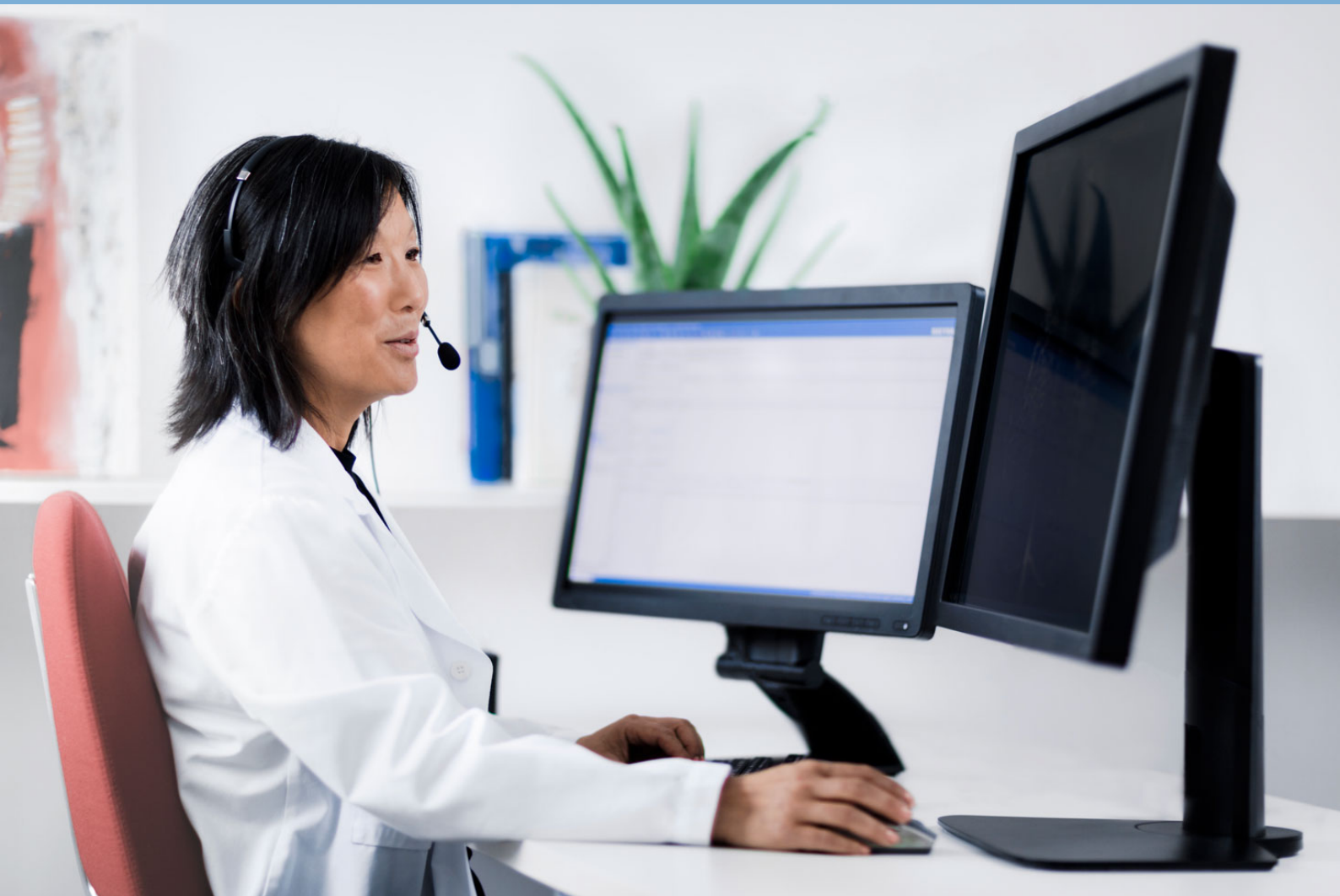


# DICOM Conformance Statement

## Sectra PACS and Sectra VNA

Sectra PACS, Version 24.1, March 2022



# SECTRA

*Knowledge and passion*

---

# Contents

---

<b>1</b>	<b>Conformance Statement Overview</b>	<b>1</b>
1.1	Supported Storage SOP Classes	4
<b>2</b>	<b>Introduction</b>	<b>13</b>
2.1	Revision History	14
2.2	Audience	16
2.3	Remarks	16
2.4	Terms and Definitions	16
2.5	Basics of DICOM Communication	19
2.6	Abbreviations	19
2.7	References	21
2.8	Products and architecture	21
<b>3</b>	<b>Networking</b>	<b>22</b>
3.1	Implementation Model	22
3.2	AE Specifications	29
3.3	Network Interfaces	79
3.4	Configuration	79
<b>4</b>	<b>Media Interchange</b>	<b>80</b>
4.1	Implementation Model	80
4.2	AE specifications	81
4.3	Augmented and Private Application Profiles	84
4.4	Media Configuration	84
<b>5</b>	<b>Transformation of DICOM to CDA</b>	<b>85</b>
<b>6</b>	<b>Support of Character Sets</b>	<b>86</b>
<b>7</b>	<b>Security</b>	<b>87</b>
7.1	Security Profiles	87
7.2	Association Level Security	87
7.3	Application Level Security	87
<b>8</b>	<b>Annexes</b>	<b>88</b>
8.1	IOD Contents	88
8.2	Data Dictionary of Private Attributes	92

8.3 Coded Terminology and Templates . . . . . 93

8.4 Grayscale Image Consistency . . . . . 93

8.5 Standard Extended/Specialized/Private SOP Classes . . . . . 93

8.6 Private Transfer Syntaxes . . . . . 94

8.7 Presentation State Display . . . . . 94

---

# 1 Conformance Statement Overview

---

The following topics are included in this chapter:

- [Supported Storage SOP Classes](#)

The following table provides an overview of the DICOM network services supported by Sectra PACS and Sectra VNA. For supported media services see [Table 1.2, “Media Services”](#). For Storage SOP Classes and viewing capabilities, see [Table 1.3, “List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView.”](#)

**Table 1.1** Network Services

SOP Class or Network Service	User of Service (SCU / Client)	Provider of Service (SCP / Server)
<b>Transfer</b>		
Verification SOP Class	Yes	Yes
All Storage SOP Classes in <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a>	Yes	Yes
<b>Workflow Management</b>		
Storage Commitment Push Model SOP Class	Yes	Yes
Basic Study Content Notification SOP Class (Retired)	Yes	No
Modality Worklist Information Model - FIND SOP Class	No	Yes
<b>Query/Retrieve</b>		
Patient Root Query/Retrieve Information Model - FIND SOP Class	No	Yes - Hierarchical only
Patient Root Query/Retrieve Information Model - MOVE SOP Class	No	Yes - Hierarchical only
Study Root Query/Retrieve Information Model - FIND SOP Class	Yes - Hierarchical only	Yes - Hierarchical only
Study Root Query/Retrieve Information Model - MOVE SOP Class	Yes - Hierarchical only	Yes - Hierarchical only
Patient/Study Only Query/Retrieve Information Model - FIND SOP Class (Retired)	No	Yes - Hierarchical only
Patient/Study Only Query/Retrieve Information Model - MOVE SOP Class (Retired)	No	Yes - Hierarchical only
<b>Print Management</b>		
Basic Grayscale Print Management Meta SOP Class	Yes	No
> Basic Film Session SOP Class	Yes	No
> Basic Film Box SOP Class	Yes	No
> Basic Grayscale Image Box SOP Class	Yes	No
> Printer SOP Class	Yes	No
Presentation LUT SOP Class	Yes	No
<b>Studies Service - Retrieve Transactions (a.k.a. WADO-RS)</b>		
Retrieve - Study	Yes	Yes
Retrieve - Study Metadata	No	Yes
Retrieve - Study Bulkdata	No	Yes
Retrieve - Rendered Study	No	No
Retrieve - Study Thumbnail	No	No
Retrieve - Series	No	Yes
Retrieve - Series Metadata	Yes - Only for UniView when configured for DICOMweb.	Yes

SOP Class or Network Service	User of Service (SCU / Client)	Provider of Service (SCP / Server)
Retrieve - Series Bulkdata	No	Yes
Retrieve - Rendered Series	No	No
Retrieve - Series Thumbnail	No	No
Retrieve - Instance	Yes - Only for UniView when configured for DICOMweb.	Yes
Retrieve - Instance Metadata	Yes - Only for UniView when configured for DICOMweb.	Yes
Retrieve - Instance Bulkdata	No	Yes
Retrieve - Rendered Instance	No	No
Retrieve - Instance Thumbnail	No	No
Retrieve - Frames	Yes - Only for UniView when configured for DICOMweb.	Yes
Retrieve - Rendered Frames	No	No
Retrieve - Frame Thumbnail	No	No
Retrieve - Bulkdata	No	Yes
<b>Studies Service - Search Transactions (a.k.a. QIDO-RS)</b>		
Search - All Studies	Yes	Yes
Search - Study	Yes	Yes
Search - Study's Series	Yes	Yes
Search - Study's Instances	No	Yes
Search - All Series	No	Yes
Search - Series	No	Yes
Search - Series' Instances	Yes - Only for UniView when configured for DICOMweb.	Yes
Search - All Instances	No	Yes
Search - Instance	No	Yes
<b>Studies Service - Store Transactions (a.k.a. STOW-RS)</b>		
Store - All Studies	No	Yes
Store - Study	No	No
Store - Bulkdata	No	Yes

The following table provides an overview of the DICOM Media Storage Application Profiles (with roles) supported by Sectra PACS and Sectra VNA.

Table 1.2 Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
<b>Compact Disk - Recordable</b>		
General Purpose CD-R	Yes	Yes
<b>DVD</b>		
General Purpose DVD-RAM	Yes	Yes
General Purpose DVD Interchange with JPEG	Yes	Yes
General Purpose DVD Interchange with JPEG 2000	Yes	Yes
<b>USB</b>		
General Purpose USB Media Interchange with JPEG	Yes	Yes
General Purpose USB Media Interchange with JPEG 2000	Yes	Yes

## 1.1 Supported Storage SOP Classes

The following table lists all storage SOP classes supported by Sectra PACS. All SOP Classes in the table are supported for storage.

The columns "IDS7" and "UniView" indicates with a "Yes" if there is support for viewing of the specific DICOM Storage SOP Class in IDS7 and UniView respectively. The term viewing should be interpreted in a broad sense. Image SOP classes can be expected to be viewable and viewing features like zooming and rotation can be applied. For most of the supported image SOP classes a large range of other viewing features are available.

Non-image SOP classes, like Grayscale Softcopy Presentation State and Mammography CAD SR are applied to referenced images and supported graphics contained in these are displayed on top of the image.

The viewing capabilities of IDS7 and UniView for the SOP Classes stated here are verified by testing and extensive use of them.

This document does not stipulate anything about the internal storage format used in Sectra PACS for objects received using the DICOM Storage service class.

IDS7 also supports viewing DICOM objects containing video encoded as MPEG-2 or MPEG-4. Typical SOP classes for video are Video Photographic Image, Video Endoscopic Image and Video Microscopic Image, but the support for video is not restricted to these SOP classes. Playing video in IDS7 might require that additional codecs are installed on the workstation. See the "System Requirements Sectra PACS" document for more information.

UniView also supports viewing DICOM objects containing video encoded as MPEG-4. Playing video in UniView requires MPEG-4 support in the browser. See the "System Requirements Sectra PACS" document for more information.

**Table 1.3** List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView.

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Stored Print (Retired)	1.2.840.10008.5.1.1.1.27			
Hardcopy Grayscale Image (Retired)	1.2.840.10008.5.1.1.1.29			
Hardcopy Color Image (Retired)	1.2.840.10008.5.1.1.1.30			
CR Image	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	
DX Image - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	
DX Image - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	
MG Image - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes	
MG Image - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes	
IO Image - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	Yes	
IO Image - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	Yes	
CT Image	1.2.840.10008.5.1.4.1.1.2	Yes	Yes	
Enhanced CT Image	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes	
Legacy Converted Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.2	Yes	Yes	
US Multi-Frame Image (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes	
US Multi-Frame Image	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	
MR Image	1.2.840.10008.5.1.4.1.1.4	Yes	Yes	
Enhanced MR Image	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes	
MR Spectroscopy	1.2.840.10008.5.1.4.1.1.4.2			
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes	
Legacy Converted Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.4	Yes	Yes	
NM Image (Retired)	1.2.840.10008.5.1.4.1.1.5	Yes	Yes	
US Image (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes	
US Image	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes	
Enhanced US Volume Storage	1.2.840.10008.5.1.4.1.1.6.2	Yes	Yes	
SC Image	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	
MF SC Single Bit Image	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes	
MF SC Grayscale Byte Image	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes	
MF SC Grayscale Word Image	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes	
MF SC True Color Image	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes	
Stand-alone Overlay (Retired)	1.2.840.10008.5.1.4.1.1.8			
Stand-alone Curve (Retired)	1.2.840.10008.5.1.4.1.1.9			



SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Waveform (Retired)	1.2.840.10008.5.1.4.1.1.9.1			
12-lead ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.1	Yes		License required for viewing
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Yes		License required for viewing
Ambulatory ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.3	Yes		License required for viewing
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1			
Cardiac Electrophysiology Waveform	1.2.840.10008.5.1.4.1.1.9.3.1			
Basic Voice Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.1			
General Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.2			
Arterial Pulse Waveform Storage	1.2.840.10008.5.1.4.1.1.9.5.1			
Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.1			
Multi-channel Respiratory Waveform Storage	1.2.840.10008.5.1.4.1.1.9.6.2			
Routine Scalp Electroencephalogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.1			
Electromyogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.2			
Electrooculogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.3			
Sleep Electroencephalogram Waveform Storage	1.2.840.10008.5.1.4.1.1.9.7.4			
Body Position Waveform Storage	1.2.840.10008.5.1.4.1.1.9.8.1			
Stand-alone Modality LUT (Retired)	1.2.840.10008.5.1.4.1.1.10			
Stand-alone VOI LUT (Retired)	1.2.840.10008.5.1.4.1.1.11			
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes	See <a href="#">section 8.7 Presentation State Display</a> for details.
Color Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.2			
Pseudo-Color Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.3			
Blending Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.4			
XA/XRF Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.5			
Grayscale Planar MPR Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.6			
Compositing Planar MPR Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.7			
Advanced Blending Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.8			
Volume Rendering Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.9			

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Segmented Volume Rendering Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.10			
Multiple Volume Rendering Volumetric Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.11			
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	
Enhanced XA Image	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes	
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes	
Enhanced XRF Image	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes	
X-Ray Angio. Bi-plane Image (Retired)	1.2.840.10008.5.1.4.1.1.12.3			
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1			
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2			
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes	
Breast Projection X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.13.1.4	Yes	Yes	
Breast Projection X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.13.1.5			
Intravascular Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1			
Intravascular Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2			
NM Image	1.2.840.10008.5.1.4.1.1.20	Yes	Yes	
Parametric Map Storage	1.2.840.10008.5.1.4.1.1.30			
Raw Data	1.2.840.10008.5.1.4.1.1.66			
Spatial Registration	1.2.840.10008.5.1.4.1.1.66.1			
Spatial Fiducials	1.2.840.10008.5.1.4.1.1.66.2			
Deformable Spatial Registraion	1.2.840.10008.5.1.4.1.1.66.3			
Segmentation	1.2.840.10008.5.1.4.1.1.66.4			
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5			
Tractography Results Storage	1.2.840.10008.5.1.4.1.1.66.6			
Real World Value Mapping	1.2.840.10008.5.1.4.1.1.67			
Surface Scan Mesh Storage	1.2.840.10008.5.1.4.1.1.68.1			
Surface Scan Point Cloud Storage	1.2.840.10008.5.1.4.1.1.68.2			
VL Image (Retired)	1.2.840.10008.5.1.4.1.1.77.1	Yes	Yes	
VL Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	Yes	

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Video Endoscopic Image	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	Yes	
VL Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	Yes	
Video Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	Yes	
VL Slide-Coordinates Microscopic Image	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	Yes	
VL Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	Yes	
Video Photographic Image	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	Yes	
Ophthalmic Photography 8 Bit Image	1.2.840.10008.5.1.4.1.1.77.1.5.1	Yes	Yes	
Ophthalmic Photography 16 Bit Image	1.2.840.10008.5.1.4.1.1.77.1.5.2	Yes	Yes	
Stereometric Relationship	1.2.840.10008.5.1.4.1.1.77.1.5.3			
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	Yes	Yes	
Wide Field Ophthalmic Photography Stereographic Projection Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.5	Yes	Yes	
Wide Field Ophthalmic Photography 3D Coordinates Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.6	Yes	Yes	
Ophthalmic Optical Coherence Tomography En Face Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.7	Yes	Yes	
Ophthalmic Optical Coherence Tomography B-scan Volume Analysis Storage	1.2.840.10008.5.1.4.1.1.77.1.5.8	Yes	Yes	
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	Yes	Yes	License and Sectra Digital Pathology Module (DPAT 2.2 or later) required for viewing. Not supported for UniView when using DICOMweb.
Dermoscopic Photography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.7	Yes	Yes	
VL Multi-frame Image (Retired)	1.2.840.10008.5.1.4.1.1.77.2			
Lensometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.1			
Autorefractometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.2			
Keratometry Measurements Storage	1.2.840.10008.5.1.4.1.1.78.3			
Subjective Refraction Measurements Storage	1.2.840.10008.5.1.4.1.1.78.4			
Visual Acuity Measurements	1.2.840.10008.5.1.4.1.1.78.5			
Spectacle Prescription Reports Storage	1.2.840.10008.5.1.4.1.1.78.6			
Ophthalmic Axial Measurements Storage	1.2.840.10008.5.1.4.1.1.78.7			
Intraocular Lens Calculations Storage	1.2.840.10008.5.1.4.1.1.78.8			
Macular Grid Thickness and Volume Report Storage	1.2.840.10008.5.1.4.1.1.79.1			

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Ophthalmic Visual Field Static Perimetry Measurements Storage	1.2.840.10008.5.1.4.1.1.80.1			
Ophthalmic Thickness Map Storage	1.2.840.10008.5.1.4.1.1.81.1			
Corneal Topography Map Storage	1.2.840.10008.5.1.4.1.1.82.1			
Text SR Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.1			
Audio SR Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.2			
Detail SR Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.3			
Comprehensive SR Storage (Retired)	1.2.840.10008.5.1.4.1.1.88.4			
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes	License required for viewing
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22			
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33			
Comprehensive 3D SR Storage	1.2.840.10008.5.1.4.1.1.88.34			
Extensible SR Storage	1.2.840.10008.5.1.4.1.1.88.35			
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40			
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Yes		
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59			
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65			
X-Ray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67			
Radiopharmaceutical Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.68			
Colon CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.69			
Implantation Plan SR Storage	1.2.840.10008.5.1.4.1.1.88.70			
Acquisition Context SR Storage	1.2.840.10008.5.1.4.1.1.88.71			
Simplified Adult Echo SR Storage	1.2.840.10008.5.1.4.1.1.88.72			
Patient Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.73			
Planned Imaging Agent Administration SR Storage	1.2.840.10008.5.1.4.1.1.88.74			
Performed Imaging Agent Administration SR Storage	1.2.840.10008.5.1.4.1.1.88.75			
Enhanced X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.76			
Content Assessment Results Storage	1.2.840.10008.5.1.4.1.1.90.1			
Microscopy Bulk Simple Annotations Storage	1.2.840.10008.5.1.4.1.1.91.1			
Encapsulated PDF	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes	
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2			

