

SIDICOM® QR

DICOM Conformance Statement

English



V3.0

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for product version from 3.0 onwards

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0 History

Release	Date	Author	Review	Comment
1.0	27/12/2004	U. Meng	J. Zimmermann	
1.1	22/11/2005	U. Meng	J. Zimmermann	
3.0	26/06/2007	U. Meng	J. Zimmermann	

1 Introduction

1.1 Purpose

This document refers to the DICOM functionality of SDEXIS DICOM Query & Retrieve Plugin Version 3.0 (furthermore called "SIDICOMQR").

This document is written according to part PS 3.2 of [1].

The applications described in this Conformance Statement are the SDEXIS XG software and SDEXIS DICOM Query & Retrieve DirectDental Plugin (DICOM Gateway).

The SDEXIS software controls the digital Sirona X-ray products and includes a local patient and image database. SIDICOMQR adds DICOM Query & Retrieve functionality to SDEXIS XG.

SIDICOMQR acts as a Query & Retrieve SCU, and as a temporary C-Store SCP to retrieve dental SC, IO, DX, or CT images and import them to SDEXIS XG. In addition, SIDICOMQR supports the C-Echo service for administration.

1.2 Scope

This Conformance Statement refers to the Sirona X-Ray products using SDEXIS and the SDEXIS DICOM Query & Retrieve Plugin version 3.0.

"DICOM Query & Retrieve Plugin" is available only in English.

1.2.1 System requirements

- SDEXIS XG version 1.5 or higher 2.2 or higher for 3D functionality
- Microsoft Windows XP Professional, recommended with Service Pack 2
- Microsoft Windows Vista

1.3 Definitions, Abbreviations

1.3.1 Definitions

C-STORE	DICOM service for storing of objects, e.g. images
CT	Computer Tomography; specific DICOM Information Object
DX	Digital X-Ray; specific DICOM Information Object
DirectDental Plugin	Additional software that can be easy integrated/used within SDEXIS XG
Gateway	Connection between different data channels
IO	Intra Oral; specific DICOM Information Object
SC	Secondary Capture; specific DICOM Information Object
VL	Visible Light (Photographic Image); specific DICOM Information Object

1.3.2 Abbreviations

ACR	American College of Radiology
AE	DICOM Application Entity
CT	Computer Tomography
DICOM	Digital Imaging and Communication in Medicine
DX	Digital X-Ray
IO	Digital intraoral X-Ray
IOD	DICOM Information Object Definition
IS	Information System (HIS, RIS, PACS within hospital)
NEMA	National Electrical Manufacturers Association
PPS	Performed Procedure Step
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SPS	Scheduled Procedure Step
SIDEXIS	SIRONA Dental X-Ray and Imaging System
SOP	DICOM Service-Object Pair
UID	Unique Identifier, string unique in the whole network

1.4 References

- [1] Digital Imaging and Communication in Medicine (DICOM) 3.0, NEMA PS 3.1-18, 2004
- [2] SIDICOMQR User Manual

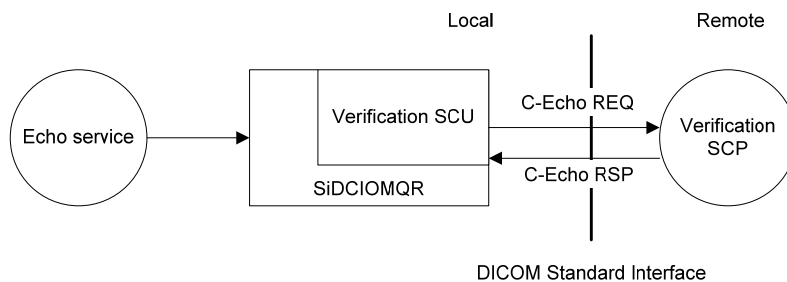
2 Implementation Model

2.1 Verification

2.1.1 Application Data Flow Diagram

The Verification service class defines an application-level class of service which allows the operator to verify the ability of an application on a remote node to respond to DICOM messages.

In SIDICOMQR the Verification service is totally integrated to act as SCU with the configured DICOM partner. The SCP will answer this responses with C-Echo replies.



2.1.2 Functional Definitions of AE's

SIDICOMQR opens an association to an application on the remote node and sends a Verification message (C-Echo Requests) to verify that the remote application can respond (C-Echo Responses) to DICOM messages.

