DICOM Conformance Statement

IDS5 6.2.1, WISE 6.2.1 and ImageServer/x 6.2.1

SECTRA

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1. Introduction

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

- IDS5

- WISE

The product ImageServer/s has some DICOM functions but they are described in the product family of ImageServer/s, namely WISE.

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.

1.1   References

[1]   Digital Imaging and Communications in Medicine (DICOM). NEMA Standard Publications PS 3.1-14 and Supplements.

[2]   IDS5 Installation Guide, SECTRA document number 3-97.559

[3]   IDS5 System Administrators Guide, SECTRA document number 3-97.535

[4]   IDS5 User's Documentation, SECTRA document number 3-97.486

[5]   WISE Installation Guide, SECTRA document number 3-97.379

[6]   WISE System Administrators Guide, SECTRA document number 3-97.471

[7]   ImageServer4/S Installation Guide, SECTRA document number 3-98.1032

[8]   ImageServer4/S System Administrators Guide, SECTRA document number 3-98.1136

1.2   Version History

1.1.1   Version 6.0

Version valid for IDS4 2.0, WISE 2.1 and WISE/Lite 1.1.

1.1.2   Version 7.0

Version valid for IDS4 2.0.1, WISE 2.1.1 and WISE/Lite 1.1.1. Changes from 6.0:

- (0028,0004) Photometric Interpretation MONOCHROME1 is now supported by IDS4 (not supported previously).

- The first LUT in a (0028,3000) Modality LUT sequence is now handled by IDS4 (not supported at all previously). All but the first LUT are ignored.

- (2010,0010) Image Display Format is now STANDARD\1,1 always (being STANDARD\C,R with C and R between one and five previously). Partition of the image window for printing more than one image per film is still supported but the images are sent to the printer as one big image. Because of this, the implementation version name of the PRINT AE is changed to "SECTRA_DCMPR_2_1".

1.1.3   Version 8.0

Version valid for IDS4 2.0.2, WISE 2.1.1 and WISE/Lite 1.1.1. No changes from 7.0.

1.1.4   Version 9.0

Version valid for IDS4 2.0.3, WISE 2.1.3 and WISE/Lite 1.1.2. Only typographic corrections from 8.0.

1.1.5   Version 10.0

Version valid for IDS4 2.2, WISE 2.2 and WISE/Lite 2.2. Changes from 9.0:

- New layout of the document

- New references: ImageServer4/S Installation Guide and System Administrators Guide

- The DICOM Storage service as SCU is now available with WISE.

- SCP or SCU has been added after all AE names in this document. This is to be able to differ between Storage SCU and Storage SCP AEs.

- Any number of STORE SCP AEs can now be set up (four previously).

- The image type RT Image is now supported for both DICOM Storage SCP and DICOM Q/R SCP.

- If an image is present in WISE with the same SOP Instance UID as one sent with DICOM Storage to WISE, the image in WISE will be overwritten by default. The old behavior with storing images with same SOP Instance UID twice can be used if configured so.

- Case insensitive matching for patient names is now used by Q/R SCP (case sensitive previously). Other attributes than patient name is still case sensitive.

- The programs `w_import` and `diccollect` have been replaced by `w_store`.

- There is a new administration program for handling STORE SCP AEs called `dcm_adm`. With this the STORE SCPs can be set up, tested and inspected in various manners. The program can e.g. automatically select a free listen port.

- There is no need to configure a STORE SCP AE to receive stacked images or non-stacked images. All STORE SCP AEs can handle both.

- Clearer specification when a STORE SCP AE rejects associations (see section 4.3).

- It is possible to set up a STORE SCP AE so it will reject associations if the WISE server is down.

- New implementation versions are: for Storage SCP: `W_STORE_SCP_1.3`, for Q/R SCP `W_QR_SCP_1.3`.

- A number of attributes that previously had to be the same for images within a stack are no longer required. The only required attribute is now the (0020,000e) Series Instance UID attribute.

- It is no longer possible to sort the images in a stack after import. The image order will be the same as the order in which the slices are received.

- The (0020,0052) Frame of Reference UID element can now be used (if configured so) for non-default method for identifying scanograms when sending images with DICOM Storage to WISE.

- (0008,0041) Data Set Subtype (retired) is not required to be the same for images within a stack anymore. The attribute is ignored.

- (0020,1041) Slice Location is not used anymore for splitting stacks if slice thickness differs. The attribute is ignored. Splitting stacks if slice thickness differs is no longer supported.

1.1.6 Version 11.0

Version valid for IDS4 3.2, WISE 3.2 and WISE/Lite 3.2. Changes from 10.0:

- Q/R SCU is now supported.

- A number of compression transfer syntaxes are now supported.

- Restructuring of the document to include two tables of all supported SOP Classes in chapter 2.

- The key list in Appendix B has been clarified to reflect the different information models in Q/R

- Maximum handled length of some DICOM attributes added to appendix A.

- Maximum PDU size is increased from 16 Kb to 28672 bytes for Storage SCP and Q/R SCP.

- Acquisition Number is no longer used.

- Images with non-square pixels can be transformed to images with square pixels by configuration of image import.

- The STORE SCU AE now supports other Transfer Syntaxes than Implicit Little Endian.

1.1.7 Version 12.0

Version valid for IDS4 3.2.2. Changes from 11.0:

- IDS4 in stand-alone mode is released for the first time.

1.1.8 Version 13.0

Version valid for IDS5 and WISE 6.2. Changes from 12.0:

- IDS5 is not supported in stand-alone mode.

- IDS5 is only supported on Windows NT. WISE only on HP-UX 11.

- WISE/Lite is removed from the document. WISE/Lite is nowadays a WISE with an IDS5 connected to it. No need to mention WISE/Lite in this document.

- IDS5 does not work as Q/R SCU as IDS4 did. Q/R SCU is not supported in WISE either.

- IDS5 now supports VOI LUT.

- WISE now supports the Basic Study Content Notification SOP Class as SCU.

1.1.9 Version 14.0

Updated version for IDS5 and WISE 6.2. Changes from 13.0:

- Changed order for transfer syntax selection.

1.1.10 Version 15.0

Version valid for IDS5 and WISE 6.2.1. Changes from 14.0:

- The STORE SCU AE now works in the same manner as C-STORE initiated from the Q/R SCP, filling in WISE attributes, supporting extended character set ISO_IR 100 etc.

- Added documentation for Sectra private attributes (Appendix C).

1.1.11 Version 16.0

Version valid for IDS5 and WISE 6.2.1. Changes from 15.0:

- Changed SOP Class UIDs for Patient Root, Study Root and Patient/Study Only Models FIND

1.1.12 Version 17.0

Version valid for IDS5 and WISE 6.2.1. Changes from 16.0:

- Changed SOP Class UIDs for Study Root and Patient/Study Only Info. Models FIND.

