SIEMENS

SIENET

SHS

DICOM Conformance Statement

MagicStore (Version VB22)

Revision 4.0

Status: final

Last Change:22-Mai-1998

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PACS E2

Author	Approved by
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Date:	Date:
Signature:	Signature:

History

Document History

Version	Date of Issue	Author	Change & Reason of Change/ Change Request
R 0.1	25-Jul-1996	H. Gnoyke/ R. Höcker	initial version
R 1.0	30-Jul-1996	R. Höcker	after review
R 1.1	10-Apr-1997	R. Höcker	VB21
R 2.0	17-Apr-1997	R. Höcker	VB21 after review
R 2.1	08-Jul-1997	R. Höcker	CHARM 8025
R 3.0	11-Jul-1997	R. Höcker	VB21 last changes
R 3.1	23-Apr-1998	R. Höcker	VB22
R 3.2	11-Mai-1998	R. Höcker	after review
R 4.0	22-Mai-1998	R. Höcker	after review

Review History

Version	Review Date	Review Document/Protocol
R1.1	17-Apr-1997	Review Report
R2.1	08.Jul-1997	Review-Report
R3.0	11-Jul-1997	Review-Report
R3.1	23-Apr-1998	Review-Report
R3.2	18-Mai-1998	Review Report

Table of Contents

Chapter A

MagicStore DICOM Conformance Statement

Introduction

0.1 Purpose

This DICOM Conformance Statement is written according to part PS 3.2 of [1].

This conformance statement describes the DICOM Interface of the Siemens implementation of a Medical Imaging Storage and Archive System (SIENET MagicStore) running Software Version VB22.

The SIENET MagicStore DICOM Interface acts as a service class provider (SCP) for Storage Service Class, Verification Service Class and Query/Retrieve Service Class. The SIENET MagicStore DICOM Interface acts as a service class user (SCU) for both Storage Service Class and Verification Service Class.

0.2 Definitions, Acronyms and Abbreviations

ACR	**A**merican **C**ollege of **R**adiology
AE	DICOM **A**pplication **E**ntity
API	**A**pplication **P**rogrammers **I**nterface
DPQR	**D**ICOM (**P**atient Directory) **Q**ue**r**y
DQRY	**D**ICOM **Q**ue**ry**
Folder	Siemens specific name for a set of (ACR-NEMA/SPI) images, corresponds to a DICOM Study Component
IOD	DICOM **I**nformation **O**bject **D**efinition
NEMA	**N**ational **E**lectrical **M**anufacturers **A**ssociation
PACSnet	Siemens proprietary implementation of the SPI Standard
PDU	**P**rotocol **D**ata **U**nit
PLA	**P**acsnet **L**ogical **A**ddress (to identify an application on a PACSnet node)

SCU	DICOM **S**ervice **C**lass **U**ser (client using this DICOM service)
SCP	DICOM **S**ervice **C**lass **P**rovider (server providing this service)
SOP	**S**ervice/**O**bject **P**air
UID	**U**nique **ID**entifier, string unique in the whole network

0.3 References

[1] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-9, 1993

1 Implementation Model

Siemens MagicStore DICOM Interface is implemented to support three DICOM Application Entities (AE) as SCP which receive associations (Verification,Storage,Query/Retrieve) from remote Application Entities.

Siemens MagicStore DICOM Interface originates associations for Storage of DICOM Composite Information Objects as SCU in Remote Application Entities.

The MagicStore consists of two Database Services:

- An Image Management and Storage Service, which holds information about patients and images for the patients currently active.
  This Service includes both a provider for the DICOM Storage and Query/Retrieve Service Classes.
- A Magic Management Service, which has knowledge about all folders of all patients, a Long Term Database Service, which controls folders on both on-line and archive media. The long term database can serve one or multiple MagicStores.
  This Service only supports a provider for the DICOM Query/Retrieve Service Classes. The images can be located on any Image Management and Storage Server.

The Siemens MagicStore does not support the Media Storage Service Class.

