



BRIT Systems

DICOM Conformance Statement

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DICOM Conformance Statement

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Table of Contents

- 1 INTRODUCTION..... 1
- 2 IMPLEMENTATION MODEL..... 1
 - 2.1 IMPLEMENTATION MODEL..... 1
 - 2.1.1 Application Data Flow Diagram 1
 - 2.1.2 Functional Definition of Application Entities..... 2
 - 2.1.3 Sequencing of Real-World Activities 2
- 3 AE SPECIFICATIONS 3
 - 3.1 AE SPECIFICATIONS 3
 - 3.2 AE ARCHIVE – SPECIFICATION 3
 - 3.2.1.1 Association Establishment Policies 6
 - 3.2.1.1.1 General 6
 - 3.2.1.1.2 Number of Associations 6
 - 3.2.1.1.3 Asynchronous Nature..... 6
 - 3.2.1.1.4 Implementation Identifying Information 6
 - 3.2.1.2 Association Initiation Policy 6
 - 3.2.1.2.1 Real-World Activity – Move Request from an External Node 6
 - 3.2.1.2.1.1 Associated Real-World Activity – Move Request from an External Node 6
 - 3.2.1.3 Real-World Activity – Storage..... 7
 - 3.2.1.3.1 Real-World Activity – Storage 7
 - 3.2.1.3.1.1 Associated Real-World Activity 7
 - 3.2.1.3.1.2 Presentation Context Table 7
 - 3.2.1.3.1.2.1 SOP Specific Conformance for SOP Class Storage 9
 - 3.2.1.3.1.2.1.1 Presentation Context Acceptance Criteria 10
 - 3.2.1.3.1.3 Presentation Context Acceptance Criteria 10
 - 3.2.1.3.2 SOP Specific Conformance for SOP Class Query/Retrieve 10
 - 3.2.1.3.2.1 SOP Specific Conformance for SOP Class Query/Retrieve..... 10
 - 3.2.1.3.3 Real World Activity – Verification 13
 - 3.2.1.3.3.1 Associated Real World Activity – Verification..... 14
 - 3.2.1.3.3.2 Presentation Context Table 14
 - 3.2.1.3.3.2.1 SOP Specific Conformance for SOP Class Verification 14
 - 3.2.1.3.3.2.1.1 Presentation Context Acceptance Criterion 14
 - 3.2.1.3.4 Transfer Syntax Selection Policies..... 14
 - 3.2.1.3.4.1 Associated Real-world Activity – Detached Study 14
 - 3.2.1.3.4.2 Attribute Table 14
 - 3.2.1.3.5 Associated Real-world Activity – Storage Commitment 15
 - 3.2.1.3.6 Real World Activity – Performed Procedure Step..... 16
 - 3.2.1.3.6.1 Associated Real World Activity – Performed Procedure Step..... 16
 - 3.2.1.3.6.2 Presentation Context Table 16
 - 3.2.1.3.7 Real World Activity – Instance Availability Notification 16
 - 3.2.1.3.7.1 Associated Real World Activity – Instance Availability Notification 17
 - 3.2.1.3.7.2 Presentation Context Table 17
- 4 COMMUNICATION PROFILES..... 17
 - 4.1 TCP/IP STACK..... 17
 - 4.1.1 TCP/IP API..... 17
 - 4.1.2 Physical Media Support 17
- 5 EXTENSIONS/SPECIALIZATIONS/ PRIVATIZATIONS 18
 - 5.1 EXTENSIONS/SPECIALIZATION/PRIVATIZATIONS..... 18
- 6 CONFIGURATION 18
 - 6.1 CONFIGURATION 18
 - 6.2 AE TITLE/PRESENTATION ADDRESS MAPPING 18



DICOM Conformance Statement

6.3	SECURITY FEATURES	18
6.4	CONFIGURABLE PARAMETERS.....	18
6.5	SUPPORT OF EXTENDED CHARACTER SETS.....	18



1 Introduction

The BRIT Systems Roentgen Files is a fully integrated system that provides the tools necessary to implement a filmless radiology department. The Archive is the component of the Roentgen Files that manages the long term storage of images. Depending on the customer need, the Archive can be configured to include Disk Arrays, Tape Drives, CD-ROM writer, and Jukeboxes. The Archive manages archival and retrieval of data between the various storage devices. The Archive also manages conversion of data format for images stored in the Archive (ex. convert DICOM to JPEG).