- Changed number of pages from 38 to 39

1.1.13 Version 18.0

Version valid for IDS5 and WISE 6.2.1. Changes from 18.0:

- Document number updated

- Date created updated

2. Implementation model

IDS5 and WISE are separate products, but they are described together in this conformance statement. The reason for this is that IDS5 can not run without a WISE and WISE has no user interface. IDS5 is the user interface for WISE. So the products are tightly coupled and functionality is spread between them.

IDS5 is available on Windows NT 4 and WISE on HP-UX 11.

IDS5 is a multi-modality viewing station for radiology images. It allows the user (among other things) to:

- Send images to a remote application (e.g. a workstation or a DICOM archive).

- Approve exams, which will generate a Study Notification.

- Print images.

WISE is the name of a database system for handling various objects in a PACS environment. These objects can be images, requests, patient data, examinations etc. It provides (among other things) the following features:

- It replies on communication tests from remote applications.

- It allows remote applications (modalities and image workstations) to send images to it.

- It allows remote applications to query the WISE database and retrieve images.
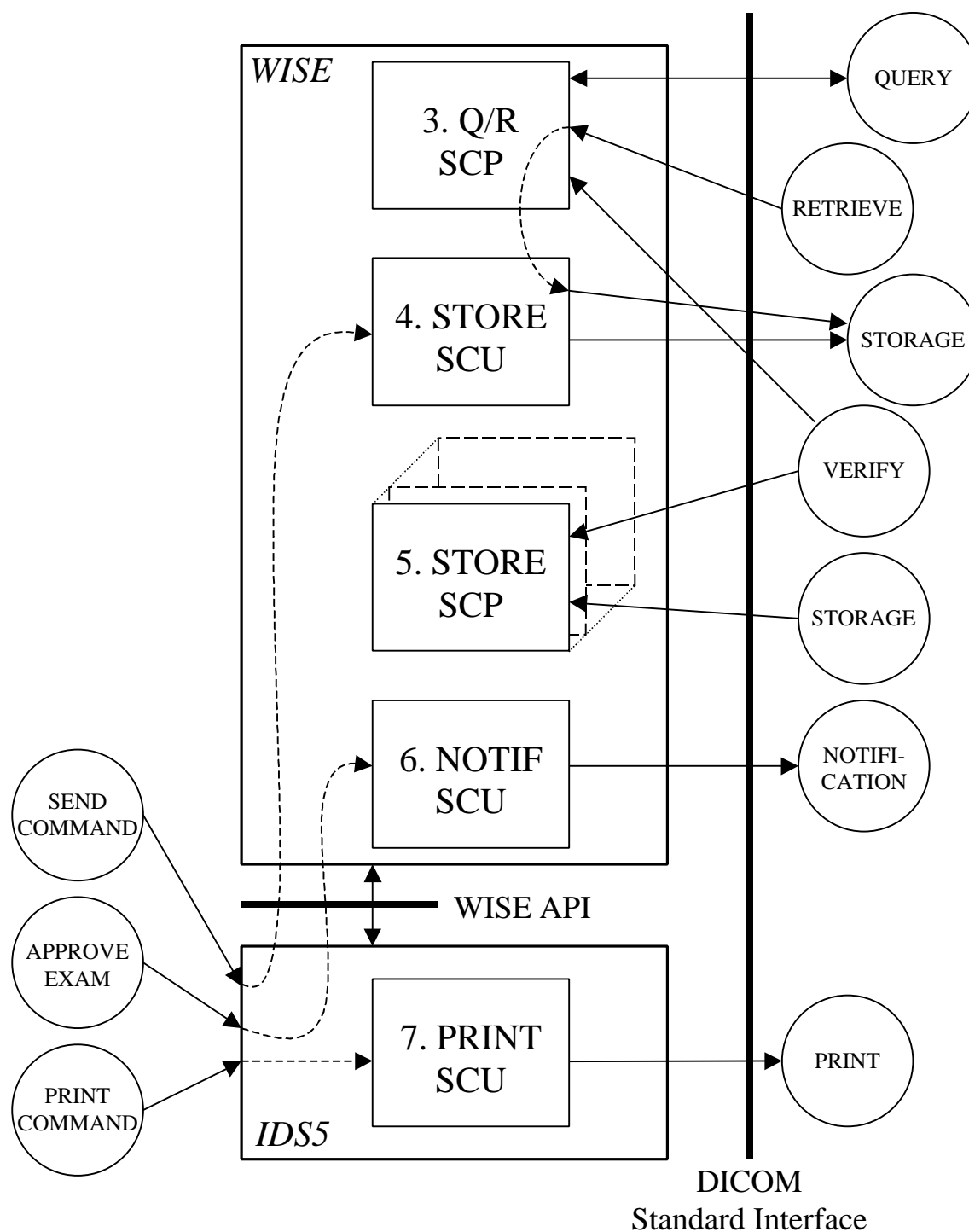
2.1 Application Data Flow Diagram

The Implementation Model of the application entities (AE:s) and their relations to the products IDS5 and WISE are shown in the figure above. There are five different types of application entities (AEs): Q/R SCP (ID 3), STORE SCP (ID 4), STORE SCU (ID 5), NOTIF SCU (ID 6) and PRINT SCU (ID 7). The ID numbers correspond to chapters in this document. There can be one or more STORE SCP AEs on a system, but there is exactly one of the other AE:s.

2.2   Functional Definitions of AE's

2.2.1   Summary of SOP Classes supported as SCU

Table 1.   Supported SOP classes as SCU

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)				
		3	4	5	6	7
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	Y	Y	-	-	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Y	Y	-	-	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Y	Y	-	-	-
US Multi-Frame Image Stor. (**Ret. ver.**)	1.2.840.10008.5.1.4.1.1.3	Y	Y	-	-	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y	Y	-	-	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Y	Y	-	-	-
US Image Storage (**Retired version**)	1.2.840.10008.5.1.4.1.1.6	Y	Y	-	-	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	Y	Y	-	-	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Y	Y	-	-	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Y	Y	-	-	-
X-Ray Angiographic Bi-Plane Storage	1.2.840.10008.5.1.4.1.1.12.3	Y	Y	-	-	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	Y	Y	-	-	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Y	Y	-	-	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Y	Y	-	-	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Y	Y	-	-	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Y	Y	-	-	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Y	Y	-	-	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Y	Y	-	-	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Y	Y	-	-	-
Basic Study Content Notification	1.2.840.10008.1.9	-	-	-	Y	-
Basic Grayscale Print Mgm Meta	1.2.840.10008.5.1.1.9	-	-	-	-	Y
> Basic Film Session	1.2.840.10008.5.1.1.1	-	-	-	-	Y
> Basic Film Box	1.2.840.10008.5.1.1.2	-	-	-	-	Y
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	-	-	-	-	Y
> Printer	1.2.840.10008.5.1.1.16	-	-	-	-	Y

The > signs for the Print Management SOP Classes indicates that the SOP Class is mandatory part of the above mentioned meta SOP Class.

