DICOM

Conformance Statement

BV Family R2.2 with integrated VF Surgical Workstation R6.1 or 3D-RX Surgical Workstation

MAY 2007

PHILIPS

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1. DICOM CONFORMANCE STATEMENT OVERVIEW

The BV Family R2.2 with integrated VF Surgical Workstation R6.1 or 3D-RX Surgical Workstation, later referred to as BV Family, is a mobile surgical X-ray image generating system.
Members of the BV Family product line are: BV Endura and BV Pulsera.

The BV Family implements a worklist management function to communicate with a RIS/HIS, an export function to transfer image data from the local system to a remote system, and an allocated function to print image data from the local system.
The BV Family can be configured with one of the following workstation options.

- The integrated VF surgical workstation offers an additional viewing function for images from the local system, images retrieved from remote systems, and images read from DVD or CD. Viewed images can be written to DVD or CD.
- The integrated 3D-RX surgical workstation offers an additional viewing function for images from the local system. Viewed images can be exported. Note that this workstation is only applicable for the BV Pulsera.

Thus the BV Family provides the following DICOM data exchange features:

- Print images from the local database on a DICOM printer (Standard DICOM package).
- Export images from the local database to a remote database (Standard DICOM package).
- Automatically send a storage commitment request (Advanced DICOM package).
- Query an information system for a modality worklist (Advanced DICOM package).
- Send Modality Performed Procedure Step details to an information system (Advanced DICOM package).
- Query and retrieve images from a remote database (VF Surgical Workstation).
- Read and Write DICOM media (VF Surgical Workstation).
- Export CX Images and Secondary Captures (3D-RX Surgical Workstation).

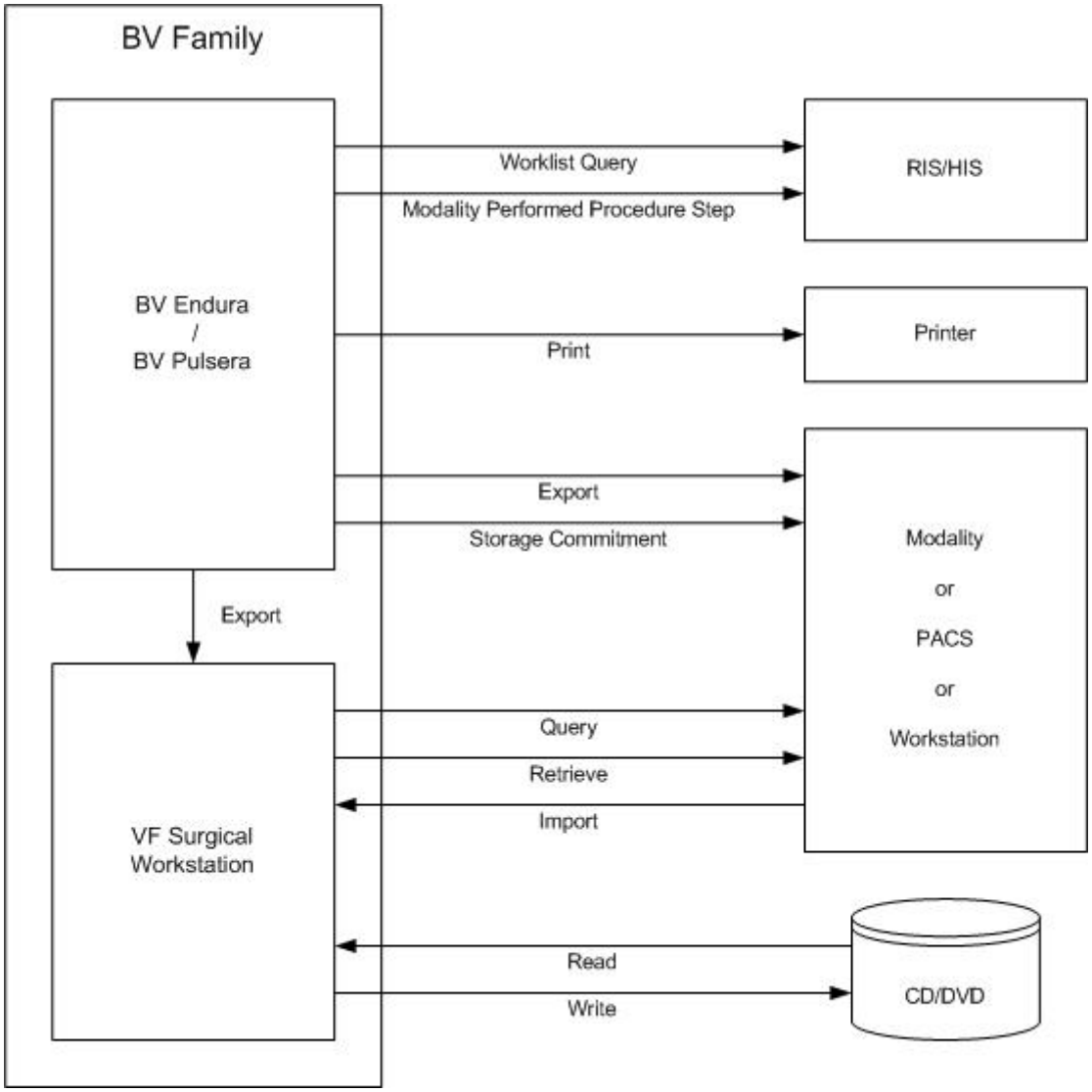

Figure 1: System Overview of the BV Family with integrated VF Surgical Workstation

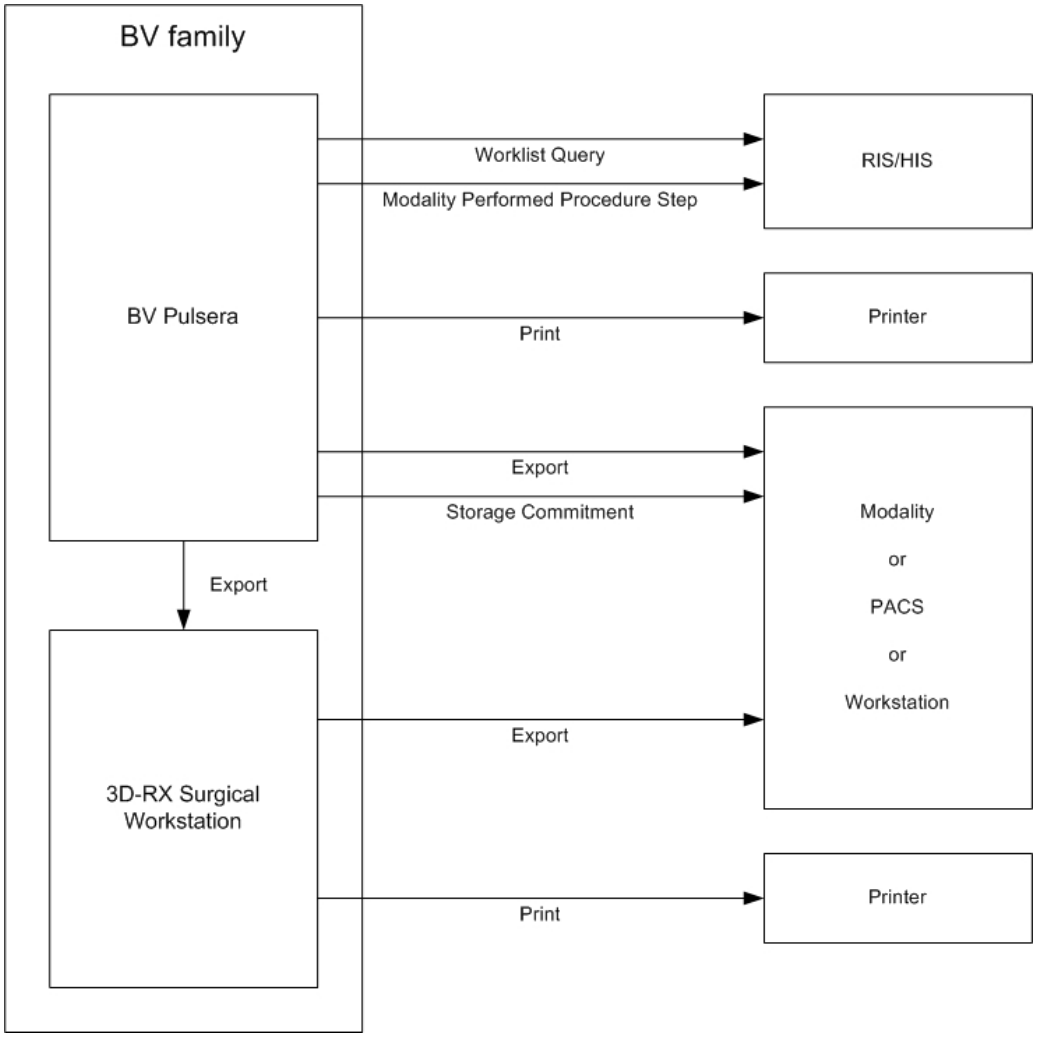

Figure 2: System Overview of the BV Pulsera with integrated 3D-RX Surgical Workstation

Table 1 provides an overview of all network services as provided by the BV Family.

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Option
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Option
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Option
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Option
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Option
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Option
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Option

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Option
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Option
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Option
X-Ray Specialization	1.3.46.670589.2.3.1.1	No	Option
Stack of X-Ray	1.3.46.670589.2.4.1.1	Option	Option
Volume	1.3.46.670589.5.0.1.1	No	Option
3D Volume Object	1.3.46.670589.5.0.2.1	No	Option
Surface	1.3.46.670589.5.0.3.1	No	Option
Cardio	1.3.46.670589.5.0.8.1	No	Option
CT Synthetic Image	1.3.46.670589.5.0.9	No	Option
MR Synthetic Image	1.3.46.670589.5.0.10	No	Option
MR Cardio Analysis	1.3.46.670589.5.0.11.1	No	Option
CX Synthetic Image	1.3.46.670589.5.0.12	No	Option
Perfusion	1.3.46.670589.5.0.13	No	Option
Perfusion Analysis	1.3.46.670589.5.0.14	No	Option
Query/Retrieve			
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Option	No
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Option	No
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Option	No
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Option	No
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Option	No
Patient/Study Only Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Option	No
Workflow Management			
Storage Commitment Push Model	1.2.840.10008.1.20.1	Option	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Option	No
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Option	No
Print Management			
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	Yes	No
> Basic Film Session	1.2.840.10008.5.1.1.1	Yes	No
> Basic Film Box	1.2.840.10008.5.1.1.2	Yes	No
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Yes	No
> Printer	1.2.840.10008.5.1.1.16	Yes	No

The Transfer SCU (X-Ray Angiographic and Secondary Capture Image Storage) and Print Management SCU services are part of the Standard DICOM package. (Note that this package is optional though required for DICOM functionality.)

The optional Workflow Management SCU services are part of the Advanced DICOM package.

The optional integrated VF Surgical Workstation includes Transfer SCP and Query/Retrieve SCU services.

The optional integrated 3D-RX Surgical Workstation includes dedicated Transfer SCU (CX and Secondary Capture Image Storage) and Print Management SCU services.

Table 2 provides an overview of all media services as provided by the BV Family.

Table 2: Media Services

Media Storage Application Profile	Write Files		Read Files
	(FSC)	(FSU)	(FSR)
DVD Disk			
General Purpose DVD Interchange with JPEG	Yes	No	Yes
CD – R Disk			
General Purpose CD-R	Yes	Yes	Yes

Note: After data is written to DVD, the DVD is finalized; the finalized DVD can now be read on mostly every DVD reader.
Currently the BV Family supports the
FSC service for CD-R(W) and DVD + R(W) media; and the
FSR service accepts for DVD both DVD + R(W) and DVD – R(W) media and CD-R(W).
Not supported are the Media DVD –R / -RW.

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3. INTRODUCTION

3.1. Revision History

Table 3: Revision History

Document Version	Date of Issue	Author	Description
1.0	06 February 2007	PMS CTO IC2	Preliminary DICOM Conformance Statement for the BV Family R2.2 with integrated VF Surgical Workstation R6.1 or 3D-RX Surgical Workstation.
2.0	01 May 2007	PMS CTO IC2	Approved DICOM Conformance Statement for the BV Family R2.2 with integrated VF Surgical Workstation R6.1 or 3D-RX Surgical Workstation.

3.2. Audience

This Conformance Statement is intended for:

- (potential) customers
- system integrators of medical equipment
- marketing staff interested in system functionality
- software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 10 and follows the contents and structuring requirements of [DICOM] PS 3.2.

This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance,

accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.
  The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

3.4. Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see [DICOM] PS 3.3 and PS 3.4.
The word Philips in this document refers to Philips Medical Systems.

The following acronyms and abbreviations are used in this document.

3D-RX	3 Dimensional Rotational X-ray
ACC	American College of Cardiology
ACR	American College of Radiology
AE	Application Entity
AET	Application Entity Title
ANSI	American National Standard Institute
AP	Application Profile
BV Family	BV Family R2.2 with integrated VF Surgical Workstation R6.1 or 3D-RX Surgical Workstation
C&S	Components & Services
CR	Computed Radiography
CRL	Certificate Revocation List
CT	Computed Tomography
CTO	Chief Technology Office
CX	Computed X-ray (reconstructed X-ray)
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DIMSE-Composite
DIMSE-N	DIMSE-Normalized
DVD	Digital Versatile Disc
DX	Digital X-Ray
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FIFO	First In - First Out
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
HIS	Hospital Information System
IC2	Interoperability Competence Center
IEEE	Institute of Electrical and Electronic Engineers
IHE	Integrating the Healthcare Enterprise
ILE	DICOM Implicit VR Little Endian

IOD	Information Object Definition
ISO	International Organization for Standardization
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
RF	X-Ray Radiofluoroscopic
RIS	Radiology Information System
RWA	Real-World Activity
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
SWS	Surgery Workstation
TCP/IP	Transmission Control Protocol/Internet Protocol
TLS	Transport Layer Security
UID	Unique Identifier
US	Ultrasound
USMF	Ultrasound Multi-frame
VF	ViewForum
VR	Value Representation
WLM	Worklist Management
XA	X-Ray Angiographic

3.5. References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), Part 1 – 18,
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Virginia. 22209, United States of America

[IHE] Integrating the Healthcare Enterprise
Technical Framework Revision 5.4
Radiological Society of North America (RSNA), Inc.
820 Jorie Boulevard, Oak Brook, IL, United States of America

[SYSLOG] Syslog Protocol
RFC 3164: The BSD Syslog Protocol

[TLS] Transport Layer Security protocol
RFC 2246: Transport Layer Security protocol (TLS) v1.0

[VFRB] Release Bulletin ViewForum R 6.1, PMSN

4. NETWORKING

4.1. Implementation model

4.1.1. Application Data Flow

For the BV Family three application entities may be distinguished: the BV Family AE, the VF Surgical Workstation AE, and the 3D-RX Surgical Workstation AE.

- The BV Family AE is responsible for all networking functionality concerning acquisitions by the BV Family. It consists of two packages (ref. Section 1): the (optional) Standard DICOM package, and the Advanced DICOM package as an optional extension to the Standard DICOM package. Using both packages the BV Family AE offers the following functionality.

  The operator can send a worklist query. (Get Worklist)

  The operator can select and perform an examination (may be scheduled per worklist), resulting in an MPPS record. Then the operator can export the acquisition images; the images in the examination may be exported as separate Secondary Capture images, as XA images, or as print job.
  If applicable, the BV Family AE automatically sends a Storage Commitment request for those images. (Export)

  In service mode the service operator can verify application level communication. (Check)

- The VF Surgical Workstation AE is intended to view images. Those images may be imported from the BV Family AE, or from a foreign storage SCU. (Query/Retrieve Image)

  The VF Surgical Workstation AE can also be used to store images on DICOM media. (Media Interchange)

- The 3D-RX Surgical Workstation AE is intended to perform 3D reconstructions on the XA images received from the BV Family AE. The resulting images may be exported as Secondary Capture images or private X-ray images.

The BV Family can work both on-line and off-line. Therefore MPPS data and acquired images that have to be transferred by the BV Family AE are put in a queue (so only for RWA (Export)
If the BV Family is connected to the network, then all queued jobs will be executed immediately.
If the BV Family is disconnected from the network, then Query/Retrieve and Worklist Queries are disabled. MPPS, storage, and print jobs will stay in the queue. When the system is connected to the network again, the user can resume the queued jobs. Then the jobs in the queue will be executed (FIFO).

The networking application data flow is shown in Figure 3 and Figure 4.

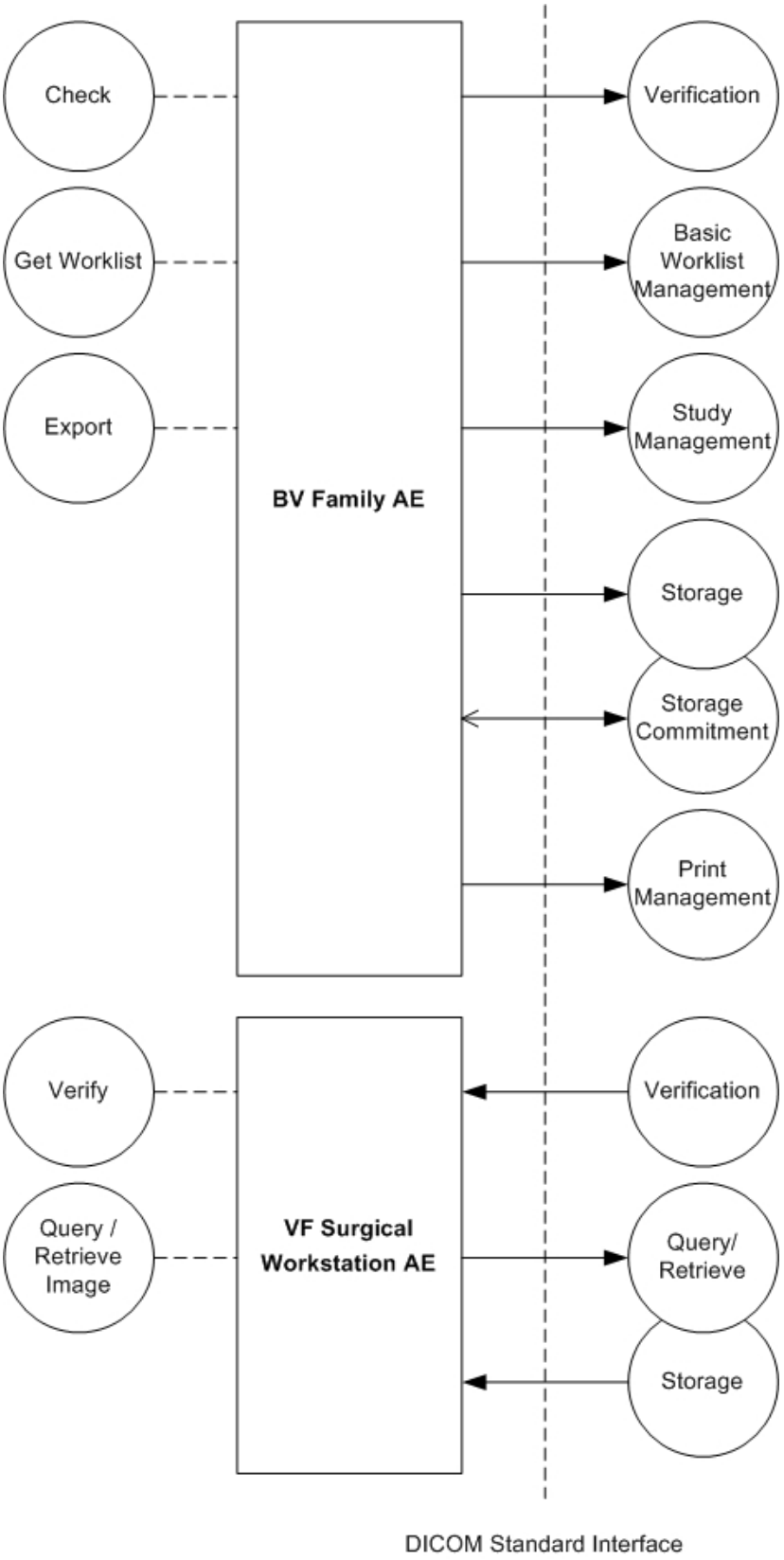

Figure 3: Application Data Flow Diagram
BV Family AE with integrated VF Surgical Workstation

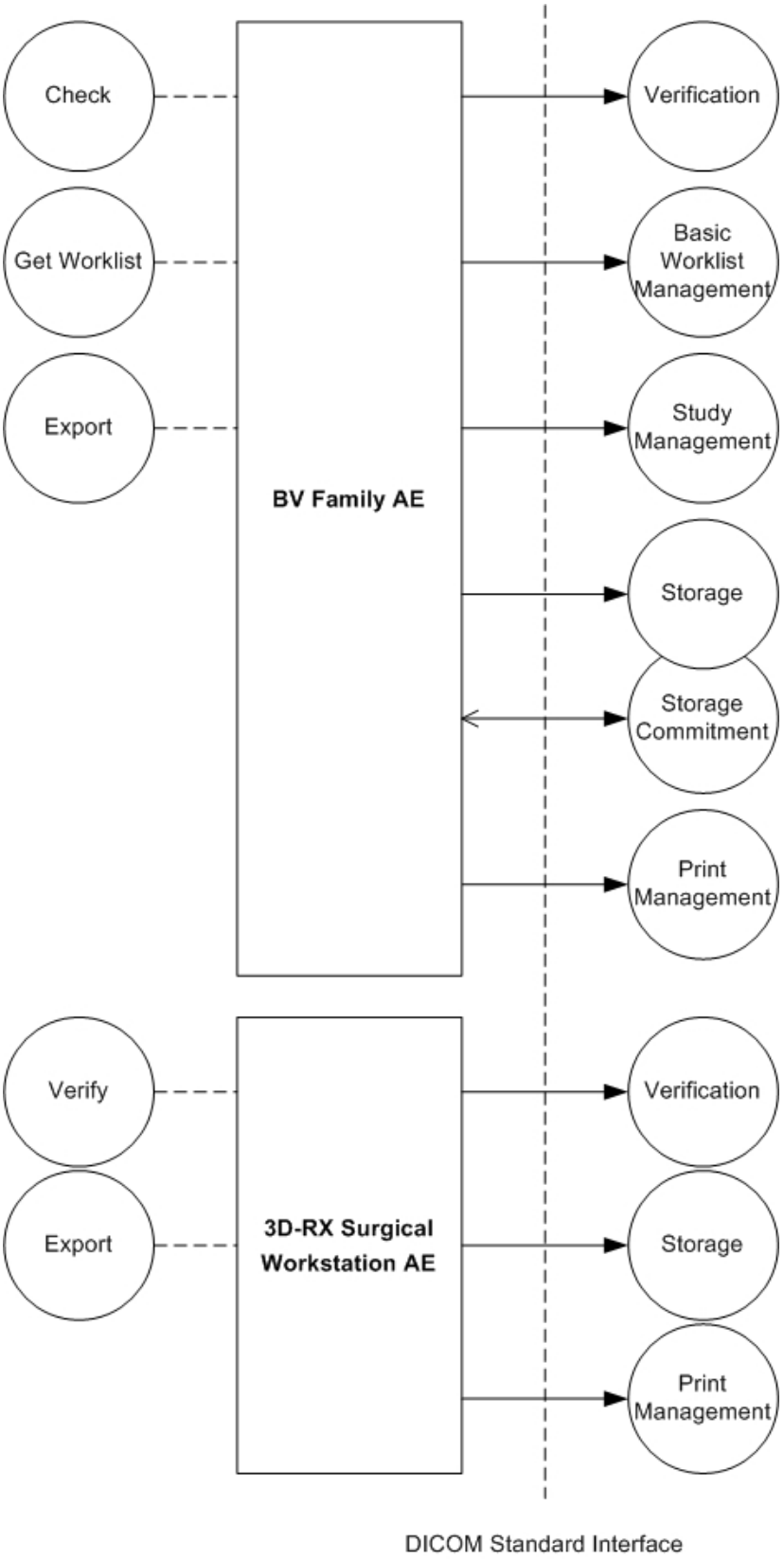

Figure 4: Application Data Flow Diagram
BV Family AE with integrated 3D-RX Surgical Workstation

4.1.2. Functional Definition of AE's

4.1.2.1. Functional Definition of the BV Family AE

The BV Family AE has no SCP implementation, and will act as SCU for Verification (Check), for Basic Worklist Management (Get Worklist), and for Study Management, Storage and Storage Commitment, and Print Management (Export). Initiated by the operator the BV Family AE will propose the required presentation contexts for an association with the peer SCP. For Storage Commitment the BV Family AE may accept associations for asynchronous event reports (Export).

4.1.2.2. Functional Definition of the VF Surgical Workstation AE

The VF Surgical Workstation AE can retrieve and view images from a foreign storage SCU (Query/Retrieve Image). The operator initiates a query request and selects examinations from the query response. The operator initiates a retrieve request for the selected images. The VF Surgical Workstation AE as storage SCP waits for an association to import the requested images (Query/Retrieve Image).

4.1.2.3. Functional Definition of the 3D-RX Surgical Workstation AE

The 3D-RX Surgical Workstation AE will act as SCU for Verification (Verify) and Storage (Export) to export images after 3D reconstruction, either as Secondary Capture or CX image.

4.1.3. Sequencing of Real World Activities

The following figures describe the sequencing constraints of some typical acquisitions per scheduled procedure step.

