

POLYTRON T.O.P. P2.5

AX

DICOM Conformance Statement

DICOM Storage

V 1.1

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M.Kerling

AXET 4

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History

Document History

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1 Introduction

1.1 Purpose

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

The applications described in this conformance statement are the SIEMENS Polytron T.O.P. products using software VD03E. The Polytron T.O.P. DICOM network implementation acts as SCU for the C-STORE DICOM network service.

1.2 Scope

This DICOM Conformance Statement refers to SIEMENS Polytron T.O.P. products using software D03E or higher. The following table relates software names to SIEMENS Polytron T.O.P. products.

Table 1: Siemens Polytron T.O.P. DICOM Products

Software Name	SIEMENS Product
D03E or higher	Polytron T.O.P.

1.3 Definitions, Abbreviations

1.3.1 Definitions

DICOM	Digital Imaging and Communication in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element with Composite information objects

1.3.2 Abbreviations

ACR	American College of Radiology
AE	DICOM Application Entity
ASCII	American Standard Code for Information Interchange
DS	Decimal String (16 bytes maximum)
IOD	DICOM Information Object Definition
IS	Integer String (12 bytes maximum)
ISO	International Standard Organisation
LO	Long String (12 bytes maximum)
NEMA	National Electrical Manufacturers Association
RIS	Radiology Information System
PDU	DICOM Protocol Data Unit

SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SH	Short String (16 characters maximum)
SOP	DICOM Service-Object Pair
ST	Short Text (1024 characters maximum)
UID	Unique Identifier, string unique in the whole network
UL	Unsigned Long (4 bytes fixed)
US	Unsigned Short (2 bytes fixed)

1.4 References

- [1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-9, 1993
- [2] CE 16-SC - DS Data Object Format Version 1.4

1.5 Connectivity and Interoperability

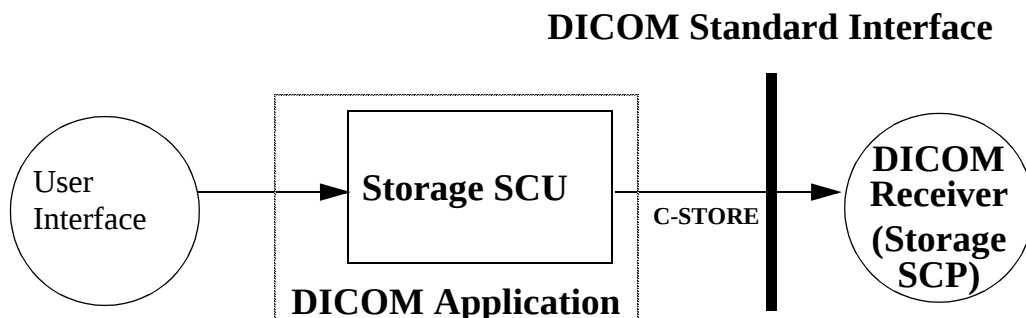
The implementation of the Siemens DICOM interface has been carefully tested to assure correspondence with this Conformance Statement. But the Conformance Statement and the DICOM standard does not guarantee interoperability of Siemens modalities and modalities of other vendors. The user must compare the relevant Conformance Statements and if a successful interconnection should be possible, the user is responsible to specify an appropriate test suite and to validate the interoperability, which is required. A network environment may need additional functions out of the scope of DICOM.

2 Implementation Model

The Siemens Polytron T.O.P. DICOM Application Entity originates associations for Storage of DICOM Composite Information Objects in Remote Application Entities.

2.1 Application Data Flow Diagram

The Polytron T.O.P. DICOM network implementation is a UNIX application and acts as SCU for the C-STORE DICOM network service.



2.2 Functional Definitions of Application Entities

not applicable.

2.3 Sequencing of real World Activities

not applicable.

3 Application Entity Specifications

3.1 Storage AEs Specification

The Polytron T.O.P. service class user application provides one AE being used when initiating associations to remote DICOM nodes.

SIEMENS Polytron T.O.P. DICOM products provide Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 2: SOP Classes as an SCU

SOP Class Name	SOP Class UID
SC (Secondary Capture) Image Information Object Storage	1.2.840.10008.5.1.4.1.1.7

3.1.1 Association Establishment Policies

3.1.1.1 General

The configuration of the Siemens Polytron T.O.P. DICOM application defines the Application Entity Titles, the port numbers and of course the host name and net address.

3.1.1.2 Number of Associations

The Siemens Polytron T.O.P. DICOM application initiates one association at a time, one for each transfer request being processed.

3.1.1.3 Asynchronous Nature

The Siemens Polytron T.O.P. DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

3.1.1.4 Implementation Identifying Information

The Siemens Polytron T.O.P. DICOM software provides a single Implementation Class UID of

- "1.3.12.2.1107.5.1995.1"

and an Implementation Version Name of

- "SIEMENS_DICOM_10".

3.1.2 Association Initiation Policy

The Siemens Polytron T.O.P. DICOM application attempts to initiate a new association for

- DIMSE C-STORE

service operations.

3.1.2.1 Associated Real-World Activity

3.1.2.1.1 Associated Real-World Activity -Send Image Objects to a remote Node

The associated Real-World activity is a C-STORE request initiated by an internal daemon process. If the process successfully establishes an association to a remote Application Entity, it will transfer each image 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.