2.2.2   Summary of SOP Classes Supported as SCP

Table 2.   Supported SOP classes as SCP

SOP Class Name	SOP Class UID	Supported for AE Y/- (Yes/No)				
		3	4	5	6	7
Verification	1.2.840.10008.1.1	Y	-	Y	-	-
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	-	-	Y	-	-
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	-	-	Y	-	-
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	-	-	Y	-	-
US Multi-Frame Image Stor. (**Ret. ver.**)	1.2.840.10008.5.1.4.1.1.3	-	-	Y	-	-
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	-	-	Y	-	-
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	-	-	Y	-	-
US Image Storage (**Retired version**)	1.2.840.10008.5.1.4.1.1.6	-	-	Y	-	-
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	-	-	Y	-	-
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	-	-	Y	-	-
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	-	-	Y	-	-
X-Ray Angiographic Bi-Plane Storage	1.2.840.10008.5.1.4.1.1.12.3	-	-	Y	-	-
NM Image Storage	1.2.840.10008.5.1.4.1.1.20	-	-	Y	-	-
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	-	-	Y	-	-
DX Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	-	-	Y	-	-
DX Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	-	-	Y	-	-
MG Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	-	-	Y	-	-
MG Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	-	-	Y	-	-
IO Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.3	-	-	Y	-	-
IO Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	-	-	Y	-	-
Patient Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Y	-	-	-	-
Study Root Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Y	-	-	-	-
Pat/Study Only Q/R Info. Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Y	-	-	-	-
Patient Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Y	-	-	-	-
Study Root Q/R Info. Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Y	-	-	-	-
Pat/Study Only Q/R Info. Mo. – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Y	-	-	-	-

2.2.3   Summary of Supported Transfer Syntaxes

Table 3.   Supported Transfer Syntaxes

Transfer Syntax Name	Transfer Syntax UID	Supported for AE Y/- (Yes/No)				
		3	4	5	6	7
1. Sectra Compression (**Private Syntax**)	1.2.752.24.3.7.6	Y	Y	Y	-	-
2. Explicit VR Little Endian	1.2.840.10008.1.2.1	Y	Y	Y	-	-
3. Explicit VR Big Endian	1.2.840.10008.1.2.2	Y	Y	Y	-	-
4. JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57	Y	Y	Y	-	-
5. JPEG Lossless, Hier., First-Order Pred.	1.2.840.10008.1.2.4.70	Y	Y	Y	-	-
6. Implicit VR Little Endian	1.2.840.10008.1.2	Y	Y	Y	Y	Y
7. JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	Y	Y	Y	-	-
8. JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	Y	Y	Y	-	-
9. JPEG Full prog., Non-Hier. (Proc. 10 & 12)	1.2.840.10008.1.2.4.55	Y	Y	Y	-	-

2.2.4   Q/R SCP

Q/R SCP is the AE responsible for receiving queries and sending images to other application entities as a response to a move request. The Q/R SCP AE is connected to the WISE product. There is only one Q/R SCP AE.

When the Q/R SCP AE receives a query (C-FIND request) it will search in the WISE database for information matching the conditions in the request message. It will search both on-line and in the archive. It returns any found information to the requesting remote AE.

When the Q/R SCP AE receives a retrieve request (C-MOVE request) it will search for images in the WISE database identified by the conditions in the request message. It will search both on-line and in the archive. If any images are found the Q/R SCP AE will change into a Storage SCU and send the images found to the requested destination AE. If the retrieve request refers to images in the archive the images will be fetched from the archive and temporarily put on-line. When the retrieve is done, the temporary images on-line will be removed. Only C-MOVE requests are handled in order to supply retrieve functionality, not C-GET requests.

The Q/R SCP AE supports verification of the DICOM communication from a remote AE.

2.2.5   STORE SCU

STORE SCU is the AE responsible for sending images to remote applications. There is only one STORE SCU AE. It is connected with the WISE product, but the sending is initiated from an IDS5.

As described in the IDS5 User's Documentation [4] the IDS5 workstation user selects examinations to send from the information window. Then he or she issues the send command by selecting the desired destination. The command is forwarded to WISE, which will activate the STORE SCU AE indicating the examinations and destination that the user has chosen. The STORE SCU AE will then initiate an association with the remote AE, supporting DICOM Storage as SCP.

2.2.6   STORE SCP

STORE SCP is the AE responsible for receiving images. There can be any number of STORE SCP AEs set up, each with its own AE title.

A STORE SCP AE can receive images from a remote application entity. A STORE SCP AE also supports verification of the DICOM communication from a remote AE.

2.2.7   NOTIF SCU

If WISE is configured so, the NOTIF SCU sends a Basic Study Descriptor instance for a specific Study when the corresponding exam is approved. The Basic Study Descriptor object is typically sent to a RIS to indicate that an exam is made, and to indicate the number of images in the exam.

2.2.8   PRINT SCU

PRINT SCU is the AE responsible for sending print request to DICOM printers. It is connected to the IDS5 product. There is only one PRINT SCU AE per IDS5.

As described in the IDS5 User's Documentation [4] the IDS5 workstation user chooses images to print from the matrix or image windows. When the user has collected the images to print, he or she issues the print command. This will open the print previewer. From the previewer the user can do some further arrangement for the print, choose the printer to print to and send the images to this printer. When this happens the PRINT SCU AE is activated, acts as a SCU and initiates an association with the remote AE, supporting DICOM Print Management as SCP (a DICOM printer).

2.3   Sequencing of Real-World Activities

Before the user can print images or issue send commands from IDS5 or retrieve images from the WISE database, the images must be present in the WISE database, e.g. they must have been sent with DICOM Storage to WISE.

3. Q/R SCP AE Specification

3.1   Association Establishment Policies

3.1.1   General

The maximum PDU-length that the Q/R SCP AE will use is configurable. Default is 28672 bytes. Configuration can only be done by Sectra authorized personnel.

3.1.2   Number of Associations

The Q/R SCP AE can handle at most 100 simultaneous associations at a time.

3.1.3   Asynchronous Nature

The Q/R SCP AE will only allow a single outstanding operation on an association. Therefore, the Q/R SCP AE will not perform asynchronous operations window negotiation.

3.1.4   Implementation Identifying Information

The Q/R SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name is "W_QR_SCP_1.6".

