10008.1.2

If the above named Registry value is defined and it's on the list of transfer syntaxes presented by the remote C-STORE SCU, MedDream PACS Server Premium Edition will use the specified transfer syntax instead of selectingthe first supported transfer syntax from the list presented by the remote AE.

3.4.2.6 Structured Reporting Storage as an SCU and SCP

MedDream PACS Server Premium Edition provides Standard Conformance to the following DICOM V3.0 Structured Reporting SOP Class as an SCU and SCP.

The following Image Storage SOP Classes may be referenced by instances of Structured Reporting SOP Class.

SOP Class	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
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
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3
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
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
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
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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
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
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 Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
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
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2

Table 31 Structured Reporting SOP Classes Supported by MedDream PACS Server Premium Edition

3.4.3 Real World Activity - Query/Retrieve

MedDream PACS server accepts associations from applications that wish to perform query (C-FIND) and retrieve(C-MOVE) operations on images that have been previously stored in the MySQL database.

3.4.3.1 Associated Real World Activity - Query/Retrieve

The real-world activity associated with C-FIND and C-MOVE requests are query and retrieval operations initiated by another application. An application other than the MedDream PACS server queries MedDream PACS server forpatient/study/series/image information that has been previously stored in the MySQL database and can request thatthe MedDream PACS server send images to a third application entity.

3.4.3.2 Presentation Context Table - Query/Retrieve

Table 32 shows the presentation contexts that may be accepted by MedDream PACS server for query operations.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Patient Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.1.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries

Study Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.2.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Patient/Study Only Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Patient/Study Only Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries
Patient/Study Only Information Model - GET	1.2.840.10008.5.1.4.1.2.3.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Relational queries

Table 32 Acceptable Presentation Contexts for Query/Retrieve Classes

3.4.3.3 SOP Specific Conformance Statement - Query/Retrieve

MedDream PACS server supports relational queries in addition to hierarchical queries. Table 34 below indicates which keys are supported by the MedDream PACS server for the Patient Root information model. Table 35 belowindicates which keys are supported by the MedDream PACS server for the Study Root information model.

MedDream PACS server also supports the Patient/Study Only information model. The keys supported for that modelare the same keys found in Table 34 with a level of either "Patient" or "Study".

Table 33 below contains the key matching methods supported by MedDream PACS Server when processing C-FINDrequests from remote Query/Retrieve SCU applications:

Key Matching Methods	Description	Supported By MedDream PACS
SV	Single Value Matching	Yes
UM	Universal Matching	Yes
WC	Wild-Card Matching	Yes
DR	Date Range Matching	Premium Edition only
TR	Time Range Matching	Premium Edition only
LU	List Of UID Matching	Premium Edition only

Table 33 Key Matching Methods Used For Processing C-FIND Requests

Level	Description	Tag	Matching Method	Type
Patient	Patient Name	0010 0010	SV,UM,WC	R
	Patient ID	0010 0020	SV,UM,WC	U
	Patient´s Birth Date	0010 0030	SV,UM,DR	O
	Patient´s Birth Time	0010 0032	SV,UM,TR	O
	Patient´s Sex	0010 0040	SV,UM	O
	Patient´s Age	0010 1010		O
	Patient´s Size	0010 1020		O
	Patient´s Weight	0010 1030		O
	Number of Patient Related Studies	0020 1200		O
	Number of Patient Related Series	0020 1202		O

	Number of Patient Related Instances	0020 1204		O
Study	Study Date	0008 0020	SV,UM,DR	R
	Study Time	0008 0030	SV,UM,TR	R
	Accession Number	0008 0050	SV,UM,WC	R
	Modalities In Study	0008 0061	SV,UM,WC	O
	Referring Physician Name	0008 0090		O
	Study Description	0008 1030		O
	Study Instance UID	0020 000D	SV,UM,WC	U
	Study ID	0020 0010	SV,UM,WC	R
	Number of Study Related Series	0020 1206		O
	Number of Study Related Instances	0020 1208		O
Series	Series Date	0008 0021	SV,UM,DR	O
	Series Time	0008 0031	SV,UM,TR	O
	Modality	0008 0060	SV,UM,WC	R
	Body Part Examined	0018 0015		O
	Series Instance UID	0020 000E	SV,UM,WC	U
	Series Number	0020 0011	SV,UM	R
	Number of Series Related Instances	0020 1209		O
Image	Instance Creation Date	0008 0012		O
	Instance Creation Time	0008 0013		O
	SOP Class UID	0008 0016	SV,UM,WC	O
	SOP Instance UID	0008 0018	SV,UM,WC	U
	Instance Number	0020 0013	SV,UM	R
	Overlay Number	0020 0022		O
	Curve Number	0020 0024		O
	LUT Number	0020 0026		O
	Samples Per Pixel	0028 0002		O
	Rows	0028 0010		O
	Columns	0028 0011		O
	Bits Allocated	0028 0100		O
	Bits Stored	0028 0101		O
	Pixel Representation	0028 0103		O

