



DICOM Conformance Statement for CDRClient

Schick Technologies, Inc.
30-00 47th Avenue
Long Island City, NY 11101

(718) 937-5765
(718) 937-5962 (fax)

Copyright © 2004 by Schick Technologies, Inc.
All Rights Reserved

CDR is a registered trademark of Schick Technologies, Inc. and is covered by US Patent Numbers 5,912,942 and 6,134,298. Additional patents are pending.

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this document, and Schick Technologies, Inc. was aware of a trademark claim, the designations have been printed in caps or initial caps.

January 7, 2004



Printed in the United States of America

This document was originally prepared in English

Contents

1. Introduction	1
1.1. Overview	1
1.2. Intended Audience	1
1.3. Scope and Field of Application	1
1.4. Important Remarks	1
1.5. References	1
1.6. Acronyms	2
2. Implementation Model	3
2.1. Application Data Flow Diagram	3
2.2. Functional Definitions	3
2.2.1. <i>Query Database</i>	4
2.2.2. <i>Transfer Image</i>	5
2.2.3. <i>Send and Store Image</i>	5
2.2.4. <i>Verify</i>	6
2.3. Sequencing of Real World Activities	6
3. CDRClient AE Specifications	7
3.1. CDRClient AE Specification	7
3.1.1. <i>Storage - Specification</i>	7
3.1.2. <i>Query / Retrieve - Specification</i>	8
3.1.3. <i>Verification - Specification</i>	9
3.1.4. <i>Association Establishment Policies for CDRClient AE</i>	10
3.1.5. <i>Association Initiation Policies for CDRClient AE</i>	11
3.1.6. <i>Association Acceptance Policies for CDRClient AE</i>	15
4. Communication Profiles	17
4.1. Supported Communication Stacks	17
4.2. TCP/IP Stack	17
4.3. Physical Media Support	17
5. Extensions / Specializations / Privatizations	18
5.1. Private Tags	18
5.1.1. <i>Viewsets</i>	18
5.1.2. <i>Change List</i>	19
5.1.3. <i>Note List</i>	19
5.1.4. <i>Image Checksum</i>	20
6. Configuration	21
6.1. Configurable Settings	21
Appendix A. Image Tags	22

List of Figures

Figure 1. Implementation Model for CDRClient Application Entity	3
Figure 2. Query Database Model.....	4
Figure 3. Transfer Image Model	5
Figure 4. Send / Store Image Model	5
Figure 5. Verify Model	6

List of Tables

Table 1. Storage SOP Classes Supported by CDRClient	7
Table 2. Query / Retrieve SOP Classes Supported by CDRClient	8
Table 3. Supported Attributes for Patient Root Query / Retrieve	8
Table 4. Supported Attributes for Study Root Query / Retrieve.....	9
Table 5. Supported Attributes for Patient / Study Only Query / Retrieve	9
Table 6. Verification SOP Class Supported by CDRClient.....	9
Table 7. Presentation Contexts to Verify DICOM Association.....	11
Table 8. Presentation Contexts to Get Worklist / Query Database.....	11
Table 9. C-Find Status Codes	12
Table 10. Transfer Syntaxes to Send and Store Images.....	12
Table 11. Presentation Contexts to Send and Store Images.....	12
Table 12. C-Store Status Codes	14
Table 13. Presentation Contexts to Transfer Images	14
Table 14. C-Move Status Codes	14
Table 15. Transfer Syntaxes to Store Images	15
Table 16. Presentation Contexts to Store Images	15
Table 17. ViewSet Tags.....	18
Table 18. ViewSet Item Tags	18
Table 19. Change List Tags	19
Table 20. Change List Item Tags.....	19
Table 21. Note Tags.....	19
Table 22. Note Item Tags	19
Table 23. Image Checksum Tags.....	20
Table 24. Image Tags	22

Notice

The software described in this document has been validated in accordance with the governing DICOM standard at the time of this document's release. Schick Technologies shall not be liable for errors contained herein or consequential damages in connection with the furnishing, performance, or use of this document.

Schick Technologies reserves the right to revise this publication and to make changes to its content at any time, without obligation to notify any person or entity of such revisions and changes.

Copyright © 2002-2004 Schick Technologies, Inc. All Rights Reserved

Document Version Information

Version information and a general description of changes affecting this document can be found in the following table.

Revision	Description	Official Release Date
-	Initial Release	9/4/2002
A	Added JPEG compression to proposed presentation context tables. Also expanded description of private tags and added Image Tags table.	1/14/2004

1. Introduction

1.1. Overview

This document is the DICOM Conformance Statement for CDRClient, the image acquisition component of the client-server software application (CDR[®]) from Schick Technologies. In its primary role, CDRClient will request access, storage, and retrieval of images from CDRServer.

1.2. Intended Audience

The reader of this document is concerned with software design and / or system integration issues. It is assumed that the reader of this document is familiar with the DICOM 3.0 Standard and the terminology and concepts employed in those documents.

