DICOM 3.0 Conformance Statement

Aixplorer® Mach30 Ultrasound System

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Conformance Statement Overview

Aixplorer Mach30 implements the necessary DICOM services to:

- Support the Echo (Verification) service as both SCU/SCP;

- Support Modality Worklist Service as SCU;

- Support Modality Performed Procedure Step Service as SCU;

- Support Basic Printing Service as SCU;

- Support Query/Retrieve Service as SCU;

- Support Image Storage as SCU;

- Support Storage Commitment Service as SCU;

- Support Media Storage Service as FSC.

This document is intended to describe Aixplorer Mach30's conformance to DICOM 3.0. Table 1.1 provides an overview of the network services supported by Aixplorer Mach30 and Table 1.2 provides an overview of the Media Storage Application Profiles supported by Aixplorer Mach30.

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Ultrasound Image Storage	Yes[1]	Yes[2]
Ultrasound Multi-Frame Image Storage	Yes[1]	Yes[2]
Ultrasound Image Storage (Retired)	No	Yes[2]
Ultrasound Multi-Frame Image Storage (Retired)	No	Yes[2]

Secondary Capture Image Storage	No	Yes[2]
Multi-Frame Single Bit Secondary Capture Image Storage	No	Yes[2]
Multi-Frame Grayscale Byte Secondary Capture Image Storage	No	Yes[2]
Multi-Frame Grayscale Word Secondary Capture Image Storage	No	Yes[2]
Multi-Frame True Color Secondary Capture Image Storage	No	Yes[2]
Encapsulated PDF Storage	Yes[1]	No
CT Image Storage	No	Yes[2]
Enhanced CT Image Storage	No	Yes[2]
MR Image Storage	No	Yes[2]
Enhanced MR Image Storage	No	Yes[2]
Digital Mammography X-Ray Image Storage - For Presentation	No	Yes[2]
Digital Mammography X-Ray Image Storage - For Processing	No	Yes[2]
Nuclear Medecine Image Storage	No	Yes[2]
RETIRED Nuclear Medecine Image Storage	No	Yes[2]
Computed Radiography Image Storage	No	Yes[2]
Digital XRay Image Storage - For Presentation	No	Yes[2]
Digital XRay Image Storage - For Processing	No	Yes[2]
XRay Angiographic Image Storage	No	Yes[2]
Enhanced XA Image Storage	No	Yes[2]
XRay Radiofluoroscopic Image Storage	No	Yes[2]
Enhanced XRF Image Storage	No	Yes[2]
VL Endoscopic Image Storage	No	Yes[2]
VL Microscopic Image Storage	No	Yes[2]
Positron Emission Tomography Image Storage	No	Yes[2]
RT Structure Set Storage	No	Yes[2]
Comprehensive SR Storage	Yes[3]	No
Query/Retrieve		
Study Root Query/Retrieve Information Model - FIND	Yes[2]	No
Study Root Query/Retrieve Information Model - MOVE	Yes[2]	No
Workflow Management		
Modality Worklist (C-FIND)	Yes[1]	No

Storage Commitment Push Model	Yes[1]	No
Modality Performed Procedure Step	Yes[1]	No
Print Management		
Basic Grayscale Print Management	Yes[1]	No
Basic Color Print Management	Yes[1]	No

Table 1.1: *Network Services*

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Compact Disk - Recordable		
General Purpose CD-R Profiles (STD-GEN-CD)	Yes[4] / No	Yes[4]
120 mm DVD		
General Purpose DVD Interchange with JPEG (STD-GEN-DVD-JPEG)	Yes[4] / No	Yes[4]
USB connected removable devices[5]		
General Purpose USB Media Interchange with JPEG (STD-GEN-USB-JPEG)	Yes[4] / No	Yes[4]

[4]Purchasable option.
[5]The DICOMDIR file is not in the root directory of the medium.

Table 1.2: *Media Services*

[1]Purchasable option. (Basic DICOM option)
[2]Purchasable option. (Q/R DICOM option)
[3]Purchasable option. (SR DICOM option)

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Introduction

2.1 Revision History

The revision history of this document is available on Table 2.1.

Document Version	Date	Author	Description
Version A	June 15, 2018	Damien LERAT / Michel AMAT	Creation
Version B	September 06, 2018	Damien LERAT	SR codes updated
Version C	October 08, 2018	Damien LERAT	Other Patient ID mapping updated

Table 2.1: *Revision history*

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2.2 Audience

This document is written for the people that need to understand how Aixplorer Mach30 will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

2.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Aixplorer Mach30 and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality. This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between Aixplorer Mach30 and other DICOM conformant equipment.

- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

- The DICOM standard will evolve to meet the users' future requirements. SuperSonic Imagine is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

Aixplorer Mach30 has participated in an industry-wide testing program sponsored by Integrating the Healthcare Enterprise (IHE). The IHE Integration Statement for Aixplorer Mach30, together with the IHE Technical Framework, may facilitate the process of validation testing. Aixplorer Mach30's Integration statement can be freely downloaded from the following URL: http://www.supersonicimagine.com/ihe.

2.4 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

2.4.1 Definitions

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax: the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE): an end point of a DICOM information exchange, including the DICOM network or media interface software; *i.e.*, the software that sends or receives DICOM information objects or messages. A single device may have multiple *Application Entities*.

Application Entity Title: the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context: The specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association: A network communication channel set up between *Application Entities*.

Attribute: a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Command: A request to operate on information across a network.

Command Element: An encoding of a parameter of a command which conveys this parameter's value.

Command Stream: The result of encoding a set of DICOM *Command Elements* using the DICOM encoding scheme.

Conformance Statement: A formal statement that describes a specific product implementation that uses the DICOM Standard. It specifies the *Service Classes*, *Information Objects*, and Communication Protocols supported by the implementation.

Context Group: A set of coded concepts defined by a Mapping Resource forming a set appropriate to use in a particular context. **Data Dictionary**: A registry of DICOM *Data Elements* which assigns a unique *tag*, a name, value characteristics, and semantics to each *Data Element*.

Data Element: A unit of information as defined by a single entry in the *Data Dictionary*.

Data Set: Exchanged information consisting of a structured set of *Attributes*. The value of each *Attribute* in a *Data Set* is expressed as a *Data Element*.

Data Stream: The result of encoding a *Data Set* using the DICOM encoding scheme (Data Element Numbers and representations as specified by the Data Dictionary).

Information Object: An abstraction of a real information entity (*e.g.*, CT Image, Structured Report, *etc.*) which is acted upon by one or more DICOM Commands.

Information Object Class: A formal description of an *Information Object* which includes a description of its purpose and the *Attributes* it possesses. It does not include values for these *Attributes*.

Information Object Definition (IOD): the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Information Object Instance: A representation of an occurrence of an real-world entity, which includes values for the *Attributes* of the *Information Object Class* to which the entity belongs.

Joint Photographic Experts Group (JPEG): A set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile: The specification of DICOM *Information Objects* and encoding exchanged on removable media (*e.g.* CDs).

Message: A data unit of the Message Exchange Protocol exchanged between two cooperating DICOM Applications. A *Message* is composed of a *Command Stream* followed by an optional *Data Stream*.

Module: A set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation: First phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context: The set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.

Protocol Data Unit (PDU): A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile: A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.

Service Class: A structured description of a service which is supported by cooperating DICOM Applications using specific DICOM Commands acting on a specific class of *Information Object*.

Service Class Provider (SCP): Role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality Worklist SCP).

Service Class User (SCU): Role of an *Application Entity* that uses a DICOM network service;

typically, a client. Examples: imaging modality (image storage SCU, and modality Worklist SCU), imaging workstation (image query/retrieve SCU).

Service/Object Pair (SOP) Class: The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance: An *Information Object*; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag: a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) *Data Element*. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [Private Data Element].

Transfer Syntax: The encoding used for exchange of DICOM *Information Objects* and *Messages*. Examples: JPEG compressed (images), little Endian explicit value representation.

Unified Code for Units of Measure (UCUM): a standard for all units of measurement.

Unique Identifier (UID): A globally unique "dotted decimal" string that identifies a specific object; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR): The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

2.4.2   Basics of DICOM communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the *Conformance Statement* are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*). DICOM specifies a number of network services and types of *Information Objects*, each of which is called an *Abstract Syntax* for the *Negotiation*. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The *Negotiation* allows the initiating *Application Entity* to propose combinations of *Abstract Syntax* and *Transfer Syntax* to be used on the *Association*; these combinations are called *Presentation Contexts*. The receiving *Application Entity* accepts the *Presentation Contexts* it supports.

For each *Presentation Context*, the *Association Negotiation* also allows the devices to agree on

Roles – which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, *i.e.*, the client system calls the server, but not always.

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

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

Two *Application Entities* may also communicate with each other by exchanging media (such as a CD-R). Since there is no *Association Negotiation* possible, they both use a *Media Application Profile* that specifies "pre-negotiated" exchange media format, *Abstract Syntax*, and *Transfer Syntax*.

2.4.3   Abbreviations and terms

ACR:	American College of Radiology
AE:	Application Entity
AET:	Application Entity Title
ASUM:	Australian Society of Ultrasound Medicine
CD-R:	Compact Disk Recordable
CFEF:	Collège Français d'Échographie Foetale
CR:	Computed Radiography
CT:	Computed Tomography
DHCP:	Dynamic Host Configuration Protocol
DICOM:	Digital Imaging and Communications in Medicine
DNS:	Domain Name System
DX:	Digital X-ray
FSC:	File-Set Creator
FSU:	File-Set Updater
FSR:	File-Set Reader
HIS:	Hospital Information System
HL7:	Health Level 7 Standard
IHE:	Integrating the Healthcare Enterprise
IOD:	Information Object Definition

IPv4:   Internet Protocol version 4
IPv6:   Internet Protocol version 6
ISO: International Organization for Standards
JPEG: Joint Photographic Experts Group
MG: Mammography (X-ray)
LUT: Look-up Table
MPEG: Moving Picture Experts Group
MG: Mammography (X-ray)
MPPS: Modality Performed Procedure Step
MR: Magnetic Resonance Imaging
MTU: Maximum Transmission Unit (IP)
MWL: Modality Worklist
NEMA: National Electrical Manufacturers Association
NM: Nuclear Medicine
NTP: Network Time Protocol
O Optional (Key Attribute)
OSI: Open Systems Interconnection
PACS: Picture Archiving and Communication System
PDE: Patient Data Entry
PDU: Protocol Data Unit
PET: Positron Emission Tomography
R Required (Key Attribute)
RF: Radiofluoroscopy
RIS: Radiology Information System
SPS: Scheduled Procedure Step
SC: Secondary Capture
SCP: Service Class Provider
SCU: Service Class User
SOP: Service-Object Pair
SPS: Scheduled Procedure Step
SR: Structured Reporting
TCP/IP: Protocol Transmission Control Protocol/Internet
U Unique (Key Attribute)
UID: Unique Identifier
UL :   Upper Layer
US: Ultrasound
US MF: Ultrasound Multi-Frame
VR: Value Representation
XA: X-ray Angiography

2.5   References

NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available
free at http://medical.nema.org/

User's Guide Aixplorer Mach30 V1 User's Guide

Networking

3.1 Implementation Model

The Implementation model consists of three sections: the Application Data Flow Diagram, specifying the relationship between the Application Entities and the "external world" or Real-World activities, a functional description of each Application Entity, and the sequencing constraints among them.

3.1.1 Application Data flow

Aixplorer Mach30 is implemented in six Application entities. Figure 3.1.1 illustrates the Aixplorer Mach30 *Application Entities* (AE), (in the boxes) and relationships between user invoked activities (in the circles at the left of the AE) and the DICOM services (depicted in the circles at the right of the AE). Exam data are sent to all selected Store and Print destinations simultaneously in accordance with system configuration of "Send After Acquisition" or at "End of Exam" or Manual. Worklist queries are executed either manually or automatically. Modality Performed Procedure Step (MPPS) messages are send at exam opening and closing. Query/Retrieve requests are executed either manually or automatically and selected instance are pushed to the local storage and added to the local database.

3.1.1.1 Storage

Aixplorer Mach30 sends single and multi-frame ultrasound images, PDF reports, and Structured Reports to one or several remote AEs. Acquisition of images is associated with the local real-world activities "Save Clip" for multi-frame images and "Save Image" for single frame images. Sending or exporting of images depends on user configuration, either "Send After Acquisition" or "End of Exam" (when "End of Exam" button is pressed), or Manual. PDF reports creation are associated with the real world activities "Report". Sending or exporting of reports also

Association Initiation

| Verify connectivity | ···· | **Verification AE** | → | Remote AE respond to Verification |

Storage AE

| Send Images, PDF and Structured Reports, Commits | ···· | Storage SCU | → | Images Stored on Remote AE |

| Respond to Verification Request | ···· | Storage Commitment SCU Verification SCP | ⇄ | Remote AE Handles Storage commitment |

Remote AE Verify Connectivity

Workflow AE

| Refresh WorkList | ···· | MWL SCU | ⇄ | Remote AE Provide Worklist items |

| Acquire Images | ···· | MPPS SCU | → | Remote MPPS SCP |

| Print B&W, color images | ···· | Hardcopy AE | → | Remote AE Print images |

Query/Retrieve AE

| Query Request | ···· | Find SCU | ⇄ | Remote AE Handles Q/R Requests |

| Retrieve Exam | ···· | Move SCU |

| Store images on local storage | ···· | Storage SCP AE | ← | Remote AE Send images and Verify Connectivity |

DICOM Standard Interface
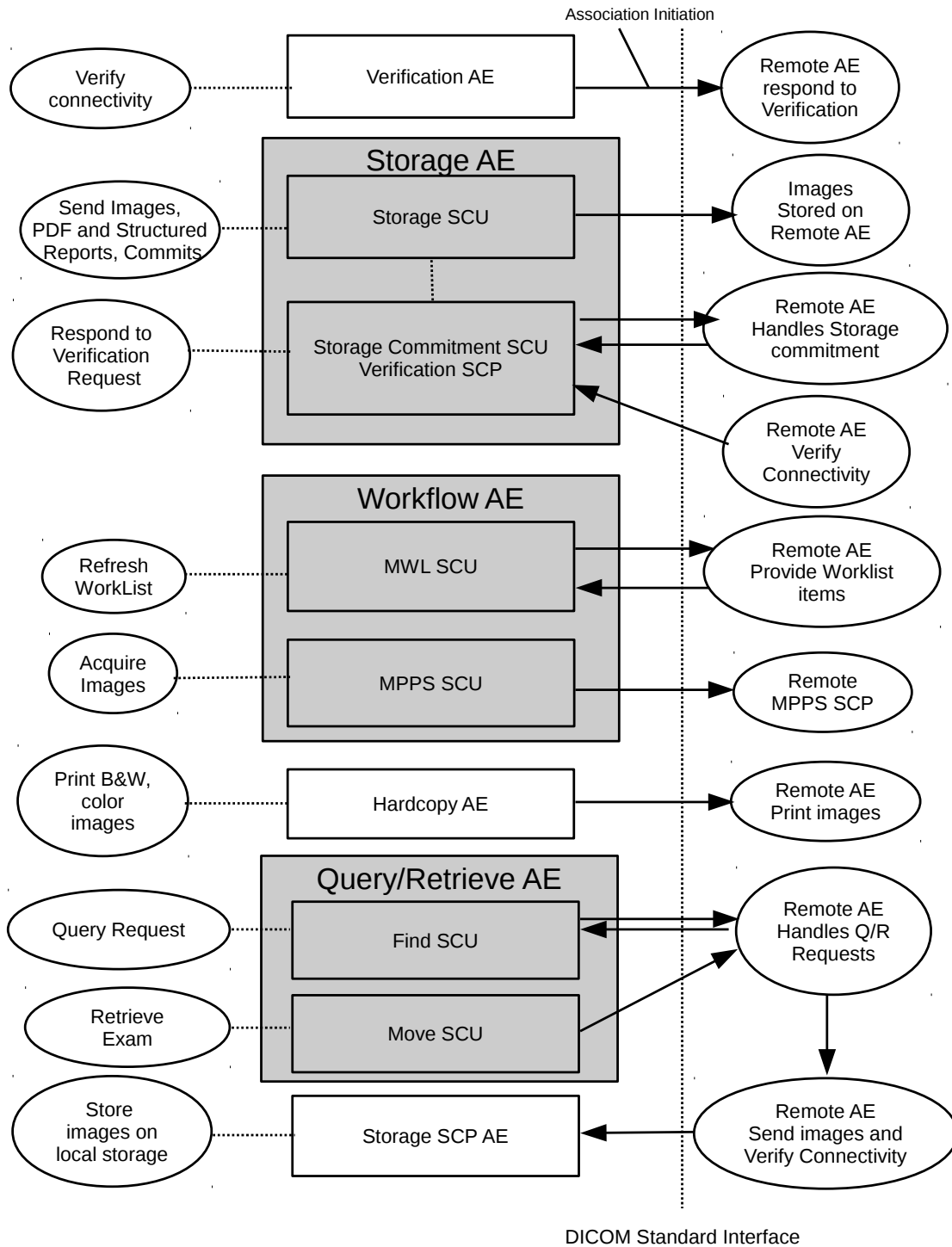
Figure 3.1.1: *Application Data Flow*

depends on user configuration, either "End of Exam" (when "End of Exam" button is pressed), or Manual. SR are generated automatically at end of exam if at least one image is acquired with the OB/Gyn or Vascular preset . Sending or exporting of SR depends on user configuration.

For either "Send After Acquisition" or "End of Exam", or manual mode, each remote AE can be individually configured to accept or reject single frame images, multi-frames images, PDF reports or Structured Reports.

Please refer to the user's guide for configuration and use of DICOM Storage.

3.1.1.2 Worklist

Aixplorer Mach30 queries Worklist information from remote AE. It is associated with the local real-world activities "Refresh" or automatic refresh (at a user configured refresh rate). When either the "Refresh" or automatic refresh are performed, Aixplorer Mach30 queries a remote AE for Worklist items that provides the set of Worklist items matching the query request.

Automatic refresh can be configured to be executed at configurable intervals of time or a key moments (Smart Mode) like "End Of Exams". Aixplorer Mach30 supports both IHE's worklist queries: the Patient Based Query and the Broad Query.

Please refer to the user's guide for configuration and use of DICOM Worklist.

3.1.1.3 Modality Performed Procedure Step

Aixplorer Mach30 sends Modality Performed Procedure Step message to remote AE. Messages are send automatically at exam opening and closing. Exam is said to be opened when patient information have been filled either automatically by selecting a patient in the Worklist or manually and a first image have been acquired or a first measurement has been performed. In this case, the message is send with the "In-Progress" Status.

Exam is closed with the status "completed" by either pressing the "End of Exam" button located on the control panel or by pressing "new patient" on the touch screen. A third way to close an exam is to press the "Cancel Exam" button on the touch screen. A "discontinued" message status is then sent. The discontinuation reason can be choosen by the Performing Physician/Sonographer.

Please refer to the user's guide for configuration and use of DICOM Modality Performed Procedure Step.

3.1.1.4 Verification

Aixplorer Mach30 initiates a connection with a remote AE, posts a Verification request and closes the connection. It also responds to incoming Verification requests (for service use).

3.1.1.5 Print Images

Aixplorer Mach30 sends single images to one or several remote AEs (Printer or Print Server). Acquisition of images is associated with the local real-world activities "Save Image". Printing of images depends on user configuration, either "Send After Acquisition" or "End of Exam" (when "End of Exam" button is pressed), or Manual.
For either "Send After Acquisition" or "End of Exam", or manual mode, each remote AE can be individually configured to send fully rendered pages already containing the user's selected formatting choices.
Please refer to the user's guide for configuration and use of DICOM Printing.

3.1.1.6 Storage commitment

Aixplorer Mach30 sends single and multi-frame images, PDF reports, and Structured Reports to one or several remote AEs. Acquisition of images is associated with the local real-world activities "Save Clip" for multi-frame images and "Save Image" for single frame images. Sending or exporting of images depends on user configuration, either "Send After Acquisition" or "End of Exam" (when "End of Exam" button is pressed), or Manual. PDF reports creation are associated with the real world activities "Report". Sending or exporting of reports also depends on user configuration, either "End of Exam" (when "End of Exam" button is pressed), or Manual. SR are generated automatically at end of exam if at least one image is acquired with the OB/Gyn preset. Sending or exporting of SR depends on user configuration.
For either "Send After Acquisition", "End of Exam", or manual mode, each remote AE can be individually configured to accept or reject single frame images, multi-frame images, and PDF report.
The Storage AE will request Storage Commitment and if a commitment is successfully obtained will record this information in the local database and then will freely manage its own internal resources according configuration (automatic deletion of exam upon commit reception). Commit requests may or may not be sent to the storage AE and depending on the configuration they may be send in the same or a separate association.
Please refer to the user's guide for configuration and use of DICOM Storage Commitment.

3.1.1.7 Query/Retrieve

Aixplorer Mach30 queries remote AE's for lists of studies and series matching user's request. If a selection of series is requested for retrieval, then an association is established to a remote query/retrieve AE and a move order is sent in destination to Aixplorer Mach30's local storage SCP.
Please refer to the user's guide for configuration and use of DICOM Query/Retrieve.

3.1.1.8 Storage SCP

Storage SCP receives incoming images. This images may be unsolicited instances send by any remote Application Entities or may be instances requested thanks to the Query/Retrieve interface.
Please refer to the user's guide for configuration and use of DICOM Query/Retrieve.

3.1.2 Functional Definitions of Aixplorer Mach30 Application Entities

As an acquisition modality, Aixplorer Mach30 mainly act as a SCU and connects to other DICOM applications. However, if Query/Retrieve option is enabled, then Aixplorer Mach30 accept incoming storage request as a store SCP. Moreover, conceptually the network services may be modeled as separate AEs, but in fact MWL SCU, MPPS SCU, image storage SCU, storage commitment SCU and print SCU share a single (configurable) AE Title.

3.1.2.1 Verification Service as both SCU and SCP

Aixplorer Mach30 can initiate associations with Presentation Contexts for the Verification service SOP class. It will send a C-ECHO request to another DICOM application and wait for a response to complete the verification. Moreover Aixplorer Mach30 will answer to any C-ECHO request coming from other DICOM application.

3.1.2.2 Basic Modality Worklist Management Service as SCU

Aixplorer Mach30 uses the Basic Worklist Management service to get required information to build its DICOM datasets.
It establishes one association with the remote Worklist SCP, performs a Find request, waits for responses, and then releases the association. During receiving, the Worklist response items are counted and the query processing is canceled if the configurable limit of items is reached. The results will be displayed in a separate list, which will be cleared with the next successful Worklist update.

3.1.2.3 Modality Performed Procedure Step Management Service as SCU

Aixplorer Mach30 establishes one association with the remote MPPS SCP, send a N-Set or N-Create message, waits for responses, and then releases the association.

3.1.2.4 Image Storage Service as SCU

The existence of a send-job queue entry with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related send-job is set to an error state with an error message. Aixplorer Mach30 will try two

other times to initiate another association with 20 seconds between each retry. If send-job is still failing, then the job is automatically paused and a notification icon is displayed in the notification panel.

The number of retry and the idle period between each retry are both configurable in the set up.

3.1.2.5 Storage Commitment Service as SCU

Aixplorer Mach30 uses the Storage Commitment service to check that a commitment is taken by the server receiving the stored images. After a Storage operation, Aixplorer Mach30 may establish one association or use an already opened one with the remote Storage Commitment SCP, performs a Store Commit request, and then releases the association. The answer is waited for another association started by the Storage Commitment SCP. An automatic deletion mechanism, triggered off upon reception of commitment message, can be activated.

3.1.2.6 Basic Print Service as SCU

The existence of a print-job in the print queue will activate the Hardcopy AE. An association is established with the printer. If the printer is operating normally, the film sheets described within the print-job will be printed. If the printer is not operating normally, Aixplorer Mach30 will try to send again the print-job two other times to initiate another association with 20 seconds between each retry. If print-job is still failing then the job is automatically paused and a notification icon is displayed in the notification panel.

The number of retry and the idle period between each retry are both configurable in the set up.

3.1.2.7 Query/Retrieve Service as SCU

Aixplorer Mach30 uses the Query/Retrieve service as a SCU to query a remote AE. Query/Retrieve service can be decomposed in two basic tasks:

- first FIND requests or queries are executed on a remote AE to perform a match of all the keys specified in the request against the information it possesses. All queries are performed recursively from the study through the series levels until all matching series have been listed. The query keys are patient's name, patient id, accession number, study date, modality. Aixplorer Mach30 performs a Find request, waits for responses, and then releases the association. During receiving, the response items are counted and the query processing is canceled if the configurable limit of items is reached.

- then, eventually, a MOVE order is sent to the remote AE to move a list of series on Aixplorer Mach30 local storage SCP.

There are two different ways to start Query requests. If the automatic query settings is activated then queries are automatically performed at exam creation. Queries can also be performed manually when the "Q/R" hard button on the control panel is pushed. If the automatic retrieve settings is activated or when a list of series is manually selected, a move request is sent.

3.1.2.8 Storage SCP

If Query/retrieve option is enabled, Aixplorer Mach30 use the Storage Service Class to accept association from any SCU. Storage Service waits in the background for unsolicited or requested instances sent by remote AE. It will accept any associations with Presentation Contexts for SOP Classes of the Storage Service Class or Verification service class, and will store the received instances to the local database where they may subsequently be listed and viewed through the Query/Retrieve user interface.

3.1.3 Sequencing of Real-World Activities

On Aixplorer Mach30, images can be pushed on a remote Print, Store, Store commit server in three ways : "after acquisition", "on End of Exam", and "manually". It is possible to configure individually each server. Moreover, at any time, during an exam or not, it is possible to start a query or retrieve a list of series.

3.1.3.1 Sequencing of Real-World Activities - Send After Acquisition

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 3.1.2 apply:

1. Query Worklist

2. Receive Worklist

3. Start acquisition and create MPPS with "IN-PROGRESS" status

4. Acquire and Store image

5. Request a Storage Commitment (if any Store Commit is configured)

6. Print acquired images on film (if film sheet is full)

7. Send MPPS with "DISCONTINUED" status (if "Cancel Exam" is pressed)

8. or Send MPPS with "COMPLETED" status (if "End of Exam" is pressed)

9. Print remaining images on film

10. Store PDF and Structured Reports

11. Wait and accept commitment response(s)

Other workflow situations (*e.g.* unscheduled procedure) will have other sequencing constraints. Printing could be omitted completely if no printer is connected or hardcopies are not required. PDF reports and Structured Reports can be omitted.
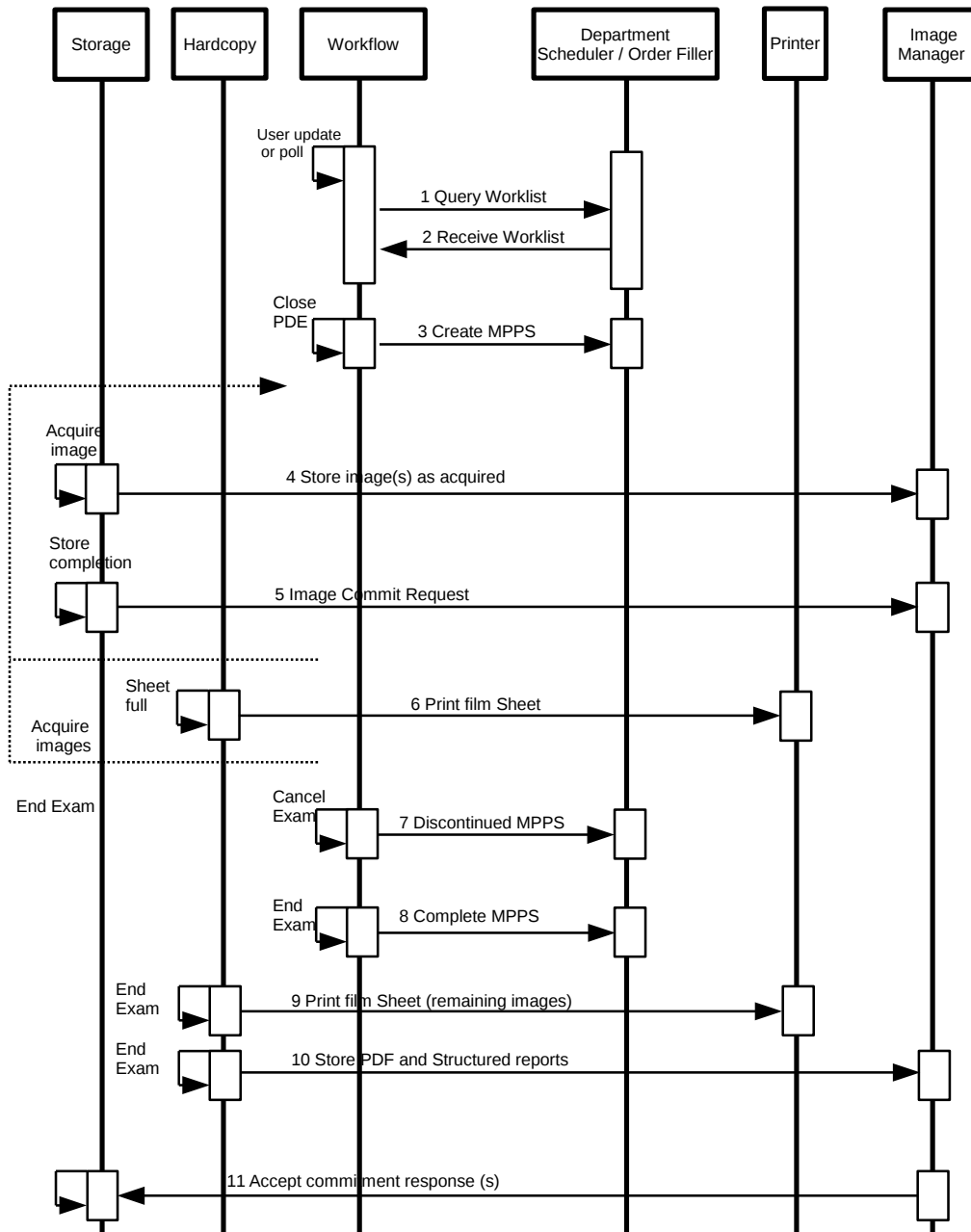
Figure 3.1.2: *Sequencing Constraints - Send After Acquisition configuration*

3.1.3.2 Sequencing of Real-World Activities - End of Exam

Under normal scheduled workflow conditions the sequencing constraints illustrated in Figure 3.1.3 apply:

1. Query Worklist

2. Receive Worklist

3. Start acquisition and create MPPS with "IN-PROGRESS" status

4. Send MPPS with "DISCONTINUED" status (if "Cancel Exam" is pressed)

5. or Send MPPS with "COMPLETED" status (if "End of Exam" is pressed)

6. Store acquired images, PDF report, Structured Report

7. Print acquired images on film

8. Request a Storage Commitment (if any Store Commit is configured)

9. Wait and accept commitment response(s)

Other workflow situations (*e.g.* unscheduled procedure) will have other sequencing constraints. Printing could be omitted completely if no printer is connected or hardcopies are not required. PDF reports and Structured Reports can be omitted.