1.1 Application Data Flow Diagram

The two Database Services may be located on different servers. Therefor the application data flow is different.

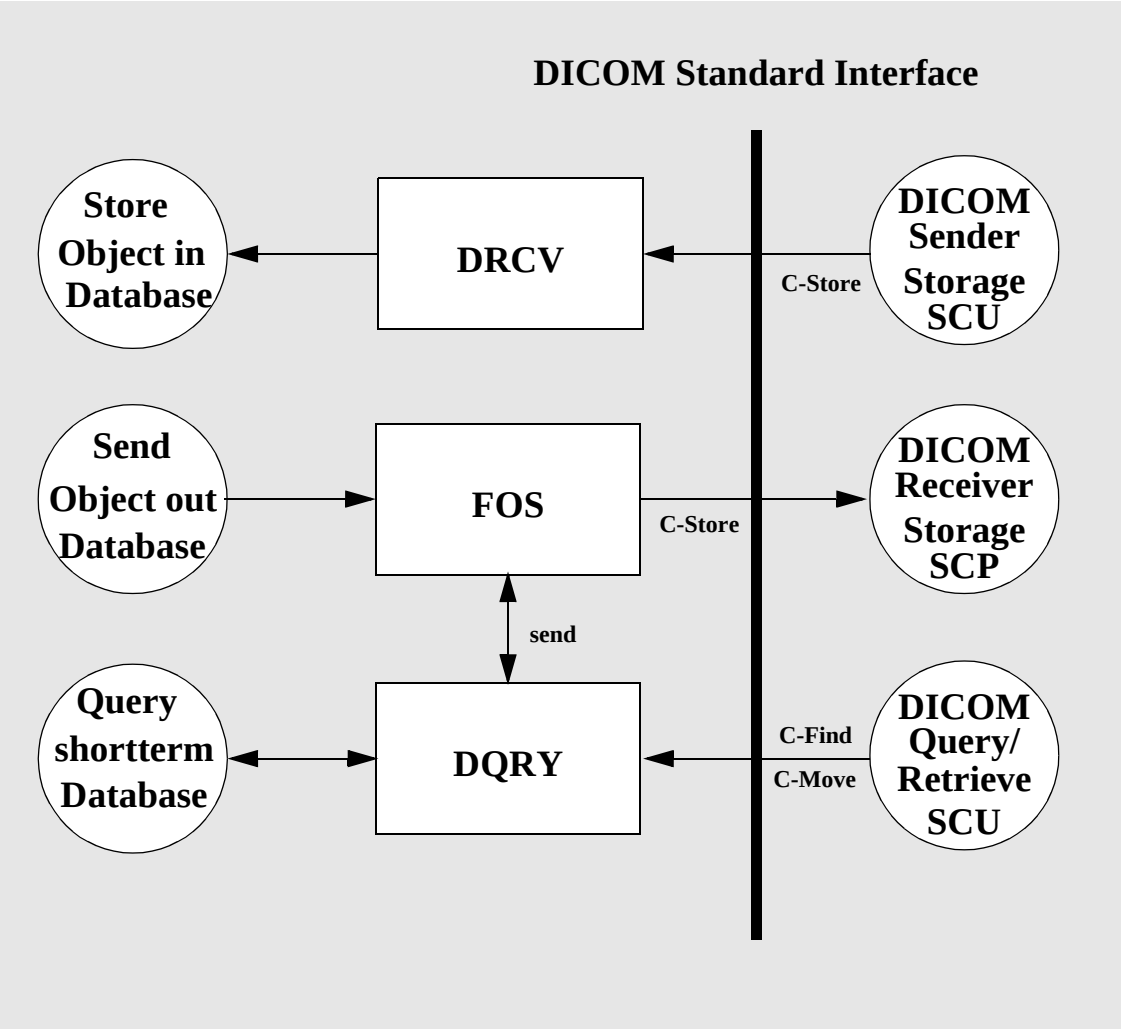
1.1.1 Image Storage and Archive Server

DRCV (DICOM Receiver for DICOM Image Storage), FOS (Folder Sender for Image Storage) and DQRY (DICOM Query/ Retrieve Provider) are applications to handle the DICOM communication for SIENET MagicStore.