2.1.3 Sequencing of Real-World Activities

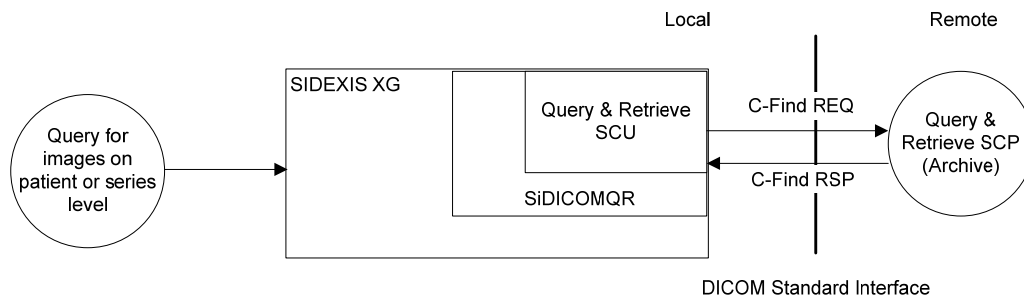
The user can select the "Echo-Test" menu item in the system menu of the SIDICOM Query Dialog Box. Depending on the answer of the remote application a dialog is shown with success or failure message.

Changing the configuration parameters (IP-Adress, Port, AE-Title) can be done within the configuration dialog.

2.2 Query Remote Database

2.2.1 Application Data Flow Diagram

SIDICOMQR can initiate a C-Find Request for special studies, series or images. So it has the role of a SCU in the Query & Retrieve service. The remote application sends the find requests to SIDICOMQR. If a patient root query is used this can be done in different level depths. E.g. on level 4 SIDICOMQR asks the server recursively for patients, studies, series, and images based on the criteria entered. On Study level search always all information on study, series and images are asked for.



2.2.2 Functional Definitions of AE's

The Query SCU (SIDICOMQR) requests the Query SCP (Archive) to perform a match to the keys specified in the C-FIND DIMSE service. The Query SCP responds to the C-FIND query and sends within this response the information of matched objects on the find level. Based on the configured level depth, SIDICOMQR sends additional C-FIND responses one level deeper and waits for these responses. This can be done down to the single-image level.

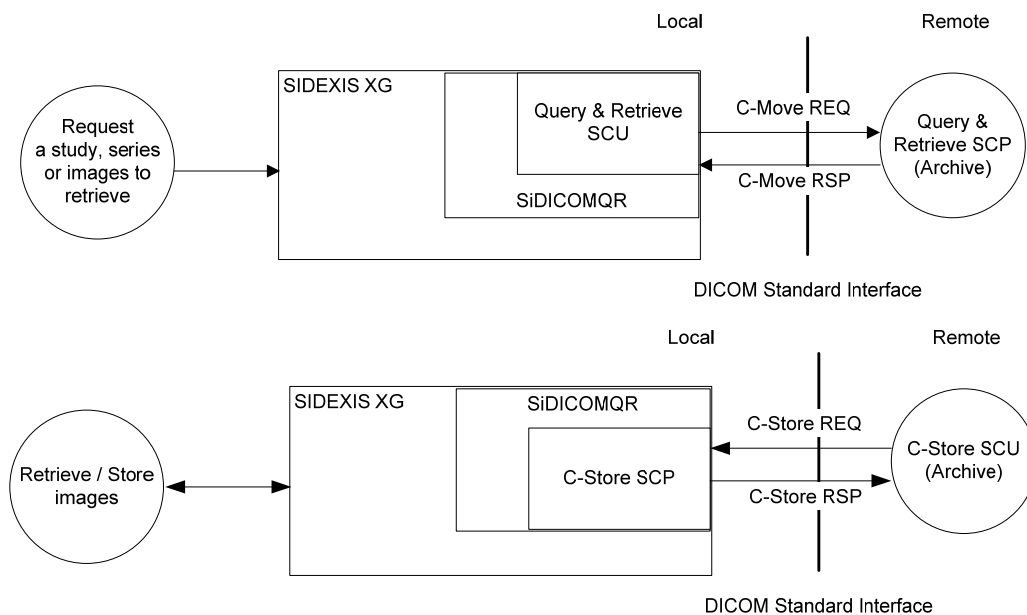
2.2.3 Sequencing of Real-World Activities

To perform a query the user chose, the "select pacs examination..." button within SIDEXIS XG. SIDICOMQR then shows a Query Dialog where the user can define "filters" of the information he want to query for. After specifying the query the "Search" button starts the C-Find Req. procedure. The responses are poured into a tree with up to 4 levels (Patient, Study, Series and Image).

