

Shina Systems LTD

DICOM Conformance Statement

Product Version: 2.1

Last Save Date: 15 November 2010

Statement of DICOM Conformance

We Shina System Ltd, hereby state that the inputs and outputs of the 3Di are DICOM 3.0 compatible and designed to receive and transfer DICOM 3.0 compatible data.

A handwritten signature in black ink, consisting of a horizontal line with a large, sweeping flourish above it.

Date: Nov. 15 2010

Table of Contents

1.	INTRODUCTION	4
1.1	OVERVIEW	4
1.2	GENERAL INFORMATION	8
1.3	REVISION HISTORY	8
1.4	AUDIENCE	8
1.5	REMARKS	8
1.6	DEFINITIONS, TERMS AND ABBREVIATIONS	8
1.7	REFERENCES	9
2.	NETWORKING	10
2.1	IMPLEMENTATION MODEL	10
2.1.1	<i>Application Data Flow</i>	<i>10</i>
2.1.2	<i>Functional Definition of AE's</i>	<i>11</i>
2.1.3	<i>Sequencing of Real World Activities</i>	<i>12</i>
2.2	AE SPECIFICATIONS	13
2.2.1	<i>Storage DICOM Service Application Entity Specifications</i>	<i>13</i>
2.2.2	<i>Patient Browser Application Entity Specifications</i>	<i>17</i>
2.3	NETWORK INTERFACES	20
2.4	CONFIGURATION	20
2.4.1	<i>AE Title/Presentation Address Mapping</i>	<i>20</i>
2.4.2	<i>Parameters</i>	<i>21</i>
3.	MEDIA INTERCHANGE	22
3.1	IMPLEMENTATION MODEL	22
3.1.1	<i>Application Data Flow</i>	<i>22</i>
3.1.2	<i>Functional Definitions of AE's</i>	<i>22</i>
3.2	AE SPECIFICATIONS	22
3.2.1	<i>Open/CD Data Source – Specification</i>	<i>22</i>
3.3	AUGMENTED AND PRIVATE APPLICATION PROFILES	26
3.4	MEDIA CONFIGURATION	26
4.	SUPPORT OF CHARACTER SETS	26
5.	SECURITY	26
5.1	SECURITY PROFILES	26
5.2	ASSOCIATION LEVEL SECURITY	27
5.3	APPLICATION LEVEL SECURITY	27
6.	ANNEXES	28
6.1	IOD CONTENTS	28
6.1.1	<i>Created SOP Instances</i>	<i>28</i>
6.1.2	<i>Usage of Attributes from received IOD's</i>	<i>28</i>
6.2	DATA DICTIONARY OF PRIVATE ATTRIBUTES	29
6.3	GRAYSCALE IMAGE CONSISTENCY	29
6.4	STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES	29
6.5	PRIVATE TRANSFER SYNTAXES	29

1. Introduction

1.1 Overview

Shina's 3Di system can receive images stored in DICOM files using either network communication or from storage media (CD or DVD).

Integration with PACS or other Applications is achieved by using the Query/Retrieve DICOM service.

Table 1-1 Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
CT Image Storage	Yes	Yes
Enhanced CT Image Storage	Yes	Yes
Ambulatory ECG Waveform Storage	Yes	Yes
Basic Text SR	Yes	Yes
Basic Voice Audio Waveform Storage	Yes	Yes
Blending Softcopy Presentation State Storage	Yes	Yes
CT Image Storage	Yes	Yes
Cardiac Electrophysiology Waveform Storage	Yes	Yes
Chest CAD SR	Yes	Yes
Color Softcopy Presentation State Storage	Yes	Yes
Comprehensive SR	Yes	Yes
Computed Radiography Image Storage	Yes	Yes
DRAFT SR Audio Storage	Yes	Yes
DRAFT SR Comprehensive Storage	Yes	Yes
DRAFT SR Detail Storage	Yes	Yes
DRAFT SR Text Storage	Yes	Yes
DRAFT Waveform Storage	Yes	Yes
Digital Intra Oral X-Ray Image Storage For Presentation	Yes	Yes
Digital Intra Oral X-Ray Image Storage For Processing	Yes	Yes
Digital Mammography X-	Yes	Yes