Readers wishing to obtain more familiarity with the content and terminology of DICOM 3.0 Standard are encouraged to obtain and review the standard prior to reading this Conformance Statement. More information on acquiring this document and its updates on the DICOM standard may be found on the website of the National Electrical Manufacturer's Association (NEMA) at <http://www.nema.com>.

1.3. Scope and Field of Application

It is the intent of this document, in conjunction with the "DICOM Conformance Statement for CDRServer", to describe the proper and unambiguous communication of data between CDRClient or other peer application and CDRServer. Since the services provided by CDRServer and CDRClient are defined by their associations, users may wish to have both documents available for a complete perspective of this exchange.

1.4. Important Remarks

The use of the CDRServer and CDRClient Conformance Statements, in conjunction with DICOM 3.0 Standard, is intended to facilitate communication between other applications and CDR software. These standards, by themselves, should not be the sole source for, or guarantee of, interoperability between CDR software and other non-CDR applications or equipment. Responsibility for the correct design and integration of CDR software within the framework of other systems remains with the user and should not be minimized or overlooked. Users are strongly urged to test and validate the proper interaction between CDR and other non-CDR applications or devices before declaring operability.

1.5. References

In preparing this conformance statement, frequent reference to the DICOM Standard, particularly PS 3.1 through PS 3.5, PS 3.7, PS 3.8, and PS 3.10 through PS 3.12 was made. For additional information on CDRServer, refer to B1051035 from Schick Technologies.

1.6. Acronyms

The following acronyms appear in this document and are defined below.

AE	Application Entity
CDR	Computed Dental Radiography
CT	Computerized Tomography
CUID	Class Unique Identifier
DICOM	Digital Imaging and Communications in Medicine
DIMSE-C	DICOM Message Service Element - Composite (objects)
DIMSE-N	DICOM Message Service Element - Normalized (objects)
DT	Date (value representation)
LO	Long String (value representation)
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers' Association
O	Optional (attribute)
OB	Other Byte String (value representation)
PDU	Protocol Data Unit
PN	Person Name (value representation)
R	Required (attribute)
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
SQ	Sequence of Items (value representation)
SR	Structured Reports
TCP/IP	Transmission Control Protocol / Internet Protocol
U	Unique (attribute)
UI	Unique Identifier (value representation)
UL	Unsigned Long (value representation)
UID	Unique Identifier
US	Unsigned Short (value representation)
VL	Visible Light
VM	Value Multiplicity
VR	Value Representation

2. Implementation Model

2.1. Application Data Flow Diagram

The CDRClient Application Entity (AE) is an application that initiates requests for the storage and retrieval of stored images and access to patient information. These requests originate with CDRClient or other calling application that interfaces with the server by DICOM association. (CDRServer AE is covered in a separate Conformance document.) The implementation model of the CDRClient AE is shown in the following figure.