2.3 Retrieve

2.3.1 Application Data Flow Diagram

SIDICOMQR initiates a C-Move request based on the selection the user wants to have transferred from the server (archive). SIDICOMQR then receives the requested images from the server and transfers them to the local SDEXIS application.



2.3.2 Functional Definitions of AE's

The SIDICOMQR application entity acts as a Service Class User (SCU) for the C-Move Service Class and temporarily as an SCP for the C-Store Service Class.

After having transmitted the C-Move request, SIDICOMQR listens on a configurable port for an incoming connection from the archive. Then it receives the images sent from the server and transmits them to the SDEXIS XG main application. After receiving the C-Move RSP, it automatically terminates.

2.3.3 Sequencing of Real-World Activities

To retrieve objects from the remote server, the user selects a study, series or an image in the query result tree and presses the "OK" button (The same can be done by double click). Then SIDICOMQR sends a C-Move Request to the archive and listens for incoming DICOM objects. If it receives a valid image, it opens it in a new temporary exam within SDEXIS XG. Now the user can view the images, discard them or save them in the local database.

In order to obtain complete SDEXIS exams or 3D data, the entire DICOM study and corresponding Raw Data storage must be requested, and the corresponding Move services must be supported by the archive.

3 AE Specifications

3.1 SIDICOM Query & Retrieve Specification

The SIDICOMQR Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Verification Service Class	1.2.840.10008.1.1
Patient Root Query Retrieve (Find)	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query Retrieve (Find)	1.2.840.10008.5.1.4.1.2.2.1
Patient Root Query Retrieve (Move)	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query Retrieve (Move)	1.2.840.10008.5.1.4.1.2.2.2
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 Intra-oral X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66

3.1.1 Association Establishment Policies

3.1.1.1 General

The configuration of SIDICOMQR defines:

- For Archives (Query & Retrieve SCP): the application entity titles, the port numbers, and the host name or net address.
- For incoming C-Store services: the application entity title and the port number.
- Additionally a special transfer syntax can be prescribed (default is auto-detect).

3.1.1.2 Number of Associations

SIDICOMQR can only attempt one association for each service establishment at one time. It is not possible to start multiple instances of SIDICOMQR.

3.1.1.3 Asynchronous Nature

SIDICOMQR does not support asynchronous communication (multiple outstanding transactions over a single association).

SIDEXIS is blocked during Query & Retrieve operations.

3.1.1.4 Implementation Identifying Information

The SIDICOMQR Implementation Class UID is

1.2.276.0.7230010.3.0.3.5.3

The default AE-Title is

SIDICOMQR

The implementation version name is

OFFIS_DCMTK_353

3.1.2 Association Initiation by Real-World Activity

SIDICOMQR initiates associations for the following DICOM V3.0 services:

- Verification
- C-Find
- C-Move

3.1.3 Association Acceptance by Real-World Activity

After a C-Move request, SIDICOMQR accepts incoming calls for the DICOM V.3.0 service:

- C-Store

3.1.3.1 Real-World Activity – for Verification

SIDICOMQR initiates an association for DICOM V3.0 Verification service.

3.1.3.1.1 Associated Real-World Activity - for Verification

After starting SIDICOMQR from within SIDEXIS XG, the user can perform a verification service to the configured DICOM Query & Retrieve Server. This can be done in the dialog's system menu / "Echo test".

3.1.3.1.2 Proposed Presentation Contexts - for Verification

The presentation contexts that are proposed by SIDICOMQR for the verification operation are specified in the following:

Presentation Context Table								
Abstract Syntax		Transfer Syntax					Role	Extended Negotiation
Name	UID	Name List			UID List			
Verification Service Class	1.2.840.10008.1.1	Explicit	VR	Little	Endian	1.2.840.10008.1.2.1	SCU	None
		Implicit	VR	Little	Endian	1.2.840.10008.1.2		
		Explicit	VR	Big	Endian	1.2.840.10008.1.2.2		

3.1.3.2 Real-World Activity – for Query (C-Find)

SIDICOMQR initiates an association for DICOM V3.0 C-Find service.