Ray Image Storage For Presentation		
Digital Mammography X-Ray Image Storage For Processing	Yes	Yes
Digital X-Ray Image Storage For Presentation	Yes	Yes
Digital X-Ray Image Storage For Processing	Yes	Yes
Encapsulated PDF Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
Enhanced SR	Yes	Yes
Enhanced XA Image Storage	Yes	Yes
Enhanced XRF Image Storage	Yes	Yes
General ECG Waveform Storage	Yes	Yes
Grayscale Softcopy Presentation State Storage	Yes	Yes
Hardcopy Color Image Storage	Yes	Yes
Hardcopy Grayscale Image Storage	Yes	Yes
Hemodynamic Waveform Storage	Yes	Yes
Key Object Selection Document	Yes	Yes
MR Image Storage	Yes	Yes
MR Spectroscopy Storage	Yes	Yes
Mammography CAD SR	Yes	Yes
Multiframe Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multiframe Grayscale Word Secondary Capture Image Storage	Yes	Yes
Multiframe Single Bit Secondary Capture Image Storage	Yes	Yes
Multiframe True Color Secondary Capture Image Storage	Yes	Yes
Nuclear Medicine Image	Yes	Yes

Storage		
Ophthalmic Photography16 Bit Image Storage	Yes	Yes
Ophthalmic Photography8 Bit Image Storage	Yes	Yes
PET Curve Storage	Yes	Yes
PET Image Storage	Yes	Yes
Procedure Log Storage	Yes	Yes
Pseudo Color Softcopy Presentation State Storage	Yes	Yes
(Retired) Nuclear Medicine Image Storage	Yes	Yes
(Retired) Ultrasound Image Storage	Yes	Yes
(Retired) Ultrasound Multiframe Image Storage	Yes	Yes
(Retired) VL Image Storage	Yes	Yes
(Retired) VL Multi Frame Image Storage	Yes	Yes
(Retired) X-Ray Angiographic Bi Plane Image Storage	Yes	Yes
RT Beams Treatment Record Storage	Yes	Yes
RT Brachy Treatment Record Storage	Yes	Yes
RT Dose Storage	Yes	Yes
RT Image Storage	Yes	Yes
RT Plan Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Treatment Summary Record Storage	Yes	Yes
Raw Data Storage	Yes	Yes
Real World Value Mapping Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Spatial Fiducials Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
Standalone Curve Storage	Yes	Yes
Standalone Modality LUT Storage	Yes	Yes
Standalone Overlay Storage	Yes	Yes
Standalone VOI/LUT Storage	Yes	Yes

Stereometric Relationship Storage	Yes	Yes
Stored Print Storage	Yes	Yes
Twelve Lead ECG Waveform Storage	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Ultrasound Multiframe Image Storage	Yes	Yes
VL Endoscopic Image Storage	Yes	Yes
VL Microscopic Image Storage	Yes	Yes
VL Photographic Image Storage	Yes	Yes
VL Slide Coordinates Microscopic Image Storage	Yes	Yes
Video Endoscopic Image Storage	Yes	Yes
Video Microscopic Image Storage	Yes	Yes
Video Photographic Image Storage	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Fluoroscopy Image Storage	Yes	Yes
X-Ray Radiation Dose SR	Yes	Yes
Query/Retrieve		
Patient Root Information Model FIND	Yes	No
Study Root Information Model MOVE	Yes	No

Table 1-2Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
CD-R, DVD		
General Purpose CD-R	No	Yes

General Information

Shina Systems LTD 3Di is intended for managing and viewing medical imaging studies that conform to the DICOM standard. 3Di offers 2D viewing options as well as advanced 3D processing on volumetric datasets.

1.2 Revision History

Revision	Writer	Date	Comment	Reviewed by
1.0	Naor Shina (CEO)	1 November 2007	First issue	Shani Shalev (QA manager)

1.3 Audience

This document is intended for hospital technical health system integrators. It is assumed that the reader has a working understanding of DICOM.

1.4 Remarks

There are no special remarks.