3.1.3.3 Sequencing of Real-World Activities - Query/Retrieve

If "Automatic Query" setting is activated, then Aixplorer Mach30 will send automatically queries to a remote server. The keys for the query are Patient's Name and/or Patient ID and/or Accession Number. The queries are send after the first image acquisition. If "automatic retrieve" setting is activated, Aixplorer Mach30 will retrieve automatically the latest study. Otherwise, manual queries can be started at anytime, with or without any active exam.

3.2 Application Entity Specifications

3.2.1 Storage SCU Application Entity Specification

3.2.1.1 SOP Classes

The Aixplorer Mach30's Storage SCU AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.1.
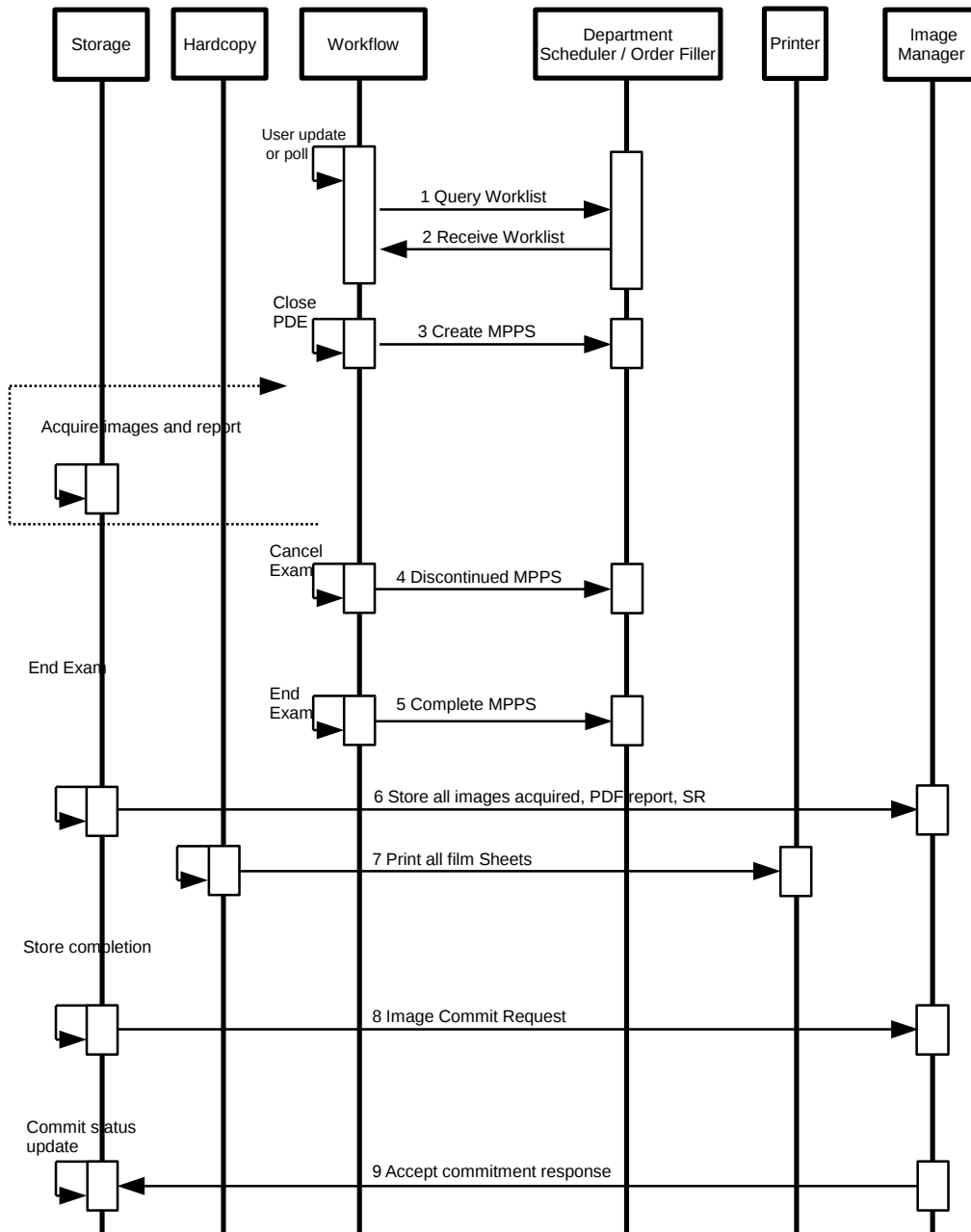
Figure 3.1.3: *Sequencing Constraints - End of Exam configuration*

SOP Class Name	SOP Class UID	SCU	SCP
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	No
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No

Table 3.1: *SOP Classes for Storage AE*

3.2.1.2 Association Policies

3.2.1.2.1 General

As illustrated in Table 3.2, the DICOM 3.0 standard Application context is always specified for each association.

Application Context Name	1.2.840.10008.3.1.1.1

Table 3.2: *DICOM Application Context for Storage AE*

3.2.1.2.2 Number of Associations

The Storage AE may initiates one Association at a time (see Table 3.3) for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains :

- pending until the active job is completed or failed,

- paused until they are resumed.

Maximum number of simultaneous Associations	1

Table 3.3: *Number of Associations as an Association Initiator for Storage AE*

The Storage AE may accept up to 15 associations (Table 3.4) to receive N-EVENT-REPORT notifications for the Storage Commitment Push Model SOP Class and C-ECHO requests for the Verification service SOP Class.

3.2.1.2.3 Asynchronous Nature

As illustrated in Table 3.5, The Storage AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Maximum number of simultaneous Associations	unlimited

Table 3.4: *Number of Associations as an Association Acceptor for Storage AE*

Maximum number of outstanding asynchronous transactions	0

Table 3.5: *Asynchronous Nature as an Association Initiator for Storage AE*

3.2.1.2.4 Implementation Identifying Information

The implementation information for the Storage Application Entity is described in Table 3.6.

Implementation Class UID	1.2.250.1.204.0.1.20120820.0.3.6.1
Implementation Version Name	SSI_DCMTK_361

Table 3.6: *DICOM Implementation Class and Version for Storage AE*

3.2.1.3 Association Initiation Policy

3.2.1.3.1 Description and Sequencing of Activity Send Instances

As described in section 3.1.1.1, a user can manually select instances from Review Mode and request them to be sent to multiple destinations. Each request is forwarded to the "DICOM Store" job queue and processed individually if the "group exportation" option is active (default). Otherwise a job per instance will be created. When the "Send After Acquisition" or "Send on End of Exam" option are active, each acquired instances will be forwarded to the "DICOM Store" job queue for a pre-configured list of target destinations. It can be configured which type of instances (still images, clips, PDF reports, Structured Reports) will be accepted by each destination.

The Storage AE is invoked by the job list interface that is responsible for processing network archival tasks. The job consists of data describing the instances marked for storage and the destination. An internal daemon process triggered by a job for a specific Storage destination initiates a C-STORE request to store instances. If the process successfully establishes an Association to a remote Application Entity, it will transfer each instance one after another via the open Association. Status of the transfer is reported through the job list interface. Only one Storage job will be active at a time. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It will be restarted automatically later.

The Storage AE attempts to initiate a new Association in order to issue a C-STORE request. If the job contains multiple instances then multiple C-STORE requests will be issued over the

same Association. If the Remote AE is configured as an archive device, after all instances have been successfully sent, a Storage Commitment request is issued. This Storage Commitment request will be sent over a separate association. Aixplorer Mach30 will open a separate association for this, send a N-ACTION request to the server and wait for the N-ACTION response on this association. Aixplorer Mach30 then releases this association, without expecting any N-EVENT-REPORT message. Aixplorer Mach30 expects N-EVENT-REPORTS messages to be sent over a separate association initiated by the Storage Commitment SCP server.

A possible sequence of interactions between Storage AE and an Image Manager is illustrated in Figure 3.2.1 :

1. The Storage AE opens an association with the Image Manager,

2. Acquired image(s), PDF reports, SR are transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success),

3. The Storage AE closes the association with the Image Manager,

4. The Storage AE opens an association with the Image Manager,

5. A Store Commitment is requested,

6. The Storage AE closes the association with the Image Manager.

3.2.1.3.2   Proposed Presentation Contexts

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by Aixplorer Mach30 for a C-Store service are defined in Table 3.7.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCU	NONE
		JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80	SCU	NONE
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	NONE

		Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCU	NONE
		JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80	SCU	NONE
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	NONE
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE

Table 3.7: *Proposed Presentation Contexts for Activity Send instances*

If a remote AE is configured as a Store Commit server, Aixplorer Mach30 will propose Presentation Contexts as shown in Table 3.8. Depending on the configuration, this presentation context will be presented during the first association or in a separate association.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE

Table 3.8: *Proposed Presentation Contexts for AE and Storage Commitment SCU Activity*

3.2.1.3.3 SOP Specific Conformance for Storage SOP Class

Aixplorer Mach30 applies the following rules for its proposed presentation contexts:

- All uncompressed transfer syntaxes are proposed for Storage operations,
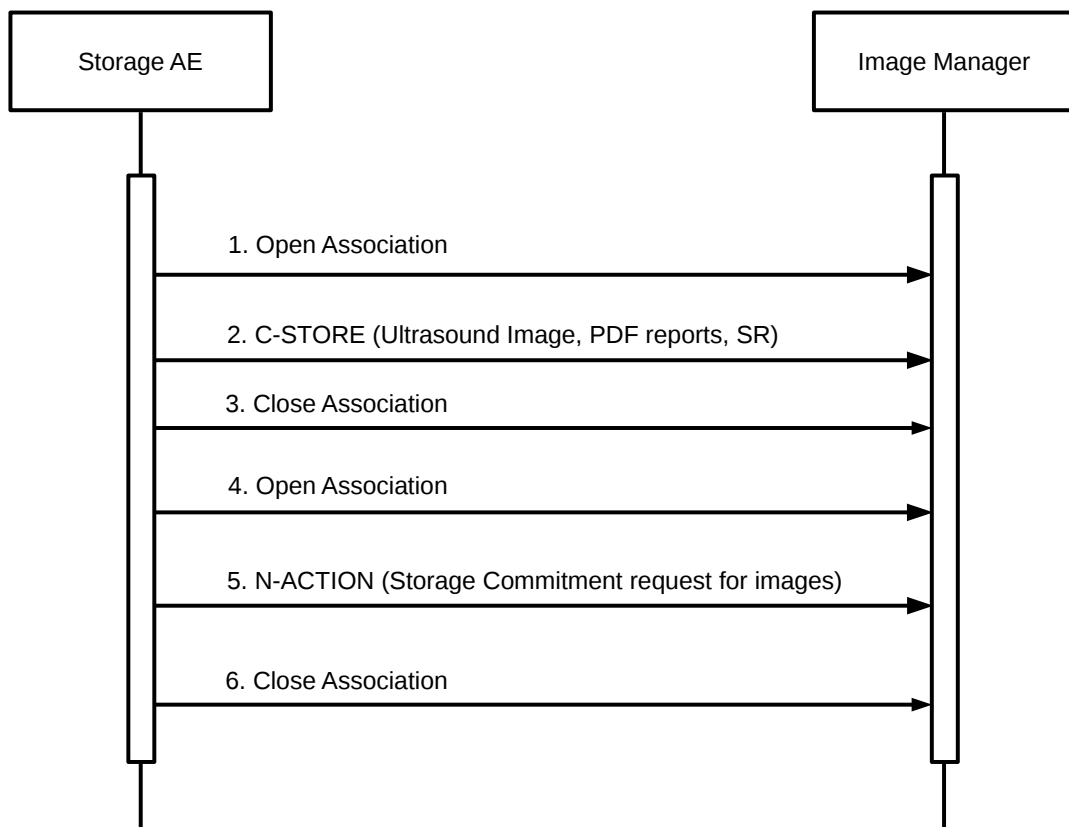
Figure 3.2.1: *Sequencing of Activity - Send Images*

- If an image is encoded, its corresponding native transfer syntax is also proposed, and will be preferred by the SCU if both compressed and uncompressed transfer syntaxes are accepted by the SCP,

- If the SCP does not accept encoded transfer syntaxes, Aixplorer Mach30 will uncompress the related images on the fly.

The DICOM images created by Aixplorer Mach30 conform to the DICOM IOD definitions (Standard extended IODs). They may contain some additional private elements (see Annex B). The DICOM Encapsulated PDF instances created by Aixplorer Mach30 conform to the DICOM Encapsulated PDF IOD (Standard extended IODs). They may contain some additional private elements (see Annex B).

The Structured Report instances created by Aixplorer Mach30 conform to the Comprehensive Structured Report IOD (Standard extended IODs). They may contain some additional private elements (see Annex B).

Structure of created instances is described in Annex A.1.

The behavior of Storage AE when encountering status codes in a C-STORE response is summarized in the Table 3.9. A failed Job will be automatically restarted. The delay between resending failed jobs and the number of retries is configurable. If a job keeps failing and reach the number of retries then it will be reschedule at the end of the queue.

The behavior of Storage AE during communication failure is summarized in the Table 3.10.

3.2.1.3.4 SOP Specific Conformance for Storage Commitment SOP Class

3.2.1.3.4.1 Storage Commitment Operations (N-ACTION)

The Storage AE will request storage commitment for encapsulated PDF, US single and multi-frame images and Structured Reports if the Remote AE is configured as an archive device with storage commitment facilities and a presentation context for the Storage Commitment Push Model has been accepted. The Storage AE will consider that encapsulated PDF, or US single and multi frame images or Structured Reports are not committed until a N-EVENT-REPORT is received for the Transaction UID. The number of committed files per exam is available in "Patient Directory"'s window. The Storage AE does not send the optional Storage Media FileSet ID & UID attributes or the Referenced Study Component Sequence Attribute in the N-ACTION.

The behavior of Storage AE when encountering status codes in a N-ACTION response is summarized in Table 3.11.

The behavior of Storage AE during communication failure is summarized in Table 3.12.

3.2.1.3.4.2 Storage Commitment Notifications (N-EVENT-REPORT)

The Storage AE is capable of receiving a N-EVENT-REPORT notification if it has successfully negotiated a Presentation Context for the Storage Commitment Push Model. However,

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.
Error	Refused: Out of Resource	A700-A7FF	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application. This is a transient failure.
	Data Set does not match SOP Class	A900-A9FF	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
	Cannot Understand	C000-CFFF	The Association is aborted using A-ABORT and the send job is marked as failed. The status meaning is logged and the job failure is reported to the user via the job control application.
Warning	Coercion of Data elements	B000	Image transmission is considered successful but the status meaning is logged.
	Elements Data Set does not match SOP Class	B007	Image transmission is considered successful but the status meaning is logged.
	Elements Discarded	B006	Image transmission is considered successful but the status meaning is logged.
*	*	Any other status code.	The Association is aborted using A-ABORT and the send job is marked as failed. The status code is logged and the job failure is reported to the user via the job control application.

Table 3.9: *Storage C-STORE response Status Handling Behavior*

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control interface.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control interface.

Table 3.10: *Storage Communication Failure Behavior*

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The request for storage commitment is considered successfully sent.
*	*	Any other status code.	The Association is aborted using A-ABORT and the request for storage commitment is marked as failed. The status meaning is logged and reported to the user.

Table 3.11: *Storage Commitment N-ACTION Response Status Handling Behavior*

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.

Table 3.12: *Storage Commitment Communication Failure Behavior*

such notifications are never expected on the same association as the one used to convey the N-ACTION request. The behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT is summarized in Table 3.13.

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 and PDE window as "Committed" Successfully. Studies with all their instances marked as "Committed" are candidates for "Automatic Deletion after Commit" from the local database. Studies will not be deleted if they are marked with a lock flag.
Storage Commitment Request Complete-Failures Exist	2	The Referenced SOP Instances under Referenced SOP Sequence (0008,1199) are treated in the same way as in the success case (Event Type 1). The Referenced SOP Instances under Failed SOP Sequence (0008,1198) are marked within the database as "Not Committed". The Failure Reasons are logged and the job failure is reported to the user via the job control application. A send job that failed storage commitment will not be automatically restarted but can be restarted by user interaction.

Table 3.13: *Storage Commitment N-EVENT-REPORT behavior*

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table 3.14.

3.2.1.4   Association Acceptance Policy

3.2.1.4.1   Activity - Receive Storage Commitment Response

3.2.1.4.1.1   Description and Sequencing of Activities
When the Storage AE has sent its storage commitment N-ACTION messages to a server, it expects to be notified of responses by N-EVENT-REPORT messages on separate associations. A possible sequence of interactions between Storage AE and an Image Manager is illustrated in Figure 3.2.2.

1. The Image Manager opens an association with Storage AE,

2. The Image Manager send the Storage Commitment responses,

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000	The storage commitment result has been successfully received.
Failure	Unrecognized Operation	0211H	The Transaction UID in the N-EVENT-REPORT request is not recognized (was never issued within a N-ACTION request).
	Resource Limitation	0213H	The Transaction UID in the N-EVENT-REPORT request has expired (no N-EVENT-REPORT was received within a configurable time limit).
	No Such Event Type	0113H	An invalid Event Type ID was supplied in the N-EVENT-REPORT request.
	Processing Failure	0110H	An internal error occurred during processing of the N-EVENT-REPORT. A short description of the error will be returned in Error Comment (0000,0902).
	Invalid Argument Value	0115H	One or more SOP Instance UIDs with the Referenced SOP Sequence (0008,1199) or Failed SOP Sequence (0008,1198) was not included in the Storage Commitment Request associated with this Transaction UID. The unrecognized SOP Instance UIDs will be returned within the Event Information of the N-EVENT-REPORT response.

Table 3.14: *Storage Commitment N-EVENT-REPORT Response Status Reasons*

3. The Images manager closes the association with the Storage AE.
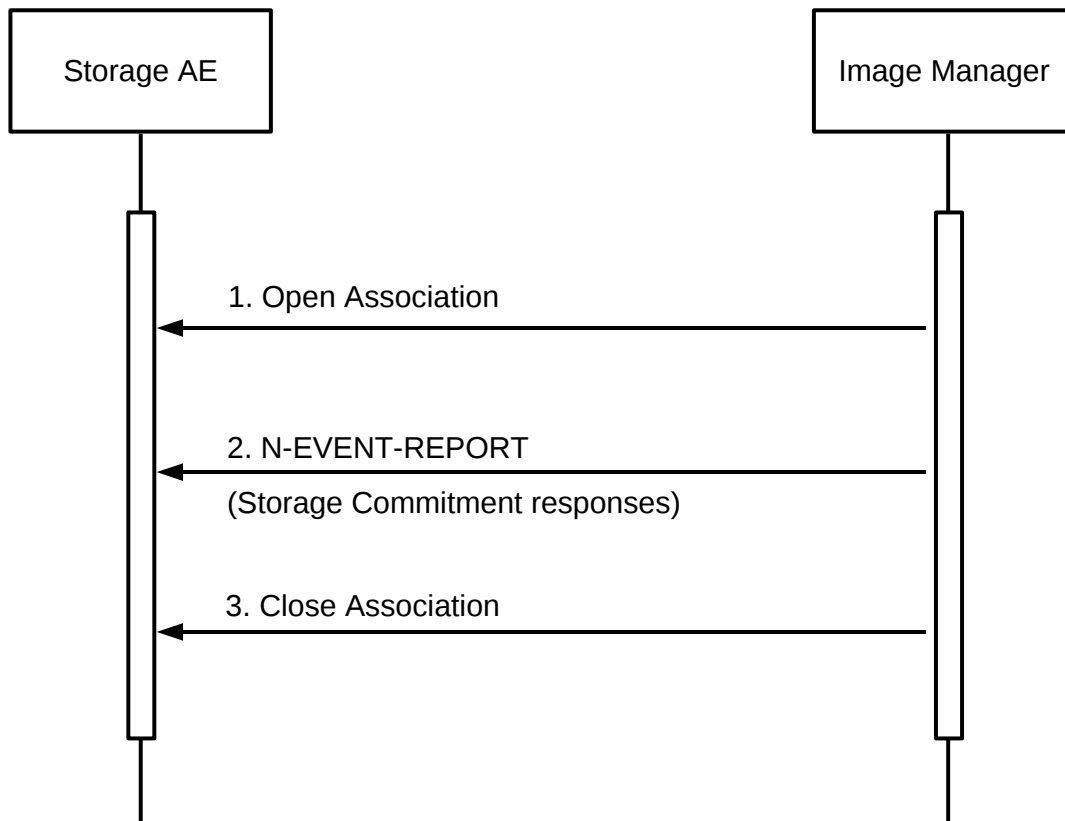
Figure 3.2.2: *Sequencing of Activity - Receive Storage Commitment Response*

The Storage AE may reject association attempts as shown in Table 3.15. The Result, Source and Reason/Diag columns represent the values returned in the appropriate fields of an ASSOCIATE-RJ PDU (see PS 3.8, Section 9.3.4). The contents of the Source column is abbreviated to save space and the meaning of the abbreviations are:

a 1 – DICOM UL service-user,

b 2 – DICOM UL service-provider (ASCE related function),

c 3 – DICOM UL service-provider (Presentation related function).

3.2.1.4.1.2 Accepted Presentation Contexts
The Storage AE will accept Presentation Contexts as shown in Table 3.16.

Result	Source	Reason/Diag	Explanation
2-rejected-transient	c	temporary congestion	No association can be accepted at this time because insufficient resources are available (*e.g.* memory, processes, threads). An association request with the same parameters may succeed at a later time.
1-rejected-permanent	a	2 - application-context-name-not-supported	The association request contained an unsupported Application Context Name. An association request with the same parameters will not succeed at a later time.
1-rejected-permanent	b	1-no-reason-given	The association request could not be parsed. An association request with the same format will not succeed at a later time.

Table 3.15: *Association Rejection Reasons*

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE

Table 3.16: *Acceptable Presentation Contexts for Activity Receive Storage Commitment Response*

3.2.1.4.1.3 SOP Specific Conformance for Storage Commitment SOP Class

3.2.1.4.1.3.1.   Storage Commitment Notifications (N-EVENT-REPORT)

Upon receipt of a N-EVENT-REPORT the exam status in the Patient Directory associated with the Transaction UID will be updated.
The behavior of Storage AE when receiving Event Types within the N-EVENT-REPORT is summarized in Table 3.13.
The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in Table 3.14.

3.2.1.4.1.3.2.   SOP Specific Conformance for Verification SOP Class

The Storage AE provides standard conformance to the Verification SOP Class as a SCP. If the C- ECHO request was successfully received, a 0000 (Success) status code will be returned in the C-ECHO response. Otherwise, a C000 (Error-Cannot Understand) status code will be returned in the C-ECHO response.

3.2.2   Workflow Application Entity Specification

3.2.2.1   SOP Classes

The Worflow AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.17.

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

Table 3.17: *SOP Classes for AE Workflow*

3.2.2.2   Association Policies

3.2.2.2.1   General

As illustrated in Table 3.18, the DICOM 3.0 standard Application context is always specified for each association.

3.2.2.2.2   Number of Associations

The Worflow AE may initiate two Associations at a time (see Table 3.19) :

Application Context Name	1.2.840.10008.3.1.1.1

Table 3.18: *DICOM Application Context for Workflow AE*

- One Worklist request,

- One association at a time for a Performed Procedure Step transfer request.

Maximum number of simultaneous Associations	1 Worklist
	1 MPPS

Table 3.19: *Number of Associations as an Association Initiator for Worflow AE*

3.2.2.2.3 Asynchronous Nature

As illustrated in Table 3.20, the Worflow AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Maximum number of outstanding asynchronous transactions	0

Table 3.20: *Asynchronous Nature as an Association Initiator for Worflow AE*

3.2.2.2.4 Implementation Identifying Information

The implementation information for the Worflow Application Entity is described in Table 3.21.

3.2.2.3 Association Initiation Policy

3.2.2.3.1 Activity - Refresh Worklist

3.2.2.3.1.1 Description and Sequencing of Activity

The request for a Worklist Update is initiated by user interaction, *i.e.* pressing the buttons "Update Worklist" or automatically at specific time intervals, configurable by the user. All Modality Worklist operations are performed synchronously and Aixplorer Mach30 always requests all items. The Broad queries are performed using any combination (7) of the following attributes: Scheduled Station AE Title (actual AET used), Scheduled Procedure Step Start Date (any date or From: today, yesterday, last two days , last seven days To: today, tomorrow, next 2 days, next 7 days), Modality (US, MG, GR, MR, CT, MN, DX, XA, RF) are configurable by a

Implementation Class UID	1.2.250.1.204.0.1.20120820.0.3.6.1
Implementation Version Name	SSI_DCMTK_361

Table 3.21: *DICOM Implementation Class and Version for Worflow AE*

Service Engineer.

The Patient Based query are performed using any combination (15) of the following attributes: Patient's Name, Patient ID, Accession Number, Requested Procedure ID. Some optional attributes can also be specified: exam date, patient's birth date, and gender.(Note that matching on those fields is not always supported by Work SCP).

To protect the system from overflow, Aixplorer Mach30 can be configured to limit the number of processed Worklist responses to a configurable maximum.

For each basic query of a remote application entity for a Modality Worklist list of items, Aixplorer Mach30 will initiate an association, send a C-FIND request command, wait in blocking mode for all C-FIND responses, and then release the association. A possible sequence of interactions between the Workflow AE and a Departmental Scheduler (*e.g.* a device such as a RIS or HIS which supports the Modality Worklist SOP Class as a SCP) is illustrated in Figure 3.2.3 :

1. The Workflow AE opens an association with the Departmental Scheduler;

2. The Workflow AE sends a C-FIND request to the Departmental Scheduler containing the Worklist Query attributes;

3. The Departmental Scheduler returns a C-FIND response containing the requested attributes of the first matching Worklist Item;

4. The Departmental Scheduler returns another C-FIND response containing the requested attributes of the second matching Worklist Item;

5. The Departmental Scheduler returns another C-FIND response with status Success indicating that no further matching; Worklist Items exist. This example assumes that only 2 Worklist items match the Worklist Query;

6. The Workflow AE closes the association with the Departmental Scheduler;

7. The user selects a Worklist Item from the Worklist and prepares to acquire new images.

3.2.2.3.1.2   Proposed Presentation Contexts

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by Aixplorer Mach30 for a C-Find service are defined in Table 3.22.
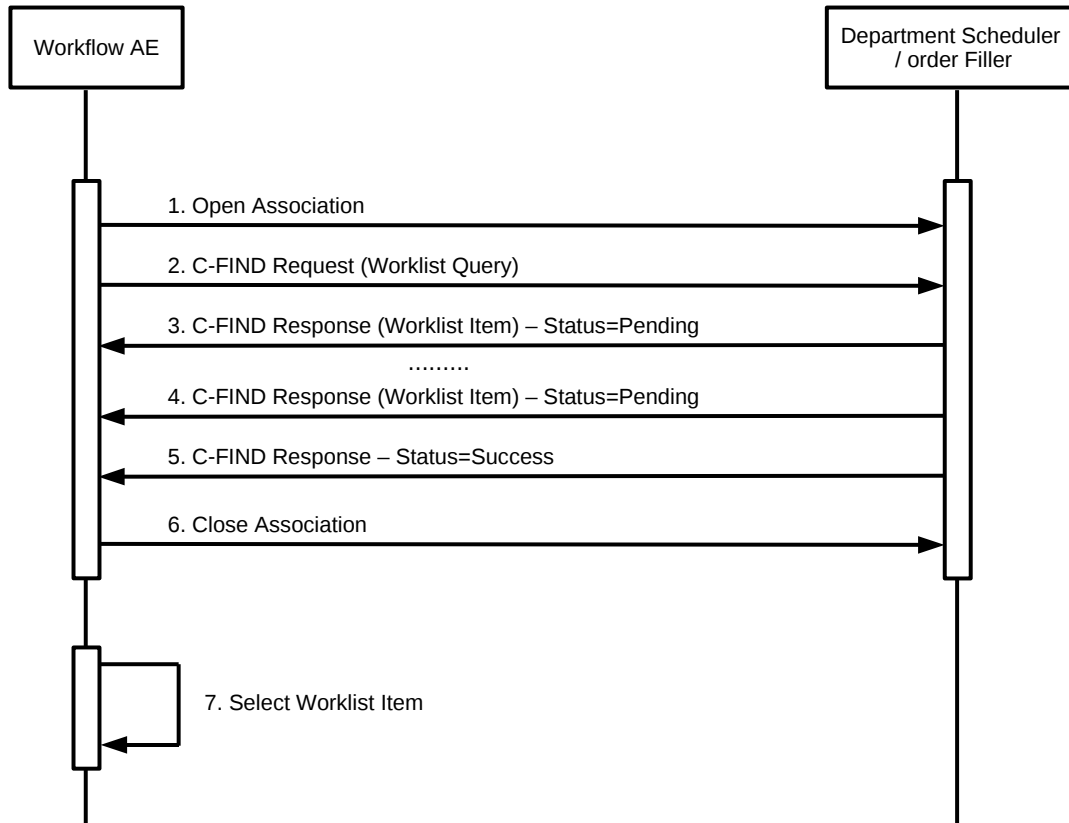
Figure 3.2.3: *Sequencing of Activity - Worklist SCU*

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Modality Worklist Information Model	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE

Table 3.22: *Proposed Presentation Contexts for Workflow AE and Worklist SCU Activity*

3.2.2.3.1.3 Specific Conformance for Worklist Management SOP Class

The behavior of Aixplorer Mach30 when encountering status codes in a Modality Worklist C-FIND response is summarized in Table 3.23. If any other SCP response status than "Success" or "Pending" is received by Aixplorer Mach30, a notification will appear on the user interface.

The behavior of Aixplorer Mach30 during communication failure is summarized in Table 3.24.

Acquired images will always[1] use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally. Table 3.25 below provides a description of Aixplorer Mach30 Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored. Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored. No attempt is made to filter out possible duplicate entries.