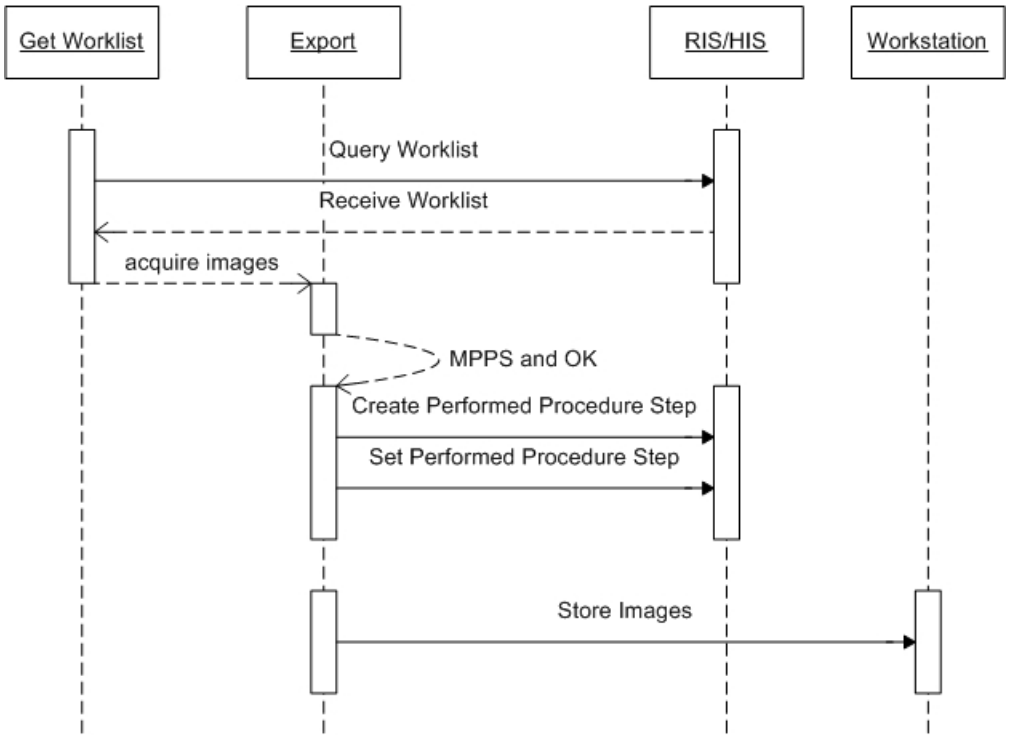

Figure 5: Typical Acquisition Workstation Storage Sequencing Constraint

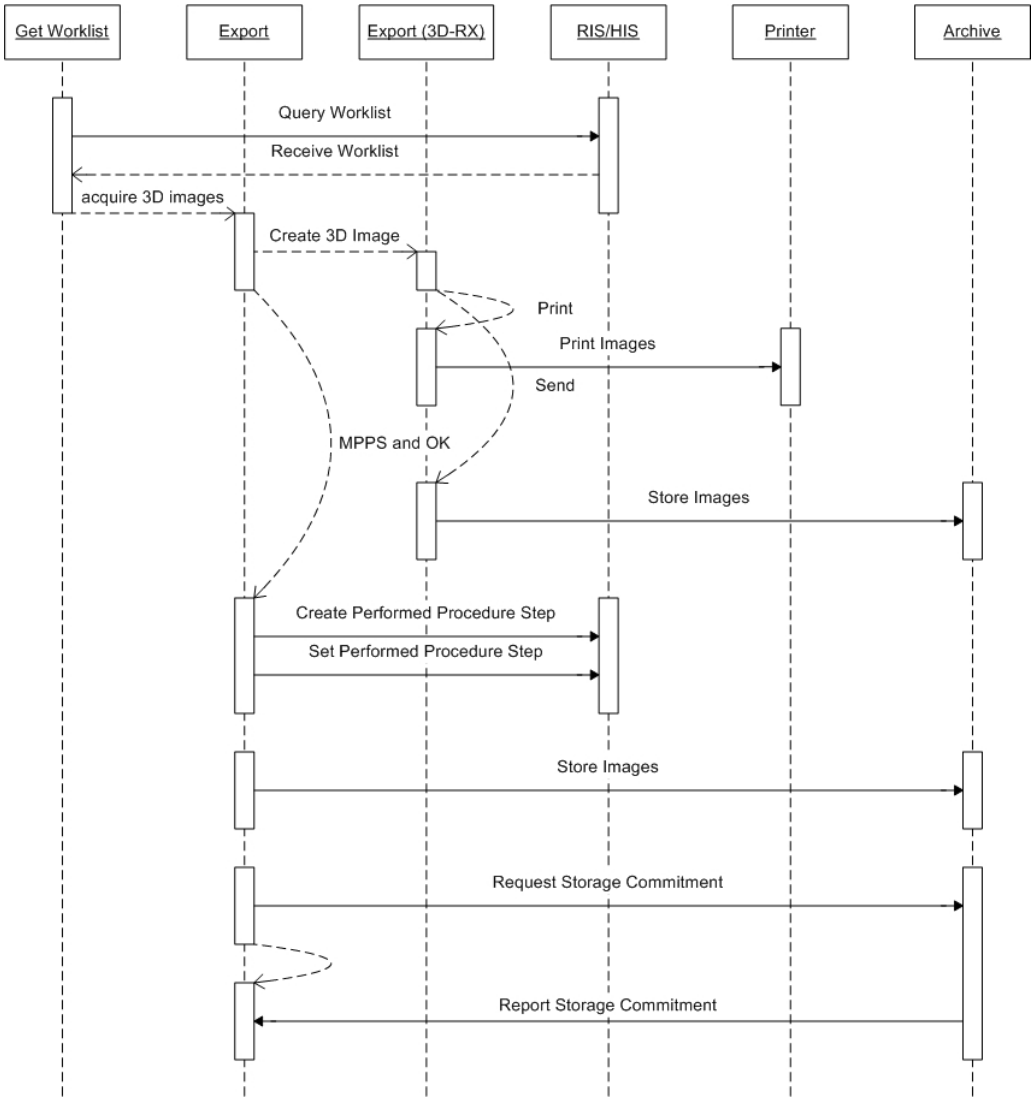

Figure 6: Typical 3D Acquisition Sequencing Constraint

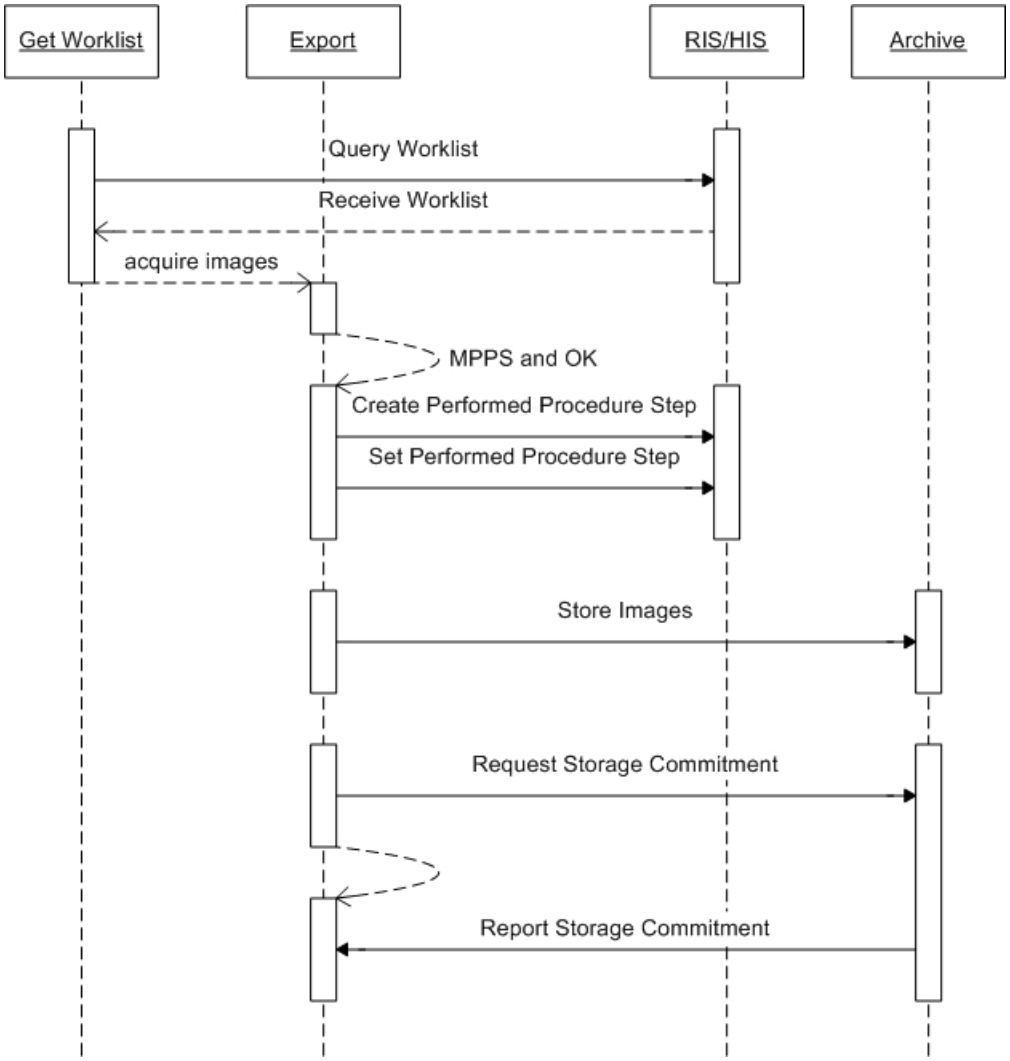

Figure 7: Typical Acquisition Archive Storage Sequencing Constraint

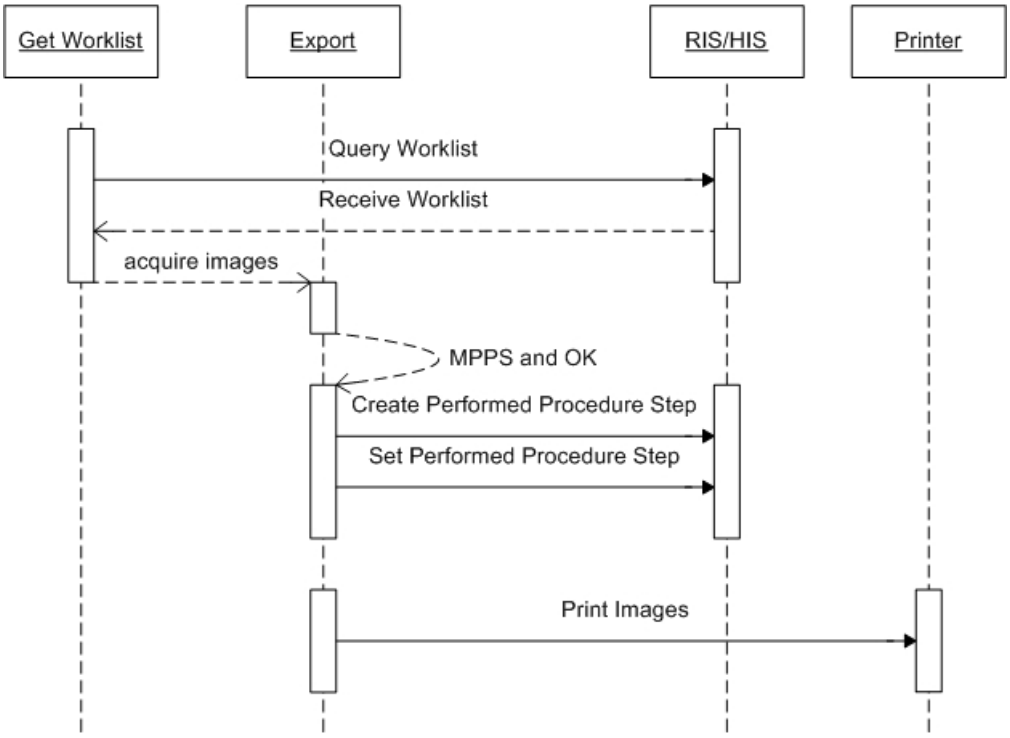

Figure 8: Typical Acquisition Print Sequencing Constraint

Note that an acquisition may also be started manually, i.e. without using a worklist.

The following figure describes the sequencing constraints of a typical Query/Retrieve action.

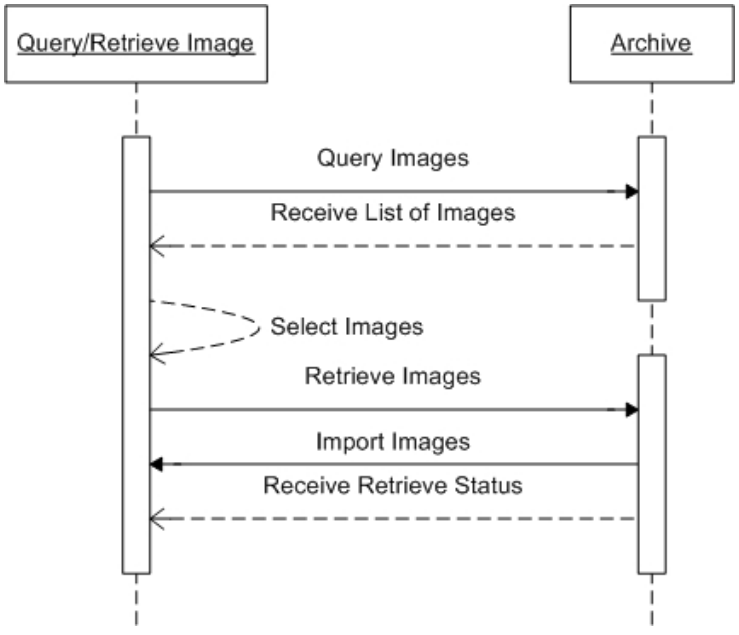

Figure 9: Typical Query/Retrieve Sequencing Constraint

Note that Import Images will be using a separate association.

4.2. AE Specifications

4.2.1. BV Family AE

4.2.1.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 4: SOP Classes for BV Family AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	Yes	No
> Basic Film Session	1.2.840.10008.5.1.1.1	Yes	No
> Basic Film Box	1.2.840.10008.5.1.1.2	Yes	No
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Yes	No
> Printer	1.2.840.10008.5.1.1.16	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Yes	No

4.2.1.2. Association Policies

4.2.1.2.1. General

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

Table 5: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

The BV Family AE may initiate and accept one association simultaneously.

Table 6: Number of Associations as an Association Initiator for BV Family AE

Maximum number of simultaneous associations	1

Table 7: Number of Associations as an Association Acceptor for BV Family AE

Maximum number of simultaneous associations	1

4.2.1.2.3. Asynchronous Nature

The BV Family AE only supports asynchronous operations for Storage Commitment report. It will not perform asynchronous window negotiation.

4.2.1.2.4. Implementation Identifying Information

For identification of the BV Family AE the following Implementation Class UID and Implementation Version Name are supplied.

Table 8: DICOM Implementation Class and Version for BV Family AE

Implementation Class UID	1.3.46.670589.8.15.2.2
Implementation Version Name	BV Family R2.2

4.2.1.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in Table 9.

Table 9: Communication Failure Behavior

Exception	Behavior
General	In the DFI the error is logged including a description of the problem. Those are the standard notifications when an association cannot be established.
Not connected	MC_NETWORK_SHUTDOWN is logged e.g. ARTIM Timeout

4.2.1.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

The behavior of the AE during DICOM communication failure is summarized in Table 10.

Table 10: DICOM Command Communication Failure Behavior

Exception	Behavior
Association setup failure	The association is aborted and the command marked as failed. The reason is logged and reported in the log file.
Network timeout behavior	See section 4.4.2 for corresponding configurable time to wait parameters.

4.2.1.3.1. Check

4.2.1.3.1.1. Description and Sequencing of Activities

In service mode the BV Family AE can send a verification request (C-ECHO) to verify application level communication. This verification is initiated on a separate service system by using the “Check” function of the BV Scope program.

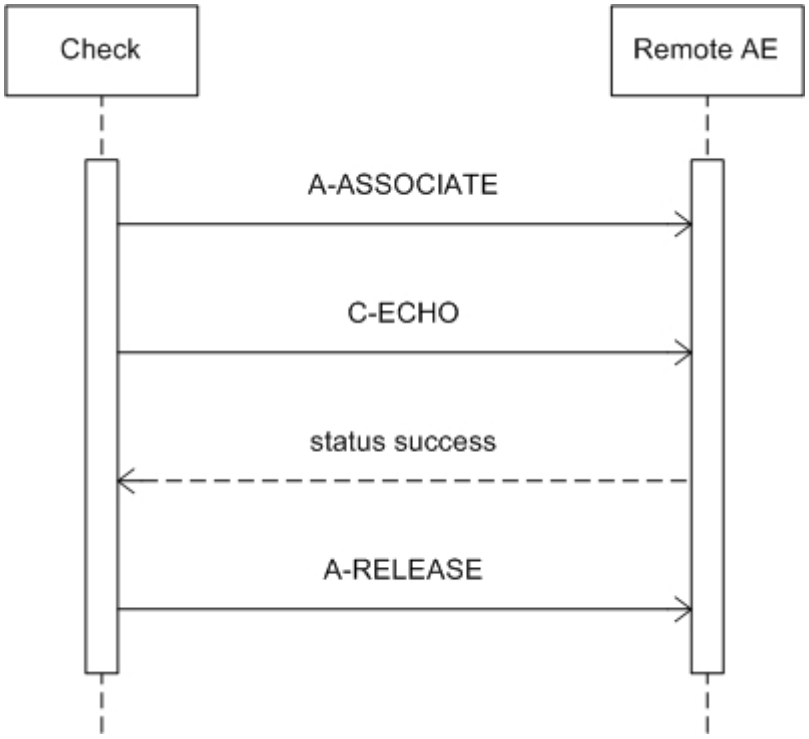

Figure 10: Sequencing of RWA Check

4.2.1.3.1.2. Proposed Presentation Contexts

For Check the BV Family AE will propose the following presentation contexts.

Table 11: Proposed Presentation Contexts for Check

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.1.3.1.3. SOP Specific Conformance for SOP Classes

4.2.1.3.1.3.1. Verification

The BV Family AE provides standard conformance to the Verification service class.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 12.

Table 12: C-ECHO Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The SCP has successfully returned a verification response.

4.2.1.3.2. Get Worklist

4.2.1.3.2.1. Description and Sequencing of Activities

The BV Family AE can send a modality worklist query (C-FIND) to update the BV Family worklist.

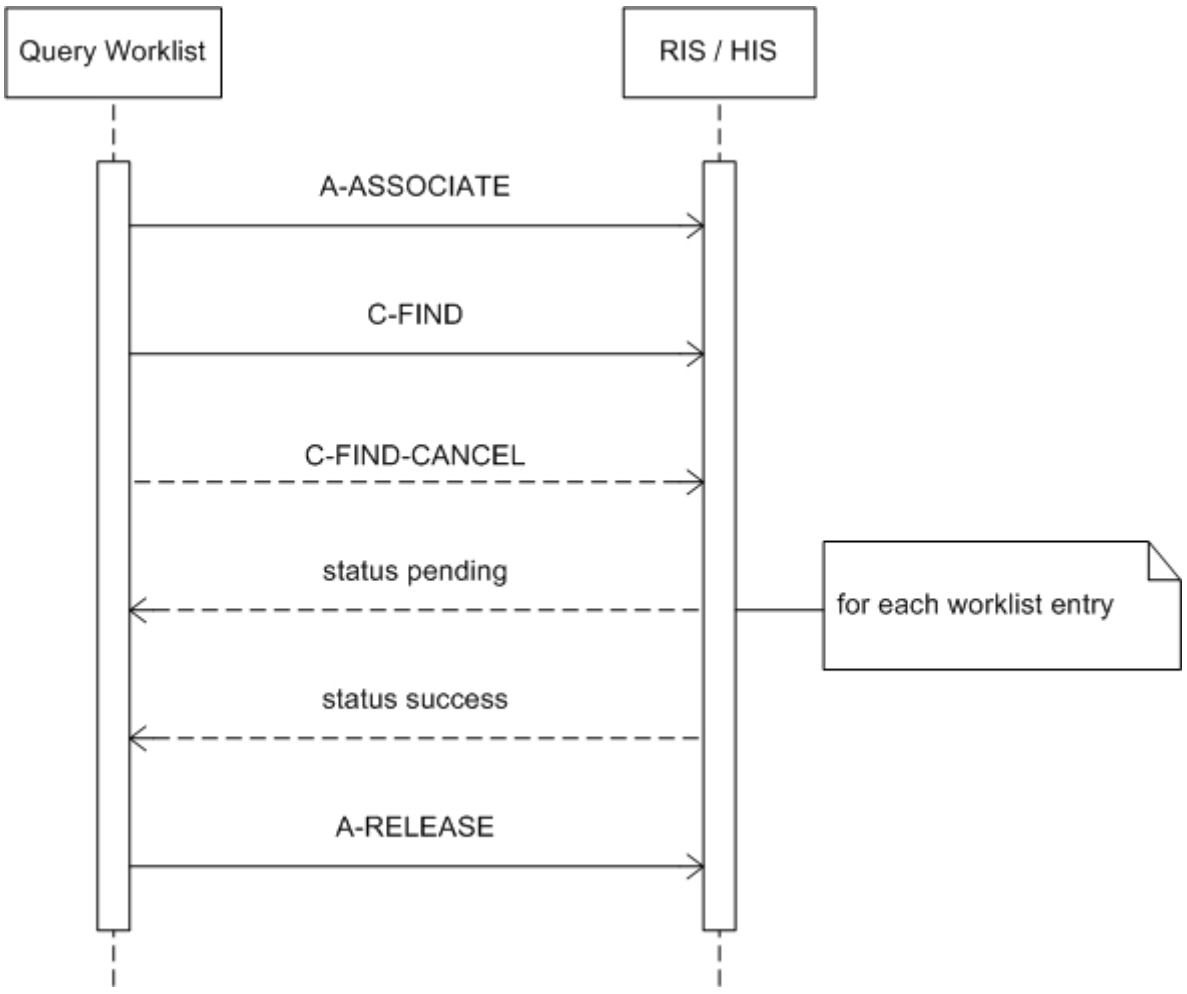

Figure 11: Sequencing of RWA Get Worklist

The worklist query is initiated by selecting “Get Worklist”. Then the BV Family AE opens an association and sends a modality worklist query. The BWLM SCP (RIS/HIS) returns the applicable worklist; a response with status Pending is received for each new entry, the final response has status Success. After the final response the BV Family AE releases the association.

The contents of the received worklist are compared with the contents of the previous worklist. In case there are any changes, the BV Family patient file is updated. A unique match of the following attributes identifies a worklist entry.

Table 13: Matching Criteria for Identifying Worklist Entries

Attribute	
Name	**Tag**
Scheduled Procedure Step ID	(0040,0009)
Accession Number	(0008,0050)
Requested Procedure ID	(0040,1001)

If none of these identification attributes is present then the received worklist entry is ignored.

4.2.1.3.2.2. Proposed Presentation Contexts

For Get Worklist the BV Family AE will propose the following presentation contexts.

Table 14: Proposed Presentation Contexts for Get Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.1.3.2.3. SOP Specific Conformance for SOP Classes

4.2.1.3.2.3.1. Modality Worklist Information Model – FIND

The BV Family AE provides standard conformance to the Modality Worklist SOP class.

The BV Family AE can contain a number of 100 worklist entries. If the sum of current and new worklist entries exceeds 100 then the BV Family AE will release the association immediately. The BV Family AE will show a message stating that the maximum number of examinations was reached.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 15.

Table 15: C-FIND Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final identifier is supplied	The association is released and the matches are stored.
Failure	A700	Refused – Out of resources	Processing of the matches and the association is terminated. A message appears in the GUI.
	A900	Failed – Identifier does not match SOP class	The association is terminated and the status is logged into the system error log. A message appears in the GUI.
	Cxxx	Failed – Unable to process	Processing of the matches and the association is terminated. A message appears in the GUI.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	Processing of the matches continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence for this identifier	Processing of the matches continues without any warnings or errors.

Table 16 provides a description of the BV Family AE worklist request identifier.