The Archive uses DICOM as an interface to the external world. The Archive accepts DICOM association requests for the purpose of storing images and for image query and retrieve. The Archive will initiate DICOM association requests for the purpose of sending images to an external server. The Archive also responds to requests via the World Wide Web (www). BRIT Systems also offers diagnostic quality viewing stations that can communicate with the Archive via a proprietary interface.

2 Implementation Model

The following section identifies the implementation model.

2.1 Implementation Model

The Archive provides for storage and query/retrieval of images. It runs on a UNIX system as a set of background processes that accepts association requests from external applications. For each association request, the Archive may fork a copy of itself so that the copy communicates exclusively with the requesting application. The Archive may listen on multiple ports with different parameters and authorization for each. The Archive will initiate a DICOM association in response to a move request from an external application.

Multiple separate instances of the Archive can execute on a single host system, and in some cases share resources. This may be useful for separating images from different groups, like clinical versus research. Access control lists and configuration files are applied to each instance separately.

Management of the Archive is performed via a www interface.

2.1.1 Application Data Flow Diagram

Figure 1 shows the relationship of the Archive to external applications. Other functions, like space management, pre-fetching, worklist generation, etc., are performed by the Archive automatically or via an explicit external request.

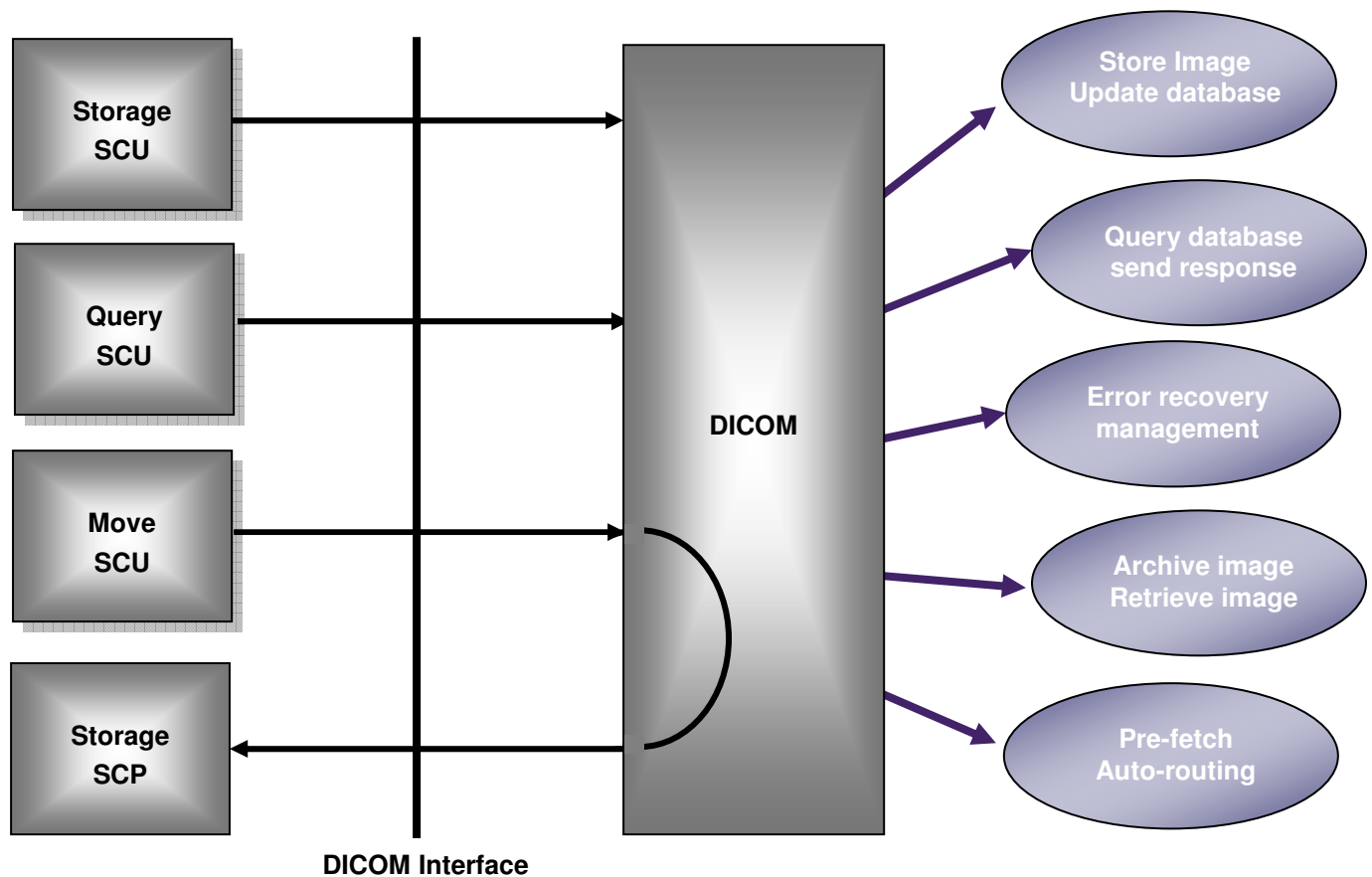


Figure 1 - The Archive Implementation Model

2.1.2 Functional Definition of Application Entities

The Archive waits for another application to connect on one or more TCP/IP ports specified upon system startup. When another application makes a DICOM application request, the Archive uses a control database and logic to verify the request.

1. The Archive uses a control table to verify that the Called Application Title used in the association request is defined on the node (UNIX host-name) upon which the Archive is running.
2. The Archive uses a control table to lookup the application defined by the Calling Application Title in the association request. The Archive verifies that the node from which the call originated matches the value stored in the control table.