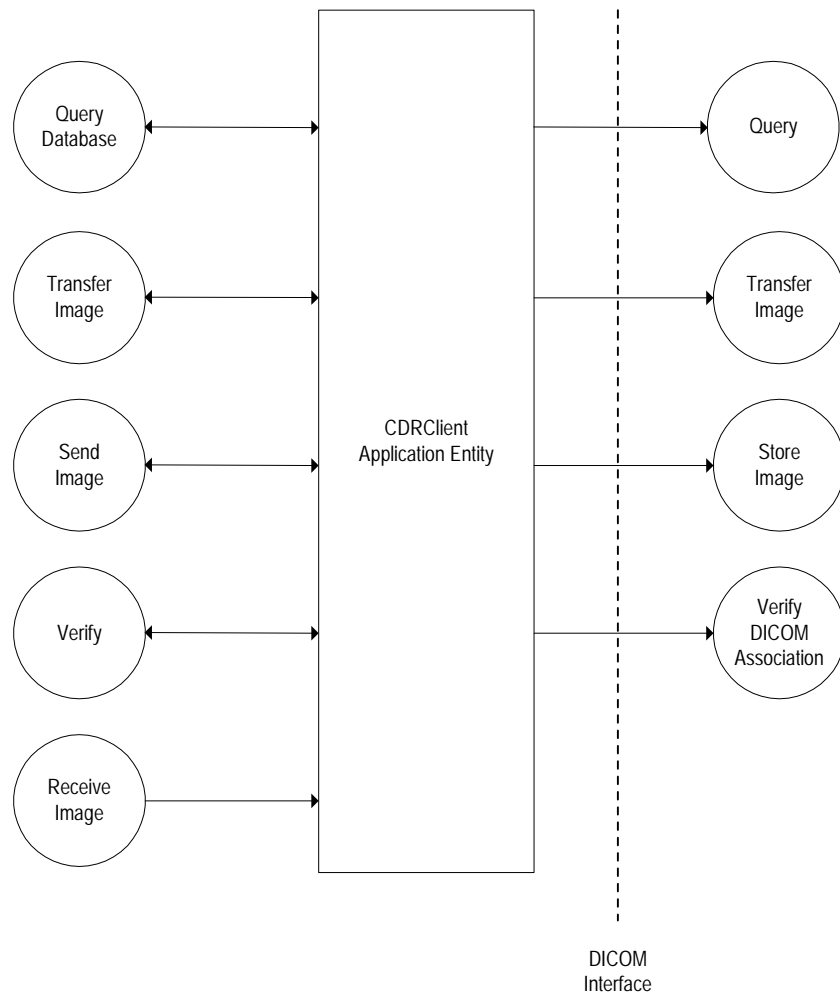


Figure 1. Implementation Model for CDRClient Application Entity

2.2. Functional Definitions

The CDRClient AE is an application initiating requests for image storage and retrieval from CDRServer. Each request will be handled by CDRServer as a unique thread. CDRServer supports multiple-threaded associations and is limited only by the available resources and parameters of the operating system.

CDRClient acts as a service class provider (SCP) in the following role:

1. SCP for C-Store operations to Storage service class users (during MOVE operations only)

CDRClient acts as a service class user (SCU) in the following roles:

1. SCU of C-Store operations from Storage service class providers
2. SCU of C-Echo operations from Verification service class providers
3. SCU of C-Find operations from Worklist Management service class providers
4. SCU of C-Find operations from Query / Retrieve service class providers
5. SCU of C-Move operations from Query / Retrieve service class providers

2.2.1. Query Database

CDRClient can initiate a request (C-Find-RQ) for patient, study, and image queries. CDRClient provides in this request all the values for the attributes it wishes to match. CDRServer searches its database and generates a C-Find-RSP for each match and a status message of "Pending" as it continues searching. A status message of "Success" is issued when all matches have been identified. Error conditions will cause other messages to occur. More information on these messages can be found in **Table 9**.

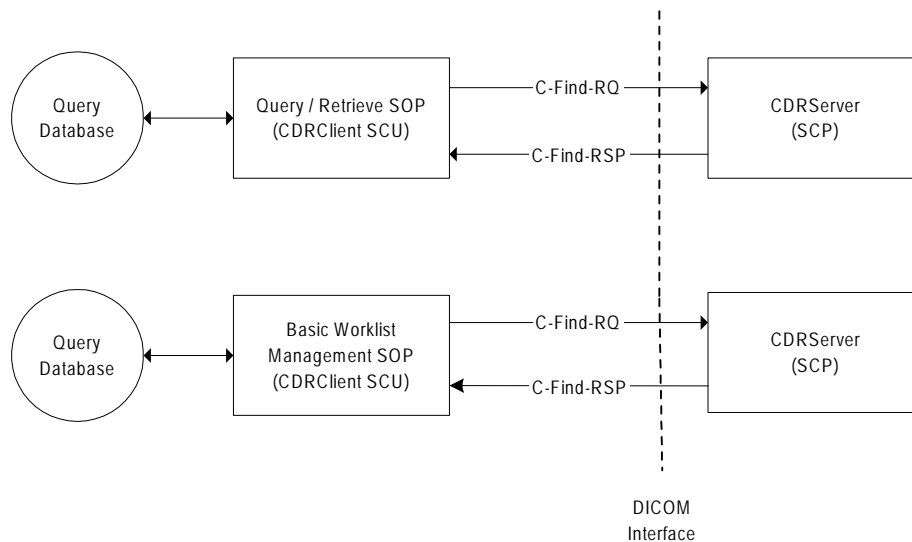


Figure 2. Query Database Model

C-Find operations can be interrupted by CDRClient through the use of C-Cancel-RQ.

2.2.2. Transfer Image

CDRClient can initiate an image move request (C-Move-RQ) and supplies unique values that identify the move destination to CDRServer (AE name, IP address, and port number). CDRClient also receives a status message confirming the operation. More information on these codes can be found in **Table 14**.

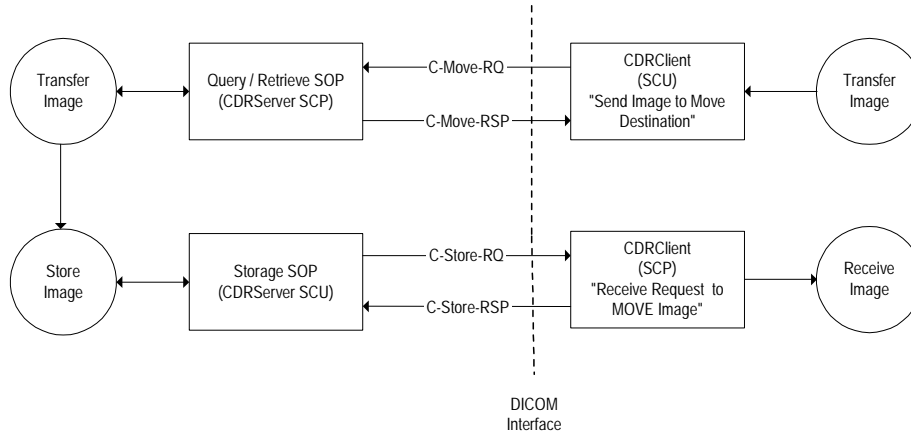


Figure 3. Transfer Image Model

2.2.3. Send and Store Image

CDRClient can initiate a request (C-Store-RQ) to store images it has acquired. CDRClient also receives a status message confirming the operation. More information on these codes can be found in **Table 12**.