These applications are started automatically and will be invoked automatically via network or via the integrated SIENET MagicStore user-interface.

- A remote Application Entity (AE) initiates an association for the DICOM Storage Service Class to the AE of DRCV. Upon acceptance of the association by DRCV the remote AE transmits the DICOM Information Objects to DRCV. After an object is received, DRCV initiates the transfer of the DICOM objects to the MagicStore image database. The images remain on short term storage before they are moved into the long-term archive.
- FOS initiates associations for DICOM Storage Service Class to remote AEs. For each folder being sent to a remote DICOM node a new association to the corresponding remote DICOM AE is initiated. The DICOM objects are sent via that open association.
- A remote Application Entity (AE) initiates an association for the DICOM Query/ Retrieve Service Class to the AE of DQRY. Upon acceptance of the association by DQRY the remote AE transmits DICOM Query / Retrieve Requests to DQRY.
  - In case of a C-Find Request the DQRY queries the short term image database of MagicStore and generates a response for each match. The responses are sent back to the remote AE via DICOM Query Responses.
  - In case of a C-Move Request the DQRY queries the short term image database of MagicStore and initiates a Storage Request for each match. A final Retrieve response is sent back to the remote AE.

Figure 1: Image Storage and Archive Server Application Data Flow Diagram



1.1.2 Magic Management Database Server

The application DPQR is a Query/Retrieve Service Class Provider.

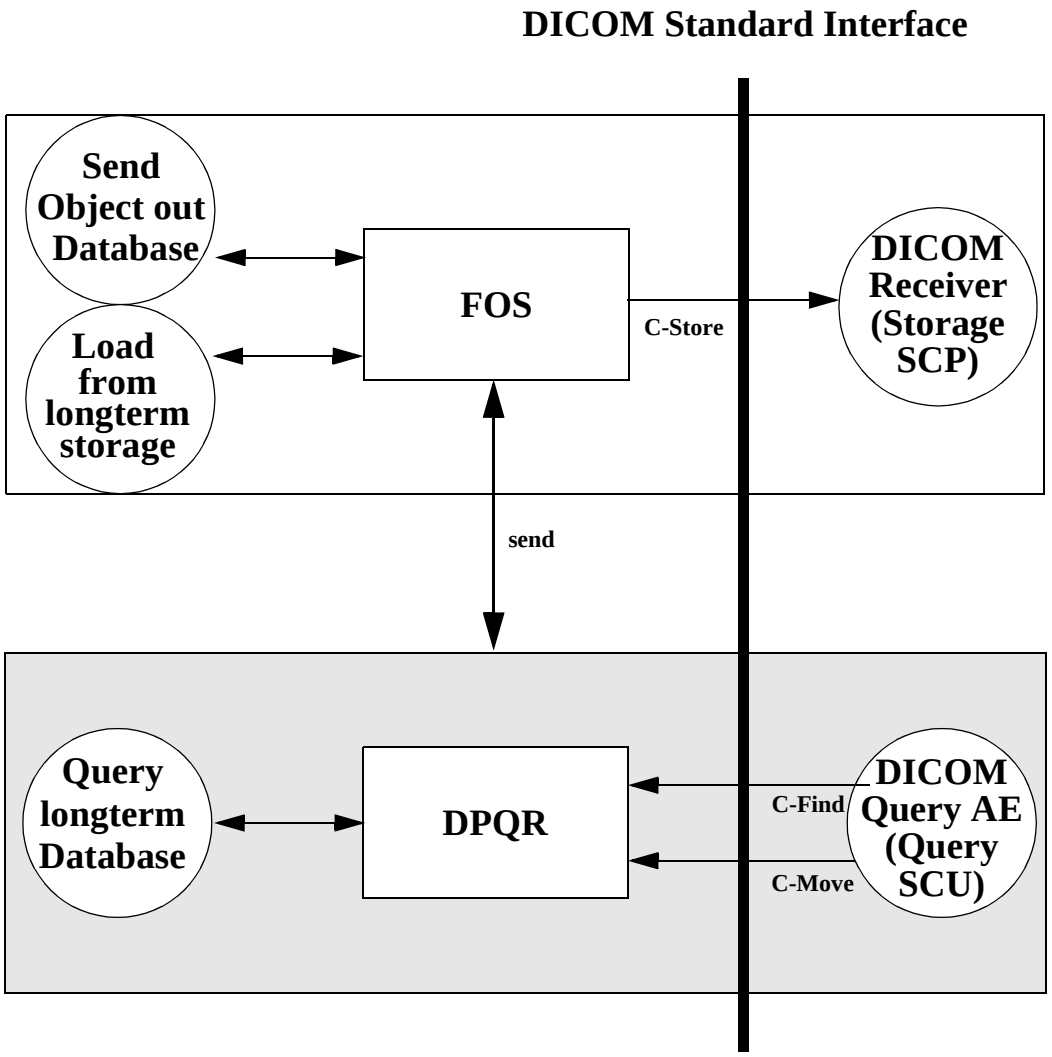
This application is started automatically and will be invoked automatically via network or via the integrated SIENET Magic-Store user-interface.