3. The Archive verifies that the calling application has access rights for the SOP classes proposed (write access for storage, read access for query retrieve).

2.1.3 Sequencing of Real-World Activities

The Archive has no way of knowing when it has a complete study or what constitutes a complete study. If it receives an image query while also receiving storage requests, the query response may not include all of the images that are in the study.



3 AE Specifications

The following describes the AE specifications.

3.1 AE Specifications

The Archive may invoke multiple server processes on a single machine and the instances may operate simultaneously. Each process is not restricted to using the same Application Entity Title.

3.2 AE Archive – Specification

The Archive provides Standard Conformance to the following DICOM 3.0 SOP Classes as a Storage Class User (SCU):

Table 1 - SOP Classes Supported by Archive as an SCU

SOP Class Name	SOP Class UM
CR (Computed Radiography) Image Information Object Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multi-Frame Image Storage 1993	1.2.840.10008.5.1.4.1.1.3
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage	1.2.840.10008.5.1.4.1.1.5
US Image Storage 1993	1.2.840.10008.5.1.4.1.1.6
US Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6.1
SC (Secondary Capture) Image Storage	1.2.840.10008.5.1.4.1.1.7
Verification	1.2.840.10008.1.1
Stand Alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Stand Alone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1
SECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
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	1.2.840.10008.5.1.4.1.1.12.3
LUT	1.2.840.10008.5.1.4.1.1.10
LUT	1.2.840.10008.5.1.4.1.1.11
NM	1.2.840.10008.5.1.4.1.1.20
PET	1.2.840.10008.5.1.4.1.1.128
PET	1.2.840.10008.5.1.4.1.1.129



DICOM Conformance Statement

SOP Class Name	SOP Class UM
VL	1.2.840.10008.5.1.4.1.1.77.1.1
VL	1.2.840.10008.5.1.4.1.1.77.1.2
VL	1.2.840.10008.5.1.4.1.1.77.1.3
VL	1.2.840.10008.5.1.4.1.1.77.1.4
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Mammo	1.2.840.10008.5.1.4.1.1.3.
RT	1.2.840.10008.5.1.4.1.1.481.1
RT	1.2.840.10008.5.1.4.1.1.481.2
RT	1.2.840.10008.5.1.4.1.1.481.3
RT	1.2.840.10008.5.1.4.1.1.481.5
Structured Report	1.2.840.10008.5.1.4.1.1.88.11
Structured Report	1.2.840.10008.5.1.4.1.1.88.22
Structured Report	1.2.840.10008.5.1.4.1.1.88.33
Greyscale Presentation State	1.2.840.10008.5.1.4.1.1.11.1
Storage Commitment Push Model	1.2.840.10008.5.1.20.1.1

The Archive provides Standard Conformance to the following DICOM 3.0 SOP Classes as a Storage Class Provider (SCP).