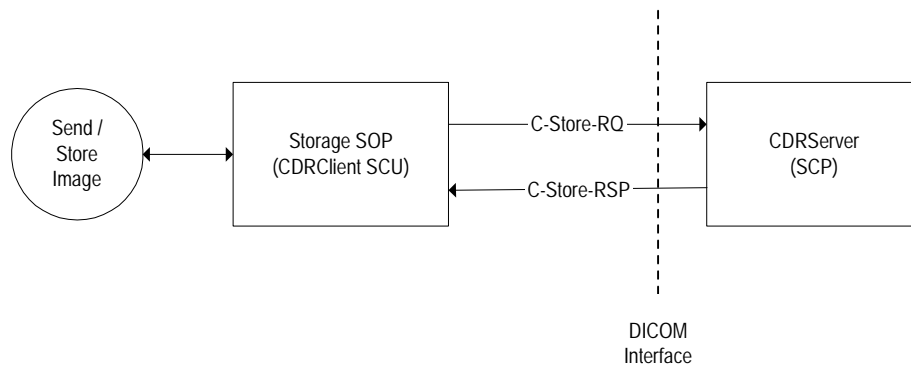


Figure 4. Send / Store Image Model

2.2.4. Verify

CDRClient can initiate a request (C-Echo-RQ) to verify a current DICOM association.

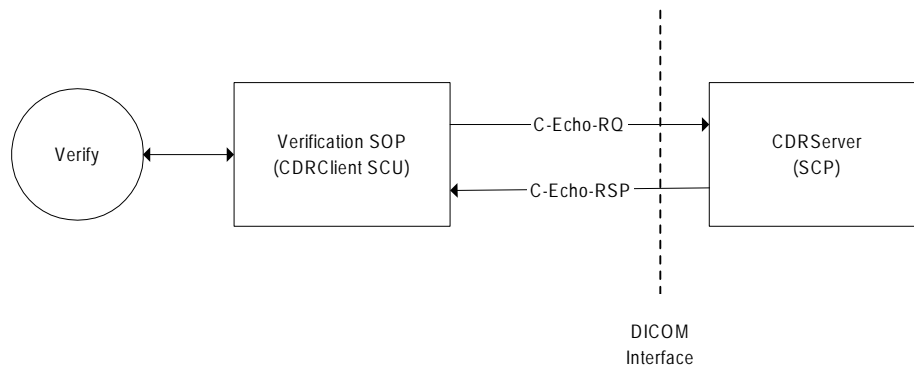


Figure 5. Verify Model

2.3. Sequencing of Real World Activities

Not applicable

3. CDRClient AE Specifications

3.1. CDRClient AE Specification

3.1.1. Storage - Specification

CDRClient provides Standard Conformance to the following DICOM 3.0 Standard SOP Class as a SCU.

Table 1. Storage SOP Classes Supported by CDRClient

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
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
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
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 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
Digital Mamography X-ray Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mamography X-ray Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Patient Root Find	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Move	1.2.840.10008.5.1.4.1.2.1.2
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2
Patient Study Only Root Find	1.2.840.10008.5.1.4.1.2.3.1
Patient Study Only Root Move	1.2.840.10008.5.1.4.1.2.3.2
Modality Worklist	1.2.840.10008.5.1.4.31

3.1.2. Query / Retrieve - Specification

CDRClient provides Standard Conformance to the following DICOM 3.0 Standard SOP Class as a SCU.

Table 2. Query / Retrieve SOP Classes Supported by CDRClient

SOP Class Name	SOP Class ID
Patient Root Find	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Move	1.2.840.10008.5.1.4.1.2.1.2
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2
Patient Study Only Root Find	1.2.840.10008.5.1.4.1.2.3.1
Patient Study Only Root Move	1.2.840.10008.5.1.4.1.2.3.2
Modality Worklist	1.2.840.10008.5.1.4.31

Table 3. Supported Attributes for Patient Root Query / Retrieve

Query Level	Field	Tag
PATIENT	Patient Name	0010,0010
	Patient ID	0010,0020
	Patient Comments	0010,4000
	Patient Birth Date	0010,0030
STUDY	Instance UID	0020,000D
	Study Date	0008,0020
	Study ID	0020,0010
	Study Time	0008,0030
	Accession Number	0008,0050
	Study Description	0008,1030
	Study Comments	0032,4000
SERIES	Instance UID	0020,000E
	Modality	0008,0060
	Series Number	0020,0011
	Series Date	0008,0021
IMAGE	Instance UID	0008,0018
	Image Number	0020,0013
	Image Type	0008,0008
	Detector ID	0018,700A
	Detector Description	0018,7006
	Image Comments	0020,4000
	Acquisition Date	0008,0022