3.2   Association Initiation Policy

The Q/R SCP AE can initiate an association as a result of retrieve request if it results in copying images of images known to the WISE database to a remote AE.

3.2.1   Copy Images from the WISE database to a Remote AE

Associated Real-World Activity

When a retrieve (C-MOVE) request is received and images matching supplied conditions are found Q/R will turn into a Storage SCU and initiate an association with the requested destination AE. If the association is accepted, image transfer will take place.

Proposed Presentation Context

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

C-STORE SCU Conformance

The Q/R SCP AE provides standard conformance to the DICOM Storage Service Class as SCU.

3.3   Association Acceptance Policy

The Q/R SCP AE will reject associations from applications that do not address it, i.e. specify an incorrect called AE title. The Q/R SCP AE will also reject associations with C-MOVE requests from hosts not present in the /etc/hosts file.

The Q/R SCP AE accepts associations for the following events:

- Verification of the DICOM communication between a remote system and the Q/R SCP AE

- Query of the WISE database

- Retrieve images from the WISE database

3.3.1   Verification of the Communication

<u>Associated Real-World Activity</u>

A remote system wants to verify the DICOM communication with the Q/R SCP AE.

<u>Accepted Presentation Contexts</u>

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 2 and Table 3. Role is SCP and no extended negotiation is supported.

<u>SOP Specific Conformance to Verification SOP class</u>

The Q/R SCP AE provides standard conformance to the DICOM Verification Service Class.

<u>Presentation Context Acceptance Criterion</u>

There are no specific rules for acceptance.

<u>Transfer Syntax Selection Policies</u>

The transfer syntax selection is done according to the order in Table 3.

3.3.2   Query of the WISE Database

<u>Associated Real-World Activity</u>

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

<u>Accepted Presentation Contexts</u>

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 2 and Table 3. Role is SCP. Extended negotiation is supported.

<u>SOP Specific Conformance to FIND SOP classes</u>

The Q/R SCP AE provides standard conformance to the DICOM FIND SOP classes as SCP with the exceptions below:

- Range matching on date and time is not supported.

- Fractions of seconds are ignored.

- At the most 100 matches are returned. This hit limit can be configured. If more items than the hit limit in the WISE database matches, zero matches are returned.

- Existence of optional keys is not supported, only unique and required keys are handled (see appendix B).

- Case insensitive matching is used for patient name. For all other attributes, case sensitive matching is used.

In case of no matching examinations, a response of *SUCCESS* is sent.

If range values (time and date values including the "-" character) are used a response "Unable to process" (C001) is returned to the association initiator.

<u>Presentation Context Acceptance Criterion</u>

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

<u>Transfer Syntax Selection Policies</u>

The transfer syntax selection is done according to the order in Table 3.

3.3.3   Retrieve Images from the WISE Database

Associated Real-World Activity

A remote application entity wishes to retrieve images from the WISE database using the C-MOVE command.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 2 and Table 3. Role is SCP. Extended negotiation is supported.

SOP Specific Conformance to MOVE SOP classes

The Q/R SCP AE provides standard conformance to the DICOM MOVE SOP classes as SCP.

In case of no matching examinations, a response of *SUCCESS* is returned to the association initiator.

If the association to the move destination is rejected a response "Unable to process" (C001) is returned to the association initiator.

If the move destination is unknown (not defined in the configuration file) a response "Destination unknown" (A801) is returned to the association initiator.

For other errors a response "Out of resources" (A702) is returned to the association initiator.

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 3.

4. STORE SCU AE Specification

4.1   Association Establishment Policies

4.1.1   General

The maximum PDU size that the STORE SCU AE will use is 28672 bytes.

4.1.2   Number of Associations

The STORE SCU AE can only handle one association at a time. One send request has to be finished before the next is started.

4.1.3   Asynchronous Nature

The STORE SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

4.1.4   Implementation Identifying Information

The STORE SCU AE will provide an implementation class UID that is 1.2.752.24.3.1.5.1.0 and an implementation version name of "DCMSENDIM_2_0".

4.2   Association Initiation Policy

4.2.1   Real-World Activity - Send Command

Associated Real-World Activity

As described in the IDS5 User's Documentation [4] the IDS5 workstation user selects examinations to send from the information window. Then he or she issues the send command by selecting the desired destination. The command is forwarded to WISE, which will activate the STORE SCU AE indicating the examinations, and destination that the user has chosen. The STORE SCU AE will then initiate an association with the remote AE, hopefully supporting DICOM Storage as SCP.

Proposed Presentation Contexts

Possible proposed abstract syntaxes and transfer syntaxes can be found by investigating Table 1 and Table 3. At most three transfer syntaxes are proposed at the same time. Implicit Little Endian is always proposed. If the image is internally stored in another transfer syntax, that syntax is proposed too. If configured so a compression transfer syntax will be proposed too.

Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance of the Storage SOP Class

The STORE SCU provides standard conformance to the Storage SOP class.

If patient or exam data for exported images has been changed in WISE, the exported images will contain the values from WISE.

If annotations has been made in the images using IDS5, the exported images will contain standard DICOM overlays with these annotations.

If configured so, the STORE SCU AE will export private attributes. These are documented in Appendix C.

4.3   Association Acceptance Policy

The STORE SCU AE does not handle incoming associations.

5. STORE SCP AE Specification

5.1   Association Establishment Policies

5.1.1   General

The maximum PDU-length, which a STORE SCP AE will use, is configurable. The default is 28672 bytes. Configuration can only be done by Sectra authorized personnel.

5.1.2   Number of Associations

Each STORE SCP AE can handle five simultaneous associations at a time by default. Any number of STORE SCP AEs can be set up, meaning that a great number of C-STORE associations can be handled at the same time.

5.1.3   Asynchronous Nature

A STORE SCP AE will only allow a single outstanding operation on an association. Therefore, a STORE SCP AE will not perform asynchronous operations window negotiation.

5.1.4   Implementation Identifying Information

A STORE SCP AE will provide an Implementation Class UID that is 1.2.752.24.3.3.25.7. The implementation version name of a STORE SCP AE is "W_STORE_SCP_1.7".

5.2   Association Initiation Policy

A STORE SCP AE will not initiate any associations with a remote AE.

5.3   Association Acceptance Policy

A STORE SCP AE **rejects** associations in the following situations:

- Association requests from applications that do not address it, i.e. specify an incorrect called AE title.

- Association requests from hosts with host names not known to the STORE SCP AE host.

- For image transfers if it is already processing the maximum number of associations that it can handle (default: 5).

- For image transfers and if configured so, if the WISE server is not responding.

A STORE SCP AE **accepts** associations for the following events:

- Verification of the DICOM communication between a remote system and a STORE SCP AE.

- Transfer of images from a remote system to the WISE database.