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Encapsulated STL Storage	1.2.840.10008.5.1.4.1.1.104.3			
Encapsulated OBJ Storage	1.2.840.10008.5.1.4.1.1.104.4			
Encapsulated MTL Storage	1.2.840.10008.5.1.4.1.1.104.5			
PET Image	1.2.840.10008.5.1.4.1.1.128	Yes	Yes	
Legacy Converted Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.128.1	Yes	Yes	
Stand-alone PET Curve (Retired)	1.2.840.10008.5.1.4.1.1.129			
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	Yes	Yes	
Basic Structured Display Storage	1.2.840.10008.5.1.4.1.1.131			
CT Defined Procedure Protocol Storage	1.2.840.10008.5.1.4.1.1.200.1			
CT Performed Procedure Protocol Storage	1.2.840.10008.5.1.4.1.1.200.2			
Protocol Approval Storage	1.2.840.10008.5.1.4.1.1.200.3			
XA Defined Procedure Protocol Storage	1.2.840.10008.5.1.4.1.1.200.7			
XA Performed Procedure Protocol Storage	1.2.840.10008.5.1.4.1.1.200.8			
RT Image	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes	
RT Dose	1.2.840.10008.5.1.4.1.1.481.2			
RT Structure Set	1.2.840.10008.5.1.4.1.1.481.3			
RT Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.4			
RT Plan	1.2.840.10008.5.1.4.1.1.481.5			
RT Brachy Treatment Record	1.2.840.10008.5.1.4.1.1.481.6			
RT Treatment Summary Record	1.2.840.10008.5.1.4.1.1.481.7			
RT Ion Plan	1.2.840.10008.5.1.4.1.1.481.8			
RT Ion Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.9			
RT Physician Intent Storage	1.2.840.10008.5.1.4.1.1.481.10			
RT Segment Annotation Storage	1.2.840.10008.5.1.4.1.1.481.11			
RT Radiation Set Storage	1.2.840.10008.5.1.4.1.1.481.12			
C-Arm Photon-Electron Radiation Storage	1.2.840.10008.5.1.4.1.1.481.13			
Tomotherapeutic Radiation Storage	1.2.840.10008.5.1.4.1.1.481.14			
Robotic-Arm Radiation Storage	1.2.840.10008.5.1.4.1.1.481.15			
RT Radiation Record Set Storage	1.2.840.10008.5.1.4.1.1.481.16			
RT Radiation Salvage Record Storage	1.2.840.10008.5.1.4.1.1.481.17			
Tomotherapeutic Radiation Record Storage	1.2.840.10008.5.1.4.1.1.481.18			

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
C-Arm Photon-Electron Radiation Record Storage	1.2.840.10008.5.1.4.1.1.481.19			
Robotic Radiation Record Storage	1.2.840.10008.5.1.4.1.1.481.20			
RT Radiation Set Delivery Instruction Storage	1.2.840.10008.5.1.4.1.1.481.21			
RT Treatment Preparation Storage	1.2.840.10008.5.1.4.1.1.481.22			
RT Beams Delivery Instruction Storage (Retired)	1.2.840.10008.5.1.4.34.1			
RT Beams Delivery Instruction Storage	1.2.840.10008.5.1.4.34.7			
RT Brachy Application Setup Delivery Instruction Storage	1.2.840.10008.5.1.4.34.10			
Hanging Protocol	1.2.840.10008.5.1.4.38.1			
Color Palette Storage	1.2.840.10008.5.1.4.39.1			
Generic Implant Template Storage	1.2.840.10008.5.1.4.43.1			
Implant Assembly Template Storage	1.2.840.10008.5.1.4.44.1			
Implant Template Group Storage	1.2.840.10008.5.1.4.45.1			
Philips Private Specialised X-Ray	1.3.46.670589.2.3.1.1			
Philips Private CX Image	1.3.46.670589.2.4.1.1			
Philips Private 3D Presentation State Storage	1.3.46.670589.2.5.1.1			
Philips Private 3D Volume (Retired)	1.3.46.670589.5.0.1			
Philips Private 3D Volume	1.3.46.670589.5.0.1.1			
Philips Private 3D Volume Object (Retired)	1.3.46.670589.5.0.2			
Philips Private 3D Volume Object	1.3.46.670589.5.0.2.1			
Philips Private Surface (Retired)	1.3.46.670589.5.0.3			
Philips Private Surface	1.3.46.670589.5.0.3.1			
Philips Private Composite Object	1.3.46.670589.5.0.4			
Philips Private MR Cardio Profile	1.3.46.670589.5.0.7			
Philips Private MR Cardio (Retired)	1.3.46.670589.5.0.8			
Philips Private MR Cardio	1.3.46.670589.5.0.8.1			
Philips Private CT Synthetic Image	1.3.46.670589.5.0.9			
Philips Private MR Synthetic Image	1.3.46.670589.5.0.10			
Philips Private MR Cardio Analysis (Retired)	1.3.46.670589.5.0.11			
Philips Private MR Cardio Analysis	1.3.46.670589.5.0.11.1			
Philips Private CX Synthetic Image	1.3.46.670589.5.0.12			

SOP Class Name	SOP Class UID	IDS7	UniView	Comment
Philips Private Perfusion	1.3.46.670589.5.0.13			
Philips Private Perfusion Analysis	1.3.46.670589.5.0.14			
Philips Private Gyroscan MR Spectrum	1.3.46.670589.11.0.0.12.1			
Philips Private Gyroscan MR Series Data	1.3.46.670589.11.0.0.12.2			
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4			
GE Private Nuclear Medicin	1.2.840.113619.4.27			
GE Private Advance (PET) Raw Data Storage	1.2.840.113619.4.30			
Siemens Private CSA Non-Image Storage	1.3.12.2.1107.5.9.1			

---

## 2 Introduction

---

The following topics are included in this chapter:

- [Revision History](#)
- [Audience](#)
- [Remarks](#)
- [Terms and Definitions](#)
- [Basics of DICOM Communication](#)
- [Abbreviations](#)
- [References](#)
- [Products and architecture](#)



## 2.1 Revision History

Table 2.1 Revision History

Document Version	Date	Author	Description
1.0	October 19, 2018	Krister Valtonen	Initial version, valid for Sectra PACS and Sectra VNA version 20.2. This version is based on the old conformance statement for Sectra PACS and Sectra VNA which was based on the original DICOM Conformance Statement template from 1993. Also, the view capabilities in IDS7 and UniView is included, which in versions before 20.2 was covered by the document "Supported DICOM Storage SOP Classes for viewing - IDS7, UniView".
2.0	January 31, 2019	Bengt Hellman, Krister Valtonen, et al.	Updated for Sectra PACS and Sectra VNA version 21.1. <ul style="list-style-type: none"> <li>● Support for the Media Storage Application Profiles General Purpose DVD Interchange with JPEG and General Purpose USB Media Interchange with JPEG.</li> <li>● Enhanced support for Presentation State Display.</li> </ul>
3.0	June 18, 2019	Alexander Kvist, Krister Valtonen, et al.	Updated for Sectra PACS and Sectra VNA version 21.2. <ul style="list-style-type: none"> <li>● Added specification for QIDO-RS User AE.</li> <li>● Support for the Media Storage Application Profiles General Purpose DVD Interchange with JPEG 2000 and General Purpose USB Media Interchange with JPEG 2000.</li> </ul>
4.0	October 22, 2019	Kevin Larsson Alm, Krister Valtonen, et al.	Updated for Sectra PACS and Sectra VNA version 21.3. <ul style="list-style-type: none"> <li>● Renamed DICOMweb-related AEs in the SHS/SSS to include SHS in their name.</li> <li>● Updated Application Data Flow overview diagram with the LVS and its related AEs.</li> <li>● Added information about UniView with DICOMweb, including information about the LVS and its related AEs.</li> <li>● Added action for fetching patient information.</li> </ul>
5.0	March 20, 2020	Krister Valtonen, Alexander Kvist, et al.	Updated for Sectra PACS and Sectra VNA version 22.1. <ul style="list-style-type: none"> <li>● Updated list of supported Storage SOP Classes.</li> <li>● Added specification for SHS WADO-RS User AE.</li> </ul>
6.0	September 25, 2020	Krister Valtonen, Alexander Kvist, et al.	Updated for Sectra PACS and Sectra VNA version 22.2. <ul style="list-style-type: none"> <li>● Updated list of supported Storage SOP Classes.</li> <li>● Added specification for STOW Provider AE.</li> </ul>
7.0	March 19, 2021	Krister Valtonen	Updated for Sectra PACS and Sectra VNA version 23.1. <ul style="list-style-type: none"> <li>● Updated list of supported Storage SOP Classes.</li> </ul>

Document Version	Date	Author	Description
8.0	September 10, 2021	Krister Valtonen	Updated for Sectra PACS and Sectra VNA version 23.2. <ul style="list-style-type: none"> <li>● Updated list of supported Storage SOP Classes.</li> </ul>
9.0	March 18, 2022	Krister Valtonen	Updated for Sectra PACS and Sectra VNA version 24.1. <ul style="list-style-type: none"> <li>● Updated list of supported Storage SOP Classes.</li> </ul>

## 2.2 Audience

This document is written for anyone that needs to understand how the covered Sectra product(s) will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

## 2.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between the covered Sectra products(s) and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

Sectra has participated in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE). The IHE Integration Statement for Sectra PACS, together with the IHE Technical Framework, may facilitate the process of validation testing.

## 2.4 Terms and Definitions

This section describes terminology used in this Conformance Statement for the non-specialist. The DICOM Standard is the authoritative source for formal definitions of these terms.

<b>Abstract Syntax</b>	The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
<b>Application Entity (AE)</b>	An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
<b>Application Entity Title (AET)</b>	The externally known name of an Application Entity, used to identify a DICOM application among a set of DICOM applications on the network.
<b>Application Context</b>	The specification of the type of communication used between Application Entities. Example: DICOM network protocol.
<b>Association</b>	A network communication channel set up between Application Entities.
<b>Attribute</b>	A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: (0010,0020) Patient ID, (0008,0050) Accession Number, (0028,0004) Photometric Interpretation and (0008,1032) Procedure Code Sequence.
<b>Information Object Definition (IOD)</b>	The specified set of Attributes that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
<b>Joint Photographic Experts Group (JPEG)</b>	A set of standardized image compression techniques, available for use by DICOM applications.
<b>Media Application Profile</b>	The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).
<b>Module</b>	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
<b>Negotiation</b>	First phase of association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.
<b>Presentation Context</b>	The set of DICOM network services used over an association, as negotiated between Application Entities; includes abstract syntaxes and transfer syntaxes.

<b>Protocol Data Unit (PDU)</b>	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
<b>Security Profile</b>	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.
<b>Service Class Provider (SCP)</b>	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).
<b>Service Class User (SCU)</b>	Role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).
<b>Service/Object Pair Class (SOP Class)</b>	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
<b>Service/Object Pair Instance (SOP Instance)</b>	An information object; a specific occurrence of information exchanged in a SOP Class. Examples: a specific X-ray image.
<b>Tag</b>	A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) - the tag for the Patient ID attribute, (07FE,0010) - the tag for the Pixel Data attribute, (0019,0210) - a tag for a private data element (19 is odd).
<b>Transfer Syntax</b>	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
<b>Unique Identifier (UID)</b>	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
<b>Value Representation (VR)</b>	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

## 2.5 Basics of DICOM Communication

This section covers some basics about DICOM and DICOM communication. This section is not a substitute for training about DICOM, and it makes many simplifications.

Two application entities (devices) that want to communicate with each other over a network using the DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an association (a connection to the other device), and ask if specific services, information, and encodings are supported by the other device (Negotiation).

DICOM specifies a number of network services and types of information objects, each of which is called an abstract syntax for the negotiation. DICOM also specifies a variety of methods for encoding data, denoted transfer syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of abstract syntax and transfer syntax to be used on the association; these combinations are called presentation contexts. The receiving application entity accepts the presentation contexts it supports.

For each presentation context, the association negotiation also allow the devices to agree on Roles - which one is the Service Class User (SCU - client) and which is the Service Class Provider (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The association negotiation finally enables exchange of maximum network packet (PDU) size, security information, and network service options (called Extended Negotiation information).

The application entities, having negotiated the association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition, and sent using the negotiated transfer syntax. There is a default transfer syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a Response Status indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no association negotiation possible, they both use a Media Application Profile that specifies "pre-negotiated" exchange media format, abstract syntax, and transfer syntax.

## 2.6 Abbreviations

<b>AE</b>	Application Entity
<b>AET</b>	Application Entity Title
<b>CAD</b>	Computer Aided Detection
<b>CDA</b>	Clinical Document Architecture
<b>CR</b>	Computed Radiography
<b>CT</b>	Computed Tomography
<b>DICOM</b>	Digital Imaging and Communications in Medicine

---

<b>DX</b>	Digital X-ray
<b>GSPS</b>	Grayscale Softcopy Presentation State
<b>IDS7</b>	Client application in Sectra PACS for viewing images, reporting etc.
<b>IHE</b>	Integrating the Healthcare Enterprise
<b>ILM</b>	Information Lifecycle Management
<b>IO</b>	Intra-oral X-ray
<b>IOCM</b>	Imaging Object Change Management, an integration profile within IHE.
<b>IOD</b>	Information Object Definition
<b>JPEG</b>	Joint Photographic Experts Group
<b>LUT</b>	Look-up Table
<b>LVS</b>	Sectra LiteView Server
<b>UVS</b>	Sectra UniView Server
<b>MG</b>	Mammography (X-ray)
<b>MPEG</b>	Moving Picture Experts Group
<b>MR</b>	Magnetic Resonance Imaging
<b>NM</b>	Nuclear Medicine
<b>PACS</b>	Picture Archiving and Communication System
<b>PDU</b>	Protocol Data Unit
<b>PET</b>	Positron Emission Tomography
<b>QIDO</b>	Query by ID for DICOM Objects
<b>RF</b>	Radiofluoroscopy
<b>RT</b>	Radiotherapy
<b>SC</b>	Secondary Capture
<b>SCP</b>	Service Class Provider
<b>SCU</b>	Service Class User
<b>SHS</b>	Sectra Healthcare Server
<b>SOP</b>	Service-Object Pair
<b>SR</b>	Structured Reporting
<b>SSS</b>	Sectra Satellite Server
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>URI</b>	Uniform Resource Identifier

<b>US</b>	Ultrasound
<b>VL</b>	Visible Light
<b>VR</b>	Value Representation
<b>WADO</b>	Web Access of DICOM Objects
<b>WS</b>	Web Service
<b>XA</b>	X-ray Angiography

## 2.7 References

- [1] NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available for free at <https://www.dicomstandard.org/>.
- [2] [Sectra User Documentation](#)<sup>1</sup>
- [3] Sectra User's Guide IDS7 ([Sectra User Documentation](#) [2])
- [4] Sectra User's Guide UniView
- [5] System Administrator's Guide WISE
- [6] System Administrator's Guide ImageServer/s
- [7] System Administrator's Guide ImageServer/fs, ImageServer/xd, ImageServer/os
- [8] System Administrator's Guide Sectra Healthcare System

**Note:** Depending on the Sectra solution you are running, referenced documents may or may not be available to you.

## 2.8 Products and architecture

The architecture and components of Sectra PACS and Sectra VNA are described in [System Administrator's Guide Sectra Healthcare System](#) [8].

The server components can be installed on Microsoft Windows Server.

---

<sup>1</sup> <https://userdoc.sectra.com/>



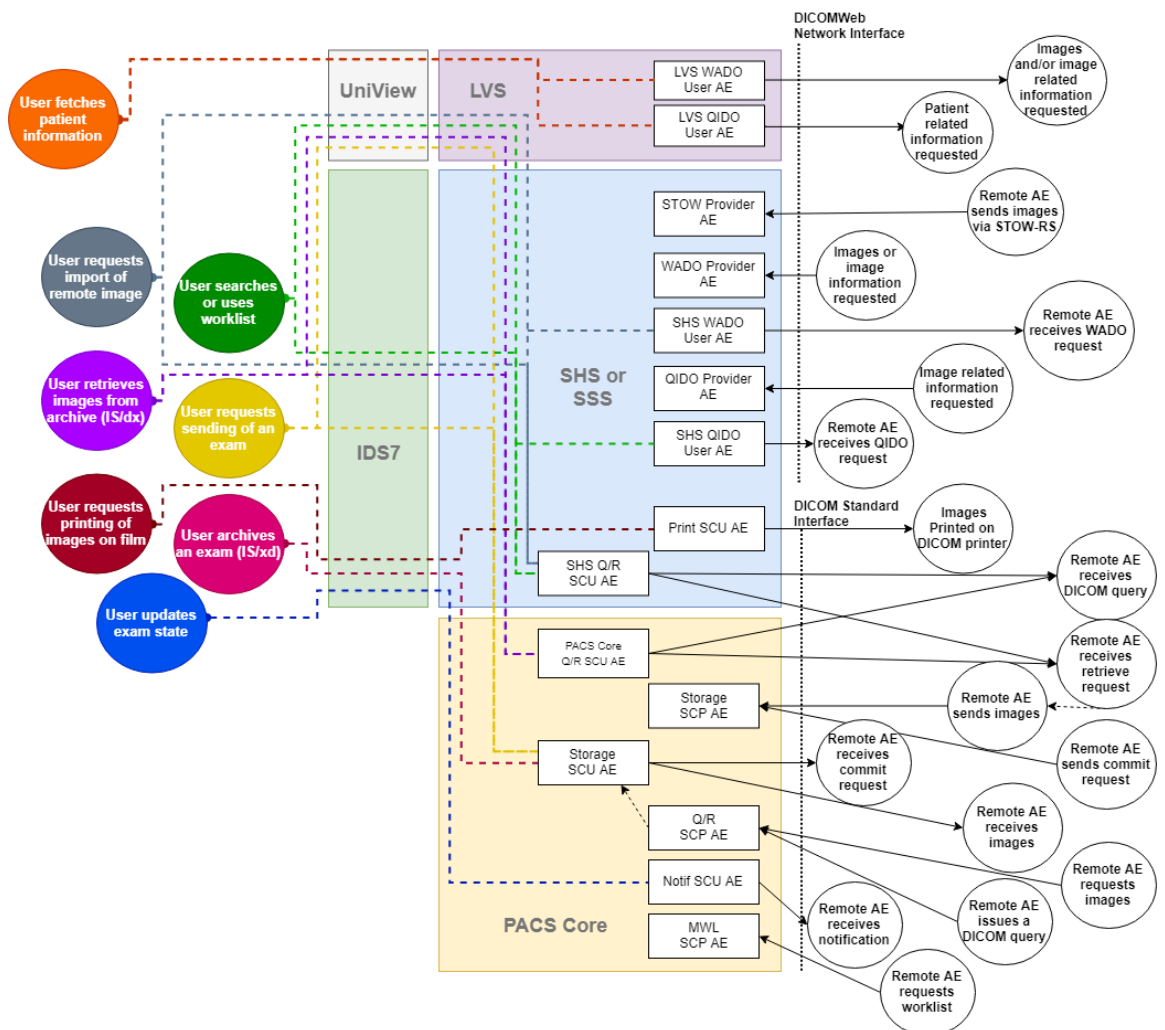
# 3 Networking

The following topics are included in this chapter:

- Implementation Model
- AE Specifications
- Network Interfaces
- Configuration

## 3.1 Implementation Model

### 3.1.1 Application Data Flow



This conformance statement covers the following products of Sectra PACS and Sectra VNA:

- **IDS7** - client application used for viewing images, reporting, etc.
- **UniView** - web-based client application used for viewing images, reports, etc.
- **Sectra UniView Server** - server application serving UniView.
- **SHS** and **SSS** - server applications serving IDS7 and Sectra UniView Server. The SHS (Sectra Healthcare Server) is the central server. SSS is a satellite server used for remote locations connected to the same Sectra PACS.
- **Sectra PACS Core** - server applications used by SHS and SSS. Includes, among other, WISE, ImageServer/s, and ImageServer/xd.

The following sections provide some details of the application flow for each product.

### 3.1.1.1 IDS7

IDS7 itself does not contain any network DICOM Application Entities. However, the following commands performed in IDS7 can trigger DICOM communication.