Table 4. Supported Attributes for Study Root Query / Retrieve

Query Level	Field	Tag
STUDY	Instance UID	0020,000D
	Study Date	0008,0020
	Study ID	0020,0010
	Study Time	0008,0030
	Accession Number	0008,0050
	Study Description	0008,1030
	Study Comments	0032,4000
SERIES	Instance UID	0020,000E
	Modality	0008,0060
	Series Number	0020,0011
	Series Date	0008,0021
	Series Time	0008,0031
IMAGE	Instance UID	0008,0018
	Image Number	0020,0013
	Image Type	0008,0008
	Detector ID	0018,700A
	Detector Description	0018,7006
	Image Comments	0020,4000
	Acquisition Date	0008,0022

Table 5. Supported Attributes for Patient / Study Only Query / Retrieve

Query Level	Field	Tag
PATIENT	Patient Name	0010,0010
	Patient ID	0010,0020
	Patient Comments	0010,4000
	Patient Birth Date	0010,0030
STUDY	Instance UID	0020,000D
	Study Date	0008,0020
	Study ID	0020,0010
	Study Time	0008,0030
	Accession Number	0008,0050
	Study Description	0008,1030
	Study Comments	0032,4000

3.1.3. Verification - Specification

CDRClient provides Standard Conformance to the following DICOM 3.0 Standard SOP Class as a SCU.

Table 6. Verification SOP Class Supported by CDRClient

SOP Class Name	SOP Class ID
Verification	1.2.840.10008.1.1

3.1.4. Association Establishment Policies for CDRClient AE

3.1.4.1. General

All associations with CDRClient are established using the DICOM 3.0 Standard application context. The maximum length PDU that CDRClient will support is 16,384 bytes.

- a. CDRClient initiates an association for verification.
- b. CDRClient initiates an association to get worklist information.
- c. CDRClient initiates an association to query database.
- d. CDRClient initiates an association to send and store images.
- e. CDRClient initiates an association to transfer images.
- f. CDRClient accepts an association to receive and store images transferred by the C-Move SCP (CDRServer).

3.1.4.2. Number of Associations

Each request from CDRClient will be handled by CDRServer as a unique thread.

3.1.4.3. Asynchronous Nature

Not supported.

3.1.4.4. Implementation Identifying Information

Schick Technologies CDRServer implementation provides a single Class Unique Identifier (CUID) -- 1.2.840.114244.0.2001-- and a Version Name -- SCHICK_200IPC.

3.1.5. Association Initiation Policies for CDRClient AE

3.1.5.1. Real World Activity: Request for Verification

3.1.5.1.1. Associated Real World Activity

CDRClient initiates an association with CDRServer to verify the current DICOM association

3.1.5.1.2. Presentation Contexts

Table 7. Presentation Contexts to Verify DICOM Association

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	SCU	None

3.1.5.2. Real World Activity: Request to Get Worklist / Query Database

3.1.5.2.1. Associated Real World Activity

CDRClient initiates an association with CDRServer to get the patient worklist or to send query requests and to receive the appropriate C-Find status code.

3.1.5.2.2. Presentation Contexts

Table 8. Presentation Contexts to Get Worklist / Query Database

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/Retrieve (Find)	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve (Find)	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve (Find)	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Worklist Management	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 9. C-Find Status Codes

Code	Value	Meaning
SUCCESS	0x0000	Image(s) matched
CANCEL	FE00	Cancel request issued by client
PENDING	0xFF00	Matching records / processing continues
FAILED	A900	Data mismatch -- request was not processed

3.1.5.3. Read World Activity: Request to Send and Store Images

3.1.5.3.1. Associated Real World Activity

CDRClient initiates an association with CDRServer to send and store images and to receive the appropriate C-Store status code.

3.1.5.3.2. Presentation Contexts

Table 10. Transfer Syntaxes to Send and Store Images

Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2
JPEG Baseline	1.2.840.10008.1.2.4.50
JPEG Extended	1.2.840.10008.1.2.4.51
JPEG 2000 Lossless	1.2.840.10008.1.2.4.90
JPEG 2000	1.2.840.10008.1.2.4.91

Table 11. Presentation Contexts to Send and Store Images

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	All from Table 10	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	All from Table 10	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	All from Table 10	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	All from Table 10	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	All from Table 10	SCU	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	All from Table 10	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	All from Table 10	SCU	None
X-ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	All from Table 10	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	All from Table 10	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 10	SCU	None
Digital X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	All from Table 10	SCU	None
Digital X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	All from Table 10	SCU	None
Digital Intra-oral X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	All from Table 10	SCU	None
Digital Intra-oral X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	All from Table 10	SCU	None
Digital Mamography X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	All from Table 10	SCU	None
Digital Mamography X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	All from Table 10	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	All from Table 10	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	All from Table 10	SCU	None
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	All from Table 10	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	All from Table 10	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	All from Table 10	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	All from Table 10	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	All from Table 10	SCU	None

Table 12. C-Store Status Codes

Code	Value	Meaning
SUCCESS	0x0000	Image added successfully
RESOURCE_ERROR	0xA700	Resources (i.e., Database DLL) unavailable
FILESAVE_ERROR	0xA701	I/O Error committing file to disk
DATA_MISMATCH_ERROR	0xA900	Critical Tags (UIDs) are missing from image
DATABASE_ERROR	0xC000	Error updating database
IMPORT_ERROR	0xC001	I/O Error importing image from disk

3.1.5.4. Real World Activity: Request to Transfer Images

3.1.5.4.1. Associated Real World Activity

CDRClient initiates an association with CDRServer to transfer images and to issue the appropriate C-Move status code.