3.1.2.1.2 Proposed Presentation Contexts

The Siemens Polytron T.O.P. DICOM application will propose Presentation Contexts as shown in the following table:

Table 3: Initiation presentation context

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
SC Image Storage Service class	1.2.840.10008.5.1.4.1.1.7	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

3.1.2.1.3 SOP Specific Conformance Statement to Storage SOP classes

The DICOM images created by Siemens Polytron T.O.P. DICOM application conform to the DICOM IOD definitions (Standard extended IODs). But they will 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!

Data Dictionary of DICOM Type 2 and 3 IOD Attributes

The table lists the data dictionary of all DICOM IOD attributes of type 2 and 3 which are encoded with none zero value length.

Table 4: Data Dictionary of DICOM type 2 and 3 IOD Attributes

Attribute Name	Tag	Value
Patient's Name	0010/0010	
Patient ID	0010/0020	
Patient's Birth Date	0010/0030	
Patient's Sex	0010/0040	
Study Date	0008/0020	
Study Time	0008/0030	
Referring Physician's Name	0008/0090	
Study Id	0020/0010	
Patient's Size	0010/1020	
Patient Weight	0010/1030	
Series Number	0020/0011	
Series Date	0008/0021	
Series Time	0008/0031	
Manufacturer	0008 /0070	"SIEMENS "
Institution Name	0008 /0080	<Hospital Name>
Station Name	0008 /1010	<AERoot, see 6.1>
Manufacturer's Model Name	0008 /1090	"POLYTRON-TOP"
Software Versions	0018 /1020	"D03E" <or higher, e.g. D03F>
Window Center	0028/1050	"00512\000512"
Window Width	0028/1051	"1024\01024"

Table 5: Special value for DICOM type 1 IOD Attributes

Attribute Name	Tag	Value
Modality	0008/0060	"DS"

Data Dictionary of applied private IOD Attributes

see document [2]

3.1.2.1.4 Image Pixel Attribute Description for Grayscale Images

The Siemens Polytron T.O.P. DICOM application supports the monochrome 2 photometric interpretation with the unsigned integer 16 bit gray scale pixel and graphic overlay format. The lower 10 bits are used for pixel and the higher 4 bits are used for the graphic overlay:

Pixel plane

- + samples per pixel (attribute 0028, 0002) = 1
- + photometric interpretation (attribute 0028,0004) = "MONOCHROME2"
- + pixel representation (attribute 0028, 0103) = 0
- + bits allocated (attribute 0028, 0100) = 16
- + bits stored (attribute 0028,0101) = 10
- + high bit (attribute 0028,0102) = 9

Overlay plane

- + rows (attribute 60xx, 0010) = same as attribute 0028, 0010
- + columns (attribute 60xx, 0011) = same as attribute 0028, 0011
- + overlay type (attribute 60xx, 0040) = "G"
- + origin (attribute 60xx, 0050) = 0,0
- + bits allocated (attribute 60xx, 0100) = 16
- + bit position (attribute 60xx, 0102) = 13
- + overlay data (attribute 60xx, 3000) = not supported.>

3.1.2.1.5 Image Pixel Attribute Description for Color Images

Not applicable.

4 Communication Profiles

4.1 Supported Communication Stacks

The Siemens Polytron T.O.P. DICOM application provide DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.1.1 OSI Stack

not supported.

4.1.2 TCP/IP Stack

The Siemens Polytron T.O.P. DICOM application uses the TCP/IP stack from the SUN-OS system upon which it executes. It uses the MergeCOM subroutine library that is based on a Berkeley socket interface.

4.1.2.1 API

The Siemens Polytron T.O.P. DICOM application uses the MergeCOM library that is based on a TCP/IP socket interface.

4.1.2.2 Physical Media Support

The Siemens Polytron T.O.P. DICOM application is indifferent to the physical medium over which TCP/IP executes; it inherits this from the SUN-OS system upon which it executes.

4.1.3 Point-to-Point Stack

not supported.

5 Extensions/Specializations/ Privatizations

5.1 Standard Extended/Specialized/Private SOPs

The DICOM Polytron T.O.P. DICOM application creates DICOM standard extended Information Objects in such a way that each image can contain additional private elements stored in private groups. These elements are used to store data not defined in DICOM. If these images are modified on DICOM nodes then these applications are responsible for data consistency. All unknown private attributes have to be removed upon modification!

5.2 Private Transfer Syntaxes

None.

6 Configuration

6.1 AE Title / Presentation Address Mapping

The Siemens Polytron T.O.P. DICOM unique Application Entity Titles are assigned using the following mechanism:

Each Application Entity Title starts with a unique 10 character string assigned for this Siemens Polytron T.O.P. DICOM node. This string is also used as the first 10 characters of the PACSnet Logical Address (PLA) and builds the AERoot. An example for such a string is '049SA1DS39'.

The DICOM Sender Application provides the Application Entity Title:

<AERoot>DFOS

6.2 Configurable Parameters

The Application Entity Titles, host names and port numbers are configured using the Siemens Polytron T.O.P. installation tool.

This installation tool also uses some default parameters:

- max PDU size set to 16384 Bytes (16 kB)
- time-out for accepting/rejecting an association request: 60 s
- time-out for responding to an association open/close request: 60 s
- time-out for accepting a message over network: 120 s

7 Support of Extended Character Sets

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

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