5.3.1   Verification of the Communication

Associated Real-World Activity

A remote system wants to verify the DICOM communication with a STORE SCP AE.

Accepted Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 2 and Table 3. Role is SCP and no extended negotiation is supported.

<u>SOP Specific Conformance to Verification SOP class</u>

A STORE SCP AE provides standard conformance to the DICOM Verification Service Class.

<u>Presentation Context Acceptance Criterion</u>

There are no specific rules for acceptance.

<u>Transfer Syntax Selection Policies</u>

The transfer syntax selection is done according to the order in Table 3.

5.3.2   Transfer of Images from a Remote System to the WISE database

<u>Associated Real-World Activity</u>

A remote system wants to store images in the WISE database.

<u>Accepted Presentation Contexts</u>

The proposed abstract syntaxes and transfer syntaxes is found by investigating Table 2 and Table 3. Role is SCP and no extended negotiation is supported.

<u>SOP Specific Conformance to STORE SOP classes</u>

A STORE SCP AE provides standard level 2 (full) conformance to the DICOM Storage Service Class as SCP. Full conformance mean that all type 1, 2 and 3 attributes sent are stored. All private and retired attributes are also stored.

A STORE SCP AE needs a value of the attribute (0010,0020), Patient ID. If the attribute is empty it will use the attribute (0010,0010), Patient Name, as patient ID. If the patient name is empty as well it will use the request number (see [8]) as patient ID. Applications sending image to a STORE SCP AE must take care when filling in the Patient ID attribute. If it is not filled in, there is a risk that images of different patients can be mixed!

If the image storage should fail on the WISE side, a status of refused, "Out of resources", will be returned to the association initiator.

WISE can be configured to overwrite images with same SOP Instance UID or to store all images it receives. Default is the second alternative, i.e. not to overwrite images with same SOP Instance UID. This means that if the same image is sent twice to a STORE SCP AE it will be stored two times in WISE. This implicates that two images with the same SOP Instance UID will be sent if a MOVE request is received by the Q/R SCP AE on that image.

For more detailed information about the handling of specific attributes by WISE and IDS5, see Appendix A.

If DICOM attributes are illegal, no responsibilities for consequences are taken. The following consequence has been noted:

- If (0020,0011) Series Number is outside the allowed range, $-(2^{32}-1) = x = (2^{32}-1)$, WISE will truncate all bits above the 32nd position.

Regarding viewing capabilities of IDS5 the following points must be noted

- Multi-frame images can not be viewed by default. There is an option when installing the DICOM Storage SCP to split multi-frame images to individual images. If this is used, the images can be viewed as a stack in IDS5. However, moving the images with Q/R will in this case not give multi-frame images but the frames as individual images. If this option is not used (which is the default) multi-frame images are stored unaltered in WISE. They can then not be viewed on IDS5 but the can be retrieved as multi-frame images with Q/R. For NM multi-frame images only the default is supported, i.e. NM multi-frame images can not be split up into individual images.

- XA Bi-plane images can not be viewed.

- IDS5 shows images with non-square pixels as if the pixels where square. It is possible to configure image import in WISE so that non-square pixels are transformed to square pixels.

- Regarding color images, IDS5 can only view those with (0028,0004), Photometric interpretation, equal to RGB with 24 bits (8 bits per channel) or (0028,0004), Photometric interpretation, equal to PALETTE_COLOR.

- Images are handled color-by-pixel internally in WISE and IDS5. In certain circumstances image that are sent color-by-plane to WISE/IDS5 are sent color-by-pixel if fetched from IDS5/WISE.

- The first LUT in a Modality LUT sequence (attribute (0028,3000), Modality LUT Sequence, etc.) is handled. The rest (second, third and so on) is ignored.

- IDS5 has full support of DICOM Overlays, however if multiple overlays are present in an image you can only choose between showing no DICOM overlays or all DICOM overlays.

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 3.

6. NOTIF SCU AE Specification

6.1   Association Establishment Policies

6.1.1   General

The maximum PDU size that the NOTIF SCU AE will use is 28672 bytes.

6.1.2   Number of Associations

The NOTIF SCU AE can only handle one association at a time. One send request has to be finished before the next is started.

6.1.3   Asynchronous Nature

The NOTIF SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

6.1.4   Implementation Identifying Information

The NOTIF SCU AE will provide an implementation class UID that is 1.2.752.24.3.3.30 and an implementation version name of "DCMCONTNOT 1.0".

6.2   Association Initiation Policy

6.2.1   Real-World Activity - Send Command

Associated Real-World Activity

If WISE is configured so, the NOTIF SCU sends a Basic Study Descriptor instance for a specific Study when the corresponding exam is approved. The Basic Study Descriptor object is typically sent to a RIS to indicate that an exam is made, and to indicate the number of images in the exam.

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance of the Basic Study Content Notification SOP Class

The NOTIF SCU sends all type 1 and type 2 attributes of the Basic Study Desctiptor IOD except (0008, 1150) Referenced SOP Class UID (a type 2 attribute). No type 3 attributes are sent.

6.3   Association Acceptance Policy

The NOTIF SCU AE does not handle incoming associations.

7. PRINT SCU AE Specification

7.1   Association Establishment Policies

7.1.1   General

The maximum PDU size that the PRINT SCU AE will use is 16 Kbytes.

7.1.2   Number of Associations

The PRINT SCU AE can only handle one association at a time. One print request has to be finished before the next can be started.

7.1.3   Asynchronous Nature

The PRINT SCU AE does not support asynchronous operations and will not perform asynchronous window negotiation.

7.1.4   Implementation Identifying Information

The PRINT SCU AE will provide an implementation class UID that is 1.2.752.24.3.1.3.1.0 and an implementation version name of "SECTRA_DCMPR_2_1".

7.2   Association Initiation Policy

7.2.1   Real-World Activity - Print Command

Associated Real-World Activity

As described in the IDS5 User's Documentation [4] the IDS5 workstation user chooses images to print from the matrix or image windows. When the user has collected the images to print, he or she issues the print command. This will open the print previewer. From the previewer the user can do some further arrangement for the print, choose the printer to print to and send the images to this printer. When this happens the PRINT SCU AE is activated, acts as an SCU and initiates an association with a remote AE, hopefully supporting DICOM Print Management as SCP (a DICOM printer).

Proposed Presentation Contexts

The proposed abstract syntaxes and transfer syntaxes are found by investigating Table 1 and Table 3. Role is SCU. Extended negotiation is not supported.

SOP-Specific Conformance

The PRINT SCU AE supports the mandatory SOP classes which are defined under the Basic Grayscale Print Management Meta SOP Class, see Table 1. No optional SOP classes are supported.

