SIEMENS

AXIOM Multix / Vertix VA40

[redacted] AX

DICOM Conformance Statement

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Network Conformance Statement

1 Introduction

1.1 Overview

The Conformance Statement describes the DICOM interface for the Siemens AXIOM Multix / Vertix in terms of part 2 of [DICOM].

This introduction describes the application's implemented DICOM functionality in general terms.

1.2 Scope and Field

The Siemens products AXIOM Multix / Vertix digitizes the X-ray image data (CR image) by using the flat panel sensor,

- **AXIOM Multix MT**
  AXIOM Multix MT is a truly versatile radiography system with a ceiling-mounted support, height- adjustable table, as well as electronic tomography (=option). The ceiling-mounted stand allows optimal access to the patient from all sides.

- **AXIOM Multix MP**
  AXIOM Multix MP is the floor-mounted stand version of AXIOM Multix M.

- **AXIOM Multix MU**
  The analog systems MULTIX TOP and MULTIX PRO can be upgraded with the detector and the imaging system. With the POLYDOROS IT as generator, the AXIOM Multix MU offers the same possibilities as the AXIOM Multix MP or MT. A wall stand that also uses the table detector can be added to all AXIOM Multix M system family members.

- **AXIOM Multix Swing mFD**
  MULTIX Swing with mFD virtually covers the full spectrum of general and specialized radiographic applications for both in-bucky and out-of-bucky examinations.

- **AXIOM Vertix Solitaire M**
  The AXIOM Vertix Solitaire M is a flexible, digital radiographic system with a ceiling-mounted X-ray tube stand, bucky wall stand* and mobile Flat Detector. The system has no fixed table and is especially well-suited for stretcher, wheel chair and routine imaging with an emphasis on trauma. The system can be configured to cover several trauma bays, allowing for immediate imaging when it counts the most.

- **AXIOM Vertix MD Trauma**
  AXIOM Vertix MD Trauma is a radiography workstation designed and optimized specifically for traumatology. AXIOM Vertix MD Trauma offers lateral, oblique and p.a. projections, and can be upgraded with a bucky wall unit.

The AXIOM Multix / Vertix supports the storage of images utilizing the DICOM CR Composite IOD. The AXIOM MULTIX / VERTIX DICOM network implementation acts as SCU for the DICOM Storage service and as SCU for the DICOM Print service.

Additionally, AXIOM Multix / Vertix is able to retrieve a Worklist from an Information System utilizing the DICOM "Basic Worklist Management Service Class" and to report back the data recorded during performance of the procedure with the "Modality Performed Procedure Step Service Class".

This DICOM Conformance Statement refers to AXIOM Multix / Vertix product only.

1.3 Audience

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

1.4 Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality as SCU and SCP, respectively.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Siemens and other vendors' Medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM 3.0 Standard [DICOM]. It is, however, by itself not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between Siemens and non-Siemens equipment.
- Test procedures should be defined and tests should be performed by the user to validate the connectivity desired. DICOM itself and the conformance parts do not specify this.
- The standard will evolve to meet the user's future requirements. Siemens is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

Siemens reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens representative for the most recent product information**.**

1.5 Definitions, Terms and Abbreviations

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

Abbreviations and terms are as follows:

ACR	American College of Radiology
AE	DICOM Application Entity
AET	DICOM Application Entity Title
ASCII	American Standard Code for Information Interchange
CR	Computed Radiography
CSE	Customer Service Engineer
DB	Database
DCS	DICOM Conformance Statement
DSA	Digital Subtraction Angiography
IOD	DICOM Information Object Definition
ISO	International Standard Organization
MPPS	Modality Performed Procedure Step
NEMA	National Electrical Manufacturers Association
R	Required Key Attribute

O	Optional Key Attribute
RIS	Radiology Information System
PDU	DICOM Protocol Data Unit
SC	Secondary Capture
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
U	Unique Key Attribute
UI	User Interface
UID	Unique Identifier

1.6 References

[DICOM] Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.16, 2003

1.7 Structure

The AXIOM Multix / Vertix Conformance Statement is subdivided into two Parts which relate to individual documents needed to declare Conformance according to the requirements of "Part 2 - Conformance" of the DICOM Standard.