Table 34 Keys Supported for Patient Root Information Model

Level	Description	Tag	Matching Method	Type
Study	Study Date	0008 0020	SV,UM,DR	R
	Study Time	0008 0030	SV,UM,TR	R
	Accession Number	0008 0050	SV,UM,WC	R
	Modalities In Study	0008 0061	SV,UM,WC	O

	Patient Name	0010 0010	SV,UM,WC	R
	Patient ID	0010 0020	SV,UM,WC	R
	Study ID	0020 0010	SV,UM,WC	R
	Study Instance UID	0020 000D	SV,UM,WC	U
	Referring Physician Name	0008 0090		O
	Study Description	0008 1030		O
	Patient´s Birth Date	0010 0030	SV,UM,DR	O
	Patient´s Birth Time	0010 0032	SV,UM,TR	O
	Patient´s Sex	0010 0040	SV,UM	O
	Patient´s Age	0010 1010		O
	Patient´s Size	0010 1020		O
	Patient´s Weight	0010 1030		O
Series	Series Date	0008 0021	SV,UM,DR	O
	Series Time	0008 0031	SV,UM,TR	O
	Modality	0008 0060	SV,UM,WC	R
	Body Part Examined	0018 0015		O
	Series Number	0020 0011	SV,UM	R
	Series Instance UID	0020 000E	SV,UM,WC	U
Image	Instance Creation Date	0008 0012		O
	Instance Creation Time	0008 0013		O
	SOP Instance UID	0008 0018	SV,UM,WC	U
	SOP Class UID	0008 0016	SV,UM,WC	O
	Image Number	0020 0013	SV,UM	R
	Overlay Number	0020 0022		O
	Curve Number	0020 0024		O
	LUT Number	0020 0026		O
	Samples Per Pixel	0028 0002		O
	Rows	0028 0010		O
	Columns	0028 0011		O
	Bits Allocated	0028 0100		O
	Bits Stored	0028 0101		O
	Pixel Representation	0028 0103		O

Table 35 Keys Supported for Study Root Information Model

Status Code	Status	Description
0000H	Success	Operation performed properly
A700H	Refused	Out of Resources
A900H	Error	Identifier does not match SOP Class
C000H	Error	Unable to Process

FE00H	Cancel	Sub-operations terminated due to Cancel Indication
FF00H	Pending	Sub-operations are continuing

Table 36 C-FIND-RSP Status Returned By MedDream PACS Server

MedDream PACS server returns the following status codes in response to a C-MOVE request:

Status Code	Status	Description
0000H	Success	Operation performed properly
A701H	Refused	Out of Resources - Unable to calculate number of matches
A702H	Refused	Out of Resources - Unable to perform sub-operations
A801H	Refused	Move destination unknown
A900H	Error	Identifier does not match SOP Class
B000H	Warning	Sub-operations Complete - One or more Failures
C000H	Error	Unable to Process
FE00H	Cancel	Sub-operations terminated due to Cancel Indication
FF00H	Pending	Sub-operations are continuing

Table 37 C-MOVE-RSP Status Returned By MedDream PACS Server

3.4.3.4 Presentation Context Acceptance Criterion - Query/Retrieve

MedDream PACS server will accept any number of query SOP classes that are listed in Table 3 above, provided that the requesting application is known to the MedDream PACS server and has been allowed access to the MySQL database (via the '***applentity***' MySQL database table). MedDream PACS server defines no limit on the number of presentation contexts accepted. In the event that MedDream PACS server runs out of resources when trying to acceptmultiple presentation contexts, MedDream PACS server will reject the association request.

MedDream PACS server does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

3.4.3.5 Transfer Syntax Selection Policies - Query/Retrieve

MedDream PACS server only supports the Implicit VR Little Endian transfer syntax. Any proposed presentation context which includes the Implicit VR Little Endian transfer syntax will be accepted with the Implicit VR Little Endian transfer syntax. Any proposed presentation context that does not include the Implicit VR Little Endian transfer syntax will be rejected.