Module Name Attribute Name	Tag	VR	VM	M	R	Q	D	IOD
SOP Common								
Specific Character Set	(0008,0005)	CS	1-n		x			
Scheduled Procedure Step								
Scheduled Procedure Step Sequence	(0040,0100)	SQ	1		x			
> Scheduled Station AET	(0040,0001)	AE	1-n	S			x	
> Scheduled Procedure Step Start Date	(0040,0002)	DA	1	R			x	
> Scheduled Procedure Step Start Time	(0040,0003)	TM	1		x		x	
> Scheduled Procedure Step End Date	(0040,0004)	DA	1		x		x	
> Scheduled Procedure Step End Time	(0040,0005)	TM	1		x		x	
> Modality	(0008,0060)	CS	1	S	x		x	x
> Scheduled Performing Physician's Name	(0040,0006)	PN	1		x		x	x
> Scheduled Procedure Step Description	(0040,0007)	LO	1		x		x	x
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	1-n		x		x	x
> > Code Value	(0008,0100)	SH	1		x		x	x
> > Coding Scheme Designator	(0008,0102)	SH	1		x		x	x
> > Coding Scheme Version	(0008,0103)	SH	1		x		x	x
> > Code Meaning	(0008,0104)	LO	1		x		x	x
> Pre-Medication	(0040,0012)	LO	1		x		x	
> Scheduled Procedure Step ID	(0040,0009)	SH	1		x		x	x
> Scheduled Station Name	(0040,0010)	SH	1		x		x	x
>Scheduled Procedure Step Location	(0040,0011)	SH	1		x		x	x

[1]Except if UID is not valid or DICOM administrator setting forced.

> Requested Contrast Agent	(0032,1070)	LO	1		x	x	
> Scheduled Procedure Step status	(0040,0020)	CS	1		x	x	
> Comments on the Scheduled Procedure Step	(0040,0400)	LT	1		x	x	
Requested Procedure							
Requested Procedure ID	(0040,1001)	SH	1		x	x	x
Requested Procedure Description	(0032,1060)	LO	1		x	x	x
Reason for the Requested Procedure	(0040,1002)	LO	1		x	x	
Requested Procedure Location	(0040,1005)	LO	1		x	x	x
Study Instance UID	(0020,000D)	UI	1		x	x	x
Study Date	(0008,0020)	DA	1		x	x	x
Study Time	(0008,0030)	TM	1		x	x	x
Referenced Study Sequence	(0008,1110)	SQ	1		x	x	x
> Referenced SOP Class UID	(0008,1150)	UI	1		x	x	x
> Referenced SOP Instance UID	(0008,1155)	UI	1		x	x	x
Requested Procedure Priority	(0040,1003)	SH	1		x	x	
Patient Transport Arrangements	(0040,1004)	LO	1		x	x	
Requested Procedure Code Sequence	(0032,1064)	SQ	1		x	x	x
> Code Value	(0008,0100)	SH	1		x	x	x
> Coding Scheme Designator	(0008,0102)	SH	1		x	x	x
> Coding Scheme Version	(0008,0103)	SH	1		x	x	x
> Code Meaning	(0008,0104)	LO	1		x	x	x
Names of Intended Recipients of Results	(0040,1010)	PN	1-n		x	x	x
Requested Procedure Comments	(0040,1400)	LT	1		x	x	x
Imaging Service Request							
Accession Number	(0008,0050)	SH	1		x	x	x
Issuer of Accession Number Sequence	(0008,0051)	SQ	1		x		x
> Local Namespace Entity ID	(0040,0031)	UT	1		x		x
> Universal Entity ID	(0040,0032)	UT	1		x		x
> Universal Entity ID Type	(0040,0033)	CS	1		x		x
Requesting Physician	(0032,1032)	PN	1		x	x	x
Referring Physician's Name	(0008,0090)	PN	1		x	x	x
Requesting Service	(0032,1033)	LO	1		x	x	
Imaging Service Request Comments	(0040,2400)	LT	1		x	x	
Placer Order Number/Imaging Service Request	(0040,2016)	LO	1		x	x	
Visit Identification							
Admission ID	(0038,0010)	LO	1		x	x	
Visit Status							
Current Patient Location	(0038,0300)	LO	1		x	x	
Visit Relationship							

Referenced Patient Sequence	(0008,1120)	SQ	1		x	x	x
> Referenced SOP Class UID	(0008,1150)	UI	1		x	x	x
> Referenced SOP Instance UID	(0008,1155)	UI	1		x	x	x
Patient Identification							
Patient Name	(0010,0010)	PN	1	*	x	x	x
Patient ID	(0010,0020)	LO	1		x	x	x
Issuer of Patient ID	(0010,0021)	LO	1		x	x	x
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	SQ	1		x		x
> Universal Entity ID	(0040,0032)	UT	1		x		x
> Universal Entity ID Type	(0040,0033)	CS	1		x		x
Other Patient IDs Sequence	(0010,1000)	SQ	1		x		x
> Patient ID	(0010,0020)	LO	1		x	x	x
> Issuer Of Patient ID	(0010,0021)	LO	1		x		x
> Type Of Patient ID	(0010,0022)	CS	1		x		x
Patient Demographic							
Patient's Birth Date	(0010,0030)	DA	1		x	x	x
Patient's Birth time	(0010,0032)	TM	1		x	x	x
Patient's Sex	(0010,0040)	CS	1		x	x	x
Patient's Weight	(0010,1030)	DS	1		x	x	x
Patient's Size	(0010,1020)	DS	1		x	x	x
Confidentiality Constraint On patient Data Description	(0040,3001)	LO	1		x	x	
Patient comments	(0010,4000)	LT	1		x	x	x
Ethnic Group	(0010,2160)	SH	1		x	x	x
Patient Medical							
Patient State	(0038,0500)	LO	1		x	x	
Pregnancy Status	(0010,21C0)	US	1		x	x	
Medical Alerts	(0010,2000)	LO	1-n		x	x	
Allergies	(0010,2110)	LO	1-n		x	x	
Special Needs	(0038,0050)	LO	1		x	x	
Additional patient History	(0010,21B0)	LT	1		x	x	
Last Menstrual Date	(0010,21D0)	DA	1		x	x	

Table 3.25: *Worklist Request Identifier*

Table 3.25 should be read as follows:

Module Name:	The name of the associated module for supported worklist attributes.
Attribute Name:	Attributes supported to build an Aixplorer Mach30 Worklist Request Identifier.
Tag:	DICOM tag for this attribute.
VR:	DICOM VR for this attribute.

VM:	DICOM VM for this attribute.
M:	Matching keys for Worklist Update. A "S" will indicate that Aixplorer Mach30 will supply an attribute value for Single Value Matching, a "R" will indicate Range Matching and a "*" will denote wildcard matching.
R:	Return keys. An "x" will indicate that Aixplorer Mach30 will supply this attribute as Return Key with zero length for Universal Matching. The Aixplorer Mach30 will support retired date format (yyyy.mm.dd) for "Patient's Birth Date" and "Scheduled Procedure Step Start Date" in the response identifiers. For "Scheduled Procedure Step Start Time" also retired time format as well as unspecified time components are supported.
Q:	Interactive Query Key.
D:	Displayed keys. An "x" indicates that this Worklist attribute is displayed to the user during a patient registration dialog. For example, Patient Name will be displayed when registering the patient prior to an examination.
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 all Worklist items. Optionally, additional matching for the own AET, US modality[2], and a period of time is configurable.

3.2.2.3.2   Activity - Acquire images

3.2.2.3.2.1   Description and Sequencing of Activities

After Patient registration, Aixplorer Mach30 is awaiting the first image acquisition. The trigger to create a MPPS SOP Instance is derived from this event. An Association to the configured MPPS SCP system is established immediately and the related MPPS SOP Instance will be created. The final state of the MPPS is automatically set to:

- "COMPLETED" when user close the exam by either pressing the "End of Exam" button on the control panel or by pressing "new patient" on the touch screen.

- "DISCONTINUED" when user press the "Cancel Exam" button on the touch screen. In the "Discontinued" case, the discontinuation reason is automatically set to "Doctor cancel procedure".

Aixplorer Mach30 only supports a 0-to-1 relationship between Scheduled and Performed Procedure Steps. Aixplorer Mach30 initiates an Association to issue both :

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[2]Modality value can be adjusted by a DICOM administrator

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the matches. Worklist items are available for display or further processing.
Failed	Refused: Out of Resource	A700	The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response will be logged.
	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and reported to the user.
	Unable to Process	CFFF	The Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged and reported to the user.
Cancel	Matching terminated due to Cancel request	FE00	If the query was canceled due to too may Worklist items then the SCP has completed the matches. Worklist items are available for display or further processing. Otherwise, the Association is aborted using A-ABORT and the Worklist query is marked as failed. The status meaning is logged.
Pending	Matches are continuing	FF00	The Worklist item contained in the Identifier is collected for later display.
	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	The Worklist item contained in the Identifier is collected for later display or further processing. The status meaning is logged only once for each C-FIND operation.
*	*	Any other status code.	The Association is aborted using A-ABORT and the Worklist is marked as failed. The status meaning is logged and reported to the user. Any additional error information in the Response will be logged.

Table 3.23: *Modality Worklist C-FIND response status handling behavior*

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the Worklist query marked as failed. The reason is logged and reported to the user if an interactive query.
Association aborted by the SCP or network layers	The Worklist query is marked as failed. The reason is logged and reported to the user.

Table 3.24: *Modality Worklist Communication Failure Behavior*

- a N-CREATE request according to the CREATE Modality Performed Procedure Step SOP Instance operation;

- a N-SET request to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

A possible sequence of interactions between the Workflow AE and a Departmental Scheduler (*e.g.* a device such as a RIS or HIS which supports the MPPS SOP Class as a SCP) is illustrated in Figure 3.2.4:

1. The Workflow AE opens an association with the Departmental Scheduler;

2. The Workflow AE sends a N-CREATE request to the Departmental Scheduler to create an MPPS instance with status of "IN PROGRESS" and create all necessary attributes. The Departmental Scheduler acknowledges the MPPS creation with a N-CREATE response (status success);

3. The Workflow AE closes the association with the Departmental Scheduler;

4. All images are acquired and stored in the local database;

5. The Workflow AE opens an association with the Departmental Scheduler;

6. The Workflow AE sends a N-SET request to the Departmental Scheduler to update the MPPS instance with status of "COMPLETED" and set all necessary attributes. The Departmental Scheduler acknowledges the MPPS update with a N-SET response (status success);

7. The Workflow AE closes the association with the Departmental Scheduler.

3.2.2.3.2.2 Proposed Presentation Contexts
The Worflow AE will propose Presentation Contexts as shown in Table 3.27.
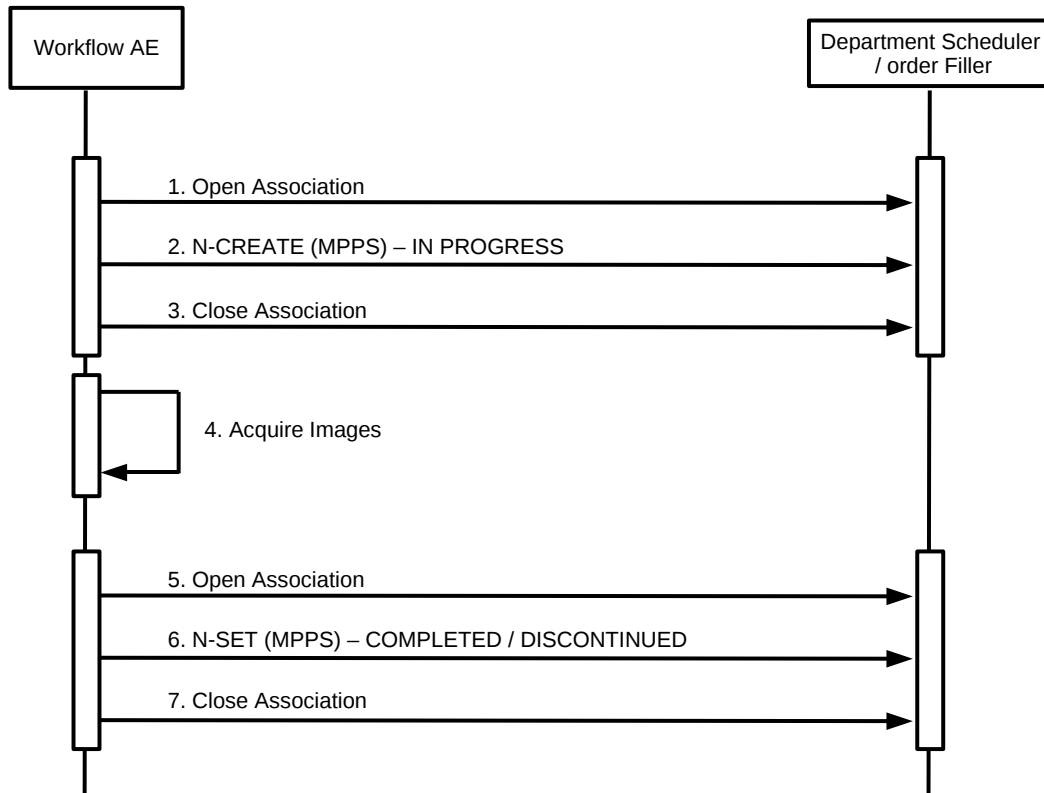
Figure 3.2.4: *Sequencing of Activity - MPPS SCU*

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE

Table 3.27: *Proposed Presentation Contexts for Workflow AE and MPPS SCU Activity*

3.2.2.3.2.3 Specific Conformance for MPPS SOP Class

The behavior of Aixplorer Mach30 when encountering status codes in an MPPS N-CREATE or N–SET response is summarized in Table 3.28. If any other SCP response status than "Success" or "Warning" is received by Aixplorer Mach30, a notification will appear on the user interface.

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has completed the operation successfully.
Failure	Processing Failure – Performed Procedure Step Object may no longer be updated	0110	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user.
Warning	Attribute Value Out of Range	0116H	The MPPS operation is considered successful but the status meaning is logged.
*	*	Any other status code.	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user.

Table 3.28: *MPPS N-CREATE / N-SET Response Status Handling Behavior*

The behavior of Workflow AE during communication failure is summarized in Table 3.29.

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and MPPS marked as failed. The reason is logged and reported to the user.
Association aborted by the SCP or network layers	The MPPS is marked as failed. The reason is logged and reported to the user.

Table 3.29: *MPPS Communication Failure Behavior*

Table 3.30 provides a description of the MPPS N-CREATE and N-SET request identifiers sent by Aixplorer Mach30. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An "x" indicates that an appropriate value will be sent. A "Zero length" attribute will be sent with zero length.

Attribute Name	Tag	VR	N-CREATE	N-SET
Specific Character set	(0008,0005)	CS	see Table 5.1	see Table 5.1
Performed Procedure Step Relationship				
Scheduled Step Attributes Sequence	(0040,0270)	SQ	Always present	
> Study Instance UID	(0020,000D)	UI	From Modality Worklist	
> Referenced Study Sequence	(0008,1110)	SQ	From Modality Worklist. The user can't modify values provided via Modality Worklist.	
> > Referenced SOP Class UID	(0008,1150)	UI	From Modality Worklist	
> > Referenced SOP Instance UID	(0008,1155)	UI	From Modality Worklist	
> Accession Number	(0008,0050)	SH	From Modality Worklist or user input. The user can't modify values provided via Modality Worklist.	
> Issuer of Accession Number Sequence	(0008,0051)	SQ	From Modality Worklist or absent. The user can't modify values provided via Modality Worklist.	
> > Local Namespace Entity ID	(0040,0031)	UT	From Modality Worklist. The user can't modify values provided via Modality Worklist.	
> > Universal Entity ID	(0040,0032)	UT	From Modality Worklist. The user can't modify values provided via Modality Worklist.	
> > Universal Entity ID Type	(0040,0033)	CS	From Modality Worklist. The user can't modify values provided via Modality Worklist.	
> Placer Order Number / Imaging Service Request	(0040,2016)	SH	From Modality Worklist or absent. The user can't modify values provided via Modality Worklist.	
> Requested Procedure ID	(0040,1001)	SH	From Modality Worklist	

> Requested Procedure Code Sequence	(0032,1064)	SQ	From Modality Worklist	
> Requested Procedure Description	(0032,1060)	LO	From Modality Worklist	
> Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist	
> Scheduled Procedure Step Description	(0040,0007)	LO	From Modality Worklist	
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	From Modality Worklist	
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input. The user can't modify values provided via Modality Worklist.	
Patient ID	(0010,0020)	LO	From Modality Worklist or user input. The user can't modify values provided via Modality Worklist.	
Issuer Of Patient ID	(0010,0021)	LO	From Modality Worklist or empty. The user can't modify values provided via Modality Worklist.	
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	SQ	From Modality Worklist or not send. The user can't modify values provided via Modality Worklist.	
> Universal Entity ID	(0040,0032)	UT	From Modality Worklist. The user can't modify values provided via Modality Worklist.	
> Universal Entity ID Type	(0040,0033)	UT	From Modality Worklist. The user can't modify values provided via Modality Worklist.	
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	

Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	
Referenced Patient Sequence	(0008,1120)	SQ	From Modality Worklist or zero length. The user can modify values provided via Modality Worklist.	
Admission ID	(0038,0010)	LO	From Modality Worklist.	
Performed Procedure Step Information				
Performed Procedure Step ID	(0040,0253)	SH	Automatically created but can be modified by the user. From Modality Worklist or user input.	
Performed Station AE Title	(0040,0241)	AE	Aixplorer Mach30 AE Title	
Performed Station Name	(0040,0242)	SH	From configuration	
Performed Location	(0040,0243)	SH	From configuration	
Performed Procedure Step Start Date	(0040,0244)	DA	Actual start date	
Performed Procedure Step Start Time	(0040,0245)	TM	Actual start time	
Performed Procedure Step Description	(0040,0254)	LO	Use Study Description Value.	
Performed Procedure Type Description	(0040,0255)	LO	Zero length	
Procedure Code Sequence	(0008,1032)	SQ	Copy from Requested Code Sequence (0032,1064)	
Performed Procedure Step End Date	(0040,0250)	DA	Zero length	Actual end date
Performed Procedure Step End Time	(0040,0251)	TM	Zero length	Actual end time
Performed Procedure Step Status	(0040,0252)	CS	IN PROGRESS	DISCONTINUED or COMPLETED
Comments On The Performed Procedure Step	0040,0280	ST	Copy from Comments on the Scheduled Procedure Step (0040,0400) if provided by Modality Worklist.	

Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	SQ	Zero length	If Performed Procedure Step Status (0040,0252) is "DISCONTINUED" then a single item will be present containing an entry drawn from Context Group 9300.
Image Acquisition Results				
Modality	(0008,0060)	CS	US	
Study ID	(0020,0010)	SH	From Modality Worklist or From Modality Worklist or user input. The user can modify values provided via Modality Worklist.	
Performed Protocol Code Sequence	(0040,0260)	SQ	Zero length	
Performed Series Sequence	(0040,0340)	SQ	Zero length	Present
> Performing Physician's Name	(0008,1050)	PN		From Modality Worklist or user input. The user can't modify values provided via Modality Worklist.
> Operator's Name	(0008,1070)	PN		From Modality Worklist or user input. The user can't modify values provided via Modality Worklist.
> Protocol Name	(0018,1030)	LO		"Free From"
> Series Instance UID	(0020,000E)	UI		x
> Series Description	(0008,103E)	LO		x
> Retrieve AE Title	(0008,0054)	AE		From Configuration
> Archive Requested	(0040,A494)	CS		x
> Referenced Image Sequence	(0008,1140)	SQ		One or more items
> > Referenced SOP Class UID	(0008,1150)	UI		x
> > Referenced SOP Instance UID	(0008,1155)	UI		x

> Referenced Non Image Composite SOP Instance Sequence	(0008,1140)	SQ		Zero or One item
> > Referenced SOP Class UID	(0008,1150)	UI		x
> > Referenced SOP Instance UID	(0008,1155)	UI		x

Table 3.30: *MPPS N-Create / N-Set Request Identifier*

3.2.2.4 Association Acceptance Policy

The Worflow AE does not accept Associations.

3.2.3 Hardcopy Application Entity Specification

3.2.3.1 SOP Classes

The Hardcopy AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.31.

3.2.3.2 Association Policies

3.2.3.2.1 General

As illustrated in Table 3.32, the DICOM 3.0 standard Application context is always specified for each association.

3.2.3.2.2 Number of Associations

Hardcopy AE may initiates 1 Association at a time (see Table 3.33).

3.2.3.2.3 Asynchronous Nature

As illustred in Table 3.34, Hardcopy AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

3.2.3.2.4 Implementation Identifying Information

The implementation information for the Hardcopy Application Entity is described in Table 3.35.

3.2.3.3 Association Initiation Policy

3.2.3.3.1 Activity - print images

SOP Class Name	SOP Class UID	SCU	SCP
Supported Meta SOP Classes for Basic Print Service			
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9	Yes	No
Basic Color Print Management	1.2.840.10008.5.1.1.18	Yes	No
Supported SOP Classes for Basic Grayscale Print Service			
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Supported SOP Classes for Basic Color Print Service			
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No

Table 3.31: *SOP Classes for AE Hardcopy*

Application Context Name	1.2.840.10008.3.1.1.1

Table 3.32: *DICOM Application Context for Hardcopy AE*

Maximum number of simultaneous Associations	1

Table 3.33: *Number of Associations as an Association Initiator for Hardcopy AE*

Maximum number of outstanding asynchronous transactions	0

Table 3.34: *Asynchronous Nature as an Association Initiator for Hardcopy AE*

Implementation Class UID	1.2.250.1.204.0.1.20120820.0.3.6.1
Implementation Version Name	SSI_DCMTK_361

Table 3.35: *DICOM Implementation Class and Version for Hardcopy AE*

3.2.3.3.1.1 Description and Sequencing of Activity

Aixplorer Mach30 will initiate a separate association with a Print SCP for each print session. After an association has been accepted and is established, Aixplorer Mach30 will send a print job to the Print Server. Each print job includes the following steps (see Figure 3.2.5):

- Aixplorer Mach30 first performs a N-GET request to get Printer information;

- Aixplorer Mach30 requests the server to a N-CREATE a film session SOP instance.

For each film to be printed:

- A N-CREATE request is performed to get a Film Box SOP instance;

- N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data;

- If no print collation is needed, a N-ACTION is requested for the Film Box instance;

- This causes the film to be printed;

- If print collation is requested, a N-ACTION is performed on the film session.

3.2.3.3.1.2 Proposed Presentation Contexts

Aixplorer Mach30 will propose Presentation Contexts as shown in Table 3.36.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Basic Grayscale Print Management Meta SOP Class[1]	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE
Basic Color Print Management Meta SOP Class[1]	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE

[1]Only one Abstract Syntax is proposed. Choice is achieved through configuration window.

Table 3.36: *Proposed Presentation Contexts for Hardcopy AE and Print SCU Activity*
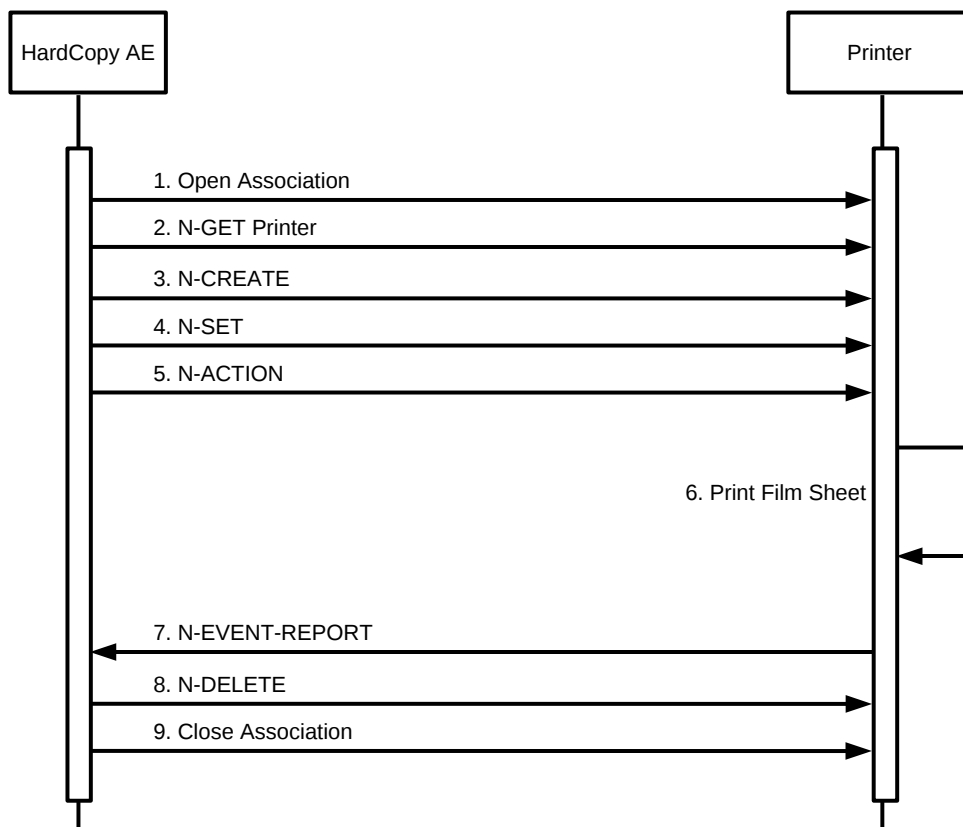
Figure 3.2.5: *Sequencing of Activity - Print SCU*

3.2.3.3.1.3 SOP Specific Conformance for Print SOP Class

If the DICOM Print software is unable to open an association with the selected destination AE, an error message displays in Aixplorer Mach30. No message is displayed when successful printing operation responses are received. After an association has been accepted and is established, Aixplorer Mach30 will send a print job to the Print Server. Each print job includes the following steps:

- Aixplorer Mach30 first performs a N-GET request to get Printer information;

- Aixplorer Mach30 requests the server to a N-CREATE a film session SOP instance;

- For each film to be printed:

  - A N-CREATE request is performed to get a Film Box SOP instance;

  - N-SET requests are made to change some film box instance attributes and to fill image boxes with image pixel data;

  - If no print collation is needed, a N-ACTION is requested for the Film Box instance. This causes the film to be printed;

  - If print collation is requested, a N-ACTION is performed on the film session.

3.2.3.3.1.3.1. Basic Printer SOP Class

Aixplorer Mach30 can send the following DIMSE commands to a Film Box: N-GET. N-GET is issued by Aixplorer Mach30 to get Print information. However, this information is not used.

3.2.3.3.1.3.2. Basic Film Session SOP Class

Aixplorer Mach30 can send the following DIMSE commands to a Film Session: N-CREATE, N-SET, N-ACTION, N-DELETE.

- N-CREATE is issued by Aixplorer Mach30 to create a Film Session where film boxes will be created. (see Table 3.37):

- No N-SET is issued by Aixplorer Mach30 to change Film Session attributes;

- N-ACTION is issued by Aixplorer Mach30 to request printing of all Film Boxes in the Film Session;

- N-DELETE is issued by Aixplorer Mach30 to request a Film Session deletion;

Attribute Name	Tag ID	Value / Comment
Number of Copies	(2000,0010)	Default is 1
Print Priority	(2000,0020)	HIGH, MED, LOW. Default is MED
Medium Type	(2000,0030)	PAPER, BLUE FILM, CLEAR FILM or empty string. Default is paper
Film Destination	(2000,0040)	PROCESSOR or MAGAZINE. Default is MAGAZINE
Film Session Label	(2000,0050)	Configurable

Table 3.37: *Basic Film Session SOP Class N-CREATE request attributes*

3.2.3.3.1.3.3. Basic Film Box SOP Class

Aixplorer Mach30 can send the following DIMSE commands to a Film Box: N-CREATE, N-SET, N-ACTION, N-DELETE.

- N-CREATE is issued by Aixplorer Mach30 to create a Film Box in a Film Session, where image boxes will be created (see Table 3.38);

- No N-SET is issued by Aixplorer Mach30 to create/change Film Box attributes;

- N-ACTION is issued by Aixplorer Mach30 to request printing of a Film Boxes;

- N-DELETE is issued by Aixplorer Mach30 to request a Film Box deletion;

3.2.3.3.1.3.4. Basic Grayscale Image Box SOP Class

Basic Grayscale Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film sheet. Aixplorer Mach30 can send the following DIMSE commands to an Image Box: N-SET.

- N-SET is issued by Aixplorer Mach30 to set change Image Box attributes. (see Table 3.39).

3.2.3.3.1.3.5. Basic Color Image Box SOP Class

Basic Color Image Box instances are created at the time the Basic Film Box SOP instance is created. The Basic Image Box contains the presentation parameters and image pixel data that apply to a single image of a film sheet. Aixplorer Mach30 can send the following DIMSE commands to an Image Box: N-SET.

- N-SET is issued by Aixplorer Mach30 to set change Image Box attributes. (see Table 3.40)

Attribute Name	Tag ID	Value / Comment
Image Display Format	(2010, 0010)	STANDARD
Film Orientation	(2010, 0030)	PORTRAIT or LANDSCAPE. Default is PORTRAIT.
Film Size ID	(2010, 0050)	8INX10IN, 8_5INX11IN, 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, A4 or A3. Not set if default.
Magnification Type	(2010, 0060)	NONE, REPLICATE, BILINEAR or CUBIC Not set if default.
Smoothing Type	(2010, 0080)	Not set if default.
Border Density	(2010, 0100)	BLACK, WHITE, Grayscale. Not set if default
Empty Image Density	(2010, 0110)	BLACK, WHITE, Grayscale. Not set if default
Min Density	(2010, 0120)	Not set
Max Density	(2010, 0130)	Not set
Trim	(2010, 0140)	Not set
Referenced Film Session Sequence	(2010, 0500)	
>Referenced SOP Class UID	(0008, 1150)	
>Referenced SOP Instance UID	(0008, 1155)	

Table 3.38: *Basic Film Box SOP Class N-CREATE attributes*

Attribute Name	Tag ID	Value / Comment
Image Box Position	(2020, 0010)	1 to <number of images in film box>
Polarity	(2020, 0020)	NORMAL or REVERSE. Not set if default
Basic Grayscale Image Sequence	(2020, 0110)	
>Samples Per Pixel	(0028, 0002)	1
>Photometric Interpretation	(0028, 0004)	MONOCHROME2
>Rows	(0028, 0010)	at most 1080 (reduction may be applied)
>Columns	(0028, 0011)	at most 1440 (reduction may be applied)
>Pixel Aspect Ratio	(0028, 0034)	1/1
>Bits Allocated	(0028, 0100)	8
>Bits Stored	(0028, 0101)	8
>High Bit	(0028, 0102)	7
>Pixel Representation	(0028, 0103)	0
>Pixel Data	(7FE0, 0010)	

Table 3.39: *Basic Grayscale Image Box SOP Class Request attributes*

Attribute Name	Tag ID	Value / Comment
Image Position	(2020, 0010)	1 to <number of images in film box>
Polarity	(2020, 0020)	NORMAL or REVERSE. Not set if default.
Basic Color Image Sequence	(2020, 0110)	
>Samples Per Pixel	(0028, 0002)	3
>Photometric Interpretation	(0028, 0004)	RGB
>Planar Configuration	(0028, 0006)	0
>Rows	(0028, 0010)	at most 1080 (reduction may be applied)
>Columns	(0028, 0011)	at most 1440 (reduction may be applied)
>Pixel Aspect Ratio	(0028, 0034)	1/1
>Bits Allocated	(0028, 0100)	8
>Bits Stored	(0028, 0101)	8
>High Bit	(0028, 0102)	7
>Pixel Representation	(0028, 0103)	0
>Pixel Data	(7FE0, 0010)	

Table 3.40: *Basic Color Image Box SOP Class Request attributes*

3.2.4 Verification Application Entity Specification

3.2.4.1 SOP Classes

The Verification AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.41.