- Printing of images towards a DICOM printer (laser camera). The command is forwarded to the SHS or SSS where the **Print SCU** application will perform the actual DICOM communication.
- The user updates an examination state. Depending on configuration this can render sending a DICOM content notification. The command is forwarded to Sectra PACS Core via the SHS and/or SSS where it is handled by the **Notif SCU** application.
- The user requests archiving of an examination. In case an ImageServer/xd archive is used this will trigger the **Storage SCU** application in Sectra PACS Core to send images to the archive. If configured, Storage Commitment will also be used to explicitly transfer the storage responsibility to the archive.
- The user performs a search, or opens or refreshes a worklist. In case the search or worklist is defined towards a remote Query/Retrieve server this will trigger the **SHS Q/R SCU** application to send a query (C-FIND request) to the remote Query/Retrieve server and receive the responses which will be sent back to IDS7 for presentation. In case the search or worklist is defined towards a remote QIDO-RS server it is the **SHS QIDO-RS User** application which will send a QIDO-RS query to the remote QIDO-RS server and receive the responses.
- The user requests that images in a study found on a remote Query/Retrieve server are imported to the PACS. This will trigger the **SHS Q/R SCU** application to request the remote Query/Retrieve server to send images to a Storage SCP AE in Sectra PACS Core.
- The user requests that images in a study found on a remote WADO-RS server are imported to the PACS. This will trigger the **SHS WADO-RS User** application to request the remote WADO-RS server to send images to a temporary destination on the Sectra Healthcare Server, after which they will be sent to a Storage SCP AE in Sectra PACS Core.
- The user requests an examination to be sent to a remote DICOM Storage SCP ("teleradiology"). The command is forwarded via the SHS and/or SSS to Sectra PACS Core where the sending is performed by the **Storage SCU** application.
- The user requests an examination to be retrieved from archive. In case an ImageServer/xd archive is used the command is forwarded via the SHS and/or SSS to Sectra PACS Core where the **Pacs**

**Core Q/R SCU** application sends a retrieve (C-MOVE) request to the archive causing the images to be sent to a Storage SCP AE.

IDS7 also supports DICOM Media operations, see [chapter 4 Media Interchange](#) for more information.

### 3.1.1.2 UniView

UniView itself does not contain any DICOM Application Entities. However, the following commands performed in UniView can trigger DICOM communication.

- The user performs a search, or opens or refreshes a worklist. In case the search or worklist is defined towards a remote Query/Retrieve server this will trigger the **SHS Q/R SCU** application to send a query (C-FIND request) to the remote Query/Retrieve server and receive the responses which will be sent back to UniView for presentation. In case the search or worklist is defined towards a remote QIDO-RS server it is the **SHS QIDO-RS User** application which will send a QIDO-RS query to the remote QIDO-RS server and receive the responses.
- The user requests patient information from a worklist. In case the worklist is defined towards a remote QIDO-RS server, it is the **LVS WADO-RS User** application which will send a WADO-RS query to the remote WADO-RS server and receive the response. The **LVS QIDO-RS User** application will also send QIDO-RS queries to the remote QIDO-RS server to receive complementary information.
- The user requests that images in a study found on a remote Query/Retrieve server are imported to the PACS. This will trigger the **SHS Q/R SCU** application to request the remote Query/Retrieve server to send images to a Storage SCP AE in Sectra PACS Core.
- The user requests that images in a study found on a remote WADO-RS server are imported to the PACS. This will trigger the **SHS WADO-RS User** application to request the remote WADO-RS server to send images to a temporary destination on the Sectra Healthcare Server, after which they will be sent to a Storage SCP AE in Sectra PACS Core.
- The user requests an examination to be sent to a remote DICOM Storage SCP ("teleradiology"). The command is forwarded via the SHS and/or SSS to Sectra PACS Core where the sending is performed by the **Storage SCU** application.
- The user requests an examination to be retrieved from archive. In case an ImageServer/xd archive is used the command is forwarded via the SHS and/or SSS to Sectra PACS Core where the **Pacs Core Q/R SCU** application sends a retrieve (C-MOVE) request to the archive causing the images to be sent to a Storage SCP AE.

### 3.1.1.3 Sectra UniView Server

Sectra UniView Server contains the following application entities:

- The **LVS WADO User** application fetches series and images from a remote AE using DICOM WADO-RS as a result of commands in UniView as described in [section 3.1.1.2 UniView](#).
- The **LVS QIDO User** application searches for studies from a remote AE using DICOM QIDO-RS as a result of commands in UniView as described in [section 3.1.1.2 UniView](#).

### 3.1.1.4 SHS and SSS

SHS and SSS contain the following application entities:

- The **WADO Provider** application receives and responds to WADO requests from a remote AE. Only the RS interface is supported.
- The **SHS WADO User** application requests and receives studies from a remote AE using DICOM WADO-RS as a result of commands in IDS7 or UniView as described above.
- The **QIDO Provider** application receives and responds to QIDO requests from a remote AE.
- The **SHS QIDO User** application searches for studies from a remote AE using DICOM QIDO-RS as a result of commands in IDS7 or UniView as described above.
- The **STOW Provider** application receives and responds to STOW requests from a remote AE.
- The **Print SCU** application prints images on a remote AE (DICOM Printer) as a result of a command in IDS7 as described above.
- The **SHS Q/R SCU** application searches for studies and requests retrieval of images from a remote AE using DICOM Query/Retrieve as a result of commands in IDS7 or UniView as described above.

### 3.1.1.5 Sectra PACS Core

Sectra PACS Core contains the following application entities:

- The **Pacs Core Q/R SCU** application searches for studies and requests retrieval of images from a remote AE using DICOM Query/Retrieve as a result of commands in IDS7 or UniView as described above.
- The **Storage SCP** application receives and responds to storage and storage commitment requests from a remote AE.
- The **Storage SCU** application sends storage and storage commitment requests to a remote AE. This can be triggered by commands in IDS7 or UniView as described above or as a result of a retrieve request handled by the **Q/R SCP** application.
- The **Q/R SCP** application receives and responds to queries and retrieval requests from a remote AE. Retrieval requests are forwarded to the **Storage SCU** application.
- The **Notif SCU** application sends content notifications to a remote AE as a result from a command in IDS7 as described above.
- The **MWL SCP** application receives and responds to modality worklist requests from a remote AE.

## 3.1.2 Functional Definition of AEs

### 3.1.2.1 Functional Definition of the WADO Provider Application

The **WADO Provider** application is associated with the remote real-world activity "Images or image information requested". It converts these requests into internal lookup functions to find the matching information. It then sends the information back to the requesting remote AE.

### 3.1.2.2 Functional Definition of the SHS WADO User Application

The **SHS WADO User** application requests retrieval of images from a remote AE using DICOM WADO-RS. This is associated with the remote real-world activity "User requests import of remote images" in IDS7 or UniView. SHS or SSS will communicate with the remote AE and perform the corresponding DICOM WADO-RS operations.

### 3.1.2.3 Functional Definition of the QIDO Provider Application

The **QIDO Provider** application handles HTTP GET requests received as part of the remote real-world activity "Image related information requested". The application uses the request to select matching information. It then returns a set of matching information or a response code indicating warning or failure back to the requesting device.

### 3.1.2.4 Functional Definition of the LVS WADO User Application

The **LVS WADO User** application fetches images from a remote AE using DICOM WADO-RS. It is associated with the local real-world activity "User fetches patient information" in UniView. Sectra UniView Server will communicate with the remote AE and perform the corresponding DICOM QIDO-RS operations.

### 3.1.2.5 Functional Definition of the LVS QIDO User Application

The **LVS QIDO User** application searches for series and instances from a remote AE using DICOM QIDO-RS. It is associated with the local real-world activity "User fetches patient information" in UniView. Sectra UniView Server will communicate with the remote AE and perform the corresponding DICOM QIDO-RS operations.

### 3.1.2.6 Functional Definition of the SHS QIDO User Application

The **SHS QIDO User** application searches for studies from a remote AE using DICOM QIDO-RS. This is associated with the local real-world activities "User searches or uses worklist" in IDS7 or UniView. SHS or SSS will communicate with the remote AE and perform the corresponding DICOM QIDO-RS operations. The user can define search criteria and request information from several QIDO-RS Providers at the same time.

### 3.1.2.7 Functional Definition of the STOW Provider Application

The **STOW Provider** application handles HTTP POST requests containing images and other DICOM objects in a DICOM STOW-RS payload sent to the Sectra PACS from a remote application entity, i.e. handles the remote real-world activity "Remote AE sends images via STOW-RS".

### 3.1.2.8 Functional Definition of the Print SCU Application

The **Print SCU** application prints images on a remote AE (DICOM Printer). It is associated with the local real-world activity "User requests printing of images on film" in IDS7. As described in the [User's Guide IDS7 \[3\]](#) the IDS7 workstation user chooses images to print from the matrix or image windows. When the user has collected the images to print, the user issues the print command. This will open the print dialog where the user can choose the printer to print to and send the images to this printer. SHS or SSS will communicate with the remote DICOM printer and send one or more virtual film sheets composed from images selected by the user. This corresponds to the remote real-world activity "Images printed on DICOM printer".

### 3.1.2.9 Functional Definition of the SHS Q/R SCU Application

The **SHS Q/R SCU** application searches for studies and requests retrieval of images from a remote AE using DICOM Query/Retrieve. These are associated with the local real-world activities "User searches or uses worklist" and "User requests import of remote images" in IDS7 or UniView. SHS or SSS will communicate with the remote AE and perform the corresponding DICOM Query/Retrieve operations. The user can define search criteria and request information from several Q/R SCPs at the same time. When responses are received from a Q/R SCP the user can select examinations and request that they are sent to a Storage SCP application on Sectra PACS.

### 3.1.2.10 Functional Definition of the Pacs Core Q/R SCU Application

The **Pacs Core Q/R SCU** application is used only when the ImageServer/xd (interface to external DICOM archive) product is used in the PACS. It is invoked when archive retrieval is performed and triggers the remote real-world activity "Remote AE receives retrieve request". It will search for and retrieve the requested studies from the external DICOM archive (VNA).

### 3.1.2.11 Functional Definition of a Storage SCP Application

The **Storage SCP** application is responsible for receiving images and other DICOM objects to the Sectra PACS from a remote application entity, i.e. handles the remote real-world activity "Remote AE sends images". There can be any number of Storage SCP AEs set up, each with its own AE title. A Storage SCP application also supports verification of the DICOM communication and Storage Commitment of DICOM instances, i.e. the remote real-world activity "Remote AE sends commit request".

Normally DICOM objects are stored as is in Sectra PACS Core. Key Object Selection (KOS) documents coded according to the IHE profile IOCM can with proper configuration also trigger other behavior.

### 3.1.2.12 Functional Definition of the Storage SCU Application

The **Storage SCU** application is responsible for sending images and other DICOM objects to remote applications. This will trigger the remote real-world activity "Remote AE receives images". Sending is initiated in the following situations:

- by a retrieve (C-MOVE) operation from a Q/R SCP application,
- from IDS7 or UniView (teleradiology), or
- as a result of archiving command when using ImageServer/xd.

The second situation is described in the [User's Guide IDS7 \[3\]](#) and [Sectra User's Guide UniView \[4\]](#). When the IDS7 workstation or UniView user selects examinations to send, he or she issues the send command by selecting the desired destination. The command is forwarded to Sectra PACS Core, which will activate the Storage SCU application indicating the examinations and destination that the user has chosen. The Storage SCU application will then initiate an association with the remote AE which supports DICOM Storage as SCP.

The Storage SCU application can also send Storage Commitment requests which will trigger the remote real-world activity "Remote AE receives commit request". This will only be done when archiving using ImageServer/xd and when configured to do so.

### 3.1.2.13 Functional Definition of a Q/R SCP Application

The **Q/R SCP** application is responsible for receiving queries and retrieve requests. These are associated with the real-world activities "Remote AE issues a DICOM query" and "Remote AE requests images". The Q/R SCP application is part of Sectra PACS Core. There can be one or more Q/R SCP AEs, each with its own AE title.

When the Q/R SCP application 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 application receives a retrieve request (C-MOVE request) it will search for images and other DICOM objects in the WISE database identified by the conditions in the request message. It will search both on-line and in the archive. If any DICOM objects are found the Q/R SCP application will forward the request to the Storage SCU application which will send the DICOM objects to the

requested destination AE. If the retrieve request refers to images and other DICOM objects in the archive the images will be fetched from the archive and temporarily put on-line. When the retrieve is done, the temporary on-line objects will be removed. Only C-MOVE requests are handled in order to supply retrieve functionality, not C-GET requests.

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

#### 3.1.2.14 Functional Definition of the Notif SCU Application

If Sectra PACS Core is configured accordingly, the **Notif SCU** application sends a Basic Study Descriptor instance for a specific Study when the corresponding exam has passed a specific exam state (usually "approved"). This corresponds to the remote real-world activity "Remote AE receives notification". 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 and other DICOM objects in the exam.

The Notif SCU application can also be configured to send a Basic Study Descriptor instance on these events:

- An exam is retrieved from the archive.
- The last on-line copy of an exam is deleted.

#### 3.1.2.15 Functional Definition of a MWL SCP Application

A **MWL SCP** application is responsible for handling requests for worklists from external devices. This corresponds to the remote real-world activity "Remote AE requests worklist". A MWL SCP application is part of Sectra PACS Core. There can be one or more MWL SCP applications set up, each with its own AE title.

When a MWL SCP application receives a query (C-FIND request) it will search in the WISE database for information matching the conditions in the request message. It returns any found information to the requesting remote AE.

A MWL SCP application supports verification of the DICOM communication from a remote AE.

### 3.1.3 Sequencing of Real World Activities

The following local real-world activities in IDS7 and/or UniView:

- "User requests printing of images on film" (IDS7 only)
- "User updates exam state" (IDS7 only)
- "User archives an exam (IS/xd)" (IDS7 only)
- "User requests sending of an exam" (both IDS7 and UniView)

can only be performed on images and other DICOM objects stored in Sectra PACS and hence can only be performed after the remote real-world activity "Remote AE sends images".

The local real-world activity "User requests import of remote images" can only be performed on results from the local real-world activity "Users searches or uses worklist".

The local real-world activity "User retrieves images from archive (IS/xd)" can only be performed on images and DICOM objects that previously has been sent as a result from the local real-world activity "User archives an exam (IS/xd)" or other automatic archiving operations within Sectra PACS.

The following remote real-world activities:

- "Images or image information requested"
- "Image related information requested"
- "Remote AE sends commit request"
- "Remote AE requests images"
- "Remote AE issues a DICOM query"

will be successful only for images and other DICOM objects stored in Sectra PACS and hence requires a previous remote real-world activity "Remote AE sends images".

## 3.2 AE Specifications

### 3.2.1 LVS WADO User AE Specification

#### 3.2.1.1 LVS WADO-RS Specifications

For all transactions, Basic Auth (Authorization header field) is used. The Accept header field depends on the specific target resource.

##### **LVS WADO-RS Retrieve Series Metadata**

The Accept header field only specifies media type "application/dicom+json". The includefield Query parameter will always request the following DICOM tags:

- 0008,0016 (SOP Class UID)
- 0008,0018 (SOP Instance UID)
- 0020,0032 (Image Position (Patient))
- 0020,0037 (Number of Frames)
- 0028,0008 (Rows)
- 0028,0010 (Columns)
- 0028,0011 (Pixel Spacing)
- 0028,0030 (Image Orientation (Patient))
- 0008,103E (Series Description)
- 0020,0013 (Instance Number)
- 0020,0052 (Frame of Reference UID)

##### **LVS WADO-RS Retrieve Instance**

Accept header field always contains multipart/related, only specifying media type "application/dicom".

The DICOM tag 7FE0,0010 (Pixel Data) is assumed to be a part of the response.



The following transfer syntaxes are supported:

- 1.2.840.10008.1.2.4.90 (JPEG 2000 Image Compression (Lossless Only))
- 1.2.840.10008.1.2.4.91 (JPEG 2000 Image Compression)
- 1.2.840.10008.1.2.4.50 (JPEG Baseline (Process 1))
- 1.2.840.10008.1.2.4.51 (JPEG Extended (Process 2 & 4))
- 1.2.840.10008.1.2.4.57 (JPEG Lossless, Non-Hierarchical (Process 14))
- 1.2.840.10008.1.2.4.70 (JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1]))
- 1.2.840.10008.1.2.5 (RLE Lossless)
- 1.2.840.10008.1.2.1 (Explicit VR Little Endian)
- 1.2.840.10008.1.2 (Implicit VR Little Endian)

#### LVS WADO-RS Retrieve Instance Metadata

The Accept header field only specifies media type "application/dicom+json". The includefield Query parameter will always request the following DICOM tags:

- 0008,0016 (SOP Class UID)
- 0008,0018 (SOP Instance UID)
- 0020,0032 (Image Position (Patient))
- 0020,0037 (Number of Frames)
- 0028,0008 (Rows)
- 0028,0010 (Columns)
- 0028,0011 (Pixel Spacing)
- 0028,0030 (Image Orientation (Patient))
- 0008,103E (Series Description)
- 0020,0013 (Instance Number)
- 0020,0052 (Frame of Reference UID)

#### LVS WADO-RS Retrieve Frames

Accept header field always contains multipart/related, with the following transfer syntaxes and media types being supported:

Transfer Syntax UID	Transfer Syntax Name	Media Type
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Lossless Only)	image/jp2
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression	image/jp2

Transfer Syntax UID	Transfer Syntax Name	Media Type
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1)	image/jpeg
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4)	image/jpeg
1.2.840.10008.1.2.4.57	JPEG Lossless, Non-Hierarchical (Process 14)	image/jpeg
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14 [Selection Value 1])	image/jpeg
1.2.840.10008.1.2.5	RLE Lossless	image/dicom-rle
1.2.840.10008.1.2.1	Explicit VR Little Endian	application/octet-stream
1.2.840.10008.1.2	Implicit VR Little Endian	application/octet-stream

## 3.2.2 LVS QIDO User AE Specification

### 3.2.2.1 LVS QIDO-RS Specification

For all transactions, Basic Auth (Authorization header field) is used, and the Accept header field only specifies the media type "application/dicom+json".

#### LVS QIDO-RS Search for Study Series

No search parameters are used. DICOM tag 0020,000E (Series Instance UID) is assumed to be a part of the response.

#### LVS QIDO-RS Search for Study Series Instances

No search parameters are used. The includefield parameter will contain the following DICOM tags:

- 0008,0016 (SOP Class UID)
- 0008,0018 (SOP Instance UID)
- 0020,0032 (Image Position (Patient))
- 0020,0037 (Number of Frames)
- 0028,0008 (Rows)
- 0028,0010 (Columns)
- 0028,0011 (Pixel Spacing)
- 0028,0030 (Image Orientation (Patient))
- 0008,103E (Series Description)
- 0020,0013 (Instance Number)
- 0020,0052 (Frame of Reference UID)

### 3.2.3 WADO Provider AE Specification

#### 3.2.3.1 WADO-RS Specifications

Using WADO-RS a client application can fetch all DICOM instances stored in Sectra PACS or information regarding these DICOM instances. The DICOM instances are coerced to reflect the information viewed to users in IDS7 and UniView. For a list of DICOM attributes that are subject to coercing, see [section 8.1.4 Coerced/Modified Fields](#). Graphics, annotations and other image settings are exposed as presentation state. See [Exported Presentation States with the Storage SCU AE or the WADO Provider AE](#) for information contained in these presentation states.

#### WADO-RS Retrieve Study

**Table 3.1** WADO-RS Retrieve Study

Parameter	Restrictions
Media Types Supported (Accept Type)	Requested media type must be multipart/related. All DICOMweb media types are allowed as type parameter.
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	By default instances are sent in the transfer syntax of the stored instance in Sectra PACS. The stored transfer syntax can also be explicitly requested.  Some single frame and multi-frame images can be transcoded. See <a href="#">WADO-RS Transcoding</a> for compatibility.
SOP Class Restrictions	All SOP Classes covered by <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a> are supported.
Size Restriction	There are no size limits imposed by the WADO Provider AE. However, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each instance.
Character Sets Supported	The WADO Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field. For responses with the media type application/dicom SOP Instances will contain the original Specific Character Set used in the images received by Sectra PACS. Generated Presentation State objects corresponding to the settings in Sectra PACS will contain the same Specific Character Set as the associated images. For supported character sets, see <a href="#">chapter 6 Support of Character Sets</a> .

