

XrayVision® DCV

DICOM Conformance Statement

Effective Date: 01/07/2016 Revision: 3.1

Abstract

This document describes the DICOM implementation and conformance of Apteryx's XrayVision DCV product line. This product line includes both the XrayVision DCV viewer application and the XrayVision DCV Data Manager.

**APTERYX CONFIDENTIAL
INFORMATION**

THIS INFORMATION IS
CONFIDENTIAL AND PROPRIETARY
TO APTERYX. UNAUTHORIZED USE
OR DISSEMINATION OF THIS
INFORMATION IS STRICTLY
PROHIBITED.

**APTERYX CONFIDENTIAL
INFORMATION**

Approval:

(please sign and date)

1. REVISION HISTORY

Revision Level	Revision Date	Description of Revision	Effective Date	Revision Author Initials	Approver Initials	Doc Change Task #
3.0	08/17/2011	Reformatted doc and changed title to adhere to QMS doc control req.	08/17/2011	SN		
3.1	01/07/2016	Added GET SOP classes to tables 1 and 2.	01/07/2016	MG	KC	

2. TABLE OF CONTENTS

1.	REVISION HISTORY	2
2.	TABLE OF CONTENTS.....	3
3.	INDEX OF FIGURES AND TABLES	5
	List of Figures	5
	List of Tables	5
4.	INTRODUCTION.....	6
	Overview	6
	Important Considerations for the Reader.....	8
	Acronyms, Abbreviations and Definitions	9
	How to Use this Document	9
5.	IMPLEMENTATION MODEL – DCV	11
	Application Data Flow Diagram	11
	Functional Definitions	12
	Sequencing of Real-world Activities	14
6.	IMPLEMENTATION MODEL – DM	15
	Application Data Flow Diagram	15
	Functional Definitions	15
	Sequencing of Real-world Activities	18
7.	DCV AE SPECIFICATIONS	19
	Association Establishment Policies	20
	Association Initiation by Real-world Activities.....	20
	Association Acceptance Policy by Real-world Activities	25
	Communication Profiles.....	26
	Extensions / Specializations / Privatizations.....	26
	Configurable Parameters	26
	Support of Extended Character Sets.....	27
8.	DM AE SPECIFICATIONS	27
	Association Establishment Policies	28
	Association Acceptance Policy by Real-world Activities	28
	Communication Profiles.....	33

Extensions / Specializations / Privatizations 33

Configurable Parameters 34

Support of Extended Character Sets 34

3. INDEX OF FIGURES AND TABLES

List of Figures

Figure 1. Implementation model for DCV AE.....	11
Figure 2. Query database model.	12
Figure 3. Transfer image model.....	13
Figure 4. Store image model.....	13
Figure 5. Verification model.	14
Figure 6. Storage commitment model.....	14
Figure 7. Implementation model for DM AE.....	15
Figure 8. Query database model.	16
Figure 9. Transfer image model.....	16
Figure 10. Store image model.....	17
Figure 11. Verification model.	17
Figure 12. Storage commitment model.....	17

List of Tables

Table 1. SOP classes supported by DCV.....	7
Table 2. SOP classes supported by DM.....	8
Table 3. SOP classes supported as SCU.....	19
Table 4. SOP classes supported as SCP.	20
Table 5. Presentation contexts to worklist.	20
Table 6. Presentation contexts to Query / Retrieve.	21
Table 7. Presentation contexts to store images.....	24
Table 8. Presentation contexts to verify DICOM association.	24
Table 9. Presentation contexts to print images.....	24
Table 10. Presentation contexts for storage commitment.	25
Table 11. Presentation contexts to receive images.	25
Table 12. SOP classes supported as SCP.	27
Table 13. SOP classes supported as SCU.....	28
Table 14. Presentation contexts to worklist.	28
Table 15. Presentation contexts to Query / Retrieve.	29
Table 16. Presentation contexts to store images.....	31
Table 17. Presentation contexts to verify DICOM association.	32
Table 18. Presentation contexts for storage commitment.	32
Table 19. Presentation contexts to receive images.	33

4. INTRODUCTION

Overview

This document describes the DICOM implementation and conformance of Apteryx’s XrayVision DCV product line, which supports DICOM. The XrayVision DCV client application (“DCV”) supports DICOM as a Service Class User (SCU). The DCV Data Manager application (“DM”) supports DICOM as a Service Class Provider (SCP). The applications making up the XrayVision product line consist of applications that are capable of acquiring and storing images from a wide range of imaging devices including, but not limited to: digital x-ray systems; digital imaging systems; scanners; and visible light cameras.

While the DICOM implementation is designed to support a wide range of DICOM SOP Classes, the primary focus of these applications is in supporting the following DICOM SOP Classes.

XrayVision DCV		
SOP Class Name	SOP Class UID	Role
Verification	1.2.840.10008.1.1	SCU, SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	SCU
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	SCU
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCU
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	SCU
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	SCU
Digital X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCU
Digital X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCU
Digital Mammography X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	SCU
Digital Mammography X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	SCU
Digital Intra Oral X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3	SCU
Digital Intra Oral X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	SCU
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	SCU
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	SCU
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	SCU
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7	SCU
X-ray Angiographic Image Storage	1.2.840.10008.5.1.5.1.1.12.1	SCU
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	SCU
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	SCU
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	SCU
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	SCU
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	SCU
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	SCU
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	SCU
Basic film session	1.2.840.10008.5.1.1.1	SCU
Basic film box	1.2.840.10008.5.1.1.2	SCU
Basic grayscale image box	1.2.840.10008.5.1.1.4	SCU
Basic color image box	1.2.840.10008.5.1.1.4.1	SCU
Basic grayscale print	1.2.840.10008.5.1.1.9	SCU
Print job	1.2.840.10008.5.1.1.14	SCU
Basic annotation box	1.2.840.10008.5.1.1.15	SCU
Printer	1.2.840.10008.5.1.1.16	SCU
Printer configuration retrieval	1.2.840.10008.5.1.1.16.376	SCU
Basic color print	1.2.840.10008.5.1.1.18	SCU
Basic print image overlay box	1.2.840.10008.5.1.1.24.1	SCU
Print queue	1.2.840.10008.5.1.1.26	SCU