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No

Table 3.41: *SOP Classes for AE Verification*

3.2.4.2 Association Policies

3.2.4.2.1 General

As illustrated in Table 3.42, the DICOM 3.0 standard Application context is always specified for each association.

Application Context Name	1.2.840.10008.3.1.1.1

Table 3.42: *DICOM Application Context for Verification AE*

3.2.4.2.2 Number of Associations

Verification AE may initiates 1 Association at a time (see Table 3.43).

Maximum number of simultaneous Associations	1

Table 3.43: *Number of Associations as an Association Initiator for Verification AE*

3.2.4.2.3 Asynchronous Nature

As illustrated in Table 3.44, Verification AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

3.2.4.2.4 Implementation Identifying Information

The implementation information for the Verification Application Entity is described in Table 3.45.

Maximum number of outstanding asynchronous transactions	0

Table 3.44: *Asynchronous Nature as an Association Initiator for Verification AE*

Implementation Class UID	Implementation Version Name
1.2.250.1.204.0.1.20120820.0.3.6.1	SSI_DCMTK_361

Table 3.45: *DICOM Implementation Class and Version for Verification AE*

3.2.4.3   Association Initiation Policy

3.2.4.3.1   Activity - Verification SCU

3.2.4.3.1.1   Description and Sequencing of Activities

All verification SCU operations are performed synchronously, on user request. Aixplorer Mach30 may initiate an association with a Verification SCP within its configuration panel to check remote SCP availability. A possible sequence of interactions between Verification SCU and a verification SCP is illustrated in Figure 3.2.6 :

1. Verification SCU opens an association with the Verification SCP;

2. Verification SCU sends a C-Echo Request;

3. Verification SCP sends a C-Echo Response;

4. Verification SCU closes the association.

3.2.4.3.1.2   Proposed Presentation Contexts

Aixplorer Mach30 will propose Presentation contexts as shown in Table 3.46.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE

Table 3.46: *Presentation Context Table for Verification SCU*
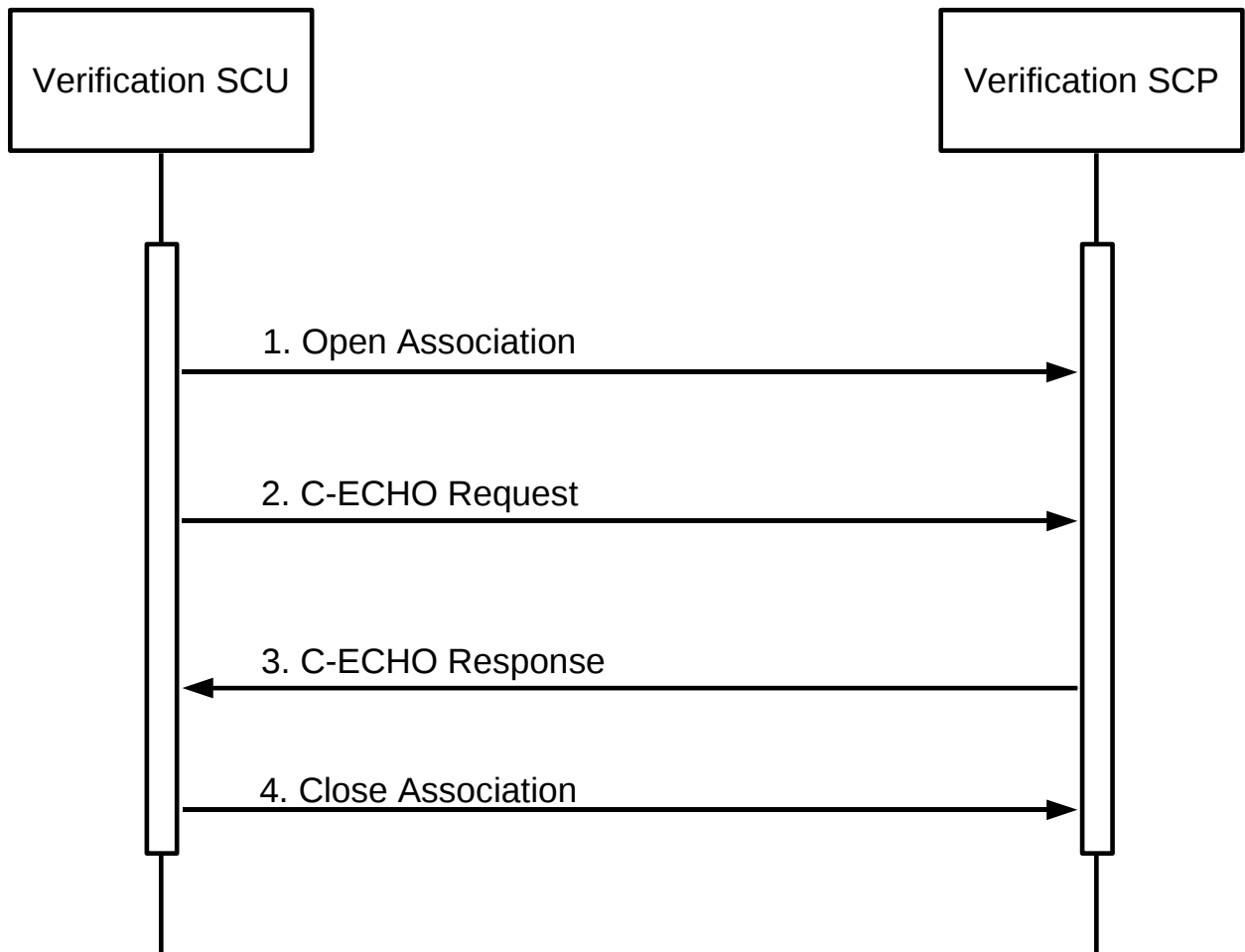
Figure 3.2.6: *Sequencing of Activity - CEcho SCU*

3.2.5 Storage SCP Application Entity Specification

3.2.5.1 SOP Classes

The Aixplorer Mach30's Storage SCP AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.47.

3.2.5.2 Association Policies

3.2.5.2.1 General

The Storage SCP AE accepts but never initiates associations.
The maximum PDU size accepted by Storage SCP AE is described in Table 3.48.

3.2.5.2.2 Number of Associations

As shown in Table 3.49, the Storage SCP AE may accept UP TO 15 of simultaneous associations.

3.2.5.2.3 Asynchronous Nature

The Storage SCP AE will only allow a single outstanding operation on an Association. Therefore, the Storage SCP AE will not perform asynchronous operations during negotiation.

3.2.5.2.4 Implementation Identifying Information

The implementation information for the Storage SCP Application Entity is described in Table 3.50.

3.2.5.3 Association Initiation Policy

The Storage SCP AE does not initiate associations.

3.2.5.4 Association Acceptance Policy

When Storage SCP accepts an association, it will respond to storage requests. Connections from any host are accepted.

3.2.5.4.1 Activity – Store instances on local storage

3.2.5.4.1.1 Description and Sequencing of Activities

As instances are received, they are copied to the local file system and a record inserted into the local database. If the received instance is a duplicate of a previously received instance, the old file and database record will be overwritten with the new one. Aixplorer Mach30's storage area is limited, thus oldest instances will be automatically deleted.

SOP Class Name	SOP Class UID	SCU	SCP
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
(Retired) US Image Storage	1.2.840.10008.5.1.4.1.1.6	No	Yes
(Retired) US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Nuclear Medecine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Nuclear Medecine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	No	Yes
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	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
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes

Table 3.47: *SOP Classes for Storage SCP AE*

Maximum pdu size received	16384

Table 3.48: *Maximum PDU size received as a SCP for Storage SCP*

Maximum number of simultaneous Associations	15

Table 3.49: *Number of Associations as a SCP for Storage SCP AE*

Implementation Class UID	1.2.250.1.204.0.1.20120820.0.3.6.1
Implementation Version Name	SSI_DCMTK_361

Table 3.50: *DICOM Implementation Class and Version for Storage SCP AE*

A possible sequence of interactions between Storage SCP AE and a Remote Storage SCU AE is illustrated in Figure 3.2.7:

1. A Remote Storage SCU AE opens an association with the Aixplorer Mach30's Storage SCP AE,

2. Acquired image(s) is transmitted to the Storage SCP AE using a C-STORE request and the Storage SCP AE replies with a C-STORE response (status success),

3. Remote Storage SCU AE closes the association with the Aixplorer Mach30's Storage SCP AE.

3.2.5.4.1.2   Accepted Presentation Contexts
Each time an association is initiated, both SCU and SCP proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts accepted by Store SCP AE:

- for a C-Store service are defined in Table 3.51.

- for a C-Echo service are defined in Table 3.52.
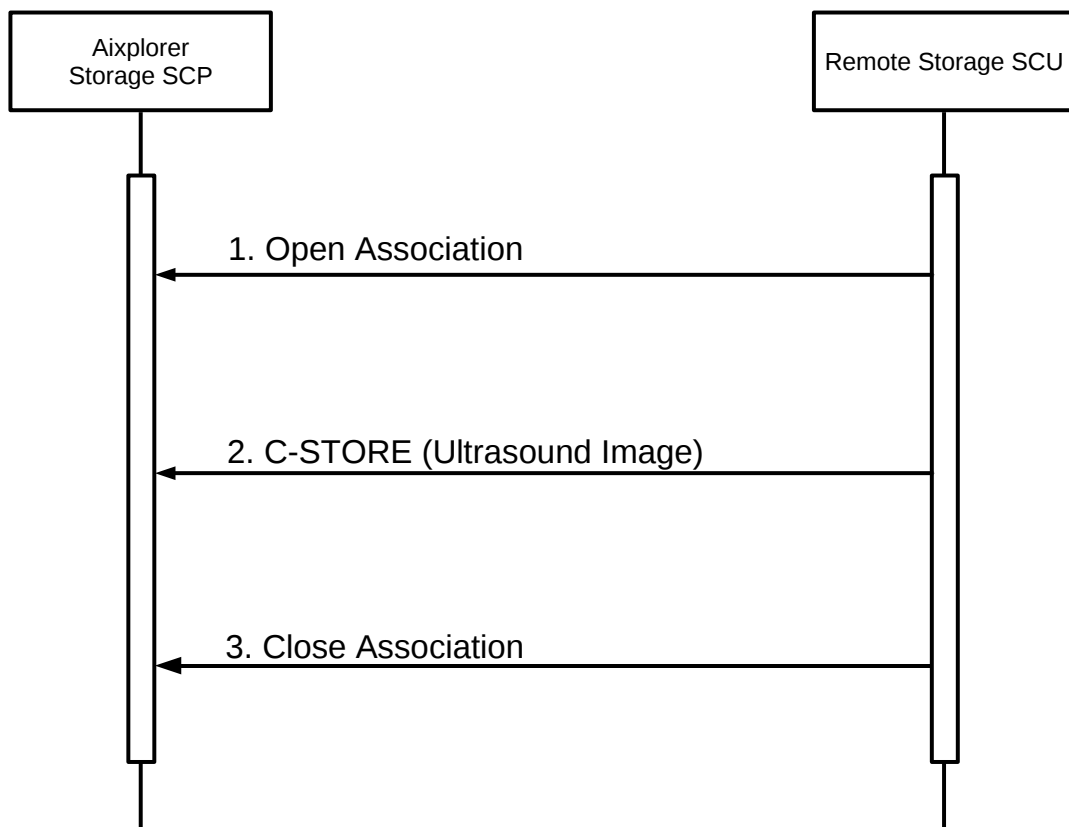
Figure 3.2.7: *Sequencing of Activity - Send Images*

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
(Retired) Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
(Retired) Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE

		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Nuclear Medecine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Digital XRay Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
Digital XRay Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
RETIRED Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
				SCP	

		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
XRay Radiofluoro-scopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE

Table 3.51: *Acceptable Presentation Contexts for Storage SCP and receive storage request*

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE

Table 3.52: *Acceptable Presentation Contexts for Storage SCP and receive Echo request*

3.2.5.4.1.2.1.   Extended Negotiation

No extended negotiation is performed, though Storage SCP:

- is a Level 2 Storage SCP (Full – does not discard any data elements);

- does not support digital signatures;

- does not coerce any received data elements.

3.2.5.4.1.3   SOP Specific Conformance

3.2.5.4.1.3.1.   SOP Specific Conformance to Storage SCP SOP Classes

Storage SCP provides standard conformance to the Storage Service Class.

3.2.5.4.1.3.2.   SOP Specific Conformance to Storage SCP SOP Classes

Storage SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

3.2.5.4.1.3.3.   Transfer Syntax Selection Policies

The default behavior of the Storage SCP is to prefer transfer syntaxes having an explicit encoding over the default implicit transfer syntax and since Storage SCP is running on little-endian hardware it will prefer Little Endian Explicit to Big Endian Explicit transfer syntax.

3.2.5.4.1.3.4.   Response Status

Storage SCP will behave as described in Table 3.53 when generating the C-STORE response command message.

Service Status	Further Meaning	Error Code	Reasons
Refused	Out of Resources	A7xx	Never sent
Error	Data Set does not match SOP Class	A9xx	Never sent – data set is not checked prior to storage
	Cannot understand	Cxxx	Never sent
Warning	Coercion of Data Elements	B000	Never sent - no coercion is ever performed
	Data Set does not match SOP Class	B007	Never sent - data set is not checked prior to storage
	Elements Discarded	B006	Never sent – all elements are always stored
Success	Success	0000	

Table 3.53: *Response Status for Storage SCP and Receive Storage Request*

3.2.6   Query/Retrieve Application Entity Specification

3.2.6.1   SOP Classes

The Query/Retrieve AE provides Standard Conformance to the DICOM 3.0 SOP Classes described in Table 3.54.

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

Table 3.54: *SOP Classes for AE Query/Retrieve*

3.2.6.2   Association Policies

3.2.6.2.1   General

As illustrated in Table 3.55, the DICOM 3.0 standard Application context is always specified for each association.

Application Context Name	1.2.840.10008.3.1.1.1

Table 3.55: *DICOM Application Context for Query/Retrieve AE*

3.2.6.2.2 Number of Associations

The Query/Retrieve AE may initiates Two Association at a time (see Table 3.56) :

- One C-Find request;

- One C-Move request.

Maximum number of simultaneous Associations	1 Find
	1 Move

Table 3.56: *Number of Associations as an Association Initiator for Query/Retrieve AE*

3.2.6.2.3 Asynchronous Nature

As illustrated in Table 3.57, the Query/Retrieve AE does not support asynchronous communication (multiple outstanding transactions over a single Association).

Maximum number of outstanding asynchronous transactions	0

Table 3.57: *Asynchronous Nature as an Association Initiator for Query/Retrieve AE*

3.2.6.2.4 Implementation Identifying Information

The implementation information for the Query/Retrieve Application Entity is described in Table 3.58.

3.2.6.3 Association Initiation Policy

3.2.6.3.1 Activity - Query Request

3.2.6.3.1.1 Description and Sequencing of Activity

The Find SCU attempts to initiate a new association when the user performs the query action from the user interface. If this involves recursive queries for lower query levels in the hierarchy, these will be performed on other associations. A single attempt will be made to query the remote AE. If the query fails, for whatever reason, no retry will be performed.

Implementation Class UID	1.2.250.1.204.0.1.20120820.0.3.6.1
Implementation Version Name	SSI_DCMTK_361

Table 3.58: *DICOM Implementation Class and Version for Query/Retrieve AE*

3.2.6.3.1.2 Proposed presentation Context

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by Aixplorer Mach30 for a C-Find service are defined in Table 3.59.

Presentation Context Table						
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**	
Name	**UID**	**Name**	**UID**			
FIND Study Root Query/Retrieve Information Model	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE	
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE	
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE	

Table 3.59: *Proposed Presentation Contexts for Activity Query Request*

3.2.6.3.1.2.1.   Extended Negotiation

No extended negotiation is performed.
In particular, relational queries are not supported.

3.2.6.3.1.3 SOP Specific Conformance

3.2.6.3.1.3.1.   SOP Specific Conformance to C-FIND SOP Classes

FIND-SCU provides standard conformance to the supported C-FIND SOP Classes. Only a single information model, Study Root, is supported. All queries are initiated at the highest level of the information model (the STUDY level), and then for each response received, recursively repeated at the next lower level(the SERIES level), in order to elucidate the "tree" of series available on the remote AE (from which the user may subsequently request a retrieval at Series level).
A CANCEL request will be sent if the number of series receive is greated than a configurable limit.
Table 3.60 show the requested identifier at the Study and Series Information level of the Study Root Query/Retrieve Information Model. The types of Matching supported by the Find SCU is the following :

- "S" indicates the identifier attribute uses Single Value Matching,

- "R" indicates Range Matching,

- "*" indicates wildcard matching,

- "U" indicates Universal Matching,

- "L" indicates that UID lists are sent,

- "NONE" indicates that no matching is supported, but that values for this Element are requested to be returned (*i.e.* universal matching),

- "UNIQUE" indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

3.2.6.3.1.3.2.   Presentation Context Acceptance Criterion

The Find SCU does not accept associations.

3.2.6.3.1.3.3.   Transfer Syntax Selection Policies

The Find SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in the accepted Presentation Contexts, it will choose the Little-Endian Explicit Transfer Syntax.

3.2.6.3.1.3.4.   Response Status

The Find SCU will behave as described in Table 3.61 in response to the status returned in the C-FIND response command message(s).

3.2.6.3.2   Activity - Retrieve Exam

3.2.6.3.2.1   Description and Sequencing of Activity

For series selected from the user interface to be retrieved, a single attempt will be made to retrieve them from the selected remote AE. If the retrieve fails, for whatever reason, no retry will be performed.

3.2.6.3.2.2   Proposed presentation Context

Each time an association is initiated, the Association Initiator proposes a number of Presentation Contexts to be used on that association. The Presentation Contexts proposed by Aixplorer Mach30 for a C-Move service are defined in Table 3.62.

Description	Tag	Type
Study Level		
Study Date	(0008,0020)	S, *, U, R
Study Time	(0008,0030)	U
Accession Number	(0008,0050)	S, *, U
Patient's Name	(0010,0010)	S, *, U
Patient ID	(0010,0020)	S, *, U
Study ID	(0020,0010)	U
Study Instance UID	(0020,000D)	UNIQUE
Modalities in Study	(0008,0061)	U
SOP Classes in Study	(0008,0062)	U
Referring Physician's Name	(0008,0090)	U
Study Description	(0008,1030)	U
Name of Physician(s) Reading Study	(0008,1060)	U
Patient's Birth Date	(0010,0030)	U
Patient's Birth Time	(0010,0032)	U
Patient's Sex	(0010,0040)	U
Number of Study Related Series	(0020,1206)	NONE
Retrieve AE Title	(0008,0054)	U
Series Level		
Series Number	(0020,0011)	U
Modality	(0008,0060)	S,U
Series Instance UID	(0020,000E)	UNIQUE
Number of Series Related Instances	(0020,1208)	U
Series Date	(0008,0021)	U
Series Time	(0008,0031)	U
Performed Procedure Step Start Date	(0040,0244)	U
Performed Procedure Step Start Time	(0040,0245)	U

Table 3.60: *Study Root request identifier for Find SCU*

Service Status	Further Meaning	Error Code	Behavior
Refused	Out of Resources	A700	Current query is terminated, remaining queries continue.
Error	Identifier does not match SOP Class	A900	Current query is terminated, remaining queries continue
	Unable to process	Cxxx	Current query is terminated, remaining queries continue
Cancel	Matching terminated due to Cancel request	FE00	A CANCEL request will be sent if the number of series receive is greated than a configurable limit
Success	Matching is complete - No final Identifier is supplied	0000	Current query is terminated, remaining queries continue
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier used to populate browser and trigger recursive lower level queries
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier	FF01	Identifier used to populate browser and trigger recursive lower level queries

Table 3.61: *Response Status for Find SCU and Query Remote AE Request*

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
MOVE Study Root Query Retrieve Information Model	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	NONE

Table 3.62: *Proposed Presentation Contexts for Activity Retrieve Exam Request*

3.2.6.3.2.2.1.   Extended Negotiation

No extended negotiation is performed.
In particular, relational retrievals are not supported.

3.2.6.3.2.3   SOP Specific Conformance

3.2.6.3.2.3.1.   SOP Specific Conformance to C-FIND SOP Classes

The Move SCU provides standard conformance to the supported C-MOVE SOP Classes. Only a single information model, Study Root, is supported. A retrieval will be performed at the SERIES level.
No CANCEL requests are ever issued.
The retrieval is performed from the AE that was specified in the Retrieve AE attribute returned from the query performed by FIND-SCU. The instances are retrieved to the current application's local database by specifying the destination as the AE Title of the STORE-SCP AE of the local application.

3.2.6.3.2.3.2.   Presentation Context Acceptance Criterion

The Move SCU does not accept associations.

3.2.6.3.2.3.3.   Transfer Syntax Selection Policies

The Move SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in the accepted Presentation Contexts, it will choose the Little-Endian Explicit Transfer Syntax.

3.2.6.3.2.3.4.   Response Status

The Move SCU will behave as described in Table 3.63 in response to the status returned in the C-MOVE response command message(s).

3.2.6.3.2.3.5.   Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate association, the question of failure of operations on the other association(s) must be considered.

The Move SCU completely ignores whatever activities are taking place in relation to the Storage SCP AE that is receiving the retrieved instances. Once the C-MOVE has been initiated it runs to completion (or failure) as described in the C-MOVE response command message(s). There is no attempt by Move SCU to confirm that instances have actually been successfully received or locally stored. Whether or not completely or partially successfully retrievals are made available in the local database to the user is purely dependent on the success or failure of the C-STORE sub-operations, not on any explicit action by Move SCU.

Whether or not the remote AE attempts to retry any failed C-STORE sub-operations is beyond the control of Move SCU.

If the association on which the C-MOVE was issued is aborted for any reason, whether or not the C- STORE sub-operations continue is dependent on the remote AE; the local Storage SCP will continue to accept associations and storage operations regardless.

3.2.6.4   Association Acceptance Policy

The Query/Retrieve AE does not accepts Associations.

3.3   Network Interfaces

3.3.1   Physical Network Interface

Aixplorer Mach30 supports a single network interface. The following physical network interfaces are supported:

- Ethernet 10baseT;

- Ethernet 100baseT;

- Ethernet 1000baseT.

Service Status	Further Meaning	Status Code	Related Fields	Behavior
Failed	Refused: Out of Resources - Unable to calculate number of matches	A701	(0000,0902)	Retrieval is terminated
	Refused: Out of Resources - Unable to perform sub-operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
	Move Destination unknown	A801	(0000,0902)	Retrieval is terminated
	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902) (0000,0901)	Retrieval is terminated
	Unable to process	Cxxx	(0000,0902)	Retrieval is terminated
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated (should never occur, since cancels never issued)
Warning	Sub-operations Complete - One or more Failures	B000	(0000,1020) (0000,1022) (0000,1023)	Retrieval is terminated
Success	Sub-operations Complete - No Failures	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval continues

Table 3.63: *Response Status for Move SCU and retrieve from Remote AE Request*

3.3.2   Additional Protocols

Aixplorer Mach30 conforms to the System Management Profiles listed in the Table below. All requested transactions for the listed profiles and actors are supported. Support for optional transactions is listed in the Table 3.64:

Profile Name	Actor	Protocols Used	Optional Transaction
Network Address Management	DHCP Client	DHCP	N/A
	DNS Client	DNS	N/A
Time Synchronization	NTP Client	NTP	N/A
	DHCP Client	DHCP	N/A

Table 3.64: *Supported System Management profiles*

3.3.2.1   DHCP

DHCP can be used to obtain TCP/IP network configuration information. The network parameters obtainable via DHCP are shown in Table 3.65. The Default Value column of the table shows the default used if the DHCP server does not provide a value. Support for DHCP can be configured via the "Network Configuration" Window. If DHCP is not in use, TCP/IP network configuration information can be manually configured via the "Network Configuration" Window. If the DHCP server refuses to renew a lease on the assigned IP address all active DICOM

DHCP Parameter	Default Value
IP Address	None
Subnet mask	Derived from IP Address
Time offset	Site configurable
MTU	Network Hardware Dependent

Table 3.65: *Supported DHCP Parameters*

Associations will be aborted.

3.3.2.2   DNS

DNS can be used for address resolution. If DHCP is not in use or the DHCP server does not return any DNS server addresses, the identity of a DNS server can be configured via the "Network Configuration" window.

3.3.2.3 NTP

The NTP client will issue an NTP broadcast to identify any local NTP servers. If no local servers can found via NTP broadcast, the NTP Servers identified by DHCP will be used as time references. Additionally, one NTP Server can be configured via the via the "Regional" window. If no NTP Servers are identified then the local clock will be used as a time reference and a warning written to the system log files.

3.3.2.4 LDAP

LPAD is not supported.

3.3.3 IPv4 and IPv6 Support

This product only supports IPv4 connections.

3.4 Configuration

3.4.1 AE Title/Presentation Address Mapping

All local applications use the AE Titles and TCP/IP Ports configured via the "System Configuration" → "Administration" → "Devices" tab of Aixplorer Mach30. The Field Service Engineer can configure Aixplorer Mach30's own DICOM parameter via the "System DICOM Options" Window. The AE Title must be configured during installation. This AE Title is shared between all local applications.
Please refer to the user's guide for configuration and use of DICOM Storage.

3.4.2 Parameters

Aixplorer Mach30 configurable parameters are accessible through the "System Configuration" → "Devices Settings" → "System DICOM Options" tab of Aixplorer Mach30.

- Default AE Title is Aixplorer Mach30. It can be changed to any value compliant with the AE VR.

- Default port is 11112. It can be changed to any value greater that 1024. Aixplorer Mach30 follows the recommandation written in chapter 9.1.1 in PS3.8. If the operating system does not permit access to privileged ports it is recommended to use the "registered" port number 11112. See "http://www.iana.org/assignments/port-numbers".

- Default Station location is echo1

- Default Number of tries before error logging default is 3

- Default Retry delay between 2 tries is 1000 ms

- Default Connection Timeout is 15s

There is no limitation on the configuration of any remote AE. Any valid AE Title, port-number, and host-names can be configured. An unlimited number of remote Storage SCP, remote Storage Commitment SCP, and Print SCP can be configured, enabling one or more of them.
An unlimited number of remote MWL SCPs and MPPS SCPs, and Query/Retrieve SCPs can be configured, enabling only one of them at a given time.

Please refer to the user's guide for configuration and use of DICOM Storage.

4

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Media Interchange

</div>

4.1 Implementation Model

4.1.1 Application Data flow

The Offline-Media Application Entity exports images, PDF and Structured reports to a CD-R, DVD, USB Storage medium. It is associated with the local real-world activities "Export to CD-R, DVD", "Export to USB". These real-world activities are performed upon user request for selected patients, studies or instances (images, clips, PDF reports, Structured reports).

The Offline-Media Application Entity can be used to import object from a CD-R, DVD, USB Storage medium. It is associated with the local real-world activities "Import to CD-R, DVD", "Import to USB". These real-world activities are performed upon user request using the import button from the Query and Retrieve interface.

The application data flow diagram for media storage is illustrated on figure 4.1.1.

4.1.2 Functional Definitions of Application Entities

4.1.2.1 Functional Definition of Media Creation Application Entity

Activation of the "Export to CD-R, DVD", "Export to USB" buttons will pass the currently selected patients, studies or instances to the media creation service. The SOP Instances associated with the selection will be collected into one job. The contents of each export job will be written to a single CD-R or DVD media.