Table 16: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	DP	DW	IOD
Patient Identification Module								
Patient's Name	0010,0010	PN		X		X	X	X
Patient ID	0010,0020	LO		X		X	X	X
Other Patient IDs	0010,1000	LO		X				X
Other Patient Names	0010,1001	PN		X			X	X
Patient Demographic Module								
Patient's Birth Date	0010,0030	DA		X		X	X	X
Patient's Birth Time	0010,0032	TM		X				X
Patient's Sex	0010,0040	CS		X		X	X	X
Patient's Weight	0010,1030	DS		X			X	X
Patient Medical Module								
Medical Alerts	0010,2000	LO		X			X	
Contrast Allergies	0010,2110	LO		X			X	
Special Needs	0038,0050	LO		X			x	
Visit Relationship Module								
Referenced Patient Sequence	0008,1120	SQ		X				X
>Referenced SOP Class UID	0008,1150	UI		X				X
>Referenced SOP Instance UID	0008,1155	UI		X				X
Scheduled Procedure Step Module								
Scheduled Procedure Step Sequence	0040,0100	SQ		X				
>Modality	0008,0060	CS	S					X
>Scheduled Station AE Title	0040,0001	AE	S					
>Scheduled Procedure Step Start Date	0040,0002	DA	R				X	

Attribute Name	Tag	VR	M	R	Q	DP	DW	IOD
>Scheduled Procedure Step Start Time	0040,0003	TM		X			X	
>Scheduled Performing Physician's Name	0040,0006	PN		X		X		
>Scheduled Procedure Step Description	0040,0007	LO		X			X	X
>Scheduled Action Item Code Sequence	0040,0008	SQ		X				
>>Code Value	0008,0100	SH		X				
>>Coding Scheme Designator	0008,0102	SH		X				
>>Coding Scheme Version	0008,0103	LO		X				
>>Code Meaning	0008,0104	LO		X				
>Scheduled Procedure Step ID	0040,0009	SH		X				X
>Scheduled Station Name	0040,0010	SH	S				X	
>Scheduled Procedure Step Location	0040,0011	SH		X			X	
>Requested Contrast Agent	0032,1070	LO		X			X	
>Pre-Medication	0040,0012	LO		X			X	
Requested Procedure Module								
Study Instance UID	0020,000D	UI		X				X
Referenced Study Sequence	0008,1110	SQ		X				X
>Referenced SOP Class UID	0008,1150	UI		X				X
>Referenced SOP Instance UID	0008,1155	UI		X				X
Requested Procedure Description	0032,1060	LO		X			X	
Requested Procedure Code Sequence	0032,1064	SQ		X				
>Code Value	0008,0100	SH		X				
>Coding Scheme Designator	0008,0102	SH		X				
>Coding Scheme Version	0008,0103	LO		X				
>Code Meaning	0008,0104	LO		X				
Requested Procedure ID	0040,1001	SH		X			X	X
Imaging Service Request Module								
Accession Number	0008,0050	SH		X			X	X
Referring Physician's Name	0008,0090	PN		X			X	X

The above table should be read as follows:

Attribute Name	Attributes supported to build a Modality Worklist Request Identifier.
Tag:	DICOM tag for this attribute.
VR:	DICOM VR for this attribute.
M:	Matching Keys for (configurable, automatic) Worklist Update. R: Range Matching, S: Single Value Matching, U: Universal Matching W: Wildcard Matching (* and ?)
R:	Return Keys. An "X" will indicate that this attribute as Return Key with zero length for Universal Matching.
Q:	Interactive Query Key. An "X" will indicate that this attribute as matching key can be used.
DP:	Displayed keys on the Patient Administration screen. An "x" indicates that this worklist attribute is displayed to the user in the main patient administration panel. For example, Patient's Name will be displayed when registering the patient prior to an examination.
DW:	Displayed keys on the worklist information panel. An "x" indicates that this worklist attribute is displayed to the user in the Information from Worklist panel.
IOD:	An "X" indicates that this Worklist attribute is included into all object Instances created during performance of the related Procedure Step.

The default Query Configuration is set to Modality (OT) and Date (today +/- 1 day). Optionally, additional matching for the own AET and/or own Station Name is configurable.

4.2.1.3.3. Export

4.2.1.3.3.1. Description and Sequencing of Activities

After an acquisition the BV Family AE sends related MPPS data to a Study Management SCP (RIS/HIS). Then the acquired image is stored or printed according the settings as specified by the operator.

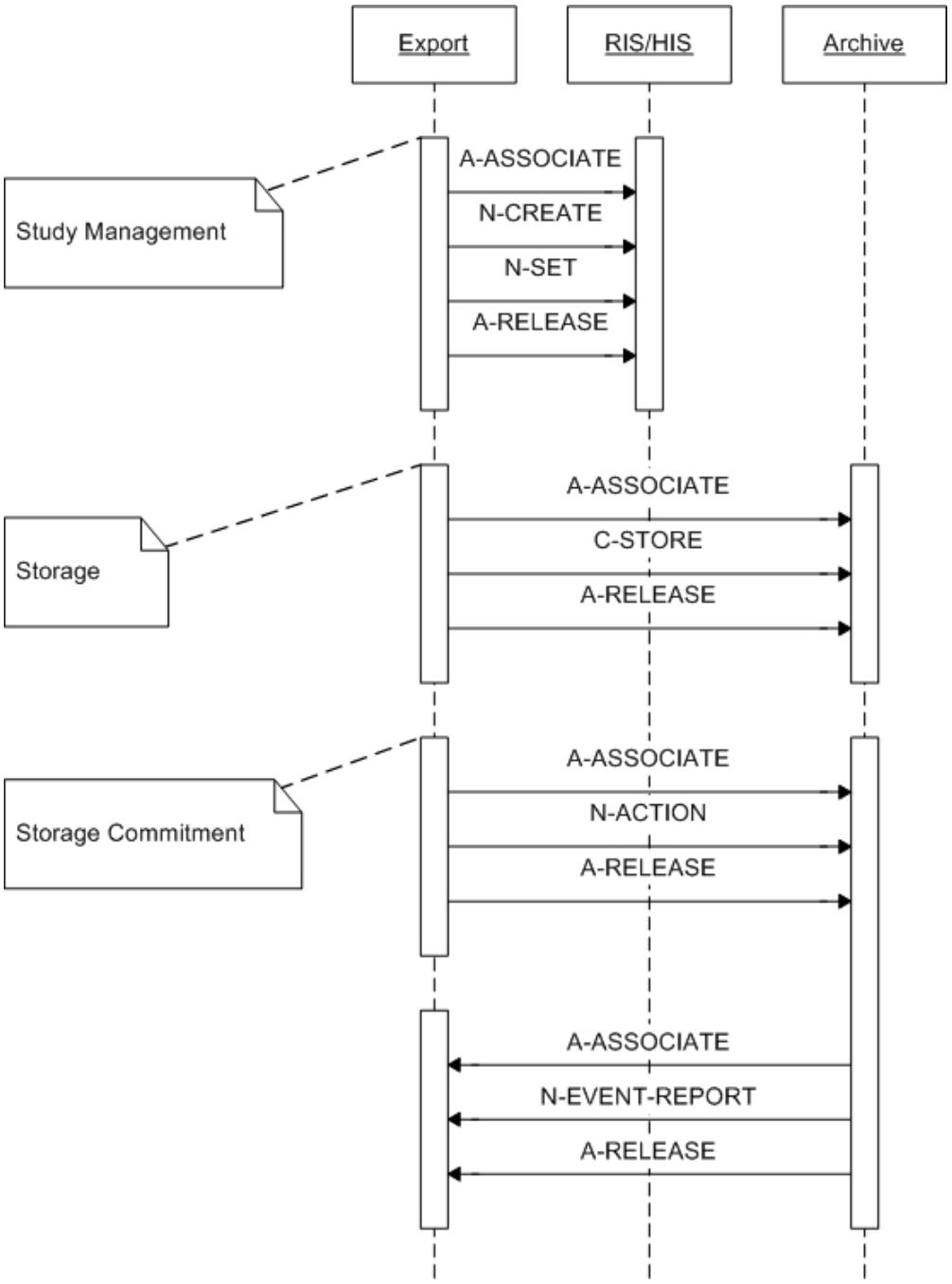

Figure 12: Sequencing of RWA Export (store)

The acquisition is initiated by selecting an examination for Export. After selecting “MPPS & OK” the protocol name and study status have to be selected. Then the BV

Family AE opens an association and sends an N-CREATE service request, followed by an N-SET service request, and on final response releases the association.
If the operator specified export to a storage SCP then the BV Family AE opens a new association and sends a C-STORE service request, and on final response releases the association. If Storage Commitment is enabled then the BV Family AE opens another association to send an N-ACTION service request, and on response releases the association. When the Storage Commitment SCP requests an association, the BV Family AE will accept an association for the N-EVENT-REPORT service request (ref. section 4.2.1.4.1).

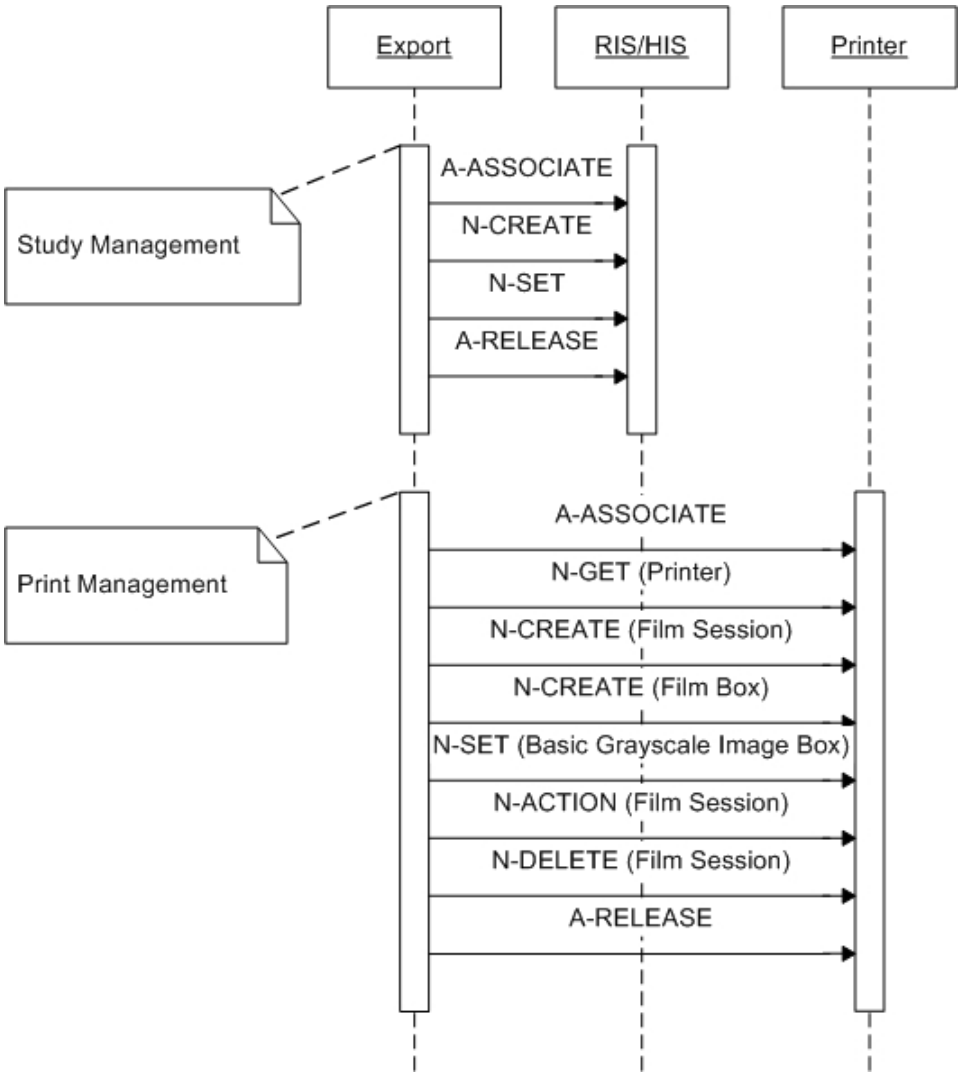

Figure 13: Sequencing of RWA Export (print)

The acquisition is initiated by selecting an examination for export. After selecting “MPPS & OK” the protocol name and study status have to be selected. Then the BV Family AE opens an association and sends an N-CREATE service request, followed by an N-SET service request, and on final response releases the association.
If the operator specified export to a print SCP then the BV Family AE opens a new association to send the printer service requests, and on final response releases the association.
The BV Family AE may handle asynchronous status updates (N-EVENT-REPORT) from the printer.

4.2.1.3.3.2. Proposed Presentation Contexts

For Export the BV Family AE will propose the following presentation contexts.

Table 17: Proposed Presentation Contexts for Study Management

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Table 18: Proposed Presentation Contexts for Storage

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Table 19: Proposed Presentation Contexts for Storage Commitment

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	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Table 20: Proposed Presentation Contexts for Print Management

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Basic Film Session	1.2.840.10008.5.1.1.1	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Film Box	1.2.840.10008.5.1.1.2	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None
Printer	1.2.840.10008.5.1.1.16	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.1.3.3.3. SOP Specific Conformance for SOP Classes

4.2.1.3.3.3.1. Study Management

The BV Family AE provides standard conformance to the Modality Performed Procedure Step SOP class.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 21 and Table 22.

Table 21: N-CREATE Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the MPPS service request successfully.
Failure	0105	No such attribute	The association is aborted and the MPPS service request is marked as failed in the export queue.
	0110	Processing failure – Performed procedure step object may no longer be updated	The association is aborted and the MPPS service request is marked as failed in the export queue.
Warning	0107	Attribute list error	The MPPS service request is considered successful.
	0116	Attribute value out of range	The MPPS service request is considered successful.

Table 22: N-SET Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the MPPS service request successfully.
Failure	0105	No such attribute	The association is aborted and the MPPS service request is marked as failed in the export queue.
	0110	Processing failure – Performed procedure step object may no longer be updated	The association is aborted and the MPPS service request is marked as failed in the export queue.
Warning	0107	Attribute list error	The MPPS service request is considered successful.
	0116	Attribute value out of range	The MPPS service request is considered successful.

Table 23 provides a description of the BV Family AE MPPS request identifier for N-CREATE and N-SET services.

Table 23: MPPS Request Identifiers

Attribute Name	Tag	VR	N-CREATE	N-SET
SOP Common Module				
Specific Character Set	0008,0005	CS	ISO_IR 100	-
Image Acquisition Results Module				
Modality	0008,0060	CS	From WLM	-
Study ID	0020,0010	SH	EMPTY	-
Performed Protocol Code Sequence	0040,0260	SQ	EMPTY	-
Performed Series Sequence	0040,0340	SQ	EMPTY	X
>Retrieve AE Title	0008,0054	AE	-	EMPTY
>Series Description	0008,103E	LO	-	EMPTY
>Performing Physician's Name	0008,1050	PN	-	Copied from scheduled performing physician's name if this provided by MWL or can be entered by Operator.
>Operator's Name	0008,1070	PN	-	Performing Technologist; User selectable in MPPS panel
>Referenced Image Sequence	0008,1140	SQ	-	Reference to all sent images
>>Referenced SOP Class UID	0008,1150	UI	-	Reference to all sent images
>>Referenced SOP Instance UID	0008,1155	UI	-	Reference to all sent images
>Protocol Name	0018,1030	LO	-	User selectable in MPPS panel
>Series Instance UID	0020,000E	UI	-	Reference to series
>Referenced Standalone SOP Instance Sequence	0040,0220	SQ	-	EMPTY
Performed Procedure Step Information Module				
Procedure Code Sequence	0008,1032	SQ	EMPTY	-
Performed Station AE Title	0040,0241	AE	System AE Title	-
Performed Station Name	0040,0242	SH	Station Name	-
Performed Location	0040,0243	SH	EMPTY	-
Performed Procedure Step Start Date	0040,0244	DA	Exam date	-
Performed Procedure Step Start Time	0040,0245	TM	Exam time (format: hhmm)	-
Performed Procedure Step End Date	0040,0250	DA	EMPTY	X
Performed Procedure Step End Time	0040,0251	TM	EMPTY	X (format: hhmm)
Performed Procedure Step Status	0040,0252	CS	Value: IN PROGRESS	Value: COMPLETED or DISCONTINUED
Performed Procedure Step ID	0040,0253	SH	Running Counter	-
Performed Procedure Step Description	0040,0254	LO	EMPTY	EMPTY
Performed Procedure Type Description	0040,0255	LO	EMPTY	EMPTY
Performed Procedure Step Relationship Module				
Referenced Patient Sequence	0008,1120	SQ	EMPTY or from WLM	-
>Referenced SOP Class UID	0008,1150	UI	From WLM	-
>Referenced SOP Instance UID	0008,1155	UI	From WLM	-
Patient's Name	0010,0010	PN	Patient Name	-
Patient ID	0010,0020	LO	Registration number	-
Patient's Birth Date	0010,0030	DA	Date of Birth	-

Attribute Name	Tag	VR	N-CREATE	N-SET
Patient's Sex	0010,0040	CS	Value: F, M, or O	-
Scheduled Step Attribute Sequence	0040,0270	SQ	X	-
>Accession Number	0008,0050	SH	From WLM or entered by the user.	-
>Referenced Study Sequence	0008,1110	SQ	EMPTY or from WLM	-
>>Referenced SOP Class UID	0008,1150	UI	From WLM	-
>>Referenced SOP Instance UID	0008,1155	UI	From WLM	-
>Study Instance UID	0020,000D	UI	Newly generated or from WLM	-
>Requested Procedure Description	0032,1060	LO	EMPTY or from WLM	-
>Scheduled Procedure Step Description	0040,0007	LO	EMPTY or from WLM	-
>Scheduled Protocol Code Sequence	0040,0008	SQ	EMPTY or from WLM	-
>>Code Value	0008,0100	SH	From WLM	-
>>Coding Scheme Designator	0008,0102	SH	From WLM	-
>>Coding Scheme Version	0008,0103	SH	From WLM	-
>>Code Meaning	0008,0104	LO	From WLM	-
>Scheduled Procedure Step ID	0040,0009	SH	EMPTY or from WLM	-
>Requested Procedure ID	0040,1001	SH	EMPTY or from WLM	-
Radiation Dose Module				
Image and Fluoroscopy Area Dose Product	0018,115E	DS	Value: 0	X
Total Time of Fluoroscopy	0040,0300	US	Value: 0	X
Total Number of Exposures	0040,0301	US	Value: 0	X
Entrance Dose	0040,0302	US	Value: 0	X
Entrance Dose in mGy	0040,8302	DS	Value: 0	X

Note: "-" indicates that the attribute is not sent; "EMPTY" indicates that the attribute is sent with zero length; "X" or an explicit value indicate that the attribute is sent with an appropriate value.

4.2.1.3.3.2. Storage

The BV Family AE provides standard conformance to the Storage SOP classes.

The BV Family administration is based on Examinations, where each Examination is mapped to one Study (for one Patient). An Examination consists of one or more Runs, where each Run is mapped to one Series. Note that a Secondary Capture Series can contain one or more Secondary Capture Images, though an XA Series can contain only one multi-frame XA Image of one or more Frames.

Upon receiving a C-STORE response with status Error or Refused, the BV Family AE will release the association. The transfer of all of the selected images of the examination will be considered failed. The operator may retry export jobs manually.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 24.

Table 24: C-STORE Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the Storage service request successfully.
Failure	A7xx	Refused – Out of resources	Image transfer is considered failed. Images remain in queue. User can initiate retry. Status is logged in system file.

Service Status	Code	Further Meaning	Behavior
	A9xx	Error – Data set does not match SOP class	Image transfer is considered failed. Images remain in queue. User can initiate retry. Status is logged in system file.
	C000	Error – Cannot understand	Image transfer is considered failed. Images remain in queue. User can initiate retry. Status is logged in system file.
Warning	B000	Coercion of data elements	Image transfer is considered successful. Status is logged in system file.
	B006	Elements discarded	Image transfer is considered successful. Status is logged in system file.
	B007	Data set does not match SOP class	Image transfer is considered successful. Status is logged in system file.

4.2.1.3.3.3. Storage Commitment

The BV Family AE provides standard conformance to the Storage Commitment Push Model SOP class for Asynchronous storage commitment.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 25.

Table 25: N-ACTION Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	The SCP has completed the Storage Commitment service request successfully.
Abort	xxxx	Any other status code	The association is aborted and the storage commitment is marked as failed.

The following table lists the contents of the N-ACTION request.

Table 26: Storage Commitment N-ACTION Request Identifiers

Attribute Name	Tag	Note
Transaction UID	0008,1195	Generated Unique UID
Referenced SOP Sequence	0008,1199	References to all images sent
>Referenced SOP Class UID	0008,1150	References to all images sent
>Referenced SOP Instance UID	0008,1155	References to all images sent

4.2.1.3.3.4. Print Management

Based on the selected layout, the BV Family AE will create a Film Session containing a single Film Box. The content of the Image Box will be filled for the print request (Film Box level). Once the print session has completed the Film Session will be deleted. A new Film Box is created for each successive film within the Film Session.

The BV Family AE is implemented to acquire grayscale images and thus to negotiate for Basic Grayscale Print Management. The processing of a print job can be cancelled at any time; then the BV Family AE will abort the processing immediately.

Before a queued print job is actually started, the system will retrieve the printer status. Upon receiving a normalized service response (N-GET) containing a Failure or Warning status, the BV Family AE does not start the export job.

Upon receiving a print command response with failure status, the BV Family AE will release the association. The transfer of all of the selected images of the examination will be considered failed. The operator may retry export jobs manually.

The following DIMSE services have been implemented.

Table 27: Basic Grayscale Print Management DIMSE Services

SOP Class	Supported DIMSE Service Element
Basic Film Session SOP Class	N-CREATE, N-ACTION, N-DELETE
Basic Film Box SOP Class	N-CREATE
Basic Greyscale Image Box SOP Class	N-SET
Printer SOP Class	N-GET, N-EVENT-REPORT

The implemented attributes can be found sorted per IOD module in next the tables.

Defined abbreviations for the presence of module attributes in the tables are:

ALWAYS	the attribute is always present with a value
EMPTY	the attribute is always present without any value (attribute sent zero length)
VNAP	the attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	the attribute is present under specified condition – if present then it will always have a value
ANAPCV	the attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV	the attribute is present under specified condition – if present then it will not have any value

Defined abbreviations for the source of the attribute data values in the tables are:

AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter
COPY	the attribute value source is another SOP instance
FIXED	the attribute value is hard-coded in the application
IMPLICIT	the attribute value source is a user-implicit setting
MPPS	the attribute value source is a Modality Performed Procedure Step
MWL	the attribute value source is a Modality Worklist
PRINTER	the attribute value source is a printer
USER	the attribute value source is explicit user input

Table 28: Printer SOP Class - N-GET-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Printer Module					
Printer Status	2110,0010	CS	Printer Status provided by printer	ALWAYS	PRINTER
Printer Status Info	2110,0020	CS	Printer Status Info provided by printer	ALWAYS	PRINTER

Note: Only in case that the printer responds with a Printer status of “NORMAL” or “WARNING” the BV Family AE continues printing of the images.

Table 29: Basic Film Session SOP Class - N-CREATE-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Basic Film Session Presentation Module					
Number of Copies*	2000,0010	IS	Integer (1-99)	ALWAYS	CONFIG
Print Priority*	2000,0020	CS	LOW, MED, HIGH	ALWAYS	CONFIG
Medium Type*	2000,0030	CS	CURRENT, BLUE FILM, CLEAR FILM, PAPER, TRANSPARENCY	ALWAYS	CONFIG
Film Destination*	2000,0040	CS	CURRENT, PROCESSOR, MAGAZINE, BIN (integer)	ALWAYS	CONFIG
Film Session Label	2000,0050	LO	Equal to Exam Type	ALWAYS	AUTO

** The default values are printer type dependent.*

Table 30: Basic Film Box SOP Class - N-CREATE-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Basic Film Box Presentation Module					
Image Display Format	2010,0010	ST	STANDARD\1,1, STANDARD\1,2, STANDARD\2,2, STANDARD\2,3	ALWAYS	USER
Film Orientation	2010,0040	CS	LANDSCAPE, PORTRAIT	ALWAYS	CONFIG
Film Size ID*	2010,0050	CS	8INX10IN, 8_5INX11IN, 10INX12IN, 10INX14IN, 11INX11IN, 11INX14IN, 11INX17IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, A3, A4, CURRENT	ALWAYS	CONFIG
Magnification Type*	2010,0060	CS	BILINEAR, CUBIC, NONE, REPLICATE	ALWAYS	CONFIG
Smoothing Type	2010,0080	CS	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 140, ENHANCED, ENHANCED1, MEDIUM, NORMAL, SHARP, SMOOTH	ALWAYS	CONFIG
Border Density*	2010,0100	CS	BLACK, OD (Integer), WHITE	ALWAYS	CONFIG
Empty Image Density*	2010,0110	CS	BLACK, WHITE	ALWAYS	CONFIG
Min Density*	2010,0120	US	0..1000	ALWAYS	CONFIG
Max Density*	2010,0130	US	0..1000	ALWAYS	CONFIG
Trim*	2010,0140	CS	NO, YES	ALWAYS	CONFIG
Configuration Information*	2010,0150	ST	Printer configurable character string (max. 1024 char.)	ALWAYS	CONFIG
Basic Film Box Relationship Module					
Referenced Film Session Sequence	2010,0500	SQ	-	ALWAYS	AUTO
>Referenced SOP Class UID	0008,1150	UI	Applied value: 1.2.840.10008.5.1.1.1	ALWAYS	FIXED
>Referenced SOP Instance UID	0008,1155	UI	-	ALWAYS	PRINTER

** The default values and ranges are printer type dependent.*

Table 31: Basic Grayscale Image Box SOP Class - N-SET-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Image Box Pixel Presentation Module					
Image Position	2020,0010	US	Generated	ALWAYS	AUTO
Polarity*	2020,0020	CS	NORMAL, REVERSE	ALWAYS	CONFIG
Preformatted Grayscale Image Sequence	2020,0110	SQ	-	ALWAYS	AUTO
>Samples per Pixel	0028,0002	US	Applied value: 1	ALWAYS	FIXED
>Photometric Interpretation	0028,0004	CS	Applied value: MONOCHROME2	ALWAYS	FIXED

Attribute Name	Tag	VR	Note	Presence	Source
Image Box Pixel Presentation Module					
>Rows	0028,0010	US	Applied value: 1024	ALWAYS	FIXED
>Columns	0028,0011	US	Applied value: 1280	ALWAYS	FIXED
>Bits Allocated	0028,0100	US	Applied value: 16	ALWAYS	FIXED
>Bits Stored	0028,0101	US	Applied value: 12	ALWAYS	FIXED
>High Bit	0028,0102	US	Applied value: 11	ALWAYS	FIXED
>Pixel Representation	0028,0103	US	Applied value: 0x0000	ALWAYS	FIXED
>Pixel Data	7FE0,0010	OW	-	ALWAYS	AUTO

** The default values are printer type dependent.*

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 32 to Table 35.

Table 32: Basic Film Session N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film Session successfully created	0000	Normal Completion.
Warning		B6XX	Print Film Session considered successful. Status logged in system file.
Failure			Print Film Session considered failed. Status logged in system file.

Table 33: Basic Film Box N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film Box successfully created	0000	Normal Completion.
Warning		B6XX	Print Film Session considered successful. Status logged in system file.
Failure		C6XX	Print Film Session considered failed. Status logged in system file.