XrayVision DCV		
SOP Class Name	SOP Class UID	Role
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	SCU
Patient Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.1.1	SCU
Patient Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.1.2	SCU
Patient Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.1.3	SCU
Study Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU
Study Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCU
Study Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.2.3	SCU
Patient Study Only Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.3.1	SCU
Patient Study Only Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.3.2	SCU
Patient Study Only Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.3.3	SCU
Implicit VR Little Endian	1.2.840.10008.1.2	SCU
Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU
Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU
RLE Lossless	1.2.840.10008.1.2.5	SCU
JPEG Baseline	1.2.840.10008.1.2.4.50	SCU
JPEG Lossless	1.2.840.10008.1.2.4.57	SCU
JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	SCU
JPEG 2000	1.2.840.10008.1.2.4.91	SCU

Table 1. SOP classes supported by DCV

DCV Data Manager		
SOP Class Name	SOP Class UID	Role
Verification	1.2.840.10008.1.1	SCU, SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	SCP
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	SCP
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	SCP
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	SCP
Digital X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	SCP
Digital X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	SCP
Digital Mammography X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	SCP
Digital Mammography X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	SCP
Digital Intra Oral X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3	SCP
Digital Intra Oral X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	SCP
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	SCP
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	SCP
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	SCP
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7	SCP
X-ray Angiographic Image Storage	1.2.840.10008.5.1.5.1.1.12.1	SCP
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	SCP
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	SCP
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	SCP
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	SCP
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	SCP
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	SCP
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	SCP
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	SCP
Patient Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.1.1	SCP
Patient Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.1.2	SCP

DCV Data Manager		
SOP Class Name	SOP Class UID	Role
Patient Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.1.3	SCP
Study Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.2.1	SCP
Study Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCP
Study Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.2.3	SCP
Patient Study Only Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.3.1	SCP
Patient Study Only Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.3.2	SCP
Patient Study Only Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.3.3	SCP
Implicit VR Little Endian	1.2.840.10008.1.2	SCP
Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP
Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP
RLE Lossless	1.2.840.10008.1.2.5	SCP
JPEG Baseline	1.2.840.10008.1.2.4.50	SCP
JPEG Lossless	1.2.840.10008.1.2.4.57	SCP
JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	SCP
JPEG 2000	1.2.840.10008.1.2.4.91	SCP

Table 2. SOP classes supported by DM

Important Considerations for the Reader

The DICOM 3.0 standard is intended to facilitate communication between other applications. This DICOM Conformance Statement in itself is not sufficient to guarantee successful interoperability between the XrayVision DCV product line and any given Service Class User (SCU) or Service Class Provider (SCP). Any conflicts or inconsistencies in interoperability with a SCU or a SCP should be reported to Apteryx, Inc. 313 S High St Suite 200, Akron, OH 44308, 330-376-0889, support@apteryx.com.

The reader should recognize that all complex software systems and its documentation may contain errors and/or omissions. Information in the documentation is subject to change without notice. Improvements and/or changes to the documentation and/or software may occur at any time. Apteryx assumes no liability resulting from any inaccuracy or omissions contained herein or from the use of the information or programs. Apteryx makes no express or implied warranty of any kind with regard to these programs or to the supplemental documentation. In no event shall Apteryx be liable for incidental or consequential damages in connection with or arising out of the furnishing, performance or use of this documentation. Apteryx reserves the right to revise this publication and make changes to its content at any time without obligation to notify any person or entity of such revisions and/or changes.

Acronyms, Abbreviations and Definitions

The following acronyms and abbreviations may be used throughout this documentation:

ASCII	American Standard Code for Information Interchange
AE	Application Entity
ANSI	American National Standards Institute
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DMI	Distributed Medical Imaging
HIS	Hospital Information System
IE	Information Entity
IOD	Information Object Definition
ISO	International Standards Organization
LUT	Look-up Table
PDU	Protocol Data Unit
PLUT	Presentation Look-up Table
RIS	Radiology Information System
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
VM	Value Multiplicity
VR	Value Representation
LE	Little Endian
BE	Big Endian

How to Use this Document

This document contains important information that the reader should compare with other SCUs and SCPs in order to determine connectivity.

Implementation Model

The implementation model describes the relationships between a device, real-world activities (which initiate certain DICOM functionality), and the DICOM services. A DICOM service is implemented on a device by a software process, which is referred to as an Application Entity (AE). Each AE is given a unique name referred to as the AE Title which is used to uniquely identify between other AE's.

AE Specifications

Each AE supports one or more SOP classes which define the functionality of the AE. An SOP Class consists of a combination of an Object or Information model with specific DICOM services. An example of an SOP Class is the "Digital X-ray Image Storage For Presentation" Class (1.2.840.10008.5.1.4.1.1.1.2) which combines the DICOM C_STORE command with the Digital X-ray Image object. Each SOP Class is uniquely identified by a UID (Unique Identification Number). An example of a SOP Class UID is the "Digital X-ray Image Storage For Presentation" Class which has been assigned a UID of 1.2.840.10008.5.1.4.1.1.1.2. The role of an AE is further broken down into role the AE is taking such as a User (conceptually as a Client) or a Provider (conceptually as a Server). These roles are defined as Service Class User (SCU) or Service Class Provider (SCP).

Value Representation (VR)

The Value Representation of the elements supported by each SOP Class defines the encoding of the information contained in each element. Conceptually, each element in a SOP Class can be thought of as consisting of data, an attribute tag and a VR (which is optional). Whether or not the VR encoding is included in the data elements is referred to as Explicit VR syntax or Implicit VR syntax.

The Explicit VR syntax indicates that the data elements include the VR information along with the data and attribute tag. Implicit VR syntax indicates that the VR information will not be included and that the receiving application must determine the VR type from the attribute tag associated with each data element. For example, when receiving a SOP Class that contains the "Patient Name" and "Patient's Birth Date" elements in Explicit VR syntax, there are additional type code fields containing the type "PN" and "DA" to identify the VR of the data element. When using Implicit VR syntax, the VR of each of these fields is assumed to be known by the receiver and thus not specified.

5. IMPLEMENTATION MODEL - DCV

Application Data Flow Diagram

The DCV Application Entity (AE) is an application that initiates requests for the storage and retrieval of images and access to patient information. The AE supports the services of the following DICOM Service Classes as a SCU: Storage Service Class; Query/Retrieve Class; Print Management Service Class; Basic Worklist Management Service; Storage Commitment PUSH. The implementation model of the DCV AE is illustrated in the following figure.

