



DICOM Conformance Statement for CDRServer

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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>Receive and Store Image</i>	5
2.2.4. <i>Verify</i>	6
2.3. Sequencing of Real World Activities.....	6
3. CDRServer AE Specifications	7
3.1. AE Specification for CDRServer	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 CDRServer AE</i>	10
3.1.5. <i>Association Acceptance Policies for CDRServer AE</i>	11
3.1.6. <i>Association Initiation Policies for CDRServer AE</i>	15
3.2. Media AE Specification for CDRServer	17
3.2.1. <i>Media - Specification</i>	17
3.2.2. <i>File Meta Information for Media AE</i>	17
3.2.3. <i>Real-World Activities for Media AE</i>	17
4. Communication Profiles	19
4.1. Supported Communication Stacks	19
4.2. TCP/IP Stack.....	19
4.3. Physical Media Support	19
5. Extensions / Specializations / Privatizations	20
5.1. Private Tags.....	20
5.1.1. <i>Viewsets</i>	20
5.1.2. <i>Change List</i>	21
5.1.3. <i>Note List</i>	21
5.1.4. <i>Image Checksum</i>	22
6. Configuration	23
6.1. Configurable Settings.....	23
Appendix A. Image Tags	24

List of Figures

Figure 1. Implementation Model for CDRServer Application Entity	3
Figure 2. Query Database Model.....	4
Figure 3. Transfer Image Model.....	5
Figure 4. Receive / Store Image Model.....	6
Figure 5. Verify Model.....	6
Figure 6. Implementation Model for Media AE Specification for CDRServer.....	17

List of Tables

Table 1. Storage SOP Classes Supported by CDRServer.....	7
Table 2. Query / Retrieve SOP Classes Supported by CDRServer	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 CDRServer	9
Table 8. Presentation Contexts to Verify DICOM Association.....	11
Table 9. Presentation Contexts to Get Worklist / Query Database.....	11
Table 10. C-Find Status Codes	12
Table 11. Transfer Syntaxes to Receive and Store Images.....	12
Table 12. Presentation Contexts to Receive and Store Images.....	12
Table 13. C-Store Status Codes	14
Table 15. Transfer Syntaxes to Transfer Images	15
Table 16. Presentation Contexts to Transfer Images	15
Table 16. SOP Classes and Transfer Syntaxes: Export to CD Media.....	18
Table 17. ViewSet Tags.....	20
Table 18. ViewSet Item Tags	20
Table 19. Change List Tags	21
Table 20. Change List Item Tags.....	21
Table 21. Note Tags.....	21
Table 22. Note Item Tags	21
Table 23. Image Checksum Tags.....	22
Table 24. Image Tags	24

Notice and Version Information

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.

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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 CDRServer, the data storage component of the client-server software application (CDR[®]) from Schick Technologies. In its primary role, CDRServer will provide the interface for access, storage, and retrieval of images for the requesting CDRClient or other peer. This interface is also configurable for clients seeking to query and / or archive data via DICOM association.

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 CDRClient", to describe the proper and unambiguous communication of data between CDRServer and its compatible CDRClient(s). 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 the 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 CDRClient, refer to B1051036 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)
DX	Digital X-ray
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
IO	Intraoral
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 CDRServer Application Entity (AE) is an application that receives requests for the storage and retrieval of images and patient information. These requests originate with CDRClient or other calling application that interfaces with the server by DICOM association. (CDRClient AE is covered in a separate Conformance document.) The implementation model of the CDRServer AE is shown in the following figure.

