

DICOM Conformance Statement

Sectra CDS version 14.3



SECTRA

Som en del av vårt åtagande att leverera högkvalitativa produkter och service, vill vi gärna ha synpunkter på kvaliteten på denna dokumentation.

Om du tycker att vi kan utveckla denna dokumentation på ett eller annat sätt, skicka dina synpunkter till support@sectra.se

1. Intended Use

For a description of the Intended Use, please refer to User's Guide Sectra RIS Client.

Dokumenttitel	CDS_DICOM_Conformance_Statement
Revision	14.3
Datum	2012-03-07

Table of Contents

1. Intended Use	2
2. Introduction	5
2.1 References.....	5
2.2 Version History	5
2.2.1 <i>Version 4.3</i>	5
3. Implementation model	6
3.1 Application Data Flow Diagram	6
3.2 Functional Definitions of AE's	7
3.2.1 <i>Summary of SOP Classes Supported as SCP</i>	7
Table 1. Supported SOP classes as SCP	7
3.2.2 <i>Summary of Supported Transfer Syntaxes as SCP</i>	7
Table 2. Supported Transfer Syntaxes	7
3.2.3 <i>Summary of SOP Classes Supported as SCU</i>	7
Table 3. Supported SOP classes as SCU.....	7
3.2.4 <i>Summary of Supported Transfer Syntaxes as SCU</i>	7
Table 4. Supported Transfer Syntaxes	7
2.3 Sequencing of Real-World Activities.....	7
4. Modality Worklist SCP Specification	8
4.1 Association Establishment Policies	8
4.1.1 <i>General</i>	8
4.1.2 <i>Number of Associations</i>	8
4.1.3 <i>Asynchronous Nature</i>	8
Table 5. Asynchronous nature as a SCP for Modality Worklist.....	8
4.1.4 <i>Implementation Identifying Information</i>	8
4.2 Association Initiation Policy	8
4.3 Association Acceptance Policy.....	8
4.3.1 <i>Real-World Activity: Verification</i>	8
4.3.2 <i>Real-World Activity: Worklist Query</i>	9
Table 6. Matching and default Return Attributes as SCP	9
5. MPPS SCP Specification	11
5.1 Association Establishment Policies	11
5.1.1 <i>General</i>	11
5.1.2 <i>Number of Associations</i>	11
5.1.3 <i>Asynchronous Nature</i>	11
Table 7. Asynchronous nature as a SCP for MPPS.....	11
5.1.4 <i>Implementation Identifying Information</i>	11
5.2 Association Initiation Policy	11
5.3 Association Acceptance Policy.....	11
5.3.1 <i>Real-World Activity: Verification</i>	11
5.3.2 <i>Real-World Activity: Performed Procedure Step Creation/Update</i>	12
Table 8. Use of Dicom Data in the MPPS SOP Instance	12

6.	MPPS SCU Specification	15
6.1	Association Establishment Policies	15
6.1.1	<i>General</i>	15
6.1.2	<i>Number of Associations</i>	15
6.1.3	<i>Asynchronous Nature</i>	15
6.1.4	<i>Implementation Identifying Information</i>	15
6.2	Association Initiation Policy	15
6.2.1	<i>Activity: Relay MPPS</i>	16
7.	Communication Profiles	17
7.1	Supported Communication Stacks.....	17
7.2	TCP/IP Stack	17
7.2.1	<i>Physical Media Support</i>	17
7.3	OSI Stack	17
7.4	Point-To-Point Stack.....	17
8.	Extensions / Specializations / Privatizations	18
9.	Configuration	19
9.1	AE Title/Presentation Address Mapping	19
9.1.1	<i>Local AE Titles and Presentation Addresses</i>	19
9.1.2	<i>Remote AE Titles and Presentation Addresses</i>	19
10.	Support of Character Sets	20

2. Introduction

This document describes the DICOM support of the following Sectra product families:

- Sectra CDS (RIS DICOM Server)

This document should be read together with the DICOM standard [1]. Definitions and terms are used in this document according to the DICOM standard. It is assumed that the reader is familiar with the DICOM standard.

2.1 References

- [1] Digital Imaging and Communications in Medicine (DICOM), NEMA Standard Publications PS 3.1-16 and Supplements.