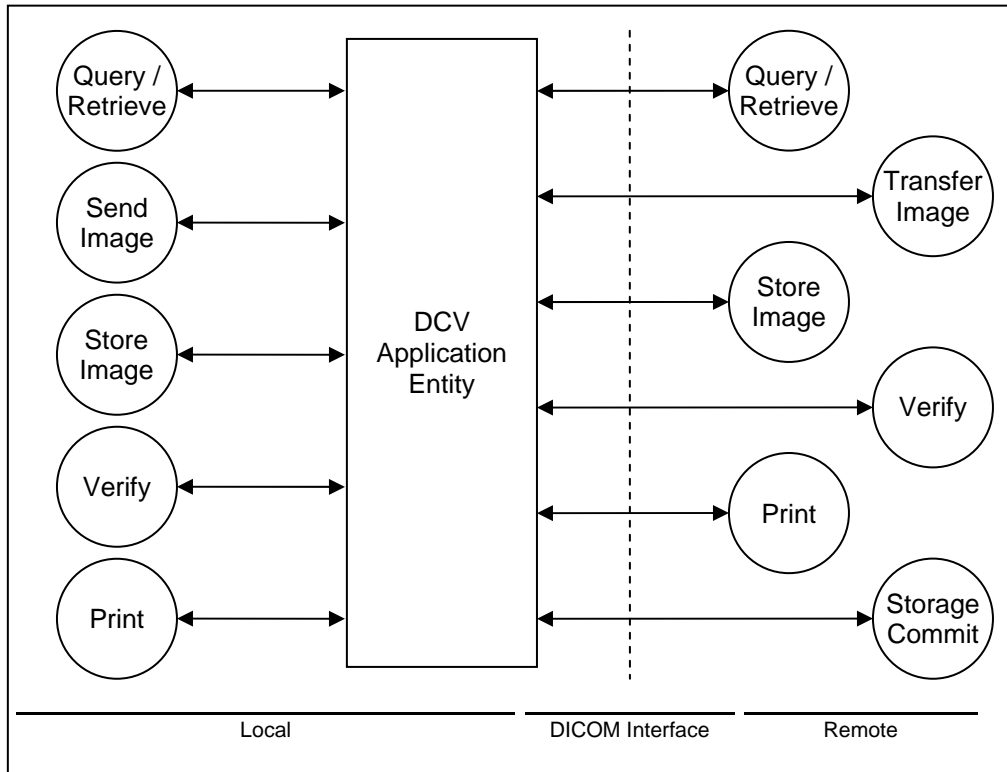


Figure 1. Implementation model for DCV AE.

Functional Definitions

The DCV AE acts as a SCP in the following role(s):

1. SCP for DICOM C-STORE operations to Storage Service Class users (during MOVE operations only).

The DCV AE acts as a SCU in the following role(s):

1. SCU of DICOM C-STORE operations from Storage Service Class providers.
2. SCU of DICOM C-ECHO operations from Verification Service Class providers.
3. SCU of DICOM C-FIND operations from Worklist Management Service Class providers.
4. SCU of DICOM C-FIND operations from Query / Retrieve Service Class providers.
5. SCU of DICOM C-MOVE operations from Query / Retrieve Service Class providers.
6. SCU of DICOM C-GET operations from Query / Retrieve Service Class providers.
7. SCU of DICOM N-ACTION operations from Storage Commitment PUSH Class providers.

Query

The DCV AE can initiate a patient or study query (C-FIND-RQ) based on a set of attributes the user wishes to match. The AE displays the status of the C-FIND-RSP messages received by the server as it continues searching. When all matches have been identified by the server, the DCV AE displays the resulting list along with any errors that may have been encountered during the search.

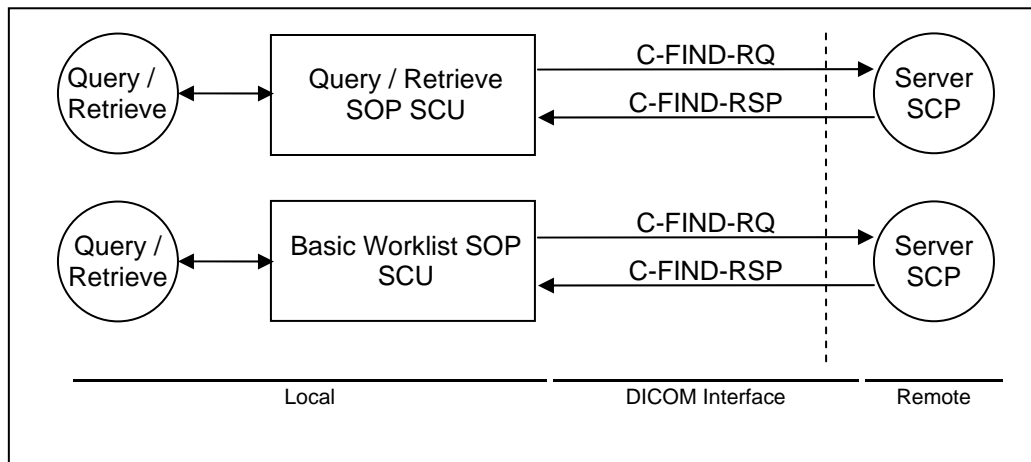


Figure 2. Query database model.

Send Image

The DCV AE can initiate an image move or image get query (C-GET-RQ or C-MOVE-RQ) and supplies unique values that identify the move destination to the SCP. The status and result of the get or move operation are displayed by the DCV AE to the user.