A remote Application Entity (AE) initiates an association for the DICOM Query/Retrieve Service Class to the AE of DPQR.

Upon acceptance of the association by DPQR the remote AE transmits DICOM Query/Retrieve Requests to DQRY.

- In case of a C-Find Request the DPQR queries the long term database of MagicStore and generates a response for each match. The responses are sent back to the remote AE via DICOM Query Responses. DPQR's response contains the Retrieve AE Title Data Element, whose value can either be a DQRY AE Title of any SIENET MagicStore in the network or the DPQR AE Title of that SIENET MagicStore, where DPQR is installed. There can be multiple AE's of DQRY in one network, there can only be one AE of DPQR in one network.
- In case of a C-Move Request the DPQR queries the long term image database of MagicStore and initiates a Storage Request for each match. This Storage Request may be executed by any SIENET MagicStore in the network, depending where the images to be reloaded from long term media are located. A final Retrieve response is sent back to the remote AE.

Figure 2: Magic Management Database Server Application Data Flow Diagram



1.2 Functional Definitions of Application Entities

All components of the Siemens DICOM Interface (including DRCV, FOS, DQRY/DPQR) are operating as background daemon processes. They start, when the machine is powered on and wait for tasks.

DRCV acting as a SCP is waiting for association requests from a remote DICOM client. The Application Entity Title and the Port Number the SCP is listening on are taken from the local configuration.

FOS acting as a SCU is waiting for requests from other local daemon processes (i.e. a new folder coming in via PACSnet) or for requests from the workstation's user. When a request is received, FOS initiates an association with a remote Application Entity.

DQRY/DPQR acting as a SCP are waiting for association requests from a remote DICOM client. The Application Entity Title and the Port Number the SCP is listening to are taken from the local configuration.

1.3 Sequencing of Real World Activities

After sending images to the Image Storage and Archive Server, the images can be retrieve from both, the Image Storage and Archive Server and the Magic Management Database Server. If the archive media is offline (CD or OD), a message for the operator will be created indicating to insert the corresponding media.

2 Application Entity Specifications

Each process of the application "Image Storage and Archive Server" on SIENET MagicStore provides one Application Entity. There are Application entities of FOS, DRCV,DPQR and DQRY.