4.1.2.2 Functional Definition of Media Importation Application Entity

Activation of the "Import to CD-R, DVD", "Import to USB" buttons will pass the currently selected DICOMDIR, files or folder located in a removable media to the media importation
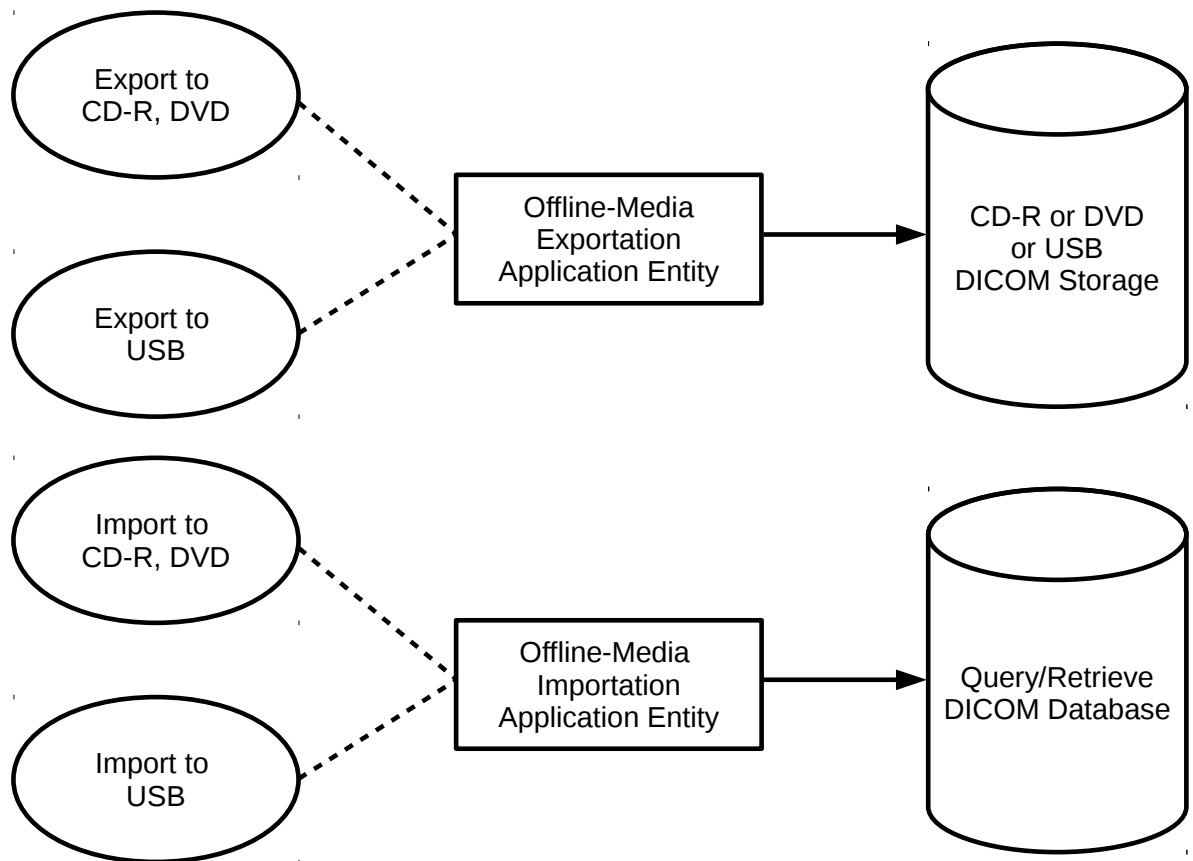
Figure 4.1.1: *Application Data Flow for Media Storage*

service. The SOP Instances associated with the selection will be copied to Aixplorer Mach30's local disk and added to the local database.

4.1.3 Sequencing of Real-Word Activities

4.1.3.1 Sequencing of Real-Word Activities - Exportation

At least one image must exist and be selected before the media creation service can be invoked. The operator can insert a new media at any time before or after invocation of the service. It will wait indefinitely for a media to be inserted before starting to write to the media device. If no media is available the media creation job can be canceled from the job queue.

4.1.3.2 Sequencing of Real-Word Activities - Importation

Upon pressing the import button from the Query/Retrieve interface, user can select a DICOM removable media and browse it. DICOMDIR, folder and files can be selected for importation. If no DICOMDIR is selected, the import service will scan recursively all files and folders and copy the DICOM files to Aixplorer Mach30's local disk. The imported exam are then displayed in the Query/Retrieve interface and flagged as "imported".

4.1.4 File Meta Information for Implementation Class and Version

The implementation information written to the File Meta Header in each file is described in Table 4.1.

Implementation Class UID	1.2.250.1.204.0.1.20120820.0.3.6.1
Implementation version name	SSI_DCMTK_361

Table 4.1: *DICOM Implementation Class and Version for DICOMDIR creation*

4.2 Application Entity Specifications

4.2.1 Offline-Media Application Entity Specification

The Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed in Table 4.2.

Application Profile supported	Real World Activity	Role
Compact Disk - Recordable		
General Purpose CD-R Profiles (STD-GEN-CD)	Export to CD-R	FSC
120 mm DVD		
General Purpose DVD Interchange with JPEG (STD-GEN-DVD-JPEG)	Export to DVD	FSC
USB connected removable devices[1]		
General Purpose USB Media Interchange with JPEG (STD-GEN-USB-JPEG))	Export to USB	FSC

[1]The DICOMDIR file is not in the root directory of the medium

Table 4.2: *Application Profiles, activities, and roles for Offline Media*

4.2.1.1   File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is the same AE Title than the one configured for DICOM Option.

4.2.1.2   Real-World Activities

4.2.1.2.1   Activity – Export to CD-R DVD

The Offline-Media Application Entity acts as an FSC when requested to export SOP Instances from the local database to a CD-R or DVD medium. The medium characteristics are automatically detected by the system and shown to user. After user selection of patients, studies and images from the review list window, an exportation job is created by pressing the "CD-R /DVD" button. The contents of the export job will be written together with a corresponding DICOMDIR to a single-session CDR/DVD. Writing in multi-session mode is not supported. The user can cancel an export job in the job queue.
Please refer to the user's guide for configuration and use of DICOM Storage.

4.2.1.2.1.1   Media Storage Application Profiles

The Offline-Media Application Entity support the Application Profile described in Table 4.3.

Application Profile supported
STD-GEN-CD
STD-GEN-DVD-JPEG

Table 4.3: *Media Storage Application Profiles for CDR/DVD*

4.2.1.2.1.1.1. Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table 4.4. Please note that when a Storage Application Profile is selected, the most adapted Transfer Syntaxes is selected for each IOD. At any time Transfer syntaxes can be forced to any value listed in Table 4.4. In such case, the created DICOM instances may not follow the Application profile. As a result, the DICOM instances will be present on the DICOM media, but won't be referenced in the DICOMDIR.

Information Object Definition	SOP Class UID	Transfer Syntax UID	Transfer Syntax
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70
		JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70
		JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1

Table 4.4: *IODs, SOP Classes and Transfer Syntaxes for the CDR/DVD media*

4.2.1.2.2 Activity – Export to USB

The Offline-Media Application Entity acts as an FSC when requested to export SOP Instances from the local database to USB medium. The medium characteristics are automatically detected by the system and shown to user. After user selection of patients, studies and images from the review list window, an exportation job is created by pressing the "USB" button. The contents

of the export job will be written together with a corresponding DICOMDIR to the following filesystem hierarchy: at the root of the medium a folder named "Aixplorer Mach30" is created, in this folder will be created for each job a second folder whose name depends on date and time exportation job was created. Please note that this implementation does not follow the DICOM standard but allow user to create several DICOM media on one USB medium without mixing the contents of two different jobs.

Please refer to the user's guide for configuration and use of DICOM Storage.

4.2.1.2.2.1 Media Storage Application Profiles

The Offline-Media Application Entity support the STD-GEN-USB-JPEG Application Profile.

4.2.1.2.2.2 Media Storage Application Profiles

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table 4.5. Please note that when a Storage Application Profile is selected, the most adapted Transfer Syntaxes is selected for each IOD. At any time Transfer syntaxes can be forced to any value listed in Table 4.5. In such case, the created DICOM instances may not follow the Application profile. As a result, the DICOM instances will be present on the DICOM media, but won't be referenced in the DICOMDIR.

4.2.2 Offline-Media Importation Application Entity Specification

The Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed in Table 4.6.

4.2.2.1 File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is the same AE Title than the one configured for DICOM Option.

4.2.2.2 Real-World Activities

4.2.2.2.1 Activity – Import to CD-R, DVD, USB

The Offline-Media Application Entity acts as an FSR when requested to import DICOM objects from a CD-R or DVD medium to the local database. The medium arborescence is shown to user and can be browsed. After user selection of DICOMDIR, folder and files from the importation window. The imported DICOM files can later be displayed to user.

Please refer to the user's guide for configuration and use of DICOM Storage.

Information Object Definition	SOP Class UID	Transfer Syntax UID	Transfer Syntax
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70
		JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70
		JPEG-LS Lossless Image Compression	1.2.840.10008.1.2.4.80
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1

Table 4.5: *IODs, SOP Classes and Transfer Syntaxes for USB media*

Application Profile supported	Real World Activity	Role
Compact Disk - Recordable		
General Purpose CD-R Profiles (STD-GEN-CD)	Import CD-R	FSR
120 mm DVD		
General Purpose DVD Interchange with JPEG (STD-GEN-DVD-JPEG)	Import DVD	FSR
USB connected removable devices[1]		
General Purpose USB Media Interchange with JPEG (STD-GEN-USB-JPEG))	Import to USB	FSR

[1]The DICOMDIR file is not in the root directory of the medium

Table 4.6: *Application Profiles, activities, and roles for Offline Media Importation*

4.2.2.2.2 Activity – Import to USB

The Offline-Media Application Entity acts as an FSR when requested to import DICOM objects from a USB medium to the local database. The medium arborescence is shown to user and can be browsed. After user selection of DICOMDIR, folder and files from the importation window. The imported DICOM files can later be displayed to user.

Please refer to the user's guide for configuration and use of DICOM Storage.

4.2.2.2.2.1 Media Storage Application Profiles

The Offline-Media Application Entity support the Application Profile described in Table 4.7.

Application Profile supported
STD-GEN-CD
STD-GEN-DVD-JPEG

Table 4.7: *Media Storage Application Profiles for CDR/DVD Importation*

4.2.2.2.2.1.1.   Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table 4.8. Please note that when a Storage Application Profile is selected, the most adapted Transfer Syntaxes is selected for each IOD. At any time Transfer syntaxes can be forced to any value listed in Table 4.8. In such case, the created DICOM instances may not follow the Application profile. As a result, the DICOM instances will be present on the DICOM media, but won't be referenced in the DICOMDIR.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
(Retired) Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
(Retired) Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE

		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Nuclear Medecine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
Multiframe Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Multiframe Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Digital XRay Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

Digital XRay Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
RETIRED Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE

		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
XRay Radiofluoro-scopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE
		JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	NONE
		JPEG Lossless Compressed	1.2.840.10008.1.2.4.70	SCP	NONE
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	NONE
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	NONE
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	NONE

Table 4.8: *IODs, SOP Classes and Transfer Syntaxes for the CDR/DVD media Importation*

4.3   Augmented and Private Application Profiles

Aixplorer Mach30 does not support any augmented for private application profiles.

4.4   Media Configuration

The local applications use the AE Titles configured via the "System Configuration" → "Administration" → "Devices" tab of Aixplorer Mach30.
Please refer to the user's guide for configuration and use of DICOM Storage.

5

Support of Extended Character Sets

All Aixplorer Mach30 DICOM applications support the following character set:

DICOM	Character Set	Coverage
ISO_IR 6	ASCII	
ISO_IR 100	Latin alphabet #1	Afrikaans, Albanian, Breton, Catalan, Danish, English (UK and US), Faroese, Galician, German, Icelandic, Irish (new orthography), Italian, Kurdish (The Kurdish Unified Alphabet), Latin (basic classical orthography), Leonese , Luxembourgish (basic classical orthography), Norwegian (Bokmål and Nynorsk), Occitan, Portuguese (Portuguese and Brazilian), Rhaeto-Romanic, Scottish Gaelic, Spanish, Swahili, Swedish, Walloon, Basque
ISO_IR 101	Latin alphabet #2	Bosnian, Croatian, Czech, German, Hungarian, Polish, Romanian, Serbian (when in the Latin script), Slovak, Slovene, Upper Sorbian, and Lower Sorbian
ISO_IR 109	Latin alphabet #3	Turkish, Maltese and Esperanto
ISO_IR 110	Latin alphabet #4	Estonian, Latvian, Lithuanian, Greenlandic, and Sami
ISO_IR 144	Cyrillic	Bulgarian, Russian, Rusyn, Bosnian, Serbian, Macedonian, Ukrainian, Moldovan, Kazakh, Uzbek, Kyrgyz, Tajik, Tuvan, Mongolian
ISO_IR 127	Arabic	
ISO_IR 126	Greek	
ISO_IR 138	Hebrew	
ISO_IR 148	Latin alphabet #5	Turkish
\ISO 2022 IR 87	Japanese	
GB18030	Chinese	
ISO_IR 192	Unicode	

Table 5.1: *Supported Character Set*

The character set has to be configured for each remote DICOM server. Finally, the Worklist accepts the following additional encodings:

- ISO 2022 IR 6

- ISO 2022 IR 100

- ISO 2022 IR 101

- ISO 2022 IR 109

- ISO 2022 IR 110

- ISO 2022 IR 144

- ISO 2022 IR 127

- ISO 2022 IR 126

- ISO 2022 IR 138

- ISO 2022 IR 148

- ISO 2022 IR 13

- ISO 2022 IR 166

- ISO 2022 IR 87

- ISO 2022 IR 159

- ISO 2022 IR 149

- GBK

- ISO IR 13

6

Security

Aixplorer Mach30 does not support any specific security measures. However Aixplorer Mach30 can be configured to reject incoming traffic on the designated listening port from any unknown host (IP address and AE Title). It is assumed that Aixplorer Mach30 is used within a secured environment. It is assumed that a secured environment includes at a minimum:

1. Firewall or router protections to ensure that only approved external hosts have network access to Aixplorer Mach30.

2. Firewall or router protections to ensure that Aixplorer Mach30 only has network access to approved external hosts and services.

3. Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (*e.g.* such as a Virtual Private Network (VPN)).

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

Appendix

A

IOD contents

A.1 Created SOP instances

Examples of Ultrasound images, Encapsulated PDF Reports and Structured reports created by Aixplorer Mach30 can be downloaded from: http://www.supersonicimagine.com/images

The following tables use a number of abbreviations. The abbreviations used in the "Presence of ..." column are:

- VNAP: Value Not Always Present (attribute sent zero length if no value is present);

- ANAP: Attribute Not Always Present;

- ALWAYS: Always Present;

- EMPTY: Attribute is sent without a value;

The abbreviations used in the "Source" column:

- MWL: the attribute value source Modality Worklist

- USER: the attribute value source is from User input

- AUTO: the attribute value is generated automatically

- MPPS: the attribute value is the same as that use for Modality Performed Procedure Step

- CONFIG: the attribute value source is a configurable parameter

Note: All dates and times are encoded in the local configured calendar and time. Date, Time and Time zone are configured using the "System Configuration" → "System Display" → "Regional" tab.

A.1.1   US Image IOD Modules

See Table A.1.

IE	Module	Reference	Presence of Module
Patient	Patient	Table A.5	ALWAYS
Study	General Study	Table A.6	ALWAYS
	Patient Study	Table A.7	ALWAYS
Series	General Series	Table A.8	ALWAYS
Equipment	General Equipment	Table A.11	ALWAYS
Image	General Image	Table A.14	ALWAYS
	Image Pixel	Table A.15	ALWAYS
	Contrast/bolus	Table A.16	ANAP
	Device	Table A.13	ANAP
	US Region Calibration	Table A.19	ALWAYS
	US Image	Table A.20	ALWAYS
	VOI LUT	Table A.21	ANAP
	SOP Common	Table A.23	ALWAYS
Extended Attributes	Private Application	Table B.1	ANAP
	Extra Module	Table A.29	ALWAYS

Table A.1: *US Image IOD Modules*

A.1.2   US Multi-Frame Image IOD Module

See table A.2.

A.1.3   Encapsulated PDF IOD Module

See table A.3.

IE	Module	Reference	Presence of Module
Patient	Patient	Table A.5	ALWAYS
Study	General Study	Table A.6	ALWAYS
	Patient Study	Table A.7	ALWAYS
Series	General Series	Table A.8	ALWAYS
Equipment	General Equipment	Table A.11	ALWAYS
Image	General Image	Table A.14	ALWAYS
	Image Pixel	Table A.15	ALWAYS
	Contrast/bolus	Table A.16	ANAP
	Cine	Table A.17	ALWAYS
	Multi-Frame	Table A.18	ALWAYS
	Device	Table A.13	ANAP
	US Region Calibration	Table A.19	ALWAYS
	US Image	Table A.20	ALWAYS
	VOI LUT	Table A.21	ANAP
	SOP Common	Table A.23	ALWAYS
Extended Attributes	Extra Module	Table A.29	ALWAYS

Table A.2: *US Multi-Frame Image IOD Module*

IE	Module	Reference	Presence of Module
Patient	Patient	Table A.5	ALWAYS
Study	General Study	Table A.6	ALWAYS
	Patient Study	Table A.7	ALWAYS
Series	Encapsulated Document Series	Table A.9	ALWAYS
Equipment	General Equipment	Table A.11	ALWAYS
	SC Equipment	Table A.22	ALWAYS
Encapsulated Document	Encapsulated Document	Table A.24	ALWAYS
	SOP Common	Table A.23	ALWAYS
Extended Attributes	Extra Module	Table A.30	ALWAYS

Table A.3: *Encapsulated PDF IOD Module*

A.1.4   Comprehensive SR IOD Module

See table A.4.

IE	Module	Reference	Presence of Module
Patient	Patient	Table A.5	ALWAYS
Study	General Study	Table A.6	ALWAYS
	Patient Study	Table A.7	ALWAYS
Series	SR Document Series	Table A.10	ALWAYS
Equipment	General Equipment	Table A.11	ALWAYS
Document	SR Document General	Table A.25	ALWAYS
	SR Document Content	Table A.26	ALWAYS
	SOP Common	Table A.23	ALWAYS
Extended Attributes	Extra Module	Table A.30	ALWAYS

Table A.4: *Comprehensive SR IOD Module*

A.1.5   Common Modules

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	From Modality Worklist or user input. Values supplied via Modality Worklist will be entered as received.	VNAP	MWL/ USER
Patient ID	(0010,0020)	LO	From Modality Worklist or user input	VNAP	MWL/ USER
Issuer of Patient ID	(0010,0021)	LO	From Modality Worklist or empty	VNAP	MWL
Issuer of Patient ID Qualifiers Sequence	(0010,0024)	SQ	From Modality Worklist or absent	VNAP	MWL
> Universal Entity ID	(0040,0032)	UT	From Modality Worklist	VNAP	MWL
> Universal Entity ID Type	(0040,0033)	CS	From Modality Worklist	VNAP	MWL
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or user input	VNAP	MWL/ USER
Patient's Sex	(0010,0040)	CS	From Modality Worklist or user input	VNAP	MWL/ USER
Other Patient IDs Sequence	(0010,1000)	SQ	From Modality Worklist	VNAP	MWL
> Patient ID	(0010,0020)	LO	From Modality Worklist	VNAP	MWL
> Issuer Of Patient ID	(0010,0021)	LO	From Modality Worklist	VNAP	MWL
> Type Of Patient ID	(0010,0022)	CS	From Modality Worklist	VNAP	MWL
Referenced Patient Sequence	(0008,1120)	SQ	From Modality Worklist	VNAP	MWL
>Referenced SOP Class UID	(0008,1150)	UI	From Modality Worklist	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	From Modality Worklist	ALWAYS	AUTO
Patient's Birth Time	(0010,0032)	TM	From Modality Worklist	VNAP	MWL
Patient Comments	(0010,4000)	LT	From Modality Worklist or user input	VNAP	USER
Patient Identity Removed	(0012,0062)	CS	de-identification selected by user	VNAP	USER
De-identification Method	(0012,0063)	LO	de-identification selected by user	VNAP	USER
Ethnic Group	(0010,2160)	SH	From Modality Worklist	VNAP	MWL

Table A.5: *Patient Module Attributes of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	From Modality Worklist or generated by the device.	ALWAYS	MWL/ USER
Study Date	(0008,0020)	DA	From Modality Worklist or generated by the device.	ALWAYS	AUTO
Study Time	(0008,0030)	TM	From Modality Worklist or generated by the device.	ALWAYS	AUTO
Referring Physician's Name	(0008,0090)	PN	From Modality Worklist or user input	VNAP	MWL/ USER
Study ID	(0020,0010)	SH	Generated by the device	ALWAYS	MWL/ AUTO
Accession Number	(0008,0050)	SH	From Modality Worklist or user input.	VNAP	AUTO
Issuer of Accession Number Sequence	(0008,0051)	SQ	From Modality Worklist	VNAP	AUTO
> Local Namespace Entity ID	(0040,0031)	UT	From Modality Worklist	VNAP	AUTO
> Universal Entity ID	(0040,0032)	UT	From Modality Worklist	VNAP	AUTO
> Universal Entity ID Type	(0040,0033)	CS	From Modality Worklist	VNAP	AUTO
Study Description	(0008,1030)	LO	user input	VNAP	USER
Referenced Study Sequence	(0008,1110)	SQ	From Modality Worklist	VNAP	AUTO
>Referenced SOP Class UID	(0008,1150)	UI	From Modality Worklist	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	From Modality Worklist	ALWAYS	AUTO
Procedure Code Sequence	(0008,1032)	SQ	From Modality Worklist	VNAP	AUTO
>Code Value	(0008,0100)	SH	From Modality Worklist	ALWAYS	AUTO
>Coding Scheme Designator	(0008,0102)	SH	From Modality Worklist	ALWAYS	AUTO
>Coding Scheme Version	(0008,0103)	SH	From Modality Worklist	ALWAYS	AUTO
>Code Meaning	(0008,0104)	LO	From Modality Worklist	ALWAYS	AUTO
Physician(s) of Record	(0008,1048)	PN	From Modality Worklist	VNAP	AUTO

Table A.6: *General Study Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Age	(0010,1010)	AS	Generated from Patient's Birth Date	VNAP	AUTO
Patient's Size	(0010,1020)	DS	user input or from Modality Worklist	VNAP	USER/ MWL
Patient's Weight	(0010,1030)	DS	user input or from Modality Worklist	VNAP	USER/ MWL
Additional Patient's History	(0010,21B0)	LT	From Modality Worklist	VNAP	MWL
Admission ID	(0038,0010)	LO	From Modality Worklist	VNAP	USER

Table A.7: *Patient Study Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	US	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device	ALWAYS	AUTO
Laterality	(0020,0060)	CS	Empty	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	AUTO
Series Time	(0008,0031)	TM	<hhmm>	ALWAYS	AUTO
Series Description	(0008,103E)	LO	User input	VNAP	USER
Performing Physician's Name	(0008,1050)	PN	User input	VNAP	USER
Protocol Name	(0018,1030)	LO	Free Form	ALWAYS	AUTO
Operators' Name	(0008,1070)	PN	Copy from Performing Physician's Name (0008,1050)	VNAP	USER
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ALWAYS	MPPS
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	MPPS
Patient Position	(0018,5100)	CS	Empty	ALWAYS	AUTO
Request Attributes Sequence	(0040,0275)	SQ		ALWAYS	AUTO
>Requested Procedure ID	(0040,1001)	SH	From Modality Worklist	ALWAYS	AUTO
>Accession Number	(0008,0050)	SH	From Modality Worklist	ALWAYS	AUTO
>Scheduled Procedure Step ID	(0040,0009)	SH	From Modality Worklist	ALWAYS	AUTO
>Scheduled Procedure Step Description	(0040,0007)	LO	From Modality Worklist	ALWAYS	AUTO
>Scheduled Protocol Code Sequence	(0040,0008)	SQ	From Modality Worklist	ALWAYS	AUTO
> >Code Value	(0008,0100)	SH	From Configuration	ALWAYS	AUTO
> >Coding Scheme Designator	(0008,0102)	SH	From Configuration	ALWAYS	AUTO
> >Coding Scheme Version	(0008,0103)	SH	From Configuration	ALWAYS	AUTO
> >Code Meaning	(0008,0104)	LO	From Configuration	ALWAYS	AUTO

Table A.8: *General Series Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	set to US	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device	ALWAYS	AUTO
Laterality	(0020,0060)	CS	Empty	ALWAYS	AUTO
Series Date	(0008,0021)	DA	Generated by device	ALWAYS	AUTO
Series Time	(0008,0031)	TM	Generated by device	ALWAYS	AUTO
Performing Physicians' Name	(0008,1050)	PN	From Modality Worklist or User input	ANAP	MWL/ USER
Series Description	(0008,103E)	LO	User input	VNAP	AUTO
Protocol Name	(0018,1030)	LO	set to Free Form	ALWAYS	AUTO
Operators' Name	(0008,1050)	PN	From Modality Worklist or User input	ANAP	MWL/ USER
Patient Position	(0018,5100)	CS	empty	ALWAYS	AUTO

Table A.9: *Encapsulated Document Series Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	set to SR	ALWAYS	AUTO
Series Instance UID	(0020,000E)	UI	Generated by device	ALWAYS	AUTO
Series Number	(0020,0011)	IS	Generated by device	ALWAYS	AUTO
Series Date	(0008,0021)	DA	Generated by device	ALWAYS	AUTO
Series Time	(0008,0031)	TM	Generated by device	ALWAYS	AUTO
Series Description	(0008,103E)	LO	User input	VNAP	AUTO
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ		ALWAYS	MPPS
>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	MPPS
>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	MPPS

Table A.10: *SR Document Series Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	SuperSonic Imagine SA	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	Configuration	ALWAYS	AUTO
Institution Address	(0008,0081)	ST	Configuration	ALWAYS	AUTO
Station Name	(0008,1010)	SH	Configuration	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	AixplorerMach30	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	Device Serial Number	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	Software Versions	ALWAYS	AUTO

Table A.11: *General Equipment Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	SuperSonic Imagine SA	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	AixplorerMach30	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	Device Serial Number	ALWAYS	AUTO
Software Versions	(0018,1020)	LO	Software Versions	ALWAYS	AUTO

Table A.12: *Enhanced General Equipment Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	SuperSonic Imagine SA	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	AixplorerMach30.	ALWAYS	AUTO
Device Serial Number	(0018,1000)	LO	Generated by device.	ALWAYS	AUTO

Table A.13: *Device Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	Generated by the device	ALWAYS	AUTO
Patient Orientation	(0020,0020)	CS	Always empty.	EMPTY	AUTO
Content Date	(0008,0023)	DA	Generated by device	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Generated by device	ALWAYS	AUTO
Image Type	(0008,0008)	CS	ORIGINAL, DERIVED, PRIMARY	ALWAYS	AUTO
Acquisition Number	(0020,0012)	IS	Generated by device	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	Generated by device	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	Generated by device	ALWAYS	AUTO
Acquisition DateTime	(0008,002A)	DT	Generated by device	ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS	Generated by device	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	Generated by device	ANAP	AUTO
Lossy Image Compression Method	(0028,2114)	CS	Generated by device	ANAP	AUTO
Lossy Image Compression Ratio	(0028,2112)	CS	Generated by device	ANAP	AUTO

Table A.14: *General Image Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	3	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	RGB, YBR_FULL_422, MONOCHROME2	ALWAYS	AUTO
Rows	(0028,0010)	US	Configuration (max 1050)	ALWAYS	AUTO
Columns	(0028,0011)	US	Configuration (max 1400)	ALWAYS	AUTO
Pixel Aspect Ratio	(0028,0034)	US	1:1	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	8	ALWAYS	AUTO
High Bit	(0028,0102)	US	7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0000H	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW		ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	0	ALWAYS	AUTO

Table A.15: *Image Pixel Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Contrast/Bolus Agent	(0018,0010)	LO	Selected contrast agent	ANAP	AUTO
Contrast/Bolus Agent Sequence	(0018,0012)	SQ	Selected contrast agent	ANAP	AUTO (see Table C.2)

Table A.16: *Contrast/Bolus Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame Time	(0018,1063)	DS	Only for US-MF image	ANAP	AUTO

Table A.17: *Cine Module of created US Multi-frame SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Frames	(0028,0008)	IS	Only for US-MF image	ANAP	AUTO
Frame Increment Pointer	(0028,0009)	AT	Only for US-MF image	ANAP	AUTO

Table A.18: *Multi-Frame Module of created US Multi-frame SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Sequence of Ultrasound Regions	(0018,6011)	SQ		ANAP	AUTO
>Region Location Min x0	(0018,6018)	UL		ANAP	AUTO
>Region Location Min y0	(0018,601A)	UL		ANAP	AUTO
>Region Location Max x1	(0018,601C)	UL		ANAP	AUTO
>Region Location Max y1	(0018,601E)	UL		ANAP	AUTO
>Physical Units X Direction	(0018,6024)	US		ANAP	AUTO
>Physical Units Y Direction	(0018,6026)	US		ANAP	AUTO
>Physical Delta X	(0018,602C)	FD		ANAP	AUTO
>Physical Delta Y	(0018,602E)	FD		ANAP	AUTO
>Region Spatial Format	(0018,6012)	US		ANAP	AUTO
>Region Data Type	(0018,6014)	US		ANAP	AUTO
>Region Flags	(0018,6016)	UL		ANAP	AUTO

Table A.19: *US Region Calibration Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per Pixel	(0028,0002)	US	3	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	RGB or YBR_FULL_422	ALWAYS	AUTO
Planar Configuration	(0028,0006)	US	0	ALWAYS	AUTO
Bits Allocated	(0028,0100)	US	8	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	8	ALWAYS	AUTO
High Bit	(0028,0102)	US	7	ALWAYS	AUTO
Pixel Representation	(0028,0103)	US	0000H	ALWAYS	AUTO
Image Type	(0008,0008)	CS	ORIGINAL, DERIVED, PRIMARY	ALWAYS	AUTO
Lossy Image Compression	(0028,2110)	CS	Generated by device	ANAP	AUTO
Ultrasound Color Data Present	(0028,0014)	CS	Generated by device	ANAP	AUTO
Acquisition DateTime	(0008,002A)	DT		ALWAYS	AUTO

Table A.20: *US Image Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Window Center	(0028,1050)	DS	Set to 127	ANAP	CONFIG
Window Width	(0028,1051)	DS	Set to 254	ANAP	CONFIG

Table A.21: *VOI LUT Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Conversion Type	(0008,0064)	CS	SD	ALWAYS	AUTO
Modality	(0008,0060)	CS	US	ALWAYS	AUTO
Secondary Capture Device ID	(0018,1010)	LO	Device serial number	ALWAYS	AUTO
Secondary Capture Device Manufacturer	(0018,1016)	LO	SuperSonic Imagine SA	ALWAYS	AUTO
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	LO	AixplorerMach30	ALWAYS	AUTO
Secondary Capture Device Software Versions	(0018,1018)	LO		ALWAYS	AUTO

Table A.22: *SC Equipment Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	See table 5.1	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	Configuration (US-SF, US-MF,encapsulated PDF)	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI		ALWAYS	AUTO
Instance Creator Date	(0008,0012)	DA		ALWAYS	AUTO
Instance Creator Time	(0008,0013)	TM		ALWAYS	AUTO
Instance Creator UID	(0008,0014)	UI		ALWAYS	AUTO
Instance Number	(0020,0013)	IS		ALWAYS	AUTO

Table A.23: *SOP Common Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Acquisition DateTime	(0008,002A)	DT		ALWAYS	AUTO
Burned In Annotation	(0028,0301)	CS		ALWAYS	AUTO