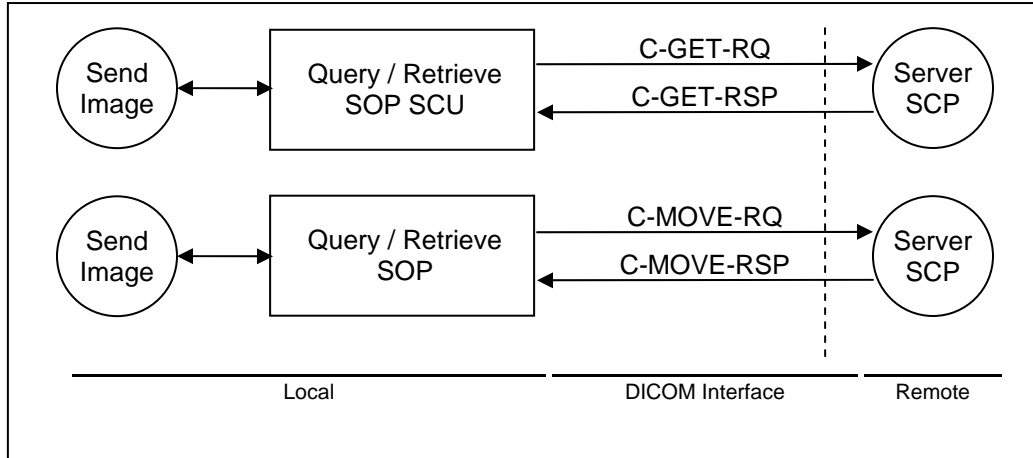


Figure 3. Transfer image model.

Store Image

The DCV AE can initiate an image store request (C-STORE-RQ) to request that an image maintained by the DCV AE be stored on a SCP. The status and result of the get or move operation are displayed by the DCV AE to the user.

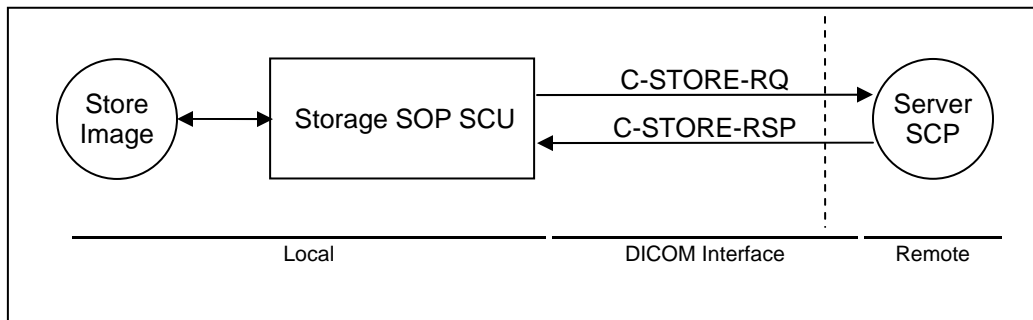


Figure 4. Store image model.

Verify

The DCV AE can initiate an echo request (C-ECHO-RQ). The echo request is used to verify a connection with a SCP as well as the DICOM association.

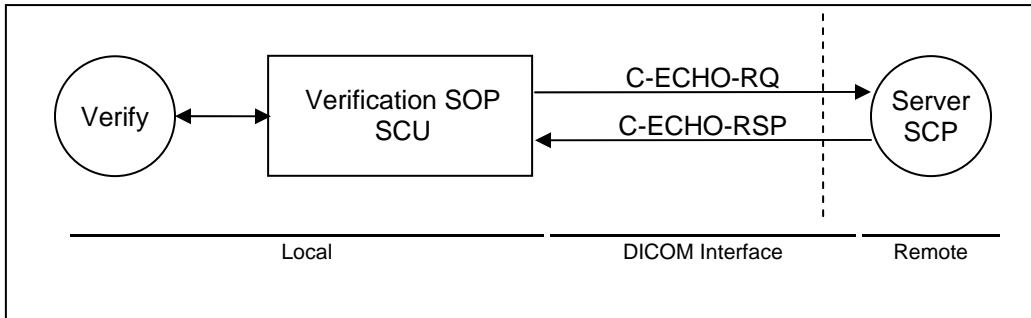


Figure 5. Verification model.

Storage Commitment

The DCV AE can initiate a storage commitment request (N-ACTION-RQ). This request is used to verify that an image that has been stored to the SCP has been successfully stored by the SCP.

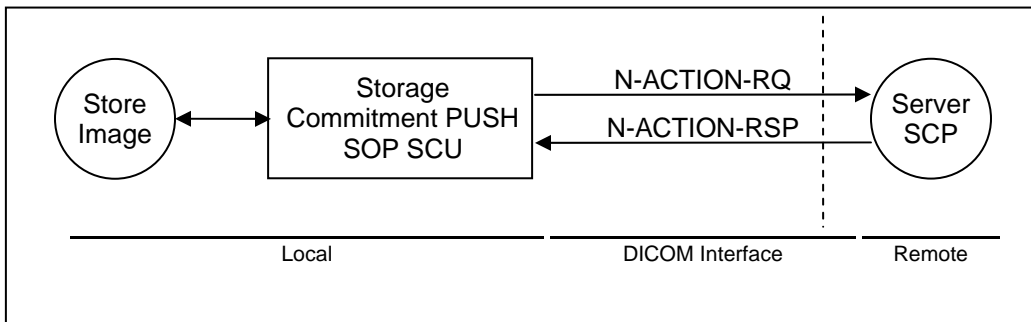


Figure 6. Storage commitment model.

Sequencing of Real-world Activities

Not applicable.

6. IMPLEMENTATION MODEL - DM

Application Data Flow Diagram

The DM Application Entity (AE) is an application that receives requests for the storage and retrieval of images and access to patient information. The AE supports the services of the following DICOM Service Classes as an SCP: Storage Service Class; Query/Retrieve Class; Basic Worklist Management Service; and Storage Commitment PUSH. The implementation model of the DM AE is illustrated in the following figure.