The Siemens MagicStore provides Standard Conformance to the following DICOM Storage SOP Classes as an SCU and SCP:

Storage SOP Classes as an SCU and SCP

- ❏ CR (Computed Radiography) Image Storage
- ❏ CT Image Storage
- ❏ Ultrasound Multi-frame Image Storage
- ❏ Ultrasound Image Storage
- ❏ MR Image Storage
- ❏ SC Image Storage
- ❏ NM Image Storage
- ❏ X-Ray Angio Image Storage
- ❏ X-Ray Angio Radiofluoroscopic Storage

The Siemens MagicStore provides Standard Conformance to the following DICOM Query/Retrieve SOP Classes as an SCP:

Query/Retrieve SOP Classes as an SCP

- ❏ Patient Root Query/Retrieve Information Model - FIND
- ❏ Patient Root Query/Retrieve Information Model - MOVE
- ❏ Study Root Query/Retrieve Information Model - FIND
- ❏ Study Root Query/Retrieve Information Model - MOVE
- ❏ Patient/Study Only Query/Retrieve Information Model - FIND
- ❏ Patient/Study Only Query/Retrieve Information Model - MOVE

The Siemens MagicStore provides Standard Conformance to the following DICOM Verification SOP Classes as an SCP:

Verification SOP Classes as an SCU and SCP

- ❏ Verification

2.1 Association Establishment Policies

2.1.1 General

The configuration of the Siemens MagicStore defines the Application Entity Titles, the port numbers and the host name and net address.

2.1.2 Number of Associations

FOS initiates several associations at a time, one for each transfer request being processed. There may be up to 3 concurrent associations initiated by FOS active at a time, which are processed in parallel.

DRCV and DQRY, respectively DPQR, accept multiple associations from different remote DICOM AEs at a time(max default 10). There may be several concurrent associations active and processed in parallel.

2.1.3 Asynchronous Nature

This version of the software does not support asynchronous communication (multiple outstanding transactions over a single association).

2.1.4 Implementation Identifying Information

The Siemens MagicStore provides an Implementation Class UID of

❑ “1.3.12.2.1107.5.8”

and an Implementation Version Name of

❑“SNKIT_1.8”.

2.2 Association Initiation Policy

The Siemens MagicStore attempts to initiate a new association for

❏ DIMSE-C-STORE

service operations.

2.2.1 Real-World Activity - Send Image Objects to a Remote Node

2.2.1.1 Associated Real-World Activity - Send Image Objects to a Remote Node

The associated Real-World activity is a C-Store request initiated by the user of the workstation or by internal daemon processes. If FOS successfully establishes an association to a remote Application Entity, it will convert (only SPI images) and transfer each image of the folder one after another via the open association. If the C-Store Response from the remote Application contains a status other than Success, the association is aborted. After a configurable time period, the transfer of the folder is started again. If the Retry also fails, the foldername will be logged on a history queue with status Failed.

The DICOM targets are configured at configuration time.

2.2.1.2 Proposed Presentation Contexts

The Siemens MagicStore will propose Presentation Contexts as shown in the following tables.

Table 1: Send SCU Presentation Contexts of MagicStore

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
CR Image Storage	1.2.840.10008.5.1.4.1.1.**1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.**2**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None

US MF Image Storage Retired	1.2.840.10008.5**.** 1.4.1.1.**3**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
US MF Image Storage	1.2.840.10008.5**.** 1.4.1.1.**3.1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None

MR Image Storage	1.2.840.10008.5**.** 1.4.1.1.**4**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 .2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
US Image Storage Retired	1.2.840.10008.5**.** 1.4.1.1.**6**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
US Image Storage	1.2.840.10008.5**.** 1.4.1.1.**6.1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None

SC Image Storage	1.2.840.10008.5**.** 1.4.1.1.**7**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
NM Image Storage	1.2.840.10008.5**.** 1.4.1.1.**20**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5**.** 1.4.1.1.**12.1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None

X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5**.** 1.4.1.1.**12.2**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None

The default proposed transfer syntax is DICOM Implicit VR Little Endian Transfer Syntax.

2.2.1.3 SOP Specific Conformance Statement

The DICOM images sent by the Siemens MagicStore conform to the DICOM IOD definitions (Standard extended IODs).

MagicStore transparently stores DICOM objects, which it receives. MagicStore is not responsible for the content of the objects.

Siemens image objects (as well as images from other manufacturers) may contain additional private elements which have to be discarded by a DICOM system when modifying the image.