3.1.3.2.1 Associated Real-World Activity - Query

The user can perform a query by pressing "Search". Special search criteria can be defined by filling in the edit fields (e.g. patient name, study date, etc.). After the association has been established, a C-Find request with possible matching values is sent to the SCP. Then the partner sends the matching objects with C-Find responses to SIDICOMQR. SIDICOMQR fills the responses into the tree in the query "Result" window. If the server cannot find a valid study, the message "There were no items found based on the criteria entered" is shown (This message is also shown if a patient without studies is found and if SIDICOMQR is configured not to display patients without studies).

3.1.3.2.2 Proposed Presentation Contexts – Query (C-Find)

The presentation contexts that are proposed by SIDICOMQR for the Query C-Find operation are specified in the following:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query Retrieve (Find)	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query Retrieve (Find)	1.2.840.10008.5.1.4.1.2.2.1		1.2.840.10008.1.2 1.2.840.10008.1.2.2		

3.1.3.3 Real-World Activity – for Retrieve operations (C-Move)

SIDICOMQR initiates an association for DICOM V3.0 C-Move service.

3.1.3.3.1 Associated Real-World Activity - for Move operations

A move is initiated when the user selects an object (study, series or image) and presses the “OK” button. (This can be although done by double clicking the object). After the move request is transmitted to the server, SIDICOMQR waits for incoming C-Store request calls to receive the objects.

3.1.3.3.2 Proposed Presentation Contexts - for Move operations

The presentation contexts that are proposed by SIDICOMQR for the send image operation are specified in the following:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query Retrieve (Move)	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1	SCU	None
Study Root Query Retrieve (Move)	1.2.840.10008.5.1.4.1.2.2.2		1.2.840.10008.1.2 1.2.840.10008.1.2.2		

3.1.3.4 Real-World Activity – for Retrieve operation (C-Store)

After the C-Move request, SIDICOMQR waits for C-Store responses to receive the DICOM object(s) (series/images/...). The current version of SIDICOMQR is unable to receive images in an asynchronous way (Initiated without a preceding move request from SIDICOMQR).

3.1.3.4.1 Associated Real-World Activity - for Retrieve operations (C-Store)

After SIDICOMQR obtains a valid image from the server via a C-Store request, the images are automatically transferred to SIDEXIS XG. Within SIDEXIS, a new exam is generated and filled with the received image(s). The images can now be viewed by the user, then stored in the local database or discarded.

There is no overlay information of the images or examinations imported.

For the time being, a retrieval of 3D data or CT volumes is only possible with original GALILEOS DICOM data. Some necessary additional information is stored in private tags in the DICOM RawData objects. This means that 3D viewing in SIDEXIS/GALAXIS after a retrieve is only possible if volume and SIDEXIS exam data were sent completely to the archive in the past and if now the whole study is completely retrieved. Therefore it is necessary that the archive supports DICOM RawData storage and retrieval.

3.1.3.4.2 Proposed Presentation Contexts - for Retrieve operation (C-Store)

The presentation contexts that are proposed by SIDICOMQR for the C-Store operations are specified in the following:

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCP	None
Digital X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCP	None
Digital Intra-oral X-ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCP	None
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCU	None
CT Image Storage (GALILEOS CT volumes only)	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCU	None
Raw Data Storage (SIDEXIS-specific data)	1.2.840.10008.5.1.4.1.1.66	Explicit VR Little Endian Implicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2 1.2.840.10008.1.2.2	SCU	None

4 Communication Profiles

4.1 Supported Communication Stacks

SIDICOMQR provides DICOM V3.0 TCP/IP network communication support as defined in PS 3.8 of [1].

4.2 TCP/IP Stack

SIDICOMQR communicates over the TCP/IP protocol stack on any supported physical interconnection media.

4.2.1 Physical Media Support

SIDICOMQR is indifferent to the physical medium over which TCP/IP is executed, It inherits this from the operating system on which it exists.

5 Extensions / Specializations / Privatizations

5.1 Standard Extended / Specialized / Private SOPs

None.

5.2 Private Transfer Syntaxes

None supported.

6 Configuration

6.1 AE Title/Presentation Address Mapping

SIDICOMQR can be configured to use every valid port, IP-address, and AE-Title for incoming and outgoing connections.

To decrease the communication time on some systems, it can be useful to use domain names instead of IP-Addresses. In this case the Domain Name Service or "systems hosts" file must be configured correctly.

6.2 Configurable Parameters

See user and configuration manual.

7 Support of Extended Character Sets

Not supported.

We reserve the right to make any alterations which may be required due to technical improvements.

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