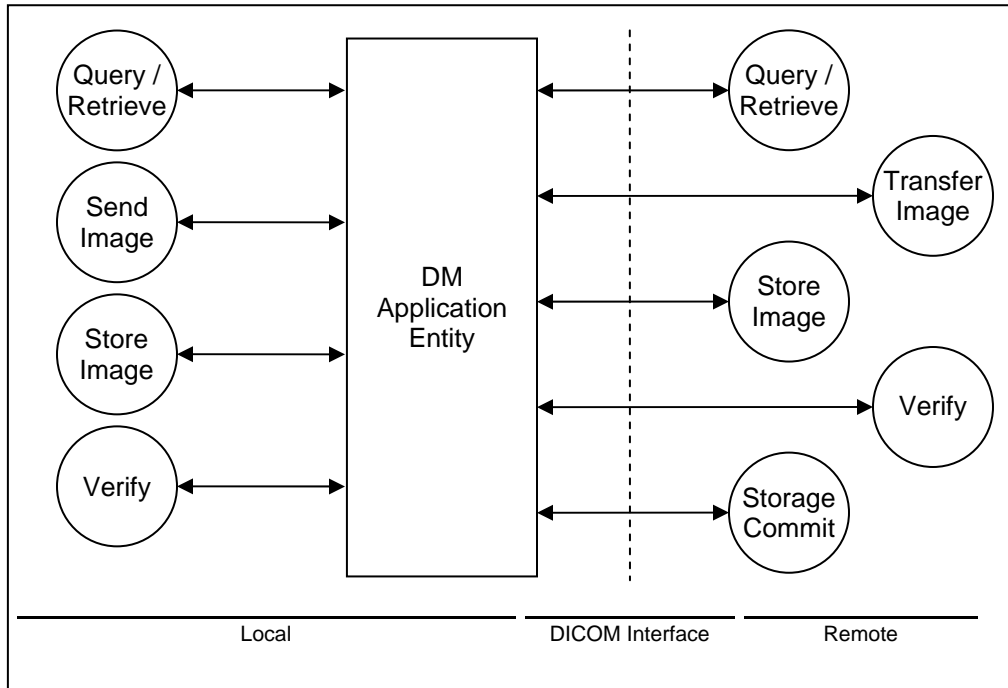


Figure 7. Implementation model for DM AE.

Functional Definitions

The DM AE acts as a SCU in the following role(s):

1. SCP for DICOM C-STORE operations to Storage Service Class users (during MOVE operations only).

The DM AE acts as a SCP in the following role(s):

1. SCU of DICOM C-STORE operations from Storage Service Class providers.
2. SCU of DICOM C-ECHO operations from Verification Service Class providers.
3. SCU of DICOM C-FIND operations from Worklist Management Service Class providers.
4. SCU of DICOM C-FIND operations from Query / Retrieve Service Class providers.
5. SCU of DICOM C-MOVE operations from Query / Retrieve Service Class providers.
6. SCU of DICOM C-GET operations from Query / Retrieve Service Class providers.
7. SCU of DICOM N-ACTION operations from Storage Commitment PUSH Class providers.

Query

The DM AE can receive a patient or study query (C-FIND-RQ) based on a set of attributes the user wishes to match. The AE displays the status of the C-FIND-RSP messages received by the client.

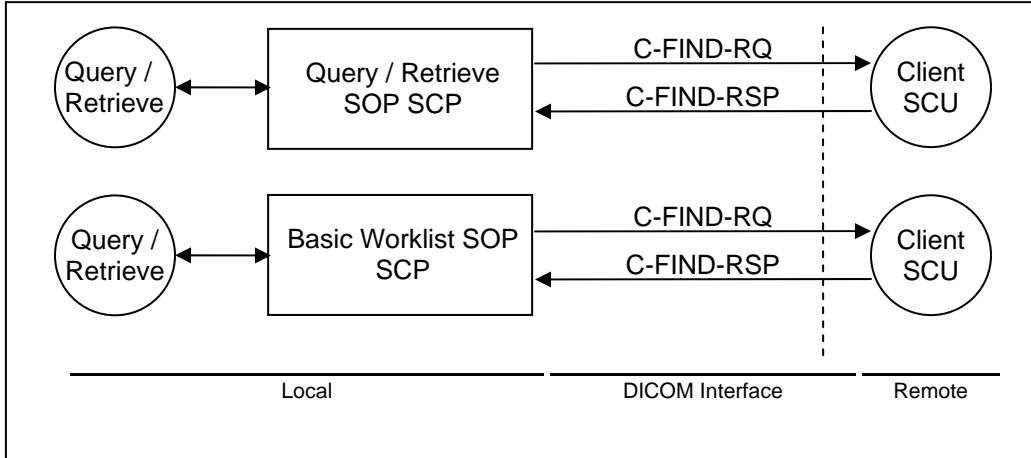


Figure 8. Query database model.

Send Image

The DM AE can send an image move or image get query (C-GET-RQ or C-MOVE-RQ) and supplies unique values that identify the move destination to the SCP.

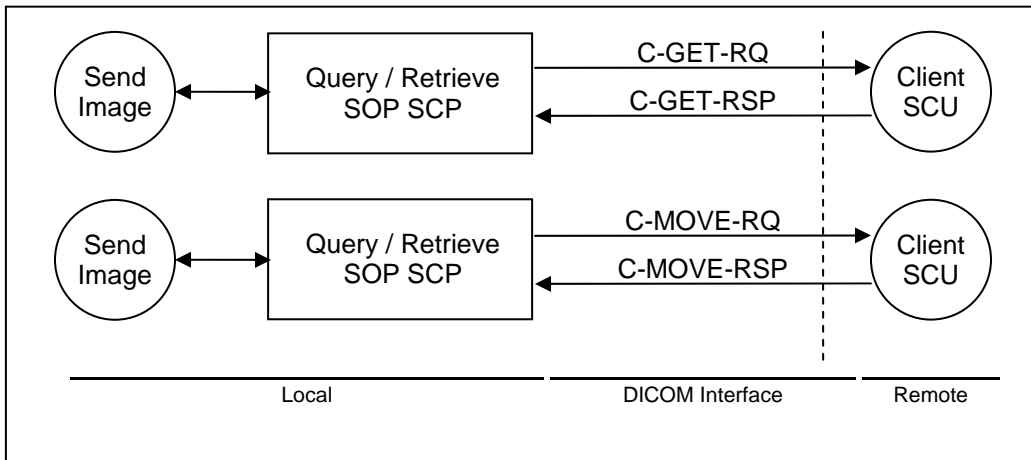


Figure 9. Transfer image model.

Store Image

The DM AE can receive an image store request (C-STORE-RQ) to request that an image be stored on a SCP.

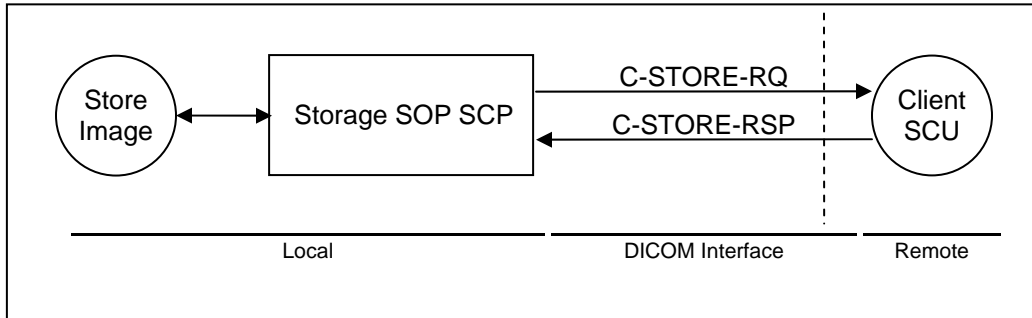


Figure 10. Store image model.