Table 34: Basic Grayscale Image Box N-SET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Image successfully stored in Image Box	0000	Normal Completion.
Warning		B6XX	Print Film Session considered successful. Status logged in system file.
Failure		C6XX	Print Film Session considered failed. Status logged in system file.

Table 35: Basic Film Session N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film accepted for printing	0000	Normal Completion.
Warning		B6XX	Print Film Session considered successful. Status logged in system file.

Service Status	Further Meaning	Error Code	Behavior
Failure		C6XX	Print Film Session considered failed. Status logged in system file.

Table 36: Printer - N-EVENT-REPORT Behavior

Event Type Name	Event Type ID	Behavior
NORMAL	1	When evaluated, the BV Family AE sends response. The event is logged. The print job continues.
WARNING	2	When evaluated, the BV Family AE sends response. The event is logged. The print job continues.
FAILURE	3	When evaluated, the BV Family AE sends response. The event is logged. The print job gets aborted and is marked as failed.

4.2.1.4. Association Acceptance Policy

4.2.1.4.1. Export

4.2.1.4.1.1. Description and Sequencing of Activities

After requesting storage commitment the BV Family AE will accept an association for the storage commitment report.

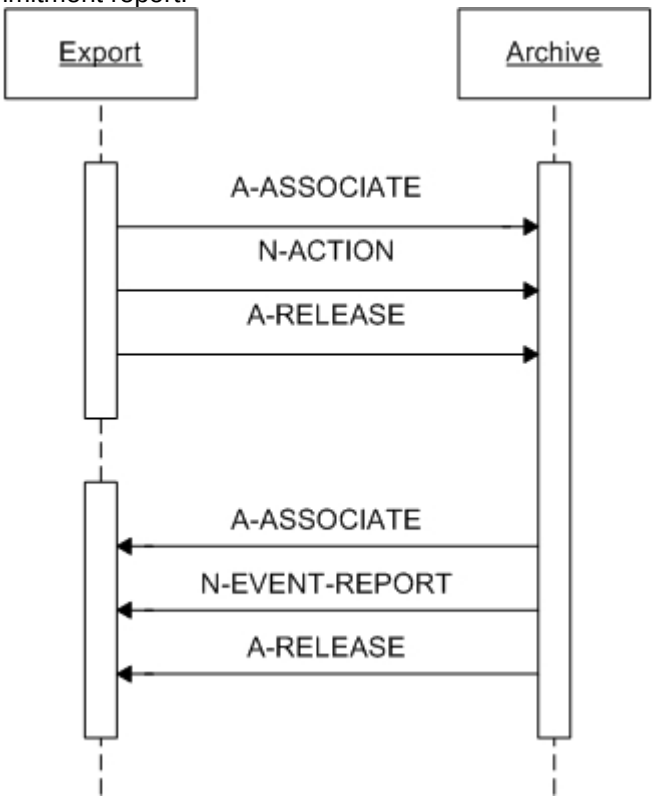

Figure 14: Sequencing of RWA Export

4.2.1.4.1.2. Accepted Presentation Contexts

The BV Family AE will accept presentation contexts as shown in Table 37.

Table 37: Acceptable Presentation Contexts for Export

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	EBE	1.2.840.10008.1.2.2	SCU	None
		ELE	1.2.840.10008.1.2.1		
		ILE	1.2.840.10008.1.2		

The BV Family AE will only accept the SCU role (which must be proposed via SCP/SCU Role Selection Negotiation) within a Presentation Context for the Storage Commitment Push Model SOP Class.

4.2.1.4.1.3. SOP Specific Conformance for SOP Classes

The behavior of the BV Family AE when receiving Event Types within the N-EVENT-REPORT is summarized in Table 38.

Table 38: Storage Commitment - N-EVENT-REPORT Behavior

Event Type Name	Event Type ID	Behavior
Storage Commitment Request Successful	1	The Referenced SOP Instances under Referenced SOP Sequence (0008,1199) are marked within the database as “Stored & Committed (SC)” to the value of Retrieve AE Title (0008,0054).
Storage Commitment Request Complete – Failures Exist	2	In case of a “Failure Exist” situation (Referenced SOP Instances under Failed SOP Sequence (0008,1198)), all of the stored SOP Instances for that examination are considered as failed for storage commitment. A send job that failed storage commitment will not be automatically restarted but can be resumed by the user.

The status response behavior of the BV Family AE is as summarized in Table 39.

Table 39: Storage Commitment - N-EVENT-REPORT Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Success	The BV Family AE has completed the operation successfully.
Failure	*	Any other Failure status code	The association is aborted and the storage commit N-EVENT-REPORT is marked as failed.

4.2.2. VF Surgical Workstation AE

4.2.2.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 40: SOP Classes for VF Surgical Workstation AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
X-Ray Specialization	1.3.46.670589.2.3.1.1	No	Yes
Stack of X-Ray	1.3.46.670589.2.4.1.1	No	Yes
Volume	1.3.46.670589.5.0.1.1	No	Yes
3D Volume Object	1.3.46.670589.5.0.2.1	No	Yes
Surface	1.3.46.670589.5.0.3.1	No	Yes
Cardio	1.3.46.670589.5.0.8.1	No	Yes
CT Synthetic Image	1.3.46.670589.5.0.9	No	Yes
MR Synthetic Image	1.3.46.670589.5.0.10	No	Yes
MR Cardio Analysis	1.3.46.670589.5.0.11.1	No	Yes
CX Synthetic Image	1.3.46.670589.5.0.12	No	Yes
Perfusion	1.3.46.670589.5.0.13	No	Yes
Perfusion Analysis	1.3.46.670589.5.0.14	No	Yes
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
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
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Yes	No
Patient/Study Only Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Yes	No

4.2.2.2. Association Policies

4.2.2.2.1. General

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

Table 41: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

The VF Surgical Workstation AE may initiate and accept one association simultaneously.

Table 42: Number of Associations as an Association Initiator for VF Surgical Workstation AE

Maximum number of simultaneous associations	1

Table 43: Number of Associations as an Association Acceptor for VF Surgical Workstation AE

Maximum number of simultaneous associations	configurable

4.2.2.2.3. Asynchronous Nature

The VF Surgical Workstation AE does not support asynchronous operations and will not perform asynchronous window negotiation.

4.2.2.2.4. Implementation Identifying Information

For identification of the VF Surgical Workstation AE the following Implementation Class UID and Implementation Version Name are supplied.

Table 44: DICOM Implementation Class and Version for VF Surgical Workstation AE

Implementation Class UID	1.3.46.670589.5.2.23
Implementation Version Name	ViewForum R6.1

4.2.2.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in Table 45.

Table 45: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The job fails in case of association setup. The reason is logged and reported to the operator.
Reply Timeout	The job fails and the association is aborted. The reason is logged and reported to the operator.
Association Timeout	The association is released.
Association Aborted	The job fails. The reason is logged and reported to the operator.

4.2.2.3. Association Initiation Policy

4.2.2.3.1. Query/Retrieve Image

4.2.2.3.1.1. Description and Sequencing of Activities

For viewing images, the operator can use the VF Surgical Workstation AE to query a remote archive and select the images to retrieve. The VF Surgical Workstation AE then sends a retrieve request and accepts the related images.

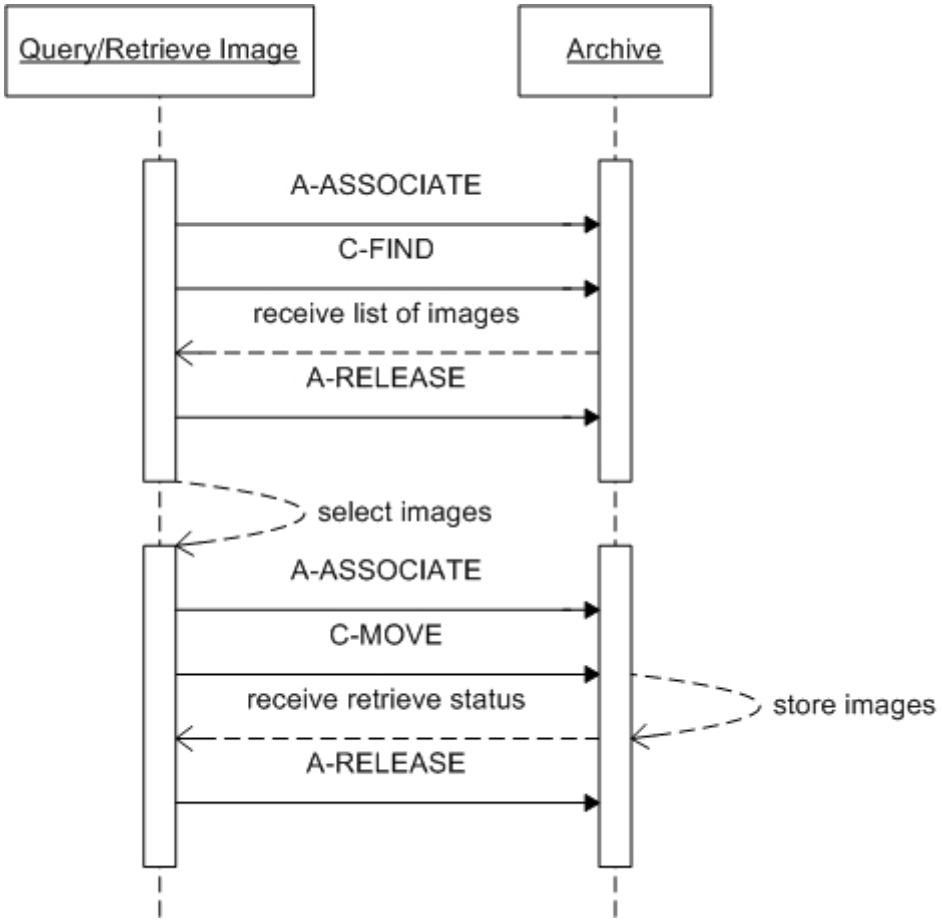

Figure 15: Sequencing of RWA Query/Retrieve Image

The operator queries a remote archive, using the query tool in the data handling facility. The VF Surgical Workstation AE initiates an association to the selected peer entity (Archive) and uses it to send Query (C-FIND) requests and receive subsequent responses. The association is released when the execution of the query completes and the Query/Retrieve dialog on the GUI is closed. The matching images are then displayed in a patient folder for the remote archive.
The required images can now be selected for copying to the BV Family, using the copy tool in the data handling facility. For each copy request the VF Surgical Workstation AE initiates an association to the selected peer entity (Archive) and uses it to send Retrieve (C-MOVE) requests and receive subsequent responses; an examination may contain both images and presentation states. The association is released after the final Retrieve (C-MOVE) response for the related request has been received (no more pending).

4.2.2.3.1.2. Proposed Presentation Contexts

For Query/Retrieve Image the VF Surgical Workstation AE will propose the following presentation contexts.

Table 46: Proposed Presentation Contexts for Query/Retrieve Image

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Patient/Study Only Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
Any other defined SOP class		ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

Note: For performance reasons the ELE transfer syntax is preferred.

4.2.2.3.1.3. SOP Specific Conformance for SOP Classes

4.2.2.3.1.3.1. Query/Retrieve Information Model – FIND

The VF Surgical Workstation AE will not generate queries containing optional keys.
The VF Surgical Workstation AE will not generate relational queries.

In the following table the supported query keys for each query level are described.
Universal matching shall be supported as default.

Table 47: Supported Query Keys

Query Level	Query Key		Type of Matching
	Name	Tag	
Patient	Patient's Name	0010,0010	Wild Card/ Universal
	Patient ID	0010,0020	Wild Card/ Universal
	Patient's Birth Date	0010,0030	-
	Patient's Sex	0010,0040	-
Study	Study Date	0008,0020	-

Query Level	Query Key		Type of Matching
	Name	Tag	
	Study Time	0008,0030	-
	Accession Number	0008,0050	-
	Modalities in Study	0008,0061	-
	Referring Physician's Name	0008,0090	-
	Study Description	0008,1030	-
	Study Instance UID	0020,000D	-
	Study ID	0020,0010	-
Series	Modality	0008,0060	-
	Station Name	0008,1010	-
	Performing Physician's Name	0008,1050	-
	Body Part Examined	0018,0015	-
	Protocol Name	0018,1030	-
	Series Instance UID	0020,000E	-
	Series Number	0020,0011	-
	Performed Procedure Step Start Date	0040,0244	-
	Performed Procedure Step ID	0040,0253	-
Image	SOP Class UID	0008,0016	-
	SOP Instance UID	0008,0018	-
	Content Date	0008,0023	-
	Content Time	0008,0033	-
	Instance Number	0020,0013	-

Do note that the query results screen will display all patients that have an empty Patient ID as one patient entry.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 48.

Table 48: C-FIND Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Matching is complete	The find results are displayed.
Failure	A700	Refused – Out of resources	No find results are displayed. The reason is logged.
	A900	Failed – Identifier does not match SOP class	No find results are displayed. The reason is logged.
	Cxxx	Failed – Unable to process	No find results are displayed. The reason is logged.
Cancel	FE00	Matching terminated due to Cancel Request	No find results are displayed. The reason is logged.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The find command continues.

Service Status	Code	Further Meaning	Behavior
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The find command continues.

4.2.2.3.1.3.2. Query/Retrieve Information Model – MOVE

The VF Surgical Workstation AE provides standard conformance.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 49.

Table 49: C-MOVE Command Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No Failures	The move job is marked as completed. The association is released.
Failure	A701	Refused – Out of Resources – Unable to calculate number of matches	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A702	Refused – Out of Resources – Unable to perform Sub-operations	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A801	Refused – Move Destination unknown	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A900	Failed – Identifier does not match SOP class	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	Cxxx	Failed – Unable to process	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Cancel	FE00	Sub-operations terminated due to Cancel Indication	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Warning	B000	Sub-operations complete – One or more Failures	The move job is marked as completed. The association is released.
Pending	FF00	Sub-operations are continuing	The move job continues.

4.2.2.4. Association Acceptance Policy

4.2.2.4.1. Query/Retrieve Image

4.2.2.4.1.1. Description and Sequencing of Activities

For viewing images, the VF Surgical Workstation AE accepts the retrieved images.

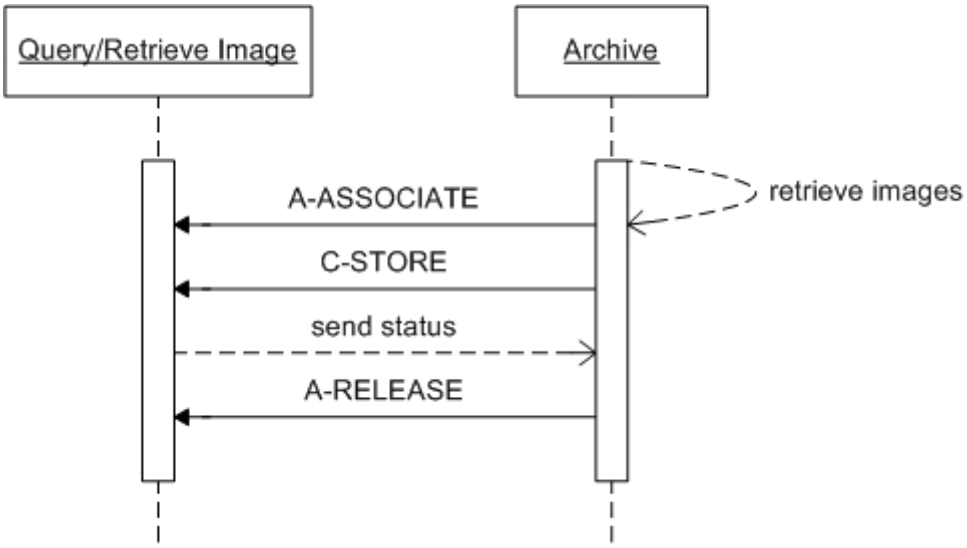

Figure 16: Sequencing of RWA Query/Retrieve Image

For each retrieve request (selected from query results) the VF Surgical Workstation AE accepts an association from the selected peer entity (Archive) and uses it to receive image Storage (C-STORE) requests and send subsequent responses. On request of the Storage SCU (Archive) the association is released.

4.2.2.4.1.2. Accepted Presentation Contexts

The VF Surgical Workstation AE will accept Presentation Contexts as shown in Table 50.

Table 50: Acceptable Presentation Contexts for Query/Retrieve Image

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Any defined SOP class		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2		
		ILE	1.2.840.10008.1.2		

Note: For performance reasons the ELE transfer syntax is preferred and shall be chosen in case multiple transfer syntaxes are proposed in the association negotiation.

The VF Surgical Workstation AE shall accept all contexts in the intersection of the proposed and acceptable presentation contexts. This means that the VF Surgical Workstation AE accepts multiple proposed presentation contexts with the same SOP class but different transfer syntaxes.
There is no check for duplicate contexts, and these will therefore be accepted.

4.2.2.4.1.3. SOP Specific Conformance for SOP Classes

4.2.2.4.1.3.1. Verification

The VF Surgical Workstation AE provides standard conformance to the Verification service class.

The status code behavior is as summarized in Table 51.

Table 51: C-ECHO Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Confirmation	Standard verification response.

4.2.2.4.1.3.2. Image Storage

The VF Surgical Workstation AE provides standard level 1 (Base) conformance to the Storage service class.

If the VF Surgical Workstation AE imports an image and during the association negotiation the presentation state SOP class was not negotiated, then the VF Surgical Workstation AE creates a presentation state instance for the imported image.

The VF Surgical Workstation AE standard supports the photometric interpretations MONOCHROME1, MONOCHROME2, and RGB.

The status code behavior is as summarized in Table 52.

Table 52: C-STORE Status Response

Service Status	Code	Further Meaning	Description
Success	0000	Storage is complete	The images are stored in the VF Surgical Workstation AE database.
Failure	A700	Refused – Out of resources	The VF Surgical Workstation AE database is full – recovery from this condition is left to the SCU. The VF Surgical Workstation AE sends a notification, log the condition, and abort the association.
	A900	Error – Data set does not match SOP class	The SOP class of the image(s) does not match the negotiated abstract syntax. The VF Surgical Workstation AE sends a notification, log the condition, and abort the association.
	C000	Error – Cannot understand	The image(s) cannot be parsed. The VF Surgical Workstation AE sends a notification, log the condition, and abort the association.
Warning	B000	Coercion of data elements	N/A
	B006	Elements discarded	N/A
	B007	Data set does not match SOP class	N/A

4.2.3. 3D-RX Surgical Workstation AE

4.2.3.1. SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes.

Table 53: SOP Classes for 3D-RX Surgical Workstation AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	Yes	No
> Basic Film Session	1.2.840.10008.5.1.1.1	Yes	No
> Basic Film Box	1.2.840.10008.5.1.1.2	Yes	No
> Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	Yes	No
> Printer	1.2.840.10008.5.1.1.16	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
CX Image	1.3.46.670589.2.4.1.1	Yes	No

4.2.3.2. Association Policies

4.2.3.2.1. General

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

Table 54: DICOM Application Context

Application Context Name	1.2.840.10008.3.1.1.1

4.2.3.2.2. Number of Associations

The 3D-RX Surgical Workstation AE may initiate and accept one association simultaneously.

Table 55: Number of Associations as an Association Initiator for 3D-RX Surgical Workstation AE

Maximum number of simultaneous associations	1

Table 56: Number of Associations as an Association Acceptor for 3D-RX Surgical Workstation AE

Maximum number of simultaneous associations	0

4.2.3.2.3. Asynchronous Nature

The 3D-RX Surgical Workstation AE does not support asynchronous operations and will not perform asynchronous window negotiation.

4.2.3.2.4. Implementation Identifying Information

For identification of the 3D-RX Surgical Workstation AE the following Implementation Class UID and Implementation Version Name are supplied.

Table 57: DICOM Implementation Class and Version for 3D-RX Surgical Workstation AE

Implementation Class UID	1.3.46.670589.7.8.5.1
Implementation Version Name	XV_rel_5.1

4.2.3.3. Association Initiation Policy

This describes the conditions under which the AE will initiate an association.

4.2.3.3.1. Verify

4.2.3.3.1.1. Description and Sequencing of Activities

The 3D-RX Surgical Workstation AE will issue verification requests in response to UI mediated requests from the user to test validity of DICOM connection.

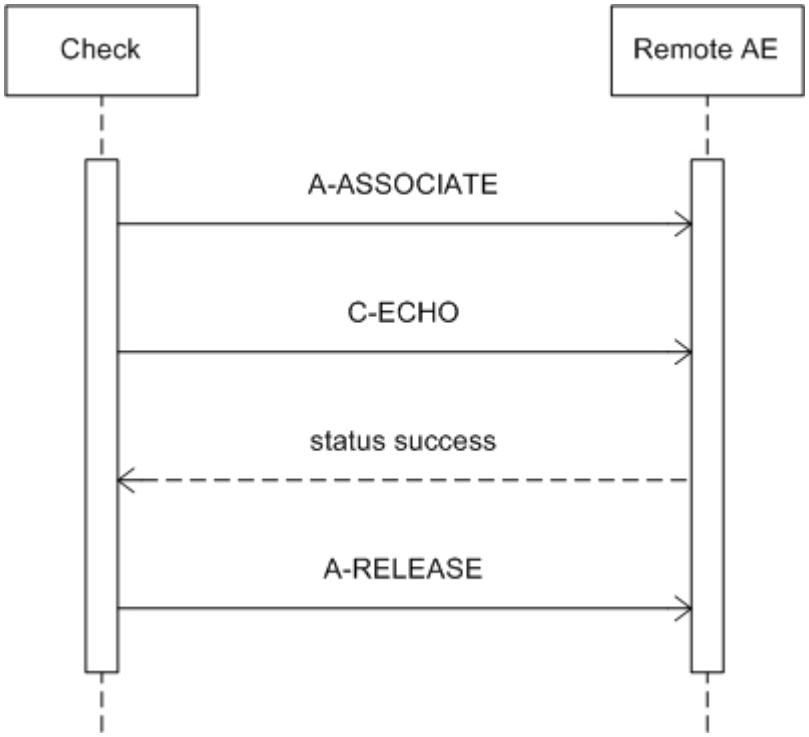

Figure 17: Sequencing of RWA Verify

4.2.3.3.1.2. Proposed Presentation Contexts

For Verify the 3D-RX Surgical Workstation AE will propose the following presentation contexts.

Table 58: Proposed Presentation Contexts for Verify

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification	1.2.840.10008.1.1	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

4.2.3.3.1.3. SOP Specific Conformance for SOP Classes

4.2.3.3.1.3.1. Verification

The 3D-RX Surgical Workstation AE provides standard conformance to the Verification service class.

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 12.

Table 59: C-ECHO Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Confirmation	The SCP has successfully returned a verification response.

4.2.3.3.2. Export

4.2.3.3.2.1. Description and Sequencing of Activities

After selection of an image file, the file will be sent when initiating the Send command. The 3D-RX Surgical Workstation AE initiates one association to the pre-configured peer system and uses it to send the selected images and runs via C-STORE requests (and receives the associated C-STORE responses). The association is released after successful transfer of the images or when an error occurs.

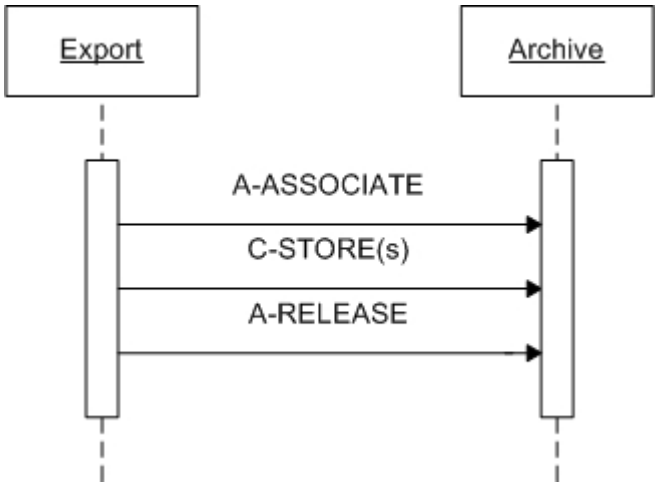

Figure 18: Sequencing of RWA Export (Send)

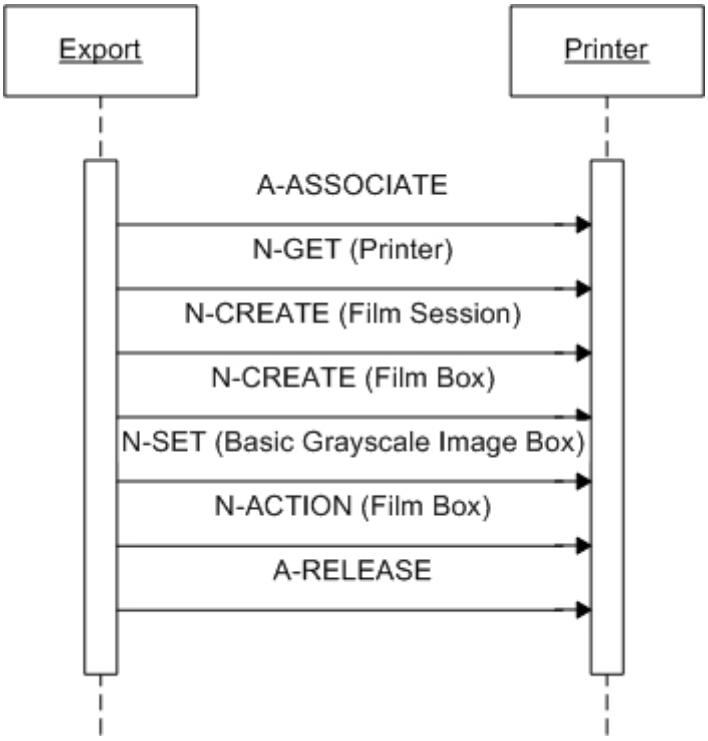

Figure 19: Sequencing of RWA Export (Print)

The operator is able to select one or more images from the internal database (via the Data Handling facility) and perform the Print operation on them.
The operator will select the print destination (out of choice list of configured printers) and some print parameters.
As a result, the 3D-RX Surgical Workstation AE will initiate an association to the selected printer and uses it to send the Print Service Elements of the Print SOP Classes.