3.4.4 Real-World Activity - Modality Worklist Management

3.4.4.1 Associated Real-World Activity - Modality Worklist Management

MedDream PACS server accepts associations from applications that wish to perform Worklist Query (Worklist-FIND) operations on worklist items that have been previously received and stored in the MySQL database.

3.4.4.2 Proposed Presentation Contexts - Modality Worklist Management

Table 38 below shows the presentation contexts that are accepted by MedDream PACS server for Modality Worklist - FIND requests.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Info Model - FIND	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 38 Presentation Context For Servicing Modality Worklist - FIND Requests

3.4.4.3 SOP Specific Conformance Statement - Modality Worklist Management

Table 39 below contains the key matching methods supported by MedDream PACS Server when servicing ModalityWorklist-FIND requests from remote Worklist SCU applications:

Key Matching Methods	Description	Supported By MedDream PACS
SV	Single Value Matching	Premium Edition only
UM	Universal Matching	Premium Edition only
WC	Wild-Card Matching	Premium Edition only
DR	Date Range Matching	Premium Edition only
LU	List Of UID Matching	Premium Edition only

Table 39 Key Matching Methods Used When Servicing Modality Worklist-FIND Requests

Module	Description	Tag	Matching Method	Return Type
Scheduled Procedure Step	Scheduled Procedure Step Sequence	0040 0100		1
	>Modality	0008,0060	UM,WC	1
	>Scheduled Station AE Title	0040 0001	UM,WC	1
	>Scheduled Procedure Step Start Date	0040 0002	SV,UM,DR	1
	>Scheduled Procedure Step Start Time	0040 0003	UM	1
Requested Procedure	Requested Procedure ID	0040 1001	UM,WC	1
	Requested Procedure Description	0032 1060		1C
	Study Instance UID	0020 000D		1
	Referenced Study Sequence	0008 1110		2
	>Referenced SOP Class UID	0008 1150		1C
	>Referenced SOP Instance UID	0008 1155		1C
Imaging Service Request	Accession Number	0008 0050	SV,UM,WC	2
	Referring Physician´s Name	0008 0090	UM	2
	Requesting Physician´s Name	0032 1032		2
Patient Identification	Patient´s Name	0010 0010	SV,UM,WC	1
	Patient ID	0010 1020	SV,UM,WC	1
Patient Demographic	Patient´s Birth Date	0010 1030	SV,UM,DR	2
	Patient´s Sex	0010 1040	SV,UM	2

Table 40 Keys Accepted by MedDream PACS Server Premium Edition for Modality Worklist - FIND Requests

3.4.4.4 Presentation Context Acceptance Criterion - Modality Worklist Management

MedDream PACS server will accept any number of query SOP classes that are listed in Table 38 above, provided that the requesting application is known to the MedDream PACS server and has been allowed access to the MySQL database (via the '***applentity***' MySQL database table). MedDream PACS server defines no limit on the number of presentation contexts accepted. In the event that MedDream PACS server runs out of resources when trying to acceptmultiple presentation contexts, MedDream PACS server will reject the association request.

3.4.4.5 Transfer Syntax Selection Policies - Modality Worklist Management

MedDream PACS server only supports the Implicit VR Little Endian transfer syntax. Any proposed presentation context which includes the Implicit VR Little Endian transfer syntax will be accepted with the Implicit VR Little Endian transfer syntax. Any proposed presentation context that does not include the Implicit VR Little Endian transfer syntax will be rejected.

3.4.5 Real-World Activity - Storage Commitment Push Model

3.4.5.1 Associated Real-World Activity - Storage Commitment Push Model

MedDream PACS Server stores images that are sent to it from an SCU. The request for storage commitment may then be transmitted to MedDream PACS Server with a list of references to one or more SOP instances. MedDream PACS Server will receive and respond to DIMSE N-ACTION of Request Storage Commitment for a set of referenced SOP instances.

3.4.5.2 Proposed Presentation Contexts - Storage Commitment Push Model

Table 41 below shows the presentation contexts that are accepted by MedDream PACS server for StorageCommitment Push Model requests.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 41 Presentation Context For Servicing Storage Commitment Push Model Requests

MedDream PACS Server supports the following elements for this SOP class as an SCP:

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Table 42 Storage Commitment Push Model Request (N-ACTION) Message

3.4.5.3 Storage Commitment Results

After the Storage Commitment Push Model request is received, MedDream PACS Server will query its database record to determine if the referenced SOP instances exist in its database tables. If so, MedDream PACS Server will

further check to see if the raw image files that correspond to the referenced SOP instances do exist and are valid in the local storage file system.