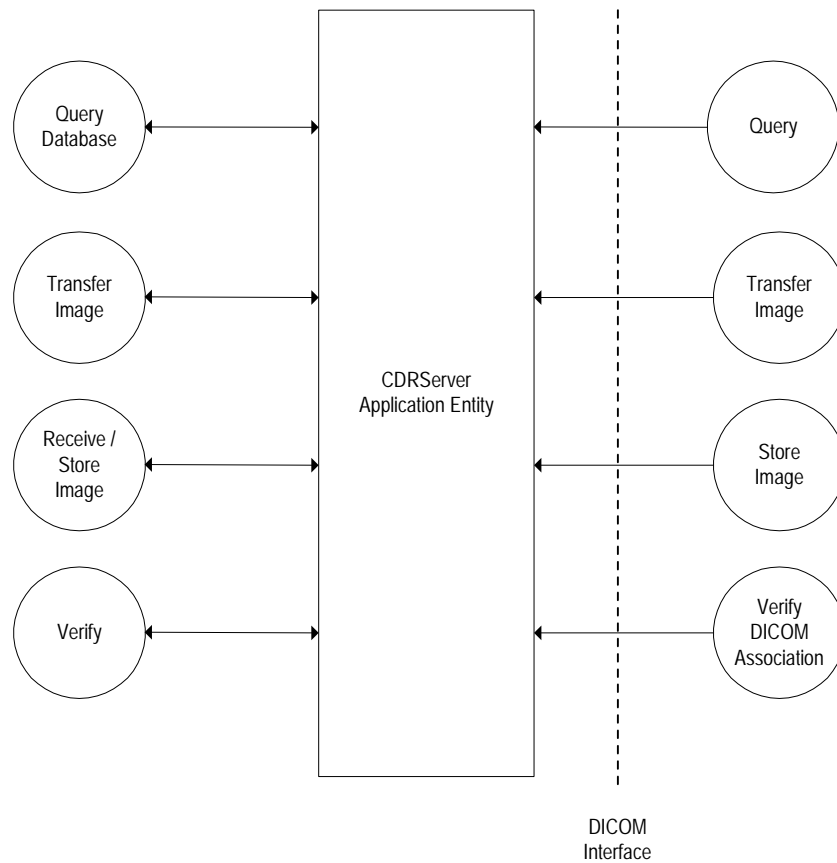


Figure 1. Implementation Model for CDRServer Application Entity

2.2. Functional Definitions

The CDRServer AE is an application providing the data storage interface for CDRClient(s). 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.

CDRServer acts as a service class provider (SCP) in the following roles:

1. SCP for C-Store operations to Storage service class users
2. SCP for C-Echo operations to Verification service class users
3. SCP for C-Find operations to Query / Retrieve service class users
4. SCP for C-Move operations to Query / Retrieve service class users

CDRServer acts as a service class user (SCU) in the following role:

1. SCU of C-Store operations from Storage service class providers (during MOVE operations only)

2.2.1. Query Database

When CDRServer receives a query request (C-Find-RQ), the database is queried for matches using the all the attributes supplied by the requesting CDRClient. 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 codes can be found in **Table 9**.

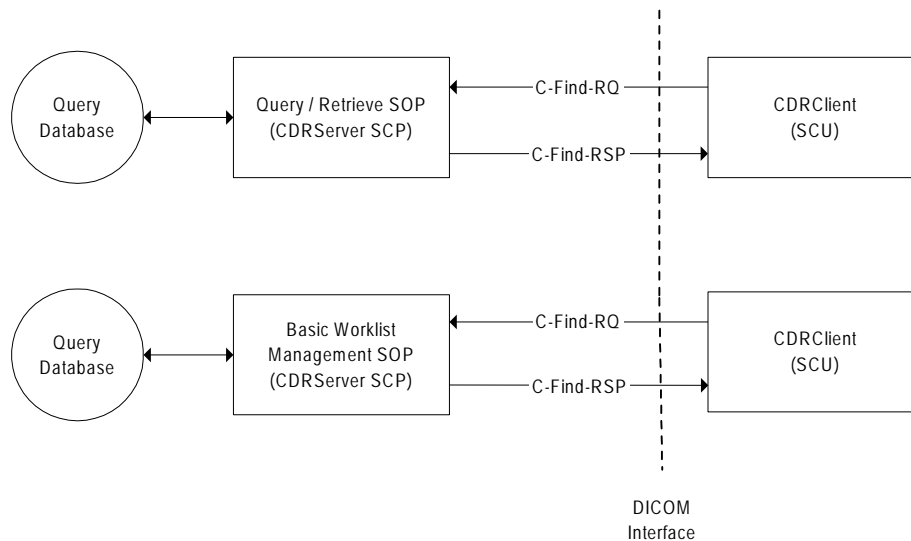


Figure 2. Query Database Model

While CDRServer is performing the matching process, C-Find operations can be interrupted by CDRClient through the use of C-Cancel-RQ.

2.2.2. Transfer Image

When CDRServer receives an image move request (C-Move-RQ), the database is queried using values supplied by CDRClient that uniquely identify the move destination to CDRServer (AE name, IP address, and port number).

CDRServer initiates C-Store operations through a separate association and transfers images corresponding to the values supplied in the move request from CDRClient. CDRServer generates responses (C-Move-RSP) and a status message of "Pending" as it completes C-Store operations. A status message of "Success" is issued when all matches have been identified. More information on these codes can be found in Error! Reference source not found..

While CDRServer is transferring images, C-Move operations can be interrupted by CDRClient through the use of C-Cancel-RQ.