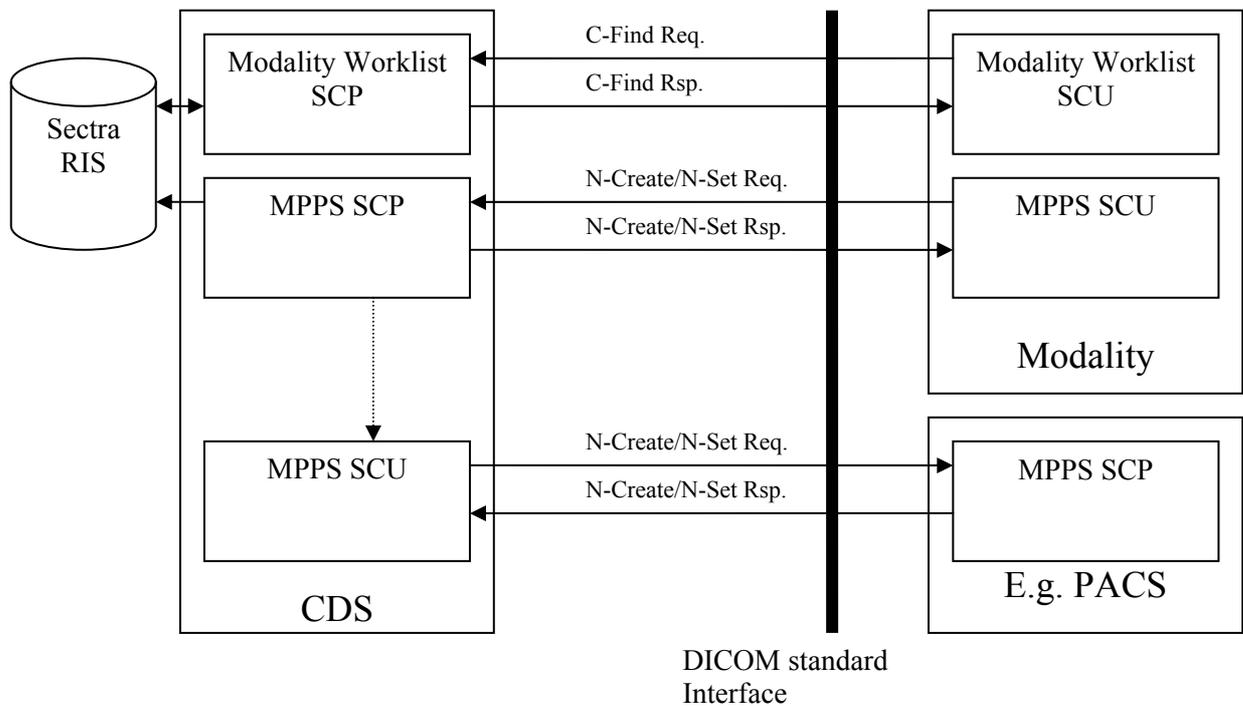
2.2 Version History

2.2.1 Version 4.3

First official release of CDS

3. Implementation model

CDS is a Windows based service application that allows modalities to query the RIS for patient demographic data such as Patient identification number, name, date of birth etc and to communicate Modality Performed Procedure Steps (MPPS) to the RIS. Modality Performed Procedure Step is abbreviated MPPS through the remainder of the document.



3.1 Application Data Flow Diagram

The CDS application acts as SCP for Modality Worklist Management SOP Class and as SCP and SCU for Modality Performed Procedure Step SOP Class. The Worklist SCP responds to C-Find requests containing matching key attributes from the modality and returns one or more C-FIND Responses containing return key attributes. The MPPS SCP responds only with a status code (i.e. no dataset). The MPPS SCU relays MPPS datasets received from the modality MPPS SCP.

3.2 Functional Definitions of AE's

3.2.1 Summary of SOP Classes Supported as SCP

Table 1. Supported SOP classes as SCP

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Modality Worklist Information Model FIND	1.2.840.10008.5.1.4.31
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

3.2.2 Summary of Supported Transfer Syntaxes as SCP

Table 2. Supported Transfer Syntaxes

Transfer Syntax Name	Transfer Syntax UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2

3.2.3 Summary of SOP Classes Supported as SCU

Table 3. Supported SOP classes as SCU

SOP Class Name	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

3.2.4 Summary of Supported Transfer Syntaxes as SCU

Table 4. Supported Transfer Syntaxes

Transfer Syntax Name	Transfer Syntax UID
Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2

2.3 Sequencing of Real-World Activities

Not applicable.