1.5 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard. Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
AE	DICOM Application Entity
AET	Application Entity Title
ASCE	Association Control Service Element
DIT	Directory Information Tree (LDAP)
DN	Distinguished Name (LDAP)
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Softcopy Presentation State
IOD	(DICOM) Information Object Definition
ISO	International Standard Organization
LDAP	Lightweight Directory Access Protocol
LDIF	LDAP Data Interchange Format

MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
R	Required Key Attribute
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
RDN	Relative Distinguished Name (LDAP)
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
U	Unique Key Attribute

.

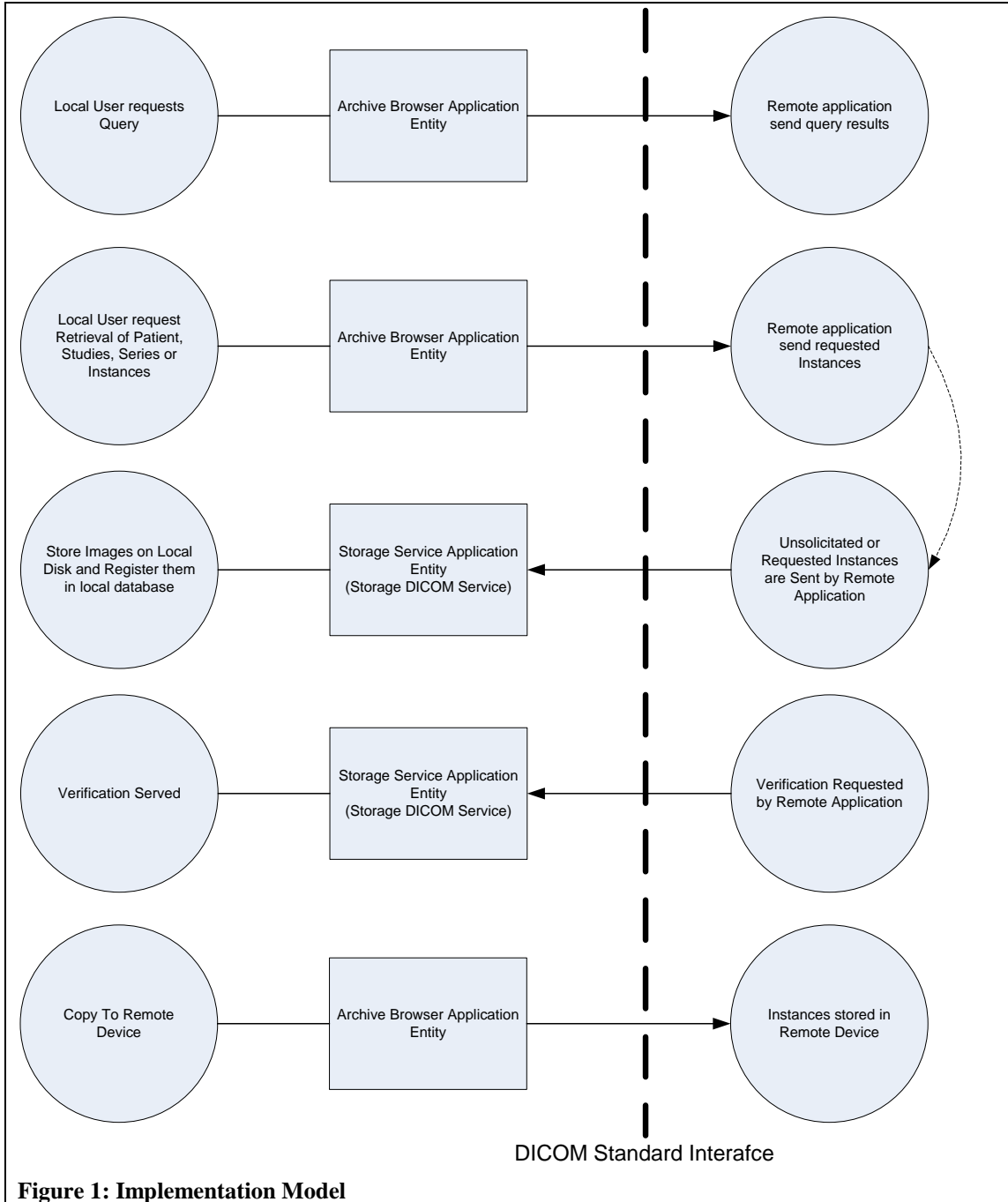
1.6 References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA Parts 07_01 – 07_18.
3Di Patient Browser User's Manual