3.1.5.4.2. Presentation Contexts

Table 13. Presentation Contexts to Transfer Images

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Patient Root Query/Retrieve (Move)	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve (Move)	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve (Move)	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 14. C-Move Status Codes

Code	Value	Meaning
SUCCESS	0x0000	Image(s) moved successfully
CANCEL	FE00	Cancel request issued by client
PENDING	0xFF00	Matching records / processing continues
FAILED	A900	Data mismatch -- request was not processed
REFUSED	A801	Move destination unknown

3.1.6. Association Acceptance Policies for CDRClient AE

3.1.6.1. Real World Activity: Respond to Store Images Request

3.1.6.1.1. Associated Real World Activity

CDRClient accepts an association to store images as a result of a C-Move request.

3.1.6.1.2. Presentation Contexts

Table 15. Transfer Syntaxes to Store Images

Name	UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Implicit VR Big Endian	1.2.840.10008.1.2.2
JPEG Baseline	1.2.840.10008.1.2.4.50
JPEG Extended	1.2.840.10008.1.2.4.51
JPEG 2000 Lossless	1.2.840.10008.1.2.4.90
JPEG 2000	1.2.840.10008.1.2.4.91

Table 16. Presentation Contexts to Store Images

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	All from Table 15	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	All from Table 15	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.4	All from Table 15	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	All from Table 15	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	All from Table 15	SCP	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	All from Table 15	SCP	None
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	All from Table 15	SCP	None
X-ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	All from Table 15	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	All from Table 15	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 15	SCP	None
Digital X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	All from Table 15	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Digital X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	All from Table 15	SCP	None
Digital Intra-oral X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	All from Table 15	SCP	None
Digital Intra-oral X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.3.1	All from Table 15	SCP	None
Digital Mamography X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	All from Table 15	SCP	None
Digital Mamography X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	All from Table 15	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	All from Table 15	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	All from Table 15	SCP	None
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	All from Table 15	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	All from Table 15	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	All from Table 15	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	All from Table 15	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	All from Table 15	SCP	None

4. Communication Profiles

4.1. Supported Communication Stacks

CDRClient provides TCP/IP Network Communication Support in accordance with DICOM 3.0 Standard.

4.2. TCP/IP Stack

CDRClient communicates over the TCP/IP protocol stack on any physical interconnection supporting the TCP/IP stack.

4.3. Physical Media Support

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

5. Extensions / Specializations / Privatizations

5.1. Private Tags

5.1.1. Viewsets

Viewsets will be encoded in a private set of tags allocated in the group 0x0009. It will consist of a Viewset Object and a sequence of Viewset Items. The Private Tag Creator ID for the Viewset shall be “SCHICK TECHNOLOGIES - Viewset Creator ID”. The Private Tag Creator ID for the Viewset item shall be: “SCHICK TECHNOLOGIES - Viewset Item Creator ID” (Table 17 and Table 18).

Table 17. ViewSet Tags

Tag	Name	VR	Description
0009,xx01	Instance UID	UI	Unique instance UID (same as SOP Inst)
0009,xx02	Name	LO	Name of the Viewset
0009,xx03	Sequence	SQ	A sequence of ViewSet Items
0009,xx04	Mode	UL	Primary Acquisition Mode
0009,xx05	Type	UL	Viewset Type (0 – Standard, 1 – Grid...)

Table 18. ViewSet Item Tags

Tag	Name	VR	Description
0009,xx01	Image Instance UID	UI	The Instance UID of the Image that should be displayed in this Viewbox (may be blank).
0009,xx02	Number	US	Sequential number representing the order it was created.
0009,xx03	Order	US	A number that represents the order in which the series should be taken.
0009,xx04	Type	US	A number describing anatomical position for this image. 1 = Upper Left 5 = Right Bitewing 2 = Upper Center 6 = Lower Left 3 = Upper Right 7 = Lower Center 4 = Left Bitewing 8 = Lower Right
0009,xx05	Orientation	US	0 = Horizontal 1 = Vertical
0009,xx06	Rect (Left, Top, Width, Height)	US (VM=4)	A rectangle of coordinates stored as (Left\Top\Width\Height) that describe the position and dimension of the Viewbox. The coordinates are based on a 1024x768 window.
0009,xx07	Caption Height	US	Height of the caption text in coordinates displayed below the ViewBox. This height should be subtracted from the above Rect before displaying and image box.
0009,xx08	Source	US	The Acquisition Source for the image box.
0009,xx09	Default Width	US	Original width of the rect
0009,xx0A	Default Height	US	Original height of the rect

5.1.2. Change List

The image change list will be encoded in a private set of tags allocated in the group 0x0021. It will consist of a Change list Object and a sequence of Change Items. The Private Tag Creator ID for the Change list shall be “SCHICK TECHNOLOGIES - Change List Creator ID”. The Private Tag Creator ID for the Change Item shall be “SCHICK TECHNOLOGIES - Change Item Creator ID” (Table 19 and Table 20).