Verify

The DM AE can receive an echo request (C-ECHO-RQ). The echo request is used to verify a connection with the SCP as well as the DICOM association.

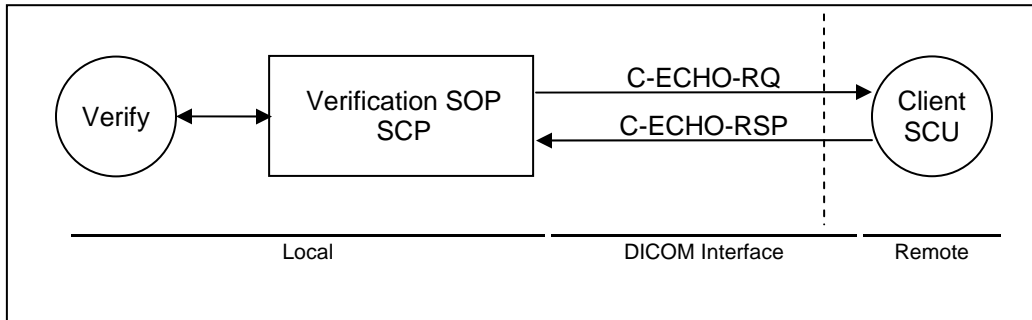


Figure 11. Verification model.

Storage Commitment

The DM AE can receive a storage commitment request (N-ACTION-RQ). This request is used to verify that an image that has been stored to the SCP has been successfully stored by the SCP.

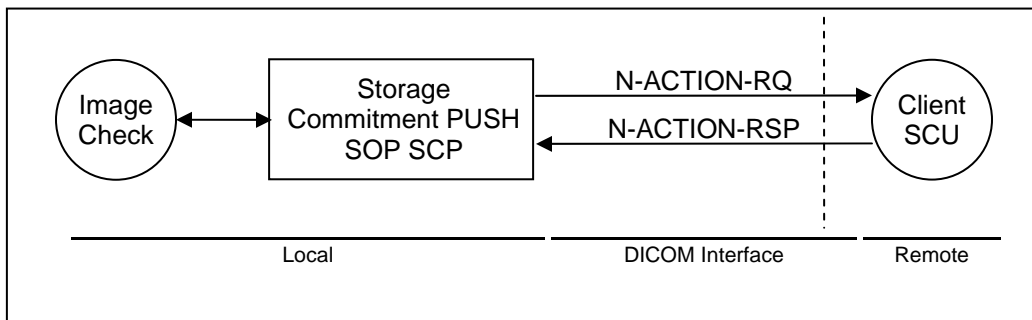


Figure 12. Storage commitment model.

Sequencing of Real-world Activities

Not applicable.

7. DCV AE SPECIFICATIONS

The DCV AE provides standard conformance to the following DICOM 3.0 standard SOP classes as an SCU:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Storage Commitment Push Model	1.2.840.10008.1.20.1
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
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
Digital Intra Oral X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7
X-ray Angiographic Image Storage	1.2.840.10008.5.1.5.1.1.12.1
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1
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
Basic grayscale print	1.2.840.10008.5.1.1.9
Print job	1.2.840.10008.5.1.1.14
Basic annotation box	1.2.840.10008.5.1.1.15
Printer	1.2.840.10008.5.1.1.16
Printer configuration retrieval	1.2.840.10008.5.1.1.16.376
Basic color print	1.2.840.10008.5.1.1.18
Basic print image overlay box	1.2.840.10008.5.1.1.24.1
Print queue	1.2.840.10008.5.1.1.26
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31
Patient Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.1.3
Patient Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.2.3
Study Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient Study Only Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Study Only Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.3.3
Patient Study Only Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.3.2

Table 3. SOP classes supported as SCU.

The DCV AE provides standard conformance to the following DICOM 3.0 standard SOP classes as an SCP:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Table 4. SOP classes supported as SCP.

Association Establishment Policies

General

The DCV AE establishes associations using the DICOM 3.0 standard application context. The maximum PDU size the DCV AE will negotiate is 256 kilobytes.

Number of Associations

The DCV AE will open one association at a time. Multiple simultaneous associations are not supported. If more destinations are requested, the requests are queued.

Asynchronous Nature

Asynchronous mode of operation is not supported.

Implementation Identifying Information

The Implementation Class Unique Identifier (UID) for the DCV AE is 1.2.840.114384. DCV also allows the users that have their own Implementation Class Unique Identifier to specify the UID in the software preferences.

Association Initiation by Real-world Activities

Real-world Activity: Request Modality Worklist

Associated Real-world Activity

The DCV AE initiates an association with the SCP to get the modality worklist.

Proposed Presentation Contexts

Name	Abstract Syntax	Transfer Syntax	Role
	UID	Name / UID	
Basic Worklist	1.2.840.10008.5.1.4.31	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU

Table 5. Presentation contexts to worklist.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Modality Worklist Service Classes. All DICOM 3.0 required and unique keys are supported. Any attribute cataloged in the database may be used as a matching or retrieval key. All range, wildcard, UID list, sequence and multiple value matching is implemented per the DICOM 3.0 standard.

Real-world Activity: Request Query / Retrieve

Associated Real-world Activity

The DCV AE initiates an association with the SCP to send and receive query requests.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Patient Root Query / Retrieve FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU
Study Root Query / Retrieve FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU
Patient Study Only Query / Retrieve FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU

Table 6. Presentation contexts to Query / Retrieve.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Query/Retrieve Service Classes. All DICOM 3.0 required and unique keys are supported. Any attribute cataloged in the database may be used as a matching or retrieval key. All range, wildcard, UID list, sequence and multiple value matching is implemented per the DICOM 3.0 standard.

Real-world Activity: Request for Storing Images

Associated Real-world Activity

The DCV AE initiates an association with the SCP to receive and store images.