Those parts are:

- "DICOM Conformance Statement" for Network related Services
- A general Appendix

2 Implementation Model Storage

The AXIOM Multix / Vertix DICOM Application Entity originates associations for Storage of DICOM Composite Information Objects in Remote Application Entities.

2.1 Application Data Flow Diagram

The AXIOM Multix / Vertix DICOM network implementation is a Windows XP application and acts as SCU for the C-STORE DICOM network service and as SCP for the C-ECHO DICOM network service.

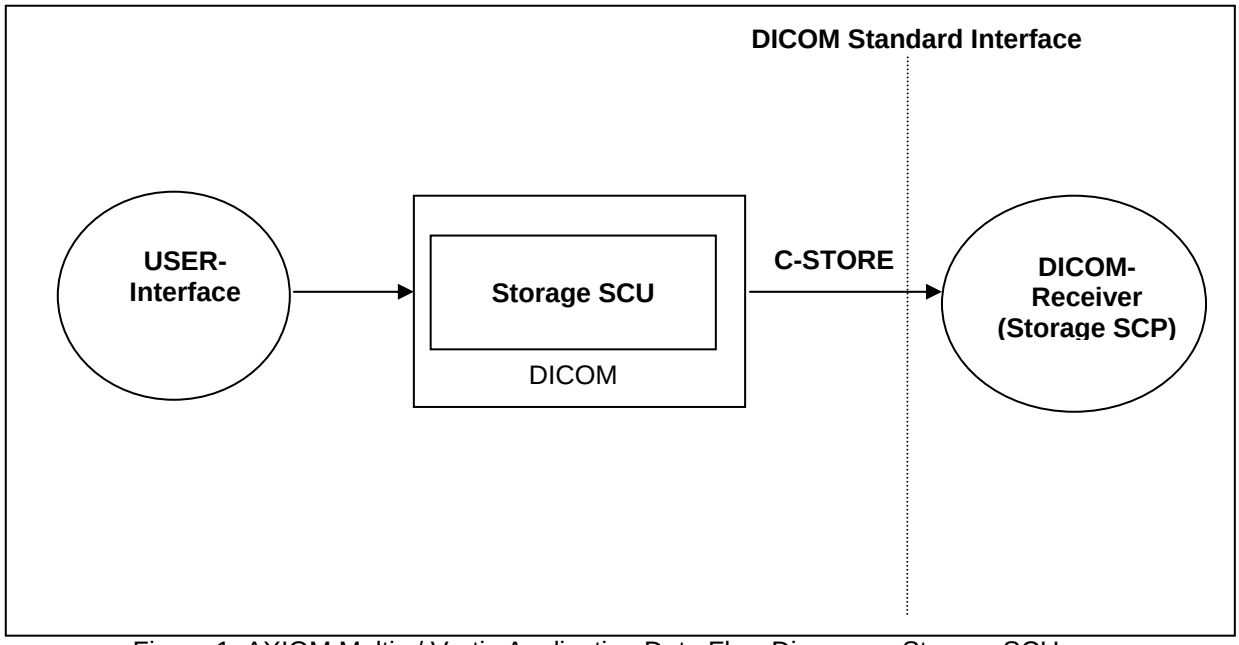

Figure 1: AXIOM Multix / Vertix Application Data Flow Diagram – Storage SCU

2.2 Functional Definitions of Application Entities

With End Study the acquired images can be sent to multiple destinations (up to 4). After acquisition images can be selected for transfer in the study list. Each request is forwarded to the job queue and processed individually.

The Storage SCU is invoked by the job control interface that is responsible for processing network archival tasks. The job consists of data describing the composite image objects marked for storage and the destination. An association is negotiated with the destination application entity and the image data is transferred using the C-STORE DIMSE-Service. Status of the transfer is reported through the job control interface. Only one job will be active at a time.