If MedDream PACS Server determines that both the database records and raw image files exist and are valid for thereferenced SOP instances, MedDream PACS Server will issue an N-EVENT-REPORT to the SCU including references to the successfully stored SOP Instances contained in the N-ACTION request. Otherwise, MedDream PACS Server will issue an N-EVENT-REPORT to the SCU including references to the failed SOP Instances contained in the N-ACTION request.

The N-EVENT-REPORT contains the Transaction UID value contained in the initiating N-ACTION request. The N-EVENT-REPORT is sent on a separate association from the N-ACTION request.

MedDream PACS Server supports the Event Report Information as specified in Table 43 below:

Action Type Name	Event Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
Storage Commitment Request Complete - Failure Exist	2	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Failed SOP Sequence	(0008,1198)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		>Failure Reason	(0008,1197)

Table 43 Storage Commitment Push Model Event Report (N-EVENT-REPORT) Message

3.4.5.4 Presentation Context Acceptance Criterion - Storage Commitment Push Model

MedDream PACS server will accept any number of Storage Commitment SOP classes that are listed in Table 41 above, provided that the requesting application is known to the MedDream PACS server and has been allowed access to the MySQL database (via the '***applentity***' MySQL database table). MedDream PACS server defines no limit on the number of presentation contexts accepted. In the event that MedDream PACS server runs out of resources when trying to accept multiple presentation contexts, MedDream PACS server will reject the association request.

3.4.5.5 Transfer Syntax Selection Policies - Storage Commitment Push Model

MedDream PACS server only supports the Implicit VR Little Endian transfer syntax for the Storage Commitment Push Model SOP class as a SCP. Any proposed presentation context which includes the Implicit VR Little Endian transfer syntax will be accepted with the Implicit VR Little Endian transfer syntax. Any proposed presentation context that does not include the Implicit VR Little Endian transfer syntax will be rejected.

3.5 DICOM Media Storage Services (Premium Edition Only)

MedDream PACS Server Premium Edition conforms to DICOM Media Storage Service File Format (PS 3.10) and the Media Storage Application Profiles (PS 3.11) for reading images on CD/DVD drive, as well as writing images to a local DICOM file format directory (**DICOMDIR**) which can be archived into CD-R/RW or DVD-R/RW/RAM/+R/+RW media later.

3.5.1 Media Storage Application Profiles

The following application profiles are supported by MedDream PACS Server Premium Edition:

Description	Identifier
General Purpose CD-R Interchange	STD-GEN-CD
General Purpose Interchange on DVD-RAM Media	STD-GEN-DVD-RAM

Table 44 Supported DICOM Media Storage Application Profiles

3.5.2 Real-World Activities:

MedDream PACS Server Premium Edition supports the following storage SOP classes when importing from DICOM Media Storage format compliant CD/DVD drives, and exporting patients/studies stored in MedDreamPACS Server database to local DICOM Media Storage formatted directories:

Storage SOP Class Name	Storage SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
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
X-Ray Angiographic Bi-plane Image Storage (retired)	1.2.840.10008.5.1.4.1.1.12.3
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
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
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
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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2

RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
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
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 Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4
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
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59

Table 45 Supported Storage SOP Classes for DICOM Part 10 Format Import and Export

When importing or exporting images of the storage SOP classes listed in TABLE 45 above, MedDream PACS Server Premium Edition requires or uses the following mandatory Selection Keys/Attributes defined in DICOM PS 3.10 and PS 3.3:

Directory Record Type	Selection Key Name	Tag
Patient	Patient Name	(0010,0010)
	Patient ID	(0010,0020)
Study	Study UID	(0020,000D)
	Study ID	(0020,0010)
Series	Modality	(0008,0060)
	Series Number	(0020,0011)
Image	Referenced File ID	(0004,1500)
	Referenced SOP Class UID in File	(0004,1510)
	Referenced SOP Instance UID in File	(0004,1511)
	Referenced Transfer Syntax UID in File	(0004,1512)

	Image Number	(0020,0013)
SR Document	Instance Number	(0020,0013)
	Completion Flag	(0040,A491)
	Verification Flag	(0040,A493)
	Content Date	(0008,0023)
	Content Time	(0008,0033)
	Verification DateTime	(0040,A030)
	Concept Name Code Sequence	(0040,A043)

Table 46 Mandatory Selection Keys Supported by MedDream PACS Server Import/Export

3.5.2.1 Real-World Activities: Reading Images from CD/DVD Drives

When reading images from CD/DVD media drives, MedDream PACS Server Premium Edition will play the role of File Set Reader (**FSR**).