Proposed Presentation Contexts

While the DICOM implementation is designed to support a wide range of DICOM SOP Classes, the primary focus of these applications is in supporting the following DICOM SOP Classes. Presentation contexts other than those in the following table are also supported.

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Digital X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Digital X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Digital Mammo-graphy X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Digital Mammo-graphy X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Digital Intra Oral X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Digital Intra Oral X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
X-ray Angiographic Image Storage	1.2.840.10008.5.1.5.1.1.12.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Radio-therapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCU

Table 7. Presentation contexts to store images.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Storage Service Classes.

Real-world Activity: Request for Verification

Associated Real-world Activity

The DCV AE initiates an association with the SCP to verify the current DICOM association.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Verification	1.2.840.10008.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU

Table 8. Presentation contexts to verify DICOM association.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Verification Service Classes.

Real-world Activity: Request to Print Images

Associated Real-world Activity

The DCV AE initiates an association with the SCP to print images.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU

Table 9. Presentation contexts to print images.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Print Service Classes.

Real-world Activity: Request for Storage Commitment

Associated Real-world Activity

The DCV AE initiates an association with the SCP to query the status of an image’s storage commitment.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Storage Commitment Push Model Class	1.2.840.10008.1.20.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCU

Table 10. Presentation contexts for storage commitment.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Print Service Classes.

Association Acceptance Policy by Real-world Activities

Real-world Activity: Respond to Store Images Request

Associated Real-world Activity

The DCV AE accepts an SCP association to store images.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Patient Root Query / Retrieve MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Study Root Query / Retrieve MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Study Only Query / Retrieve MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Root Query / Retrieve GET	1.2.840.10008.5.1.4.1.2.1.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Study Root Query / Retrieve GET	1.2.840.10008.5.1.4.1.2.2.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Study Only Query / Retrieve GET	1.2.840.10008.5.1.4.1.2.3.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP

Table 11. Presentation contexts to receive images.

SOP Specific Conformance

The DCV AE provides standard conformance to the DICOM 3.0 Image Service Classes.

Communication Profiles

Supported Communication Stacks

The DCV AE provides TCP/IP Network Communication Support in accordance with the DICOM 3.0 standard.

OSI / Point-to-Point Stack

Not supported.

TCP / IP Stack

The TCP/IP stack is inherited from the underlying operating system on which the software runs.

Physical Media Support

DCV AE is indifferent to the physical medium over which TCP/IP executes.

Extensions / Specializations / Privatizations

Not applicable.

Configurable Parameters

- Any number of server definitions may be defined (AE title, IP address, and port).
- Local Application Entity title and port may be specified per server definition.
- Encryption requirements may be specified per server definition.
- Modality mapping may be specified per server definition. For example if a server supports "Digital X-ray Image Storage For Presentation" (1.2.840.10008.5.1.4.1.1.1.1) but not "Digital X-ray Image Storage For Processing" (1.2.840.10008.5.1.4.1.1.1.1) the application can be set to automatically convert 1.2.840.10008.5.1.4.1.1.1.1 to 1.2.840.10008.5.1.4.1.1.1.1 when submitting them to that particular server.
- Automatic association of institution information when forwarding images to a server (with overwrite settings).
- Automatic conversion of dental modalities (i.e. IO, PX and DX) to CR modality.
- Specification of restriction of image routing based on image information. Images can be prevented from being forwarded to a server if they contain certain content.
- Tag blocking may be specified per server definition. In other words, if a server cannot support a certain tag, the application can be set to automatically remove the tag before the image is submitted to that particular server.
- Mandatory tags may be specified before an image is submitted to a particular server. In other words, if an image does not contain mandatory information, it will be submitted for data correction.
- Custom name formats may be specified per server definition. In other words, if a server saves a name in the format "Lastname, Firstname", the application will automatically convert between that format and the standard format of "Lastname^Firstname" when storing and retrieving information to and from that particular server.
- Automatic storage commitment may be enabled or disabled.
- Data requirements and specification. For any particular server, the following may be specified: transfer syntax (LE or BE); value representation (explicit or implicit); group lengths (present or absent); length encoding; compression (none, lossless JPEG 200 or JPEG); remove empty elements.

Support of Extended Character Sets

The DCV AE supports the ISO-IR 100 Latin 1 character set as well as the default ISO-IR 6 character set.

8. DM AE SPECIFICATIONS

The DM AE provides standard conformance to the following DICOM 3.0 Standard SOP classes as an SCP.

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Storage Commitment Push Model	1.2.840.10008.1.20.1
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
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
Digital Intra Oral X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7
X-ray Angiographic Image Storage	1.2.840.10008.5.1.5.1.1.12.1
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Radiotherapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31
Patient Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.1.3
Patient Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.2.3
Study Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient Study Only Root Query/Retrieve – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Study Only Root Query/Retrieve – GET	1.2.840.10008.5.1.4.1.2.3.3
Patient Study Only Root Query/Retrieve – MOVE	1.2.840.10008.5.1.4.1.2.3.2

Table 12. SOP classes supported as SCP.

The DM AE provides standard conformance to the following DICOM 3.0 standard SOP classes as an SCU:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Table 13. SOP classes supported as SCU.

Association Establishment Policies

General

The DM AE establishes associations using the DICOM 3.0 standard application context. The maximum PDU size the DM AE will negotiate is 256 kilobytes.

Number of Associations

The DM AE will open one association at a time. Multiple simultaneous associations are not supported. If more destinations are requested, the requests are queued.

Asynchronous Nature

Asynchronous mode of operation is not supported.

Implementation Identifying Information

The Implementation Class Unique Identifier (UID) for the DM AE is: 1.2.840.114384.

Association Acceptance Policy by Real-world Activities

Real-world Activity: Response Modality Worklist

Associated Real-world Activity

The DM AE responds to an association from the SCU requesting the modality worklist query.

Proposed Presentation Contexts

Name	Abstract Syntax	Transfer Syntax	Role
	UID	Name / UID	
Basic Worklist	1.2.840.10008.5.1.4.31	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP

Table 14. Presentation contexts to worklist.

SOP Specific Conformance

The DM AE provides standard conformance to the DICOM 3.0 Modality Worklist Service Classes. All DICOM 3.0 required and unique keys are supported. Any attribute cataloged in the database may be used as a matching or retrieval key. All range, wildcard, UID list, sequence and multiple value matching is implemented per the DICOM 3.0 standard.