The 3D-RX Surgical Workstation AE handles each send request one after another.

4.2.3.3.2.2. Proposed Presentation Contexts

For Export the 3D-RX Surgical Workstation AE will propose the following presentation contexts.

Table 60: Proposed Presentation Contexts for Storage

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1	ELE EBE ILE	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2 1.2.840.10008.1.2	SCU	None

Table 61: Proposed Presentation Contexts for Print Management

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management (Meta)	1.2.840.10008.5.1.1.9	EBE ELE ILE	1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2	SCU	None

4.2.3.3.2.3. SOP Specific Conformance for SOP Classes

4.2.3.3.2.3.1. Storage

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 62.

Table 62: C-STORE Response Status Handling Behavior

Service Status	Code	Further Meaning	Behavior
Success	0000	Success	Message in console.
Failure	0122	Refused – SOP Class not supported	Message in console.
	A7xx	Refused – Out of resources	Message in console.
	A9xx	Error – Data set does not match SOP class	Message in console.
	Cxxx	Error – Cannot understand	Message in console.
Warning	B00x	Any applicable warning	Message in console.

4.2.3.3.2.3.2. Print Management

The 3D-RX Surgical Workstation AE provides standard conformance to the Basic Grayscale Print Management Meta SOP Class.

An explicit N-DELETE request on the created instances is not implemented; these instances are deleted implicitly by releasing the association.

The following DIMSE services have been implemented.

Table 63: Basic Grayscale Print Management DIMSE Services

SOP Class	Supported DIMSE Service Element
Basic Film Session SOP Class	N-CREATE
Basic Film Box SOP Class	N-CREATE, N-ACTION
Basic Greyscale Image Box SOP Class	N-SET
Printer SOP Class	N-GET, N-EVENT-REPORT

The implemented attributes can be found sorted per IOD module in the next tables.

Defined abbreviations for the presence of module attributes in the tables are:

ALWAYS	the attribute is always present with a value
EMPTY	the attribute is always present without any value (attribute sent zero length)
VNAP	the attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	the attribute is present under specified condition – if present then it will always have a value
ANAPCV	the attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV	the attribute is present under specified condition – if present then it will not have any value

Defined abbreviations for the source of the attribute data values in the tables are:

AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter
COPY	the attribute value source is another SOP instance
FIXED	the attribute value is hard-coded in the application
IMPLICIT	the attribute value source is a user-implicit setting
MPPS	the attribute value source is a Modality Performed Procedure Step
MWL	the attribute value source is a Modality Worklist
PRINTER	the attribute value source is a printer
USER	the attribute value source is explicit user input

Table 64: Basic Film Session SOP Class - N-CREATE-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Basic Film Session Presentation Module					
Number of Copies	2000,0010	IS	Applied values: 1..9	ALWAYS	USER
Print Priority	2000,0020	CS	Applied values: LOW, MED, HIGH	ALWAYS	CONFIG
Medium Type	2000,0030	CS	Applied values: CURRENT, BLUE FILM, CLEAR FILM, PAPER	ALWAYS	CONFIG
Film Destination	2000,0040	CS	Applied values: PROCESSOR, MAGAZINE, BIN_(integer)	ALWAYS	CONFIG

Table 65: Basic Film Box SOP Class - N-CREATE-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Basic Film Box Presentation Module					
Image Display Format	2010,0010	ST	Applied values: 1,1; 1,2; 2,2; 2,3	ALWAYS	USER
Film Orientation	2010,0040	CS	Applied value: PORTRAIT	ALWAYS	FIXED
Film Size ID	2010,0050	CS	-	ALWAYS	AUTO
Magnification Type	2010,0060	CS	Applied values: BILINEAR, CUBIC, NONE, REPLICATE	ALWAYS	CONFIG
Smoothing Type	2010,0080	CS	-	ALWAYS	AUTO
Border Density	2010,0100	CS	Applied value: BLACK	ALWAYS	FIXED
Empty Image Density	2010,0110	CS	Applied value: BLACK	ALWAYS	FIXED
Min Density	2010,0120	US	Applied values: 0..349 (printer dependent)	ALWAYS	AUTO
Max Density	2010,0130	US	Applied values: 1..350 (printer dependent)	ALWAYS	CONFIG
Trim	2010,0140	CS	Applied value: NO	ALWAYS	FIXED
Configuration Information	2010,0150	ST	-	ALWAYS	CONFIG
Basic Film Box Relationship Module					

Attribute Name	Tag	VR	Note	Presence	Source
Basic Film Box Presentation Module					
Referenced Film Session Sequence	2010,0500	SQ	Parent film session	ALWAYS	AUTO
>Referenced SOP Class UID	0008,1150	UI	Applied value: 1.2.840.10008.5.1.1.1	ALWAYS	FIXED
>Referenced SOP Instance UID	0008,1155	UI	-	ALWAYS	AUTO

Note: the Image Display Format, and Film Size ID are selectable.

Table 66: Basic Grayscale Image Box SOP Class - N-SET-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Image Box Pixel Presentation Module					
Image Position	2020,0010	US	-	ALWAYS	AUTO
Polarity	2020,0020	CS	Applied value: NORMAL	ALWAYS	FIXED
Preformatted Grayscale Image Sequence	2020,0110	SQ	-	ALWAYS	AUTO
>Samples per Pixel	0028,0002	US	-	ALWAYS	FIXED
>Photometric Interpretation	0028,0004	CS	-	ALWAYS	AUTO
>Rows	0028,0010	US	-	ALWAYS	AUTO
>Columns	0028,0011	US	-	ALWAYS	AUTO
>Bits Allocated	0028,0100	US	-	ALWAYS	AUTO
>Bits Stored	0028,0101	US	-	ALWAYS	AUTO
>High Bit	0028,0102	US	-	ALWAYS	AUTO
>Pixel Representation	0028,0103	US	-	ALWAYS	FIXED
>Pixel Data	7FE0,0010	OW	-	ALWAYS	AUTO

Table 67: Printer SOP Class - N-GET-RQ

Attribute Name	Tag	VR	Note	Presence	Source
Printer Module					
Manufacturer	0008,0070	LO	-	ALWAYS	AUTO
Manufacturer's Model Name	0008,1090	LO	-	ALWAYS	AUTO
Device Serial Number	0018,1000	LO	-	ALWAYS	AUTO
Software Version(s)	0018,1020	LO	-	ALWAYS	AUTO
Date of Last Calibration	0018,1200	DA	-	ALWAYS	AUTO
Time of Last Calibration	0018,1201	TM	-	ALWAYS	AUTO
Printer Status	2110,0010	CS	-	ALWAYS	AUTO
Printer Status Info	2110,0020	CS	-	ALWAYS	AUTO
Printer Name	2110,0030	LO	-	ALWAYS	AUTO

Note: Only in case that the printer responds with a Printer status of "NORMAL" or "WARNING" the 3D-RX Surgical Workstation AE continues printing of the images.

Table 68: Printer SOP Class - N-EVENT-REPORT

Attribute Name	Tag	VR	Note	Presence	Source
Printer Module					
Film destination	2000,0040	CS	-	ANAP	AUTO

Attribute Name	Tag	VR	Note	Presence	Source
Printer Module					
Printer Status Info	2110,0020	CS	Printer Status Info provided by printer	ANAP	AUTO
Printer Name	2110,0030	LO	-	ANAP	AUTO

All details regarding the specific conformance, including response behavior to all status codes, both from an application level and communication errors are provided in Table 69 to Table 72.

Table 69: Basic Film Session N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film Session successfully created	0000	Normal Completion.
Warning	(any warning)		Message in console; the print job is continued.
Failure	(any failure)		Message in console; the print job is stopped.

Table 70: Basic Film Box N-CREATE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film Box successfully created	0000	Normal Completion.
Warning	(any warning)		Message in console; the print job is continued.
Failure	(any failure)		Message in console; the print job is stopped.

Table 71: Basic Grayscale Image Box N-SET Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Image successfully stored in Image Box	0000	Normal Completion.
Warning	(any warning)		Message in console; the print job is continued.
Failure	(any failure)		Message in console; the print job is stopped.

Table 72: Basic Film Session N-ACTION Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Film accepted for printing	0000	Normal Completion.
Warning	(any warning)		Message in console; the print job is continued.
Failure	(any failure)		Message in console; the print job is stopped.

4.2.3.4. Association Acceptance Policy

The 3D-RX Surgical Workstation AE will not accept any associations.

4.3. Network Interfaces

4.3.1. Physical Network Interface

The BV Family provides DICOM 3.0 TCP/IP Network Communication Support as defined in [DICOM] PS 3.8.
For the BV Family AE the TCP/IP stack is inherited from the VxWorks operating system.
For the VF Surgical Workstation AE and the 3D-RX Surgical Workstation AE the TCP/IP stack is inherited from the Windows XP operating system.

The BV Family supports Ethernet (ISO 8802-3) and IEEE 802.3 (10 / 100 BASE-T) for the printer and image interfaces.

4.3.2. Additional Protocols

No additional protocols are used.

4.4. Configuration

The configuration of a BV Family AE is done by means of a web-based service program called BV-Scope.
The configuration of a VF Surgical Workstation AE is done by means of a configuration program, which is accessible at start-up (password protected, intended to be used by Philips Customer Support Engineers only).
The configuration of a 3D-RX Surgical Workstation AE is done by means of service user tool.

4.4.1. AE Title/Presentation Address Mapping

An important installation issue is the translation from AE title to presentation address. How this is to be performed shall be described in this section.

4.4.1.1. Local AE Titles

Per default the BV Family AE Application Entity Title is “No Name”. At installation the Customer Support Engineer can change the host name. The BV Family AE can be changed independently.

Table 73: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
BV Family AE	“No Name”	104
		8104 (Storage Commitment, fixed)
VF Surgical Workstation AE	“VF1”	3010
3D-RX Surgical Workstation AE	“XVexport”	3110
	“XVexportvol”	3110
	“XVprint”	3110

4.4.1.2. Remote AE Title/Presentation Address Mapping

4.4.1.2.1. Remote Association Initiators

The following information must be provided for all relevant remote applications that are able to initiate DICOM associations to the BV Family.

- The Application Entity Title.
- The host name/IP address on which the remote application resides
- The port number at which the remote application has to send association requests
- The SOP classes and transfer syntaxes for which the VF Surgical Workstation AE accepts associations.

4.4.1.2.2. Remote Association Acceptors

The following information must be provided for all relevant remote applications that are able to accept DICOM associations from BV Family AE:

- The Application Entity Title.
- The host name/IP address on which the remote application resides.
- The port number at which the remote application accepts association requests.

4.4.2. Parameters

The specification of important operational parameters, and if configurable, their default value and range, are specified here.

The configuration parameters of the BV Family AE are given in Table 74, categorized in the following sections:

- Local System Parameters
- Export Target(s) (Store) Parameters
- Export Target(s) (Print) Parameters
- Worklist Management Target Parameters
- MPPS Target Parameters
- Storage commit (N-EVENT-REPORT) Parameters

Table 74: Configuration Parameters table for BV Family AE

Parameter		Configurable	Default Value
AE Specific Parameters			
SOP Class support		Yes	MPPS Storage Commitment Printer
Local System Parameters			
AE Title		Yes	“No Name”
Host Name		Yes	“No Name”
IP Address		Yes	0.0.0.0
Subnet Mask		Yes	0.0.0.0
Default Gateway		Yes	0.0.0.0
Max. PDU size		Yes	28672 (4..256 kb)
Receive Message Timeout		Yes	60 [s] (0..3600 s)
Association Close Timeout		Yes	1 [s] (0..3600 s)
Association Reply Timeout		Yes	60 [s] (0..3600 s)
Association Release Timeout		Yes	60 [s] (0..3600 s)
Network Write Timeout		Yes	60 [s] (0..3600 s)
Network Connect Timeout		Yes	60 [s] (0..3600 s)
Network Inactivity Timeout		Yes	60 [s] (0..3600 s)
Export Target(s) (Store) Parameters			
AE Title		Yes	“No Name”
Name		Yes	Max. 25 char. Unique
IP Address		Yes	0.0.0.0
Port number		Yes	104
Type		Yes	STORE
Storage Commit	AE Title	Yes	“No Name”
	IP Address	Yes	0.0.0.0
	Port number	Yes	104
	Enable/Disable	Yes	Disable
Export Target(s) (Print) Parameters			
AE Title		Yes	“No Name”
Name		Yes	Max. 25 char. Unique
IP Address		Yes	0.0.0.0
Port number		Yes	104
Type		Yes	PRINT
Printer type		Yes	Predefined List
Printer Priority		Yes	LOW
Film Destination		Yes	CURRENT

Parameter	Configurable	Default Value
Film Orientation	Yes	PORTRAIT
Film Size	Yes	CURRENT, depending on Printer Type
Border Density	Yes	BLACK
Border Density Value	Yes	1
Number of Copies	Yes	1
Magnification Type	No	Depending on Printer Type
Smoothing Type	No	Depending on Printer Type
Minimum Density	No	Depending on Printer Type
Maximum Density	No	Depending on Printer Type
Empty Image Density	No	Depending on Printer Type
Polarity	No	Depending on Printer Type
Trim	No	Depending on Printer Type
Configuration Information	No	Depending on Printer Type
Worklist Management Target Parameters		
AE Title	Yes	“No Name”
Name	Yes	Max. 25 char. Unique
IP Address	Yes	0.0.0.0
Port number	Yes	104
Type	Yes	MWL
Select Query	Yes	Predefined Query List, maximum 4 items in the list
Define Query	Yes	Defines the queries that can be selected
MPPS Target Parameters		
AE Title	Yes	“No Name”
Name	Yes	Max. 25 char. Unique
IP Address	Yes	0.0.0.0
Port number	Yes	104
Type	Yes	MPPS
Automatic MPPS	Yes	If configured, always start MPPS panel directly after selection of Export function
Protocol Names	Yes	List of Protocol Names that can be selected in the MPPS panel
Storage commit (N-EVENT-REPORT) Parameters		
AE Title	Yes	Local System AE-Title
IP Address	Yes	Local System IP address
Port number	No	Fixed: 8104

Note: Parameters that are part of a specific DICOM IOD are specified in section 4 and 8

Table 75: Configuration Parameters table for VF Surgical Workstation AE

Parameter	Configurable	Default Value
General Parameters		
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	No	-
General DIMSE level time-out values	No	-
Time-out waiting for response to TCP/IP connect request. (Low-level timeout)	No	-
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	-
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	-
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	-
Local Configurable AE Specific Parameters		
Size constraint in maximum object size	No	-
Maximum PDU size the AE can receive	Yes	0 (unlimited)
Maximum PDU size the AE can send	No	-
AE specific DIMSE level time-out values	No	-
Number of simultaneous Associations by Service and/or SOP Class	No	-
SOP Class support	Yes	-
Transfer Syntax support	Yes	-
Remote Configurable AE Specific Parameters		
Size constraint in maximum object size	No	-
Maximum PDU size the AE can receive	Yes	0 (unlimited)
Maximum PDU size the AE can send	No	-
AE specific DIMSE level time-out values	No	-
Number of simultaneous Associations by Service and/or SOP Class	No	-
SOP Class support	Yes	-
Transfer Syntax support	Yes	-

Note: The JPEG Baseline transfer syntax is only supported for RGB and YBR_FULL_422 images; therefore JPEG Baseline may NOT be configured for systems that are capable of handling storage of monochrome images too.

Table 76: Configuration Parameters table for 3D-RX Surgical Workstation AE

Parameter	Configurable	Default Value
Local Configurable AE Specific Parameters		
Exam ID	Yes	The Exam ID can be set to either Accession Number, Requested Procedure ID, Study ID, or Study Instance UID.

5. MEDIA INTERCHANGE

5.1. Implementation Model

5.1.1. Application Data Flow Diagram

The only DICOM media interchange implementation of the BV Family is implemented in the VF Surgical Workstation AE**.** Figure 20 shows the Media Interchange Application Data Flow as a functional overview of the VF Surgical Workstation AE for CD and DVD.

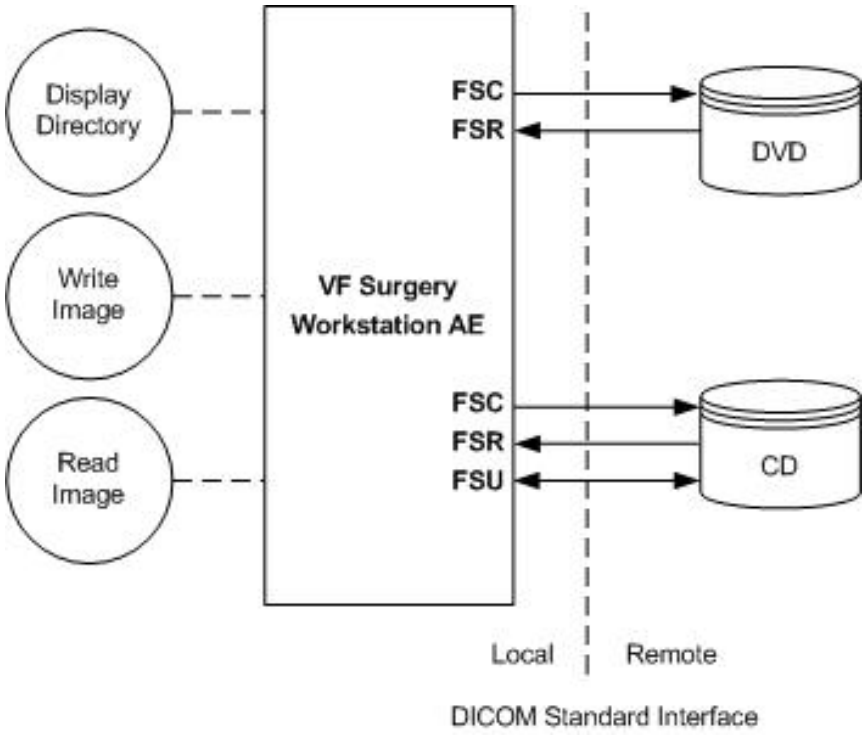

Figure 20: Application Data Flow Diagram

Table 83 shows the Media Interchange overview of the VF Surgical Workstation AE and the supporting roles for CD-R and DVD.

Table 77: Media Services

Media Storage Application Profile	Write Files		Read Files
	(FSC)	(FSU)	(FSR)
DVD Disk			
General Purpose DVD Interchange with JPEG	Yes	No	Yes
CD – R Disk			
General Purpose CD-R	Yes	Yes	Yes

Note: After data is written to DVD, the DVD is finalized; the finalized DVD can now be read on mostly every DVD reader. Currently the BV Family supports the next services:
FSC service for CD-R(W) and DVD + R(W) media; and the
FSR service accepts for DVD both DVD + R(W) and DVD - R(W) media and CD-R(W).
Not supported are the Media DVD -R / -RW.

The VF Surgical Workstation AE will act as a FSR, for CD-R and DVD, when reading the directory of the medium. The VF Surgical Workstation AE will act as a FSC / FSU for a CD-R and as FSC for DVD, when writing the selected images in a patient folder onto the medium.
The VF Surgical Workstation AE supports the media profiles as shows in the Table below:

Table 78: Media Profiles supported by VF Surgical Workstation AE

Application Profile	CD	DVD+RW / DVD+R
General Purpose	STD-GEN-CD	STD-GEN-DVD

Note; DVD-R and DVD-RW can be read but are not supported for writing.

Supported Photometric Interpretations
The VF Surgical Workstation AE supports images with the following DICOM Photometric Interpretations as shows in the Table below:

Table 79: Photometric interpretations supported by VF Surgical Workstation AE

Photometric Interpretation	Import	Export	Viewing
MONOCHROME1	YES	YES	YES
MONOCHROME2	YES	YES	YES
PALETTE COLOR	YES	YES	NO
RGB	YES	YES	YES
YBR_FULL	YES	YES	NO
YBR_FULL_422 (see note)	YES	YES	NO
YBR_PARTIAL_422	YES	YES	NO
YBR_RCT	YES	YES	NO
YBR_ICT	YES	YES	NO

Note: if the photometric interpretation YBR_FULL_422 is used in combination with transfer syntax JPEG-lossy then the pixel data is converted to RGB on import.

The system proposes the transfer syntaxes mentioned in Table below.

Table 80: Transfer Syntaxes of DVD/CD supported by VF Surgical Workstation AE

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List (note)	UID List		
See Note	See Note	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Note: any of the standard image storage and private SOP classes mentioned before. The preferred transfer syntax is ELE.

The VF Surgical Workstation AE supports images with Lossy image compression via JPEG as described as shows in the Table below.

Table 81: JPEG coding supported by VF Surgical Workstation AE

DICOM Transfer Syntax UID	JPEG coding process	JPEG description
1.2.840.10008.1.2.4.50	1	Lossy, Baseline (JPEG 8 Bit Image Compression)

Note: Lossy Compression is only supported for images with photometric interpretation RGB and YBR_FULL_422 and therefore VF Surgical Workstation AE *supports this only for Ultrasound Images.*

5.1.2. Functional Definitions of AE's

The VF Surgical Workstation AE implements the following functions for DICOM media.

DICOM Media Storage Service Class for CD and DVD

The VF Surgical Workstation AE can perform the CD-R DICOM Media Storage service as SCU, with capabilities for:
RWA Display Directory (as FSR),
RWA Write Images (as FSC / FSU), and
RWA Read Images (as FSR).

For DVD the VF Surgical Workstation AE can perform the DICOM Media Storage service as SCU, with capabilities for:
RWA Display Directory (as FSR),
RWA Write Images (as FSC), and
RWA Read Images (as FSR).

5.1.3. Sequencing of Real World Activities

Whenever DICOM Media (CD or DVD) has to be written, the VF Surgical Workstation AE first tries to read the DICOMDIR. The VF Surgical Workstation AE will compile the updated DICOMDIR and any required DICOM images into a CD or DVD session image; this session image will be written to the DICOM Media.

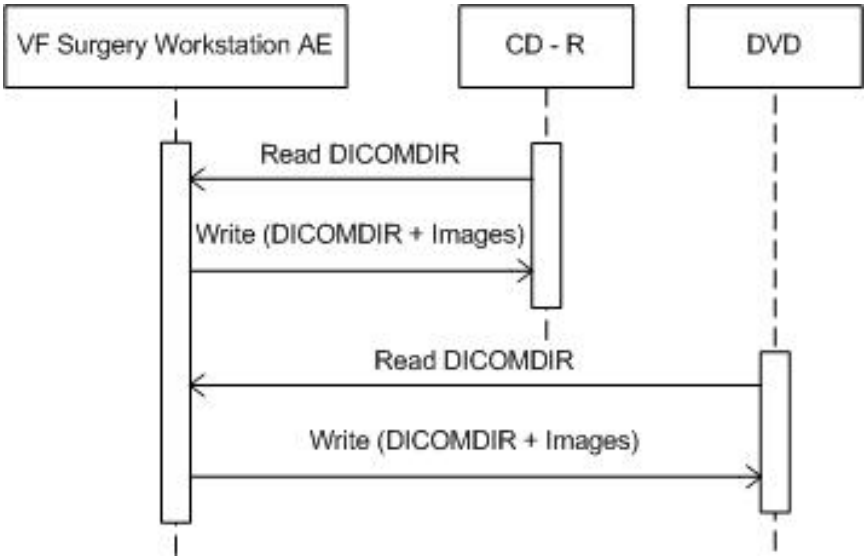

Figure 21: Sequencing of RWA Write Image

Note that after the DVD Media is written the DVD will be finalized by VF Surgical Workstation AE to guarantee the readability on the most DVD reader.

5.1.4. File Meta Information for Implementation Class and Version

The Implementation Class UID and Implementation Version Name are supplied as specified for the VF Surgical Workstation AE for networking.
Conform [DICOM], using File Meta Information Header version 1 requires the File Meta Information Version to be set as specified below.

Table 82: File Meta Information for VF Surgical Workstation AE

File Meta Information Version	00,01
Implementation Class UID	1.3.46.670589.5.2.23
Implementation Version Name	ViewForum R6.1

5.2. AE Specifications

5.2.1. VF Surgical Workstation AE

The VF Surgical Workstation AE provides standard conformance to the DICOM interchange option of the Media Storage service class, and follows the specifications as defined in [DICOM] Media Storage and File Format for Data Interchange (PS 3.10) the Media Storage Application Profiles STD-GEN-CD ([DICOM] PS 3.11) and the Media Storage Application Profiles STD-GEN-DVD-JPEG ([DICOM] PS 3.12) for Reading and Writing.

The VF Surgical Workstation AE supports multi-patient and multi-session for CD/DVD, both for reading and writing. Table 83 shows for each Application Profile in the first column the Real-World Activities in the second column, the roles required for each of these Real-World Activities in the third column, and the related Service Class Option in the fourth column.

Table 83: AE Related Application Profiles, Real-World Activities, and Roles for CD-R and DVD

Supported Application Profile	Real-World Activity	Roles	SC Option
STD-GEN-CD	Display Directory	FSR	Interchange
	Read Image	FSR	Interchange
	Write Image	FSC	Interchange
STD-GEN-DVD-JPEG	Display Directory	FSR	Interchange
	Read Image	FSR	Interchange
	Write Image	FSC	Interchange

The next table gives an overview of the supported SOP classes that can be read and written according the supported application profile in Table 83.