Table 2 - SOP Classes Supported by Archive as an SCP

SOP Class Name	SOP Class UM
Verification SOP Class	1.2.840.10008.1.1
CR (Computed Radiography) Image Information Object Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multi-Frame Image Storage 1993	1.2.840.10008.5.1.4.1.1.3
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage	1.2.840.10008.5.1.4.1.1.5
US Image Storage 1993	1.2.840.10008.5.1.4.1.1.6
US Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6.1
SC (Secondary Capture) Image Storage	1.2.840.10008.5.1.4.1.1.7



DICOM Conformance Statement

SOP Class Name	SOP Class UM
Stand Alone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Stand Alone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1
SECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
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	1.2.840.10008.5.1.4.1.1.12.3
LUT	1.2.840.10008.5.1.4.1.1.10
LUT	1.2.840.10008.5.1.4.1.1.11
NM	1.2.840.10008.5.1.4.1.1.20
PET	1.2.840.10008.5.1.4.1.1.128
PET	1.2.840.10008.5.1.4.1.1.129
VL	1.2.840.10008.5.1.4.1.1.77.1.1
VL	1.2.840.10008.5.1.4.1.1.77.1.2
VL	1.2.840.10008.5.1.4.1.1.77.1.3
VL	1.2.840.10008.5.1.4.1.1.77.1.4
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.3.
RT	1.2.840.10008.5.1.4.1.1.481.1
RT	1.2.840.10008.5.1.4.1.1.481.2
RT	1.2.840.10008.5.1.4.1.1.481.3
RT	1.2.840.10008.5.1.4.1.1.481.5
Structured Report	1.2.840.10008.5.1.4.1.1.88.11
Structured Report	1.2.840.10008.5.1.4.1.1.88.22
Structured Report	1.2.840.10008.5.1.4.1.1.88.33
Greyscale Presentation State	1.2.840.10008.5.1.4.1.1.1.11.1
Storage Commitment Push Model	1.2.840.10008.5.1.20.1.1
Patient Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Patient Root Query/Retrieve Model – GET	1.2.840.10008.5.1.4.1.2.1.3
Study Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Study Root Query/Retrieve Model – GET	1.2.840.10008.5.1.4.1.2.2.3



SOP Class Name	SOP Class UM
Patient/Study Root Q/R Model – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Root Q/R Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2
Patient/Study Root Q/R Model – GET	1.2.840.10008.5.1.4.1.2.3.3
Modality Worklist Model – FIND	1.2.840.10008.5.1.4.31

3.2.1.1 Association Establishment Policies

3.2.1.1.1 General

The Archive will attempt to initiate associations in response to C-MOVE requests from other Application Entities. The Archive will only initiate associations in response to valid C-MOVE requests for images that are known to the server (stored in the database). Images will be automatically retrieved from other media if necessary.

The maximum PDU size that can be transmitted by the Archive is fixed at 128KB. The default maximum PDU size that can be received by the Archive is configurable with a maximum value of 128KB.

3.2.1.1.2 Number of Associations

The number of simultaneous associations that will be accepted by the Archive is limited by a configuration parameter. Once this limit is reached, incoming association requests will hang until a thread becomes available.

3.2.1.1.3 Asynchronous Nature

The Archive does not support asynchronous operations and will not perform asynchronous window negotiation.

3.2.1.1.4 Implementation Identifying Information

The Archive will provide an implementation class UID of 1.2.840.113797.2.1.

The Archive will provide an implementation version name of BRITMODDOCT96.

3.2.1.2 Association Initiation Policy

The Archive attempts to initiate one association in response to each C-MOVE command it receives from an external node. The Archive attempts a single type of association request.

3.2.1.2.1 Real-World Activity – Move Request from an External Node

The Archive accepts associations from nodes that are to request C-MOVE operations.

3.2.1.2.1.1 Associated Real-World Activity – Move Request from an External Node



In response to a C-MOVE request, the archive will attempt to negotiate an association with a third node, as specified by the C-MOVE request. If the association is successful, the Archive will attempt to C-STORE the related objects. Compression or decompression may occur as needed.

3.2.1.3 Real-World Activity – Storage

3.2.1.3.1 Real-World Activity – Storage

The Archive accepts associations from nodes that are to store images using the C-STORE command.

3.2.1.3.1.1 Associated Real-World Activity

The associated Real-World activity associated with the C-STORE operation is the storage of the image on the disk of the system upon which the Archive is running. Images are stored by writing the data set of the C-STORE command directly to disk. After the image is stored to disk, the Archive updates an image database with patient, study, series, and image information; this image database can be used by the Archive for query/retrieve operations.

The Archive will issue a failure status if it is unable to store the image on disk, if the images do not conform to the IOD of the SOP class under which it was transmitted, or if the Archive is not able to successfully update its image database.