2. Networking

2.1 Implementation Model

2.1.1 Application Data Flow



Shina's DICOM Application is comprised of the *Patient Browser* that encapsulate the FIND-SCU and MOVE-SCP conceptual application entities and the *Storage DICOM Service* that encapsulate the Storage and Verification application entities.

- The Patient Browser AE queries the PACS or other DICOM application for the list of Patients/Studies/Series and Images for specific patient according to patient name and ID or by Study Date. The user initiates this action. Once the list of matching objects is received and presented, the user can select a patient, a series or one or more images and retrieve the instances of that selection. This causes a C-MOVE command to be sent to the PACS.
- The *Storage DICOM Service* listens for incoming associations and serves verification and storage commands. Files are saved on the local disk.

2.1.2 Functional Definition of AE's

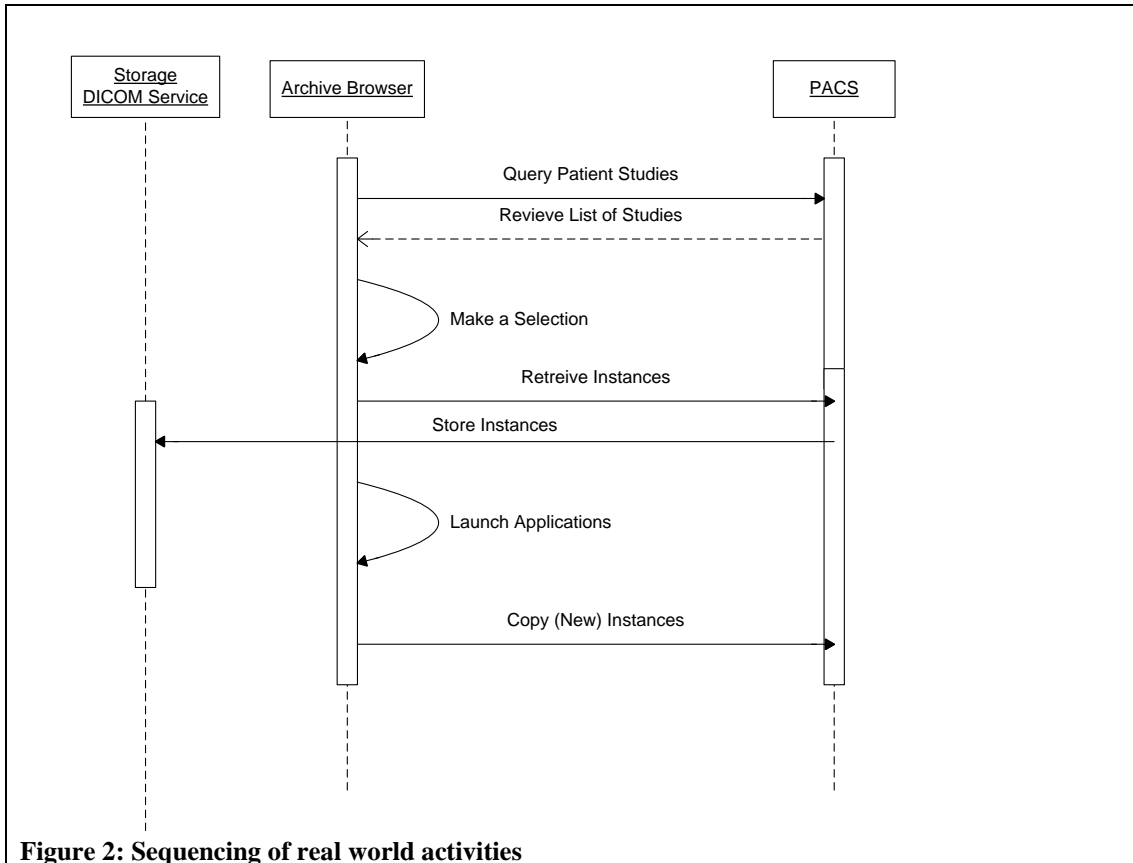
2.1.2.1 Query/Retrieve

The Patient Browser AE is part of the *Patient Browser* application. Shina's Patient Browser provides the user a GUI through which she can either load exams from the local database, from a storage media or retrieve the information from the PACS using the network. In the third option, the user first queries the PACS and then retrieves the images.