4. Modality Worklist SCP Specification

4.1 Association Establishment Policies

4.1.1 General

The maximum PDU length is default 256 Kbytes, but the value is configurable.

4.1.2 Number of Associations

The maximum number of simultaneous associations that is supported by the Modality Worklist SCP is 128 by default, but the value is configurable. There is no other limit for the number of concurrent associations for a given Modality Worklist SCU AE.

4.1.3 Asynchronous Nature

The Modality Worklist SCP supports multiple outstanding transactions over a single association.

Table 5. Asynchronous nature as a SCP for Modality Worklist

Maximum number of outstanding asynchronous transactions	1024 (configurable).
---	----------------------

4.1.4 Implementation Identifying Information

The Modality Worklist SCP AE will provide an Implementation Class UID that is 1.2.752.24.5.5.1.1.0.0. The implementation version name is "SectraDcmtk".

4.2 Association Initiation Policy

The Modality Worklist SCP does not initiate associations.

4.3 Association Acceptance Policy

It is possible to configure whether unrecognized AE-titles shall be allowed or not. By default, the Modality Worklist SCP will reject associations from applications that do not address it properly, i.e. specify an incorrect called AE title. The Worklist SCP accepts associations for the following events:

- Verification of the DICOM communication between a remote system and the Modality Worklist SCP.
- Modality Worklist C-Find query.

4.3.1 Real-World Activity: Verification

Associated Real-World Activity

A remote system wants to verify the DICOM communication with the Modality Worklist SCP.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 2. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class

The Modality Worklist SCP AE provides standard conformance to the DICOM Verification Service Class.

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 2, but is configurable.

4.3.2 Real-World Activity: Worklist Query

Associated Real-World Activity

A remote system wants to query the worklist database using the C-FIND command.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 2. Role is SCP. Extended negotiation is not supported.

SOP Specific Conformance to FIND SOP classes

The Modality Worklist SCP AE provides conformance to the DICOM FIND SOP classes as SCP. Listed in Table 6 are currently supported Matching key attributes and default Return attributes. For each modality registered in the RIS database, it is possible to configure what attributes shall be supported with a value from the RIS (provided that it is included in the worklist query) and also what information each attribute shall contain. However, the information is restricted to what information is stored and available in the RIS database. Attributes included in the worklist query that are not configured in the RIS to contain a value will be returned with an empty value unless the standard states something else.

If unsupported matching key(s) are found in the worklist query a pending response status of xFF01 (Pending Warning) will be returned, otherwise xFF00 (Pending). In case the query results in no matching, a response of x0 (Success) is sent.

Table 6. Matching and default Return Attributes as SCP

Tag	VR	Attribute Name	Matching	Comments
(0008,0005)	CS	Specific Character Set		Configurable.
(0008,0050)	SH	Accession Number	Single value	
(0008,0090)	PN	Referring Physician's name		
(0010,0010)	PN	Patients Name	Single value or wild card	
(0010,0020)	LO	PatientID	Single value or wild card	
(0010,0030)	DA	PatientsBirthDate		
(0010,0040)	CS	PatientsSex		
(0010,2000)	LO	MedicalAlerts		
(0020,000d)	UI	StudyInstanceUID		

(0032,1032)	PN	RequestingPhysician		
(0032,1060)	LO	RequestedProcedureDescription		
(0032,1064)	SQ	Requested ProcedureCodeSequence	Sequence	
> (0008,0100)	SH	CodeValue		
> (0008,0102)	SH	CodingSchemeDesignator		
> (0008,0103)	SH	CodingSchemeVersion		
> (0008,0104)	LO	CodeMeaning		
(0040,0100)	SQ	ScheduledProcedureStepSequence	Sequence	
> (0008,0060)	CS	Modality	Single value or wild card	
> (0040,0001)	AE	ScheduledStationAETitle	Single value, multiple value or wild ward	
> (0040,0002)	DA	ScheduledProcedureStepStartDate	Single value or range	
> (0040,0003)	TM	ScheduledProcedureStepStartTime	Single value or range	
> (0040,0007)	LO	ScheduledProcedureStepDescription		
> (0040,0008)	SQ	ScheduledProtocolCodeSequence	Sequence	
>> (0008,0100)	SH	CodeValue		
>> (0008,0102)	SH	CodingSchemeDesignator		
>> (0008,0103)	SH	CodingSchemeVersion		
>> (0008,0104)	LO	CodeMeaning		
> (0040,0009)	SH	ScheduledProcedureStepID		
> (0040,0010)	SH	ScheduledStationName	Single value, multiple value or wild card	
> (0040,0020)	CS	ScheduledProcedureStepStatus		SCHEDULED or ARRIVED
(0040,1001)	SH	RequestedProcedureID	Single value or wild card	
(0040,1003)	SH	RequestedProcedurePriority		MEDIUM or HIGH