The DICOM nodes are responsible for data consistency when modifying images. All unknown private attributes have to be removed upon modification!

2.3 Association Acceptance Policy

The Siemens MagicStore accepts a new association for

❑ DIMSE-C-Echo

- ❏ DIMSE-C-Store
- ❏ DIMSE-C-Find
- ❏ DIMSE-C-Move

service operations.

2.3.1 Real-World Activity - Receive Echo

2.3.1.1 Associated Real-World Activity - respond to echo request

The associated Real-World activity is a C-Echo response by the DRCV and DQRY.

2.3.1.2 Proposed Presentation Contexts

The Siemens MagicStore will accept Presentation Contexts as shown in the following table.

Table 2: Echo SCP Presentation Contexts of MagicStore

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	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	None

2.3.1.3 SOP Specific Conformance to the Verification SOP Class

The DICOM MagicStore provides standard conformance to the DICOM Verification Service Class.

2.3.2 Real-World Activity - Receive Image Objects from a Remote Node

2.3.2.1 Associated Real-World Activity -Receive Image Objects from a Remote Node

The associated Real-World activity is a C-Store request received by the daemon process DRCV. After accepting an association from a remote DICOM AE, the DRCV process receives the images via the open association.

After the association is closed by the sender, DRCV initiates the transfer of the images information into the MagicStore's database.

2.3.2.2 Proposed Presentation Contexts

The Siemens MagicStores will accept Presentation Contexts as shown in the following tables.

Table 3: Send SCU Presentation Contexts of MagicStore

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
CR Image Storage	1.2.840.10008.5.1.4.1.1.**1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.**2**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None

US MF Image Storage Retired	1.2.840.10008.5**.** 1.4.1.1.**3**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
US MF Image Storage	1.2.840.10008.5**.** 1.4.1.1.**3.1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
MR ImageStorage	1.2.840.10008.5**.** 1.4.1.1.**4**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None

US Image Storage Retired	1.2.840.10008.5**.** 1.4.1.1.**6**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
US Image Storage	1.2.840.10008.5**.** 1.4.1.1.**6.1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
SC Image Storage	1.2.840.10008.5**.** 1.4.1.1.**7**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None

NM Image Storage	1.2.840.10008.5**.** 1.4.1.1.**20**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5**.** 1.4.1.1.**12.1**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5**.** 1.4.1.1.**12.2**	DICOM Implicit VR Little Endian Transfer Syntax, DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax JPEG Baseline (Process 1) Lossy JPEG Extended (Process 2 und 4) Lossy JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None

2.3.2.3 SOP Specific Conformance Statement

The Siemens MagicStore conforms to the Full Storage Service Class at Level 2. No Type 1, Type 2 or Type 3 attributes are discarded from the image. Even elements specified by tags not included in the DICOM standard will be kept.

The current Implementation does not discard elements. In the event of a successful C-STORE operation, the image has been successfully stored.

Images with identical Study Instance UID sent in one association or images with identical Study Instance UID sent in more associations within a configurable time are grouped into one folder. Images received after time expired are assigned a new folder identification.

The MagicStore can be configured to save the patient name in a normalized format, e.g. the used RIS format.The MagicStore can also be configured to show the normalized or the original patient name in a query response.

The DICOM MagicStore Receiver DRCV returns the status Success upon successful operation. Otherwise one of the following status codes is returned and the association is aborted:

- Refused (A700):
  This error status indicates a lack of Resources (e.g. not enough disk space) on the DICOM Interface Queues.
- Error (A900 or C000):
  An error occurred while processing the image. The image will not be stored and the association is aborted.

2.3.3 Real-World Activity - Receive Query Request from a remote Node

2.3.3.1 Associated Real-World Activity - respond to find request

- Image Storage and Archive Server
  - The associated Real-World activity is a C-Find request received by the daemon process DQRY. After accepting an association from a remote DICOM AE, the DQRY process receives the query requests via the open association and queries the short-term database. For each match a result messages is sent to the requesting remote node.
- Magic Managemenet Database Server
  - The associated Real-World activity is a C-Find request received by the daemon process DPQR. After accepting an association from a remote DICOM AE, the DPQR process receives the query requests via the open association and queries the long-term database. For each match a result messages is sent to the requesting remote node.