Table A.24: *Encapsulated Document Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Preliminary Flag	(0040,A496)	CS	PRELIMINARY	ALWAYS	AUTO
Completion Flag	(0040,A491)	CS	PARTIAL	ALWAYS	AUTO
Completion Flag Description	(0040,A492)	LO	"This report precedes the final report"	ALWAYS	AUTO
Verification Flag	(0040,A493)	CS	UNVERIFIED	ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Author Observer Sequence	(0040,A078)	SQ	From Configuration	ALWAYS	AUTO
>Observer Type	(0040,A084)	CS	PSN	ALWAYS	AUTO
>Person Name	(0040,A123)	PN	From Configuration	ALWAYS	AUTO
>Person Identification Code Sequence	(0040,1101)	SQ		ALWAYS	AUTO
> >Code Value	(0008,0100)	SH	From Configuration	ALWAYS	AUTO
> >Coding Scheme Designator	(0008,0102)	SH	From Configuration	ALWAYS	AUTO
> >Coding Scheme Version	(0008,0103)	SH	From Configuration	ALWAYS	AUTO
> >Code Meaning	(0008,0104)	LO	From Configuration	ALWAYS	AUTO
Participant Sequence	(0040,A07A)	SQ		ALWAYS	AUTO
>Participation Type	(0040,A080)	CS	SOURCE	ALWAYS	AUTO
>Participation DateTime	(0040,A082)	DT		ALWAYS	AUTO
> >Observer Type	(0040,A084)	CS	DEV	ALWAYS	AUTO
> >Station Name	(0008,1010)	SH	From Configuration	ALWAYS	AUTO
> >Device UID	(0018,1002)	UI		ALWAYS	AUTO
> >Manufacturer	(0008,0070)	LO	SuperSonic Imagine SA	ALWAYS	AUTO
> >Manufacturer's Model Name	(0008,1090)	LO	AixplorerMach30	ALWAYS	AUTO
> >Institution Name	(0008,0080)	LO	From Configuration	ALWAYS	AUTO
Predecessor Documents Sequence	(0040,A360)	SQ		ANAP	AUTO
>Study Instance UID	(0020,000D)	UI		ALWAYS	AUTO
>Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
> >Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO

> >Referenced SOP Sequence	(0008,1199)	SQ			ALWAYS	AUTO
> > >Referenced SOP Class UID	(0008,1150)	UI			ALWAYS	AUTO
> > >Referenced SOP Instance UID	(0008,1155)	UI			ALWAYS	AUTO
Referenced Request Sequence	(0040,A370)	SQ	From Modality Worklist		ALWAYS	MWL
>Study Instance UID	(0020,000D)	UI			ALWAYS	AUTO
>Referenced Study Sequence	(0008,1110)	UI	From Modality Worklist		ALWAYS	MWL
>Requested Procedure Description	(0032,1060)	LO	From Modality Worklist		ALWAYS	MWL
>Requested Procedure Code Sequence	(0032,1064)	SQ	From Modality Worklist		ALWAYS	MWL
Performed Procedure Code Sequence	(0040,A372)	SQ	From Modality Worklist		ALWAYS	MWL
Current Requested Procedure Evidence Sequence	(0040,A375)	SQ	From Modality Worklist		ALWAYS	MWL
>Study Instance UID	(0020,000D)	UI			ALWAYS	AUTO
>Referenced Series Sequence	(0008,1115)	SQ			ALWAYS	AUTO
> >Series Instance UID	(0020,000E)	UI			ALWAYS	AUTO
> >Referenced SOP Sequence	(0008,1199)	SQ			ALWAYS	AUTO
> > >Referenced SOP Class UID	(0008,1150)	UI			ALWAYS	AUTO
> > >Referenced SOP Instance UID	(0008,1155)	UI			ALWAYS	AUTO

Table A.25: *SR Document General Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Include Table A.27					
Include Table A.28					

Table A.26: *SR Document Content Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Value Type	(0040,A040)	CS		ALWAYS	AUTO
Concept Name Code Sequence	(0040,A043)	SQ		ALWAYS	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
Text Value	(0040,A160)	UT		ANAP	AUTO
DateTime	(0040,A120)	DT		ANAP	AUTO
Date	(0040,A121)	DA		ANAP	AUTO
Time	(0040,A122)	TM		ANAP	AUTO
Person Name	(0040,A123)	PN		ANAP	AUTO
UID	(0040,A124)	UI		ANAP	AUTO
Measured Value Sequence	(0040,A300)	SQ		ANAP	AUTO
>Numeric Value	(0040,A30A)	DS		ALWAYS	AUTO
>Measurement Units Code Sequence	(0040,08EA)	SQ		ALWAYS	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
Concept Code Sequence	(0040,A168)	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
Continuity of Content	(0040,A050)	CS		ANAP	AUTO
Content Template Sequence	(0040,A504)	SQ		ANAP	AUTO
>Mapping Resource	(0008,0105)	CS		ALWAYS	AUTO
>Template Identifier	(0040,DB00)	CS		ALWAYS	AUTO

Table A.27: *Document Content Macro*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Observation Date-Time	(0040,A032)	DT		ANAP	AUTO
Content Sequence	(0040,A730)	SQ		ANAP	AUTO
>Relationship Type	(0040,A010)	CS		ANAP	AUTO
>Include Table A.28					
>Include Table A.27					

Table A.28: *Document Relationship Macro*

A.1.6 Extra Modules

These attributes extend the standard US Image and US Multiframe Image IODs
These attributes extend the standard Encapsulated PDF IOD.

Attribute Name	Tag	VR	Value	Presence of Value	Source
Requesting Physician	(0032,1032)	PN	From Modality Worklist	VNAP	MWL
Medical Alerts	(0010,2000)	LO	From Modality Worklist	VNAP	MWL
Allergies	(0010,2110)	LO	From Modality Worklist	VNAP	MWL
Pregnancy Status	(0010,21C0)	CS	From Modality Worklist	VNAP	MWL
Presentation Intent Type	(0008,0068)	CS		ALWAYS	AUTO
Last Menstrual Date	(0010,21d0)	DA	From Modality Worklist	VNAP	MWL
Requesting Service	(0032,1033)	LO	From Modality Worklist	VNAP	MWL
Special Needs	(0038,0050)	LO	From Modality Worklist	VNAP	MWL
Patient State	(0038,0500)	LO	From Modality Worklist	VNAP	MWL
Performed Location	(0040,0243)	SH	From Configuration	ALWAYS	AUTO
Acquisition Context Description	(0040,0556)	ST		ALWAYS	AUTO
Names Of Intended Recipients Of Results	(0040,1010)	PN	From Modality Worklist	VNAP	MWL
Reason For The Imaging Service Request	(0040,2001)	LO	From Modality Worklist	VNAP	MWL
Imaging Service Request Comments	(0040,2400)	LT	From Modality Worklist	VNAP	MWL
Confidentiality Constraint On Patient Data Description	(0040,3001)	LO	From Modality Worklist	VNAP	MWL
Placer Order number/imaging service request	(0040,2016)	LO	From Modality Worklist	VNAP	MWL
Concatenation Frame Offset Number	(0020,9228)	UL		VNAP	AUTO CONFIG
Concatenation UID	(0020,9161)	UI		VNAP	AUTO CONFIG
SOP Instance UID Of Concatenation Source	(0020,0242)	UI		VNAP	AUTO CONFIG
In-Concatenation Number	(0020,9162)	US		VNAP	AUTO CONFIG
In-Concatenation Total Number	(0020,9163)	US		VNAP	AUTO CONFIG

Table A.29: *Extra Module of created SOP Instances*

Attribute Name	Tag	VR	Value	Presence of Value	Source
Requesting Physician	(0032,1032)	PN	From Modality Worklist	VNAP	MWL
Medical Alerts	(0010,2000)	LO	From Modality Worklist	VNAP	MWL
Allergies	(0010,2110)	LO	From Modality Worklist	VNAP	MWL
Pregnancy Status	(0010,21C0)	CS	From Modality Worklist	VNAP	MWL
Presentation Intent Type	(0008,0068)	CS		ALWAYS	AUTO
Last Menstrual Date	(0010,21d0)	DA	From Modality Worklist	VNAP	MWL
Requesting Service	(0032,1033)	LO	From Modality Worklist	VNAP	MWL
Special Needs	(0038,0050)	LO	From Modality Worklist	VNAP	MWL
Patient State	(0038,0500)	LO	From Modality Worklist	VNAP	MWL
Performed Location	(0040,0243)	SH	From Configuration	ALWAYS	AUTO
Acquisition Context Description	(0040,0556)	ST		ALWAYS	AUTO
Names Of Intended Recipients Of Results	(0040,1010)	PN	From Modality Worklist	VNAP	MWL
Reason For The Imaging Service Request	(0040,2001)	LO	From Modality Worklist	VNAP	MWL
Imaging Service Request Comments	(0040,2400)	LT	From Modality Worklist	VNAP	MWL
Confidentiality Constraint On Patient Data Description	(0040,3001)	LT	From Modality Worklist	VNAP	MWL
Placer Order number/imaging service request	(0040,2016)	LO	From Modality Worklist	VNAP	MWL
Series Date	(0008,0021)	DA	From Configuration	ALWAYS	AUTO
Acquisition Date	(0008,0022)	DA	From Configuration	ALWAYS	AUTO
Series Time	(0008,0031)	TM	From Configuration	ALWAYS	AUTO
Acquisition Time	(0008,0032)	TM	From Configuration	ALWAYS	AUTO
Performing Physician's Name	(0008,1050)	PN	User input	VNAP	AUTO
Operators' Name	(0008,1070)	PN	User input	VNAP	AUTO

Table A.30: *Extra Module of created SOP Instances for Encapsulated PDF IOD*

A.2   Used Fields in received IOD

No SOP Class specific fields are required.
The local database, remote query and directory browsers make use of the conventional iden-
tification attributes to distinguish patients, studies, series and instances. In particular, if two
patients have the same value for Patient ID, they will be treated as the same in the browser and
the local database. The usage of attributes received by Modality Worklist is described in section
3.2.2.3.1.3.

A.3   Attribute Mapping

A.3.1   Worklist-Instances-MPPS IOD mapping

The relationships between attributes received via Modality Worklist, stored in acquired images
and communicated via MPPS are summarized in Table A.31. The format and conventions used
are the same as the corresponding table in DICOM Part 4, Annex M.6 [DICOM].

Modality Worklist	Image IOD	MPPS IOD
Patient Name	Patient Name	Patient Name
Patient ID	Patient ID	Patient ID
Issuer Of Patient ID	Issuer Of Patient ID	Issuer Of Patient ID
Issuer of Patient ID Qualifiers Sequence	Issuer of Patient ID Qualifiers Sequence	Issuer of Patient ID Qualifiers Sequence
Other Patient IDs Sequence	Other Patient IDs Sequence	—
Patient's Birth Date	Patient's Birth Date	Patient's Birth Date
Patient's Sex	Patient's Sex	Patient's Sex
Accession Number	Accession Number	Accession Number
Issuer of Accession Number Sequence	Issuer of Accession Number Sequence	Issuer of Accession Number Sequence
Referenced Patient Sequence	—	Referenced Patient Sequence
Admission ID	Admission ID	Admission ID
Patient's Weight	Patient's Weight	—
Referring Physician's Name	Referring Physician's Name	—
—	—	Scheduled Step Attributes Sequence
Study Instance UID	Study Instance UID	>Study Instance UID
Referenced Study Sequence	Referenced Study Sequence	>Referenced Study Sequence
Accession Number	Accession Number	>Accession Number
Placer Order Number / Imaging Service Request	—	> Placer Order Number / Imaging Service Request

—	Request Attributes Sequence	—
Requested Procedure ID	>Requested Procedure ID	>Requested Procedure ID
Requested Procedure Description	Requested Procedure Description	>Requested Procedure Description
Scheduled Procedure Step ID	>Scheduled Procedure Step ID	>Scheduled Procedure Step ID
Scheduled Procedure Step Description	>Scheduled Procedure Step Description	>Scheduled Procedure Step Description
Scheduled Protocol Code Sequence	>Scheduled Protocol Code Sequence	>Scheduled Protocol Code Sequence
—	Performed Protocol Code Sequence	Performed Protocol Code Sequence
—	Study ID	Study ID
—	Performed Procedure Step ID	Performed Procedure Step ID
Study Date	Study Date	Performed Procedure Step Start Date
Study Time	Study Time	Performed Procedure Step Start Time
—-	Study Description	Performed Procedure Step Description
Comments on the Scheduled Procedure Step	Comments on the Performed Procedure Step	Comments on the Performed Procedure Step
—-	—-	Performed Series Sequence
Scheduled Performing Physician's Name	Performing Physician's Name	>Performing Physician's Name
Requested Procedure Code Sequence	Procedure Code Sequence	Procedure Code Sequence, Requested Procedure Code Sequence
—-	Referenced Study Component Sequence	—-
—-	>Referenced SOP Class UID	SOP Class UID
—-	>Referenced SOP Instance UID	SOP Instance UID
—-	Protocol Name	Protocol Name

Table A.31: *Attribute Mapping between Modality Worklist, Images and MPPS*

A.3.2 Worklist attribute mapping in Aixplorer Mach30's user interface

The relationships between attributes received via Modality Worklist, fields displayed in Worklist and Patient Data window are summarized in Table A.32.

Module Name Attribute Name	Tag	VR	VM	PDE	Worklist
SOP Common					
Specific Character Set	(0008,0005)	CS	1-n		
Scheduled Procedure Step					
Scheduled Procedure Step Sequence	(0040,0100)	SQ	1	Scheduled procedure Tab	
> Scheduled Station AET	(0040,0001)	AE	1-n	Station AET	
> Scheduled Procedure Step Start Date	(0040,0002)	DA	1	Step Start Date	Date
> Scheduled Procedure Step Start Time	(0040,0003)	TM	1	Step Start Time	Date
> Scheduled Procedure Step End Date	(0040,0004)	DA	1	Step End Date	
> Scheduled Procedure Step End Time	(0040,0005)	TM	1	Step End Time	
> Modality	(0008,0060)	CS	1		
> Scheduled Performing Physician's Name	(0040,0006)	PN	1	Sonographer	Performing Physician
> Scheduled Procedure Step Description	(0040,0007)	LO	1	Step Description	
> Scheduled Station Name	(0040,0010)	SH	1-n	Station Name	Scheduled Station Name
> Scheduled Procedure Step Location	(0040,0011)	SH	1	Location	Scheduled Station Location
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	1	Scheduled Protocol Code Sequence	
> Pre-Medication	(0040,0012)	LO	1	Pre-Medication	
> Scheduled Procedure Step ID	(0040,0009)	SH	1	Step ID	
> Requested Contrast Agent	(0032,1070)	LO	1	Contrast Agent	
> Scheduled Procedure Step status	(0040,0020)	CS	1	Step status	
> Comments on the Scheduled Procedure Step	(0040,0400)	LT	1	Comments	
Requested Procedure					
Requested Procedure ID	(0040,1001)	SH	1	Requested ID	
Requested Procedure Description	(0032,1060)	LO	1	Procedure Description	Exam
Reason for the Requested Procedure	(0040,1002)	LO	1	Reason for Procedure	
Study Instance UID	(0020,000D)	UI	1	Study Instance UID	
Referenced Study Sequence	(0008,1110)	SQ	1	Referenced Study Sequence	
> Referenced SOP Class UID	(0008,1150)	UI	1	SOP Class UID	
> Referenced SOP Instance UID	(0008,1155)	UI	1	SOP Instance UID	
Requested Procedure Priority	(0040,1003)	SH	1		
Patient Transport Arrangements	(0040,1004)	LO	1		
Requested Procedure Code Sequence	(0032,1064)	SQ	1	Requested Procedure Code Sequence	
Names of intended recipients of results	(0040,1010)	PN	1-n	Recipients	
Requested Procedure Comments	(0040,1400)	LT	1	Comments	
Imaging Service Request					
Accession Number	(0008,0050)	SH	1	Accession #	Accession Number
Requesting Physician	(0032,1032)	PN	1	Requesting MD	
Referring Physician's Name	(0008,0090)	PN	1	Referring MD	
Requesting Service	(0032,1033)	LO	1	Requesting Service	
Reason for the Imaging Service Request (RET)	(0040,2001)	LO	1	Reason	
Imaging service request comments	(0040,2400)	LT	1	comments	
Placer Order number/imaging service request	(0040,2016)	LO	1		
Visit Identification					
Admission ID	(0038,0010)	LO	1	Admission ID	
Visit Status					
Current Patient Location	(0038,0300)	LO	1	Patient Location	
Visit Relationship					
Referenced Patient Sequence	(0008,1120)	SQ	1	Referenced Patient Sequence	

> Referenced SOP Class UID	(0008,1150)	UI	1	SOP Class UID	
> Referenced SOP Instance UID	(0008,1155)	UI	1	SOP Instance UID	
Patient Identification					
Patient Name	(0010,0010)	PN	1	Last Name, First Name, MI	Name
Patient ID	(0010,0020)	LO	1	Patient ID	Patient ID
Issuer of Patient ID	(0010,0021)	LO	1		
Other Patient IDs	(0010,1000)	LO	1-n	Other ID	
Patient Demographic					
Patient's Birth Date	(0010,0030)	DA	1	Date of Birth	
Patient's Birth time	(0010,0032)	TM	1		
Patient's Sex	(0010,0040)	CS	1	Gender	Gender
Patient's Weight	(0010,1030)	DS	1	Weight	
Patient's Size	(0010,1020)	DS	1	Height	
Confidentiality constraint on patient data	(0040,3001)	LO	1		
Patient comments	(0010,4000)	LT	1	Comments	
Ethnic Group	(0010,2160)	SH	1		
Patient Medical					
Patient State	(0038,0500)	LO	1	Patient State	
Pregnancy Status	(0010,21C0)	US	1	Pregnancy Status & Pregnant	
Medical Alerts	(0010,2000)	LO	1-n	Medical Alerts	
Allergies	(0010,2110)	LO	1-n	Allergies	
Special Needs	(0038,0050)	LO	1	Special Needs	
Additional patient History	(0010,21B0)	LT	1		
Last Menstrual Date	(0010,21D0)	DA	1	Last Menstrual Date& LMP& LMP	

Table A.32: *Attribute Mapping between Modality Worklist, Worklist and Patient Data windows*

A.4 Coerced/Modified Fields

The Modality Worklist AE will truncate attribute values received in the response to a Modality Worklist Query if the value length is longer than the maximum length permitted by the attribute's VR.

When the "Image De-Identification" option is enabled the attributes described in Table A.33 will be altered.

A.5 Attribute anonymization

In order to meet United States Health Insurance Portability and Accountability Act of 1996 (HIPAA) Safe-Harbor De-Identification Guidelines and European's GDPR regulations, Aixplorer Mach30 supports basic anonymization. anonymization is achieved by the following means:

- Attributes to be protected are either removed from the dataset, or have their values replaced by a different "replacement value" that does not allow identification of the patient;

- Attribute specified to be retained are retained;

- The attribute Patient Identity Removed (0012,0062) is added to the dataset with a value of "YES", De-identification Method (0012,0063) is added with the value "Limited Data Set" and De-identification Method Code Sequence (0012,0064) is added with the value "Basic Application Confidentiality Profile" from CID 7050. De-identification Method.

- If the Dataset being de-identified is being stored within a DICOM File, then the File Meta Information are also anonymized

The option to de-identify is available at the time of export for the manual send to media (USB and CD/DVD) and for manual send to DICOM Store . Please note that anonymization of "image pixel data" is ultimately the responsibility of the anonymization site even if Aixplorer Mach30 is used to anonymize the data. Anonymization of data burned into the image itself (ie, image pixel data) is notoriously difficult. Review of all such images for accurate anonymization is strongly recommended.

Table A.33 list the attributes altered during anonymization and the method used. This table is derived from DICOM 2018b PS3.15 Annex E, Table E.1-1.

Attribute Name	Tag	De-Identification Method
Accession Number	(0008,0050)	De-Identified value
Acquisition Date	(0008,0022)	De-Identified value
Acquisition DateTime	(0008,002A)	De-Identified value
Acquisition Time	(0008,0032)	De-Identified value
Additional Patient's History	(0010,21B0)	Removed
Admission ID	(0038,0010)	Removed
Allergies	(0010,2110)	Removed
Author Observer Sequence	(0040,A078)	Removed
Comments on the Performed Procedure Step	(0040,0280)	Removed
Confidentiality Constraint on Patient Data Description	(0040,3001)	Removed
Content Date	(0008,0023)	De-Identified value
Content Time	(0008,0033)	De-Identified value
Contrast Bolus Agent	(0018,0010)	Empty Value
Ethnic Group	(0010,2160)	Removed
Filler Order Number/Imaging ServiceRequest	(0040,2017)	Empty Value
Imaging Service Request Comments	(0040,2400)	Removed
Instance Creator UID	(0008,0014)	De-Identified value
Institution Address	(0008,0081)	Removed
Institution Code Sequence	(0008,0082)	Removed
Institution Name	(0008,0080)	Removed
Institutional Department Name	(0008,1040)	Removed
Issuer of Admission ID	(0038,0011)	Removed
Issuer of Patient ID	(0010,0021)	Removed
Last Menstrual Date	(0010,21D0)	Removed
Media Storage SOP Instance UID	(0002,0003)	De-Identified value
Medical Alerts	(0010,2000)	Removed
Name of Physician(s) Reading Study	(0008,1060)	Removed
Names of Intended Recipient of Results	(0040,1010)	Removed
Operators' Name	(0008,1070)	Removed
Other Patient IDs	(0010,1000)	Removed
Other Patient IDs Sequence	(0010,1002)	Removed
Other Patient Names	(0010,1001)	Removed
Patient Comments	(0010,4000)	Removed
Patient ID	(0010,0020)	De-Identified value

Patient's Age	(0010,1010)	Value Kept
Patient's Birth Date	(0010,0030)	Empty Value
Patient's Birth Time	(0010,0032)	Removed
Patient's Name	(0010,0010)	De-Identified value "Anonymous Anonymous"
Patient's Sex	(0010,0040)	Empty Value
Patient's Size	(0010,1020)	Removed
Patient's Weight	(0010,1030)	Removed
Performed Location	(0040,0243)	Removed
Performed Procedure Step Description	(0040,0254)	Removed
Performed Procedure Step End Date	(0040,0250)	Removed
Performed Procedure Step End DateTime	(0040,4051)	Removed
Performed Procedure Step End Time	(0040,0251)	Removed
Performed Procedure Step ID	(0040,0253)	Removed
Performed Procedure Step Start Date	(0040,0244)	Removed
Performed Procedure Step Start DateTime	(0040,4050)	Removed
Performed Procedure Step Start Time	(0040,0245)	Removed
Performed Station AE Title	(0040,0241)	Removed
Performed Station Name	(0040,0242)	Removed
Performing Physicians' Name	(0008,1050)	Removed
Physician(s) Reading Study Identification Sequence	(0008,1062)	Removed
Physician(s) of Record	(0008,1048)	Removed
Placer Order Number / Imaging Service Request	(0040,2016)	Removed
Pregnancy Status	(0010,21C0)	Removed
Private attributes	(gggg,eeee)	(where gggg) is odd Value Kept
Protocol Name	(0018,1030)	Removed
Referenced Performed Procedure Step Sequence	(0008,1111)	Removed
Referenced SOP Instance UID	(0008,1155)	De-Identified value
Referenced Study Sequence	(0008,1110)	Removed
Referring Physician's Name	(0008,0090)	Empty Value
Request Attributes Sequence	(0040,0275)	Removed
Requested Procedure Comments	(0040,1400)	Removed
Requested Procedure Description	(0032,1060)	Removed
Requested Procedure ID	(0040,1001)	Removed
Requesting Physician	(0032,1032)	Removed
Requesting Service	(0032,1033)	Removed
Scheduled Procedure Step Description	(0040,0007)	Removed
Series Date	(0008,0021)	De-Identified value
Series Description	(0008,103E)	Removed
Series Instance UID	(0020,000E)	De-Identified value
Series Time	(0008,0031)	De-Identified value
SOP Instance UID	(0008,0018)	De-Identified value
Station Name	(0008,1010)	Removed
Study Comments	(0032,4000)	Removed
Study Date	(0008,0020)	De-Identified value
Study Description	(0008,1030)	Removed
Study ID	(0020,0010)	Empty Value
Study Instance UID	(0020,000D)	De-Identified value
Study Time	(0008,0030)	De-Identified value

Table A.33: *De-Identified attributes*

B

Data Dictionary of Private Attributes

If appropriate options are set the Aixplorer Mach30 may include private attributes in the US Image IODs. The Private Attributes added to created SOP Instances are listed in the Table B.1. Aixplorer Mach30 reserves blocks of private attributes in groups 2FF1 and 8FF1. Further details on usage of these private attributes are contained in Section A.

Name	Description	Tag	VR	VM	Value
Contrast Quantification Private Creator	Private creator data element	(2FF1,0060)	LO	1	SSI Contrast Quantification
Contrast Quantification Version	Private Creator Data Version	(2FF1,6001)	LO	1	1.0
Region Location Min X2	Location of the Contrast image (pixel coordinates)	(2FF1,6018)	IS	1	
Region Location Min Y2	Location of the Contrast image (pixel coordinates)	(2FF1,601A)	IS	1	
Region Location Min X3	Location of the Contrast image (pixel coordinates)	(2FF1,601C)	IS	1	
Region Location Min Y3	Location of the Contrast image (pixel coordinates)	(2FF1,601E)	IS	1	
Region Location Min X4	Location of the Contrast image (pixel coordinates)	(2FF1,6019)	IS	1	
Region Location Min Y4	Location of the Contrast image (pixel coordinates)	(2FF1,601B)	IS	1	
Region Location Min X5	Location of the B-Mode image (pixel coordinates)	(2FF1,601D)	IS	1	
Region Location Min Y5	Location of the B-Mode image (pixel coordinates)	(2FF1,601F)	IS	1	
Log-Compression Method	Method used for the Log-compression	(2FF1,6031)	IS	1	
Anti-Log Law Vector / Coefficient Table	Inverse log-compression law for data linearization	(2FF1,6032)	FL	256	
TGC Contrast Gain Vector	Unit: dB	(2FF1,6032)	DS	256	
Palette Name		(2FF1,6035)	LO	1	
Contrast Red Palette Data	Contrast palette RGB values	(2FF1,6036)	IS	256	
Contrast Green Palette Data	Contrast palette RGB values	(2FF1,6037)	IS	256	
Contrast Blue Palette Data	Contrast palette RGB values	(2FF1,6038)	IS	256	
Transducer name		(2FF1,6040)	LO	1	
SSI Q Private Creator	Private creator data element for header	(8FF1,0013)	LO	1	SSI Rich Quantification Group
SSI Q Blob	Binary data	(8FF1,1301)	OB	1	
SSI Image enhancement Private Creator	Private creator data element for header	(8FF1,0013)	LO	1	SSI Image enhancement Group
Gamma Value	Gamma Value	(8FF1,1401)	DS	1	
SSI Image enhancement Group Version	Private Creator Data Version	(8FF1,1410)	LO	1	2.0
RGB LUT	RGB LUT	(8FF1,1420)	IS	256	LUT values
LUT Description	LUT Description	(8FF1,1424)	LO	1	

Table B.1: *Data Dictionary of Private Attributes*

C

Coded Terminology and Templates

C.1 Context Groups

The Workflow AE is capable of supporting arbitrary coding schemes for Procedure and Protocol Codes. The contents of Requested Procedure Code Sequence (0032,1064) and Scheduled Protocol Code Sequence (0040,0008) supplied in Worklist Items will be mapped to Image IOD and MPPS attributes as described in Table A.32.

As shown in Table C.1, the contents of Performed Procedure Step Discontinuation Reason Code Sequence (0040,0281) for a discontinued MPPS will be filled with a code selected by the user from a fixed list corresponding to Context Group 9300. The Ultrasound Contrast/Bolus Agents codes used by Aixplorer Mach30 are described in Table C.2. Besides, since Aixplorer Mach30 has the ability to export structured report, a subset of the context groups described in TID 5000 OB-GYN Ultrasound Procedure Report and/or TID 5200 Vascular Ultrasound Procedure Report may also be used.