Presentation Context Acceptance Criterion

The intersection between the proposed and acceptable Presentation Contexts is taken for the established association.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 2, but is configurable.

5. MPPS SCP Specification

5.1 Association Establishment Policies

5.1.1 General

The maximum PDU length is 256 Kbytes, but the value is configurable.

5.1.2 Number of Associations

The maximum number of simultaneous associations that is supported by the MPPS SCP instance is 128 by default, but the value is configurable. There is no other limit for the number of concurrent associations for a given MPPS SCU AE.

5.1.3 Asynchronous Nature

The Modality Performed Procedure Step SCP supports multiple outstanding transactions over a single association.

Table 7. Asynchronous nature as a SCP for MPPS

Maximum number of outstanding asynchronous transactions	1024 (configurable)
---	---------------------

5.1.4 Implementation Identifying Information

The MPPS SCP AE provides an Implementation Class UID that is 1.2.752.24.5.5.1.1.0.0. The implementation version name is "SectraDcmtk".

5.2 Association Initiation Policy

The MPPS SCP does not initiate associations.

5.3 Association Acceptance Policy

It is possible to configure whether unrecognized AE-titles shall be allowed or not. By default, the MPPS SCP will reject associations from applications that do not address it, i.e. specify an incorrect called AE title. The MPPS SCP accepts associations for the following events:

- Verification of the DICOM communication between a remote system and the MPPS SCP.
- Request to Create (N-CREATE) or Update (N-SET) a Performed Procedure Step.

5.3.1 Real-World Activity: Verification

Associated Real-World Activity

A remote system wants to verify the DICOM communication with the MPPS SCP.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 2. Role is SCP and no extended negotiation is supported.

SOP Specific Conformance to Verification SOP class

The Modality Performed Procedure Step SCP AE provides standard conformance to the DICOM Verification Service Class.

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 2, but is configurable.

5.3.2 Real-World Activity: Performed Procedure Step Creation/Update

Associated Real-World Activity

A remote system wants to create a new or update an existing Performed Procedure Step using the N-CREATE or N-SET commands.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 2. Role is SCP. Extended negotiation is not supported.

SOP Specific Conformance to MPPS SOP Class

The MPPS SCP AE provides conformance to the DICOM MPPS SOP Class as SCP. Table 8 describes the usage of specific attributes in the MPPS SOP Instance.

In case of an N-CREATE message and the modality does not provide a SOP Instance UID for the new Performed Procedure Step the MPPS SCP will create one.

It is possible to configure whether the MPPS SCP shall return an error (x112) if the study in the MPPS SOP Instance does not exist in the RIS database. If it is configured to verify studies, the MPPS SCP will not perform the requested actions unless the modality uses the values provided by the CDS Modality Worklist SCP.

It is possible to configure (for each modality) what DICOM tag the CDS shall use when verifying MPPS messages. Possible tags are:

- Study Instance UID (default)
- Accession Number
- Study Id
- Requested Procedure ID

The MPPS SCP responds only with a status code (i.e. no attribute list) and possibly with a failure class instance if an error has occurred.