2.1.2.2 Storage DICOM Service

The *Storage DICOM Service* is a windows service that listens for incoming connections. It accepts verification and storage service requests and store the images sent through C-STORE commands on the local disk. The local images are registered in the local database file.

2.1.3 Sequencing of Real World Activities



The following sequencing applies:

1. The user key in patient information and/or study date and gets a list of patients and series.
2. The user selects a patient, series or instances from the lists and retrieves the selection.
3. Instances are stored locally.
4. Once the instances are locally stored, the user can launch one of the cardiovascular applications.
5. New instances (screenshots, 3D rendering and other) that are created by the applications can be copied to the PACS using C-STORE.

An alternative flow may exist when instances are sent to the *Storage DICOM Service* in an unsolicited manner instead of step 3. In this case, steps 1 and 2 are replaced by queries to the local application database.

2.2 AE Specifications

2.2.1 Storage DICOM Service Application Entity Specifications

2.2.1.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 2-1: Verification SOP Class

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes

Table 2-2: Storage SOP Classes

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	No	Yes
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Digital Intra Oral X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra Oral X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
DRAFT SR Audio Storage	1.2.840.10008.5.1.4.1.1.88.2	No	Yes
DRAFT SR Comprehensive Storage	1.2.840.10008.5.1.4.1.1.88.4	No	Yes
DRAFT SR Detail Storage	1.2.840.10008.5.1.4.1.1.88.3	No	Yes
DRAFT SRText Storage	1.2.840.10008.5.1.4.1.1.88.1	No	Yes

DRAFT Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30	No	Yes
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29	No	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	No	Yes
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	No	Yes
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Ophthalmic Photography16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Ophthalmic Photography8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129	No	Yes
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	No	Yes
Pseudo Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	No	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No	Yes
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	No	Yes
(Retired) Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5	No	Yes
(Retired) Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	No	Yes
(Retired) Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3	No	Yes
(Retired) VL Image Storage	1.2.840.10008.5.1.4.1.1.77.1	No	Yes
(Retired) VL Multi Frame Image	1.2.840.10008.5.1.4.1.1.77.2	No	Yes

Storage			
(Retired) X-Ray Angiographic Bi Plane Image Storage	1.2.840.10008.5.1.4.1.1.12.3	No	Yes
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	No	Yes
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6	No	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No	Yes
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	No	Yes
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	No	Yes
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	No	Yes
Standalone VOI/LUT Storage	1.2.840.10008.5.1.4.1.1.11	No	Yes
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3	No	Yes
Stored Print Storage	1.2.840.10008.5.1.1.27	No	Yes
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Ultrasound Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
X-Ray Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67	No	Yes

2.2.1.2 Association Policies

2.2.1.2.1 General

Table 2-3: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

2.2.1.2.2 Number of Associations

The storage service does not initiate associations.

The storage service accepts a single association at a time. While the storage service is connected to another AE, other association requests are ignored.

Table 2-4: Number of associations as association initiator for storage service

Maximum number of simultaneous associations	1
---	---

Table 2-5: Number of associations as association acceptor for storage service

Maximum number of simultaneous associations	1
---	---

2.2.1.2.3 Asynchronous Nature

The storage service does not support multiple outstanding transactions.

2.2.1.2.4 Implementation Identifying Information

Table 2-6 DICOM Implementation Class UID and Version Name for Storage Service

Implementation Class UID	1.2.276.0.7230010.3.0.3.5.4
Implementation Version Name	1.2.276.0.7230010.3.0.3.5.4

2.2.1.3 Association Initiation Policies

The *Storage DICOM* Service does not initiate associations.