Table 84: Supported SOP Classes by the Media AE

Abstract Syntax		Transfer Syntax	
Name	UID	Name List	UID List
Media Storage Directory Storage	1.2.840.10008.1.3.10	ELE	1.2.840.10008.1.2.1
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1		
Digital X-Ray Image Storage – for Presentation	1.2.840.10008.5.1.4.1.1.1.1		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2		
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1		
MR Image Storage	1.2.840.10008.5.1.4.1.1.4		
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7		
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1		
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1		
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2		
X-Ray Specialization	1.3.46.670589.2.3.1.1		

Abstract Syntax		Transfer Syntax	
Name	UID	Name List	UID List
Stack of X-Ray	1.3.46.670589.2.4.1.1		
Volume	1.3.46.670589.5.0.1.1		
3D Volume Object	1.3.46.670589.5.0.2.1		
Surface	1.3.46.670589.5.0.3.1		
Cardio	1.3.46.670589.5.0.8.1		
CT Synthetic Image	1.3.46.670589.5.0.9		
MR Synthetic Image	1.3.46.670589.5.0.10		
MR Cardio Analysis	1.3.46.670589.5.0.11.1		
CX Synthetic Image	1.3.46.670589.5.0.12		
Perfusion	1.3.46.670589.5.0.13		
Perfusion Analysis	1.3.46.670589.5.0.14		

5.2.1.1. File Meta Information for the VF Surgical Workstation AE

The Source Application Entity Title is configurable (ref. section 5.4).

5.2.1.2. Real-World Activities

5.2.1.2.1. Display Directory

When a Database Open action is initiated on DICOM media then the VF Surgical Workstation AE acts as an FSR using the interchange option to read the DICOMDIR of the DICOM media.
This will result in an overview of the patients, studies, series, and images on the GUI.

5.2.1.2.1.1. Media Storage Application Profile

As depicted in Table 83, the VF Surgical Workstation AE supports the RWA Display Directory for STD-GEN-CD and STD-GEN-DVD-JPEG application profiles.

5.2.1.2.1.1.1. Options

The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series, and Image.

5.2.1.2.2. Read Image

When an image transfer from DICOM media is initiated then the VF Surgical Workstation AE acts as an FSR using the interchange option to import SOP instances from the DICOM media.

5.2.1.2.2.1. Media Storage Application Profile

As depicted in Table 83, the VF Surgical Workstation AE supports the RWA Read Image for STD-GEN-CD and STD-GEN-DVD-JPEG application profiles.

5.2.1.2.2.1.1. Options

The mandatory attributes of the DICOM images are required for the correct storage of the images in the local database. Optional attributes and retired/private attributes are stored too – if present; this is equivalent with the level 2 (Full) conformance for the Storage service class in the Network support.

5.2.1.2.3. Write Image

When an image transfer to DICOM media is initiated then the VF Surgical Workstation AE acts as an FSC using the interchange option to write SOP instances on the DICOM media.

5.2.1.2.3.1. Media Storage Application Profile

As depicted in Table 83, the VF Surgical Workstation AE supports the RWA Write Image for STD-GEN-CD and STD-GEN-DVD-JPEG application profiles. However, the VF Surgical Workstation AE only supports writing on DVD+R(W) media, not DVD-R(W) media.

5.2.1.2.3.1.1. Options

The DICOMDIR file will be extended when new images are written. In case some attributes are not present in an image but are specified as mandatory in the DICOMDIR definition of DICOM media, a generated value will be filled in.

Implementation remarks an restrictions
When writing the DICOMDIR records, key values are generated when no value of the corresponding attribute is supplied, according to the following table.

Table 85: Generated Keys

Key	Tag	Generated Value
Patient Keys		
Patient ID	0010,0020	At import the VF Surgical Workstation AE each time creates a new value based on the Study Instance UID for each new study written to DICOM media (even if this study belongs to a patient recorded earlier). Otherwise the default generated value shall be a succession of “UNKNOWN”, the Patient’s Name, the Patient’s Birth Date, and the Patient’s Sex, concatenated by using underscore characters.
Study Keys		
Study Date	0008,0020	Current date.
Study Time	0008,0030	Current time.
Study ID	0020,0010	“UNKNOWN”
Series Keys		
Series Number	0020,0011	1
Image Keys		
Instance Number	0020,0013	1

The default value for (0028,1040) Pixel Intensity Relationship is set to DISP.

The VF Surgical Workstation AE can write volumes of the media to that media.
If spanning is required then the VF Surgical Workstation AE asks for a new media.

5.3. Augmented and Private Application Profiles

5.3.1. Augmented Application Profiles

5.3.1.1. Augmented Application Profile AUG-GEN-DVD-JPEG

5.3.1.1.1. SOP Class Augmentations

As augmentation to the STD-GEN-DVD-JPEG application profile, also the SOP classes as per following table are supported.

Table 86: Additional SOP Classes supported by AUG-GEN-DVD-JPEG

SOP Class Name	SOP Class UID
X-Ray Specialization	1.3.46.670589.2.3.1.1
Stack of X-Ray	1.3.46.670589.2.4.1.1
Volume	1.3.46.670589.5.0.1.1
3D Volume Object	1.3.46.670589.5.0.2.1
Surface	1.3.46.670589.5.0.3.1
Cardio	1.3.46.670589.5.0.8.1
CT Synthetic Image	1.3.46.670589.5.0.9
MR Synthetic Image	1.3.46.670589.5.0.10
MR Cardio Analysis	1.3.46.670589.5.0.11.1
CX Synthetic Image	1.3.46.670589.5.0.12
Perfusion	1.3.46.670589.5.0.13
Perfusion Analysis	1.3.46.670589.5.0.14

5.3.1.1.2. Directory Augmentations

Not applicable.

5.3.1.1.3. Other Augmentations

Not applicable.

5.3.2. Private Application Profiles

Not applicable.

5.4. Media Configuration

Any configuration issues may be found in the Networking section 4.4.

6. SUPPORT OF CHARACTER SETS

Any support for character sets beyond the default character repertoire in Network and Media services shall be described here.

Table 87: Supported DICOM Character Sets of BV Family

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Single-byte Character Sets without Code Extensions					
Default repertoire	-	-	ISO-IR 6	G0	ISO 646
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
		-	ISO-IR 100	G1	Supplementary set of ISO 8859
Single-byte Character Sets with Code Extensions					
Default repertoire	ISO 2022 IR 6	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
Latin alphabet No. 1	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
		ESC 02/13 04/01	ISO-IR 100	G1	Supplementary set of ISO 8859

If a WLM query response includes a Person Name attribute containing character code 5C (i.e. BACKSLASH “\” in ISO-IR 6) then all characters behind the character code 5C will be omitted (at GUI and export, i.e. will still be present in MPPS).

Unsupported character sets will be accepted, though all characters will be displayed as per ISO_IR 100, not conforming the actual character set specification.

- The behavior when an unsupported character set is received shall be documented.
- Character set configuration capabilities, if any, shall be specified.
- Mapping and/or conversion of character sets across services and instances shall be specified.
- Query capabilities for attributes that include non-default character sets, both for the Worklist service class and the Query service class, shall be specified. Behavior of attributes using extended character sets by a C-FIND, both as SCU and SCP request and response, shall be specified. In particular the handling of Person Names (VR of PN) shall be specified.
- The presentation of the characters to a user, i.e. capabilities, font limitations and/or substitutions shall be specified.

7. SECURITY

7.1. Security Profiles

7.1.1. Basic Application Level Confidentiality Profile

The BV Family AE conforms to the Basic Application Level Confidentiality Profile as de-identifier.

De-identified SOP Instances will be created on DICOM Media if specified by the user.

No instances of the Encrypted Attributes Data Set are created. No transfer syntaxes are supported for encoding/decoding of Encrypted Attributes Data Sets.

The terms used to describe the replacement value in the anonymized patient data can be read as follows:

COPY	Same value as in source data
EMPTY	The attribute will have a value of zero length.
ANP	Attribute Not Present
n.a.	Not applicable, the attribute is not contained in the standard IOD of the BV Family AE

The next table lists the protected data attributes.

Table 88: Basic Application Level Confidentiality Profile Attributes

Name	Tag	VR	Replacement Value
Instance Creator UID	0008,0014	UI	n.a.
SOP Instance UID	0008,0018	UI	COPY
Accession Number	0008,0050	SH	EMPTY
Institution Name	0008,0080	LO	ANP
Institution Address	0008,0081	ST	n.a.
Referring Physician's Name	0008,0090	PN	EMPTY
Referring Physician's Address	0008,0092	ST	n.a.
Referring Physician's Telephone Numbers	0008,0094	SH	n.a.
Station Name	0008,1010	SH	COPY
Study Description	0008,1030	LO	COPY
Series Description	0008,103E	LO	COPY
Institutional Department Name	0008,1040	LO	n.a.
Physician(s) of Record	0008,1048	PN	n.a.
Performing Physicians' Name	0008,1050	PN	ANP
Name of Physician(s) Reading Study	0008,1060	PN	n.a.
Operators' Name (Technologist)	0008,1070	PN	COPY
Admitting Diagnoses Description	0008,1080	LO	n.a.
Referenced SOP Instance UID	0008,1155	UI	COPY
Derivation Description	0008,2111	ST	COPY
Patient's Name	0010,0010	PN	EMPTY

Name	Tag	VR	Replacement Value
Patient ID	0010,0020	LO	In Patient Module the Patient ID value is “EMPTY”. In the DIRECTORY RECORD: 0 (PATIENT) the Patient ID value has a new generated value
Patient’s Birth Date	0010,0030	DA	EMPTY
Patient’s Birth Time	0010,0032	TM	COPY
Patient’s Sex	0010,0040	CS	EMPTY
Other Patient Ids	0010,1000	LO	COPY
Other Patient Names	0010,1001	PN	COPY
Patient’s Age	0010,1010	AS	EMPTY
Patient’s Size	0010,1020	DS	COPY
Patient’s Weight	0010,1030	DS	COPY
Medical Record Locator	0010,1090	LO	n.a.
Ethnic Group	0010,2160	SH	n.a.
Occupation	0010,2180	SH	n.a.
Additional Patient’s History	0010,21B0	LT	n.a.
Patient Comments	0010,4000	LT	n.a.
Device Serial Number	0018,1000	LO	COPY
Protocol Name	0018,1030	LO	COPY
Study Instance UID	0020,000D	UI	COPY
Series Instance UID	0020,000E	UI	COPY
Study ID	0020,0010	SH	EMPTY
Frame of Reference UID	0020,0052	UI	n.a.
Synchronization Frame of Reference UID	0020,0200	UI	n.a.
Image Comments	0020,4000	LT	COPY
Requested Attributes Sequence	0040,0275	SQ	n.a.
UID	0040,A124	UI	n.a.
Content Sequence	0040,A730	SQ	n.a.
Storage Media File-set UID	0088,0140	UI	n.a.
Referenced Frame of Reference UID	3006,0024	UI	n.a.
Related Frame of Reference UID	3006,00C2	UI	n.a.

7.1.1.1. SOP Class Augmentations

DICOM media that have been written with the de-identification feature switched on (anonymized data) will have DICOM-format data.

In case of writing to CD or DVD, de-identification is supported. However, when the de-identification feature is active, also Secondary Capture images are written to the DICOM media; it is possible that they contain burned-in patient information.

7.2. Association Level Security

Not supported.

Any calling AE title and/or IP address may open an association.

7.3. Application Level Security

Not applicable.

8. ANNEXES BV FAMILY AE

8.1. IOD Contents

8.1.1. Created SOP Instances

This section specifies each IOD created by the BV Family AE.

Defined abbreviations for the presence of IOD modules are:

ALWAYS	the module is always present
CONDITIONAL	the module is used under specified condition

Defined abbreviations for the presence of module attributes in the tables are:

ALWAYS	the attribute is always present with a value
EMPTY	the attribute is always present without any value (attribute sent zero length)
VNAP	the attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	the attribute is present under specified condition – if present then it will always have a value
ANAPCV	the attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV	the attribute is present under specified condition – if present then it will not have any value

Defined abbreviations for the source of the attribute data values in the tables are:

AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter
COPY	the attribute value source is another SOP instance
FIXED	the attribute value is hard-coded in the application
IMPLICIT	the attribute value source is a user-implicit setting
MPPS	the attribute value source is a Modality Performed Procedure Step
MWL	the attribute value source is a Modality Worklist
USER	the attribute value source is explicit user input

8.1.1.1. Secondary Capture Image Storage SOP Class

Table 89: Modules of the Secondary Capture Image Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient module	ALWAYS
Study	General Study module	ALWAYS
	Patient Study module	CONDITIONAL
Series	General Series module	ALWAYS
Equipment	General Equipment module	CONDITIONAL
	SC Equipment module	ALWAYS
Image	General Image module	ALWAYS
	Image Pixel module	ALWAYS
	SC Image module	ALWAYS

Information Entity	Module Name	Usage
	SOP Common module	ALWAYS

Table 90: Created Secondary Capture Image Storage SOP Class Attributes

Name	Tag	VR	Present of Value	Source	Comment
Patient Module					
Patient's Name	0010,0010	PN	ALWAYS	MWL / USER	-
Patient ID	0010,0020	LO	ALWAYS	MWL / USER	-
Patient's Birth Date	0010,0030	DA	ALWAYS	MWL / USER	-
Patient's Birth Time	0010,0032	TM	VNAP	MWL	-
Patient's Sex	0010,0040	CS	ALWAYS	MWL / USER	-
Other Patient IDs	0010,1000	LO	VNAP	MWL	-
Other Patient Names	0010,1001	PN	VNAP	MWL	-
General Study Module					
Study Date	0008,0020	DA	ALWAYS	AUTO	Examination date.
Study Time	0008,0030	TM	ALWAYS	AUTO	Examination time.
Accession Number	0008,0050	SH	ALWAYS	MWL / USER	-
Referring Physician's Name	0008,0090	PN	VNAP	MWL	-
Study Description	0008,1030	LO	ALWAYS	IMPLICIT	User selected examination type.
Referenced Study Sequence	0008,1110	SQ	VNAP	MWL	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	MWL	-
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	MWL	-
Study Instance UID	0020,000D	UI	ALWAYS	AUTO / MWL	-
Study ID	0020,0010	SH	EMPTY,	FIXED	-
Patient Study Module					
Patient’s Weight	0010,1030	DS	VNAP	MWL	-
General Series Module					
Performing Physician’s Name	0008,1050	PN	VNAP, USER		Can be entered by Physician who makes the Examination
Series Instance UID	0020,000E	UI	ALWAYS	AUTO	-
Series Number	0020,0011	IS	ALWAYS	AUTO	Increasing number that identifies series (run).
Laterality	0020,0060	CS	EMPTY	FIXED	-
Performed Procedure Step Start Date	0040,0244	DA	ALWAYS	AUTO	Examination date.
Performed Procedure Step Start Time	0040,0245	TM	ALWAYS	AUTO	Examination time.
General Equipment Module					
Manufacturer	0008,0070	LO	ALWAYS, AUTO		Applied value: Philips Medical Systems

Name	Tag	VR	Present of Value	Source	Comment
Institution Name	0008,0080	LO	ALWAYS	CONFIG	Hospital Name.
Station Name	0008,1010	SH	ALWAYS	CONFIG	-
Manufacturer's Model Name	0008,1090	LO	ALWAYS	AUTO	Applied value: BV Family
SC Equipment Module					
Modality	0008,0060	CS	ALWAYS	AUTO	Applied values: OT (Dose report only); XA
Conversion Type	0008,0064	CS	ALWAYS	AUTO	Applied value: DI
Secondary Capture Device ID	0018,1010	LO	ALWAYS	CONFIG	BV System ID.
Secondary Capture Device Manufacturer	0018,1016	LO	ALWAYS	AUTO	Applied value: Philips Medical Systems
Secondary Capture Device Manufacturer's Model Name	0018,1018	LO	ALWAYS	AUTO	Applied value: BV Family
Secondary Capture Device Software Version	0018,1019	LO	ALWAYS	AUTO	Applied value: BV Family R2.2
General Image Module					
Image Type	0008,0008	CS	ALWAYS	AUTO	Applied value: DERIVED\SECONDARY
Instance Number	0020,0013	IS	ALWAYS	AUTO	Generated running number.
Patient Orientation	0020,0020	CS	EMPTY	FIXED	-
Image Pixel Module					
Samples per Pixel	0028,0002	US	ALWAYS	AUTO	Applied value: 1
Photometric Interpretation	0028,0004	CS	ALWAYS	AUTO	Applied value: MONOCHROME2
Rows	0028,0010	US	ALWAYS	AUTO	Applied values: 1024
Columns	0028,0011	US	ALWAYS	AUTO	Applied values: For images with text: 1280; For images without text: 1024
Bits Allocated	0028,0100	US	ALWAYS	AUTO	Applied value: 16
Bits Stored	0028,0101	US	ALWAYS	AUTO	Applied value: 12
High Bit	0028,0102	US	ALWAYS	AUTO	Applied value: 11
Pixel Representation	0028,0103	US	ALWAYS	AUTO	Applied value: 0
Pixel Data	7FE0,0010	OW	ALWAYS	AUTO	-
SC Image Module					
Date of Secondary Capture	0018,1012	DA	ALWAYS	AUTO	The date the Secondary Capture Image is captured.
Time of Secondary Capture	0018,1014	TM	ALWAYS	AUTO	The time the Secondary Capture Image is captured.
SOP Common Module					

Name	Tag	VR	Present of Value	Source	Comment
Specific Character Set	0008,0005	CS	ALWAYS	AUTO	Applied value: ISO_IR 100
SOP Class UID	0008,0016	UI	ALWAYS	AUTO	Applied value: 1.2.840 .10008.5.1.4.1. 1.7 (Secondary Capture Image Storage)
SOP Instance UID	0008,0018	UI	ALWAYS	AUTO	-

8.1.1.2. X-Ray Angiographic Image Storage SOP Class

Table 91: Created X-Ray Angiographic Image Storage SOP Class Attributes

Information Entity	Module Name	Usage
Patient	Patient module	ALWAYS
Study	General Study module	ALWAYS
	Patient Study module	CONDITIONAL
Series	General Series module	ALWAYS
Equipment	General Equipment module	ALWAYS
Image	General Image module	ALWAYS
	Image Pixel module	ALWAYS
	Cine module	ALWAYS
	Multi-Frame module	ALWAYS
	X-Ray Image module	ALWAYS
	X-Ray Acquisition module	ALWAYS
	XA Positioner module	ALWAYS
	SOP Common module	ALWAYS

Table 92: Created X-Ray Angiographic Image Storage SOP Class Attributes

Name	Tag	VR	Present of Value	Source	Comment
Patient Module					
Patient's Name	0010,0010	PN	ALWAYS	MWL / USER	-
Patient ID	0010,0020	LO	ALWAYS	MWL / USER	-
Patient's Birth Date	0010,0030	DA	ALWAYS	MWL / USER	-
Patient's Birth Time	0010,0032	TM	VNAP	MWL	-
Patient's Sex	0010,0040	CS	ALWAYS	MWL / USER	-
Other Patient IDs	0010,1000	LO	VNAP	MWL	-
Other Patient Names	0010,1001	PN	VNAP	MWL	-
General Study Module					
Study Date	0008,0020	DA	ALWAYS	AUTO	Examination date.

Name	Tag	VR	Present of Value	Source	Comment
Study Time	0008,0030	TM	ALWAYS	AUTO	Examination time.
Accession Number	0008,0050	SH	ALWAYS	MWL / USER	-
Referring Physician's Name	0008,0090	PN	VNAP	MWL	-
Study Description	0008,1030	LO	ALWAYS	IMPLICIT	User selected examination type.
Referenced Study Sequence	0008,1110	SQ	VNAP	MWL	-
>Referenced SOP Class UID	0008,1150	UI	ALWAYS	MWL	Applied value: 1.2.840.10008.3.1.2.3.1
>Referenced SOP Instance UID	0008,1155	UI	ALWAYS	MWL	-
Study Instance UID	0020,000D	UI	ALWAYS,	AUTO / MWL	-
Study ID	0020,0010	SH	VNAP	FIXED	Value only present for 3D acquisitions. Applied value: 3D-RX
Patient Study Module					
Patient's Weight	0010,1030	DS	VNAP	MWL	-
General Series Module					
Series Date	0008,0021	DA	ANAP	AUTO	Only present for 3D acquisitions
Series Time	0008,0031	TM	ANAP	AUTO	Only present for 3D acquisitions.
Modality	0008,0060	CS	ALWAYS	AUTO	Applied value: XA
Series Description	0008,103E	LO	ANAP	AUTO	Depending on 3D run. Applied values: 3DRAanypos,3DRApatient (normal 3D run), 3DRAanypos,3DRAdodec (geometry calibration), 3DRAanypos,3DRApincus (pincushion calibration)
Performing Physician's Name	0008,1050	PN	VNAP	MWL / USER	Can be entered by Physician who makes the Examination
Series Instance UID	0020,000E	UI	ALWAYS	AUTO	-
Series Number	0020,0011	IS	ALWAYS	AUTO	Increasing number that identifies series (run).

Name	Tag	VR	Present of Value	Source	Comment
Laterality	0020,0060	CS	EMPTY	FIXED	-
Performed Procedure Step Start Date	0040,0244	DA	ALWAYS	AUTO	Examination date.
Performed Procedure Step Start Time	0040,0245	TM	ALWAYS	AUTO	Examination time.
Request Attributes Sequence	0040,0275	SQ	ANAP	AUTO	Only present for 3D acquisitions.
> Request Procedure ID	0040,1001	SH	ALWAYS	AUTO	Applied values: For acquisition: 3DRAAcquisition For calibration: GeometryCalibration, PincushionCalibration
General Equipment Module					
Manufacturer	0008,0070	LO	ALWAYS	AUTO	Applied value: Philips Medical Systems
Institution Name	0008,0080	LO	ALWAYS	CONFIG	Hospital Name.
Station Name	0008,1010	SH	ALWAYS	CONFIG	-
Manufacturer's Model Name	0008,1090	LO	ALWAYS	AUTO	Applied value: BV Family
General Image Module					
Content Date	0008,0023	DA	ALWAYS	AUTO	-
Content Time	0008,0033	TM	ALWAYS	AUTO	-
Instance Number	0020,0013	IS	ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS	EMPTY	FIXED	-
Image Pixel Module					
Rows	0028,0010	US	ALWAYS	AUTO	Applied value: 1024
Columns	0028,0011	US	ALWAYS	AUTO	Applied value: 1024
Pixel Data	7FE0,0010	OW	ALWAYS	AUTO	-
Cine Module					
Start Trim	0008,2142	IS	ALWAYS	AUTO	Applied value: 1
Stop Trim	0008,2143	IS	ALWAYS	AUTO	Number of images in the run.
Recommended Display Frame Rate	0008,2144	IS	ALWAYS	AUTO	Acquisition speed.
Cine Rate	0018,0040	IS	ALWAYS	AUTO	Calculated from acquisition speed.
Frame Time	0018,1063	DS	ALWAYS	AUTO	Calculated from acquisition speed [ms].
Multi-Frame Module					

Name	Tag	VR	Present of Value	Source	Comment
Number of Frames	0028,0008	IS	ALWAYS	AUTO	Number of exported images in the run.
Frame Increment Pointer	0028,0009	AT	ALWAYS	AUTO	Applied value: 0x00181063 (Frame Time)
X-Ray Image Module					
Image Type	0008,0008	CS	ALWAYS	AUTO	Applied value: ORIGINAL\ PRIMARY
Samples per Pixel	0028,0002	US	ALWAYS	AUTO	Applied value: 1
Photometric Interpretation	0028,0004	CS	ALWAYS	AUTO	Applied value: MONOCHROME2
Pixel Spacing	0028,0030	DS	ANAP	FIXED	Only present for 3D acquisitions. Applied value: 0.183/0.183
Bits Allocated	0028,0100	US	ALWAYS	AUTO	Applied value: 16
Bits Stored	0028,0101	US	ALWAYS	AUTO	Applied value: 12
High Bit	0028,0102	US	ALWAYS	AUTO	Applied value: 11
Pixel Representation	0028,0103	US	ALWAYS	AUTO	Applied value: 0
Pixel Intensity Relationship	0028,1040	CS	ALWAYS	AUTO	Applied value: LIN
X-Ray Acquisition Module					
KVP	0018,0060	DS	EMPTY	FIXED	-
Field of View Shape	0018,1147	CS	ALWAYS	AUTO	Applied value: ROUND
Exposure	0018,1152	IS	EMPTY	FIXED	-
Radiation Setting	0018,1155	CS	ALWAYS	AUTO	Applied values: GR, SC
Type of Filters	0018,1161	LO	ALWAYS	AUTO	Applied value: NONE
Intensifier Size	0018,1162	DS	ALWAYS	AUTO	Applied values: 150, 230, 310
Grid	0018,1166	CS	ALWAYS	AUTO	Applied value: IN
XA Positioner Module					
Distance Source to Detector	0018,1110	DS	ALWAYS	FIXED	Applied value: 983

Name	Tag	VR	Present of Value	Source	Comment
Distance Source to Patient	0018,1111	DS	ANAP	FIXED	Only present for 3D acquisitions. Applied value: 651
Positioner Motion	0018,1500	CS	VNAP	AUTO	Value only present for 3D acquisitions. Applied value: DYNAMIC
Positioner Primary Angle	0018,1510	DS	ALWAYS	AUTO	Applied values: For non-3D acquisitions: 0 For 3D acquisitions: -101.5
Positioner Secondary Angle	0018,1511	DS	ALWAYS	FIXED	Applied value: 0
Positioner Primary Angle Increment	0018,1520	DS	ANAP	AUTO	Only present for 3D acquisitions. Applied value equals 203 divided by the number of images in the run.
Positioner Secondary Angle Increment	0018,1521	DS	ANAP	FIXED	Only present for 3D acquisitions. Applied value: 0
SOP Common Module					
Specific Character Set	0008,0005	CS	ALWAYS	AUTO	Applied value: ISO_IR 100
SOP Class UID	0008,0016	UI	ALWAYS	AUTO	Applied value: 1.2.840.10008.5.1.4.1.1.12.1 (X-Ray Angiography Image Storage)
SOP Instance UID	0008,0018	UI	ALWAYS	AUTO	-

8.1.2. Usage of Attributes from Received IOD's

Not applicable.