2.3 Sequencing of Real-World Activities

not applicable

3 Application Entity Specification Storage

3.1 Storage AEs Specification

AXIOM Multix / Vertix product provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Computed **R**adiography Image Storage	1.2.840.10008.5.1.4.1.1.1

3.1.1 Association Establishment Policies

3.1.1.1 General

The existence of a job queue entry with network destination will activate the DICOM Storage Application. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the transfer is started. If the association can not be opened, the related job is set to an error state and can be restarted by user job control interface. It is configurable by the CSE if a retry for failed jobs is initiated automatically.

The default PDU size used will be 128 KB.

3.1.1.2 Number of Associations

The AXIOM Multix / Vertix DICOM application initiates a single association establishment request and operates as application entity.

3.1.1.3 Asynchronous Nature

The AXIOM Multix / Vertix DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

3.1.1.4 Implementation Identifying Information

Implementation Class UID	1.2.392.200046.100.2
Implementation Version Name	CANON CCR

3.1.2 Association Initiation Policy

If a job with network destination gets active in the job list the AXIOM Multix / Vertix DICOM application attempts to initiate a new association for

- DIMSE C-STORE

service operations.

3.1.2.1 Associated Real-World Activity – Storage SCU

3.1.2.1.1 Associated Real-World Activity –Send to ...

Depending on the configuration images are sent automatically or user-triggered (“Send” / “Send all”). If the system successfully establishes an association to a remote Application Entity, it will transfer each image one after another via the open association. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the association is aborted. The related job is switched to a failed state. It will be restarted automatically .

3.1.2.1.2 Proposed Presentation Context –Send to...

The AXIOM Multix / Vertix DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Computed **R**adiography Image Storage Service Class	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

3.1.2.1.3 SOP specific Conformance Statement –Send to...

The DICOM images created by the DICOM interface of the AXIOM Multix / Vertix conform to the DICOM CR IOD definitions. Private elements are contained in the objects.

3.1.2.1.3.1 Optional Attributes

Please see "CR Standard Extended SOP Class” in the Appendix for a list of all DICOM IOD attributes of type 2 and 3 which are encoded by the AXIOM Multix / Vertix applications.

3.1.3 Association Acceptance Policy

Not applicable

4 Implementation Model Modality Worklist

The Basic Worklist Management Service Class defines an application-level class-of-service that facilitates access to worklists. The worklist is queried by the AE (modality) and supplies the SCU with the tasks scheduled and which have to be performed on the modality. The AXIOM Multix / Vertix DICOM application will support the Modality Worklist SOP class as an SCU.

4.1 Application Data Flow Diagram

Worklist Update is performed as a result of an operator request. Each request results in an initiation for an association. Under normal condition the association will be closed after receiving a "Success" response from the Information System.

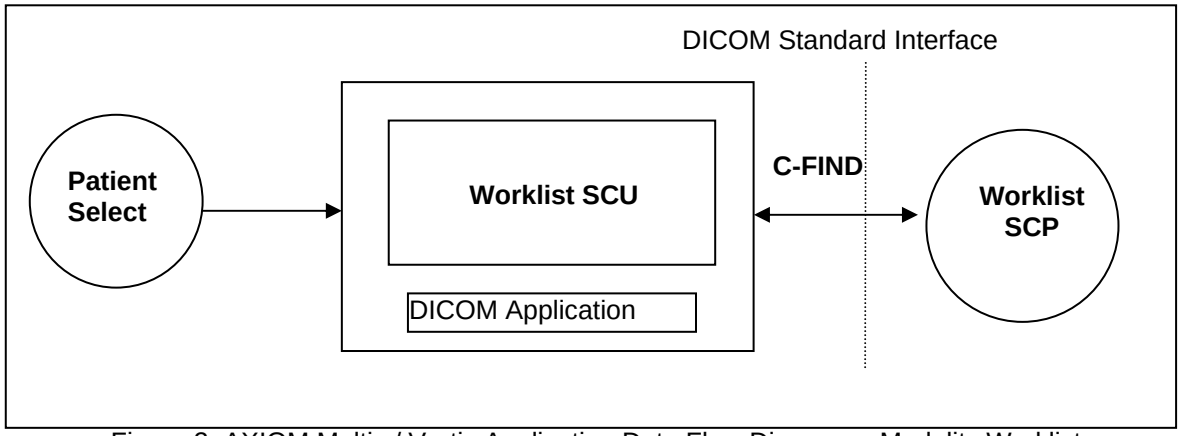

Figure 2: AXIOM Multix / Vertix Application Data Flow Diagram – Modality Worklist