2.3.3.2 Proposed Presentation Contexts

The Siemens MagicStores will accept Presentation Contexts as shown in the following tables.

Table 4: Query SCP Presentation Contexts of MagicStore

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Query/ Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None

2.3.3.3 SOP Specific Conformance Statement

- ❏ Relational Queries are supported.
- ❏ The query matching for patient name is case insensitiv. (Can be configured to case sensitiv)
- ❏ The DICOM MagicStore Query Provider DQRY/DPQR returns one of the following status codes:
  - Success (0000):
    Matching is complete
  - Pending (FF00):
    Matches are continuing.
  - Failed(A900):
    Identifier does not match SOP Class
  - Refused (A700):
    Out of Resources
  - Failed (C001)
    Unable to process
- ❏ The DQRY only returns the own AET as Retrieve AET.

additional SOP Specific Conformance Statements for the Magic Management Database Server:

- ❏ The DPQR returns the own AET as Retrieve AET and additional the AET of the DQRY of the Image Archive and Storage Server, where the images are located, if they are in store.
- ❏ The Patient Root and Study Root Query/Retrieve Model only work with retrieve level patient or study. Although this is not DICOM conform, the Magic Management Database Server supports these Services, because many Dicom Query Retrieve users did not implement the
  Patient/Study Only Query Retrieve Model.
- ❏ The Storage Media File-Set ID (0088,0130) is used for folder_status information ("INSTORE", "NEARLINE", "OFFLINE"). (Not used, if the Query/Retrieve Level is Patient.)

2.3.3.3.1 Patient Root C-Find SOP Class Specific Conformance Statement

R = required, U = unique, 0 = optional

Table 5: Supported Patient level attributes

Description	Tag	Type
Patient's Name	(0010,0010)	R
Patient ID	(0010,0020)	U
Patient's Birth Date	(0010,0030)	O
Patient's Sex	(0010,0040)	O

Table 6: Supported Study level attributes

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician's Name	(0008,0090)	O
Study Description	(0008,1030)	O
Name of Physician(s) Reading Study	(0008,1060)	O
Number of Study Related Images	(0020,1208)	O

Table 7: Supported Series level attributes

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U
Body Part Examined	(0018,0015)	O

Table 8: Supported Image level attributes

Description	Tag	Type
Image Number	(0020,0013)	R
SOP Instance UID	(0008,0018)	U
Image Date	(0008,0023)	O
Image Time	(0008,0033)	O

2.3.3.3.2 Study Root C-Find SOP Class Specific Conformance Statement

Table 9: Supported Study level attributes

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Patient's Name	(0010,0010)	R
Patient ID	(0010,0020)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician's Name	(0008,0090)	O
Study Description	(0008,1030)	O
Name of Physician(s) Reading Study	(0008,1060)	O
Patient's Birth Date	(0010,0030)	O

Description	Tag	Type
Patient's Sex	(0010,0040)	O
Number of Study Related Images	(0020,1208)	O

- ❏ The same Series level attributes as in the Patient Root C-Find SOP class are supported.
- ❏ The same Image level attributes as in the Patient Root C-Find SOP class are supported.

2.3.3.3.3 Patient/Study Only C-Find SOP Class Specific Conformance Statement

- ❏ The same Patient level attributes as in the Patient Root C-Find SOP class are supported.
- ❏ The same Study level attributes as in the Patient Root C-Find SOP class are supported.

2.3.4 Real-World Activity - Receive Transfer Request from a remote Node

2.3.4.1 Associated Real-World Activity - initiate image transfer

❏ Image Storage and Archive Serve

The associated Real-World activity is a C-Move request received by the internal daemon process DQRY. After accepting an association from a remote DICOM AE, the DQRY process receives the move request via the open association and queries the short-term database. The requested images are sent to the requested remote node.