8.1.3. Attribute Mapping

The following mapping applies for attributes of the BV Family AE.

Table 93: Attribute Mapping of the BV Family AE

Attribute Name	MWL Tag	MPPS		SC Tag	XA Tag
		Create Tag	Set Tag		
Specific Character Set (if present)	0008,0005	0008,0005	-	0008,0005	0008,0005
Accession Number	0008,0050	0008,0050	-	0008,0050	0008,0050
Modality	0008,0060	0008,0060	-	0008,0060	0008,0060
Referring Physician's Name	0008,0090	-	-	0008,0090	0008,0090
Referenced Study Sequence	0008,1110	0008,1110	-	0008,1110	0008,1110
> Referenced SOP Class UID	0008,1150	0008,1150	-	-	0008,1150
> Referenced SOP Instance UID	0008,1155	0008,1155	-	-	0008,1155
Referenced Patient Sequence	0008,1120	0008,1120	-	-	-
> Referenced SOP Class UID	0008,1150	0008,1150	-	-	-
> Referenced SOP Instance UID	0008,1155	0008,1155	-	-	-
Patient's Name	0010,0010	0010,0010	-	0010,0010	0010,0010
Patient ID	0010,0020	0010,0020	-	0010,0020	0010,0020
Patient's Birth Date	0010,0030	0010,0030	-	0010,0030	0010,0030
Patient's Birth Time	0010,0032	-	-	0010,0032	0010,0032
Patient's Sex	0010,0040	0010,0040	-	0010,0040	0010,0040
Other Patient IDs	0010,1000	-	-	0010,1000	0010,1000
Other Patient Names	0010,1001	-	-	0010,1001	0010,1001
Patient's Weight	0010,1030	-	-	0010,1030	0010,1030
Study Instance UID	0020,000D	0020,000D	-	0020,000D	0020,000D
Requested Procedure Description	0032,1060	0032,1060	-	-	-
Scheduled Performing Physician's Name (Physician who makes the Examination)	0040,0006	-	0008,1050	0008,1050	0008,1050
Scheduled Procedure Step Description	0040,0007	0040,0007	-	-	-
Scheduled Procedure Step ID	0040,0009	0040,0009	-	-	-
> Scheduled Performing Physician's Name	0040,0006	-	0008,1050	0008,1050	0008,1050
> Scheduled Procedure Step Description	0040,0007	0040,0007	-	-	-
> Scheduled Protocol Code Sequence	0040,0008	0040,0008	-	-	-
>> Code Value	0008,0100	0008,0100	-	-	-
>> Coding Scheme Designator	0008,0102	0008,0102	-	-	-
>> Coding Scheme Version	0008,0103	0008,0103	-	-	-
>> Code Meaning	0008,0104	0008,0104	-	-	-
> Scheduled Procedure Step ID	0040,0009	0040,0009	-	-	-
Requested Procedure ID	0040,1001	0040,1001	-	-	-

8.1.4. Coerced/Modified fields

When exporting an image the following behavior applies.

A Secondary Capture image shall be exported as reflected in the GUI.

To enable reconstruction, an X-ray image shall be exported without annotations and using the original grayscale values as per acquisition, and a 3D image shall be exported without supplementary rotation.

8.2. Data Dictionary of Private Attributes

Not applicable.

8.3. Coded Terminology and Templates

Not applicable.

8.4. Grayscale Image consistency

Not applicable.

8.5. Standard Extended/Specialized/Private SOPs

8.5.1. Standard Extended X-Ray Angiographic Image Storage SOP Class

The
X-Ray Angiographic Image Storage SOP Class is extended to create a standard extended SOP class by addition of standard and private attributes to the created SOP instances as documented in section 8.1.1.2

8.6. Private Transfer Syntaxes

Not applicable.

9. ANNEXES VF SURGICAL WORKSTATION AE

9.1. IOD Contents

9.1.1. Created SOP Instances

This section specifies each IOD created by the VF Surgical Workstation AE.

Defined abbreviations for the presence of IOD modules are:

ALWAYS	the module is always present
CONDITIONAL	the module is used under specified condition

Defined abbreviations for the presence of module attributes in the tables are:

ALWAYS	the attribute is always present with a value
EMPTY	the attribute is always present without any value (attribute sent zero length)
VNAP	the attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	the attribute is present under specified condition – if present then it will always have a value
ANAPCV	the attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV	the attribute is present under specified condition – if present then it will not have any value

Defined abbreviations for the source of the attribute data values in the tables are:

AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter
COPY	the attribute value source is another SOP instance
FIXED	the attribute value is hard-coded in the application
IMPLICIT	the attribute value source is a user-implicit setting
MPPS	the attribute value source is a Modality Performed Procedure Step
MWL	the attribute value source is a Modality Worklist
USER	the attribute value source is explicit user input

9.1.1.1. Secondary Capture Image Storage SOP Class

Table 94: Modules of the Secondary Capture Image Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient module	ALWAYS
Study	General Study module	ALWAYS
	Patient Study module	CONDITIONAL
Series	General Series module	ALWAYS
Equipment	General Equipment module	CONDITIONAL
	SC Equipment module	ALWAYS
Image	General Image module	ALWAYS
	Image Pixel module	ALWAYS
	SC Image module	ALWAYS

Information Entity	Module Name	Usage
	Overlay Plane module	CONDITIONAL
	Modality LUT module	CONDITIONAL
	VOI LUT module	CONDITIONAL
	SOP Common	ALWAYS

Table 95: Created Secondary Capture Image Storage SOP Class Attributes

Name	Tag	VR	Presence of Value	Source	Comment
Patient Module (ALWAYS)					
Referenced Patient Sequence	0008,1120	SQ	ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	-
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
Patient's Name	0010,0010	PN	VNAP	AUTO, USER	From GUI
Patient ID	0010,0020	LO	VNAP	AUTO, USER	From GUI
Patient's Birth Date	0010,0030	DA	VNAP	AUTO, USER	From GUI
Patient's Birth Time	0010,0032	TM	ANAP	AUTO	Format <hhmm>
Patient's Sex	0010,0040	CS	VNAP	AUTO, USER	From GUI M, F, O
Other Patient IDs	0010,1000	LO	ANAP	AUTO	-
Other Patient Names	0010,1001	PN	ANAP	AUTO	-
Ethnic Group	0010,2160	SH	ANAP	AUTO	-
Patient Comments	0010,4000	LT	ANAP	AUTO, USER	From GUI
PATIENT MEDICAL MODULE					
Medical Alerts	0010,2000	LO	ANAP	AUTO, USER	From GUI
Contrast Allergies	0010,2110	LO	ANAP	AUTO, USER	From GUI
General Study Module (ALWAYS)					
Study Date	0008,0020	DA	VNAP	AUTO	-
Study Time	0008,0030	TM	VNAP	AUTO	-
Accession Number	0008,0050	SH	VNAP	AUTO, USER	From GUI
Referring Physician's Name	0008,0090	PN	VNAP	AUTO, USER	From GUI
Study Description	0008,1030	LO	ANAP	AUTO, USER	From GUI
Procedure Code Sequence	0008,1032	SQ	ANAP	AUTO	-
> Code Value	0008,0100	SH	ALWAYS	AUTO	-
> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
> Context Identifier	0008,010F	CS	ANAP	AUTO	-
Physician(s) of Record	0008,1048	PN	ANAP	AUTO, USER	From GUI

Name	Tag	VR	Presence of Value	Source	Comment
Name of Physician(s) Reading Study	0008,1060	PN	ANAP	AUTO, USER	From GUI
Referenced Study Sequence	0008,1110	SQ	ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	-
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
Study Instance UID	0020,000D	UI	ALWAYS	AUTO	-
Study ID	0020,0010	SH	VNAP	AUTO	-
Patient Study Module (CONDITIONAL)					
Admitting Diagnoses Description	0008,1080	UI	ANAP	AUTO, USER	From GUI
Admitting Diagnoses Code Sequence	0008,1084	SQ	ANAP	AUTO	-
> Code Value	0008,0100	SH	ALWAYS	AUTO	-
> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
> Context Identifier	0008,010F	CS	ANAP	AUTO	-
Patient's Age	0010,1010	AS	ANAP	AUTO, USER	From GUI
Patient's Size	0010,1020	DS	ANAP	AUTO	-
Patient's Weight	0010,1030	DS	ANAP	AUTO	-
Occupation	0010,2180	SH	ANAP	AUTO, USER	From GUI
Additional Patient's History	0010,21B0	LT	ANAP	AUTO, USER	From GUI
General Series Module (ALWAYS)					
Series Date	0008,0021	DA	ANAP	AUTO	-
Series Time	0008,0031	TM	ANAP	AUTO	-
Series Description	0008,103E	LO	ANAP	AUTO	-
Performing Physicians' Name	0008,1050	PN	ANAP	AUTO, USER	-
Operators' Name	0008,1070	PN	ANAP	AUTO	-
Referenced Performed Procedure Step Sequence	0008,1111	SQ	ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	-
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
Body Part Examined	0018,0015	CS	ANAP	AUTO	-
Protocol Name	0018,1030	LO	ANAP	AUTO, USER	-
Patient Position	0018,5100	CS	ANAPCV	AUTO	-
Series Instance UID	0020,000E	UI	ALWAYS	CONF	-
Series Number	0020,0011	IS	VNAP	AUTO	-
Laterality	0020,0060	CS	ANAPCV	AUTO	-
Smallest Pixel Value in Series	0028,0108	SS / US	ANAP	AUTO	-
Largest Pixel Value in Series	0028,0109	SS / US	ANAP	AUTO	-
Request Attributes Sequence	0040,0275	SQ	ANAP	AUTO	-
> Scheduled Procedure Step Description	0040,0007	LO	ANAP	AUTO	-
> Scheduled Protocol Code Sequence	0040,0008	SQ	ANAP	AUTO	-
>> Code Value	0008,0100	SH	ALWAYS	AUTO	-

Name	Tag	VR	Presence of Value	Source	Comment
>> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
>> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
>> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
>> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
>> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
>> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
>> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
>> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
>> Context Identifier	0008,010F	CS	ANAP	AUTO	-
> Scheduled Procedure Step ID	0040,0009	SH	ALWAYS	AUTO	-
> Requested Procedure ID	0040,1001	SH	ALWAYS	AUTO	-
Performed Procedure Step Start Date	0040,0244	DA	ANAP	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM	ANAP	AUTO	-
Performed Procedure Step ID	0040,0253	SH	ANAP	AUTO	-
Performed Procedure Step Description	0040,0254	LO	ANAP	AUTO, USER	From GUI
Performed Protocol Code Sequence	0040,0260	SQ	ANAP	AUTO	-
> Code Value	0008,0100	SH	ALWAYS	AUTO	-
> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
> Context Identifier	0008,010F	CS	ANAP	AUTO	-
Comments on the Performed Procedure Step	0040,0280	ST	ANAP	AUTO, USER	From GUI
General Equipment Module (CONDITIONAL)					
Manufacturer	0008,0070	LO	VNAP	AUTO	-
Institution Name	0008,0080	LO	ANAP	AUTO	-
Institution Address	0008,0081	ST	ANAP	AUTO	-
Station Name	0008,1010	SH	ANAP	AUTO, USER	-
Institutional Department Name	0008,1040	LO	ANAP	AUTO	-
Manufacturer's Module Name	0008,1090	LO	ANAP	AUTO	-
Device Serial Number	0018,1000	LO	ANAP	AUTO	-
Software Versions	0018,1020	LO	ANAP	AUTO	-
Spatial Resolution	0018,1050	DS	ANAP	AUTO	-
Date of Last Calibration	0018,1200	DA	ANAP	AUTO	-
Time of Last Calibration	0018,1201	TM	ANAP	AUTO	-
Pixel Padding Value	0028,0120	SS / US	ANAP	AUTO	-
SC Equipment Module (ALWAYS)					
Modality	0008,0060	CS	ALWAYS	AUTO, USER	-
Conversion Type	0008,0064	CS	ALWAYS	AUTO	Applied value: WSD
General Image Module (ALWAYS)					
Image Type	0008,0008	CS	ANAP	AUTO	-
Acquisition Date	0008,0022	DA	ANAP	AUTO	-

Name	Tag	VR	Presence of Value	Source	Comment
Content Date	0008,0023	DA	ANAPCV	AUTO	The date the image pixel data creation started.
Acquisition Datetime	0008,002A	DT	ANAP	AUTO	-
Acquisition Time	0008,0032	TM	ANAP	AUTO	-
Content Time	0008,0033	TM	ANAPCV	AUTO	The time the image pixel data creation started.
Referenced Image Sequence	0008,1140	SQ	ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	-
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
> Referenced Frame Number	0008,1160	IS	ANAP	AUTO	-
> Purposed of Reference Code Sequence	0040,A170	SQ	ANAP	AUTO	-
>> Code Value	0008,0100	SH	ALWAYS	AUTO	-
>> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
>> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
>> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
>> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
>> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
>> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
>> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
>> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
>> Context Identifier	0008,010F	CS	ANAP	AUTO	-
Derivation Description	0008,2111	ST	ANAP	AUTO	-
Source Image Sequence	0008,2112	SQ	ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	-
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
> Referenced Frame Number	0008,1160	IS	ANAP	AUTO	-
> Purpose of Reference Code Sequence	0040,A170	SQ	ANAP	AUTO	-
>> Code Value	0008,0100	SH	ALWAYS	AUTO	-
>> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
>> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
>> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
>> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
>> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
>> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
>> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
>> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
>> Context Identifier	0008,010F	CS	ANAP	AUTO	-
Derivation Code Sequence	0008,9215	SQ	ANAP	AUTO	-
> Code Value	0008,0100	SH	ALWAYS	AUTO	-
> Coding Scheme Designator	0008,0102	SH	ALWAYS	AUTO	-
> Coding Scheme Version	0008,0103	SH	ALWAYS	AUTO	-
> Code Meaning	0008,0104	LO	ALWAYS	AUTO	-
> Mapping Resource	0008,0105	CS	ALWAYS	AUTO	-
> Context Group Version	0008,0106	DT	ALWAYS	AUTO	-
> Context Group Local Version	0008,0107	DT	ALWAYS	AUTO	-
> Context Group Extension Flag	0008,010B	CS	ANAP	AUTO	-
> Context Group Extension Creator UID	0008,010D	UI	ALWAYS	AUTO	-
> Context Identifier	0008,010F	CS	ANAP	AUTO	-

Name	Tag	VR	Presence of Value	Source	Comment
Acquisition Number	0020,0012	IS	ANAP	AUTO	-
Instance Number	0020,0013	IS	VNAP	AUTO	-
Patient Orientation	0020,0020	CS	ALWAYS	AUTO	-
Images in Acquisition	0020,1002	IS	ANAP	AUTO	-
Image Comments	0020,4000	LT	ANAP	AUTO	-
Quality Control Image	0028,0300	CS	ANAP	AUTO	-
Burned in Annotation	0028,0301	CS	ANAP	AUTO	-
Lossy Image Compression	0028,2110	CS	ANAP	AUTO	-
Lossy Image Compression Ratio	0028,2112	DS	ANAP	AUTO	-
Icon Image Sequence	0088,0200	SQ	ANAP	AUTO	-
> Slice Thickness	0018,0050	DS	ALWAYS	AUTO	-
> Slice Location	0020,1041	DS	ALWAYS AUTO	AUTO	-
> Pixel Spacing	0028,0030	DS	ALWAYS	AUTO	-
Presentation LUT Shape	2050,0020	CS	ANAP	AUTO	-
Image Pixel Module (ALWAYS)					
Samples per Pixel	0028,0002	US	ALWAYS	AUTO	-
Photometric Interpretation	0028,0004	CS	ALWAYS	AUTO	-
Planar Configuration	0028,0006	US	ANAP	AUTO	-
Row	0028,0010	US	ALWAYS	AUTO	-
Columns	0028,0011	US	ALWAYS	AUTO	-
Pixel Aspect Ratio	0028,0034	IS	ANAP	AUTO	-
Bits Allocated	0028,0100	US	ALWAYS	AUTO	-
Bits Stored	0028,0101	US	ALWAYS	AUTO	-
High Bit	0028,0102	US	ALWAYS	AUTO	-
Pixel Representation	0028,0103	US	ALWAYS	AUTO	-
Smallest Image Pixel Value	0028,0106	SS / US	ANAP	AUTO	-
Largest Image Pixel Value	0028,0107	SS / US	ANAP	AUTO	-
Red Palette Color Lookup Table Descriptor	0028,1101	SS / US	ANAP	AUTO	-
Green Palette Color Lookup Table Descriptor	0028,1102	SS / US	ANAP	AUTO	-
Blue Palette Color Lookup Table Descriptor	0028,1103	SS / US	ANAP	AUTO	-
Red Palette Color Lookup Table Data	0028,1201	OW	ANAP	AUTO	-
Green Palette Color Lookup Table Data	0028,1202	OW	ANAP	AUTO	-
Blue Palette Color Lookup Table Data	0028,1203	OW	ANAP	AUTO	-
Pixel Data	7FE0,0010	OW	ALWAYS	AUTO	-
SC Image Module (ALWAYS)					
Date of Secondary Capture	0018,1012	DA	ALWAYS	AUTO	-
Time of Secondary Capture	0018,1014	TM	ALWAYS	AUTO	-
Overlay Plane Module (CONDITIONAL)					
Overlay Rows	60xx,0010	US	ALWAYS	AUTO	-
Overlay Columns	60xx,0011	US	ALWAYS	AUTO	-
Overlay Description	60xx,0022	LO	ANAP	AUTO	-
Overlay Type	60xx,0040	CS	ALWAYS	AUTO	-
Overlay Subtype	60xx,0045	LO	ANAP	AUTO	-
Overlay Origin	60xx,0050	SS	ALWAYS	AUTO	-
Overlay Bits Allocated	60xx,0100	US	ALWAYS	AUTO	-
Overlay Bits Position	60xx,0102	US	ALWAYS	AUTO	-
ROI Area	60xx,1301	IS	ANAP	AUTO	-
ROI Mean	60xx,1302	DS	ANAP	AUTO	-
ROI Standard Deviation	60xx,1303	DS	ANAP	AUTO	-

Name	Tag	VR	Presence of Value	Source	Comment
Overlay Label	60xx,1500	LO	ANAP	AUTO	-
Overlay Data	60xx,3000	OB / OW	ALWAYS	AUTO	-
Modality LUT Module (CONDITIONAL)					
Modality LUT Sequence	0028,3000	SQ	ANAP	AUTO	-
> LUT Descriptor	0028,3002	SS / US	ALWAYS	AUTO	-
> LUT Explanation	0028,3003	LO	ANAP	AUTO	-
> Modality LUT Type	0028,3004	LO	ALWAYS	AUTO	-
> LUT Data	0028,3006	SS / US / OW	ALWAYS	AUTO	-
Rescale Intercept	0028,1052	DS	ANAP	AUTO	-
Rescale Slope	0028,1053	DS	ANAP	AUTO	-
VOI LUT Module (CONDITIONAL)					
VOI LUT Sequence	0028,3010	SQ	ANAP	AUTO	-
>LUT Descriptor	0028,3002	SS / US	ALWAYS	AUTO	-
>LUT Explanation	0028,3003	LO	ANAP	AUTO	-
>LUT Data	0028,3006	SS / US / OW	ALWAYS	AUTO	-
Window Center	0028,1050	DS	ANAP	AUTO	-
Window Width	0028,1051	DS	ANAP	AUTO	-
Window Center & Width Explanation	0028,1055	LO	ANAP	AUTO	-
SOP Common Module (ALWAYS)					
Specific Character Set	0008,0005	CS	ANAP	AUTO	Applied values: ISO_IR 100
SOP Class UID	0008,0016	UI	ALWAYS	AUTO	Applied value: 1.2.840.10008.5.1.1.7
SOP Instance UID	0008,0018	UI	ALWAYS	AUTO	-

9.1.1.2. Grayscale Softcopy Presentation State Storage SOP Class

Table 96: Modules of the

Grayscale Softcopy Presentation State Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient module	ALWAYS
Study	General Study module	ALWAYS
Series	General Series module	ALWAYS
	Presentation Series module	ALWAYS
Equipment	General Equipment module	ALWAYS
Presentation State	Displayed Area module	ALWAYS
	Graphic Layer module	CONDITIONAL
	Softcopy Presentation LUT module	ALWAYS
	Softcopy VOI LUT module	CONDITIONAL
	Presentation State Identification module	ALWAYS

Information Entity	Module Name	Usage
	Presentation State Relationship module	ALWAYS
	Presentation State Shutter module	ALWAYS
	SOP Common module	ALWAYS

Table 97: Created

Grayscale Softcopy Presentation State Storage SOP Class Attributes

Name	Tag	VR	Present of Value	Source	Comment
Patient Module					
Patient's Name	0010,0010	PN	ALWAYS	COPY	-
Patient ID	0010,0020	LO	VNAP	COPY	-
Patient's Birth Date	0010,0030	DA	VNAP	COPY	-
Patient's Sex	0010,0040	CS	VNAP	COPY	-
General Study Module					
Study Date	0008,0020	DA	ALWAYS	COPY	Date on which this study was created.
Study Time	0008,0030	TM	ALWAYS	COPY	Time on which this Study was created.
Accession Number	0008,0050	SH	VNAP	COPY	-
Referring Physician's Name	0008,0090	PN	VNAP	COPY	-
Study Description	0008,1030	LO	VNAP	COPY	-
Referenced Study Sequence	0008,1110	SQ	ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	Applied value: 1.2.840.10008.3.1.2.3.3
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
Study Instance UID	0020,000D	UI	ALWAYS, COPY	COPY	-
Study ID	0020,0010	SH	VNAP, COPY	COPY	-
General Series Module					
Series Date	0008,0021	DA	ANAP	AUTO	Date the Series started.
Series Time	0008,0031	TM	ANAP, AUTO	AUTO	Time the Series started.
Series Instance UID	0020,000E	UI	ALWAYS	AUTO	-
Series Number	0020,0011	IS	VNAP	COPY	-
Laterality	0020,0060	CS	ANAP	COPY	Applied values: L, R
Presentation Series Module					
Modality	0008,0060	CS	ALWAYS	AUTO	Applied value: PR (Presentation State)
General Equipment Module					
Manufacturer	0008,0070	LO	ALWAYS	AUTO	Applied value: Philips Medical Systems
Manufacturer's Model Name	0008,1090	LO	ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO	ALWAYS	AUTO	-
Displayed Area Module					
Displayed Area Selection Sequence	0070,005A	SQ	ALWAYS	AUTO	-

Name	Tag	VR	Present of Value	Source	Comment
> Displayed Area Top Left Hand Corner	0070,0052	SL	ALWAYS	FIXED	Applied value: 1, 1
> Displayed Area Bottom Right Hand Corner	0070,0053	SL	ALWAYS	AUTO	-
> Presentation Size Mode	0070,0100	CS	ALWAYS	FIXED	Applied value: SCALE TO FIT
Graphic Layer Module					
Graphic Layer Sequence	0070,0060	SQ	ALWAYS	AUTO	-
> Graphic Layer	0070,0002	CS	ALWAYS	AUTO	-
> Graphic Layer Order	0070,0062	IS	ALWAYS	AUTO	-
Softcopy Presentation LUT Module					
Presentation LUT Sequence	2050,0010	SQ	ALWAYS	AUTO	-
> LUT Descriptor	0028,3002	SS	ALWAYS	AUTO	-
> LUT Data	0028,3006	OW	ALWAYS	AUTO	-
Softcopy VOI LUT Module					
Softcopy VOI LUT Sequence	0028,3110	SQ	ALWAYS	AUTO	-
> Referenced Image Sequence	0008,1140	SQ	ANAP	AUTO	-
>> Referenced SOP Class UID	0008,1150	UI	ALWAYS	AUTO	-
>> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
>> Referenced Frame Number	0008,1160	IS	ANAP	AUTO	-
> Window Center	0028,1050	DS	ANAP	AUTO	-
> Window Width	0028,1051	DS	ANAP	AUTO	-
> Window Center & Width Explanation	0028,1055	DS	ANAPCV	AUTO	-
> VOI LUT Sequence	0028,3010	SQ	ANAP	COPY	-
>> LUT Descriptor	0028,3002	SQ	ALWAYS	COPY	-
>> LUT Explanation	0028,3003	SQ	ANAPCV	COPY	-
>> LUT Data	0028,3006	SQ	ALWAYS	COPY	-
Presentation State Identification Module					
Instance Number	0020,0013	IS	ALWAYS	AUTO	-
Content Label	0070,0080	CS	ALWAYS	AUTO	Applied values: “AS LAST SEEN”, ”NEW AT IMPORT”
Content Description	0070,0081	LO	VNAP	AUTO	-
Presentation Creation Date	0070,0082	DA	ALWAYS	AUTO	Current date.
Presentation Creation Time	0070,0083	TM	ALWAYS	AUTO	Current time.
Content Creator’s Name	0070,0084	PN	ALWAYS	AUTO	Applied value: “Surgery user”
Presentation State Relationship Module					
Referenced Series Sequence	0008,1115	SQ	ALWAYS	AUTO	-
> Referenced Image Sequence	0008,1140	SQ	ALWAYS	AUTO	-
>> Referenced SOP Class UID	0008,1150	UI	ALWAYS	COPY	-
>> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	COPY	-
> Series Instance UID	0020,000E	UI	ALWAYS	AUTO	-
Presentation State Shutter Module					
Shutter Presentation Value	0018,1622	US	ANAP	AUTO	Applied value: 0
SOP Common Module					
Specific Character Set	0008,0005	CS	ANAP,	AUTO	Applied value: ISO_IR 100
SOP Class UID	0008,0016	UI	ALWAYS	AUTO	Applied value: 1.2.840.10008.5.1.4.1.1.11.1
SOP Instance UID	0008,0018	UI	ALWAYS	AUTO	-

9.1.2. Usage of Attributes from Received IOD's

None specific.