Table 19. Change List Tags

Tag	Name	VR	Description
0021,xx01	Reference Image Instance UID	UI	Reference to Image SOP Instance UID
0021,xx02	Sequence	SQ	Sequence of Change List Items

Table 20. Change List Item Tags

Tag	Name	VR	Description
0021,xx01	Change List Item UID	UI	Unique Instance UID for this change
0021,xx02	Operation	US	Number describing the change operation
0021,xx03	Date	DT	Date of the Change
0021,xx04	User Name	PN	User who applied the change
0021,xx05	Additional Change Data	OB	Additional binary data used as parameters for the change operation

5.1.3. Note List

The note list will be encoded in a private set of tags allocated in the group 0x0021. It will consist of a Note list Object and a sequence of Note Items. The Private Tag Creator ID for the Note list shall be “SCHICK TECHNOLOGIES - Note List Creator ID”. The Private Tag Creator ID for the Note Item shall be “SCHICK TECHNOLOGIES - Note Item Creator ID” (Table 21 and Table 22).

Table 21. Note Tags

Tag	Name	VR	Description
0021,0x01	Reference Image Instance UID	UI	Reference to Image SOP Instance UID
0021,0x02	Item	SQ	Sequence of Note Items

Table 22. Note Item Tags

Tag	Name	VR	Description
0021,xx01	Text	ST	Text of the note
0021,xx02	Date	DT	Date the note was created
0021,xx03	User Name	PN	Name of user creating the note
0021,xx04	Coordinates (X, Y)	US (Multiplicity of 2)	Image coordinates of location of note

5.1.4. Image Checksum

The image checksum will be encoded in a private set of tags allocated in the group 0x0029. It will be a single 4 byte item stored as an unsigned long VR = UL. The Private Tag Creator ID for the image checksum shall be “SCHICK TECHNOLOGIES - Image Security Creator ID” (Table 23).

Table 23. Image Checksum Tags

Tag	Name	VR	Description
0029,xx01	Image Checksum	UL	Unique CRC Checksum used to validate image integrity.

6. Configuration

6.1. Configurable Settings

The following settings are configurable at the CDRServer dialog box.

- A. Local Application Entity Title
- B. Add / Delete / Modify Remote Application Entity
- C. IP Address
- D. Port Number

Appendix A. Image Tags

Table 24. Image Tags

Tag	VR, Value	Description	Value or Source
(0008,0008)	CS,16	ImageType	"ORIGINAL\PRIMARY"
(0008,0016)	UI, 28	SOPClassUID	"1.2.840.10008.5.1.4.1.1.1.3"
(0008,0018)	UI, 46	SOPInstanceUID	"1.2.840.114244.030.4.337057497.868863780.4817"
(0008,0020)	DA ,8	StudyDate	"19981005"
(0008,0021)	DA, 8	SeriesDate	"19981019"
(0008,0022)	DA, 8	AcquisitionDate	"19981005"
(0008,0023)	DA, 8	ImageDate	"19981005"
(0008,0030)	TM, 0	StudyTime	""
(0008,0031)	TM, 0	SeriesTime	""
(0008,0032)	TM, 0	AcquisitionTime	""
(0008,0033)	TM, 0	ImageTime	""
(0008,0050)	SH, 0	AccessionNumber	""
(0008,0060)	CS, 2	Modality	"IO"
(0008,0068)	CS, 16	PresentationIntentType	"FOR PRESENTATION"
(0008,0070)	LO, 26	Manufacturer	"Schick Technologies, Inc. "
(0008,0080)	LO, 0	InstitutionName	""
(0008,0081)	ST, 0	InstitutionAddress	""
(0008,0090)	PN, 0	ReferringPhysician'sName	""
(0008,1010)	SH, 6	StationName	"BUILD "
(0008,1030)	LO, 10	StudyDescription	"LISA'S FMX"
(0008,103e)	LO, 0	SeriesDescription	""
(0008,1040)	LO, 0	InstitutionalDepartmentName	""
(0008,1050)	PN, 0	PerformingPhysician'sName	""
(0008,1070)	PN, 0	Operators'Name	""
(0008,1090)	LO, 22	Manufacturer'sModelName	"CDR DICOM for Windows "
(0008,1120)	SQ, -1	ReferencedPatientSequence	(null)
<(0008,1150)	UI, 24	ReferencedSOPClassUID	"1.2.840.10008.3.1.2.1.1"
<(0008,1155)	UI, 48	ReferencedSOPInstanceUID	"1.2.840.114244.030.0.337057497.2795720758.31665"
(0008,2218)	SQ, 0	AnatomicRegionSequence	(null)
(0008,2220)	SQ, 0	AnatomicRegionModifierSequence	(null)
(0008,2228)	SQ, 0	PrimaryAnatomicStructureSequence	(null)
(0008,2230)	SQ, 0	PrimaryAnatomicStructureModifierSequence	(null)
(0010,0010)	PN, 12	Patient'sName	"FMX^SERIES2 "
(0010,0020)	LO, 12	PatientID	"040-00-0007 "
(0010,0030)	DA, 0	Patient'sBirthDate	""
(0010,0040)	CS, 0	Patient'sSex	""
(0010,1000)	LO, 0	OtherPatientIDs	""
(0010,4000)	LT, 0	PatientComments	""
(0018,0015)	CS,0	BodyPartExamined	""
(0018,1020)	LO, 16	SoftwareVersion(s)	"3.0.1.1046"
(0018,1164)	DS, 18	ImagerPixelSpacing	"0.040000\0.040000 "