3.2.1.3.1.2 Presentation Context Table

Any of the Presentation Contexts shown in Table 4 are acceptable to the Archive for receiving images.

Table 3 - Acceptable Presentation Contexts for the Archive

Abstract Syntax		Transfer Syntax		Role
Name	UID			
Computed Radiography Image	1.2.840.10008.5.1.4.1.1	ILE	ELE	SCP
		EBE	JPEG	
CT Image	1.2.840.10008.5.1.4.1.1.2	ILE	ELE	SCP
		EBE	JPEG	
US Multi-Frame Image Storage 1993	1.2.840.10008.5.1.4.1.1.3	ILE	ELE	SCP
		EBE	JPEG	
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	ILE	ELE	SCP
		EBE	JPEG	
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	ILE	ELE	SCP
		EBE	JPEG	
NM Image Storage	1.2.840.10008.5.1.4.1.1.5	ILE	ELE	SCP
		EBE	JPEG	
US Image 1993	1.2.840.10008.5.1.4.1.1.6	ILE	ELE	SCP
		EBE	JPEG	
US Image	1.2.840.10008.5.1.4.1.1.6.1	ILE	ELE	SCP
		EBE	JPEG	



DICOM Conformance Statement

Abstract Syntax		Transfer Syntax			Role
Name	UID				
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	ILE EBE	ELE JPEG		SCP
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	ILE EBE	ELE JPEG		SCP
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	ILE EBE	ELE JPEG		SCP
Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1	ILE EBE	ELE JPEG		SCP
SECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	ILE EBE	ELE JPEG		SCP
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	ILE EBE	ELE JPEG		SCP
X-Ray RadiofluoroScopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	ILE EBE	ELE JPEG		SCP
X-Ray Angiographic Bi-Plane Image Storage	1.2.840.10008.5.1.4.1.1.12.3	ILE EBE	ELE JPEG		SCP
LUT	1.2.840.10008.5.1.4.1.1.10	ILE	ELE EBE		SCP
LUT	1.2.840.10008.5.1.4.1.1.11	ILE	ELE EBE		SCP
NM	1.2.840.10008.5.1.4.1.1.20	ILE EBE	ELE JPEG		SCP
PET	1.2.840.10008.5.1.4.1.1.128	ILE EBE	ELE JPEG		SCP
PET	1.2.840.10008.5.1.4.1.1.129	ILE EBE	ELE JPEG		SCP
VL	1.2.840.10008.5.1.4.1.1.77.1.1	ILE EBE	ELE JPEG		SCP
VL	1.2.840.10008.5.1.4.1.1.77.1.2	ILE EBE	ELE JPEG		SCP
VL	1.2.840.10008.5.1.4.1.1.77.1.3	ILE EBE	ELE JPEG		SCP
VL	1.2.840.10008.5.1.4.1.1.77.1.4	ILE EBE	ELE JPEG		SCP
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.1	ILE EBE	ELE JPEG		SCP
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.1.1	ILE EBE	ELE JPEG		SCP
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.2	ILE EBE	ELE JPEG		SCP
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.2.1	ILE	ELE		SCP



DICOM Conformance Statement

Abstract Syntax		Transfer Syntax			Role
Name	UID				
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.3	EBE	JPEG		
		ILE	ELE		SCP
		EBE	JPEG		
Digital Mammo	1.2.840.10008.5.1.4.1.1.1.3.1	ILE	ELE		SCP
		EBE	JPEG		
RT	1.2.840.10008.5.1.4.1.1.481.1	ILE	ELE		SCP
		EBE	JPEG		
RT	1.2.840.10008.5.1.4.1.1.481.2	ILE	ELE		SCP
		EBE	JPEG		
RT	1.2.840.10008.5.1.4.1.1.481.3	ILE	ELE		SCP
		EBE	JPEG		
RT	1.2.840.10008.5.1.4.1.1.481.5	ILE	ELE		SCP
		EBE	JPEG		
Structured Report	1.2.840.10008.5.1.4.1.1.88.11	ILE	ELE	EBE	SCP
Structured Report	1.2.840.10008.5.1.4.1.1.88.22	ILE	ELE	EBE	SCP
Structured Report	1.2.840.10008.5.1.4.1.1.88.33	ILE	ELE	EBE	SCP
Greyscale Presentation State	1.2.840.10008.5.1.4.1.1.11.1	ILE	ELE	EBE	SCP

ILE = Implicit Little Endian = 1.2.840.10008.1.2

ELE = Explicit Little Endian = 1.2.840.10008.1.2.1

EBE = Explicit Big Endian = 1.2.840.10008.1.2.2

JPEG = Lossy and Lossless, 8 and 12-16 bit,

DICOM compression = 1.2.840.10008.1.2.840.100081.2.4.5.1 and 1.2.840.10008.1.2.4.70

The Archive will attempt to generate Explicit images from those received implicitly and will provide "Unknown" as the attribute type if the elements were not known to the Archive. An external dictionary can be updated to add additional private elements.