From the MedDream PACS web user interface, users can import external images stored in CD/DVD media drives byvisiting the **Tools** page from the Main Menu Bar, from which users can select the **Import** option by entering:

- Either the CD/DVD media drive and the destination storage directory where the images will be imported and raw image files on the media drive will be copied to the destination directory.
- Or a source DICOM storage format compatible directory with or without **DICOMDIR** directory record, from which the images will be imported into MedDream PACS Server database but the raw image files arenot copied, as the MedDream PACS Server database records will be linked directly to the source directory.

3.5.2.2 Real-World Activities: Writing Images to Local Directory

When writing images to a local directory using DICOM Media Storage compliant directory formats (**DICOMDIR** directory record), MedDream PACS Server Premium Edition will play the role of File Set Creator (**FSC**).

From the MedDream PACS web user interface, users can export patients/studies stored in the MedDream PACS database to a local directory using the DICOM Media Storage formats, by visiting the **Tools** page from the Main Menu Bar, from which users can select a list of one or more patients/studies, enter a media label for the export, and enter a destination directory to export to. Users will also select the export media types which can be either CD (650 MBytes) or DVD (4.7 GBytes). In case the total size of the selected patients/studies exceeds the storage limit for the selected media type, multiple volumes will be created with the volume number automatically appended to the specified media label.

4 Communication Profiles

4.1 TCP/IP Stack

MedDream PACS server provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the Standard.

4.1.1 TCP/IP API

MedDream PACS server uses the TCP/IP stack from Microsoft Windows, Mac OS X or Linux (Premium Edition only) platforms upon which it executes. It uses a subroutine library that is based on either Windows Socket API (Winsock 2.0) interface on Windows platforms, or the Berkeley socket interface on Linux and Mac OS X platforms (Premium Edition only).

4.1.2 Physical Media Support

MedDream PACS server exists as a software application that can be compiled and run on various Windows, Mac OSX or Linux (Premium Edition only) platforms. As such, it places no restrictions on the physical network. MedDreamPACS server has been tested using TCP/IP over Ethernet (10/100/1000 Mbps) as well as wireless LAN (IEEE 802.11x variants).

5 Extensions/Specializations/Privatizations

Not applicable

6 Configuration

MedDream PACS server obtains configuration information from a database table which is stored in a relationaldatabase. In this implementation, the relational database is the open source MySQL database.

6.1 AE Title/Presentation Address Mapping

A MySQL database table '***applentity***' is used to map between AE Titles and Presentation Addresses. The format of the table is as follows:

Field	Type	Null	Key	Default
title	varchar(16)	NO	Primary	N/A
hostname	varchar(64)	YES	N/A	NULL
ipaddr	varchar(64)	YES	N/A	NULL
port	int(11)	YES	N/A	NULL
allowaccess	tinyint(1)	YES	N/A	0
archivedir	varchar(255)	YES	N/A	NULL

Table 47 AE Title/Presentation Address Mapping Table

6.2 Security Features

MedDream PACS server uses the '***applentity***' table to control access. The table allows the MedDream PACS server to determine which applications are allowed access and where received images should be stored.

6.3 Configurable Parameters

The following parameters may be configured for MedDream PACS server:

- Application Entity Title
- Logfile Directory
- TCP/IP Port Number
- Storage Format

Methods for setting these parameters are detailed in the MedDream PACS Server Installation Guide included in theMedDream PACS Server installation package.

6.4 Support of Extended Character Sets

MedDream PACS server currently does not support any extended character sets.

7 Web Access to DICOM Persistent Objects (WADO)

WADO specifies a web-based service for accessing and presenting DICOM persistent objects (e.g. images, medical imaging reports). It provides a simple mechanism for accessing a DICOM persistent object from HTML pages or XML documents, through HTTP/HTTPs protocol, using DICOM UIDs (Unique Identifiers). Data may be retrieved either in a presentation-ready form as specified by the requester (e.g. JPEG or GIF) or in a native DICOM format. This standard relates only to DICOM persistent objects (not to other DICOM objects or to non-DICOM objects).