Tag	VR, Value	Description	Value or Source
(0018,1508)	CS,4	PositionerType	"NONE"
(0018,7006)	LT, 10	DetectorDescription	"APS SENSOR"
(0018,7008)	LT, 0	DetectorMode	""
(0018,700a)	SH, 0	DetectorID	""
(0018,700c)	DA, 0	DetectorCalibrationDate	""
(0018,700e)	TM, 0	DetectorCalibrationTime	""
(0018,7022)	DS, 18	DetectorElementSpacing	"0.040000\0.040000 "
(0018,7030)	DS, 4	FieldOfViewOrigin	"0\0 "
(0018,7032)	DS, 4	FieldOfViewRotation	"270 "
(0018,7034)	CS, 4	FieldOfViewHorizFlip	"YES "
(0020,000d)	UI, 48	StudyInstanceUID	"1.2.840.114244.030.2.337057497.2853760626.28713"
(0020,000e)	UI, 48	SeriesInstanceUID	"1.2.840.114244.030.3.337057497.3234060830.23108"
(0020,0010)	SH, 12	StudyID	"FMXSERIE.001"
(0020,0011)	IS, 2	SeriesNumber	"0 "
(0020,0013)	IS, 2	ImageNumber	"8 "
(0020,0020)	CS, 0	PatientOrientation	""
(0020,0062)	CS,0	Image Laterality	""
(0020,4000)	LT, 0	ImageComments	""
(0021,0010)	LO, 44	Change List	"SCHICK TECHNOLOGIES - Change List Creator ID"
(0021,0011)	LO, 42	Note Item	"SCHICK TECHNOLOGIES - Note Item Creator ID"
(0021,1001)	UI, 48	ReferencImageInstanceUID	"1.2.840.114244.030.4.337057497.868863780.4817"
(0021,1002)	SQ, 0	Sequence	(null)
(0021,1101)	UI, 48	ReferencImageInstanceUID	"1.2.840.114244.030.4.337057497.868863780.4817"
(0021,1102)	SQ, 0	Sequence	(null)
(0028,0002)	US, 2	SamplesperPixel	0001
(0028,0004)	CS, 12	PhotometricInterpretation	"MONOCHROME1 "
(0028,0010)	US, 2	Rows	0280
(0028,0011)	US, 2	Columns	0384
(0028,0100)	US, 2	BitsAllocated	0008
(0028,0101)	US, 2	BitsStored	0008
(0028,0102)	US, 2	HighBit	0007
(0028,0103)	US, 2	PixelRepresentation	0000
(0028,0301)	CS, 2	BurnedInAnnotation	"NO"
(0028,1040)	CS, 4	PixelIntensityRelationship	"LIN "
(0028,1041)	SS, 2	PixelIntensityRelationshipSign	+1
(0028,1050)	DS, 2	WindowCenter	"0 "
(0028,1051)	DS, 2	WindowWidth	"1 "
(0028,1052)	DS,2	RescaleIntercept	"0 "
(0028,1053)	DS, 2	RescaleSlope	"1 "
(0028,1054)	LO, 2	RescaleType	"US"
(0028,2110)	CS, 2	LossyImageCompression	"00"
(0029,1010)	LO, 48	Image Security	"SCHICK TECHNOLOGIES - Image Security Creator ID"
(0029,1001)	UL, 4	ImageChecksum	93 80 78 4b

Tag	VR, Value	Description	Value or Source
(0032,4000)	LT, 0	StudyComments	"Series 1"
(0040,0555)	SQ, 0	AcquisitionContextSequence	(null)
(2050,0020)	CS, 8	PresentationLUTShape	"INVERSE "
(7fe0,0010)	OW, 576000	PixelDataOW	5655 525c 5354 5454 655e 5c5d 605e 6663 6666 6b6a 6569 6868 6c69 7571 7376 6e70 ..