The PRINT SCU AE uses the following DIMSE Service Elements:

Table 4.   DIMSE Service Elements

SOP Class	DIMSE Service Element
Basic Film Session SOP Class	N-CREATE, N-DELETE
Basic Film Box SOP Class	N-CREATE, N-DELETE, N-ACTION
Basic Grayscale Image Box SOP Class	N-SET
Printer SOP Class	N-GET

N-EVENT-REPORT is not supported.

Immediately after establishing an association, the PRINT SCU AE will execute an N-GET on the Printer SOP Class. This operation can be configured into two modes, one for fetching all available printer attributes and one for fetching a minimal set of printer attributes.

If configured to fetch all attributes, the following attributes will be requested:

Table 5.   Attributes, when fetching all available attributes

Attribute name	Tag	Optional according to standard

Printer Status	(2110,0010)	NO
Printer Status Info	(2110,0020)	NO
Printer Name	(2110,0030)	YES
Manufacturer	(0008,0070)	YES
Manufacturer Model Name	(0008,1090)	YES
Device Serial Number	(0018,1000)	YES
Software Versions	(0018,1020)	YES
Date Of Last Calibration	(0018,1200)	YES
Time Of Last Calibration	(0018,1201)	YES

If configured to fetch a minimum set of attributes, the following attributes will be requested:

Table 6.   Attributes, when fetching minimum set of attributes

Attribute name	Tag	Optional according to standard
Printer Status	(2110,0010)	NO
Printer Status Info	(2110,0020)	NO
Printer Name	(2110,0030)	YES

If the Printer Status tag is returned as NORMAL, the print job will continue immediately.

If the status is WARNING, the user will be notified and the value of the Printer Status Info tag will be displayed. The print job is then continued.

If the status is FAILURE, the user will be notified and the value of the Printer Status Info tag will be displayed. The print job is then aborted.

The PRINT SCU AE supports the following SOP class attributes:

Table 7.   SOP Class Attributes

SOP Class, DIMSE Service Element	Attribute name	Tag	Optional according to standard	Con-figu-rable	Default value
Basic Film Session N-CREATE	Number of Copies	(2000,0010)	YES	YES	1
Basic Film Session N-CREATE	Print Priority	(2000,0020)	YES	YES	MED
Basic Film Session N-CREATE	Medium Type	(2000,0030)	YES	YES	BLUE FILM
Basic Film Session N-CREATE	Film Destination	(2000,0040)	YES	YES	MAGAZINE
Basic Film Box N-CREATE	Image Display Format	(2010,0010)	NO	NO	STANDARD\1,1
Basic Film Box N-CREATE	Film Orientation	(2010,0040)	YES	YES	PORTRAIT
Basic Film Box N-CREATE	Film Size ID	(2010,0050)	YES	YES	14INX17IN
Basic Film Box N-CREATE	Magnification Type	(2010,0060)	YES	YES	(none)
Basic Film Box N-CREATE	Max Density	(2010,0130)	YES	YES	(none)
Basic Film Box N-CREATE	Configuration Information	(2010,0150)	YES	YES	(none)
Basic Film Box N-CREATE	Smoothing Type	(2010,0080)	YES	YES	(none)

Basic Film Box N-CREATE	Border Density	(2010,0100)	YES	YES	BLACK
Basic Film Box N-CREATE	Empty Image Density	(2010,0110)	YES	YES	BLACK
Basic Film Box N-CREATE	Min Density	(2010,0120)	YES	YES	(none)
Basic Film Box N-CREATE	Trim	(2010,0140)	YES	YES	YES
Basic Grayscale Image Box N-SET	Polarity	(2020,0020)	YES	YES	NORMAL

Several images per film can be printed. They are arranged in IDS5, which composes them and sends them as one big image (Image Display Format "STANDARD\1,1").

7.3   Association Acceptance Policy

The PRINT SCU AE does not handle incoming associations.

8. Communication Profiles

8.1   Supported Communication Stacks

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

8.2   TCP/IP Stack

The AEs uses the TCP/IP stack built into their respective operating system, see chapter 2.

8.2.1   Physical Media Support

All AEs are neutral to the physical medium over which TCP/IP executes. They can e.g. be used with fiber optics, token ring, Ethernet and twisted pair.

8.3   OSI Stack

Not supported.

8.4   Point-To-Point Stack

Not supported.

9. Extensions / Specializations / Privatizations

9.1 Transfer Syntaxes

The Sectra Compression Transfer Syntax can be used between different components of Sectra PACS. The UID of the Transfer Syntax is 1.2.752.24.3.7.6.

9.2 Private Attributes

See Appendix C.

10.Configuration

NOTIF SCU Configuration of the NOTIF AE is done in the file
`/etc/opt/sectra/wise_ris.def`. Configuration is described in the WISE System
Administrator's Guide [6].

STORE SCP and Q/R SCP The AEs reference standard configuration files used by the
MergeCOM Tool Kit and the program `/opt/sectra/config/si_setup`. For further
information see the ImageServer4/S Installation Guide [7] and System Administrator's Guide
[8].

STORE SCU For the STORE SCU AE a configuration file is provided, located at
`/etc/opt/sectra/wise_send.rc`. Configuration is specified in the teleradiology section
of the WISE System Administrator's Guide [6].

PRINT SCU For the PRINT SCU AE a configuration file is provided, located at
`/opt/sectra/share/config/config/general/def/dicom_printer.def` on HP-
UX and `/sectra/config/config/general/def/dicom_printer.def` on NT.
Configuration is specified in the IDS5 System Administrator's Guide [3].

10.1 AE Title/Presentation Address Mapping

10.1.1 Local AE Titles and Presentation Addresses

Q/R SCP The AE title can be configured. This is done when running the setup program
`/opt/sectra/config/si_setup` as described in the WISE Installation Guide [6]. Default
is `QR_SCP_WISE`. This AE title is also used when the Q/R SCP turns into a Storage SCU as a
result of a C-MOVE request.

The listen port of the Q/R SCP AE can also be configured. This is specified in the
`qr_scp.pro` file located in `/etc/opt/sectra/qr_wise`. The default is 7632.

STORE SCU The AE title of the STORE SCU AE can be configured in the above-mentioned
file. The default AE title is `STORE_SCU_WISE`.

STORE SCP The AE title of each AE can be configured. This is done running the
administration program `/opt/sectra/bin/dcm_adm` as described in the ImageServer4/S
Installation Guide [7]. Any number of AEs can be set up. The default AE title is
`DICOM_STORAGE`.

The listen port of each AE can be also configured with the administration program
`/opt/sectra/bin/dcm_adm`. You can either set a listen port yourself or let the program
automatically select a free listen port.

NOTIF SCU The AE title can be configured in the above mentioned file. The default AE title
is SCN_SCU_WISE.