9.1.3. Attribute Mapping

Not applicable.

9.1.4. Coerced/Modified fields

In general, the VF Surgical Workstation AE will try and optimize the imported image data. This may involve the removal of redundant data, either or not due to the creation of a Presentation State object for the image data. This may also involve the creation of extra attributes. As it is not the intention of the VF Surgical Workstation AE to export this data as such, the SOP Instance UID shall not be changed.
If not available at import then the VF Surgical Workstation AE will create the additional attributes as listed in Table 98.

Table 98: Additional Attributes for

Image Storage

Attribute Name	Tag	VR	Generated Value
Performed Procedure Step Start Date	0040,0244	DA	Copied from (0008,0020) Study Date.
Performed Procedure Step Start Time	0040,0245	TM	Copied from (0008,0030) Study Time.
Performed Procedure Step ID	0040,0253	SH	Copied from (0020,0010) Study ID.
Performed Procedure Step Description	0040,0254	LO	Copied from (0008,1030) Study Description.

If the SCU does not propose a presentation context for the Grayscale Softcopy Presentation State storage SOP class, then the VF Surgical Workstation AE will derive Presentation State data from the imported image data and store this data in a new series within the examination of the imported image.
However, if during import the image is accompanied by Presentation State data, the VF Surgical Workstation AE database shall avoid data overlap by only storing the relevant data from the first object received; either the first image or its Presentation State!
Thus it will omit data received by succeeding objects concerning the optional attributes (VT=3) listed in Table 99, and clear all mandatory attributes (VT=2) listed in Table 100.

Table 99: Omitted Attributes for

Image Storage

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module					
Referenced Patient Sequence	0008,1120	SQ		ANAP	AUTO
Patient's Birth Time	0010,0032	TM		ANAP	AUTO
Other Patient Ids	0010,1000	LO		ANAP	AUTO
Other Patient Names	0010,1001	PN		ANAP	AUTO
Ethnic Group	0010,2160	SH		ANAP	AUTO

Patient Comments	0010,4000	LT		ANAP	AUTO
General Study Module					
Referring Physician Identification Sequence	0008,0096	SQ		ANAP	AUTO
Study Description	0008,1030	LO		ANAP	AUTO
Procedure Code Sequence	0008,1032	SQ		ANAP	AUTO
Physician(s) of Record	0008,1048	PN		ANAP	AUTO
Physician(s) of Record Identification Sequence	0008,1049	SQ		ANAP	AUTO
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	AUTO
Physician(s) Reading Study Identification Sequence	0008,1062	SQ		ANAP	AUTO
Referenced Study Sequence	0008,1110	SQ		ANAP	AUTO
Patient Study Module					
Admitting Diagnoses Description	0008,1080	UI		ANAP	AUTO
Admitting Diagnoses Code Sequence	0008,1084	SQ		ANAP	AUTO
Patient's Age	0010,1010	AS		ANAP	AUTO
Patient's Size	0010,1020	DS		ANAP	AUTO
Patient's Weight	0010,1030	DS		ANAP	AUTO
Occupation	0010,2180	SH		ANAP	AUTO
Additional Patient History	0010,21B0	LT		ANAP	AUTO
Clinical Trial Study Module					
Clinical Trial Time Point Description	0012,0051			ANAP	AUTO
General Series Module					
Series Date	0008,0021	DA		ANAP	AUTO
Series Time	0008,0031	TM		ANAP	AUTO
Series Description	0008,103E	LO		ANAP	AUTO
Performing Physicians' Name	0008,1050	PN		ANAP	AUTO
Performing Physician Identification Sequence	0008,1052	SQ		ANAP	AUTO
Operators' Name	0008,1070	PN		ANAP	AUTO
Operators Identification Sequence	0008,1072	SQ		ANAP	AUTO
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO
Body Part Examined	0018,0015	CS		ANAP	AUTO
Protocol Name	0018,1030	LO		ANAP	AUTO
Smallest Pixel Value in Series	0028.0108	US / SS		ANAP	AUTO
Largest Pixel Value in Series	0028.0109	US / SS		ANAP	AUTO
Performed Procedure Step Start Date	0040,0244	DA		ANAP	AUTO
Performed Procedure Step Start Time	0040,0245	TM		ANAP	AUTO
Performed Procedure Step ID	0040,0253	SH		ANAP	AUTO
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	AUTO
Request Attributes Sequence	0040,0275	SQ		ANAP	AUTO
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	AUTO
General Equipment Module					
Institution Name	0008,0080	LO		ANAP	AUTO
Institution Address	0008,0081	ST		ANAP	AUTO
Station Name	0008,1010	SH		ANAP	AUTO
Institutional Department Name	0008,1040	LO		ANAP	AUTO
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO
Device Serial Number	0018,1000	LO		ANAP	AUTO
Software Versions	0018,1020	LO		ANAP	AUTO

Spatial Resolution	0018,1050	DS		ANAP	AUTO
Date of Last Calibration	0018,1200	DA		ANAP	AUTO
Time of Last Calibration	0018,1201	TM		ANAP	AUTO
Pixel Padding Value	0028,0120	US / SS		ANAP	AUTO
Display Shutter Module					
Shutter Presentation Value	0018,1622	US		ANAP	AUTO
Overlay Plane Module					
Overlay Description	60xx,0022	LO		ANAP	AUTO
Overlay Subtype	60xx,0045	LO		ANAP	AUTO
ROI Area	60xx,1301	IS		ANAP	AUTO
ROI Mean	60xx,1302	DS		ANAP	AUTO
ROI Standard Deviation	60xx,1303	DS		ANAP	AUTO
Overlay Label	60xx,1500	LO		ANAP	AUTO
SOP Common Module					
Instance Creation Date	0008,0012	DA		ANAP	AUTO
Instance Creation Time	0008,0013	TM		ANAP	AUTO
Instance Creator UID	0008,0014	UI		ANAP	AUTO
Coding Scheme Identification Sequence	0008,0110	SQ		ANAP	AUTO
Timezone Offset From UTC	0008,0201	SH		ANAP	AUTO
Contributing Equipment Sequence	0018,A001	SQ		ANAP	AUTO
Instance Number	0020,0013	IS		ANAP	AUTO
SOP Authorization Date and Time	0100,0420	DT		ANAP	AUTO
SOP Authorization Comment	0100,0424	LT		ANAP	AUTO
Authorization Equipment Certification Number	0100,0426	LO		ANAP	AUTO
MAC Parameters Sequence	4FFE,0001	SQ		ANAP	AUTO
Digital Signatures Sequence	FFFA,FFFA	SQ		ANAP	AUTO

Table 100: Cleared Attributes for

Image Storage

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient Module					
Patient's Name	0010,0010	PN		VNAP	AUTO
Patient ID	0010,0020	LO		VNAP	AUTO
Patient's Birth Date	0010,0030	DA		VNAP	AUTO
Patient's Sex	0010,0040	CS		VNAP	AUTO
Clinical Trial Subject Module					
Clinical Trial Protocol Name	0012,0021	LO		VNAP	AUTO
Clinical Trial Site ID	0012,0030	LO		VNAP	AUTO
Clinical Trial Site Name	0012,0031	LO		VNAP	AUTO
General Study Module					
Study Date	0008,0020	DA		VNAP	AUTO
Study Time	0008,0030	TM		VNAP	AUTO
Accession Number	0008,0050	SH		VNAP	AUTO
Referring Physician's Name	0008,0090	PN		VNAP	AUTO
Study ID	0020,0010	SH		VNAP	AUTO
Clinical Trial Study Module					
Clinical Trial Time Point ID	0012,0050	LO		VNAP	AUTO
General Series Module					

Patient Position	0018,5100	CS		ANAPCV	AUTO
Series Number	0020,0011	IS		VNAP	AUTO
Laterality	0020,0060	CS		ANAPCV	AUTO
Clinical Trial Series Module					
Clinical Trial Coordinating Center Name	0012,0060	LO		VNAP	AUTO
General Equipment Module					
Manufacturer	0008,0070	LO		VNAP	AUTO
Mask Module					
Recommended Viewing Mode	0028,1090	CS		VNAP	AUTO
Overlay/Curve Activation Module					
Curve Activation Layer	50xx,1001	CS		ANAP	AUTO
Overlay Activation Layer	60xx,1001	CS		ANAP	AUTO

The VF Surgical Workstation AE allows the operator (USER) to modify attributes of the stored images in the GUI; see Table 101.
The VF Surgical Workstation AE does not modify the pixel values of the stored images. Modified images retain their original Study, Series and Image UID.

Table 101: Modifiable Attributes

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient					
Patient's Name	0010,0010	PN		VNAP	USER
Patient ID	0010,0020	LO		VNAP	USER
Patient's Birth Date	0010,0030	DA		VNAP	USER
Patient's Sex	0010,0040	CS		VNAP	USER
Medical Alerts	0010,2000	LO	1-N	VNAP	USER
Contrast Allergies	0010,2110	LO	1-N	VNAP	USER
Patient Comments	0010,4000	LT		ANAP	USER
Study					
Accession Number	0008,0050	SH		VNAP	USER
Referring Physician's Name	0008,0090	PN		VNAP	USER
Study Description	0008,1030	LO		ANAP	USER
Physician(s) of Record	0008,1048	PN	1-N	ANAP	USER
Name of Physician(s) Reading Study	0008,1060	PN	1-N	ANAP	USER
Admitting Diagnoses Description	0008,1080	LO	1-N	ANAP	USER
Patient's Age	0010,1010	AS		ANAP	USER
Occupation	0010,2180	SH		ANAP	USER
Additional Patient History	0010,21B0	LT		ANAP	USER
Examination					
Performed Station Name	0040,0242	SH	An institution defined name for the modality on which the Performed Procedure Step was performed.	ANAP	CONF, MPPS, USER
Performed Location	0040,0243	SH	Description of the location at which the Performed Procedure Step was performed.	ANAP	MPPS, USER
Performed Procedure Step Description	0040,0254	LO	From Modality Worklist or user input. The user can modify the description provided via Modality Worklist.	ANAP	MPPS, USER
Performed Procedure Type Description	0040,0255	LO	A description of the type of procedure performed.	ANAP	MPPS, USER

Comments on the Performed Procedure Step	0040,0280	ST	User-defined comments on the Performed Procedure Step.	ANAP	MPPS, USER
Series					
-					

9.2. Data Dictionary of Private Attributes

Not applicable.

9.3. Coded Terminology and Templates

Not applicable.

9.4. Grayscale Image consistency

The high-resolution display monitor attached to the product can be calibrated by using the service tool together with a light probe. See the [VFRB] for details on the calibration procedure.

9.5. Standard Extended/Specialized/Private SOPs

The VF Surgical Workstation AE supports the following standard specialized SOP classes as SCP.

Table 102: Standard Specialized SOP Classes of VF Surgical Workstation AE

SOP Class Name	SOP Class UID
X-Ray Specialization	1.3.46.670589.2.3.1.1
Stack of X-Ray	1.3.46.670589.2.4.1.1
Volume	1.3.46.670589.5.0.1.1
3D Volume Object	1.3.46.670589.5.0.2.1
Surface	1.3.46.670589.5.0.3.1
Cardio	1.3.46.670589.5.0.8.1
CT Synthetic Image	1.3.46.670589.5.0.9
MR Synthetic Image	1.3.46.670589.5.0.10
MR Cardio Analysis	1.3.46.670589.5.0.11.1
CX Synthetic Image	1.3.46.670589.5.0.12
Perfusion	1.3.46.670589.5.0.13
Perfusion Analysis	1.3.46.670589.5.0.14

9.6. Private Transfer Syntaxes

Not applicable.

10. ANNEXES 3D-RX SURGICAL WORKSTATION AE

10.1. IOD Contents

10.1.1. Created SOP Instances

This section specifies each IOD created by the 3D-RX Surgical Workstation AE.

Defined abbreviations for the presence of IOD modules are:

ALWAYS	the module is always present
CONDITIONAL	the module is used under specified condition

Defined abbreviations for the presence of module attributes in the tables are:

ALWAYS	the attribute is always present with a value
EMPTY	the attribute is always present without any value (attribute sent zero length)
VNAP	the attribute is always present and its Value is Not Always Present (attribute sent zero length if no value is present)
ANAP	the attribute is present under specified condition – if present then it will always have a value
ANAPCV	the attribute is present under specified condition – if present then its Value is Not Always Present (attribute sent zero length if condition applies and no value is present)
ANAPEV	the attribute is present under specified condition – if present then it will not have any value

Defined abbreviations for the source of the attribute data values in the tables are:

AUTO	the attribute value is generated automatically
CONFIG	the attribute value source is a configurable parameter
COPY	the attribute value source is another SOP instance
FIXED	the attribute value is hard-coded in the application
IMPLICIT	the attribute value source is a user-implicit setting
MPPS	the attribute value source is a Modality Performed Procedure Step
MWL	the attribute value source is a Modality Worklist
USER	the attribute value source is explicit user input

10.1.1.1. Secondary Capture Image Storage SOP Class

Table 103: Modules of the Secondary Capture Image Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient module	ALWAYS
Study	General Study module	ALWAYS
Series	General Series module	ALWAYS
Equipment	General Equipment module	ALWAYS
	SC Equipment module	ALWAYS
Image	General Image module	ALWAYS
	Image Pixel module	ALWAYS
	SC Image module	ALWAYS
	VOI LUT module	ALWAYS
	SOP Common module	ALWAYS

Table 104: Created Secondary Capture Image Storage SOP Class Attributes

Name	Tag	VR	Present of Value	Source	Comment
Patient Module					
Patient's Name	0010,0010	PN	ALWAYS	COPY	-
Patient ID	0010,0020	LO	ALWAYS	COPY	-
Patient's Birth Date	0010,0030	DA	ALWAYS	COPY	-
Patient's Sex	0010,0040	CS	ALWAYS	COPY	-
General Study Module					
Study Date	0008,0020	DA	ALWAYS	AUTO	-
Study Time	0008,0030	TM	ALWAYS	AUTO	-
Accession Number	0008,0050	SH	ALWAYS	COPY	-
Referring Physician's Name	0008,0090	PN	ALWAYS	COPY	-
Study Instance UID	0020,000D	UI	ALWAYS	COPY	-
Study ID	0020,0010	SH	ALWAYS	AUTO	-
General Series Module					
Series Date	0008,0021	DA	ALWAYS	AUTO	-
Series Time	0008,0031	TM	ALWAYS	AUTO	-
Performing Physician's Name	0008,1050	PN	ANAPCV	COPY	-
Referenced Study Component Sequence	0008,1111	SQ	ALWAYS	AUTO	-
> Referenced SOP Class UID	0008,1150	UI			Uniquely identifies the referenced Modality Performed Procedure SOP Class. Applied value: 1.2.840.10008.3.1.2.3.3
> Referenced SOP Instance UID	0008,1155	UI	ALWAYS	AUTO	-
Patient Position	0018,5100	CS	ANAP	AUTO	-
Series Instance UID	0020,000E	UI	ALWAYS	AUTO	-
Series Number	0020,0011	IS	ALWAYS	AUTO	-
Performed Procedure Step Start Date	0040,0244	DA	ANAP	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM	ANAP	AUTO	-
Performed Procedure Step ID	0040,0253	SH	ANAP	AUTO	-
Performed Procedure Step Description	0040,0254	LO	ANAP	AUTO	-
Request Attributes Sequence	0040,0275	SQ	ANAP	AUTO	-
> Scheduled Procedure Step Description	0040,0007	LO	ANAP	AUTO	-
> Scheduled Action Item Code Sequence	0040,0008	SQ	ANAP	AUTO	-
>> Code Value	0008,0100	SH	ANAP	AUTO	-
>> Coding Scheme Designator	0008,0102	SH	ANAP	AUTO	-
>> Coding Scheme Version	0008,0103	SH	ANAP	AUTO	-
>> Code Meaning	0008,0104	LO	ANAP	AUTO	-
> Scheduled Procedure Step ID	0040,0009	SH	ANAP	AUTO	-
> Requested Procedure ID	0040,1001	SH	ANAP	AUTO	-
>> Code Value	0008,0100	SH	ANAP	AUTO	-
>> Coding Scheme Designator	0008,0102	SH	ANAP	AUTO	-
General Equipment Module					

Name	Tag	VR	Present of Value	Source	Comment
Manufacturer	0008,0070	LO	ALWAYS	AUTO	Applied value: Philips Medical Systems (Netherlands)
Institution Name	0008,0080	LO	ALWAYS	AUTO	-
Station Name	0008,1010	SH	ALWAYS	AUTO	-
Manufacturer's Model Name	0008,1090	LO	ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO	ALWAYS	AUTO	Applied value: R_5.1_1
Institution Name	0008,0080	LO	ALWAYS	AUTO	Applied value: XtraVision
SC Equipment Module					
Conversion Type	0008,0064	CS	ALWAYS	AUTO	Applied value: WSD
Modality	0008,0060	CS	ALWAYS	AUTO	Applied value: XA
General Image Module					
Image Type	0008,0008	CS	ALWAYS	AUTO	Applied value: DERIVED\ SECONDARY
Instance Number	0020,0013	IS	ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS	EMPTY	FIXED	-
Image Pixel Module					
Samples per Pixel	0028,0002	US	ALWAYS	AUTO	Applied value: 1
Photometric Interpretation	0028,0004	CS	ALWAYS	AUTO	Applied value: MONOCHROME 2
Rows	0028,0010	US	ALWAYS	AUTO	Applied value: 512
Columns	0028,0011	US	ALWAYS	AUTO	Applied value: 512
Bits Allocated	0028,0100	US	ALWAYS	AUTO	Applied value: 8
Bits Stored	0028,0101	US	ALWAYS	AUTO	Applied value: 8
High Bit	0028,0102	US	ALWAYS	AUTO	Applied value: 7
Pixel Representation	0028,0103	US	ALWAYS	AUTO	Applied value: 0000
Pixel Data	7FE0,0010	OW /OB	ALWAYS	AUTO	-
SC Image Module					
Date of Secondary Capture	0018,1012	DA	ALWAYS	AUTO	-
Time of Secondary Capture	0018,1014	TM	ALWAYS	AUTO	-
VOI LUT Module					
Window Center	0028,1050	DS	ALWAYS	AUTO	Applied value: 32767.5
Window Width	0028,1051	DS	ALWAYS	AUTO	Applied value: 65535
SOP Common Module					
Specific Character Set	0008,0005	CS	ALWAYS	AUTO	Applied value: ISO_IR 100
SOP Class UID	0008,0016	UI	ALWAYS	AUTO	Applied value: 1.3.46.760589.2.4.1.1
SOP Instance UID	0008,0018	UI	ALWAYS	AUTO	-

10.1.1.2. CX Image Storage SOP Class

Table 105: Modules of the CX Image Storage SOP Class

Information Entity	Module Name	Usage
Patient	Patient module	ALWAYS
Study	General Study module	ALWAYS
Series	General Series module	ALWAYS
Frame of Reference	Frame of Reference module	ALWAYS
Equipment	General Equipment module	ALWAYS
Image	General Image module	ALWAYS
	Image Plane module	ALWAYS
	Image Pixel module	ALWAYS
	VOI LUT module	ALWAYS
	SOP Common module	ALWAYS

Table 106: Created CX Image Storage SOP Class Attributes

Name	Tag	VR	Present of Value	Source	Comment
Patient Module					
Patient's Name	0010,0010	PN	ALWAYS	COPY	-
Patient ID	0010,0020	LO	ALWAYS	COPY	-
Patient's Birth Date	0010,0030	DA	ALWAYS	COPY	-
Patient's Sex	0010,0040	CS	ALWAYS	COPY	-
General Study Module					
Study Date	0008,0020	DA	ALWAYS	AUTO	-
Study Time	0008,0030	TM	ALWAYS	AUTO	-
Accession Number	0008,0050	SH	ALWAYS	COPY	-
Referring Physician's Name	0008,0090	PN	ALWAYS	COPY	-
Study Instance UID	0020,000D	UI	ALWAYS	COPY	-
Study ID	0020,0010	SH	ALWAYS	AUTO	-
General Series Module					
Series Date	0008,0021	DA	ALWAYS	AUTO	-
Series Time	0008,0031	TM	ALWAYS	AUTO	-
Modality	0008,0060	CS	ALWAYS	AUTO	Applied value: XA
Performing Physician's Name	0008,1050	PN	VNAP	COPY	-
Patient Position	0018,5100	CS	ALWAYS	AUTO	Applied values: FFD, FFDR, FFP, FFS, HFDL, HFDR, HFP, HFS
Series Instance UID	0020,000E	UI	ALWAYS	AUTO	-
Series Number	0020,0011	IS	ALWAYS	AUTO	Applied value: 1
Performed Procedure Step Start Date	0040,0244	DA	ALWAYS	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM	ALWAYS	AUTO	-
Performed Procedure Step ID	0040,0253	SH	ALWAYS	AUTO	-
Performed Procedure Step Description	0040,0254	LO	ALWAYS	AUTO	-
Request Attributes Sequence	0040,0275	SQ	ALWAYS	AUTO	-
> Scheduled Procedure Step Description	0040,0007	LO	ALWAYS	AUTO	-
> Scheduled Procedure Step ID	0040,0009	SH	ALWAYS	AUTO	-
> Requested Procedure ID	0040,1001	SH	ALWAYS	AUTO	-

Name	Tag	VR	Present of Value	Source	Comment
Frame of Reference Module					
Frame of Reference UID	0020,0052	UI	ALWAYS, AUTO		-
Position Reference Indicator	0020,1040	LO	ALWAYS, AUTO		-
General Equipment Module					
Manufacturer	0008,0070	LO	ALWAYS	AUTO	Applied value: Philips Medical Systems (Netherlands)
Institution Name	0008,0080	LO	ALWAYS	AUTO	-
Station Name	0008,1010	SH	ALWAYS	AUTO	-
Manufacturer's Model Name	0008,1090	LO	ALWAYS	AUTO	Applied value: XtraVision
Software Version(s)	0018,1020	LO	ALWAYS	AUTO	Applied value: R_5.1_1
General Image Module					
Image Type	0008,0008	CS	ALWAYS	AUTO	Applied value: DERIVED\SECONDARY
Instance Number	0020,0013	IS	ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS	EMPTY	FIXED	-
Image Plane Module					
Slice Thickness	0018,0050	DS	ALWAYS	AUTO	-
Image Position (Patient)	0020,0032	DS	ALWAYS	AUTO	-
Image Orientation (Patient)	0020,0037	DS	ALWAYS	AUTO	-
Slice Location	0020,1041	DS	ALWAYS	AUTO	-
Pixel Spacing	0028,0030	DS	ALWAYS	AUTO	-
Image Pixel Module					
Samples per Pixel	0028,0002	US	ALWAYS	AUTO	Applied value: 1
Photometric Interpretation	0028,0004	CS	ALWAYS	AUTO	Applied value: MONOCHROME2
Rows	0028,0010	US	ALWAYS	AUTO	Applied values: 128, 256
Columns	0028,0011	US	ALWAYS	AUTO	Applied values: 128, 256
Bits Allocated	0028,0100	US	ALWAYS	AUTO	Applied value: 8
Bits Stored	0028,0101	US	ALWAYS	AUTO	Applied value: 8
High Bit	0028,0102	US	ALWAYS	AUTO	Applied value: 7
Pixel Representation	0028,0103	US	ALWAYS	AUTO	Applied value: 0000
Pixel Data	7FE0,0010	OB / OW	ALWAYS	AUTO	-
VOI LUT Module					
Window Center	0028,1050	DS	ALWAYS	AUTO	Applied value: 32767.5
Window Width	0028,1051	DS	ALWAYS	AUTO	Applied value: 65535
SOP Common Module					
Specific Character Set	0008,0005	CS	ALWAYS	AUTO	Applied value: ISO_IR 100
SOP Class UID	0008,0016	UI	ALWAYS	AUTO	Applied value: 1.3.46.760589.2.4.1.1
SOP Instance UID	0008,0018	UI	ALWAYS	AUTO	-

10.1.2. Usage of Attributes from Received IOD's

Not applicable.

10.1.3. Attribute Mapping

The following mapping applies for attributes of the 3D-RX Surgical Workstation AE.

Table 107: Attribute Mapping of the 3D-RX Surgical Workstation AE

Attribute Name	BV Family AE	SC Tag	CX Tag
Accession Number	0008,0050	0008,0050	0008,0050
Referring Physician's Name	0008,0090	0008,0090	0008,0090
Patient's Name	0010,0010	0010,0010	0010,0010
Patient ID	0010,0020	0010,0020	0010,0020
Patient's Birth Date	0010,0030	0010,0030	0010,0030
Patient's Sex	0010,0040	0010,0040	0010,0040
Study Instance UID	0020,000D	0020,000D	0020,000D
Performing Physician's Name	0008,1050	0008,1050	0008,1050

10.1.4. Coerced/Modified fields

Not applicable.

10.2. Data Dictionary of Private Attributes

Not applicable.

10.3. Coded Terminology and Templates

Not applicable.

10.4. Grayscale Image consistency

Not applicable.

10.5. Standard Extended/Specialized/Private SOPs

10.5.1. CX Image Storage SOP Class

The CX Image Storage SOP Class is a standard specialized SOP class as specified in section 10.1.1.2.

10.6. Private Transfer Syntaxes

Not applicable.