4.2 Functional Definitions of Application Entities

Upon initiation of the request, the AXIOM Multix / Vertix will build an Identifier for the C-FIND request, will initiate an association to send the request and will wait for Worklist responses. AXIOM Multix / Vertix will display all responses in the UI. The data of a selected procedure will be used for the next acquisitions. All other procedures are discarded and may be retrieved again, when needed.

If any other SCP response status than "Success" or "Pending" is received by AXIOM Multix / Vertix, an error message will appear on the user interface.

The AXIOM Multix / Vertix Worklist Request Identifier is described in Annex A.3.

4.3 Sequencing of Real-World Activities

Not applicable.

5 AE Specification Modality Worklist

5.1 Modality Worklist Service AEs Specification

SIEMENS AXIOM MULTIX / VERTIX DICOM products provide Standard Conformance to the following DICOM V3.0 SOP Classes as SCU:

SOP Class Name	SOP Class UID
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31

5.1.1 Association Establishment Policies

5.1.1.1 General

Worklist will be queried upon user request.

The default PDU size used will be 16 KB.

5.1.1.2 Number of Associations

The AXIOM Multix / Vertix DICOM application initiates one association at a time for a Worklist request.

5.1.1.3 Asynchronous Nature

The AXIOM Multix / Vertix DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

5.1.1.4 Implementation Identifying Information

Implementation Class UID	1.2.392.200046.100.7.2
Implementation Version Name	CANON CXDI

5.1.2 Association Initiation Policy

The AXIOM Multix / Vertix DICOM Application Entity acts as a Service Class User (SCU) for the

- Modality Worklist Service Class (to request a Worklist from a RIS).

To do so, the AXIOM Multix / Vertix will issue a

- C-FIND DIMSE according to the Modality Worklist Information Model or a

5.1.2.1 Real-World Activity

5.1.2.1.1 Associated Real-World Activity – Patient Worklist Query

The user selects the icon for the patient query. The query is done according to configured search criteria. All results will be displayed in a list, where the user selects the needed patient. All other results are discarded.

5.1.2.1.2 Proposed Presentation Contexts – Patient Worklist Query

The AXIOM Multix / Vertix DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

5.1.2.1.3 SOP Specific Conformance Statement – Patient Worklist Query

Please refer to Annex A.3 for the description of the AXIOM Multix / Vertix Worklist Request Identifier.

If any other SCP response status than "Success" or "Pending" is received by AXIOM Multix / Vertix , an error message will appear on the user interface.

5.1.3 Association Acceptance Policy

Not applicable.

6 Implementation Model Modality Performed Procedure Step

The AXIOM Multix / Vertix DICOM application will support the Modality Performed Procedure Step (MPPS) SOP class as an SCU.

6.1 Application Data Flow Diagram

MPPS is only performed for studies received with the worklist. When selecting a study the MPPS-Provider is informed about the beginning of a procedure. When closing a study the MPPS-Provider is informed, that the procedure is completed.