Any additional SOP Classes can be added to the archive by editing a configuration file.

3.2.1.3.1.2.1 SOP Specific Conformance for SOP Class Storage

An Archive implements Level 2 (Full) Conformance for the Storage SOP Class.

The following attributes are modified by converting all characters to upper case before data is stored in the image database. The image files themselves are not modified.

1. Patient Name
2. Patient ID
3. Accession Number
4. Study ID

Before accepting the image, the Archive will test validity of the Patient Name, Patient ID, Study Instance UID, Series Instance UID, and SOP Instance UID against the values already in the database. If a conflict



DICOM Conformance Statement

is detected, the image may be rejected. Specific details will be included in the DICOM Attribute Error Comment (0x00000902).

In the event that an image is successfully stored by the Archive, it may be accessed by requesting associations with the Archive and performing query/retrieve operations.

The Archive stores images for a configurable period.

The Archive returns the following status values in response to a C-STORE request:

0000H	Image successfully stored
A700H	Refused – out of resources (unable to create local file, or other failure)
A900H	Error – data set does not match SOP Class
C000H	Error – cannot understand

In the case of an error storing an image, notification via e-mail or other mechanism can be performed based on configured setting.

3.2.1.3.1.3 Presentation Context Acceptance Criteria

The Archive will accept any number of storage SOP classes that are listed in Table 4 above, provided that the requesting application is known to the Archive and has been enabled to store images on the Archive (via a configuration step). The Archive defines no limit on the number of presentation contexts accepted. In the event that the Archive runs out of resources when trying to accept multiple presentation contexts, the Archive will reject the association request.

Note: Modality Worklist PUSH model can be made available upon request.

3.2.1.3.2 SOP Specific Conformance for SOP Class Query/Retrieve

3.2.1.3.2.1 SOP Specific Conformance for SOP Class Query/Retrieve

The Archive does not support relational searches. Table 6 below indicates which keys are supported by the Archive for the patient root information model. The Archive also supports the patient/study only information model. The keys supported for that model are the same keys found in Table 6 with a level of “Patient” or “Study”. Table 7 indicates which keys are supported by the Archive for the study root information model. These tables include the optional and required keys that are supported. Optional keys are supported like required keys. The Archive does not support relational queries.

Table 4 - Keys Supported for Patient Root Information Model

Level	Description	Tag	Type
Patient	Patient Name	00100010	R
Patient	Patient ID	00100020	U
Patient	Patient Birth Date	00100030	O
Patient	Patient Birth Time	00100032	O
Patient	Patient Sex	00100040	O
Patient	Number of Patient Related Studies	00201200	O



DICOM Conformance Statement

Level	Description	Tag	Type
Patient	Number of Patient Related Series	00201202	O
Patient	Number of Patient Related Images	00201204	O
Patient	Current Patient Location	00380300	O

Level	Description	Tag	Type
Study	Study Date	00080020	R
Study	Study Time	00080030	R
Study	Accession Number	00800050	R
Study	Study ID	00200010	R
Study	Study Instance UID	00200000	U
Study	Referring Physician Name	00080090	O
Study	Study Description	00081030	O
Study	Patient's Age	00101010	O
Study	Patient's Weight	00101030	O
Study	Patient's Size	00101020	O
Study	Number of Study Related Series	00201206	O
Study	Number of Study Related Images	00201208	O
Study	Study Status ID	0032000A	O
Study	Body Part Examined	00180015	O
Study	Modalities in Study	00080061	O
Study	Modality	00080060	O

Level	Description	Tag	Type
Series	Modality	00080060	R
Series	Series Number	00200011	R
Series	Series Instance UID	0020000E	U
Series	Series Description	0008103E	O
Series	Number of Series Related Images	00201209	O
Series	View Position	00185101	O
Series	Body Part Examined	00180015	O