Context Group	Default Value Set	Configurable	Use
Procedure Discontinuation Reasons	Subset of CID 9300 (CID 9302 not included)	No	Mapped from popup window "Cancel Exam". Used in Performed Procedure Step Discontinuation Reason Code Sequence (0040,0281). User can select one item from the list. Default value is "Doctor cancelled procedure".(see Table C.3
Ultrasound Contrast/Bolus Agents	CID 12030.	No	Ultrasound IOD(see Table C.2)
OB-GYN Dates	CID 12003	No	OB-GYN Ultrasound Procedure Report (see Table D.1)
Fetal Biometry Ratios	CID 12004	No	OB-GYN Ultrasound Procedure Report (see Table D.2)
Fetal Biometry Measurements	CID 12005	No	OB-GYN Ultrasound Procedure Report (see Table D.3)
Fetal Long Bones Biometry Measurements	CID 12006	No	OB-GYN Ultrasound Procedure Report (see Table D.4)
Fetal Cranium	CID 12007	No	OB-GYN Ultrasound Procedure Report (see Table D.5)
OB-GYN Amniotic Sac	CID 12008	No	OB-GYN Ultrasound Procedure Report (see Table D.6)
Early Gestation Biometry Measurements	CID 12009	No	OB-GYN Ultrasound Procedure Report (see Table D.7)
Ultrasound Pelvis and Uterus	CID 12011	No	OB-GYN Ultrasound Procedure Report (see Table D.8)
OB Equations and Tables	CID 12012	No	OB-GYN Ultrasound Procedure Report (see Table D.21)
Gestational Age Equations and Tables	CID 12013	No	OB-GYN Ultrasound Procedure Report (see Table D.21)
OB Fetal Body Weight Equations and Tables	CID 12014	No	OB-GYN Ultrasound Procedure Report (see Table D.21)

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Fetal Growth Equations and Tables	CID 12015	No	OB-GYN Ultrasound Procedure Report (see Table D.21)
Estimated Fetal Weight Percentile Equations and Tables	CID 12016	No	OB-GYN Ultrasound Procedure Report (see Table D.21)
OB-GYN Summary	CID 12018	No	OB-GYN Ultrasound Procedure Report (see Table D.9)
OB-GYN Fetus Summary	CID 12019	No	OB-GYN Ultrasound Procedure Report (see Table D.10)
Measurement Orientation	CID 12118	No	OB-GYN Ultrasound Procedure Report (see Table D.11)
Vascular Ultrasound Property	CID 12119	No	OB-GYN Ultrasound Procedure Report (see Table D.12)
Blood Velocity Measurements by Ultrasound	CID 12120	No	OB-GYN Ultrasound Procedure Report (see Table D.13)
Vascular Indices and Ratios	CID 12121	No	OB-GYN Ultrasound Procedure Report (see Table D.14)
Other Vascular Properties	CID 12122	No	OB-GYN Ultrasound Procedure Report (see Table D.15)
Pelvic Vasculature Anatomical Location	CID 12140	No	OB-GYN Ultrasound Procedure Report (see Table D.16)
Fetal Vasculature Anatomical Location	CID 12141	No	OB-GYN Ultrasound Procedure Report (see Table D.17)
Measurement Type	CID 3627	No	OB-GYN Ultrasound Procedure Report (see Table E.18)
Equation or Table	CID 228	No	OB-GYN Ultrasound Procedure Report (see Table D.19)
Laterality	CID 244	No	OB-GYN Ultrasound Procedure Report (see Table E.20)
Extracranial Arteries	CID 12104	No	Vascular Ultrasound Procedure Report (see Table E.1)
Intracranial Cerebral Vessels	CID 12105	No	Vascular Ultrasound Procedure Report (see Table E.2)
Intracranial Cerebral Vessels (unilateral)	CID 12106	No	Vascular Ultrasound Procedure Report (see Table E.3)
Upper Extremity Arteries	CID 12107	No	Vascular Ultrasound Procedure Report (see Table E.4)
Upper Extremity Veins	CID 12108	No	Vascular Ultrasound Procedure Report (see Table E.5)
Lower Extremity Arteries	CID 12109	No	Vascular Ultrasound Procedure Report (see Table E.6)
Lower Extremity Veins	CID 12110	No	Vascular Ultrasound Procedure Report (see Table E.7)
Abdominal Arteries (lateral)	CID 12111	No	Vascular Ultrasound Procedure Report (see Table E.8)
Abdominal Arteries (unilateral)	CID 12112	No	Vascular Ultrasound Procedure Report (see Table E.9)
Abdominal Veins (lateral)	CID 12113	No	Vascular Ultrasound Procedure Report (see Table E.10)
Abdominal Veins (unilateral)	CID 12114	No	Vascular Ultrasound Procedure Report (see Table E.11)
Renal Vessels	CID 12115	No	Vascular Ultrasound Procedure Report (see Table E.12)
Vessel Segment Modifiers	CID 12116	No	Vascular Ultrasound Procedure Report (see Table E.13)
Vessel Branch Modifiers	CID 12117	No	Vascular Ultrasound Procedure Report (see Table E.14)
Vascular Ultrasound Property	CID 12119	No	Vascular Ultrasound Procedure Report (see Table E.15)
Carotid Ratios	CID 12123	No	Vascular Ultrasound Procedure Report (see Table E.16)
Renal Ratios	CID 12124	No	Vascular Ultrasound Procedure Report (see Table E.17)
Measurement Type	CID 3627	No	Vascular Ultrasound Procedure Report (see Table E.18)
Equation or Table	CID 228	No	Vascular Ultrasound Procedure Report (see Table E.19)

Table C.1: *Context Groups*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Sonazoid	125905	DCM	20090409	Sonazoid
SonoVue	125906	DCM	20090409	SonoVue

Table C.2: *CID 12030 Ultrasound Contrast/Bolus Agents*

C.2   Template Specifications

Aixplorer Mach30 supports the root Templates described in Table C.4.

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Doctor canceled procedure	110500	DCM	20140419	Doctor canceled procedure
Equipment failure	110501	DCM	20140419	Equipment failure
Incorrect procedure ordered	110502	DCM	20140419	Incorrect procedure ordered
Patient allergic to media/contrast	110503	DCM	20140419	Patient allergic to media/contrast
Patient died	110504	DCM	20140419	Patient died
Patient refused to continue procedure	110505	DCM	20140419	Patient refused to continue procedure
Patient taken for treatment or surgery	110506	DCM	20140419	Patient taken for treatment or surgery
Patient did not arrive	110507	DCM	20140419	Patient did not arrive
Patient pregnant	110508	DCM	20140419	Patient pregnant
Change of procedure for correct charging	110509	DCM	20140419	Change of procedure for correct charging
Duplicate order	110510	DCM	20140419	Duplicate order
Nursing unit cancel	110511	DCM	20140419	Nursing unit cancel
Incorrect side ordered	110512	DCM	20140419	Incorrect side ordered
Discontinued for unspecified reason	110513	DCM	20140419	Discontinued for unspecified reason
Incorrect worklist entry selected	110514	DCM	20140419	Incorrect worklist entry selected
Patient condition prevented continuing	110515	DCM	20140419	Patient condition prevented continuing
Equipment change	110516	DCM	20140419	Equipment change

Table C.3: *CID 9300 Procedure Discontinuation Reasons*

SOP Class	Template ID	Template Name	Use
Comprehensive SR	5000	"OB-GYN Ultrasound Procedure Report" (see annex D)	Create
Comprehensive SR	5100	"Vascular Ultrasound Report" (see annex E)	Create

Table C.4: *Structured Report Root Templates*

C.3   Private Code definitions

The private codes used by Aixplorer Mach30 are described in Table C.5.

Code Value	Coding Scheme Designator	Code Version	Code Meaning
SSI-666-2	SMS	20030130	AC by GA, CFEF 2000
SSI-666-5	SMS	20030130	FL by GA, CFEF 2000
SSI-666-7	SMS	20061024	GA by AC, CFEF 2000
SSI-666-9	SMS	20061024	GA by BPD, CFEF 2000
SSI-666-11	SMS	20061024	GA by FL, CFEF 2000
SSI-666-13	SMS	20061024	GA by HC, CFEF 2000
SSI-666-15	SMS	20061024	GA by TAD, CFEF 2000
SSI-666-17	SMS	20030130	HC by GA, CFEF 2000
SSI-666-19	SMS	20030130	TAD by GA, CFEF 2000
SSI-666-21	SMS	20061024	GA by FL, ASUM 2000
SSI-666-32	SMS	20030130	CRL by GA, Jeanty 1984
SSI-666-34	SMS	20030130	BPD by GA, Jeanty 1984
SSI-666-37	SMS	20030130	CRL by GA, Hansmann 1986
SSI-666-45	SMS	20030130	EFW by GA, Hadlock 1991
SSI-666-46	SMS	20030130	EFW by GA, Doubilet 1997
SSI-666-47	SMS	20030130	EFW by GA, Oken Male 2003
SSI-666-48	SMS	20030130	EFW by GA, Oken Female 2003
SSI-666-49	SMS	20030130	EFW by GA, Oken All 2003
SSI-666-50	SMS	20160830	EWP by GA, CFEF Massoud 2015
SSI-666-51	SMS	20160830	BPD by GA, CFEF 2006
SSI-666-52	SMS	20160830	BPDoi by GA, ISUOG Leung 2008

SSI-666-53	SMS	20160830	BPDoo by GA, ISUOG Leung 2008
SSI-666-54	SMS	20160830	FL by GA, ISUOG Leung 2008
SSI-666-55	SMS	20160830	GA by BPDoi, ISUOG Leung 2008
SSI-666-56	SMS	20160830	GA by BPDoo, ISUOG Leung 2008
SSI-666-57	SMS	20160830	GA by FL, ISUOG Leung 2008
SSI-666-58	SMS	20160830	GA by HC, ISUOG Leung 2008
SSI-666-59	SMS	20160830	HC by GA, ISUOG Leung 2008
SSI-666-60	SMS	20160830	GA by CRL, ISUOG Sahota 2009
SSI-666-61	SMS	20160830	HL by GA, Jeanty 1982
SSI-666-62	SMS	20160830	TIB by GA, Jeanty 1982
SSI-666-63	SMS	20160830	Ulna by GA, Jeanty 1982
SSI-666-64	SMS	20160830	GA by CRL, McLeannan Schluter 2008
SSI-666-65	SMS	20160830	GA by CRL, Robinson Fleming 1975
SSI-666-66	SMS	20160830	GA by CRL, Verburg 2008
SSI-666-67	SMS	20160830	CRL by GA, Hadlock 1992

Table C.5: *OB-Gyn Private code*

D

OB-GYN Ultrasound Procedure Report

OB-GYN Ultrasound Procedure Reports are always created when images are acquired with the following preset:

- GYN;

- Early OB;

- Gen OB.

They are pushed to any DICOM Store in accordance with the "Enable export of SR OB-GYN" option.

D.1   OB-Gyn measurements

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
EDD	11778-8	LN	20030130	EDD
EDD from LMP	11779-6	LN	20030130	EDD from LMP
EDD from AUA	11781-2	LN	20030130	EDD from average ultrasound age
EDD from ovulation	11780-4	LN	20030130	EDD from ovulation date
LMP	11955-2	LN	20030130	LMP
Ovulation date	11976-8	LN	20030130	Ovulation date
DOC	33067-0	LN	20030130	Conception Date

Table D.1: *CID 12003 OB-GYN Dates*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
HC/AC Ratio	11947-9	LN	20030130	HC/AC
FL/AC Ratio	11871-1	LN	20030130	FL/AC
FL/BPD Ratio	11872-9	LN	20030130	FL/BPD
Cephalic Index	11823-2	LN	20030130	Cephalic Index
FL/HC Ratio	11873-7	LN	20030130	FL/HC

Table D.2: *CID 12004 Fetal Biometry Ratios*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Abdominal Circumference	11979-2	LN	20030130	Abdominal Circumference
Anterior-Posterior Abdominal Diameter	11818-2	LN	20030130	Anterior-Posterior Abdominal Diameter
Anterior-Posterior Trunk Diameter	11819-0	LN	20030130	Anterior-Posterior Trunk Diameter
Biparietal Diameter	11820-8	LN	20030130	Biparietal Diameter
Biparietal Diameter Area Corrected	11824-0	LN	20030130	BPD area corrected
Cisterna Magna Length	11860-4	LN	20030130	Cisterna Magna
Femur Length	11963-6	LN	20030130	Femur Length
Foot Length	11965-1	LN	20030130	Foot length
Head Circumference	11984-2	LN	20030130	Head Circumference
Occipital Frontal Diameter	11851-3	LN	20030130	Occipital-Frontal Diameter
Thoracic Circumference	11988-3	LN	20030130	Thoracic Circumference
Thoracic Area	33068-8	LN	20030130	Thoracic Area
Transverse Abdominal Diameter	11862-0	LN	20030130	Tranverse Abdominal Diameter
Trans Cerebellar Diameter	11863-8	LN	20030130	Trans Cerebellar Diameter
Transverse Thoracic Diameter	11864-6	LN	20030130	Transverse Thoracic Diameter
Kidney Height	11853-9	LN	20030130	Left Kidney thickness
Kidney length	11834-9	LN	20030130	Left Kidney length
Kidney width	11825-7	LN	20030130	Left Kidney width
Kidney Height	11855-4	LN	20030130	Right Kidney thickness
Kidney length	11836-4	LN	20030130	Right Kidney length
Kidney width	11827-3	LN	20030130	Right Kidney width
APADxTAD	33191-8	LN	20030130	APAD * TAD

Table D.3: *CID 12005 Fetal Biometry Measurements*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Humerus Length	11966-9	LN	20030130	Humerus length
Radius Length	11967-7	LN	20030130	Radius length
Ulna Length	11969-3	LN	20030130	Ulna length
Tibia Length	11968-5	LN	20030130	Tibia length
Fibula Length	11964-4	LN	20030130	Fibula length
Clavicle Length	11962-8	LN	20030130	Clavicle length
Femur Length	11963-6	LN	20030130	Femur Length

Table D.4: *CID 12006 Fetal Long Bones Biometry Measurements*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Lateral Ventrical width	12171-5	LN	20030130	Lateral Ventrical width
Cisterna Magna length	11860-4	LN	20030130	Cisterna Magna length
Nuchal Fold thickness	12146-7	LN	20030130	Nuchal Fold thickness
Inner Orbital Diameter	33070-4	LN	20030130	Inner Orbital Diameter
Outer Orbital Diameter	11629-3	LN	20030130	Outer Orbital Diameter
Trans Cerebellar Diameter	11863-8	LN	20030130	Trans Cerebellar Diameter
Nuchal Translucency	33069-6	LN	20030130	Nuchal Translucency
Anterior Horn Lateral Ventricular Width	33197-5	LN	20030130	Anterior Horn Lateral ventricular width
Posterior Horn Lateral Ventricular Width	33196-7	LN	20030130	Posterior Horn Lateral ventricular width
Hemisphere Width	12170-7	LN	20030130	Width of Hemisphere

Table D.5: *CID 12007 Fetal Cranium*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Amniotic Fluid Quadrant 1 Diameter	11624-4	LN	20030130	First Quadrant Diameter
Amniotic Fluid Quadrant 2 Diameter	11626-9	LN	20030130	Second Quadrant Diameter
Amniotic Fluid Quadrant 3 Diameter	11625-1	LN	20030130	Third Quadrant Diameter
Amniotic Fluid Quadrant 4 Diameter	11623-6	LN	20030130	Fourth Quadrant Diameter

Table D.6: *CID 12008 OB-GYN Amniotic Sac*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Crown Rump Length	11957-8	LN	20030130	Crown Rump Length
Gestational Sac Diameter	11850-5	LN	20030130	Gestational Sac Diameter
Spine Length	33071-2	LN	20030130	Spine Length
Yolk Sac Diameter	11816-6	LN	20030130	Yolk Sac length
Nuchal Translucency	33069-6	LN	20030130	Nuchal Translucency

Table D.7: *CID 12009 Early Gestation Biometry Measurements*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Cervix Length	11961-0	LN	20030130	Cervix Length
Endometrium Thickness	12145-9	LN	20030130	Endometrium Thickness

Table D.8: *CID 12011 Ultrasound Pelvis and Uterus*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Number of Fetuses by US	11878-6	LN	20030130	Number of Fetuses by US
GA by ovulation date	11886-9	LN	20030130	Gestational Age by ovulation date

Table D.9: *CID 12018 OB-GYN Summary*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
GA	18185-9	LN	20030130	Gestational Age
Average Ultrasound Age	11888-5	LN	20030130	Composite Ultrasound Age
GA by LMP	11885-1	LN	20030130	Gestational Age by LMP
Estimated Fetal Weight	11727-5	LN	20030130	Estimated Weight
Fetal Heart rate	11948-7	LN	20030130	Fetal Heart Rate

Table D.10: *CID 12019 OB-GYN Fetus Summary*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Anterior-Posterior	122675	DCM	20110125	Anterior-Posterior
Transverse	G-A117	SRT	20110125	Transverse
Longitudinal	G-A143	SRT	20110125	Longitudinal

Table D.11: *CID 12118 Measurement Orientation*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
		Include Table D.13		
		Include Table D.14		
		Include Table D.15		

Table D.12: *CID 12119 Vascular Ultrasound Property*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
End Diastolic Velocity	11653-3	LN	20030327	End Diastolic Velocity
Minimum Diastolic Velocity	11665-7	LN	20030327	Minimum Diastolic Velocity
Peak Systolic Velocity	11726-7	LN	20030327	Peak Systolic Velocity
Time averaged mean velocity	20352-1	LN	20030327	Time averaged mean velocity
Time averaged peak velocity	11692-1	LN	20030327	Time averaged peak velocity

Table D.13: *CID 12120 Blood Velocity Measurements by Ultrasound*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Acceleration Index	20167-3	LN	20050110	Acceleration Index
Lumen Area Stenosis	R-101BA	SRT	20050110	Lumen Area Stenosis
Lumen Diameter Stenosis	R-101BB	SRT	20050110	Lumen Diameter Stenosis
Pulsatility Index	12008-9	LN	20050110	Pulsatility Index
Resistivity Index	12023-8	LN	20050110	Resistivity Index
Systolic to Diastolic Velocity Ratio	12144-2	LN	20050110	Systolic to Diastolic Velocity Ratio
Velocity ratio	33867-3	LN	20050110	Velocity ratio

Table D.14: *CID 12121 Vascular Indices and Ratios*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Acceleration Time	20168-1	LN	20050110	Acceleration Time
Deceleration Time	20217-6	LN	20050110	Deceleration Time
Vessel lumen diameter	G-0364	SRT	20050110	Vessel lumen diameter
Vessel Intimal Diameter	R-1025C	SRT	20050110	Vessel Intimal Diameter
Volume flow	33878-0	LN	20050110	Volume flow
Vessel depth from surface	R-1025E	SRT	20050110	Vessel depth from surface
Peak Gradient	20247-3	LN	20050110	Peak Gradient
Mean Gradient	20256-4	LN	20050110	Mean Gradient
Length of Segment	R-1025F	SRT	20050110	Length of Segment

Table D.15: *CID 12122 Other Vascular Properties*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Ovarian Artery	T-46980	SRT	20040322	Ovarian Artery
Ovarian Vein	T-48780	SRT	20040322	Ovarian Vein
Uterine Artery	T-46820	SRT	20040322	Uterine Artery
Uterine Vein	T-49010	SRT	20040322	Uterine Vein
Vitelline Artery of Placenta	T-F1412	SRT	20040322	Vitelline Artery of Placenta
Vitelline Vein of Placenta	T-F1413	SRT	20040322	Vitelline Vein of Placenta
Common Iliac Artery	T-46710	SRT	20040322	Common Iliac Artery

Table D.16: *CID 12140 Pelvic Vasculature Anatomical Location*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Umbilical Artery	T-F1810	SRT	20040322	Umbilical Artery
Umbilical Vein	T-F1820	SRT	20040322	Umbilical Vein
Aorta	T-42000	SRT	20040322	Aorta
Descending Aorta	T-D0765	SRT	20040322	Descending Aorta
Middle Cerebral Artery	T-45600	SRT	20040322	Middle Cerebral Artery
Pulmonary Vein	T-48581	SRT	20040322	Pulmonary Vein
Pulmonary Artery	T-44000	SRT	20040322	Pulmonary Artery

Table D.17: *CID 12141 Fetal Vasculature Anatomical Location*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Best value	R-002E1	SRT	20060613	Best value
Average	R-00317	SRT	20060613	Mean
Estimated	R-10260	SRT	20060613	Estimated
Measured	R-41D41	SRT	20060613	Measured

Table D.18: *CID 3627 Measurement Type*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Equation	121420	DCM	20030327	Equation

Table D.19: *CID 228 Equation or Table*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Right	G-A100	SRT	20030108	Right
Left	G-A101	SRT	20030108	Left

Table D.20: *CID 244 Laterality*

D.2   OB-Gyn Equation and Table

Equations and tables used in the ultrasound procedure report are described in Table D.21.

Code Value	Coding Scheme Designator	Code Version	Code Meaning
33072-0	LN	20061024	GA by AC, ASUM 2000
33145-4	LN	20030130	AC by GA, ASUM 2000
33075-3	LN	20061024	GA by AC, Merz 1988
33081-1	LN	20061024	GA by BPD, Merz 1988
SSI-666-2	SMS	20030130	AC by GA, CFEF 2000
33146-2	LN	20030130	AC by GA, Hadlock 1984
33148-8	LN	20030130	AC by GA, Merz 1988
11892-7	LN	20061024	GA by AC, Hadlock 1984
33106-6	LN	20061024	GA by GS, Hansmann 1985
33151-2	LN	20030130	BPD by GA, ASUM 2000
33198-3	LN	20030130	BPD by GA, Hadlock 1984
SSI-666-34	SMS	20030130	BPD by GA, Jeanty 1984
33154-6	LN	20030130	BPD by GA, Merz 1988
11902-4	LN	20061024	GA by BPD, Hadlock 1984
33538-0	LN	20061024	GA by BPD, Hansmann 1986
33081-1	LN	20061024	GA by BPD, Merz 1988
33079-5	LN	20061024	GA by BPD, ASUM 2000
33090-2	LN	20061024	GA by CRL, ASUM 2000
33540-6	LN	20061024	GA by CRL, Hansmann 1986
11910-7	LN	20061024	GA by CRL, Hadlock 1992
11735-8	LN	20030130	EFW by AC, BPD, FL, Hadlock 1985
11732-5	LN	20030130	EFW by AC, BPD, FL, HC, Hadlock 1985
11738-2	LN	20030130	EFW by AC, BPD, Hadlock 1984
11751-5	LN	20030130	EFW by AC, FL, Hadlock 1985
11746-5	LN	20030130	EFW by AC, FL, HC, Hadlock 1985
11754-9	LN	20030130	EFW by AC, HC Hadlock 1984
33165-2	LN	20030130	FL by GA, ASUM 2000
SSI-666-5	SMS	20030130	FL by GA, CFEF 2000
33166-0	LN	20030130	FL by GA, Hadlock 1984
33168-6	LN	20030130	FL by GA, Jeanty 1982
33169-4	LN	20030130	FL by GA, Merz 1988
33098-5	LN	20061024	GA by FL, Chitty 1997
11920-6	LN	20061024	GA by FL, Hadlock 1984
33541-4	LN	20061024	GA by FL, Hansmann 1986
11923-0	LN	20061024	GA by FL, Jeanty 1984
33542-2	LN	20061024	GA by FL, Merz 1988
33104-1	LN	20061024	GA by GS, Daya 1991
SSI-666-7	SMS	20061024	GA by AC, CFEF 2000
SSI-666-9	SMS	20061024	GA by BPD, CFEF 2000
SSI-666-21	SMS	20061024	GA by FL, ASUM 2000
SSI-666-11	SMS	20061024	GA by FL, CFEF 2000
SSI-666-13	SMS	20061024	GA by HC, CFEF 2000
SSI-666-15	SMS	20061024	GA by TAD, CFEF 2000
33109-0	LN	20061024	GA by HC, ASUM 2000
33172-8	LN	20030130	HC by GA, ASUM 2000
SSI-666-17	SMS	20030130	HC by GA, CFEF 2000
33173-6	LN	20030130	HC by GA, Hadlock 1984
33176-9	LN	20030130	HC by GA, Merz 1988
11932-1	LN	20061024	GA by HC, Hadlock 1984
33543-0	LN	20061024	GA by HC, Hansmann 1986
33110-8	LN	20061024	GA by HC measured, Chitty 1997
33115-7	LN	20061024	GA by HC, Merz 1988
11936-2	LN	20061024	GA by Humerus length, Jeanty 1984

33116-5	LN	20061024	GA by Humerus Length, ASUM 2000
33177-7	LN	20030130	Humerus Length by GA, ASUM 2000
33119-9	LN	20061024	GA by OFD, ASUM 2000
33178-5	LN	20030130	OFD by GA, ASUM 2000
33120-7	LN	20061024	GA by OFD, Hansmann 1986
SSI-666-19	SMS	20030130	TAD by GA, CFEF 2000
11941-2	LN	20061024	GA by Tibia, Jeanty 1984
11944-6	LN	20061024	GA by Ulna, Jeanty 1984
33136-3	LN	20061024	GA by Transverse Thoracic Diameter, Hansmann 1985
33082-9	LN	20061024	GA by BPD, Osaka 1989
33117-3	LN	20061024	GA by HL, Osaka 1989
33093-6	LN	20061024	GA by CRL, Osaka 1989
SSI-666-37	SMS	20030130	CRL by GA, Hansmann 1986
SSI-666-45	SMS	20030130	EFW by GA, Hadlock 1991
SSI-666-46	SMS	20030130	EFW by GA, Doubilet 1997
SSI-666-47	SMS	20030130	EFW by GA, Oken Male 2003
SSI-666-48	SMS	20030130	EFW by GA, Oken Female 2003
SSI-666-49	SMS	20030130	EFW by GA, Oken All 2003
SSI-666-50	SMS	20160830	EWP by GA, CFEF Massoud 2015
SSI-666-51	SMS	20160830	BPD by GA, CFEF 2006
SSI-666-52	SMS	20160830	BPDoi by GA, ISUOG Leung 2008
SSI-666-53	SMS	20160830	BPDoo by GA, ISUOG Leung 2008
SSI-666-54	SMS	20160830	FL by GA, ISUOG Leung 2008
SSI-666-55	SMS	20160830	GA by BPDoi, ISUOG Leung 2008
SSI-666-56	SMS	20160830	GA by BPDoo, ISUOG Leung 2008
SSI-666-57	SMS	20160830	GA by FL, ISUOG Leung 2008
SSI-666-58	SMS	20160830	GA by HC, ISUOG Leung 2008
SSI-666-59	SMS	20160830	HC by GA, ISUOG Leung 2008
SSI-666-60	SMS	20160830	GA by CRL, ISUOG Sahota 2009
SSI-666-61	SMS	20160830	HL by GA, Jeanty 1982
SSI-666-62	SMS	20160830	TIB by GA, Jeanty 1982
SSI-666-64	SMS	20160830	GA by CRL, McLeannan Schluter2008
SSI-666-65	SMS	20160830	GA by CRL, Robinson Fleming 1975
SSI-666-66	SMS	20160830	GA by CRL, Verburg 2008
SSI-666-67	SMS	20160830	CRL by GA, Hadlock 1992

Table D.21: *Tables and equations*

D.3   OB-Gyn Template

OB-GYN Ultrasound Procedure Report template is described in table D.22

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	EV (125000, DCM, "OB-GYN Ultrasound Procedure Report")	1		
2	>	CONTAINS	INCLUDE	DTID (5001) Patient Characteristics (See D.23)	1		
3	>	CONTAINS	CONTAINER	DT (111028, DCM, "Image Library")	1		
4	> >	CONTAINS	IMAGE	No purpose of reference	1-n		

5	>	CONTAINS	INCLUDE	DTID (5002) OB-GYN Procedure Summary Section (See D.24)	1		
6	>	CONTAINS	INCLUDE	DTID (5004) Fetal Biometry Ratio Section (See Table D.26)	1-n		
7	>	CONTAINS	INCLUDE	DTID (5005) Fetal Biometry Section (See Table D.27)	1-n		
8	>	CONTAINS	INCLUDE	DTID (5006) Long Bones Section (See Table D.28)	1-n		
9	>	CONTAINS	INCLUDE	DTID (5007) Fetal Cranium Section (See Table D.29)	1-n		
10	>	CONTAINS	INCLUDE	DTID (5009) Fetal Biophysical Profile Section (See Table D.31)	1-n		
11	>	CONTAINS	INCLUDE	DTID (5011) Early Gestation Section (See Table D.33)	1-n		
12	>	CONTAINS	INCLUDE	DTID (5010) Amniotic Sac Section (See Table D.32)	1		
13	>	CONTAINS	INCLUDE	DTID (5015) Pelvis and Uterus Section (See Table D.37)	1		
14	>	CONTAINS	INCLUDE	DTID (5012) Ovaries Section (See Table D.34)	1		
15	>	CONTAINS	INCLUDE	DTID (5013) Follicles Section (See Table D.35)	1		$Laterality = EV (G-A101, SRT, "Left") $Number = EV (11879-4, LN, "Number of follicles in left ovary")
16	>	CONTAINS	INCLUDE	DTID (5013) Follicles Section (See Table D.35)	1		$Laterality = EV (G-A100, SRT, "Right") $Number = EV (11880-2, LN, "Number of follicles in right ovary")
17	>	CONTAINS	CONTAINER	EV (121070, DCM, "Findings")	1-n		
18	> >	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1		EV (T-F6800, SRT, "Embryonic Vascular Structure")
19	> >	CONTAINS	INCLUDE	DTID (5025) OB-GYN Fetal Vascular Measurement Group (See Table D.39)	1		$AnatomyGroup = DCID (12141) Fetal Vasculature
20	>	CONTAINS	CONTAINER	EV (121070, DCM, "Findings")	1		
21	> >	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1		EV (T-D6007, SRT, "Pelvic Vascular Structure")
22	> >	CONTAINS	INCLUDE	DTID (5026) OB-GYN Pelvic Vascular Measurement Group (See Table D.40)	1		$AnatomyGroup = DCID (12140) Pelvic Vasculature Anatomical Location

Table D.22: *TID 5000 OB-GYN Ultrasound Procedure Report*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	EV (121118, DCM, "Patient Characteristics")	1		
2	>	CONTAINS	TEXT	EV (121106, DCM, "Comment")	1		
3	>	CONTAINS	NUM	EV (8302-2, LN, "Patient Height")	1		
4	>	CONTAINS	NUM	EV (29463-7, LN, "Patient Weight")	1		
5	>	CONTAINS	NUM	EV (11996-6, LN, "Gravida")	1		
6	>	CONTAINS	NUM	EV (11977-6, LN, "Para")	1		
7	>	CONTAINS	NUM	EV (11612-9, LN, "Aborta")	1		
8	>	CONTAINS	NUM	EV (33065-4, LN, "Ectopic Pregnancies")	1		

Table D.23: *TID 5001 OB-GYN Patient Characteristics*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (121111, DCM, "Summary")	1		
2	>	CONTAINS	DATE	DCID (12003) OB-GYN Dates	1-n		
3	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n		$Measurement = BCID (12018) OB-GYN Summary
4	>	CONTAINS	INCLUDE	BTID (5003) OB-GYN Fetus Summary (See Table D.25)	1-n	No more than 1 inclusion per fetus	

Table D.24: *TID 5002 OB-GYN Procedure Summary Section*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125008, DCM, "Fetus Summary")	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n		$Measurement = DCID (12019) OB-GYN Fetus Summary $Equation = DCID (12012) OB Equations and Tables

Table D.25: *TID 5003 OB-GYN Fetus Summary*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125001, DCM, "Fetal Biometry Ratios")	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	NUM	DCID (12004) Fetal Biometry Ratios[1]	1-n		

Table D.26: *TID 5004 Fetal Biometry Ratio Section*

[1]Numeric ratio related to fetal growth.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125002, DCM, "Fetal Biometry")	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	INCLUDE	DTID (5008) Fetal Biometry Group[1](See Table D.30)	1-n		$BiometryType = Member Of {DCID (12005) Fetal Biometry Measurements}

Table D.27: *TID 5005 Fetal Biometry Section*

[1]The group of measurements. Only one group per biometry type.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125003, DCM, "Fetal Long Bones")	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	INCLUDE	DTID (5008) Fetal Biometry Group[1](See Table D.30)	1-n		$BiometryType = Member Of {DCID (12006) Fetal Long Bones Biometry Measurements}

Table D.28: *TID 5006 Fetal Long Bones Section*

[1]The group of measurements. Only one group per biometry type.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125004, DCM, "Fetal Cranium")	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	INCLUDE	DTID (5008) Fetal Biometry Group (See Table D.30)[1]	1-n		$BiometryType = Member Of {DCID (12007) Fetal Cranium}