**WADO-RS Retrieve Series****Table 3.2** WADO-RS Retrieve Series

Parameter	Restrictions
Media Types Supported (Accept Type)	Requested media type must be multipart/related. All DICOMweb media types are allowed as type parameter.
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	<p>By default instances are sent in the transfer syntax of the stored instance in Sectra PACS. The stored transfer syntax can also be explicitly requested.</p> <p>Some single frame and multi-frame images can be transcoded. See <a href="#">WADO-RS Transcoding</a> for compatibility.</p>
SOP Class Restrictions	All SOP Classes covered by <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a> are supported.
Size Restriction	There are no size limits imposed by the WADO Provider AE. However, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each instance.
Character Sets Supported	The WADO Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field. For responses with the media type application/dicom SOP Instances will contain the original Specific Character Set used in the images received by Sectra PACS. Generated Presentation State objects corresponding to the settings in Sectra PACS will contain the same Specific Character Set as the associated images. For supported character sets, see <a href="#">chapter 6 Support of Character Sets</a> .

**WADO-RS Retrieve Instance****Table 3.3** WADO-RS Retrieve Instance

Parameter	Restrictions
Media Types Supported (Accept Type)	Requested media type must be multipart/related. All DICOMweb media types are allowed as type parameter.
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	<p>By default instances are sent in the transfer syntax of the stored instance in Sectra PACS. The stored transfer syntax can also be explicitly requested.</p> <p>Some single frame and multi-frame images can be transcoded. See <a href="#">WADO-RS Transcoding</a> for compatibility.</p>
SOP Class Restrictions	All SOP Classes covered by <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a> are supported.
Size Restriction	There are no size limits imposed by the WADO Provider AE. However, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each instance.
Character Sets Supported	The WADO Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field. For responses with the media type application/dicom SOP Instances will contain the original Specific Character Set used in the images received by Sectra PACS. Generated Presentation State objects corresponding to the settings in Sectra PACS will contain the same Specific Character Set as the associated images. For supported character sets, see <a href="#">chapter 6 Support of Character Sets</a> .

**WADO-RS Retrieve Frames****Table 3.4** WADO-RS Retrieve Frames

Parameter	Restrictions
Media Types Supported (Accept Type)	Requested media type must be multipart/related. All DICOMweb media types in the Multi-frame Image category are allowed as type parameter (i.e. video is not supported).
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	By default instances are sent in the transfer syntax of the stored instance in Sectra PACS. The stored transfer syntax can also be explicitly requested.  Some multi-frame images can be transcoded. See <a href="#">WADO-RS Transcoding</a> for compatibility.
SOP Class Restrictions	All SOP Classes covered by <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a> are supported.
Size Restriction	There are no size limits imposed by the WADO Provider AE. However, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each frame.

**WADO-RS Retrieve Bulk Data****Table 3.5** WADO-RS Retrieve Bulk Data

Parameter	Restrictions
Media Types Supported (Accept Type)	Requested media type must be multipart/related. All DICOMweb media types except application/dicom are allowed as type parameter.
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	If the requested data is not Pixel Data only Explicit VR Little Endian (1.2.840.10008.1.2.1) is supported.  If the requested data is Pixel Data, then by default the bulk data is sent in the transfer syntax of the stored instance in Sectra PACS. The stored transfer syntax can also be explicitly requested.  Some single frame and multi-frame images can be transcoded. See <a href="#">WADO-RS Transcoding</a> for compatibility.
SOP Class Restrictions	All SOP Classes covered by <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a> are supported.
Size Restriction	There are no size limits imposed by the WADO Provider AE. However, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each instance.

**WADO-RS Retrieve Metadata****Table 3.6** WADO-RS Retrieve Metadata

Parameter	Restrictions
Media Types Supported (Accept Type)	Restricted to application/dicom+json. multipart/related; type="application/dicom+xml" is currently <b>not</b> supported.
Accept-Encoding	Restricted to gzip, or identity (the use of no transformation whatsoever).
SOP Class Restrictions	All SOP Classes covered by Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView." are supported.
Size Restriction	There are no size limits imposed by the WADO Provider AE.

**WADO-RS Transcoding**

Transcoding can be performed from any transfer syntax in Table 3.7, "WADO-RS Decodable Transfer Syntaxes" to any transfer syntax in Table 3.8, "WADO-RS Encodable Transfer Syntaxes".

**Table 3.7** WADO-RS Decodable Transfer Syntaxes

Media Type	Transfer Syntax	
	Name List	UID List
application/octet-stream	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 (Retired)	1.2.840.10008.1.2.2
image/jpeg	JPEG Lossless, Non-Hier., First-Order Pred.	1.2.840.10008.1.2.4.70
	JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
	JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
	JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57
image-dicom-rle	RLE Lossless	1.2.840.10008.1.2.5
image/jp2	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
	JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
n/a	Sectra Compression LS (Private Syntax)	1.2.752.24.3.7.7

**Table 3.8** WADO-RS Encodable Transfer Syntaxes

Media Type	Transfer Syntax	
	Name List	UID List
application/octet-stream	Explicit VR Little Endian	1.2.840.10008.1.2.1
image/jp2	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90

## Connection Policies

### General

All standard RS connection policies apply. There are no extensions for RS options.

### Number of Connections

The WADO Provider AE is hosted on Windows IIS (Internet Information Services) and has no limit in the number of simultaneous HTTP connections for WADO-RS outside IIS. Depending on the available memory or other resources on the hosting computer other limits might apply.

**Table 3.9** Number of Rs Requests Supported

Maximum number of simultaneous RS requests	4294967295 or as configured in Windows IIS (Internet Information Services) on the hosting computer.
--	---

### Asynchronous Nature

The WADO Provider AE does not support RS asynchronous requests.

### Response Status

The following table contains the response statuses provided by the WADO Provider AE.

**Table 3.10** HTTP Standard Response Codes used by the WADO Provider AE

Code	Name	Description
Success		
200	OK	The request was successfully completed.
206	Partial Content	Always used when there is bulk data in the response.
Failure		
400	Bad Request	This indicates that the WADO Provider AE was unable to fulfill the request because it cannot understand it.
401	Unauthorized	This indicates that the WADO Provider AE refused to fulfill the request because the client is not authorized.
404	Not Found	Specified resource does not exist.
406	Not Acceptable	Accept type, transfer syntax or decompression method not supported.
500	Internal Server Error	The WADO Provider AE encountered an error during processing of the request.

## 3.2.4 SHS WADO User AE Specification

### 3.2.4.1 WADO-RS Specifications

For all transactions, Basic Auth (Authorization header field) is supported.



**WADO-RS Retrieve Study****Table 3.11** WADO-RS Retrieve Study

Parameter	Restrictions
Media Types Supported (Accept Type)	Restricted to application/dicom.
Transfer Syntaxes Supported (transfer-syntax Accept parameter)	The SHS WADO User AE will send a list of supported transfer syntaxes with each request. For the list of transfer syntaxes sent in the Accept header, see <a href="#">Table 3.56, "Acceptable presentation contexts for a Storage SCP AE and activity "A remote AE sends images"."</a>
Size Restriction	There are no size limits imposed by the SHS WADO User AE. However, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each instance.
Character Sets Supported	The SHS WADO User AE does not support character set negotiation in any form and will not send any "charset" parameter(s), character-set query parameters, or an Accept-Charset header field.

**3.2.5 QIDO Provider AE Specification****3.2.5.1 QIDO-RS Specifications****QIDO-RS Search for Studies****Table 3.12** QIDO-RS Search for Studies Specification

Parameter	Restrictions
Media Types	Restricted to "application/dicom+json"
Matching Attributes	See <a href="#">Table 3.13, "QIDO-RS Study Attribute Matching"</a>
Return Attributes	See <a href="#">Table 3.13, "QIDO-RS Study Attribute Matching"</a>
Limit and Offset supported	Yes
Person Name Matching	Literal. Matching is case insensitive for (0010,0010) Patient Name but case sensitive for other person names.
Character Sets Supported	The QIDO Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field. Responses will always use UTF-8, which is the default character repertoire for the media type "application/dicom+json".

**Table 3.13** QIDO-RS Study Attribute Matching

Keyword	Tag	Types of Matching
<b>STUDY level</b>		
StudyDate	00080020	S, U, *, R
StudyTime	00080030	S, U, *, R
AccessionNumber	00080050	S, U, *
ModalitiesInStudy	00080061	S, U, *
InstitutionName	00080080	U
ReferringPhysiciansName	00080090	S, U, *
StudyDescription	00081030	U
PerformingPhysicianName	00081050	U
PatientName	00100010	S, U, *
PatientID	00100020	S, U, *
IssuerOfPatientID	00100021	S, U, *
PatientBirthDate	00100030	S, U, *, R
PatientSex	00100040	NONE
OtherPatientIDsSequence	00101002	NONE
>PatientID	00100020	NONE
>IssuerOfPatientID	00100021	NONE
>TypeOfPatientID	00100022	NONE
BodyPartExamined	00180015	U
StudyInstanceUID	00200000	UNIQUE, L
StudyID	00200010	S, U, *
NumberOfStudyRelatedSeries	00201206	U
NumberOfStudyRelatedInstances	00201208	U
PerformedProcedureStepDescription	00400254	U

Types of Matching (see Section C.2.2.2 "Attribute Matching" in PS3.4) :

"S" indicates the identifier attribute uses Single Value Matching.

"L" indicates List of UID Matching.

"U" indicates Universal Matching.

"\*" indicates Wild Card Matching.

"R" indicates Range Matching.

"NONE" indicates that no matching is supported, but that values for this element will be returned with all requests.

"UNIQUE" indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level (see Section C.2.2.1.1 "Unique Keys" in PS3.4).

### QIDO-RS Search for Series

**Table 3.14** QIDO-RS Search for Series Specification

Parameter	Restrictions
Media Types	Restricted to "application/dicom+json"
Matching Attributes	See <a href="#">Table 3.15, "QIDO-RS Series Attribute Matching"</a>
Return Attributes	See <a href="#">Table 3.15, "QIDO-RS Series Attribute Matching"</a>
Limit and Offset supported	Yes
Relational Queries Supported	Yes
Character Sets Supported	The QIDO Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field. Responses will always use UTF-8, which is the default character repertoire for the media type "application/dicom+json".

**Table 3.15** QIDO-RS Series Attribute Matching

Keyword	Tag	Types of Matching
<b>SERIES level</b>		
Modality	00080060	S, U, *
StationName	00081010	U
SeriesInstanceUID	0020000E	UNIQUE, L
SeriesNumber	00200011	S, U, *
NumberOfSeriesRelatedInstances	00201209	U
PerformedProcedureStepStartDate	00400244	S, U, *, R
PerformedProcedureStepStartTime	00400245	S, U, *, R

Types of Matching: see [QIDO-RS Search for Studies](#).

**QIDO-RS Search for Instances**

**Table 3.16** QIDO-RS Search for Instances Specification

Parameter	Restrictions
Media Types	Restricted to "application/dicom+json"
Matching Attributes	See <a href="#">Table 3.17, "QIDO-RS Instance Attribute Matching"</a>
Return Attributes	See <a href="#">Table 3.17, "QIDO-RS Instance Attribute Matching"</a>
Limit and Offset supported	Yes
Relational Queries Supported	Yes
Character Sets Supported	The QIDO Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field. Responses will always use UTF-8, which is the default character repertoire for the media type "application/dicom+json".

**Table 3.17** QIDO-RS Instance Attribute Matching

Keyword	Tag	Types of Matching
<b>COMPOSITE INSTANCE Level</b>		
SOPClassUID	00080016	S, U, *
SOPInstanceUID	00080018	UNIQUE, L
InstanceNumber	00200013	S, U, *
NumberOfFrames	00280008	U
Rows	00280010	U
Columns	00280011	U
BitsAllocated	00280100	U

Types of Matching: see [QIDO-RS Search for Studies](#).

**Connection Policies**

**General**

All standard RS connection policies apply. There are no extensions for RS options.

**Number of Connections**

The QIDO Provider AE is hosted on Windows IIS (Internet Information Services) and has no limit in the number of simultaneous HTTP connections for QIDO-RS outside IIS. Depending on the available memory or other resources on the hosting computer other limits are possible.

**Table 3.18** Number of Rs Requests Supported

Maximum number of simultaneous RS requests	4294967295 or as configured in Windows IIS (Internet Information Services) on the hosting computer.
--	---

**Asynchronous Nature**

The QIDO Provider AE does not support RS asynchronous requests.

**Response Status**

The following table contains the response statuses provided by the QIDO Provider AE.

**Table 3.19** HTTP Standard Response Codes used by the QIDO Provider AE

Code	Name	Description
Success		
200	OK	The query completed and any matching results are returned in the message body.
204	No Content	The QIDO Provider AE successfully processed the request and is not returning any content.
299	Warning	There are additional results that can be requested, or only literal matching has been performed even though the fuzzymatching parameter was present in the request.
Failure		
400	Bad Request	This indicates that the QIDO Provider AE was unable to fulfill the request because it cannot understand the query component.
401	Unauthorized	This indicates that the QIDO Provider AE refused to fulfill the request because the client is not authorized.
413	Payload Too Large	This indicates that the query was too broad and a narrower query or paging should be requested.
500	Internal Server Error	The QIDO Provider AE encountered an error during processing of the request.

**3.2.6 SHS QIDO User AE Specification****3.2.6.1 SHS QIDO-RS Specifications****SHS QIDO-RS Search for Studies****Table 3.20** SHS QIDO-RS Search for Studies Specification

Parameter	Restrictions
Matching Attributes	See <a href="#">Table 3.21</a> , "SHS QIDO-RS Study Attribute Matching"

**Table 3.21** SHS QIDO-RS Study Attribute Matching

Keyword	Tag	Types of Matching
<b>STUDY level</b>		
StudyDate	00080020	S, R
StudyTime	00080030	R
AccessionNumber	00080050	S, *
PatientName	00100010	S, *
PatientID	00100020	S, *
StudyInstanceUID	00200000	S, *
StudyID	00200010	S, *

Types of Matching (see Section C.2.2.2 "Attribute Matching" in PS3.4) :

"S" indicates the identifier attribute uses Single Value Matching.

"\*" indicates Wild Card Matching.

"R" indicates Range Matching.

### 3.2.7 STOW Provider AE Specification

Using STOW-RS a client application can send images and other DICOM objects to the Sectra PACS through a HTTP multipart request containing either a full DICOM instance, or separate metadata in the form of JSON or XML accompanied by bulkdata.

### 3.2.7.1 STOW-RS Specifications

#### STOW-RS Store Instances

**Table 3.22** STOW-RS Store Instances

Parameter	Restrictions
Media Types Supported (Accept Type)	application/json, application/dicom+json, application/xml, or application/dicom+xml.
Media Types Supported (Content Type)	The media type of the request must be multipart/related. The accepted DICOMweb media types are application/dicom (for binary dicom instance storage), and application/dicom+xml or application/dicom+json (for metadata accompanied by bulkdata). Supported media types for bulkdata are image/jpeg and video/mp4. The STOW Provider AE can store instances with transfer syntaxes listed in <a href="#">Table 3.56, "Acceptable presentation contexts for a Storage SCP AE and activity "A remote AE sends images"</a> .
SOP Class Restrictions	All SOP Classes covered by <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a> are supported.
Size Restriction	The STOW Provider AE has a limit of a request size of 2 GB. Additionally, depending on system resource restrictions of the deployed Sectra PACS there might be limits to the size of each instance.
Character Sets Supported	The STOW Provider AE does not support character set negotiation in any form and ignores the "charset" parameter(s) of the selected media type, the character-set query parameter, and the Accept-Charset header field.

#### Connection Policies

##### General

All standard RS connection policies apply. There are no extensions for RS options.

##### Number of Connections

The STOW Provider AE is hosted on Windows IIS (Internet Information Services) and has no limit in the number of simultaneous HTTP connections for STOW-RS outside IIS. Depending on the available memory or other resources on the hosting computer other limits are possible.

**Table 3.23** Number of Rs Requests Supported

Maximum number of simultaneous RS requests	4294967295 or as configured in Windows IIS (Internet Information Services) on the hosting computer.
--	---

##### Asynchronous Nature

The STOW Provider AE does not support RS asynchronous requests.

##### Response Status

The following table contains the response statuses provided by the STOW Provider AE.

**Table 3.24** HTTP Standard Response Codes used by the STOW Provider AE

Code	Name	Description
Success		
200	OK	The STOW Provider AE finished handling the request and stored all instances.
202	Accepted	The STOW Provider AE finished handling the request. The success or failure of storing individual instances is indicated in the response payload.
Failure		
400	Bad Request	This indicates that the STOW Provider AE was unable to fulfill the request because it could not understand the content of the request.
401	Unauthorized	This indicates that the STOW Provider AE refused to fulfill the request because the client is not authorized.
413	Request Entity Too Large	This indicates that the size of the STOW-RS request was above the limits of the STOW Provider AE.
415	Unsupported Media Type	This indicates that the media type in the root part of the STOW-RS request was not supported.
500	Internal Server Error	The STOW Provider AE encountered an error during processing of the request.

## 3.2.8 Print SCU AE Specification

### 3.2.8.1 SOP Classes

The Print SCU AE provides Standard Conformance to the following SOP Classes:



**Table 3.25** SOP Classes for Print SCU

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
> Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
> Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
> Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
> Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No

### 3.2.8.2 Association Policies

#### General

The Print SCU AE initiates but never accepts associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 3.26** DICOM Application Context for Print SCU

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

#### Number of Associations

The Print SCU AE initiates one association at a time for each configured DICOM printer. Multiple DICOM printers can be configured.

**Table 3.27** Number of Associations for Print SCU

Maximum number of simultaneous associations	= number of configured DICOM printers
---	---------------------------------------

#### Asynchronous Nature

The Print SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**Table 3.28** Asynchronous Nature as a SCU for Print SCU

Maximum number of outstanding asynchronous transactions	1
---	---

#### Implementation Identifying Information

The Print SCU AE will provide the following implementation identifying information

**Table 3.29** DICOM Implementation Class UID and Version Name for Print SCU

Implementation Class UID	1.2.752.24.10.4.2
Implementation Version Name	SHPRISCU_24_1

### 3.2.8.3 Association Initiation Policy

**Activity - User requests printing of images on film**

#### Description and Sequencing of Activities

As described in [User's Guide IDS7 \[3\]](#) the IDS7 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 dialog where the user can 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 Print SCU AE is capable of proposing the presentation contexts shown in the table below:

**Table 3.30** Proposed presentation contexts for Print SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Mgm Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
> Basic Film Session	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
> Basic Film Box	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
> Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

#### SOP Specific Conformance to Print SOP Classes

The Print SCU AE uses the following DIMSE Service Elements:

**Table 3.31** DIMSE Service Elements used by Print SCU

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
Presentation LUT SOP Class	N-CREATE

N-EVENT-REPORT is not supported.

The Print SCU AE supports the following SOP class attributes:

**Table 3.32** SOP Class Attributes used by Print SCU

SOP Class, DIMSE Service Element	Attribute name	Tag	Optional according to standard	Configurable	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	Max Density	(2010,0130)	YES	YES	(none)
Basic Film Box N-CREATE	Border Density	(2010,0100)	YES	YES	(none)
Basic Film Box N-CREATE	Empty Image Density	(2010,0110)	YES	YES	(none)
Basic Film Box N-CREATE	Min Density	(2010,0120)	YES	YES	(none)
Basic Film Box N-CREATE	Illumination	(2010,015E)	YES	YES	(none)
Basic Film Box N-CREATE	Reflected Ambient Light	(2010,0160)	YES	YES	(none)
Basic Film Box N-CREATE	Referenced Presentation LUT Sequence	(2050,0500)	YES	YES	(none)
Basic Film Box N-CREATE	>Referenced SOP Class UID	(0008,1150)	YES	YES	(none)
Basic Film Box N-CREATE	>Referenced SOP Instance UID	(0008,1155)	YES	YES	(none)

Several images per film can be printed. They are arranged in IDS7, which composes them and sends them as a single image using Image Display Format “STANDARD\1,1”.

#### 3.2.8.4 Association Acceptance Policy

The Print SCU AE does not handle incoming associations.