Access to the content of a WADO object is enabled by specifying a "link" pointing to a specific DICOM Persistent Object by means of its URL/URI and specifying its DICOM object Instance UID. The general syntax of the standard respects the URI recommendation IETF RFC2396. It can be expressed as:

<scheme>://<authority><path>?<query>

It is structured following BNF syntax. The first definition of this syntax is:

1. URI-reference = [absoluteURI | relativeURI] ["#" fragment]
2. absoluteURI = scheme ":" (hier_part | opaque_part)
3. relativeURI = (net_path | abs_path | rel_path) ["?" query]
4. hier_part = (net_path | abs_path) ["?" query]

This definition of the term query shall respect fully the BNF syntax exposed in the IETF RFC2396. Within a query component, the characters ";", "/", "?", ":", "@", "&", "=", "+", ",", and "$" are reserved. It is only a restriction of it for the unique purpose of retrieving DICOM Persistent Objects through Web Access to DICOM Persistent Objects.

Control names and values are escaped. Space characters are replaced by "+", and then reserved characters are escaped as described in IETF RFC2396. Non-alphanumeric characters are replaced by "%HH", a percent sign and two hexadecimal digits representing the ASCII code of the character. Line breaks are represented as "CR LF" pairs (i.e., "%0D%0A"). The control names/values are listed in the order they appear in the document. The name is separated from the value by "=" and name/value pairs are separated from each other by "&".

Syntax of the <query> component

The BNF syntax restriction of parameters for the Web Access to DICOM Persistent Objects service is the following:

1. query = parameter ["&" parameter]
2. parameter = name "=" value
3. name = nchars
4. value = nchars
5. nchars = *nchar
6. nchar = unreserved | escaped

where unreserved and escaped are defined in IETF RFC2396.

7.1 URL Parameters Required for All DICOM Persistent Objects

7.1.1 Request type - Type of request performed

The parameter name shall be **requestType**, and the value shall be "WADO".

7.1.2 Unique Identifier of the Series - Series Instance UID

The parameter name shall be **seriesUID**, and the value shall be encoded as a Unique Identifier (UID) string, as specified in PS 3.5, except that it shall not be padded to an even length with a NULL character.

7.1.3 Unique Identifier of the Object - SOP Instance UID

The parameter name shall be **objectUID**, and the value shall be encoded as a Unique Identifier (UID) string, as specified in PS 3.5, except that it shall not be padded to an even length with a NULL character.

7.2 URL Parameters Optional for All DICOM Persistent Objects

7.2.1 MIME Type Constraints

MIME type(s) desired by the Web Client for the response from the Server, as defined in the IETF RFC2616.

This parameter is OPTIONAL. If present, the parameter name shall be **contentType**, and its value can be one of the following:

- application/dicom
- image/jpeg

If the **contentType** parameter is not present in the request, the response shall contain an image/jpeg MIME type.

7.2.2 AE Title

In case of multi-instance configurations where multiple instances of MedDream PACS Server are running on the same server, this parameter will be used to identify the particular instance of MedDream PACS Server in order toaccess the correct database for the requesting Dicom objects.

This parameter is OPTIONAL. If present, the parameter name shall be **aetitle**.

7.3 Authentication Methods for Web Access to DICOM Persistent Objects (WADO)

A valid username/password pair is required before the web clients can access the MedDream PACS Server database, and the System Administrator must have pre-created this username/password before they can be used to login to theMedDream PACS Server database.

7.3.1 Authentication via HTTP Request Parameters

Authentication information can be supplied via the following URL parameters sent as part of the HTTP request:

- username
- password

For example, the following URL can be entered into a web client for accessing the MedDream PACS Server database:

http://hostname/MedDream PACS/wado.php?requestType=WADO&seriesUID=1.2.840.113674.514.212.82.300&objectUID=1.2.840.113674.950809132337081.100&contentType=application%2Fdicom&username=wado&password=wado

7.3.2 HTTP Basic Authentication

If authentication information is not supplied via HTTP Request parameters above, MedDream PACS Server will switch to HTTP Basic Authentication method instead, by presenting a diaglog window prompting for username/password information. Web users can then manually enter such username/password information before they can be authenticated to access the MedDream PACS Server database.

7.3.3 Pre-Configured Username/Password

Instead of the two HTTP authentication methods above, the System Administrator can pre-configure a designated username/password to be used exclusively for WADO from the Configuration page of the **Main Menu**.

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