❏ Magic Management Database Server

The associated Real-World activity is a C-Move request received by the internal daemon process DPQR. After accepting an association from a remote DICOM AE, the DPQR process receives the move request via the open association and queries the long-term database.The DPQR sends a request to the Folder Sender of the corresponding Image Storage and Archive Server to send the requested images to the determined remote node.

2.3.4.2 Proposed Presentation Contexts

The Siemens MagicStores will accept Presentation Contexts as shown in the following table.

Table 10: Retrieve SCP Presentation Contexts of MagicStore

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None
Patient/Study Only Query/ Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax, DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None

2.3.4.3 SOP Specific Conformance statement for SOP class C-Find

- DQRY/DPQR initiates C-Store sub-operations using Presentation Context listed in 2.1.3.2.2.
- **additional** SOP Specific Conformance statement for the Magic Management Database Server

  The Patient Root and Study Root Query/Retrieve Model only work with retrieve level patient or study. Although this is not DICOM conform, the Magic Management Database Server supports these Services, because many Dicom Query Retrieve users did not implement the Patient/StudyOnly Query Retrieve Model.

2.3.5 Presentation Context Acceptance Criterion

The Siemens MagicStore will accept any number of verification or storage SOP classes that are listed above. There is no limit on the number of presentation contexts accepted. In the event that the Siemens MagicStore runs out of resources, it will reject the association request.

2.3.6 Transfer Syntax Selection Policies

The Siemens MagicStore currently supports the Implicit VR Little Endian, the Explicit VR Little Endian and Explicit VR Big Endian transfer syntax. Any proposed presentation context which includes one of these transfer syntaxes will be accepted. Any proposed presentation context that does not include one of these transfer syntaxes will be rejected.

3 Communication Profiles

3.1 Supported Communication Stacks

Siemens MagicStore provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

3.1.1 OSI Stack

not yet supported.

3.1.2 TCP/IP Stack

Siemens MagicStore uses the TCP/IP stack from the SUN SOLARIS system upon which it executes.

3.1.2.1 Physical Media Support

Siemens MagicStore is independent of the physical medium over which TCP/IP executes. This feature is inherent in the SUN SOLARIS operating system used on the MagicStore.

3.1.3 Point-to-Point Stack

not supported.

4 Extensions/Privatizations/ Specializations

4.1 Standard Extended/ Specialized/Private SOPs

None.

4.2 Private Transfer Syntaxes

None.

5 Configuration

5.1 AE Title / Presentation Address Mapping

The Siemens MagicStore maps Application Entity Titles to host name and port number via an internal configuration method. The IP address for the host name is determined using standard UNIX system calls.

For each DICOM MagicStore **default** unique Application Entity Titles are assigned using the following mechanism:

Each Application Entity Title starts with a unique 10 character string assigned to a DICOM MagicStore node. This string is also used as the first 10 characters of each PACSnet Logical Address (PLA) of the SIENET processes on the Siemens MagicStore. An example of such a string is '049SA1OT39'.

If <AEroot> describes such a 10 character unique string assigned to this specific DICOM MagicStore, the DICOM Application Entity title of DRCV and FOS (Storage AE Title) is:

<AEroot>DRSP port number:50082

The DICOM Application Entity Title of the query and retrieve daemons are:

<AEroot>DQRY short-term database port number 50089

<AEroot>DPQR long-term database port number 50091

The Portnumber and AE Titles can be changed with the SIENET Install Tool.

5.2 Configurable Parameters

The Application Entity Titles, host names and port numbers are configured using the SIENET Install Tool of the DICOM Interface.

This Install Tool also uses some default parameters:

- ❏ max PDU size set to 16384 Bytes (16 kB)
- ❏ no patient name normalization
- ❏ time-out for accepting/rejecting an association request: 240 sec
- ❏ time-out for responding to an association open/close request: 240 sec
- ❏ time-out for accepting a message over the network: 240 sec

6 Support of Extended Character Sets

The Siemens DICOM application supports the ISO 8859 Latin 1 (ISO-IR 100) character set.