## 3.2.9 SHS Q/R SCU AE Specification

### 3.2.9.1 SOP Classes

The SHS Q/R SCU AE provides Standard Conformance to the following SOP Classes:

**Table 3.33** SOP Classes Supported By the SHS Q/R SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

### 3.2.9.2 Association Policies

#### General

The SHS Q/R SCU AE initiates but never accepts associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 3.34** DICOM Application Context for the SHS Q/R SCU AE

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

#### Number of Associations

The SHS Q/R SCU AE will only open one association per remote Q/R SCP at a time. Multiple remote Q/R SCPs can be configured.

**Table 3.35** Number of Associations for the SHS Q/R SCU AE

Maximum number of simultaneous associations	= number of configured remote Q/R SCPs
---	--

#### Asynchronous Nature

The SHS Q/R SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**Table 3.36** Asynchronous Nature as a SCU for the SHS Q/R SCU AE

Maximum number of outstanding asynchronous transactions	1
---	---

#### Implementation Identifying Information

The SHS Q/R SCU AE will provide the following implementation identifying information

**Table 3.37** DICOM Implementation Class UID and Version Name for the SHS Q/R SCU AE

Implementation Class UID	1.2.752.24.10.4.2
Implementation Version Name	SHQRSCU_24_1

### 3.2.9.3 Association Initiation Policy

#### Activity - User Searches or Uses Worklist

##### Description and Sequencing of Activities

A user creates a search or a worklist containing one or several Q/R SCPs. Then the user defines the search criteria to be used and the search or worklist search is performed. When several Q/R SCPs are defined for a search or worklist they are queried in sequence. This activity will trigger the remote activity "Remote AE receives DICOM query".

This activity is a prerequisite for the local activity "User requests import of remote images", which will trigger the remote activity "Remote AE receives retrieve request".

#### Proposed Presentation Contexts

**Table 3.38** Proposed presentation contexts for the SHS Q/R SCU AE and User Searches or Uses Worklist

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

#### Extended Negotiation

No extended negotiation is performed.

#### SOP Specific Conformance to Q/R C-FIND SOP Classes

The SHS Q/R SCU AE provides standard conformance to the Q/R service class C-FIND SOP Classes.

Only a single information model, Study Root, is supported.

No CANCEL requests are ever issued.

#### Activity - User Requests Import of Remote Images

##### Description and Sequencing of Activities

When responses are received from a search, as described in the activity "User Searches or Uses Worklist", the user can select one or several of the matching studies and request fetching them from the Q/R SCP. This corresponds to the remote activity "Remote AE receives retrieve request". The images and other DICOM objects are sent to a configured destination, a Storage SCP AE on Sectra PACS Core. This corresponds to the remote activity "Remote AE sends images".

### Proposed Presentation Contexts

**Table 3.39** Proposed presentation contexts for the SHS Q/R SCU AE and User Requests Import of Remote Images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

#### Extended Negotiation

No extended negotiation is performed.

#### SOP Specific Conformance to Q/R C-MOVE SOP Classes

The SHS Q/R SCU AE provides standard conformance to the Q/R service class C-MOVE SOP Classes.

Only a single information model, Study Root, is supported.

No CANCEL requests are ever issued.

**Table 3.40** Study Root C-MOVE Request Identifier for the SHS Q/R SCU AE

Name	Tag	Unique, Matching or Return Key
STUDY level		
Study Instance UID	{0020,000D}	U

#### 3.2.9.4 Association Acceptance Policy

The SHS Q/R SCU AE does not handle incoming associations.

### 3.2.10 Pacs Core Q/R SCU AE Specification

#### 3.2.10.1 SOP Classes

The Pacs Core Q/R SCU AE provides Standard Conformance to the following SOP Classes:

**Table 3.41** SOP Classes Supported By Pacs Core Q/R SCU

SOP Class Name	SOP Class UID	SCU	SCP
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

### 3.2.10.2 Association Policies

#### General

The Pacs Core Q/R SCU AE initiates but never accepts associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 3.42** DICOM Application Context for the Pacs Core Q/R SCU AE

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

#### Number of Associations

The Pacs Core Q/R SCU AE can open several associations simultaneously. One or more Q/R SCPs can be configured.

**Table 3.43** Number of Associations for Pacs Core Q/R SCU

Maximum number of simultaneous associations	The maximum number is controlled by the configuration of the number of archive retrieval threads in Sectra PACS Core, see <a href="#">System Administrator's Guide WISE [5]</a> .
---	---

#### Asynchronous Nature

The Pacs Core Q/R SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**Table 3.44** Asynchronous Nature as a SCU for Pacs Core Q/R SCU

Maximum number of outstanding asynchronous transactions	1
---	---

#### Implementation Identifying Information

The Pacs Core Q/R SCU AE will provide the following implementation identifying information

**Table 3.45** DICOM Implementation Class UID and Version Name for Pacs Core Q/R SCU

Implementation Class UID	1.2.752.24.3.3.25.7
Implementation Version Name	WIQRSCU_24_1

### 3.2.10.3 Association Initiation Policy

#### Activity - User Retrieves Images From Archive (IS/xd)

##### Description and Sequencing of Activities

Triggered by the local activity "User Retrieves Images From Archive (IS/xd)" or other internal mechanisms in Sectra PACS a DICOM archive (VNA) is queried and a retrieve request is sent. This corresponds to the remote activities "Remote AE receives DICOM query" and "Remote AE receives retrieve request". The query is done in order to confirm that all information from the the DICOM archive is retrieved. The "Remote AE receives retrieve request" will trigger the remote activity "Remote AE sends images". Images are sent to a Storage SCP on the Sectra PACS that is specifically configured to receive image and other DICOM objects as a result of an archive retrieval.

**Proposed Presentation Contexts**

**Table 3.46** Proposed presentation contexts for Pacs Core Q/R SCU and User Retrieves Images From Archive (IS/xd)

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root Query/Retrieve Information Model - FIND	1.2840.10008.5.14.1.221	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model - MOVE	1.2840.10008.5.14.1.222				

**Extended Negotiation**

No extended negotiation is performed.

**SOP Specific Conformance to Q/R SOP Classes**

Pacs Core Q/R SCU provides standard conformance to the Q/R service class C-FIND and C-MOVE SOP Classes.

Only a single information model, Study Root, is supported.

No CANCEL requests are ever issued.

The C-FIND request is issued in order to confirm that the correct number of instances are received.

**Table 3.47** Study Root C-FIND Request Identifier for Pacs Core Q/R SCU

Name	Tag	Unique, Matching or Return Key
STUDY level		
Study Instance UID	(0020,000D)	U
Number of Study Related Instances	(0020,1208)	R

In normal cases a basic C-MOVE request is used:

**Table 3.48** Basic Study Root C-MOVE Request Identifier for Pacs Core Q/R SCU

Name	Tag	Unique, Matching or Return Key
STUDY level		
Study Instance UID	(0020,000D)	U

In some special cases complementary C-MOVE requests are issued:



**Table 3.49** Special Study Root C-MOVE Request Identifier for Pacs Core Q/R SCU

Name	Tag	Unique, Matching or Return Key
STUDY level		
Study Instance UID	(0020,000D)	U
SERIES level		
Series Instance UID	(0020,000E)	U
INSTANCE level		
SOP Instance UID	(0008,0018)	U

The C-FIND, the basic C-MOVE and the special C-MOVE requests are performed over separate associations. Each association negotiation will only propose one presentation context, for Study Root C-FIND or C-MOVE.

#### 3.2.10.4 Association Acceptance Policy

The Pacs Core Q/R SCU AE does not handle incoming associations.

### 3.2.11 Storage SCP AE Specification

Multiple Storage SCP AEs can be set up in Sectra PACS. Typically one Storage SCP AE per sending application is set up.

#### 3.2.11.1 SOP Classes

A Storage SCP AE provide Standard Conformance to the following SOP Classes:

**Table 3.50** SOP Classes Supported By a Storage SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	No	Yes
Storage Commitment Push Model	1.2.840.10008.1.20.1	No	Yes
See <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a>	See <a href="#">Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."</a>	No	Yes

#### 3.2.11.2 Association Policies

##### General

A Storage SCP AE accepts but will never initiate associations.

**Table 3.51** Maximum PDU Size Received as a SCP for a Storage SCP AE

Maximum PDU size received	Configurable. The default is 28672 bytes (28 Kbytes). Configuration can only be done by Sectra authorized personnel. Allowed values are between 4096 bytes (4 Kbytes) and 131072 bytes (128 Kbytes), inclusive.
---------------------------	---

### Number of Associations

**Table 3.52** Number of Associations as a SCP for a Storage SCP AE

Maximum number of simultaneous associations	Configurable, the default is 5 per configured Storage SCP AE. Configuration can only be done by Sectra authorized personnel.
---	--

Since many Storage SCP AEs can be set up, a great number of associations can be handled at the same time. In practice, the number of Storage SCP AEs and simultaneous associations are limited by the system capabilities, for instance network bandwidth, server memory size, and file system performance.

### Asynchronous Nature

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

### Implementation Identifying Information

**Table 3.53** DICOM Implementation Class UID and Version Name for a Storage SCP AE

Implementation Class UID	1.2.752.24.3.3.25.7
Implementation Version Name	WISTOSCP_24_1

#### 3.2.11.3 Association Initiation Policy

A Storage SCP AE does not initiate associations.

#### 3.2.11.4 Association Acceptance Policy

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

- Association requests from applications that do not address it properly, i.e. specify an incorrect called AE title.
- Association requests from hosts with host names not known to the Storage SCP AE host. This requirement can be lifted via configuration.
- If it is already processing the maximum number of associations that it can handle (default: 5).

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

- Verification of the DICOM communication between a remote system and a Storage SCP AE.
- Transfer of images from a remote system to Sectra PACS.
- Request for Storage Commitment to store images in Sectra PACS.

#### Activity - Remote AE verifies DICOM communication

##### Description and Sequencing of Activities

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

**Accepted Presentation Contexts**

**Table 3.54** Acceptable presentation contexts for a Storage SCP AE and the activity "Remote AE verifies DICOM communication"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

A Storage SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A Storage SCP AE prefers the Explicit VR Little Endian transfer syntax.

A Storage SCP AE will accept duplicate presentation contexts, i.e., if it is offered multiple presentation contexts, each of which offers acceptable transfer syntaxes, it will accept all presentation contexts, applying the same priority for selecting a transfer syntax for each.

**Extended Negotiation**

No extended negotiation is performed.

**SOP Specific Conformance to Verification SOP Class**

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

A Storage SCP AE will never send a failure service status, but always responds with success.

**Activity - A remote AE sends commit request**

**Description and Sequencing of Activities**

A remote system makes a request for Sectra PACS to commit to store a number of DICOM instances.

**Accepted Presentation Contexts**

**Table 3.55** Acceptable presentation contexts for a Storage SCP AE and activity "A remote AE sends commit request"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

**Extended Negotiation**

No extended negotiation is performed.

### SOP Specific Conformance to Storage Commitment

A Storage SCP AE provides standard conformance to the Storage Commitment Push Model SOP Class.

Notes about the implementation:

By default, an attempt will be made to transmit the N-EVENT-REPORT-RQ message on the same association where the N-ACTION-RQ message was received. If the association is down, the Storage SCP AE will open a new association to the Storage Commitment SCU and send the N-EVENT-REPORT-RQ message on the new association. The time between the reception of the N-ACTION-RQ message and the sending of the N-EVENT-REPORT-RQ message is dependent on the WISE server load, but it can be expected to be short (seconds). It is possible to configure skipping the attempt to send the N-EVENT-REPORT-RQ message on the same association and always open a new association.

Any time after the images have been committed with Storage Commitment, they can be deleted by an IDS7 user, **i.e.** a Storage Commitment will not make sure that the images will be stored permanently.

Committed images can be retrieved using DICOM Query/Retrieve towards a Q/R SCP AE connected to the same Sectra PACS. If a Q/R SCP is connected towards the Sectra PACS at the time of commitment, the AE title of it will be returned in the N-EVENT-REPORT message sent to the SCU.

Storage Commitment can be made for DICOM instances stored on short-term (ImageServer/s) or long-term storage (Archive). In case a Storage SCP AE has been configured only to trigger IOCM processing from received IOCM KOS documents (as described in [Activity - A remote AE sends images](#)) and not to store the KOS document itself into Sectra PACS Core, then the Storage SCP AE will not be able to commit storage of these KOS documents since they are not stored in Sectra PACS Core.

The optional Storage Media File-Set ID & UID attributes will never be filled in by a Storage SCP AE.

As long as the N-EVENT-REPORT-RQ message can be interpreted as a proper DICOM message a success status will be sent in the N-EVENT-REPORT-RSP.

#### Activity - A remote AE sends images

##### Description and Sequencing of Activities

As instances are received they are copied to the associated ImageServer/s file system and information is inserted into the WISE database. Key Object Selection (KOS) documents coded according to the IHE profile IOCM can with proper configuration also trigger other behavior, see below.

## Accepted Presentation Contexts

Table 3.56 Acceptable presentation contexts for a Storage SCP AE and activity "A remote AE sends images"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
See Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."	See Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
		Sectra Compression ( <b>Private Syntax</b> )	1.2.752.24.3.7.6		
		Sectra Compression LS ( <b>Private Syntax</b> )	1.2.752.24.3.7.7		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian (Retired)	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57		
		JPEG Lossless, Non-Hier., First-Order Pred.	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Full prog., Non-Hier. (Proc. 10 & 12)	1.2.840.10008.1.2.4.55		
		MPEG2 MP@ML*	1.2.840.10008.1.2.4.100		
		MPEG2 MP@HL*	1.2.840.10008.1.2.4.101		
		MPEG4 AVC/H.264 HP*	1.2.840.10008.1.2.4.102		
		MPEG4 AVC/H.264 BD-compatible HP*	1.2.840.10008.1.2.4.103		

\* In case multiple pixel data fragments are used for videos in the MPEG2 or MPEG4 transfer syntaxes, this is handled and fragments are kept even though DICOM limits to one fragment only.

A Storage SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A Storage SCP AE will by default select transfer syntaxes according to the order of transfer syntaxes in Table 3.56, "Acceptable presentation contexts for a Storage SCP AE and activity "A remote AE sends images"". If the topmost transfer syntax in this table is present, that will be selected. If not, the second

transfer syntax of the table will be selected, if present, and so on. There are some possibilities in configuration of the transfer syntax selection, see [System Administrator's Guide ImageServer/s \[6\]](#).

### Extended Negotiation

No extended negotiation is performed, though Storage SCP:

- are Level 2 Storage SCPs (Full - does not discard any data elements)
- do not support digital signatures
- do not coerce any received data elements. Coercing will however take place during image export through the Storage SCU AE or media export, see [section 8.1.4 Coerced/Modified Fields](#).

### SOP Specific Conformance to Storage SOP Classes

A Storage 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. However, any element that is received with an explicitly encoded value representation that is different from the standard value representation for that element will be discarded.

A Storage 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 [System Administrator's Guide ImageServer/s \[6\]](#)) as patient ID. Applications sending images to a Storage 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 an image with a SOP Instance UID that already exists in WISE is received, the default behavior is to store it. This means that if the same image is sent twice to a Storage SCP AE it will be stored two times in Sectra PACS. This means that two images with the same SOP Instance UID will be sent if a MOVE request is received by a Q/R SCP AE on that image. It is possible to configure a Storage SCP AE so that duplicate images are overwritten, ignored, or rejected.

If DICOM attributes are not following the DICOM standard, no responsibilities for consequences are taken.

Images are handled color-by-pixel internally in Sectra PACS. In certain circumstances images that are sent color-by-plane to Sectra PACS are sent color-by-pixel if fetched from Sectra PACS.

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

Embedded Real World Value Mapping Sequence (0040,9096) is supported. The sequence must contain a single item with Real World Value Intercept (0040,9224) and Real World Value Slope (0040,9225).

IDS7 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.

UniView has full support of DICOM Overlays and always apply all overlays.

Regarding the support for viewing of presentation states, see [section 8.7 Presentation State Display](#).

Regarding color images, IDS7 and UniView can only view those with (0028,0004), Photometric interpretation, equal to

- RGB with 24 bits (8 bits per channel)
- PALETTE\_COLOR

- YBR\_FULL
- YBR\_FULL\_422 (except for images compressed with JPEG lossless)
- YBR\_RCT (JPEG 2000 lossless only)
- YBR\_ICT (JPEG 2000 only)

IDS7 applies supplemental palette color LUTs when provided, for example in certain enhanced MR and enhanced CT images. For Siemens images, the palette is applied after the window/level in order to display them as in Siemens software. For all other vendors the palette is applied directly to the stored pixel values, which is in compliance with DICOM. UniView does not apply supplemental palettes.

Key Object Selection (KOS) documents coded according to the IHE profile IOCM can with proper configuration also trigger other behavior. It is possible to configure the receiving of the KOS document only to trigger associated processing and not to store the KOS document itself into Sectra PACS Core. The KOS documents must fulfill the IOCM profile for proper processing to be triggered. A Storage SCP AE supports the following document titles:

- (113038, DCM, "Incorrect Modality Worklist Entry")
- (113039, DCM, "Data Retention Policy Expired")

When a KOS with the above mentioned document title is received the Storage SCP AE can trigger an internal IOCM operation to remove the referenced SOP instances and associated information from Sectra PACS.

If the image storage or KOS processing should fail, a status of refused, "Out of resources", will be returned to the association initiator.

## 3.2.12 Storage SCU AE Specification

### 3.2.12.1 SOP Classes

Storage SCU provides Standard Conformance to the following SOP Classes:

**Table 3.57** SOP Classes for Storage SCU

SOP Class Name	SOP Class UID	SCU	SCP
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
See <a href="#">Table 1.3</a> , "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."	See <a href="#">Table 1.3</a> , "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."	Yes	No

### 3.2.12.2 Association Policies

#### General

Storage SCU initiates but never accepts associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 3.58** DICOM Application Context for Storage SCU

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

**Number of Associations**

The Storage SCU AE initiates one association at a time for each configured Storage SCP (destination). Multiple destinations can be configured for teleradiology and C-MOVE destinations. Only a single destination can be configured for archiving using ImageServer/xd.

**Table 3.59** Number of Associations for Storage SCU

Maximum number of simultaneous associations	= number of configured destinations
---	-------------------------------------

**Asynchronous Nature**

The Storage SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**Table 3.60** Asynchronous Nature as a SCU for Storage SCU

Maximum number of outstanding asynchronous transactions	1
---	---

**Implementation Identifying Information**

The Storage SCU AE will provide the following implementation identifying information

Implementation Class UID	1.2.752.24.3.3.25.7
Implementation version name	SISTOSCU_24_1

**3.2.12.3 Association Initiation Policy****Activity - Remote AE receives commit request****Description and Sequencing of Activities**

Storage Commitment is used by the Storage SCU AE only when archiving towards an external archive (VNA). Configuration determines if storage commitment should be performed or not during archiving. Storage commitment is not used when sending DICOM instances in other situations from Sectra PACS; e.g. when using teleradiology or as a result of an incoming C-MOVE request from a Q/R SCP AE.

The N-ACTION-RQ will be sent after the DICOM instances has been successfully sent to the DICOM archive. The Storage SCU AE expects the N-EVENT-REPORT-RQ message to be sent to a specific Storage SCP on the Sectra PACS which is specifically configured to receive commit responses. For more information see System Administrator's Guide ImageServer/fs, ImageServer/xd, ImageServer/os.

**Proposed Presentation Contexts**

The Storage SCU AE is capable of proposing the presentation context shown in the table below:



**Table 3.61** Proposed presentation contexts for Storage SCU and Remote AE receives commit request

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**SOP Specific Conformance to Storage Commitment**

The association to the destination will be taken down directly after the N-ACTION-RSP message has been received.

**Activity - Remote AE receives images****Description and Sequencing of Activities**

As described in the [User's Guide IDS7 \[3\]](#) and [Sectra User's Guide UniView \[4\]](#) the IDS7 workstation or UniView user selects examinations to send. Then he or she issues the send command by selecting the desired destination. The command is forwarded to WISE, which will activate the Storage SCU AE indicating the examinations, and destination that the user has chosen. The Storage SCU AE will then initiate an association with the remote AE, hopefully supporting DICOM Storage as SCP.