DICOM Conformance Statement

Level	Description	Tag	Type
Image	Image Number	00200013	R
Image	SOP Instance UID	00080018	U
Image	SOP Class UID	00080016	O
Image	Samples per Pixel	00280002	O
Image	Rows	00280010	O
Image	Columns	00280011	O
Image	Bits Allocated	00280100	O
Image	Bits Stored	00280101	O
Image	Image Location	00280020	O
Image	Patient Orientation	00200020	O
Image	Photometric Interpretation	00280004	O
Image	Pixel Representation	00280103	O

Table 5 - Keys Supported for Study Root Information Model

Level	Description	Tag	Type
Study	Study Date	00080020	R
Study	Study Time	00080030	R
Study	Accession Number	00080050	R
Study	Patient Name	00100010	R
Study	Patient ID	00100020	R
Study	Study ID	00200010	R
Study	Study Instance UID	0020000D	U
Study	Referring Physician Name	00080090	O
Study	Study Description	00081030	O
Study	Patient Birth Date	00100030	O
Study	Patient Birth Time	00100032	O
Study	Patient Sex	00100040	O
Study	Patient's Age	00101010	O
Study	Patient's Size	00101020	O
Study	Number of Patient Related Studies	00201200	O
Study	Number of Patient Related Series	00201202	O
Study	Number of Patient Related Images	00201204	O
Study	Current Patient Location	00380300	O
Study	Number of Study Related Series	00201206	O



DICOM Conformance Statement

Level	Description	Tag	Type
Study	Number of Study Related Images	00201028	O
Study	Study Status ID	0032000A	O
Study	Body Part Examined	00180015	O
Study	Modalities in Study	00080061	O
Study	Modality	00080060	O
Study	Patient's Weight	00101030	O

Level	Description	Tag	Type
Series	Modality	00080060	R
Series	Series Description	0008103E	O
Series	Series Number	00200011	R
Series	Number of Series Related Images	00201209	O
Series	View Position	00185101	O
Series	Series Instance UID	0020000E	U
Series	Body Part Examined	00180015	O

Level	Description	Tag	Type
Image	Image Number	00200013	R
Image	SOP Instance UID	00080018	U
Image	SOP Class UID	00080016	O
Image	Samples per Pixel	00280002	O
Image	Rows	00280010	O
Image	Columns	00280011	O
Image	Bits Allocated	00280100	O
Image	Image Location	00280020	O
Image	Patient Orientation	00200020	O
Image	Photometric Interpretation	00280004	O
Image	Bits Stored	00280101	O
Image	Pixel Representation	00280103	O

3.2.1.3.3 Real World Activity – Verification

The Archive accepts associations from nodes that are to perform a verification operation on the Archive.



3.2.1.3.3.1 Associated Real World Activity – Verification

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

3.2.1.3.3.2 Presentation Context Table

Table 8 shows the Presentation Contexts that may be accepted by the Archive for verification operations.

Table 6 - Acceptable Presentation Contexts for the Archive for Verification

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

3.2.1.3.3.2.1 SOP Specific Conformance for SOP Class Verification

3.2.1.3.3.3 Presentation Context Acceptance Criterion

The Archive will accept any number of verification SOP classes that are listed in Table 8 above, provided that the requesting application is known to the Archive (via a configuration step). The Archive defines no limit on the number of presentation contexts accepted. In the event that the Archive runs out of resources when trying multiple presentation contexts, the Archive will reject the association request.

The Archive does not check for duplicate presentation contexts and will accept duplicate presentation contexts.

3.2.1.3.4 Transfer Syntax Selection Policies

The Archive supports multiple transfer syntaxes. If the first proposed transfer syntax is supported by the Archive, it will be accepted. If not, the Implicit VR Little Endian transfer syntax will be chosen.

3.2.1.3.4.1 Associated Real-world Activity – Detached Study

The real-world activity associated with the Detached Study Management Set/Get is that an external node wishes to update values at the study level. Examples would be to set the Status to READ or to correct an incorrect Accession Number. The Patient ID cannot be changed, nor can a study be moved from one patient to another.

3.2.1.3.4.2 Attribute Table

Table 9 shows the attributes that can be obtained/alterd by Detached Study Management.