PRINT SCU The AE title of the PRINT SCU AE can be configured at installation in the
above-mentioned file. The default AE title is `DICOM_PRINT_SCU`.

10.1.2 Remote AE Titles and Presentation Addresses

Q/R SCP The remote Applications Entity's AE-title, host name and port number are specified
in the `qr_scp.app` file located in `/etc/opt/sectra/qr_wise`. The remote host's host
name must be known to the Q/R SCP host, e.g. be present in the `/etc/hosts` file. Note that
all C-MOVE destinations also have to be specified. The setup is described in detail in the
ImageServer4/S Installation Guide [7].

STORE SCU The remote Applications Entity's AE-title, host name and port number are specified the configuration file `/etc/opt/sectra/wise_send.def` using the tool `wm_config_telerad`. More details can be found in the teleradiology section of the WISE System Administrator's Guide [6].

STORE SCP The remote Applications Entity's AE-title does not have to be specified. A STORE SCP AE will accept any AE-title. However the remote hosts host name must be known to the STORE SCP hosts, e.g. be present in the `/etc/hosts` file.

NOTIF SCU The remote Application Entity's AE-title, host name and port number are specified in the above mentioned file. The default value of the AE-title is SCN_SCP.

PRINT SCU The remote Applications Entity's AE-title, host name and port number are specified the above-mentioned configuration file. Each remote AE is specified in its own section of the file. Default AE title is `PRINT_SERVER_SCP`.

11. Support of Extended Character Sets

The **PRINT SCU AE** provides no support for extended character sets. However, note that all text in the images is passed to the printer in the image data itself. This means that all overlay text appears on the printed medium in the same way as on the screen. IDS5 handles most character repertoires used in Western Europe.

A **STORE SCP AE**, the **STORE SCU AE**, the **NOTIF SCU AE** and the **Q/R SCP AE** supports the extended character set *ISO_IR 100*, which is the Latin alphabet number 1, supplementary set.

Appendix A.   Attribute List for Store SCP

This list contains the DICOM attributes that are used by a STORE SCP AE by default. Please note that the default behavior can be changed for both WISE and IDS5. The comments give indication what the attributes are used for. If an attribute is not present in this list it is still stored by WISE but ignored by IDS5.

For the PRINT SCU AE attributes, see Table 7. For supported attributes as keys for the Q/R SCP AE in a C-FIND request, see appendix B.

Table 8.   Attribute List for a STORE SCP AE

DICOM Attribute	Comment
(0008,0005) Specific Character Set	"ISO_IR 100" is supported.
(0008,0008) Image Type	1. Is used for determining default window setting in IDS5 if no window is included in the image. 2. Third value used by `w_store` in default scanogram finding method, and method "-S A"
(0008,0018) SOP Instance UID	1. Stored in WISE image data (max 64 characters) 2. Required attribute for compression. 3. Used in `w_store` to overwrite equivalent image (if `-k` is not specified).
(0008,0020) Study Date	1. Stored in WISE examination data if value not found in RIS 2. Shown in all IDS5 image windows if present and (0008,0023) and (0008,0022) and (0008,0021) not present.
(0008,0021) Series Date	Shown in all IDS5 image windows if present and (0008,0023) and (0008,0022) not present.
(0008,0022) Acquisition Date	Shown in all IDS5 image windows if present and (0008,0023) not present.
(0008,0023) Image Date	If present, shown in all IDS5 image windows.
(0008,0030) Study Time	1. Stored in WISE examination data if value not found in RIS 2. Shown in all IDS5 image windows if present and (0008,0033) and (0008,0022) and (0008,0021) not present.
(0008,0031) Series Time	Shown in all IDS5 image windows if present and (0008,0033) and (0008,0032) not present.
(0008,0032) Acquisition Time	Shown in all IDS5 image windows if present and (0008,0033) not present.
(0008,0033) Image Time	If present, shown in all IDS5 image windows.

(0008,0050) Accession Number	1. Stored in WISE examination data (max 16 characters). 2. Default attribute for examination number in WISE. Used for connecting the image to RIS entities.
(0008,0060) Modality	1. Stored in WISE series data (max 32 characters). 2. Stored in WISE exam data (max 16 characters). 3. Defines modality for modality specific settings in IDS5 (e.g. information in images and selecting default print partition).
(0008,0080) Institution Name	Stored in WISE examination data (max 32 characters).
(0008,1030) Study Description	Stored in WISE examination data (max 64 characters).
(0008,1140) Referenced Image Sequence	Used by WISE in default method for locating scanograms.
(0008,1155) Referenced SOP Instance UID	Used by WISE in default method for locating scanograms.
(0010,0010) Patient Name	Stored in WISE patient data if value not found in RIS (max 64 characters).
(0010,0020) Patient ID	1. Must be set. If not, (0010,0010) Patient Name is used as Patient ID in WISE. If both (0010,0020) Patient ID and (0010,0010) Patient Name are empty, the request number is used as Patient ID in WISE. 2. Stored in WISE patient data if value not found in RIS (max 64 characters). 3. Used as request number in WISE if attribute for request number (default: (0020,0010) Study ID) is empty.
(0010,0030) Patient's Birth Date	Stored in WISE patient data if value not found in RIS.
(0018,0010) Contrast/Bolus Agent	Shown in IDS5 image window for all CT images
(0018,0015) Body Part Examined	Stored in WISE examination data (max 32 characters).
(0018,0020) Scanning Sequence	Shown in IDS5 image window for all MR images if (0018,0024) not present.
(0018,0024) Sequence Name	If present, shown in IDS5 image window for all MR images
(0018,0050) Slice Thickness	Shown in IDS5 image window for all CT and MR images
(0018,0060) KVP	Shown in IDS5 image window for all CT images
(0018,0080) Repetition Time	Shown in IDS5 image window for all MR images
(0018,0081) Echo Time	Shown in IDS5 image window for all MR images
(0018,0083) Number of Averages	Shown in IDS5 image window for all MR images