Table 8. Use of Dicom Data in the MPPS SOP Instance

Tag	Attribute Name	Req.Type N-CREATE	Req.Type N-SET	Stored In RIS
(0008,0005)	Specific Character Set	3	-	
(0040,0270)	Scheduled Step Attribute Sequence	1	-	
>(0020,000D)	Study Instance UID	1C*	-	

>(0008,0110)	Referenced Study Sequence	3	-	
>>(0008,1150)	Referenced SOP Class UID	3	-	
>>(0008,1155)	Referenced SOP Instance UID	3	-	
>(0008,0050)	Accession Number	1C*	-	
>(0040,2016)	Placer Order Number/Imaging service request	3	-	
>(0040,2017)	Filler Order Number/Imaging service request	3	-	
>(0040,1001)	Requested Procedure ID	1C*	-	
>(0032,1060)	Requested Procedure Description	3	-	
>(0040,0009)	Scheduled Procedure Step ID	3	-	
>(0040,0007)	Scheduled Procedure Step Description	3	-	
>(0040,0008)	Scheduled Protocol Code Sequence	3	-	
>>(0008,0100)	Code Value	3	-	
>>(0008,0102)	Coding Scheme Designator	3	-	
>>(0008,0103)	Coding Scheme Version	3	-	
>>(0008,0104)	Code Meaning	3	-	
(0010,0010)	Patient's Name	3	-	
(0010,0020)	Patient ID	3	-	
(0010,0030)	Patient's Birth Date	3	-	
(0010,0040)	Patient's Sex	3	-	
(0008,1120)	Referenced Patient Sequence	3	-	
>(0008,1150)	Referenced SOP Class UID	3	-	
>(0008,1155)	Referenced SOP Instance UID	3	-	
(0040,0253)	Performed Procedure Step ID	1	-	
(0040,0241)	Performed Station AE Title	1	-	
(0040,0242)	Performed Station Name	3	-	
(0040,0243)	Performed Location	3	-	
(0040,0244)	Performed Procedure Step Start Date	1	-	
(0040,0245)	Performed Procedure Step Start Time	1	-	
(0040,0252)	Performed Procedure Step Status	1	3	Yes
(0040,0254)	Performed Procedure Step Description	3	3	
(0040,0255)	Performed Procedure Type Description	3	3	
(0008,1032)	Procedure Code Sequence	3	3	
>(0008,0100)	Code Value	3	3	
>(0008,0102)	Coding Scheme Designator	3	3	
>(0008,0103)	Coding Scheme Version	3	3	
>(0008,0104)	Code Meaning	3	3	
(0040,0250)	Performed Procedure Step End Date	3	3	
(0040,0251)	Performed Procedure Step	3	3	

	End Time			
(0040,0280)	Comments on the Performed Procedure Step	3	3	
(0040,0281)	Performed Procedure Step Discontinuation Reason Code Sequence	3	3	
>(0008,0100)	Code Value	3	3	
>(0008,0102)	Coding Scheme Designator	3	3	
>(0008,0103)	Coding Scheme Version	3	3	
>(0008,0104)	Code Meaning	3	3	
(0008,0060)	Modality	3	-	
(0020,0010)	Study ID	1C*	-	
(0040,0260)	Performed Protocol Code Sequence	3	3	
>(0008,0100)	Code Value	3	3	
>(0008,0102)	Coding Scheme Designator	3	3	
>(0008,0103)	Coding Scheme Version	3	3	
>(0008,0104)	Code Meaning	3	3	
(0040,0340)	Performed Series Sequence	3	3	
>(0008,1050)	Performing Physician's Name	3	3	
>(0018,1030)	Protocol Name	3	3	
>(0008,1070)	Operator's Name	3	3	
>(0020,000E)	Series Instance UID	3	3	
>(0008,103E)	Series Description	3	3	
>(0008,0054)	Retrieve AE Title	3	3	
>(0008,1140)	Referenced Image Sequence	3	3	
>>(0008,1150)	Referenced SOP Class UID	3	3	
>>(0008,1155)	Referenced SOP Instance UID	3	3	
>(0040,0220)	Referenced Non-Image Composite SOP Instance Sequence	3	3	
>>(0008,1150)	Referenced SOP Class UID	3	3	
>>(0008,1155)	Referenced SOP Instance UID	3	3	
	All other attributes from Performed Series Sequence	3	3	
	All other attributes from Billing and Material Code Module	3	3	
(0008,2229)	Anatomic Structure, Space or Region Sequence	3	3	
>(0008,0100)	Code Value	3	3	Yes
>(0008,0102)	Coding Scheme Designator	3	3	Yes
>(0008,0103)	Coding Scheme Version	3	3	
>(0008,0104)	Code Meaning	3	3	Yes
(0040,0300)	Total Time of Fluoroscopy	3	3	Yes
(0040,0301)	Total Number of Exposures	3	3	Yes
(0018,1110)	Distance Source to Detector (SID)	3	3	Yes
(0040,0306)	Distance Source to Entrance	3	3	Yes
(0040,0302)	Entrance Dose	3	3	Yes