Image sending can also be activated as a result of a C-MOVE request received from a Q/R SCP, or when archiving DICOM instances using ImageServer/xd.

**Proposed Presentation Contexts**

The Storage SCU AE is capable of proposing the presentation context shown in the table below:

**Table 3.62** Proposed presentation contexts for Storage SCU and Remote AE receives images

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
See Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."	See Table 1.3, "List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView."	JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	None
		Sectra Compression ( <b>Private Syntax</b> )	1.2.752.24.3.7.6		
		Sectra Compression LS ( <b>Private Syntax</b> )	1.2.752.24.3.7.7		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian (Retired)	1.2.840.10008.1.2.2		
		JPEG Lossless, Non-Hier. (Process 14)	1.2.840.10008.1.2.4.57		
		JPEG Lossless, Non-Hier., First-Order Pred.	1.2.840.10008.1.2.4.70		
		RLE Lossless	1.2.840.10008.1.2.5		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50		
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51		
		JPEG Full prog., Non-Hier. (Proc. 10 & 12)	1.2.840.10008.1.2.4.55		
		MPEG2 MP@ML*	1.2.840.10008.1.2.4.100		
		MPEG2 MP@HL*	1.2.840.10008.1.2.4.101		
		MPEG4 AVC/H.264 HP*	1.2.840.10008.1.2.4.102		
MPEG4 AVC/H.264 BD-compatible HP*	1.2.840.10008.1.2.4.103				

At most four transfer syntaxes are proposed. Normally Implicit Little Endian and Explicit Little Endian are always proposed. If the image is internally stored in a compressed transfer syntax, that syntax is proposed too. If configured so and if the actual image can be compressed, a JPEG or JPEG2000 compression transfer syntax can be proposed too. However, when sending videos and some other specific DICOM instances, only the internally used transfer syntax will be proposed.

**SOP Specific Conformance to Storage**

The Storage SCU provides standard conformance to the supported SOP classes in the Storage Service Class.

If patient or exam data for exported images has been changed in Sectra PACS, the exported images will contain the values from Sectra PACS, i.e. coercing will take place. See [section 8.1.4 Coerced/Modified Fields](#) for a list of DICOM attributes that can be coerced during export.

If Sectra PACS has been configured to support multiple issuers then the exported DICOM objects will contain (0010,0021) Issuer of Patient ID and the receiving side must check both (0010,0020) Patient ID and (0010,0021) Issuer of Patient ID in the exported DICOM objects to uniquely identify a patient. If Sectra PACS is also configured for patient linking an export issuer can be configured. If a patient does not have information for the configured export issuer then information for another issuer will be used. Again the receiving side must check both (0010,0020) Patient ID and (0010,0021) Issuer of Patient ID in the exported DICOM objects to uniquely identify a patient.

If graphics, annotations and other settings have been made in the default setting for images in IDS7, this information will be exported as Standard Grayscale Presentation State if the receiving side supports such (see [Exported Presentation States with the Storage SCU AE or the WADO Provider AE](#) for details), otherwise the annotations will be exported standard DICOM overlays. If the IDS7 user changes an existing default setting, then the SOP Instance UID of the associated presentation state will be changed. The old setting will not be saved.

If configured so, the Storage SCU AE will export Sectra private attributes. These are documented in [section 8.2 Data Dictionary of Private Attributes](#).

#### 3.2.12.4 Association Acceptance Policy

The Storage SCU AE does not handle incoming associations.

### 3.2.13 Q/R SCP AE Specification

Multiple Q/R SCP AEs can be set up in Sectra PACS.

#### 3.2.13.1 SOP Classes

A Q/R SCP AE provides Standard Conformance to the following SOP Classes:

**Table 3.63** SOP Classes Supported By Q/R SCP

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	No	Yes
Patient Root Q/R Info. Mod. - FIND	1.2.840.10008.5.1.4.1.2.1.1	No	Yes
Study Root Q/R Info. Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	No	Yes
Patient/Study Only Q/R I M - FIND (Retired)	1.2.840.10008.5.1.4.1.2.3.1	No	Yes
Patient Root Q/R Info. Mod - MOVE	1.2.840.10008.5.1.4.1.2.1.2	No	Yes
Study Root Q/R Info. Mod. - MOVE	1.2.840.10008.5.1.4.1.2.2.2	No	Yes
Patient/Study Only Q/R I M - MOVE (Retired)	1.2.840.10008.5.1.4.1.2.3.2	No	Yes

#### 3.2.13.2 Association Policies

##### General

A Q/R SCP AE accepts but will never initiate associations.

**Table 3.64** Maximum PDU Size Received as a SCP for Q/R SCP

Maximum PDU size received	Configurable. The default is 28672 bytes (28 Kbytes). Configuration can only be done by Sectra authorized personnel. Allowed values are between 4096 bytes (4 Kbytes) and 131072 bytes (128 Kbytes), inclusive.
---------------------------	---

**Number of Associations**

**Table 3.65** Number of Associations as a SCP for Q/R SCP

Maximum number of simultaneous associations	Configurable, the default is 5 per configured Q/R SCP AE. Configuration can only be done by Sectra authorized personnel.
---	--

Since multiple Q/R SCP AEs can be set up, a great number of associations can be handled at the same time. In practice, the number of Q/R SCP AEs and simultaneous associations are limited by the system capabilities, for instance network bandwidth, server memory size, and file system performance.

**Asynchronous Nature**

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

**Implementation Identifying Information**

**Table 3.66** DICOM Implementation Class UID and Version Name for Q/R SCP

Implementation Class UID	1.2.752.24.3.3.25.7
Implementation Version Name	WIQRSCP_24_1

**3.2.13.3 Association Initiation Policy**

A Q/R SCP AE does not initiate associations.

**3.2.13.4 Association Acceptance Policy**

A Q/R SCP AE **rejects** associations in the following situations:

- Association requests from applications that do not address it properly, i.e. specify an incorrect called AE title.
- Association requests from hosts with host names not known to the Q/R SCP AE host. This requirement can be lifted via configuration.
- If it is already processing the maximum number of associations that it can handle (default: 5).

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

- Verification of the DICOM communication between a remote system and a Q/R SCP AE.
- Queries from a remote system to Sectra PACS.
- Requests to export images and other DICOM objects from Sectra PACS.

**Activity - Remote AE verifies DICOM communication****Description and Sequencing of Activities**

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

**Accepted Presentation Contexts**

**Table 3.67** Acceptable presentation contexts for a Q/R SCP AE and activity "Remote AE verifies DICOM communication"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

A Q/R SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A Q/R SCP AE only supports the implicit VR Little Endian transfer syntax.

**Extended Negotiation**

No extended negotiation is performed.

**SOP Specific Conformance to Verification SOP Class**

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

A Q/R SCP AE will never send a failure service status, but always responds with success.

**Activity - Remote AE Issues a DICOM Query****Description and Sequencing of Activities**

A remote system wants to query Sectra PACS using the Q/R C-FIND service.

**Accepted Presentation Contexts**

**Table 3.68** Acceptable presentation contexts for a Q/R SCP AE and activity "Remote AE Issues a DICOM Query"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Q/R Info. Mod. - FIND	1.2.840.10008.5.- 1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Q/R Info. Model - FIND	1.2.840.10008.5.- 1.4.1.2.2.1				
Patient/Study Only Q/R I M - FIND	1.2.840.10008.5.- 1.4.1.2.3.1				

A Q/R SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A Q/R SCP AE only supports the implicit VR Little Endian transfer syntax.

A Q/R SCP AE will accept duplicate presentation contexts, i.e., if it is offered multiple presentation contexts, each of which offers acceptable transfer syntaxes, it will accept all presentation contexts, applying the same priority for selecting a transfer syntax for each.

### Extended Negotiation

No extended negotiation is performed.

### SOP Specific Conformance to the Q/R C-FIND SOP Classes

A Q/R SCP AE provides standard conformance to the C-FIND SOP classes of the Q/R Service Class as SCP with the following exceptions:

- Fractions of seconds are ignored.
- At most 750 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.

The tables below contain the DICOM keys that are supported by a Q/R SCP AE in C-FIND requests. The three (or two) columns under "Information Model" correspond to the different Q/R information models: **Pat** = Patient Root, **Study** = Study Root and **P/S O** = Patient/Study Only. The contents of the Information Model columns specify the key type, where **M** = supported for matching and as return key, **R** = supported as return key only, not for matching. A minus sign (-) indicates that the key is not supported for the specific level and information model. An asterisk (\*) indicates that the attribute is required to have a single value per the DICOM hierarchical search method.

**Table 3.69** Patient Level

Key	Tag	Information Model		Comment
		Pat	P/S O	
Patient's Name	(0010,0010)	M	M	Case insensitive matching
Patient ID	(0010,0020)	M	M	
Issuer of Patient ID	(0010,0021)	M	M	Required if Patient ID is specified and multiple issuers is enabled in WISE and a fixed issuer is not configured for the Q/R SCP.
Patient's Birth Date	(0010,0030)	M	M	
Patient's Sex	(0010,0040)	R	R	
Other Patient IDs Sequence	(0010,1002)			
>Patient ID	(0010,0020)	R	R	
>Issuer of Patient ID	(0010,0021)	R	R	

Table 3.70 Study Level

Key	Tag	Information Model			Comment
		Pat	Study	P/S O	
Study Date	(0008,0020)	M	M	M	Range matching is supported
Study Time	(0008,0030)	M	M	M	Range matching is supported
Accession Number	(0008,0050)	M	M	M	
Modalities in Study	(0008,0061)	M	M	M	
Institution Name	(0008,0080)	M	M	M	
Referring Physician's Name	(0008,0090)	M	M	M	Case sensitive matching
Study Description	(0008,1030)	M	M	M	
Patient's Name	(0010,0010)	-	M	-	Case insensitive matching
Patient ID	(0010,0020)	*	M	-	
Issuer of Patient ID	(0010,0021)	-	M	-	Required if Patient ID is specified and multiple issuers is enabled in WISE and a fixed issuer is not configured for the Q/R SCP.
Patient's Birth Date	(0010,0030)	-	M	-	
Patient's Sex	(0010,0040)	-	R	-	
Other Patient IDs Sequence	(0010,1002)				
>Patient ID	(0010,0020)	-	R	-	
>Issuer of Patient ID	(0010,0021)	-	R	-	
Study ID	(0020,0010)	M	M	M	
Study Instance UID	(0020,000D)	M	M	M	
Number of Study Related Series	(0020,1206)	R	R	R	
Number of Study Related Instances	(0020,1208)	R	R	R	

**Table 3.71** Series Level

Key	Tag	Information Model		Comment
		Pat	Study	
Modality	(0008,0060)	M	M	
Series Description	(0008,103E)	R	R	
Body Part Examined	(0018,0015)	M	M	
Series Number	(0020,0011)	M	M	
Series Instance UID	(0020,000E)	M	M	
Number of Series Related Instances	(0020,1209)	R	R	
Request Attribute Sequence	(0040,0275)			
>Request Procedure ID	(0040,1001)	M	M	
>Scheduled Procedure Step ID	(0040,0009)	M	M	
Performed Procedure Step Start Date	(0040,0244)	M	M	
Performed Procedure Step Start Time	(0040,0245)	M	M	



**Table 3.72** Composite Object Instance Level

Key	Tag	Information Model		Comment
		Pat	Study	
SOP Class UID	(0008,0016)	M	M	
SOP Instance UID	(0008,0018)	M	M	
Content Date	(0008,0023)	R	R	
Content Time	(0008,0033)	R	R	
Instance Number	(0020,0013)	M	M	
Referenced Series Sequence	(0008,1115)			
>Series Instance UID	(0008,1115)	R	R	For presentation states
>Referenced Image Sequence	(0008,1140)			
>>Referenced SOP Class UID	(0008,1150)	R	R	For presentation states
>>Reference SOP Instance UID	(0008,1155)	R	R	For presentation states
Number of Frames	(0028,0008)	R	R	For images
Rows	(0028,0010)	R	R	For images
Columns	(0028,0011)	R	R	For images
Bits Allocated	(0028,0100)	R	R	For images
Observation DateTime	(0040,A032)	R	R	For key object selection documents
Concept Name Code Sequence	(0040,A043)			
>Code Value	(0008,0100)	M	M	
>Code Scheme Designator	(0008,0102)	M	M	
>Coding Scheme Version	(0008,0103)	R	R	
>Code Meaning	(0008,0104)	R	R	
Referenced Request Sequence	(0040,A370)			
>Accession Number	(0008,0050)	R	R	
>Study Instance UID	(0020,000D)	R	R	
>Requested Procedure Code Sequence	(0032,1064)			
>>Code Value	(0008,0100)	R	R	
>>Code Scheme Designator	(0008,0102)	R	R	
>>Coding Scheme Version	(0008,0103)	R	R	
>>Code Meaning	(0008,0104)	R	R	
>Requested Procedure ID	(0040,1001)	R	R	
Content Template Sequence	(0040,A504)			

Key	Tag	Information Model		Comment
		Pat	Study	
>Template Identifier	(0040,DB00)	R	R	For structured reports
Content Label	(0070,0080)	R	R	For presentation states
Content Description	(0070,0081)	R	R	For presentation states
Presentation Creation Date	(0070,0082)	R	R	For presentation states
Presentation Creation Time	(0070,0083)	R	R	For presentation states
Presentation Creator's Name	(0070,0084)	R	R	For presentation states

Relational queries are not supported.

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

Range matching is supported for both Study Date and Study Time. If both Study Date and Study Time are specified as a range, e.g. date1 - date2 and time1 - time2, all studies between date1.time1 and date2.time2 are returned. I.e. the result is not all studies between time1 and time2 on date1, and all studies between time1 and time2 on date1 + 1, ..., and all studies between time1 and time2 on date2. If this is required, the SCU must do a query on date range only, requiring time in return and filter out the required studies himself. If Study Date is not specified and Study Time is specified as a range an implicit Study Date of today is assumed, i.e. all studies between the two time points on the day the query is done is returned.

Wildcard matching on date and time is not supported. The result is undefined.

If WISE is configured to support multiple issuers then all C-FIND requests must contain (0010,0021) Issuer of Patient ID except for series and instance level queries when using the Study Root Query/Retrieve Information Model. A Q/R SCP AE can be configured to use a fixed issuer, which will override any issuer given in a C-FIND request. A Query/Retrieve SCU must in such circumstances take the (0010,0021) Issuer of Patient ID in the received C-FIND response into account when evaluating which patient the response belongs to.

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

#### **Activity - Remote AE Requests Images**

##### **Description and Sequencing of Activities**

A remote application entity wishes to retrieve images or other DICOM objects from Sectra PACS using the Q/R C-MOVE service.

### Accepted Presentation Contexts

**Table 3.73** Acceptable presentation contexts for a Q/R SCP AE and activity "Remote AE Requests Images"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Q/R Info. Mod. - MOVE	1.2.840.10008.5.-1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Study Root Q/R Info. Model - MOVE	1.2.840.10008.5.-1.4.1.2.2.2				
Patient/Study Only Q/R I M - MOVE	1.2.840.10008.5.-1.4.1.2.3.2				

A Q/R SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A Q/R SCP AE only supports the implicit VR Little Endian transfer syntax.

A Q/R SCP AE will accept duplicate presentation contexts, i.e., if it is offered multiple presentation contexts, each of which offers acceptable transfer syntaxes, it will accept all presentation contexts, applying the same priority for selecting a transfer syntax for each.

#### Extended Negotiation

No extended negotiation is performed.

#### SOP Specific Conformance to the Q/R C-MOVE SOP Classes

A Q/R SCP AE provides standard conformance to the C-MOVE SOP classes of the Q/R Service Class as SCP.

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

Pending messages will be sent to the Q/R SCU by default every 10th second.

The table below described used error and warning codes. In case of errors or warnings an error comment will be sent in the C-MOVE response to further specify the exact error.

**Table 3.74** Error and Warning codes used by a Q/R SCP AE

Error or Warning code	Meaning
A702 (Refused: Out of resources - Unable to perform sub-operations)	General error code, used in error situations in case no other of the situations below are encountered.
A801 (Refused: Move Destination unknown)	The move destination is unknown (not configured).
B000 (Sub-operations Complete - One or more Failures or Warnings)	Some DICOM objects could be sent successfully, but some DICOM objects failed to be generated or failed during sending.
C000 (Failed: Unable to process)	Objects failed to be generated.
C001 (Failed: Unable to process)	The association to the move destination was rejected.

## 3.2.14 Notif SCU AE Specification

### 3.2.14.1 SOP Classes

The Notif SCU AE provides Standard Conformance to the following SOP Classes:

**Table 3.75** SOP Classes for the Notif SCU AE

SOP Class Name	SOP Class UID	SCU	SCP
Basic Study Content Notification (Retired)	1.2.840.10008.1.9	Yes	No

This SOP Class is retired from the DICOM standard. See the DICOM standard from 2004 for the most recent specification.

### 3.2.14.2 Association Policies

#### General

The Notif SCU AE initiates but never accepts associations.

The DICOM standard application context name for DICOM 3.0 is always proposed:

**Table 3.76** DICOM Application Context for the Notif SCU AE

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

#### Number of Associations

The Notif SCU AE can initiate several associations simultaneously. Only one destination (SCP) can be configured.

**Table 3.77** Number of Associations for the Notif SCU AE

Maximum number of simultaneous associations	No limit exists for the maximum number of associations. The number of simultaneous associations is depending on the number of simultaneous changes in exam (study) level in WISE.
---	---

### Asynchronous Nature

The Notif SCU AE does not support asynchronous communication (multiple outstanding transactions over a single association).

**Table 3.78** Asynchronous Nature as a SCU for the Notif SCU AE

Maximum number of outstanding asynchronous transactions	1
---	---

### Implementation Identifying Information

The Notif SCU AE will provide the following implementation identifying information

**Table 3.79** DICOM Implementation Class UID and Version Name for the Notif SCU AE

Implementation Class UID	1.2.752.24.3.3.25.7
Implementation Version Name	SINOTSCU_24_1

## 3.2.14.3 Association Initiation Policy

### Activity - User Updates Exam State

#### Description and Sequencing of Activities

If WISE is configured accordingly, the Notif SCU AE 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.

The Notif SCU AE can also be configured to send a Basic Study Descriptor instance on these events:

- An exam is retrieved from the archive.
- The last on-line copy of an exam is deleted.

The sending of a Basic Study Descriptor instance will lead to the remote activity "Remote AE receives notification".

### Proposed Presentation Contexts

The Notif SCU AE is capable of proposing the presentation contexts shown in the table below:

**Table 3.80** Proposed presentation contexts for the Notif SCU AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Study Content Notification (Retired)	1.2.840.10008.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

### SOP Specific Conformance to the Basic Study Content Notification SOP Class

The Notif SCU AE sends all type 1 and type 2 attributes of the Basic Study Descriptor IOD. No type 3 attributes are sent.

If configured so, the Notif SCU AE can send a standard extended type of the Basic Study Descriptor IOD, see [section 8.5.1.1 Basic Study Content Notification SOP Class](#) for details.

### 3.2.14.4 Association Acceptance Policy

The Notif SCU AE does not handle incoming associations.

## 3.2.15 MWL SCP AE Specification

Multiple MWL SCP AEs can be set up in Sectra PACS.

### 3.2.15.1 SOP Classes

A MWL SCP AE provides Standard Conformance to the following SOP Classes:

**Table 3.81** SOP Classes Supported By a MWL SCP AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	No	Yes
Modality Worklist Info. Mod. - FIND	1.2.840.10008.5.1.4.31	No	Yes

### 3.2.15.2 Association Policies

#### General

A MWL SCP AE accepts but will never initiate associations.

**Table 3.82** Maximum PDU Size Received as a SCP for a MWL SCP AE

Maximum PDU size received	Configurable. The default is 28672 bytes (28 Kbytes). Configuration can only be done by Sectra authorized personnel. Allowed values are between 4096 bytes (4 Kbytes) and 131072 bytes (128 Kbytes), inclusive.
---------------------------	---

#### Number of Associations

**Table 3.83** Number of Associations as a SCP for a MWL SCP AE

Maximum number of simultaneous associations	Configurable, the default is 5 per configured MWL SCP AE. Configuration can only be done by Sectra authorized personnel.
---	--

Since multiple MWL SCP AEs can be set up, a great number of associations can be handled at the same time. In practice, the number of MWL SCP AEs and simultaneous associations are limited by the system capabilities, for instance network bandwidth, server memory size, and file system performance.