2.2.1.4 Association Acceptance Policies

2.2.1.4.1 Activity – Store Images

2.2.1.4.1.1 Description and Sequencing of Events

This activity is performed when another application (e.g. a PACS) requests to store images on the local disk either as a result of a retrieve command issued by the *Patient Browser* or in an unsolicited manner.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Any Storage Class from Table 2-2: Storage SOP Classes	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

2.2.1.4.1.2 Accepted Presentation Contexts

2.2.1.4.1.3 SOP Specific Conformance Statement for SOP Classes

Table 2-7: C-STORE Response Statuses

Status	Meaning	Error Code	Reason
Success	Success	0000H	File stored
Refused	Out of resources	A700H	Failed to create local file

2.2.2 Patient Browser Application Entity Specifications

2.2.2.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No

Patient Query Find	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Query Move	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Storage	Any Storage SOP Class from Table 2-2: Storage SOP Classes	Yes	No

2.2.2.2 Association Policies

2.2.2.2.1 General

Table 2-8: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

2.2.2.2.2 Number of Associations

The Patient Browser AE initiates a single association at a time.

The Patient Browser AE does not accept associations.

Table 2-9: Number of associations as association initiator for Patient Browser AE

Maximum number of simultaneous associations	1
---	---

Table 2-10: Number of associations as association acceptor for Patient Browser

Maximum number of simultaneous associations	0
---	---

2.2.2.2.3 Asynchronous Nature

The Patient Browser does not support multiple outstanding transactions.

2.2.2.2.4 Implementation Identifying Information

Table 2-11 DICOM Implementation Class UID and Version Name for Storage Service

Implementation Class UID	1.2.276.0.7230010.3.0.3.5.4
Implementation Version Name	OFFIS_DCMTK_354

2.2.2.3 Association Initiation Policies

2.2.2.3.1 Activity – Query and Retrieve Instances

2.2.2.3.1.1 Description

This activity is performed when a user selects the remote data source from the data sources menu.

Once the identifier is keyed in by the user, Shina's Patient Browser performs a sequence of queries in the following order of query levels: PATEINT, STUDY, and SERIES and builds the local Patients and Series lists. The results are presented to the user. When the user selects one of the series Shina's Patient Browser performs a IMAGE level query with the selected row as the identifier. When the user selects the local DB destination from the

copy-to menu, The Patient Browser performs a Retrieve action to get the selection to the local database. The Query Level of the C-MOVE command is determined depending on the display area where the selection was made. When the users selects a patient, the query level is PATIENT, when the user selects Series, the query level is SERIES and when the user selects specific instances, the query level is IMAGE.

2.2.2.3.1.2 Proposed Presentation Contexts for Query and Retrieve Action

Table 2-12: Proposed Presentation Contexts for Query and Retrieve Action

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Query Find	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient Query Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

2.2.2.3.1.3 SOP Specific Conformance Statement for SOP Classes

The following table summarizes the behavior in response to command statuses:

Table 2-13: DICOM Command Response Status Handling for Query/Retrieve Application Entity

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000H	Continue execution normally
Other	Failure	Other than 0000H	Stop and display an error message to the user

Shina's Patient Browser stops the current activity and informs the user in response to any non-success status in the status bar display area.

The same apply to any communication error.

2.2.2.3.2 Activity – Copy to Remote Device

This activity is performed when the user selects a remote device from the Copy to Items menu while in Local, Open or CD data source modes. The Patient Browser sends the selected instances using C-STORE commands.

2.2.2.3.2.1 Proposed Presentation Contexts for Copy to Action

Table 2-14: Proposed Presentation Contexts for Copy To Action

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage	The common list of all SOP Class UID's of the selected instances and that are listed in Table 2-2:	The common list of all transfer syntaxes of	The common list of all Transfer Syntax UID's of the selected	SCP	None

	Storage SOP Classes	the selected instances	instances and that are listed in Table 2-2: Storage SOP Classes		
--	---------------------	------------------------	---	--	--

2.2.2.3.2.2 SOP Specific Conformance Statement for SOP Classes

The following table summarizes the behavior in response to command statuses:

Table 2-15: DICOM Command Response Status Handling for Query/Retrieve Application Entity

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000H	Continue execution normally
Other	Failure	Other than 0000H	Stop and display an error message to the user

Shina's Patient Browser stops the current activity and informs the user in response to any non-success status in the status bar display area.