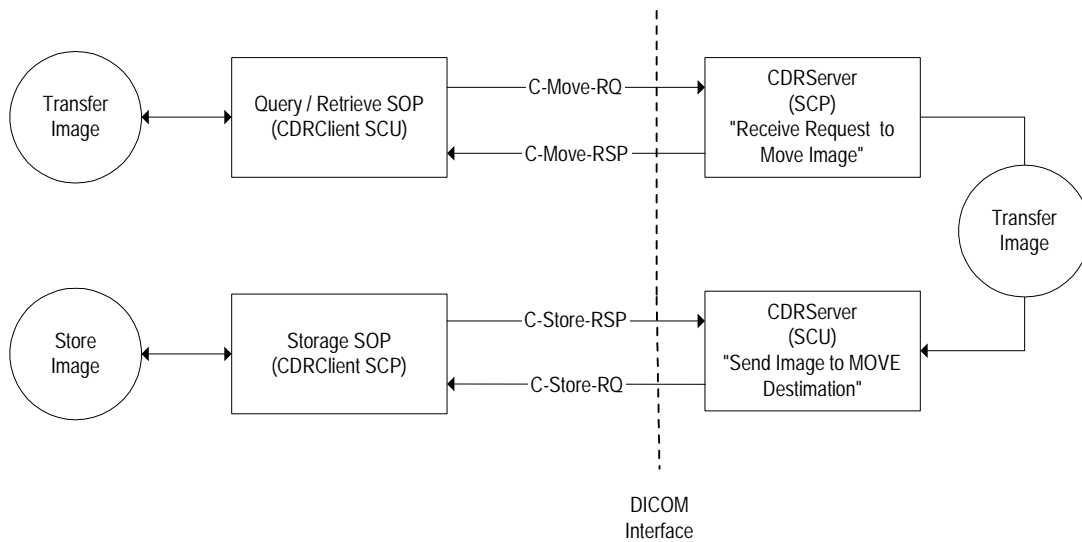


Figure 3. Transfer Image Model

2.2.3. Receive and Store Image

When CDRServer receives a request to store images (C-Store-RQ), the received image is stored locally on disk and image attributes are extracted and stored in the local database. CDRServer stores images in a configurable location on disk and then updates the local database with that information. CDRServer also issues a status message confirming the operation. More information on these codes can be found in **Table 12**.

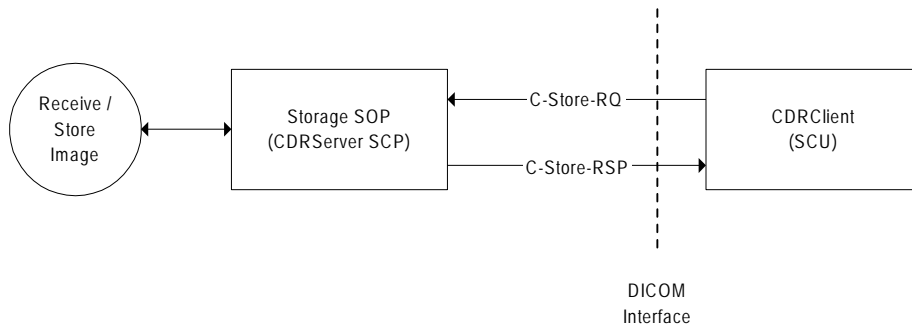


Figure 4. Receive / Store Image Model

2.2.4. Verify

When CDRServer receives a request to verify a current DICOM association (C-Echo-RQ), it responds with the C-Echo-RSP primitive.

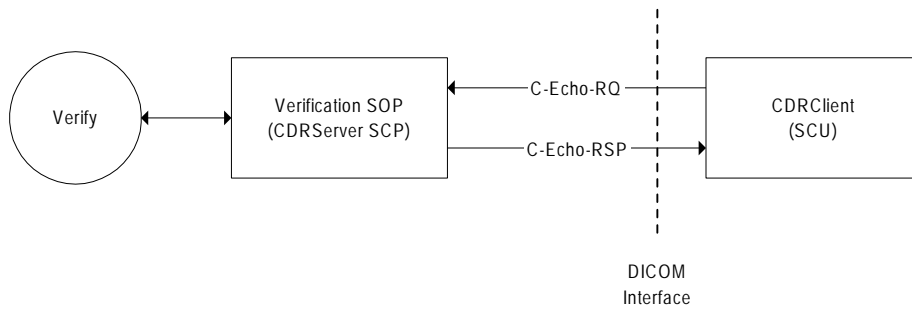


Figure 5. Verify Model

2.3. Sequencing of Real World Activities

Not applicable

3. CDRServer AE Specifications

3.1. AE Specification for CDRServer

3.1.1. Storage - Specification

CDRServer provides Standard Conformance to the following DICOM 3.0 Standard SOP Class as a SCP.