Table D.29: *TID 5007 Fetal Cranium Section*

[1]The group of measurements. Only one group per biometry type.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125005, DCM, "Biometry Group")[1]	1		
2	>	CONTAINS	INCLUDE	DTID (300) Measurement[2] (See Table D.41)	1-n	At least one of row 2 and 3 shall be present	$Measurement = $BiometryType $Derivation = DCID (3627) Measurement Type
3	>	CONTAINS	NUM	EV (18185-9, LN, "Gestational Age")	1	At least one of row 2 and 3 shall be present	Units= EV (d, UCUM, days)
4	>>	INFERRED FROM	INCLUDE	DCID (228) Equation or Table[3]	1		DCID (12013) Gestational Age Equations and Tables

Table D.30: *TID 5008 Fetal Biometry Group*

[1]Container to segregate biometry data by measurement type.
[2]The discrete measurements of the biometry type including derived measurements such as mean. One of the measurements may be flagged as selected for derived measurements.
[3]The reference that defines the equation or table of GA derivation.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125006, DCM, "Biophysical Profile")	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	NUM	EV (11631-9, LN, "Gross Body Movement")[1]	1	At least one of row 3-7 shall be present	Units = DT ("0:2", UCUM, "range 0:2")
4	>	CONTAINS	NUM	EV (11632-7, LN, "Fetal Breathing")[1]	1	At least one of row 3-7 shall be present	Units = DT ("0:2", UCUM, "range 0:2")
5	>	CONTAINS	NUM	EV (11635-0, LN, "Fetal Tone")[1]	1	At least one of row 3-7 shall be present	Units = DT ("0:2", UCUM, "range 0:2")
6	>	CONTAINS	NUM	EV (11635-5, LN, "Fetal Heart Reactivity")[1]	1	At least one of row 3-7 shall be present	Units = DT ("0:2", UCUM, "range 0:2")
7	>	CONTAINS	NUM	EV (11630-1, LN, "Amniotic Fluid Volume")[1]	1	At least one of row 3-7 shall be present	Units = DT ("0:2", UCUM, "range 0:2")
8	>	CONTAINS	NUM	DT (11634-3, LN, "Biophysical Profile Sum Score")[2]	1		

Table D.31: *TID 5009 Fetal Biophysical Profile Section*

[1]The numeric profile score of range 0-2
[2]The sum of rows 3-7. The range is from 0 to the maximum possible score according the items scored in rows 3-7.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (121070, DCM, "Findings")	1		
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1		DT (T-F1300, SRT, "Amniotic Sac")
3	>	CONTAINS	INCLUDE	DTID (300) Measurement[1] (See Table D.41)	1		$Measurement = DT (11627-7, LN, "Amniotic Fluid Index")
4	>	CONTAINS	INCLUDE	DTID (300) Measurement[2] (See Table D.41)	4		$Measurement = DCID (12008) OB-GYN Amniotic Sac

Table D.32: *TID 5010 Amniotic Sac Section*

[1]The sum of the 4 quadrant diameters
[2]The four amniotic sac quadrant diameters

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125009, DCM, "Early Gestation")	1		

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	
3	>	CONTAINS	INCLUDE	DTID (5008) Fetal Biometry Group (See Table D.30)	1-n		$BiometryType= Member of {DCID (12009) Early Gestation Biometry Measurements}

Table D.33: *TID 5011 Early Gestation Section*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (121070, DCM, "Findings")	1		
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1		DT (T-87000, SRT, "Ovary")
3	>	CONTAINS	INCLUDE	DTID (5016) LWH Volume Group (See Table D.38)	1		$GroupName = EV (T-87000, SRT, "Ovary") $Width = EV (11829-9, LN, "Left Ovary Width") $Length = EV (11840-6, LN, "Left Ovary Length") $Height =EV (11857-0 , LN,"Left Ovary Height") $Volume=EV (12164-0, LN, "Left Ovary Volume")
4	>	CONTAINS	INCLUDE	DTID (5016) LWH Volume Group (See Table D.38)	1		$GroupName = EV (T-87000, SRT, "Ovary") $Width = EV (11830-7, LN, "Right Ovary Width") $Length = EV (11841-4, LN, "Right Ovary Length") $Height = EV (11858-8, LN,"Right Ovary Height") $Volume= EV (12165-7, LN, "Right Ovary Volume")

Table D.34: *TID 5012 Ovaries Section*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (121070, DCM, "Findings")	1		
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1		DT (T-87600, SRT, "varian Follicle")
3	>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1		$Laterality
4	>	CONTAINS	NUM	$Number	1		
5	>	CONTAINS	INCLUDE	DTID (5014) Follicle Measurement Group (See Table D.36)	1-n		

Table D.35: *TID 5013 Follicles Section*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	EV (125007, DCM, "Measurement Group")	1		

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
2	>	HAS OBS CONTEXT	TEXT	EV (125010, DCM, "Identifier")	1		Unique among all groups of same laterality
3	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1		$Measurement = EV (G-D705, SRT, "Volume")
4	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n		$Measurement = EV (11793-7, LN, "Follicle Diameter") $Derivation = DCID (3627) Measurement Type

Table D.36: *TID 5014 Follicle Measurement Group*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	DT (125011, DCM, "Pelvis and Uterus")	1		
2	>	CONTAINS	INCLUDE	DTID (5016) LWH Volume Group (See Table D.38)	1		$GroupName = EV (T-83000, SRT, "Uterus") $Width = EV (11865-3,LN, "Uterus Width") $Length = EV (11842-2, LN, "Uterus Length") $Height = EV (11859-6, LN, "Uterus Height") $Volume = EV (33192-6, LN, "Uterus Volume")
3	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n		$Measurement = DCID (12011) Ultrasound Pelvis and Uterus $Derivation = DCID (3627) Measurement Type

Table D.37: *TID 5015 Pelvis and Uterus Section*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	$GroupName	1		
2	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1	At least one of row 2,3,4,5 shall be present	$Measurement = $Volume
3	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n	At least one of row 2,3,4,5 shall be present	$Measurement = $Length $Derivation = DCID (3627) Measurement Type
4	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n	At least one of row 2,3,4,5 shall be present	$Measurement = $Width $Derivation = DCID (3627) Measurement Type
5	>	CONTAINS	INCLUDE	DTID (300) Measurement (See Table D.41)	1-n	At least one of row 2,3,4,5 shall be present	$Measurement = $Height $Derivation = DCID (3627) Measurement Type

Table D.38: *TID 5016 LWH Volume Group*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	$AnatomyGroup	1		
2	>	HAS OBS CONTEXT	INCLUDE	DTID (1008) Subject Context, Fetus (See Table D.43)	1	IF this template is invoked more than once to describe more than one fetus	

3	>	HAS OBS CON-TEXT	CODE	EV (G-C171, SRT "Laterality")	1-n	IFF anatomy has laterality	DCID (244) Laterality
4	>	CONTAINS	INCLUDE	DTID (300) Measure-ment (See Table D.41)	1-n		$MeasType = DCID (12119) Vascular Ultrasound Property $Derivation = DCID (3627) Measurement Type

Table D.39: *TID 5025 OB-GYN Fetal Vascular Ultrasound Measurement Group*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CONTAINER	$AnatomyGroup[1]	1		
2	>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	IFF anatomy has laterality	DCID (244) Laterality
3	>	HAS CONCEPT MOD	TEXT	EV (112050, DCM, "Anatomic Identi-fier") [2]	1-n		
4	>	CONTAINS	INCLUDE	DTID (300) Measure-ment (See Table D.41)	1-n		$MeasType = DCID (12119) Vascular Ultrasound Property $Derivation = DCID (3627) Measurement Type
5	>>	HAS CONCEPT MOD	CODE	EV (125105, DCM, "Measurement Orien-tation")	1		DCID (12118) Measurement Orientation
6	>>	HAS CONCEPT MOD	NUM	EV (125106, DCM, "Doppler Angle")	1		UNIT = EV (deg, UCUM , "de-grees")
7	>>	HAS CONCEPT MOD	NUME	EV (125107, DCM, "Sample Volume Depth")	1-n		UNIT = EV (cm, UCUM , "cm")

Table D.40: *TID 5026 OB-GYN Pelvic Vascular Ultrasound Measurement Group*

[1]Specifies the anatomical context of the observations in the group.
[2]Differentiates between multiple structures such as the two umbilical arteries.

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			NUM	$Measurement	1	Units = $Units	
2	>	HAS CONCEPT MOD	CODE	$ModType[1]	1-n	$ModValue	
3	>	HAS CONCEPT MOD	CODE	EV (G-C036, SRT, "Measurement Method")	1	$Method	
4	>	HAS CONCEPT MOD	CODE	EV (121401, DCM, "Derivation")	1	$Derivation	
5	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1	$TargetSite	
6	> >	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	DCID (244) Laterality	
7	> >	HAS CONCEPT MOD	CODE	DT (G-A1F8, SRT, "Topographical modifier")	1	$TargetSiteMod	
8		INFERRED FROM	INCLUDE	DTID (315) Equation or Table (See Table D.42)	1	$Equation = $Equation	

Table D.41: *TID 300 Measurement*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			CODE	EV (121036, DCM, "Mother of fetus")	1		$Equation
2	>	HAS PROPER-TIES	NUM	EV (11951-1, LN, "Fetus ID")	1-n		
3	>	R-HAS PROPER-TIES	NUM	EV (11878-6,LN, "Number of Fetuses")	1-n		

Table D.42: *TID 315 Equation or Table*

	NL	Rel with Parent	VT	Concept Name	VM	Condition	Value Set Constraint
1			PNAME	EV (121036, DCM, "Mother of fetus")	1		Defaults to an observation subject that is a patient prior to replacing the Observation Subject Class with Fetus.
2			TEXT	EV (11951-1, LN, "Fetus ID")	1		For separation of multiple fetuses during this procedure e.g. fetus "1" of "2" ... not for longitudinal comparisons.; ie. the "m" of fetus "m" of "n"
3			NUME	EV (11878-6,LN, "Number of Fetuses")	1		i.e. the "n" of fetus "m" of "n" Units EV (1,UCUM,"no units")

Table D.43: *TID 1008 Subject Context, Fetus*

E

Vascular Ultrasound Procedure Report

Vascular Ultrasound Procedure Reports are always created when images are acquired with the following applications:

- Vascular;

- Abdominal;

They are pushed to any DICOM Store in accordance with the "Enable export of SR Vascular" option.

E.1   Vascular measurements

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Carotid Bifurcation	T-45160	SRT	20030327	Carotid Bifurcation
Bulb	T-45170	SRT	20030327	Carotid Bulb
Common Carotid Artery	T-45100	SRT	20030327	Common Carotid Artery
External Carotid Artery	T-45200	SRT	20030327	External Carotid Artery
Internal Carotid Artery	T-45300	SRT	20030327	Internal Carotid Artery
Subclavian Artery	T-46100	SRT	20030327	Subclavian Artery
Vertebral Artery	T-45700	SRT	20030327	Vertebral Artery

Table E.1: *CID 12104 Extracranial Arteries*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Anterior Cerebral Artery	T-45540	SRT	20050110	Anterior Cerebral Artery
Anterior Communicating Artery	T-45530	SRT	20050110	Anterior Communicating Artery
Anterior-Middle Cerebral Artery Bifurcation	G-0368	SRT	20050110	Anterior-Middle Cerebral Artery Bifurcation
Anterior-Posterior Cerebral Artery Bifurcation	G-0369	SRT	20050110	Anterior-Posterior Cerebral Artery Bifurcation
Carotid Siphon	T-45308	SRT	20050110	Carotid Siphon
Central Retinal Artery	T-45430	SRT	20050110	Central Retinal Artery
Central Retinal Vein	T-48286	SRT	20050110	Central Retinal Vein
Internal Carotid Artery	T-45300	SRT	20050110	Internal Carotid Artery
Terminal internal carotid artery	R-102BD	SRT	20050110	Terminal internal carotid artery
Middle Cerebral Artery	T-45600	SRT	20050110	Middle Cerebral Artery
Middle Cerebral Artery M1 Segment	R-1024F	SRT	20050110	Middle Cerebral Artery M1 Segment
Middle Cerebral Artery M2 Segment	R-10251	SRT	20050110	Middle Cerebral Artery M2 Segment
Ophthalmic Artery	T-45400	SRT	20050110	Ophthalmic Artery
Posterior Cerebral Artery	T-45900	SRT	20050110	Posterior Cerebral Artery
Posterior Cerebral Artery P1 Segment	R-10253	SRT	20050110	Posterior Cerebral Artery P1 Segment
Posterior Cerebral Artery P2 Segment	R-10255	SRT	20050110	Posterior Cerebral Artery P2 Segment
Posterior Communicating Artery	T-45320	SRT	20050110	Posterior Communicating Artery

Table E.2: *CID 12105 Intracranial Cerebral Vessels*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Basilar Artery	T-45800	SRT	20030327	Basilar Artery

Table E.3: *CID 12106 Intracranial Cerebral Vessels (unilateral)*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Axillary Artery	T-47100	SRT	20050110	Axillary Artery
Brachial Artery	T-47160	SRT	20050110	Brachial Artery
Deep Palmar Arch of Radial Artery	T-47340	SRT	20050110	Deep Palmar Arch of Radial Artery
Innominate Artery	T-46010	SRT	20050110	Innominate Artery
Radial Artery	T-47300	SRT	20050110	Radial Artery
Subclavian Artery	T-46100	SRT	20050110	Subclavian Artery
Superficial Palmar Arch	T-47240	SRT	20050110	Superficial Palmar Arch
Ulnar Artery	T-47200	SRT	20050110	Ulnar Artery
Digital artery of hand	T-47260	SRT	20050110	Digital artery of hand

Table E.4: *CID 12107 Upper Extremity Arteries*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Axillary vein	T-49110	SRT	20030327	Axillary vein
Basilic vein	T-48052	SRT	20030327	Basilic vein
Brachial vein	T-49350	SRT	20030327	Brachial vein
Cephalic vein	T-49240	SRT	20030327	Cephalic vein
Innominate vein	T-48620	SRT	20030327	Innominate vein
Median Cubital vein	T-49250	SRT	20030327	Median Cubital vein
Radial vein	T-49340	SRT	20030327	Radial vein
Subclavian vein	T-48330	SRT	20030327	Subclavian vein
Ulnar vein	T-49330	SRT	20030327	Ulnar vein
Superior Vena Cava	T-48610	SRT	20030327	Superior Vena Cava
Deep Palmar Venous Arch	T-49218	SRT	20030327	Deep Palmar Venous Arch

Table E.5: *CID 12108 Upper Extremity Veins*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Common Iliac Artery	T-46710	SRT	20050110	Common Iliac Artery
Common Iliac Artery Bifurcation	R-10258	SRT	20050110	Common Iliac Artery Bifurcation
Anterior Tibial Artery	T-47700	SRT	20050110	Anterior Tibial Artery
Common Femoral Artery	T-47400	SRT	20050110	Common Femoral Artery
Dorsalis Pedis Artery	T-47740	SRT	20050110	Dorsalis Pedis Artery
External Iliac Artery	T-46910	SRT	20050110	External Iliac Artery
Internal Iliac Artery	T-46740	SRT	20050110	Internal Iliac Artery
Peroneal Artery	T-47630	SRT	20050110	Peroneal Artery
Popliteal Artery	T-47500	SRT	20050110	Popliteal Artery
Posterior Tibial Artery	T-47600	SRT	20050110	Posterior Tibial Artery
Profunda Femoris Artery	T-47440	SRT	20050110	Profunda Femoris Artery
Superficial Femoral Artery	T-47403	SRT	20050110	Superficial Femoral Artery

Table E.6: *CID 12109 Lower Extremity Arteries*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Anterior Tibial Vein	T-49630	SRT	20101103	Anterior Tibial Vein
Lateral calf perforator	T-49423	SRT	20101103	Lateral calf perforator
Common Femoral Vein	G-035B	SRT	20101103	Common Femoral Vein
Common Iliac Vein	T-48920	SRT	20101103	Common Iliac Vein
External Iliac Vein	T-48930	SRT	20101103	External Iliac Vein
Great Saphenous Vein	T-49530	SRT	20101103	Great Saphenous Vein
Lesser Saphenous Vein	T-49550	SRT	20101103	Lesser Saphenous Vein
Peroneal Vein	T-49640	SRT	20101103	Peroneal Vein
Popliteal Vein	T-49650	SRT	20101103	Popliteal Vein
Posterior arch vein	T-49620	SRT	20101103	Posterior Tibial Vein
Saphenofemoral Junction	T-D930A	SRT	20101103	Saphenofemoral Junction
Soleal vein	G-036B	SRT	20101103	Soleal vein
Superficial Femoral Vein	G-035A	SRT	20101103	Superficial Femoral Vein
Thigh perforator	T-48940	SRT	20101103	Internal iliac vein
Saphenopopliteal junction	T-4941A	SRT	20101103	Saphenopopliteal junction
Hunterian perforating vein	T-4942A	SRT	20101103	Hunterian perforating vein

Table E.7: *CID 12110 Lower Extremity Veins*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Accessory Renal Artery	T-46640	SRT	20050110	Accessory Renal Artery
Gastric Artery	T-46410	SRT	20050110	Gastric Artery
Ovarian Artery	T-46980	SRT	20050110	Ovarian Artery
Testicular Artery	T-46970	SRT	20050110	Testicular Artery
Umbilical Artery	T-F1810	SRT	20050110	Umbilical Artery
Uterine Artery	T-46820	SRT	20050110	Uterine Artery
Left Kidney thickness	11853-9	LN	20030130	Left Kidney thickness
Left Kidney length	11834-9	LN	20030130	Left Kidney length
Left Kidney width	11825-7	LN	20030130	Left Kidney width
Kidney	T-71000	SRT		Kidney
Right Kidney thickness	11855-4	LN	20030130	Right Kidney thickness
Right Kidney length	11836-4	LN	20030130	Right Kidney length
Right Kidney width	11827-3	LN	20030130	Right Kidney width

Table E.8: *CID 12111 Abdominal Arteries (lateral)*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Aorta	T-42000	SRT	20050110	Aorta
Infra-renal Aorta	T-42520	SRT	20050110	Infra-renal Aorta
Supra-renal Aorta	T-42510	SRT	20050110	Supra-renal Aorta
Celiac Axis	T-46400	SRT	20050110	Celiac Axis
Common Hepatic Artery	T-46421	SRT	20050110	Common Hepatic Artery
Common Iliac Artery	T-46710	SRT	20050110	Common Iliac Artery
Gastroduodenal Artery	T-46440	SRT	20050110	Gastroduodenal Artery
Inferior Mesenteric Artery	T-46520	SRT	20050110	Inferior Mesenteric Artery
Lumbar Artery	T-46960	SRT	20050110	Lumbar Artery
Proper Hepatic Artery	T-46422	SRT	20050110	Proper Hepatic Artery
Right Branch of Hepatic Artery	T-46423	SRT	20050110	Right Branch of Hepatic Artery
Left Branch of Hepatic Artery	T-46427	SRT	20050110	Left Branch of Hepatic Artery
Splenic Artery	T-46460	SRT	20050110	Splenic Artery
Superior Mesenteric Artery	T-46510	SRT	20050110	Superior Mesenteric Artery
Liver	T-62000	SRT		Liver
Gall Bladder	T-63000	SRT		Gall Bladder
Bile Duct	T-60610	SRT		Bile Duct
Pancreatic duct	T-65010	SRT		Pancreatic duct
Spleen	T-C3000	SRT		Spleen
Abdominal Aortic Aneurysm	SSI-666-73	SMS		Abdominal Aortic Aneurysm

Table E.9: *CID 12112 Abdominal Arteries (unilateral)*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Common iliac vein	T-48920	SRT	20030327	Common iliac vein
Gastric vein	T-48820	SRT	20030327	Gastric vein
Ileal vein	G-0370	SRT	20030327	Ileal vein
Ovarian vein	T-48780	SRT	20030327	Ovarian vein
Testicular Vein	T-48770	SRT	20030327	Testicular Vein

Table E.10: *CID 12113 Abdominal Veins (lateral)*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Hepatic Vein	T-48720	SRT	20030327	Hepatic Vein
Inferior Right Hepatic Vein	G-036D	SRT	20030327	Inferior Right Hepatic Vein
Left Hepatic Vein	T-48727	SRT	20030327	Left Hepatic Vein
Right Hepatic Vein	T-48725	SRT	20030327	Right Hepatic Vein
Portal Vein	T-48810	SRT	20030327	Portal Vein
Left Main Branch of Portal Vein	T-48814	SRT	20030327	Left Main Branch of Portal Vein
Right Main Branch of Portal Vein	T-48813	SRT	20030327	Right Main Branch of Portal Vein
Inferior Mesenteric Vein	T-48910	SRT	20030327	Inferior Mesenteric Vein
Inferior Vena Cava	T-48710	SRT	20030327	Inferior Vena Cava
Splenic Vein	T-48890	SRT	20030327	Splenic Vein
Superior Mesenteric Vein	T-48840	SRT	20030327	Superior Mesenteric Vein
Transjugular Intrahepatic Portosystemic Shunt	G-036C	SRT	20030327	Transjugular Intrahepatic Portosystemic Shunt
Inferior Vena Cava	18006-7	LN		Inferior Vena Cava
Portal Vein Congestion Index	SSI-666-71	SMS		Portal Vein Congestion Index

Table E.11: *CID 12114 Abdominal Veins (unilateral)*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Renal Artery	T-46600	SRT	20030327	Renal Artery
Segmental Artery	T-46659	SRT	20030327	Segmental Artery
Arcuate Artery of the Kidney	T-4668A	SRT	20030327	Arcuate Artery of the Kidney
Interlobar Artery of Kidney	T-4667D	SRT	20030327	Interlobar Artery of Kidney
Accessory Renal Artery	T-46640	SRT	20030327	Accessory Renal Artery
Renal Vein	T-48740	SRT	20030327	Renal Vein
Bladder	T-74000	SRT		Bladder
Post Void Bladder	SSI-666-74	SMS		Post Void Bladder
Left Kidney thickness	11853-9	LN	20030130	Left Kidney thickness
Left Kidney length	11834-9	LN	20030130	Left Kidney length
Left Kidney width	11825-7	LN	20030130	Left Kidney width
Kidney	T-71000	SRT		Kidney
Right Kidney thickness	11855-4	LN	20030130	Right Kidney thickness
Right Kidney length	11836-4	LN	20030130	Right Kidney length
Right Kidney width	11827-3	LN	20030130	Right Kidney width

Table E.12: *CID 12115 Renal Vessels*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Dist	G-A119	SRT	20050110	Distal
Mid	G-A188	SRT	20050110	Mid-longitudinal
Prox	G-A118	SRT	20050110	Proximal

Table E.13: *CID 12116 Vessel Segment Modifiers*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Inf	G-A115	SRT	20030327	Inferior
Mid	G-A109	SRT	20030327	Medial
Sup	G-A116	SRT	20030327	Superior

Table E.14: *CID 12117 Vessel Branch Modifiers*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
End Diastolic Velocity	11653-3	LN	20030327	End Diastolic Velocity
Minimum Diastolic Velocity	11665-7	LN	20030327	Minimum Diastolic Velocity
Peak Systolic Velocity	11726-7	LN	20030327	Peak Systolic Velocity
Time Average Mean Velocity	20352-1	LN	20030327	Time averaged mean velocity
Time Averaged Peak Velocity	11692-1	LN	20030327	Time averaged peak velocity
Pulsatility Index	12008-9	LN	20050110	Pulsatility Index
Resistive Index	12023-8	LN	20050110	Resistivity Index
Systolic to Diastolic Ratio	12144-2	LN	20050110	Systolic to Diastolic Velocity Ratio
Peak Pressure Gradient	20247-3	LN	20050110	Peak Gradient
Doppler Angle	125106	DCM		Doppler Angle
SV Depth	125107	DCM		Sample Volume Depth

Table E.15: *CID 12119 Vascular Ultrasound Property*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
ICA/CCA velocity ratio	33868-1	LN	20030327	ICA/CCA velocity ratio

Table E.16: *CID 12123 Carotid Ratios*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Renal Artery/Aorta velocity ratio	33869-9	LN	20030327	Renal Artery/Aorta velocity ratio

Table E.17: *CID 12124 Renal Ratios*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Best value	R-002E1	SRT	20060613	Best value
Average	R-00317	SRT	20060613	Mean
Estimated	R-10260	SRT	20060613	Estimated
Measured	R-41D41	SRT	20060613	Measured

Table E.18: *CID 3627 Measurement Type*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Equation	121420	DCM	20030327	Equation

Table E.19: *CID 228 Equation or Table*

Label	Code Value	Coding Scheme Designator	Code Version	Code Meaning
Right	G-A100	SRT	20030108	Right
Left	G-A101	SRT	20030108	Left

Table E.20: *CID 244 Laterality*

E.2 Vascular Template

Vascular Ultrasound Procedure Report template is described in table E.21

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (125100, DCM, "Vascular Ultrasound Procedure Report")	1	M		
2	>	CONTAINS	INCLUDE	DTID 5101 "Vascular Patient Character-istics" (See Table E.22)	1	U		
3	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-D0767, SRT, "Blood Vessel of Head") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12105 "Intracranial Cerebral Vessels"
4	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-D0767, SRT, "Blood Vessel of Head") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12105 "Intracranial Cerebral Vessels"
5	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-D0767, SRT, "Blood Vessel of Head") $SectionLaterality = EV (G-A103, SRT, "Uni-lateral") $Anatomy = DCID 12106 "Intracranial Cerebral Vessels (unilateral)"
6	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-45005, SRT, "Artery of neck") $Sec-tionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12104 "Extracranial Arteries" (See Table E.1) $AnatomyRatio = DCID 12123 "Carotid Ratios"
7	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-45005, SRT, "Artery of neck") $Sec-tionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12104 "Extracranial Arteries" (See Table E.1) $AnatomyRatio = DCID 12123 "Carotid Ratios"
8	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-47040, SRT, "Artery of Lower Ex-tremity") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12109 "Lower Extremity Arteries"
9	>	CONTAINS	INCLUDE	DTID 5103 "Vascu-lar Ultrasound Sec-tion" (See Table E.23)	1	U		$SectionScope = DT (T-47040, SRT, "Artery of Lower Ex-tremity") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12109 "Lower Extremity Arteries"

10	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-49403, SRT, "Vein of Lower Extremity") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12110 "Lower Extremity Veins"
11	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-49403, SRT, "Vein of Lower Extremity") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12110 "Lower Extremity Veins"
12	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-47020, SRT, "Artery Of Upper Extremity") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12107 "Upper Extremity Arteries"
13	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-47020, SRT, "Artery Of Upper Extremity") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12107 "Upper Extremity Arteries"
14	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-49103, SRT, "Vein Of Upper Extremity") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12108 "Upper Extremity Veins"
15	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-49103, SRT, "Vein Of Upper Extremity") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12108 "Upper Extremity Veins"
16	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-71019, SRT, "Vascular Structure Of Kidney") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12115 "Renal Vessels" $AnatomyRatio = DCID 12124 "Renal Ratios"
17	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-71019, SRT, "Vascular Structure Of Kidney") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12115 "Renal Vessels" $AnatomyRatio = DCID 12124 "Renal Ratios"
18	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-46002, SRT, "Artery of Abdomen") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12111 "Abdominal Arteries (lateral)"

19	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-46002, SRT, "Artery of Abdomen") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12111 "Abdominal Arteries (lateral)"
20	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-46002, SRT, "Artery of Abdomen") $SectionLaterality = EV (G-A103, SRT, "Unilateral") $Anatomy = DCID 12112 "Abdominal Arteries (unilateral)"
21	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-487A0, SRT, "Vein of Abdomen") $SectionLaterality = EV (G-A101, SRT, "Left") $Anatomy = DCID 12113 "Abdominal Veins (lateral)"
22	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-487A0, SRT, "Vein of Abdomen") $SectionLaterality = EV (G-A100, SRT, "Right") $Anatomy = DCID 12113 "Abdominal Veins (lateral)"
23	>	CONTAINS	INCLUDE	DTID 5103 "Vascular Ultrasound Section" (See Table E.23)	1	U		$SectionScope = DT (T-487A0, SRT, "Vein of Abdomen") $SectionLaterality = EV (G-A103, SRT, "Unilateral") $Anatomy = DCID 12114 "Abdominal Veins (unilateral)"

Table E.21: *TID 5100 Vascular Ultrasound Procedure Report*

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	EV (121118, DCM, "Patient Characteristics")	1	M		
2	>	CONTAINS	NUM	EV (121033, DCM, "Subject Age")	1	U		UNITS = DCID 7456 "Units of Measure for Age"
3	>	CONTAINS	CODE	EV (121032, DCM, "Subject Sex")	1	U		DCID 7455 "Sex"

Table E.22: *TID 5101 Vascular Patient Characteristics*

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	DT (121070, DCM, "Findings")	1	M		
2	>	HAS CONCEPT MOD	CODE	EV (G-C0E3, SRT, "Finding Site")	1	M		$SectionScope
3	>	HAS CONCEPT MOD	CODE	EV (G-C171, SRT, "Laterality")	1	M		$SectionLaterality
4	>	CONTAINS	INCLUDE	DTID 5104 "Vascular Ultrasound Measurement Group" (See Table E.24)	1-n	M		$AnatomyGroup = $Anatomy

5	>	CONTAINS	INCLUDE	DTID 300 "Measurement" (See Table D.41)	1-n	U		$Measurement = $AnatomyRatio

Table E.23: *TID 5103 Vascular Ultrasound Section*

	NL	Rel with Parent	VT	Concept Name	VM	Req Type	Condition	Value Set Constraint
1			CONTAINER	$AnatomyGroup	1	M		
2	>	HAS CONCEPT MOD	CODE	EV (G-A1F8, SRT, "Topographical Modifier")	1	U		DCID 12116 "Vessel Segment Modifiers"
3	>	HAS CONCEPT MOD	CODE	EV (125101, DCM, "Vessel Branch")	1-n	U		DCID 12117 "Vessel Branch Modifiers"
4	>	CONTAINS	INCLUDE	DTID 300 "Measurement" (See Table D.41)	1-n	M		$Measurement = DCID 12119 "Vascular Ultrasound Property" $Derivation = DCID 3627 "Measurement Type"
5	»	HAS PROPERTIES	NUM	EV (125106, DCM, "Doppler Angle")	1	U		UNIT = EV (deg, UCUM, "degrees")
6	»	HAS PROPERTIES	NUM	EV (125107, DCM, "Sample Volume Depth")	1	U		UNIT = EV (cm, UCUM, "cm")

Table E.24: *TID 5104 Vascular Ultrasound Measurement Group*

F

Private Transfer Syntaxes

No Private Transfer Syntaxes are supported.