Table 7 - Detached Study Management Get/Set Attributes

Description	Tag	Type
Study Date	00080020	O
Study Time	00080030	O
Accession Number	00080050	O
Patient ID	00100020	O (Get Only)
Study ID	00200010	O
Study Instance UID	0020000D	U
Referring Physician Name	00800090	O
Study Description	00081030	O
Patient Birth Time	00100032	O
Patient Sex	00100040	O
Patient's Age	00101010	O
Patient's Size	00101020	O
Number of Patient Related Studies	00201200	O
Number of Patient Related Series	00201202	O
Number of Patient Related Images	00201204	O
Current Patient Location	00380300	O
Number of Study Related Series	00201206	O
Number of Study Related Images	00201208	O
Study Status ID	0032000A	O
Body Part Examined	00180015	O
Modalities in Study	00080061	O
Modality	00080060	O
Patient's Weight	00101030	O

3.2.1.3.5 Associated Real-world Activity – Storage Commitment

The real-world activity associated with Storage Commitment is that an external node wishes to request that the archive commit images/studies to long term storage. At the completion of the commitment operation, the archive will contact the external node using a separate association and send a storage commitment N-Event report to inform the external node that images/studies have been committed.

The PUSH model is supported.



3.2.1.3.6 Real World Activity – Performed Procedure Step

The Archive accepts associations from nodes that are to perform Performed Procedure Step operations and forwards these transactions to nodes that act as IHE Order Fillers.

3.2.1.3.6.1 Associated Real World Activity – Performed Procedure Step

The real-world activity associated with the Modality Performed Procedure Step is as follows:

Upon receipt of a N-CREATE of an MPPS object, the Archive will store an object and forward this object to any Application Entities that are specified as OrderFillers using an N-EVENTREPORT.

Later, the MPPS object can be update using the N-SET command. The values specified in the N-SET will be merged into the MPPS object and it will be forwarded to all OrderFillers using an N-EVENTREPORT.

3.2.1.3.6.2 Presentation Context Table

Table 8 shows the Presentation Contexts that may be accepted by the Archive for verification operations.

Table 9 - Acceptable Presentation Contexts for the Archive for MPPS CREATE and SET

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
MPPS N-SET N-CREATE	1.2.840.10008.3.1.2.3.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 10 - Acceptable Presentation Contexts for the Archive for MPPS N-Event Report

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
MPPS N-EVENT REPORT	1.2.840.10008.3.1.2.3.5	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.2.1.3.7 Real World Activity – Instance Availability Notification

The Archive sends Instance Availability Notification messages when Images for know Performed Procedure Steps arrive.



3.2.1.3.7.1 Associated Real World Activity – Instance Availability Notification

The real-world activity associated with the Instance Availability Notification is to notify Order Fillers when all the images associated with a Performed Procedure Step have arrived. Upon completion of a successful STORE operation, after disconnecting the association, the Archive will search through Performed Procedure Step objects to determine if a study is complete based on the list of UIDs specified in that object. If a study is complete, the Instance Availability Notification message will be sent to any Application Entities specified as OrderFillers.

3.2.1.3.7.2 Presentation Context Table

Table 8 shows the Presentation Contexts that may be initiated by the Archive for Instance Availability Notification operations.

Table 9 - Acceptable Presentation Contexts for the Archive for Instance Availability Notification

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
MPPS N-SET N-CREATE	1.2.840.10008.5.1.4.33	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4 Communication Profiles

4.1 TCP/IP Stack

The Archive provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.1.1 TCP/IP API

The Archive uses the TCP/IP stack from the UNIX system upon which it executes. It uses a subroutine library that is based on a Berkeley socket interface.

4.1.2 Physical Media Support

The Archive exists as a software application that can be compiled on various UNIX platforms. As such, it places no restrictions on the physical network. The Archive has been tested using TCP/IP over Ethernet (Thick Wire, Thin Wire, 10BaseT), ATM, and PPP modem connections.



5 Extensions/Specializations/ Privatizations

5.1 Extensions/Specialization/Privatizations

6 Configuration

6.1 Configuration

The Archive obtains configuration information from a “Control” database which is stored in a relational database. Other configuration is stored on files in the configuration directory. These files control all aspects of the operation of the Archive other than association acceptance.

6.2 AE Title/Presentation Address Mapping

The control table “Application Entity” is used to map between AE Titles and Presentation Addresses. Access to this table is provided via a www interface.

6.3 Security Features

The Archive uses three additional control tables to control access. These tables allow the Archive to determine which nodes are allowed read and/or write access and where images should be stored.

6.4 Configurable Parameters

The following parameters may be configured for the Archive:

- Application Entity Title
- TCP/IP Port Number
- Number of Concurrent Threads

6.5 Support of Extended Character Sets

The Archive provides no support for extended character sets.