Table 1. Storage SOP Classes Supported by CDRServer

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

CDRServer provides Standard Conformance to the following DICOM 3.0 Standard SOP Class as a SCP.

Table 2. Query / Retrieve SOP Classes Supported by CDRServer

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

CDRServer provides Standard Conformance to the following DICOM 3.0 Standard SOP Class as a SCP.

Table 6. Verification SOP Class Supported by CDRServer

SOP Class Name	SOP Class ID
Verification	1.2.840.10008.1.1

3.1.4. Association Establishment Policies for CDRServer AE

3.1.4.1. General

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

- a. CDRServer accepts an association for verification.
- b. CDRServer accepts an association to get worklist information.
- c. CDRServer accepts an association to retrieve patient, study, series, and image information.
- d. CDRServer accepts an association to receive and store images.
- e. CDRServer initiates an association to transfer images to the destination specified by the C-Move SCU (CDRClient).

3.1.4.2. Number of Associations

CDRServer supports multiple-threaded associations and is limited only by the available resources and parameters of the operating system.

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 Acceptance Policies for CDRServer AE

CDRServer accepts associations for Verification, Basic Worklist Management, Query / Retrieve, Storage, and Structured Reporting services.

3.1.5.1. Real World Activity: Respond to Verification Request

3.1.5.1.1. Associated Real World Activity

CDRServer accepts an association with CDRClient or other peer 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	SCP	None

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

3.1.5.2.1. Associated Real World Activity

CDRServer accepts an association with CDRClient or other peer to get the patient worklist or to send query requests to the database and issue 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	SCP	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	SCP	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	SCP	None
Basic Worklist Management	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	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. Real World Activity: Respond to Receive and Store Images Request

3.1.5.3.1. Associated Real World Activity

CDRServer accepts an association with CDRClient or other peer to receive and store images and to issue the appropriate C-Store status code.

3.1.5.3.2. Presentation Contexts

Table 10. Transfer Syntaxes to Receive and 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 11. Presentation Contexts to Receive 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	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	All from Table 10	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.4	All from Table 10	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	All from Table 10	SCP	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	All from Table 10	SCP	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	All from Table 10	SCP	None
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	All from Table 10	SCP	None
X-ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	All from Table 10	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	All from Table 10	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 10	SCP	None
Digital X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	All from Table 10	SCP	None
Digital X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	All from Table 10	SCP	None
Digital Intra-oral X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	All from Table 10	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 10	SCP	None
Digital Mamography X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	All from Table 10	SCP	None
Digital Mamography X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	All from Table 10	SCP	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	All from Table 10	SCP	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	All from Table 10	SCP	None
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	All from Table 10	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	All from Table 10	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	All from Table 10	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	All from Table 10	SCP	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	All from Table 10	SCP	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 (i.e., UIDs) are missing from image
DATABASE_ERROR	0xC000	Error updating database
IMPORT_ERROR	0xC001	I/O Error importing image from disk

3.1.6. Association Initiation Policies for CDRServer AE

3.1.6.1. Real World Activity: Request to Transfer Images

3.1.6.1.1. Associated Real World Activity

CDRServer initiates an association to transfer images as a result of a C-Move request.

3.1.6.1.2. Presentation Contexts

Table 13. Transfer Syntaxes to Transfer 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 14. Presentation Contexts to Transfer 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 13	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	All from Table 13	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	All from Table 13	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	All from Table 13	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	All from Table 13	SCU	None
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	All from Table 13	SCU	None
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	All from Table 13	SCU	None

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID			
X-ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	All from Table 13	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	All from Table 13	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 13	SCU	None
Digital X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.1	All from Table 13	SCU	None
Digital X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.1.1	All from Table 13	SCU	None
Digital Intra-oral X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.3	All from Table 13	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 13	SCU	None
Digital Mamography X-ray Image Storage (Presentation)	1.2.840.10008.5.1.4.1.1.1.2	All from Table 13	SCU	None
Digital Mamography X-ray Image Storage (Processing)	1.2.840.10008.5.1.4.1.1.1.2.1	All from Table 13	SCU	None
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	All from Table 13	SCU	None
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	All from Table 13	SCU	None
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	All from Table 13	SCU	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	All from Table 13	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	All from Table 13	SCU	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	All from Table 13	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	All from Table 13	SCU	None

3.2. Media AE Specification for CDRServer

3.2.1. Media - Specification

CDRServer provides Standard Conformance to the DICOM Interchange Option of the Media Storage SOP Class. The application profile and its roles during real-world activities are provided in the following illustration.