Real-world Activity: Response Query / Retrieve

Associated Real-world Activity

The DM AE responds to an association from the SCU to send and receive query requests.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Patient Root Query / Retrieve FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Study Root Query / Retrieve FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Study Only Query / Retrieve FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP

Table 15. Presentation contexts to Query / Retrieve.

Specific Conformance

The DM AE provides standard conformance to the DICOM 3.0 Query/Retrieve Service Classes. All DICOM 3.0 required and unique keys are supported. Any attribute cataloged in the database may be used as a matching or retrieval key. All range, wildcard, UID list, sequence and multiple value matching is implemented per the DICOM 3.0 standard.

Real-world Activity: Response for Storing Images

Associated Real-world Activity

The DM AE responds to an association from the SCU to receive and store images.

Proposed Presentation Contexts

While the DICOM implementation is designed to support a wide range of DICOM SOP Classes, the primary focus of these applications is in supporting the following DICOM SOP Classes. Other presentation contexts are supported than those in the following table.

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Digital X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Digital X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Digital Mammography X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Digital Mammography X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Digital Intra Oral X-ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Digital Intra Oral X-ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Secondary Capture Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
X-ray Angiographic Image Storage	1.2.840.10008.5.1.5.1.1.12.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
X-Ray Radio Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP
Radio-therapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2 JPEG Baseline / 1.2.840.10008.1.2.4.50 JPEG 2000 / 1.2.840.10008.1.2.4.91 JPEG 2000 Losses Only / 1.2.840.10008.1.2.4.90 RLE Losses / 1.2.840.10008.1.2.5	SCP

Table 16. Presentation contexts to store images.

SOP Specific Conformance

The DM AE provides standard conformance to the DICOM 3.0 Storage Service Classes.

Real-world Activity: Response for Verification

Associated Real-world Activity

The DM AE responds to an association from the SCU to verify the current DICOM association.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Verification	1.2.840.10008.1.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP

Table 17. Presentation contexts to verify DICOM association.

SOP Specific Conformance

The DM AE provides standard conformance to the DICOM 3.0 Verification Service Classes.

Real-world Activity: Response for Storage Commitment

Associated Real-world Activity

The DM AE responds to an association from the SCU to query the status of an image's storage commitment.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Storage Commitment Push Model Class	1.2.840.10008.1.20.1	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP

Table 18. Presentation contexts for storage commitment.

SOP Specific Conformance

The DM AE provides standard conformance to the DICOM 3.0 Print Service Classes.

Real-world Activity: Response to Store Images Request

Associated Real-world Activity

The DM AE responds to an association from the SCU association to store images.

Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax	Role
Name	UID	Name / UID	
Patient Root Query / Retrieve MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Study Root Query / Retrieve MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Study Only Query / Retrieve MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Root Query / Retrieve GET	1.2.840.10008.5.1.4.1.2.1.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Study Root Query / Retrieve GET	1.2.840.10008.5.1.4.1.2.2.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP
Patient Study Only Query / Retrieve GET	1.2.840.10008.5.1.4.1.2.3.3	Implicit VR LE / 1.2.840.10008.1.2 Explicit VR LE / 1.2.840.10008.1.2.1 Explicit VR BE / 1.2.840.10008.1.2.2	SCP

Table 19. Presentation contexts to receive images.

SOP Specific Conformance

The DM AE provides standard conformance to the DICOM 3.0 Image Service Classes.

Communication Profiles

Supported Communication Stacks

The DM AE provides TCP/IP Network Communication Support in accordance with the DICOM 3.0 standard.

OSI / Point-to-Point Stack

Not supported.

TCP / IP Stack

The TCP/IP stack is inherited from the underlying operating system on which the software runs.

Physical Media Support

DM AE is indifferent to the physical medium over which TCP/IP executes.

Extensions / Specializations / Privatizations

Not applicable.

Configurable Parameters

Server DICOM Options

- Multiple IP address and ports can be specified.
- Server's AE title can be specified.
- Maximum number of connections can be specified.
- Encryption requirements may be specified.
- Data anonymization can be enabled.
- Multiple accepted clients can be defined. The server supports several types of definitions: anonymous (no specific IP address is required and any Client AE title can be specified); general IP (IP address is required but any Client AE title can be specified); general AE (no specific IP address is required but a specified Client AE title is required); definitive (both a specific IP and Client AE title is required). Each accepted client can further have limits on the types of operations that can be performed when using the accepted client connection (i.e. echoing, storing images, querying images and retrieving images).

Image Forwarding Options

- Any number of server definitions may be defined (AE title, IP address, and port).
- Encryption requirements may be specified per server definition.
- Local Application Entity title and port may be specified per server definition.
- Modality mapping may be specified per server definition. For example if a server supports "Digital X-ray Image Storage For Presentation" (1.2.840.10008.5.1.4.1.1.1.1) but not "Digital X-ray Image Storage For Processing" (1.2.840.10008.5.1.4.1.1.1.1.1) the application can be set to automatically convert 1.2.840.10008.5.1.4.1.1.1.1 to 1.2.840.10008.5.1.4.1.1.1.1.1 when submitting them to that particular server.
- Automatic association of institution information when forwarding images to a server (with overwrite settings).
- Automatic conversion of dental modalities (i.e. IO, PX and DX) to CR modality.
- Specification of restriction of image routing based on image information. Images can be prevented from being forwarded to a server if they contain certain content.
- Tag blocking may be specified per server definition. In other words, if a server cannot support a certain tag, the application can be set to automatically remove the tag before the image is submitted to that particular server.
- Mandatory tags may be specified before an image is submitted to a particular server. In other words, if an image does not contain mandatory information, it will be submitted for data correction.
- Custom name formats may be specified per server definition. In other words, if a server saves a name in the format "Lastname, Firstname", the application will automatically convert between that format and the standard format of "Lastname^Firstname" when storing and retrieving information to and from that particular server.
- Automatic storage commitment may be enabled or disabled.
- Data requirements and specification. For any particular server, the following may be specified: transfer syntax (LE or BE); value representation (explicit or implicit); group lengths (present or absent); length encoding; compression (none, lossless JPEG 200 or JPEG); remove empty elements.

Support of Extended Character Sets

The DM AE supports the ISO-IR 100 Latin 1 character set as well as the default ISO-IR 6 character set.