The same apply to any communication error.

The Copy to Action is performed as a background process while the user can continue with her work.

2.2.2.4 Association Acceptance Policies

The Patient Browser does not accept associations.

2.3 Network Interfaces

Shina's Patient Browser uses windows sockets as the underlying network implementation. Additional protocols are not supported.

2.4 Configuration

The configuration of the system is done using the Patient Browser GUI application when the user is logged in to the system as administrator. All configurations are stored in the configuration files.

2.4.1 AE Title/Presentation Address Mapping

2.4.1.1 Local AE Titles

The Local AE Title is Configurable. The default installation value is SH_DICOM.

The TCP/IP listener port number is configurable. The default installation value is 104.

2.4.1.2 Remote AE Titles

The Storage DICOM Service will accept only associations from pre-configured AE Titles. Remote devices can be configured in the Patient Browser.

2.4.2 Parameters

1. Parameter	Configurable	Default Value
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	No	100 Seconds
General DIMSE level time-out values	No	100 Seconds
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	No	100 Seconds
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	100 Seconds

3. Media Interchange

3.1 Implementation Model

3.1.1 Application Data Flow

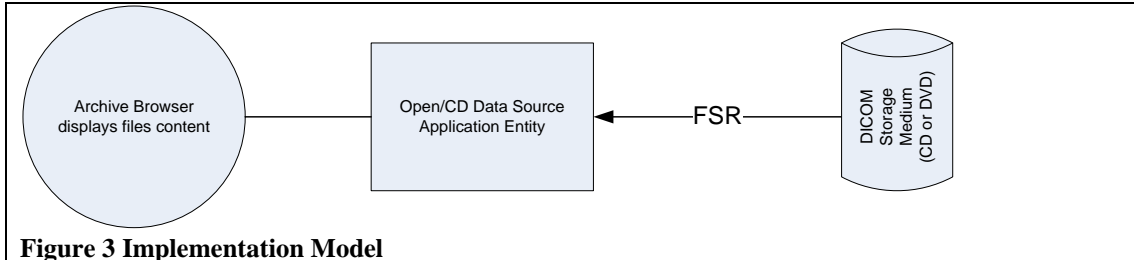


Figure 3 Implementation Model

When the user inserts a CD or DVD to the computer optical drive and selects the CD data source Shina's Patient Browser scans the media for valid DICOM files and loads the information from the files.

3.1.2 Functional Definitions of AE's

3.1.2.1 Open/CD Data Source

The Open/CD Data Source is activated by selecting either the Open or the CD data source from the data sources menu. The Patient Browser first looks for a valid DICOMDIR file. If a DICOMDIR file is found, the Patient Browser uses it. If no valid DICOMDIR file is found, the Patient Browser attempts to create such file by scanning the folder recursively.

3.2 AE Specifications

3.2.1 Open/CD Data Source – Specification

The Open/CD Data Source is responsible to read DICOM files stored on a CD, DVD or any local or network file system folder.

Table 3-1 Application Profiles, Activities and Roles for CD Data Source

Application Profiles Supported	Real World Activity	Role	SC Options
STD-GEN-CD	Load CD	FSR	Interchange
STD-GEN-DVD-RAM	Load DVD	FSR	Interchange
STD-XABC-CD	Load CD	FSR	Interchange
STD-XA1K-CD	Load CD	FSR	Interchange
STD-XA1K-DVD	Load DVD	FSR	Interchange
STD-CTMR-CD	Load CD	FSR	Interchange
STD-CTMR-DVD-RAM	Load DVD	FSR	Interchange
STD-CTMR-DVD	Load DVD	FSR	Interchange

3.2.1.1 File Meta Information for DICOM File Reader

N/A

3.2.1.2 Real World Activities

3.2.1.2.1 Activity – Open CD/DVD or File System Folder

Shina's Patient Browser reads the DICOMDIR file or if not found, scans the folder recursively and then displays the data.