#### Asynchronous Nature

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

#### Implementation Identifying Information

**Table 3.84** DICOM Implementation Class UID and Version Name for a MWL SCP AE

Implementation Class UID	1.2.752.24.3.3.25.7
Implementation Version Name	WIMWLSCP_24_1

**3.2.15.3 Association Initiation Policy**

A MWL SCP AE does not initiate associations.

**3.2.15.4 Association Acceptance Policy**

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

- Association requests from applications that do not address it properly, i.e. specify an incorrect called AE title.
- Association requests from hosts with host names not known to the MWL SCP AE host. This requirement can be lifted via configuration.
- If it is already processing the maximum number of associations that it can handle (default: 5).

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

- Verification of the DICOM communication between a remote system and a MWL SCP AE.
- Modality Worklist queries from a remote system to Sectra PACS.

**Activity - Remote AE verifies DICOM communication**

**Description and Sequencing of Activities**

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

**Accepted Presentation Contexts**

**Table 3.85** Acceptable presentation contexts for a MWL SCP AE and activity "Remote AE verifies DICOM communication"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

A MWL SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A MWL SCP AE only supports the implicit VR Little Endian transfer syntax.

**Extended Negotiation**

No extended negotiation is performed.

**SOP Specific Conformance to Verification SOP Class**

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

A MWL SCP AE will never send a failure service status, but always responds with success.

**Activity - Remote AE Requests Worklist****Description and Sequencing of Activities**

A remote system wants to query Sectra PACS using the MWL C-FIND service.

**Accepted Presentation Contexts**

**Table 3.86** Acceptable presentation contexts for a MWL SCP AE and activity "Remote AE Requests Worklist"

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Info. Mod. - FIND	1.2.840.10008.5.- 1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

A MWL SCP AE will always accept any presentation context for the supported SOP Classes with the supported transfer syntaxes. More than one proposed presentation context will be accepted for the same abstract syntax if the transfer syntax is supported, whether or not it is the same as another presentation context.

A MWL SCP AE only supports the implicit VR Little Endian transfer syntax.

A MWL SCP AE will accept duplicate presentation contexts, i.e., if it is offered multiple presentation contexts, each of which offers acceptable transfer syntaxes, it will accept all presentation contexts, applying the same priority for selecting a transfer syntax for each.

**Extended Negotiation**

No extended negotiation is performed.

**SOP Specific Conformance to the MWL SOP Class**

A MWL SCP AE provides standard conformance to the DICOM Basic Worklist Management service class as SCP with the following exceptions:

- Fractions of seconds are ignored.
- At most 750 matches are returned. The hit limit can be configured. If there are more items than the hit limit in the WISE database, zero matches are returned.

The table below contains the DICOM keys that are supported by the Modality Worklist SCP AE in C-FIND requests. The contents of the Type columns specify the key type, where **M** = supported for matching and as return key, **R** = supported as return key only, not for matching.



**Table 3.87** Modality Worklist Information Model Attributes

Key	Tag	Type	Comment
Specific Character Set	(0008,0005)	R	
Scheduled Procedure Step Sequence	(0040,0100)	M	
>Scheduled Station AE Title	(0040,0001)	M	
>Scheduled Procedure Step Start Date	(0040,0002)	M	Range matching is supported
>Scheduled Procedure Step Start Time	(0040,0003)	M	Range matching is supported
>Modality	(0008,0060)	M	
>Scheduled Performing Physician's name	(0040,0006)	M	
>Scheduled Procedure Step Description	(0040,0007)	M	
>Scheduled Station Name	(0040,0010)	M	
>Scheduled Procedure Step ID	(0040,0009)	M	
Requested Procedure ID	(0040,1001)	M	
Requested Procedure Description	(0032,1060)	R	
Study Instance UID	(0020,0000)	M	
Accession Number	(0008,0050)	M	
Referring Physician's Name	(0008,0090)	M	Case sensitive matching
Patient ID	(0010,0020)	M	
Issuer of Patient ID	(0010,0021)	M	Required if Patient ID is specified and multiple issuers is enabled in WISE and a fixed issuer is not configured for a MWL SCP AE.
Patient's Name	(0010,0010)	M	Case insensitive matching
Patient's Birth Date	(0010,0030)	M	
Patient's Sex	(0010,0040)	R	
Other Patient IDs Sequence	(0010,1002)		
>Patient ID	(0010,0020)	R	
>Issuer of Patient ID	(0010,0021)	R	

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

Range matching is supported for both Study Date and Study Time. If both Study Date and Study Time are specified as a range, e.g. date1 - date2 and time1 - time2, all studies between date1.time1 and date2.time2 are returned. I.e. the result is **not** all studies between two time points on consecutive dates.

If this is required, the SCU must do a query on date range only, requiring time in return and filter out the required studies itself. If Study Date is not specified and Study Time is specified as a range an implicit Study Date of today is assumed, i.e. all studies between the two time points on the day the query is done is returned.

Wildcard matching on date and time is not supported. The result is undefined.

If no matches are found, a response with “SUCCESS” is sent.

## 3.3 Network Interfaces

### 3.3.1 Physical Network Interface

Sectra PACS is indifferent to the physical medium over which TCP/IP executes, which is dependent on the underlying operating system and hardware.

### 3.3.2 Additional Protocols

Sectra PACS does not in itself support any additional system management protocols, but protocols like NTP, DHCP and DNS can be used if supported by the underlying operating system and hardware. Either host names or IP addresses can be used in the configuration of presentation addresses for remote AEs. Sectra PACS uses the name resolution mechanism of the underlying operating system for addressing.

### 3.3.3 IPv4 and IPv6 Support

Sectra PACS supports both IPv4 and IPv6. It does not utilize any of the optional configuration identification or security features of IPv6.

## 3.4 Configuration

Configuration is mostly done using Sectra Enterprise Manager, but some AE configuration is done using command line programs, configuration files, and/or Sectra Deployment Manager. For more information on configuration, please consult [System Administrator's Guide Sectra Healthcare System \[8\]](#), [System Administrator's Guide WISE \[5\]](#), [System Administrator's Guide ImageServer/fs, ImageServer/xd, ImageServer/os \[7\]](#), and [System Administrator's Guide ImageServer/s \[6\]](#).

---

# 4 Media Interchange

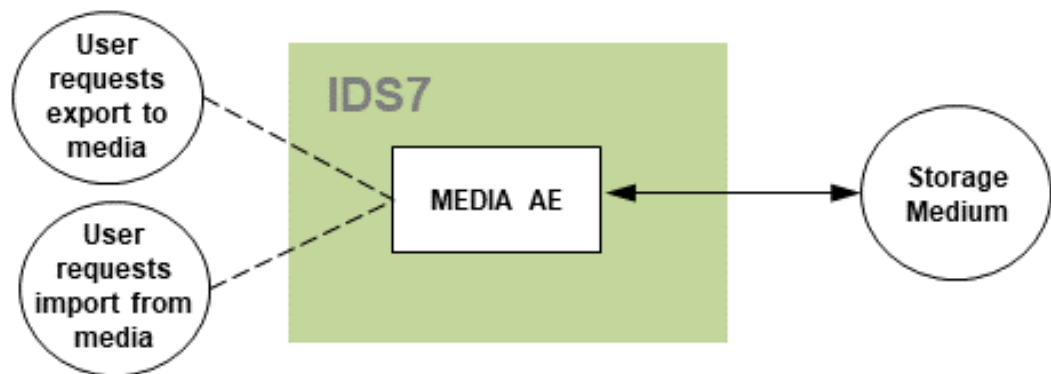
---

The following topics are included in this chapter:

- [Implementation Model](#)
- [AE specifications](#)
- [Augmented and Private Application Profiles](#)
- [Media Configuration](#)

## 4.1 Implementation Model

### 4.1.1 Application Data Flow



The Media AE is located in IDS7 product and provides Standard Conformance to the DICOM Media Storage Service and File Format (PS 3.10 in [NEMA PS3 Digital Imaging and Communications in Medicine \(DICOM\) Standard](#), available for free at <https://www.dicomstandard.org/>. [1]). It support DICOM Media Storage both as File Set Reader (FSR) and File Set Creator (FSC). The Media AE supports the STD-GEN-CD, STD-GEN-DVD-RAM, STD-GEN-DVD-JPEG, STD-GEN-DVD-J2K, STD-GEN-USB-JPEG and STD-GEN-USB-J2K Media Storage Application Profiles to interchange DICOM information on interchangeable media.

### 4.1.2 Functional Definitions of AEs

#### 4.1.2.1 Functional Definition of Media AE

Both media export and media import is triggered by user activity in IDS7. IDS7 is internally using both Sectra Healthcare Server and Sectra PACS Core to perform the export and import operations. IDS7 use Windows Image Mastering API (IMAPI) to leverage the built-in CD/DVD writing capabilities of

Windows, making it possible to write to media from within IDS7. It is also possible to export to any folder location that is reachable from the IDS7 workstation.

### 4.1.3 Sequencing of Real World Activities

Not applicable.

### 4.1.4 File Meta Information

The DICOM Media AE will provide the following implementation identifying information

Implementation Class UID	1.2.752.24.10.4.2
Implementation version name	SHMEFSRC_24_1

## 4.2 AE specifications

### 4.2.1 Media AE specification

Media AE provides standard conformance to the DICOM Media Storage Service Class.

Application Profiles Supported	Real-World Activity	Role
STD-GEN-CD	Import Media	FSR
	Export Media	FSC
STD-GEN-DVD-RAM	Import Media	FSR
	Export Media	FSC
STD-GEN-DVD-JPEG	Import Media	FSR
	Export Media	FSC <sup>2</sup>
STD-GEN-DVD-J2K	Import Media	FSR
	Export Media	FSC <sup>3</sup>
STD-GEN-USB-JPEG	Import Media	FSR
	Export Media	FSC <sup>4</sup>

<sup>2</sup>Transfer syntaxes JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 and JPEG Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51 are used.

<sup>3</sup>Transfer syntax JPEG 2000 Image Compression (Lossless Only) 1.2.840.10008.1.2.4.90 is used.

<sup>4</sup>Transfer syntaxes JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 and JPEG Extended (Process 2 & 4) 1.2.840.10008.1.2.4.51 are used.

Application Profiles Supported	Real-World Activity	Role
STD-GEN-USB-J2K	Import Media	FSR
	Export Media	FSC <sup>5</sup>

See [Table 1.3, “List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView.”](#) for a list of SOP Classes supported for import media by default. Additional SOP Classes can be configured. Export of media has basically the same list with the exception that it only handles SOP Classes with image data and the following:

- Grayscale Softcopy Presentation State Storage
- Color Softcopy Presentation State Storage
- Pseudo-Color Softcopy Presentation State Storage
- Blending Softcopy Presentation State Storage
- XA/XRF Grayscale Softcopy Presentation State Storage
- Grayscale Planar MPR Volumetric Presentation State Storage
- Compositing Planar MPR Volumetric Presentation State Storage
- Advanced Blending Presentation State Storage
- Volume Rendering Volumetric Presentation State Storage
- Segmented Volume Rendering Volumetric Presentation State Storage
- Multiple Volume Rendering Volumetric Presentation State Storage
- Basic Text Structured Report Storage
- Enhanced Structured Report Storage
- Comprehensive Structured Report Storage
- Comprehensive 3D Structured Report Storage
- Extensible Structured Report Storage
- Procedure Log Storage
- Mammography CAD Structured Report
- Key Object Selection Document Storage
- Chest CAD Structured Report Storage
- X-Ray Radiation Dose Structured Report Storage
- Radiopharmaceutical Radiation Dose Structured Report Storage
- Colon CAD Structured Report Storage
- Implantation Plan Structured Report Storage

<sup>5</sup>Transfer syntax JPEG 2000 Image Compression (Lossless Only) 1.2.840.10008.1.2.4.90 is used.

- Acquisition Context Structured Report Storage
- Simplified Adult Echo Structured Report Storage
- Patient Radiation Dose Structured Report Storage
- Planned Imaging Agent Administration Structured Report Storage
- Performed Imaging Agent Administration Structured Report Storage
- Enhanced X-Ray Radiation Dose SR Storage
- Encapsulated PDF Storage
- 12-lead ECG Waveform Storage
- General ECG Waveform Storage
- Ambulatory ECG Waveform Storage

#### 4.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title is not used by IDS7.

Private Information from the IDS7 is not stored with the images. Private information included in images before they get imported to Sectra PACS is not removed and is thus retained when exporting them to media.

#### 4.2.1.2 Real-World Activities

##### Activity - Import Media

IDS7 can choose to import a complete or parts of a complete file set acting as FSR. User will be presented with a tree structure presenting the selected file-set and can select which part to import. The mandatory DICOMDIR keys are required to present the tree structure in a correct way. This structure will show Patients, Studies and Series. It is possible to import DICOM objects even if the DICOMDIR file is missing.

Read more about this functionality in [User's Guide IDS7 \[3\]](#).

##### Application Profile Specific Conformance

There are no extensions or specializations.

##### Activity - Export Media

IDS7 can create a complete multi-patient file set to be written on CD acting as FSC.

When exporting to media, images are stored in one of the following transfer syntaxes

Transfer Syntax Name	Transfer Syntax UID
Explicit VR Little Endian	1.2.840.10008.1.2.1
JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50
JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51
JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90

Read more about this functionality in [User's Guide IDS7 \[3\]](#).

All values needed for DICOMDIR file will be fetched from SHS, if a value does not exist; actual image file will be checked for information. If SHS data is used, image file will be updated according to it. This will ensure that the same information that is written in DICOMDIR file is in the image file.

Referenced Image Sequence is not written into the DICOMDIR file.

#### **Application Profile Specific Conformance**

There are no extensions or specializations.

## **4.3 Augmented and Private Application Profiles**

Not used.

## **4.4 Media Configuration**

Configuration is done using Sectra Enterprise Manager. For more information on configuration, please consult [System Administrator's Guide Sectra Healthcare System \[8\]](#).

---

## 5 Transformation of DICOM to CDA

---

Sectra PACS and Sectra VNA do not support transformation of DICOM to CDA.



---

## 6 Support of Character Sets

---

All AEs provide support for the ISO\_IR 100 (Latin 1) and ISO\_IR 138 (Hebrew) extended character sets except the Print SCU AE. 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. IDS7 and UniView handles Unicode characters which cover most of the world's writing systems.

With specific configuration, a Storage SCP AE and a Q/R SCP AE support the character set ISO 2022 IR 87 (Japanese). The Q/R SCP does not support non-ASCII search keys, but supports returning values with ISO 2022 IR 87.

When encountering an unknown character set, characters are interpreted according to the locale on the computer where the Application Entity is running.

---

# 7 Security

---

The following topics are included in this chapter:

- [Security Profiles](#)
- [Association Level Security](#)
- [Application Level Security](#)

Sectra PACS supports connections for WADO-RS and QIDO-RS over https if configured correctly.

## 7.1 Security Profiles

None supported.

## 7.2 Association Level Security

By default only known hosts are allowed to open an association towards any of the SCP AEs. A known host is a host whose host name can be resolved.

## 7.3 Application Level Security

None supported.

---

# 8 Annexes

---

The following topics are included in this chapter:

- [IOD Contents](#)
- [Data Dictionary of Private Attributes](#)
- [Coded Terminology and Templates](#)
- [Grayscale Image Consistency](#)
- [Standard Extended/Specialized/Private SOP Classes](#)
- [Private Transfer Syntaxes](#)
- [Presentation State Display](#)

## 8.1 IOD Contents

### 8.1.1 Created SOP Instances

#### 8.1.1.1 Created Presentation State Objects

If the user changes an existing default setting the SOP Instance UID of the associated presentation state will be changed. The old setting will not be saved.

Please note that Presentation States that have been imported into Sectra PACS will be exported in a transparent way.

#### **Exported Presentation States with the Storage SCU AE or the WADO Provider AE**

The presentation states modules contain the following information generated from IDS7 workstation settings and annotations.

Module	IDS7 correspondence	Note
Presentation State	-	Label: "SECTRA DEFAULT" Description: "SECTRA Default Setting"
Mask	-	Not used.
Display Shutter	Cropping.	Always RECTANGULAR.
Bitmap Display Shutter	-	Not used.
Overlay Plane	-	Not used.

Module	IDS7 correspondence	Note
Overlay/Curve Activation	-	All 60xx overlays are rendered in graphic layer O.  50xx curves are not displayed.
Displayed Area	A combination of view port, zoom factor, zoom to fit, true size	The presentation size mode can be one of "TRUE SIZE", "SCALE TO FIT" or "MAGNIFY" depending on the IDS7 settings.
Graphic Annotation	All overlay graphics and measurements.	We always use annotation units "PIXEL", i.e. image relative coordinates.
Spatial Transformation	Rotation/flip.	
Graphic Layer	-	Only one single layer (O).
Modality LUT	-	Copied from original image.
Softcopy VOI LUT	Window width/center setting or currently selected LUT.	If the user has selected a true lookup table from the original image, this table is copied from the original image. Otherwise the current window width/center is used.
Softcopy Presentation LUT	-	Normally "IDENTITY", but in some cases it could also be "INVERSE".

#### Exported Presentation States with Media Export

If the user makes changes to annotations or image orientation, these can be exported as DICOM Standard Grayscale Presentation States during export to DICOM Media.

The presentation states modules contain the following information generated from IDS7 settings and annotations.

Module	IDS7 correspondence	Note
Presentation State	-	Label: "SECTRA DEFAULT"
Mask	-	Not used.
Display Shutter	-	Not used.
Bitmap Display Shutter	-	Not used.
Overlay Plane	All overlay graphics and measurements.	
Overlay/Curve Activation	-	Not used.
Displayed Area	-	The presentation size mode is always "SCALE TO FIT".
Graphic Annotation	-	Not used.
Spatial Transformation	Rotation/flip.	
Graphic Layer	-	Only one single layer (O).
Modality LUT	-	Copied from original image.
Softcopy VOI LUT	-	Copied from original image.

Module	IDS7 correspondence	Note
Softcopy Presentation LUT	-	Copied from original image.

### 8.1.1.2 Created Key Object Selection (KOS) Objects

Sectra PACS and Sectra VNA can with proper configuration generate and send Key Object Selection documents corresponding to workflows in the Integrating the Healthcare Enterprise (IHE) integration profile Imaging Object Change Management (IOCM). These objects will conform to the DICOM standard and contain all type 1 and type 2 attributes of the Key Object Selection IOD. The following Key Object Selection Document Titles are used:

- (113038, DCM, "Incorrect Modality Worklist Entry")
- (113039, DCM, "Data Retention Policy Expired")

## 8.1.2 Usage of Attributes From Received IODs

### 8.1.2.1 Stack sorting

In IDS7 and UniView the following attributes are used for stack sorting:

- Sort by position - Attribute (0020, 0032), 'Image Position (Patient)'
- Sort by orientation - Attribute (0020, 0037), 'Image Orientation (Patient)'
- Sort by time - Attribute (0008, 0023), 'Content Date' and attribute (0008, 0033), 'Content Time'
- Sort by slice number - Attribute (0020, 0013) 'Instance Number'

### 8.1.3 Attribute Mapping

Not applicable.

### 8.1.4 Coerced/Modified Fields

The following table shows DICOM attributes that can be coerced during export from Sectra PACS. Coercion can be an effect of updated information received via HL7, grouping effects during import, or configuration.

Additional DICOM attributes can be coerced in case DICOM mappings (tag morphing) is used with the Storage SCU AE.