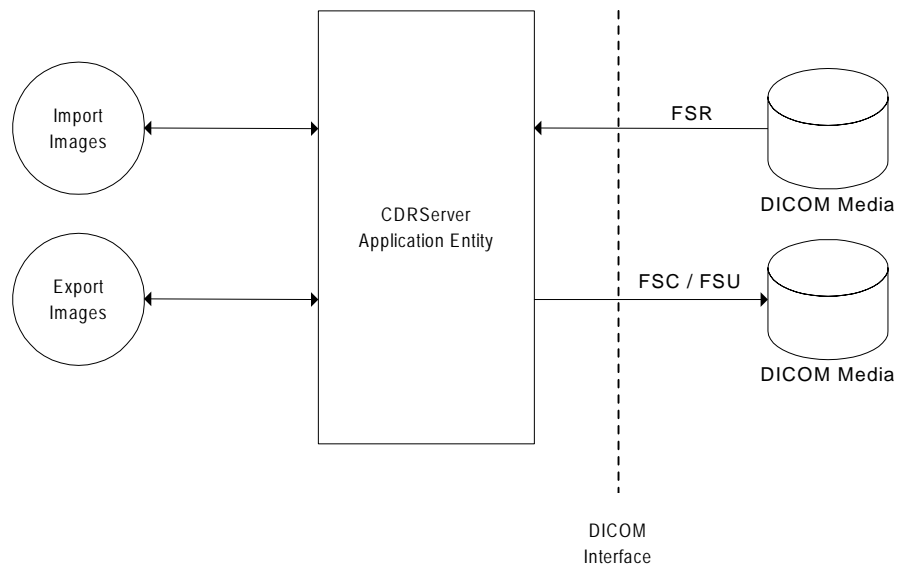


Figure 6. Implementation Model for Media AE Specification for CDRServer

3.2.2. File Meta Information for Media AE

The source Application Entity title for the Media AE is CDRDATAFSC.

3.2.3. Real-World Activities for Media AE

The Media AE supports the following real-world activities as listed below.

1. Import images from CD media
2. Export images to CD-R media

3.2.3.1. Real World Activity: Import

The import function is initiated from the CDR Data Administration utility. The user browses for the appropriate media and the location of the DICOMDIR file. In its role as a File Set Reader (FSR), CDRServer reads the directory of the DICOMDIR file and lists the studies available for import. Patient and study details, and the number of images in each study, are displayed. The studies can be imported all at once or selectively. Once selected, the studies are copied to the local database.

3.2.3.1.1. Media Application Profile

The import from CD media real-world activity uses the General Purpose CD-R Image Interchange Profile (STD-GEN-CD) as a File Set Reader.

3.2.3.2. Real World Activity: Export

The export function is initiated from the CDR Data Administration utility. The user selects a set of patients and studies from the local database to copy out to CD-R media. In its role as a File Set Creator and Updater (FSC / FSU) CDRServer exports the selected patients and studies and creates a DICOMDIR file on the media.

3.2.3.2.1. Media Application Profile

The export to CD media real-world activity uses the General Purpose CD-R Image Interchange Profile (STD-GEN-CD) as a File Set Creator and File Set Updater.

3.2.3.2.2. Interchange Option

The export to CD media real-world activity uses the Interchange option of the STD-GEN-CD application profile with a Directory Information Module.

3.2.3.2.3. SOP Classes and Transfer Syntaxes

The SOP classes and Transfer Syntaxes supported by the export to CD media real-world activity is listed in the following table.

Table 15. SOP Classes and Transfer Syntaxes: Export to CD Media

Information Object Definition	Service Object Pair UID	Transfer Syntax	
		Name	UID
Basic Directory	1.2.840.10008.1.3.10	Implicit VR Little Endian	1.2.840.10008.1.2

3.2.3.2.4. Attribute Information in the DICOMDIR

The DICOMDIR created by export includes the Basic Directory IOD containing directory records for every patient, study, series, and image copied out during this real-world activity. File IDs are created according to the following format:

LastName\ FirstName\ PatientID \ StudyDate \ StudyTime \ XXNumber

NOTE: In the format, "XXNumber", XX represents the modality (IO, DX, SR) and Number is a sequential number.

4. Communication Profiles

4.1. Supported Communication Stacks

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

4.2. TCP/IP Stack

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

4.3. Physical Media Support

CDRServer 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 16 and Table 17).

Table 16. 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 17. 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 18** and **Table 19**).

Table 18. 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 19. 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 20** and **Table 21**).

Table 20. 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 21. 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 22).

Table 22. 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. Port Number

Appendix A. Image Tags

Table 23. 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 ..