(0018,1041) Contrast/Bolus Volume	Shown in IDS5 image window for all CT and MR images
(0018,1100) Reconstruction Diameter	Shown in IDS5 image window for all CT and MR images
(0018,1120) Gantry/Detector Tilt	Shown in IDS5 image window for all CT images
(0018,1150) Exposure Time	Shown in IDS5 image window for all CT images
(0018,1151) X-ray Tube Current	Shown in IDS5 image window for all CT images
(0018,1164) Imager Pixel Spacing	Used for calibrating the image in IDS5 if (0028,0030) is not set.
(0018,1210) Convolution Kernel	Shown in IDS5 image window for all CT images
(0018,1602) Shutter Left Vertical Edge	Is used for IDS5 cropping.
(0018,1604) Shutter Right Vertical Edge	Is used for IDS5 cropping.
(0018,1606) Shutter Upper Horizontal Edge	Is used for IDS5 cropping.
(0018,1608) Shutter Lower Horizontal Edge	Is used for IDS5 cropping.
(0018,1610) Center of Circular Shutter	If present and (0018,1602) - (0018,1608) not present, defines an IDS5 square cropping.
(0018,1612) Radius of Circular Shutter	If present and (0018,1602) - (0018,1608) not present, defines an IDS5 square cropping.
(0018,5100) Patient Position	Shown in IDS5 image window for all CT and MR images
(0020,000D) Study Instance UID	Stored in WISE examination data (max 64 characters).
(0020,000E) Series Instance UID	1. Stored in WISE series data (max 64 characters). 2. Is used for non-default method for identifying scanogram images if "-S U" option is used with w_store. 3. By default, must be equal for all images within a stack.
(0020,0010) Study ID	1. Stored in WISE examination data (max 16 characters). 2. Default attribute for request number in WISE. Used for connecting the image to RIS entities.
(0020,0011) Series Number	1. Stored in WISE series data 2. Is used for non-default method for identifying scanogram images if "-S S" option is used with w_store.
(0020,0013) Image Number	1. Stored in WISE image data 2. Is used for non-default method for identifying scanogram images if "-S I" option is used with w_store. 3. Shown in IDS5 image window for all CT and MR images
(0020,0020) Patient Orientation	Always shown in IDS5 image windows for showing anatomical orientation of the image (anterior, posterior, right, left, head, foot). If not present, this information is calculated from tags (0020,0032) and (0020,0037).

(0020,0032) Image Position (Patient)	Important attribute for showing location of images in scanograms in IDS5. Needs to be present in both the stack and in the scanogram. See also (0020,0037) and (0028,0030).
(0020,0037) Image Orientation (Patient)	Important attribute for showing location of images in scanograms in IDS5. Needs to be present in both the stack and in the scanogram. See also (0020,0032) and (0028,0030).
(0020,0052) Frame of Reference UID	Is used for non-default method for identifying scanogram images if "-S A" option is used with w_store.
(0028,0002) Samples per Pixel	If not set, 1 is assumed in IDS5.
(0028,0004) Photometric Interpretation	MONOCHROME1, MONOCHROME2, PALETTE_COLOR and RGB are supported by IDS5. If this attribute is not set, MONOCHROME2 is used by IDS5.
(0028,0006) Planar Configuration	If not set, 000 is assumed by IDS5.
(0028,0008) Number of Frames	If not set, 1 is assumed by IDS5.
(0028,0010) Rows	Must be set to be viewable in IDS5.
(0028,0011) Columns	Must be set to be viewable in IDS5
(0028,0030) Pixel Spacing	1. Used for calibrating the image in IDS5. If empty (0018,1164) is used. 2. Important attribute for showing location of images in scanograms in IDS5. Needs to be present in both the stack and in the scanogram. See also (0020,0032) and (0020,0037). 3. An images with non-square pixels can be transformed to an image with square pixels during image import. IDS5 can only handle images with square pixels.
(0028,0034) Pixel Aspect Ratio	Not used. 1/1 assumed by IDS5. There are possibilities to convert non-square pixels to square pixels in image import.
(0028,0100) Bits Allocated	Must be set to be viewable in IDS5
(0028,0101) Bits Stored	Must be set and less than (0028,0100) Bits Allocated to be viewable in IDS5.
(0028,0102) High Bit	1. If not set, (Bit Stored)-1 is used by IDS5. 2. If set, must be between greater than 0 and less than or equal to Bits Allocated. If not, (Bits Stored)-1 is used by IDS5.
(0028,0103) Pixel Representation	If not set, 0000H (unsigned integer) is assumed by IDS5.
(0028,1050) Window Center	If not set, the default in IDS is half the bit depth.
(0028,1051) Window Width	If not set, the default in IDS5 is the bit depth.
(0028,1052) Rescale Intercept	Is used for calculating Hounsfield units of CT images in IDS5.
(0028,1053) Rescale Slope	Is used for calculating Hounsfield units of CT images in IDS5.
(0028,3000) Modality LUT Sequence	The first LUT in a sequence is used by IDS5, the rest is ignored.

(0028,3002) LUT Descriptor	Must be set if (0028,3000) Modality LUT Sequence is used.
(0028,3006) LUT Data	Must be set if (0028,3000) Modality LUT Sequence is used.
(7FE0,0010) Pixel Data	Must be set.

Appendix B.   Key List for Q/R C-FIND Requests

These tables contain the DICOM keys that are supported by the Q/R SCP AE in C-FIND requests. Note that only these keys are supported. No optional keys are supported. The type columns specify the key type according to the DICOM Standard, where **R** = Required and **U** = Unique. A minus sign means not supported. The three columns under Type corresponds to the different information models: **Pat** = Patient Root, **Study** = Study Root and **P/S O** = Patient/Study Only.

Table 9.   PATIENT Level

Key	Tag	Type			Comment
		Pat	Study	P/S O	
Patient's Name	(0010,0010)	R	-	R	
Patient ID	(0010,0020)	U	-	U	

Table 10. STUDY Level

Key	Tag	Type			Comment
		Pat	Study	P/S O	
Study Date	(0008,0020)	R	R	R	Range matching not supported
Study Time	(0008,0030)	R	R	R	Range matching not supported
Accession Number	(0008,0050)	R	R	R	
Patient's Name	(0010,0010)	-	R	-	
Patient ID	(0010,0020)	-	R	-	
Study ID	(0020,0010)	R	R	R	
Study Instance UID	(0020,000D)	U	U	U	

Table 11. SERIES Level

Key	Tag	Type			Comment
		Pat	Study	P/S O	
Modality	(0008,0060)	R	R	-	
Series Number	(0020,0011)	R	R	-	
Series Instance UID	(0020,000E)	U	U	-	

Table 12. IMAGE Level

Key	Tag	Type			Comment
		Pat	Study	P/S O	
Image Number	(0020,0013)	R	R	-	
SOP Instance UID	(0008,0018)	U	U	-	

Appendix C.   Sectra Private Attributes

If configured so, the Store SCU AE can include some Private Attributes in images exported from it. This table documents these attributes.

Tag	Name	VR	VM	Description
(0009,00xx)	Private creator code	LO	1	Value: SECTRA_Ident_01
(0009,xx01)	Request number	LO	1	Unique id of request for this image
(0009,xx02)	Examination number	LO	1	Unique id of examination for this image
(0029,00yy)	Private creator code	LO	1	Value: SECTRA_ImageInfo_01
(0029,yy01)	Image info	OB	1	Image settings made on an IDS workstation

SECTRA

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