**Table 8.1** DICOM attributes that can be coerced during export

Attribute Name	Attribute Tag
SOP Instance UID	(0008,0016)
SOP Class UID	(0008,0018)
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Modality	(0008,0060)
Institution Name	(0008,0080)
Referring Physician's Name	(0008,0090)
Station Name	(0008,1010)
Study Description	(0008,1030)
Procedure Code Sequence	(0008,1032)
> Code Value	(0008,0100)
> Code Scheme Designator	(0008,0102)
> Code Meaning	(0008,0104)
Performing Physician's Name	(0008,1050)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Issuer of Patient ID	(0010,0021)
Patient's Birth Date	(0010,0030)
Patient's Sex	(0010,0040)
Other Patient IDs	(0010,1000)
Other Patient IDs Sequence	(0010,1002)
Body Part Examined	(0018,0015)
Study Instance UID	(0020,0000)
Series Instance UID	(0020,000E)
Study ID	(0020,0010)
Series Number	(0020,0011)
Instance Number	(0020,0013)
Performed Procedure Step Start Date	(0040,0244)
Performed Procedure Step Start Time	(0040,0245)
Performed Procedure Step Description	(0040,0254)

## 8.2 Data Dictionary of Private Attributes

If configured so, the Storage SCU AE can include some Sectra Private Attributes in exported DICOM instances. The following table documents these attributes.

Tag	Name	VR	VM	Description
(0009,00xx)	Private creator code	LO	1	Value: SECTRA_Ident_01
(0009,xx01)	Request ID	LO	1	Unique id of request for this image
(0009,xx02)	Examination ID	LO	1	Unique id of examination for this image
(0009,xx04)	Series ID	LO	1	Series identifier
(0009,xx05)	Series order	LO	1	Order within exam
(0009,xx06)	File name	LO	1	File name
(0009,xx07)	Image data ID	LO	1	Image identifier
(0009,xx08)	Referring unit	LO	1	Referring physician's institution or clinic
(0009,xx09)	License category	LO	1	License category of imported image
(0009,xx0A)	Teaching file keywords	LT	1	Teaching file keywords for the examination
(0009,xx0B)	Examination comments	LT	1	Comments for the examination
(0009,xx0C)	Teaching file user ID	LO	1	Internal ID of the user setting teaching file keywords
(0021,00yy)	Private creator code	LO	1	Value: SECTRA_ImageRel_01
(0021,yy01)	Import order	IS	1	Image import order
(0029,00zz)	Private creator code	LO	1	Value: SECTRA_ImageInfo_01
(0029,zz01)	Image info	OB	1	Image settings made on an IDS workstation
(0029,zz02)	Marking	CS	1	Marking. Possible value: KEY.
(0029,zz03)	No decompression	LO	1	Indicates no decompression
(0029,zz04)	Image info new	OB	1	Image settings, new version
(0029,zz05)	Original pixel padding value	US or SS	1	Original pixel padding value if changed by import
(0041,00qq)	Private creator code	LO	1	Value: SECTRA_EncapsulatedDicom_01
(0041,qq01)	Encapsulated DICOM file	OB	1	The encapsulated DICOM file
(0041,qq02)	Encapsulating DICOM SOP Instance UID	UI	1	SOP Instance UID of the encapsulating DICOM file
(0089,00uu)	Private creator code	LO	1	Value: SECTRA_IconImageSequence_01
(0089,uu01)	Private icon image sequence	SQ	1	Private icon image data for certain images
(6001,00ww)	Private creator code	LO	1	Value: SECTRA_OverlayInfo_01
(6001,w01)	Sectra overlay	LO	1	Indicates which overlay that is the Sectra Overlay

Tag	Name	VR	VM	Description
(7FDF,00ww)	Private creator code	LO	1	Value: SECTRA_PixelData_O1
(7FDF,ww01)	Scanned document image	OB	1	Pixel data for scanned documents
(7FDF,ww02)	Private icon image pixel data	OB	1	Pixel data for private icon images
(7FDF,ww03)	Original images pixel data	OB	1	Pixel data for the original wrapped image

## 8.3 Coded Terminology and Templates

The value for Code Meaning will be displayed for all code sequences. No local lexicon is provided to look up alternative code meanings.

## 8.4 Grayscale Image Consistency

IDS7 and UniView do not support the DICOM Grayscale Standard Display Function. However the display monitors connected to the computer that are running these products can itself support calibration towards the DICOM Grayscale Standard Display Function.

## 8.5 Standard Extended/Specialized/Private SOP Classes

Sectra PACS and Sectra VNA supports the private SOP Classes specified in [Table 1.3, “List of supported Storage SOP classes and their viewing capabilities in IDS7 and UniView.”](#)

### 8.5.1 Standard extended SOP Classes

#### 8.5.1.1 Basic Study Content Notification SOP Class

If configured so, the Notif SCU AE of WISE can send an extended version of the Basic Study Content Notification SOP Class, where the Basic Study Descriptor IOD is enhanced with the following attributes:

Attribute Name	Tag	Type	Attribute Description
Study Date	(0008,0020)	3	Date the study started
Study Time	(0008,0030)	3	Time the study started
Accession Number	(0008,0050)	3	A RIS generated number that identifies the order for the study
Patient's Birth Date	(0010,0030)	3	Birth date of the patient
Patient's Sex	(0010,0040)	3	Sex of the named patient



Attribute Name	Tag	Type	Attribute Description
Study Comments	(0032,4000)	3	User defined comments about the study. Used values (these are configurable):  ADD (indicating that the study has been added to the PACS)  DELETE (indicating that the last on-line copy of the examination had been deleted)

### 8.5.1.2 Overlay Plane and Multi-frame Overlay modules

If configured so, the Storage SCU AE will include annotations etc. done in the system as overlays in images. This applies both to Q/R C-MOVE requests done towards WISE and to images exported as a consequence of a user request on IDS7.

When such annotations are included in the images, it is done regardless of the IOD. This means that IOD:s that in the DICOM standard do not contain Overlay Plane and/or Multi-frame Overlay modules will do so, and hence being a standard extended SOP Class when exported. E.g. annotations are made with the IDS7 on a US-MF image (which do not contain the Multi-frame Overlay module in DICOM), can be exported in the Multi-frame Overlay module.

## 8.6 Private Transfer Syntaxes

The Sectra Compression and Sectra Compression LS transfer syntaxes can be used between different components. The UIDs of the transfer syntaxes are 1.2.752.24.3.7.6 and 1.2.752.24.3.7.7.

## 8.7 Presentation State Display

### 8.7.1 IDS7

IDS7 has the ability to show graphical objects, spatial transformations, display shutters and LUT information with limitations described in the rest of this section.

**Note:** Presentation states are not applied on images of the VL Whole Slide Microscopy Image SOP Class.

#### 8.7.1.1 Presentation State Module (C.11.10)

IDS7 displays annotations from all available presentation states and can only toggle this display on and off all together. The other settings are applied using one selected presentation state at a time.

Presentation Label	(0070,0080)	Presented to user to aid in selection
Referenced Series Sequence	(0008,1115)	Used to link PR with image
>Referenced Image Sequence	(0008,1140)	Used to link PR with image
>>Referenced Frame Number	(0008,1160)	Used to link PR with image

**8.7.1.2 Mask Module (C.7.6.10)**

Not supported in IDS7.

**8.7.1.3 Display Shutter Module (C.7.6.11), Bitmap Display Shutter (C.7.6.15)**

Bitmap shutters are not supported by IDS7.

Shutter Shape	(0018,1600)	RECTANGULAR, CIRCULAR, and POLYGONAL shapes are supported by IDS7.
Shutter Left Vertical Edge	(0018,1602)	Used to define RECTANGULAR shutter shape.
Shutter Right Vertical Edge	(0018,1604)	Used to define RECTANGULAR shutter shape.
Shutter Upper Horizontal Edge	(0018,1606)	Used to define RECTANGULAR shutter shape.
Shutter Lower Horizontal Edge	(0018,1608)	Used to define RECTANGULAR shutter shape.
Center of Circular Shutter	(0018,1610)	Used to define CIRCULAR shutter shape.
Radius of Circular Shutter	(0018,1612)	Used to define CIRCULAR shutter shape.
Vertices of the Polygonal Shutter	(0018,1620)	Used to define POLYGONAL shutter shape.
Shutter Presentation Value	(0018,1622)	Supported by IDS7.
Shutter Presentation Color CIE Lab Value	(0018,1624)	Not supported by IDS7.

**8.7.1.4 Overlay Plane (C.9.2)**

Only bitmap overlays (no curves) are supported.

Overlay Rows	(60xx,0010)	Defines overlay size
Overlay Columns	(60xx,0011)	
Overlay Type	(60xx,0040)	Graphics "G" and ROI "R" overlays are supported
Overlay Origin	(60xx,0050)	
Overlay Bits Allocated	(60xx,0100)	
Overlay Bit Position	(60xx,0102)	
Overlay data	(60xx,3000)	

**8.7.1.5 Overlay/Curve Activation (C.11.7)**

Not supported; overlay display is controlled by user (normally "on").

Overlay Activation Layer	60xx,1001	In IDS7 a warning is displayed if present
--------------------------	-----------	---

### 8.7.1.6 Displayed Area (C.10.4)

In IDS7, this module is used for calculation of coordinates, referencing to a displayed area. Otherwise the module is ignored.

Displayed Area Selection Sequence	(0070,005A)	Used to select displayed area item
>Referenced Image Sequence	(0008,1140)	
>>Referenced SOP Instance Sequence	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	
>Presentation Pixel Spacing	(0070,0101)	
>Presentation Pixel Aspect Ratio	(0070,0102)	
>Displayed Area Top Left Hand Corner	(0070,0052)	
>Displayed Area Bottom Right Hand Corner	(0070,0053)	
>Presentation Size Mode	(0070,0100)	
>Presentation Pixel Magnification Ratio	(0070,0103)	

### 8.7.1.7 Graphic Annotation (C.10.5)

Graphic Type INTERPOLATED and Shadow Style OUTLINED is not supported.

Graphic Annotation Sequence	(0070,0001)	
>Referenced Image Sequence	(0008,1140)	
>>Referenced SOP Instance UID	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	
>Graphic Layer	(0070,0002)	
>Text Object Sequence	(0070,0008)	
>>Bounding Box Annotation Units	(0070,0003)	
>>Anchor Point Annotation Units	(0070,0004)	
>>Unformatted Text Value	(0070,0006)	
>>Bounding Box Top Left Hand Corner	(0070,0010)	
>>Bounding Box Bottom Right Hand Corner	(0070,0011)	
>>Bounding Box Text Horizontal Justification	(0070,0012)	
>>Anchor Point	(0070,0014)	
>>Anchor Point Visibility	(0070,0015)	
>>Text Style Sequence	(0070,0231)	

>>>Text Color CIELab Value	(0070,0241)	
>>>Shadow Style	(0070,0244)	Shadow Style OUTLINED is not supported
>Graphic Object Sequence	(0070,0009)	
>>Graphic Annotation Units	(0070,0005)	
>>Number of Graphic Points	(0070,0021)	
>>Graphic Data	(0070,0022)	
>>Graphic Type	(0070,0023)	Graphic Type INTERPOLATED is not supported.
>>Graphic Filled	(0070,0024)	
>>Line Style Sequence	(0070,0232)	
>>>Shadow Style	(0070,0244)	Shadow Style OUTLINED is not supported
>>>Pattern On Color CIELab Value	(0070,0251)	
>>>Line Thickness	(0070,0253)	

#### 8.7.1.8 Spatial Transformation (C.10.6)

Image Rotation	(0070,0042)	
Image Horizontal Flip	(0070,0041)	

#### 8.7.1.9 Graphic Layer (C.10.7)

Graphic Layer Sequence	(0070,0060)	
>Graphic Layer Recommended Display CIELab Value	(0070,0401)	

#### 8.7.1.10 Modality LUT (C.11.1)

Modality LUT Sequence	(0028,3000)	
>LUT Descriptor	(0028,3002)	
>LUT Data	(0028,3006)	
Modality LUT Rescale Intercept	(0028,1052)	
Modality LUT Rescale Slope	(0028,1053)	

#### 8.7.1.11 Softcopy VOI LUT (C.11.8)

Softcopy VOI LUT Sequence	(0028,3110)	
>Referenced Image Sequence	(0008,1140)	
>>Referenced SOP Instance UID	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	
>VOI LUT Sequence	(0028,3010)	

>>LUT Descriptor	(0028,3002)	
>>LUT Data	(0028,3006)	
>Window Center	(0028,1050)	
>Window Width	(0028,1051)	
>VOI LUT Function	(0028,1056)	

### 8.7.1.12 Softcopy Presentation LUT (C.11.6)

Presentation LUT Sequence	(2050,0010)	
>LUT Descriptor	(0028,3002)	
>LUT Data	(0028,3006)	
Presentation LUT Shape	(2050,0020)	

## 8.7.2 UniView

UniView has the ability to show graphical objects, spatial transformations and LUT information with limitations described in the rest of this section.

**Note:** Presentation states are not applied on images of the VL Whole Slide Microscopy Image SOP Class.

**Note:** The Sectra Echo Viewer component in UniView does not apply presentation states to the images.

### 8.7.2.1 Presentation State Module (C.11.10)

UniView displays annotations from all available presentation states. The other settings are applied using the default presentation state.

Presentation Label	(0070,0080)	Not displayed in UniView
Referenced Series Sequence	(0008,1115)	Used to link PR with image
>Referenced Image Sequence	(0008,1140)	Used to link PR with image
>>Referenced Frame Number	(0008,1160)	Used to link PR with image

### 8.7.2.2 Mask Module (C.7.6.10)

Not supported in UniView.

### 8.7.2.3 Display Shutter Module (C.7.6.11), Bitmap Display Shutter (C.7.6.15)

Display shutters and Bitmap shutters are not supported by UniView.

### 8.7.2.4 Overlay Plane (C.9.2)

Only bitmap overlays (no curves) are supported.

Overlay Rows	(60xx,0010)	Defines overlay size
Overlay Columns	(60xx,0011)	

Overlay Type	(60xx,0040)	Graphics "G" and ROI "R" overlays are supported
Overlay Origin	(60xx,0050)	
Overlay Bits Allocated	(60xx,0100)	
Overlay Bit Position	(60xx,0102)	
Overlay data	(60xx,3000)	

### 8.7.2.5 Overlay/Curve Activation (C.11.7)

Not supported in UniView.

### 8.7.2.6 Displayed Area (C.10.4)

In UniView, this module is used for calculation of coordinates, referencing to a displayed area. Otherwise the module is ignored.

Displayed Area Selection Sequence	(0070,005A)	Used to select displayed area item
>Referenced Image Sequence	(0008,1140)	
>>Referenced SOP Instance Sequence	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	
>Presentation Pixel Spacing	(0070,0101)	
>Presentation Pixel Aspect Ratio	(0070,0102)	
>Displayed Area Top Left Hand Corner	(0070,0052)	
>Displayed Area Bottom Right Hand Corner	(0070,0053)	
>Presentation Size Mode	(0070,0100)	
>Presentation Pixel Magnification Ratio	(0070,0103)	

### 8.7.2.7 Graphic Annotation (C.10.5)

Filled graphics are not supported. Graphic type INTERPOLATED and filled graphics are not supported.

Graphic Annotation Sequence	(0070,0001)	
>Referenced Image Sequence	(0008,1140)	
>>Referenced SOP Instance UID	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	
>Graphic Layer	(0070,0002)	Graphic Layer is not supported.
>Text Object Sequence	(0070,0008)	
>>Bounding Box Annotation Units	(0070,0003)	
>>Anchor Point Annotation Units	(0070,0004)	
>>Unformatted Text Value	(0070,0006)	
>>Bounding Box Top Left Hand Corner	(0070,0010)	

>>Bounding Box Bottom Right Hand Corner	(0070,0011)	
>>Bounding Box Text Horizontal Justification	(0070,0012)	
>>Anchor Point	(0070,0014)	
>>Anchor Point Visibility	(0070,0015)	
>Graphic Object Sequence	(0070,0009)	
>>Graphic Annotation Units	(0070,0005)	
>>Number of Graphic Points	(0070,0021)	
>>Graphic Data	(0070,0022)	
>>Graphic Type	(0070,0023)	Type INTERPOLATED is not supported.
>>Graphic Filled	(0070,0024)	Value "Y" (filled graphics) not supported

### 8.7.2.8 Spatial Transformation (C.10.6)

Image Rotation	(0070,0042)	
Image Horizontal Flip	(0070,0041)	

### 8.7.2.9 Graphic Layer (C.10.7)

Not supported; overlays from all layers are displayed in the same manner.

### 8.7.2.10 Modality LUT (C.11.1)

Modality LUT Sequence	(0028,3000)	
>LUT Descriptor	(0028,3002)	
>LUT Data	(0028,3006)	
Modality LUT Rescale Intercept	(0028,1052)	
Modality LUT Rescale Slope	(0028,1053)	

### 8.7.2.11 Softcopy VOI LUT (C.11.8)

Softcopy VOI LUT Sequence	(0028,3110)	
>Referenced Image Sequence	(0008,1140)	
>>Referenced SOP Instance UID	(0008,1155)	
>>Referenced Frame Number	(0008,1160)	
>VOI LUT Sequence	(0028,3010)	
>>LUT Descriptor	(0028,3002)	
>>LUT Data	(0028,3006)	
>Window Center	(0028,1050)	

>Window Width	(0028,1051)	
>VOI LUT Function	(0028,1056)	

#### 8.7.2.12 Softcopy Presentation LUT (C.11.6)

Presentation LUT Sequence	(2050,0010)	
>LUT Descriptor	(0028,3002)	
>LUT Data	(0028,3006)	
Presentation LUT Shape	(2050,0020)	



## **Compliance to Regulations and Standards**

The Management System of Sectra AB [Sectra] conforms to ISO 9001, ISO 13485, ISO 27001, ISO 27017 and ISO 27018. All Sectra medical devices have obtained regulatory clearance for those markets where Sectra sells and deploys its devices, e.g. EEA, USA, Canada, Australia. For further regulatory information, please contact Sectra.

## **Disclaimer**

Sectra AB is not responsible for problems caused by changes in the operating characteristics of the computer hardware or operating system, which are made after the delivery of the software, or for problems that occur as a result of the use of Sectra software in conjunction with non-Sectra software other than the software explicitly covered in this documentation. For a complete description of warranty, refer to the End User License Agreement supplied with the Sectra product.

## Trademarks and Patents

Sectra, Sectra Imtec and the Sectra logotype, are registered trademarks of Sectra AB. FIMAG and Image Exchange Portal are registered trademarks of Burnbank Systems Ltd in the UK. IDS7, Sectra BizTrack, Sectra CloudFlex, Sectra DoseTrack, Sectra IEP, Sectra Image Central, Sectra Image Lab, Sectra LiteView, Sectra UniView, Sectra One Connect, Sectra Open Archive, Sectra VNA, Sectra UserInfluence, Sectra Upload & Store App and WISE are trademarks of Sectra Imaging IT Solutions AB. Sectra Preop Online and Sectra OneScreen are trademarks of Sectra AB.

*Windows* is a registered trademark of Microsoft Corporation in the United States and other countries. *iOS*, *IpadOS*, *Mac*, *Safari*, *iPhone*, and *iPad* are registered trademarks of Apple Inc. in the United States and other countries. *Android* is a trademark of Google LLC.

All other names/products by © or ™ are registered trademarks of the respective manufacturer.

The intellectual property of Sectra includes a number of patents, for full information refer to: <https://sectra.com/medical/about-sectra/patents/>

## Copyright and Legal

© Sectra AB, Sweden, 2022

All rights are reserved. Reproduction or transmission in whole or part, in any form or by any means, electronic, mechanical or otherwise, is prohibited without written consent of the copyright owner.

Copyrights and all other proprietary rights in any software and related documentation ("Software") made available to you rest exclusively with Sectra AB. No title or ownership in the Software is conferred to you. Use of the Software is subject to the end user license conditions as are available on request.

To the maximum extent permitted by law, you shall not decompile and/or reverse engineer the software or any part thereof.

**Sectra AB**  
Teknikringen 20  
SE-58330 Linköping  
Sweden  
Phone: +46 13 23 52 00  
E-mail: [info.medical@sectra.com](mailto:info.medical@sectra.com)

# SECTRA

*Knowledge and passion*

For other regions please visit [www.sectra.com/medical/](http://www.sectra.com/medical/)