3.2.1.2.1.1 Media Storage Application Profiles

The DICOM File Reader supports STD-GEN-CD and STD-GEN-DVD-RAM Application Profiles.

3.2.1.2.1.1.1 Options

The Patient Browser supports the SOP Classes and Transfer Syntaxes listed in the table below:

Table 3-2 IODS, SOP Classes and Transfer Syntaxes for DICOM File Reader

IOD	SOP Class UID	Transfer Syntax	Transfer Syntax UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First-Order Predictor	1.2.840.10008.1.2.4.70
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1

		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First- Order Predictor	1.2.840.10008.1.2.4.70
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.84 0.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First- Order Predictor	1.2.840.10008.1.2.4.70
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.84 0.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First- Order Predictor	1.2.840.10008.1.2.4.70
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.84 0.10008.1.2

		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First- Order Predictor	1.2.840.10008.1.2.4.70
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.84 0.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First- Order Predictor	1.2.840.10008.1.2.4.70
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.84 0.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First- Order Predictor	1.2.840.10008.1.2.4.70

X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.84 0.10008.1.2
		Explicit VR Little Endian	1.2.840.10008.1.2.1
		Explicit VR Big Endian	1.2.840.10008.1.2.2
		JPEG Lossless First-Order Predictor	1.2.840.10008.1.2.4.70
		JPEG Lossy Baseline	1.2.840.10008.1.2.4.50
		JPEG Lossy Extended	1.2.840.10008.1.2.4.51

3.3 Augmented and Private Application Profiles

N/A

3.4 Media Configuration

N/A

4. Support of Character Sets

Shina's Patient Browser supports the ISO-IR 100 (Latin alphabet No.1) Supplementary set of ISO8859.

5. Security

5.1 Security Profiles

Shina's Patient Browser does not support any DICOM security profile.

5.2 Association Level Security

Shina's Patient Browser accepts associations with a combination of AE title and host or IP address that is configured in the application database.

5.3 Application Level Security

Shina's Patient Browser implements a user's management sub-system. Adding and removing users from the user's management sub-system is restricted to Administrator of the system.

The application database is encrypted and protected using a predefined password.

6. Annexes

6.1 IOD Contents

6.1.1 Created SOP Instances

N/A

6.1.2 Usage of Attributes from received IOD's

The following attributes are required for the workstation in order to function properly:

Table 6-1: Use of attributes from received IOD's to form image sequences

Name	Tag	Type
Image Type	(0008,0008)	O
SOP Class UID	(0008,0016)	R
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Modality	(0008,0060)	O
Manufacturer	(0008,0070)	O
Institution Name	(0008,0080)	O
Manufacturer Model	(0008,1090)	O
Patient Name	(0010,0010)	R
Patient ID	(0010,0020)	R
Patient Birth Date	(0010,0030)	O
Patient Sex	(0010,0040)	O
Slice Thickness	(0018,0050)	O
Patient Position	(0018,5100)	O
Study Instance UID	(0020,000d)	R
Series Instance UID	(0020,000e)	R
Series Number	(0020,0011)	O
Image Number	(0020,0013)	R
Image Position (Patient)	(0020,0032)	O
Image Orientation (Patient)	(0020,0037)	O
Frame of Reference UID	(0020,0052)	O
Samples Per Pixel	(0028,0002)	R
Photometric Interpretation	(0028,0004)	R
Number of Rows	(0028,0010)	R
Number of Columns	(0028,0011)	R

Name	Tag	Type
Pixel Spacing	(0028,0030)	O
Corrected Image	(0028,0051)	O
Bits Allocated	(0028,0100)	R
Bits Stored	(0028,0101)	R
High Bit	(0028,0102)	R
Pixel Representation	(0028,0103)	R
Pixel Padding Value	(0028,0120)	O
Rescale Intercept	(0028,1052)	O
Rescale Slope	(0028,1053)	O

6.2 Data Dictionary of Private Attributes

N/A

6.3 Grayscale Image Consistency

N/A

6.4 Standard Extended/Specialized/Private SOP Classes

N/A

6.5 Private Transfer Syntaxes

N/A