(0040,8302)	Entrance Dose in mGy	3	3	Yes
(0040,0303)	Exposed Area	3	3	Yes
(0018,115E)	Image Area Dose Product	3	3	Yes
(0040,0310)	Comments on Radiation Dose	3	3	Yes
(0040,030E)	Exposure Dose Sequence	3	3	
>(0018,115A)	Radiation Mode	3	3	Yes
>(0018,0060)	KVp	3	3	Yes
>(0018,8151)	X-Ray Tube Current in μ A	3	3	Yes
>(0018,1150)	Exposure Time	3	3	Yes
>(0018,1160)	Filter Type	3	3	Yes
>(0018,7050)	Filter Material	3	3	Yes
>(0040,0310)	Comments on Radiation Dose	3	3	Yes
(0040,0316)	Organ Dose	3	3	Yes

* May be required depending on configuration, see explanation under 5.3.2.

Presentation Context Acceptance Criterion

There are no specific rules for acceptance.

Transfer Syntax Selection Policies

The transfer syntax selection is done according to the order in Table 2, but is configurable.

6. MPPS SCU Specification

6.1 Association Establishment Policies

6.1.1 General

The maximum PDU length is default 128 Kbytes, but the value is configurable.

6.1.2 Number of Associations

The MPPS SCU will only initiate one association at a time.

6.1.3 Asynchronous Nature

The MPPS SCU supports asynchronous operations, but will only use a single outstanding operation on an association.

6.1.4 Implementation Identifying Information

The MPPS SCU AE will provide an Implementation Class UID that is 1.2.752.24.5.5.1.1.0.0. The implementation version name is "SectraDcmtk".

6.2 Association Initiation Policy

The MPPS SCU will initiate an association when an MPPS message arrives from a modality and provided that the CDS is configured to relay MPPS messages.

6.2.1 Activity: Relay MPPS

Description and Sequencing of Activities

The MPPS SCP AE receives an MPPS message from a modality. The CDS examines whether one or more remote AE: s shall have the message relayed. If so, the MPPS SCU will initiate associations with the remote AE(s) and relay the message. The relay is done in a sequential order.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 3 and Table 4. Role is SCU. Extended negotiation is not supported.

SOP Specific Conformance to MPPS SOP Class

The MPPS SCP AE provides conformance to the DICOM MPPS SOP Class as SCU. The MPPS messages are relayed in their original state without the CDS making any modifications.

7. Communication Profiles

7.1 Supported Communication Stacks

All application entities described in this conformance statement provide DICOM 3.0 TCP/IP Network Communication Support as defined in part eight of the DICOM Standard.

7.2 TCP/IP Stack

The server inherits the TCP/IP stack built into the operating system under which it runs, see chapter 3.

7.2.1 Physical Media Support

The CDS is neutral to the physical medium over which TCP/IP executes.

7.3 OSI Stack

Not supported.

7.4 Point-To-Point Stack

Not supported.

8. Extensions / Specializations / Privatizations

Not applicable.

9. Configuration

The behavior and settings of the CDS application are not to be altered by the users of either the Sectra RIS or connected modalities. All questions regarding configuration issues are referred to the system administrators.

9.1 AE Title/Presentation Address Mapping

Modality Worklist/MPPS SCU shall by default use the same configuration parameters (AE, Host and Port) for both Modality Worklist SCP and MPPS SCP. It is however possible to configure them to use separate ports.

9.1.1 Local AE Titles and Presentation Addresses

The local AE title is “SECTRA_RIS” using port 4007 by default, but is configurable. See administrator’s manual for further description.

9.1.2 Remote AE Titles and Presentation Addresses

Configuration of remote AE titles and port numbers is described in the administrator’s manual.

10. Support of Character Sets

Supported extended character sets:

- ISO_IR 100 (ISO-8859-1)

SECTRA

Sectra Imtec AB, Radiatorvägen 17
SE-702 27 Örebro, Sverige
Telefon: +46 19 670 66 00 Fax: +46 19 670 66 66
support@sectra.se www.sectra.se