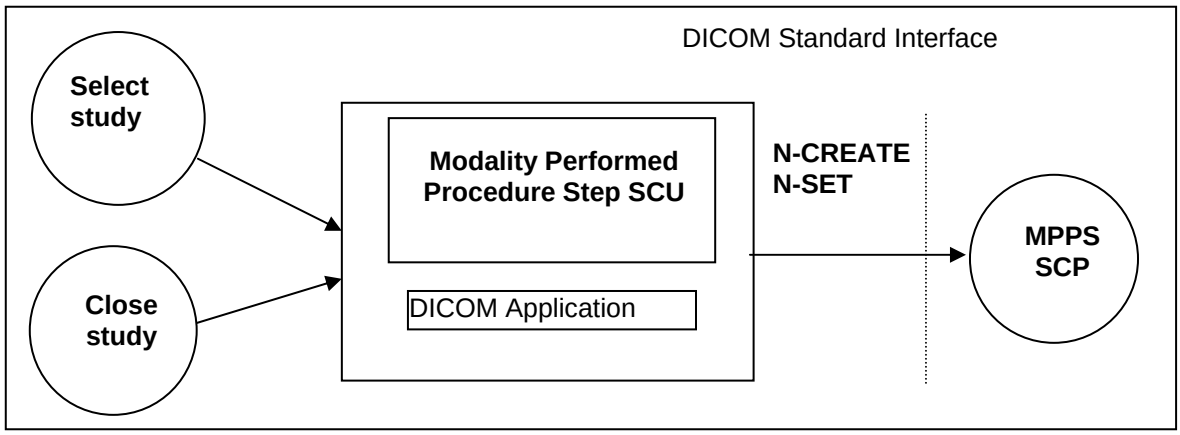

Figure 3: AXIOM Multix / Vertix Application Data Flow Diagram – Modality Performed Procedure Step

6.2 Functional Definitions of Application Entities

The AXIOM Multix / Vertix notifies the information system (MPPS SCP) that provides the modality performed procedure step SCP service that a study is being performed using N-CREATE and that a study has been completed or suspended using N-SET.

The AXIOM Multix / Vertix will not support creation of “unscheduled cases” by allowing MPPS Instances to be communicated for locally registered Patients.

6.3 Sequencing of Real-World Activities

Not applicable.

7 AE Specification Modality Performed Procedure Step

7.1 Modality Performed Procedure Step Service AEs Specification

AXIOM Multix / Vertix DICOM products provide Standard Conformance to the following DICOM V3.0 SOP Classes as SCU:

SOP Class Name	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

7.1.1 Association Establishment Policies

7.1.1.1 General

The creation of a MPPS Instance is done automatically by AXIOM Multix / Vertix after a study is acquired.

The default PDU size used will be 16 KB.

7.1.1.2 Number of Associations

The AXIOM Multix / Vertix DICOM application initiates one association at a time for a communication of MPPS information.

7.1.1.3 Asynchronous Nature

The AXIOM Multix / Vertix DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

7.1.1.4 Implementation Identifying Information

Implementation Class UID	1.2.392.200046.100.7.2
Implementation Version Name	CANON CXDI

7.1.2 Association Initiation Policy

The AXIOM Multix / Vertix DICOM Application Entity acts as a Service Class User (SCU) for the

- Modality Performed Procedure Step Service Class (to notify a RIS about status of a procedure while it is performed).

To do so, the AXIOM Multix / Vertix will issue a

- N-CREATE DIMSE according to the CREATE Modality Performed Procedure Step SOP Instance operation or a
- N-SET DIMSE to update the contents and state of the MPPS according to the SET Modality Performed Procedure Step Information operation.

7.1.2.1 Real-World Activity

7.1.2.1.1 Associated Real-World Activity

When selecting a study the MPPS-Provider is informed about the beginning of a procedure. When closing a study the MPPS-Provider is informed, that the procedure is completed.

7.1.2.1.2 Proposed Presentation Contexts

The AXIOM Multix / Vertix DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
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

7.1.2.1.3 SOP Specific Conformance Statement

Please refer to Annex A.4 for the description of the AXIOM Multix / Vertix Modality Performed Procedure Step CREATE Request Identifier.

7.1.3 Association Acceptance Policy

Not applicable.

8 Implementation Model Print

The Print Management Service Classes define an application-level class of services that facilitate the printing of images on a hardcopy medium. The print management SCU and the print management SCP are peer DICOM print management application entities. The AXIOM Multix / Vertix DICOM print application supports the print management DIMSE services to act as SCU.

8.1 Application Data Flow Diagram

The AXIOM Multix / Vertix DICOM network implementation is a Windows XP application and acts as SCU for the print management network service.

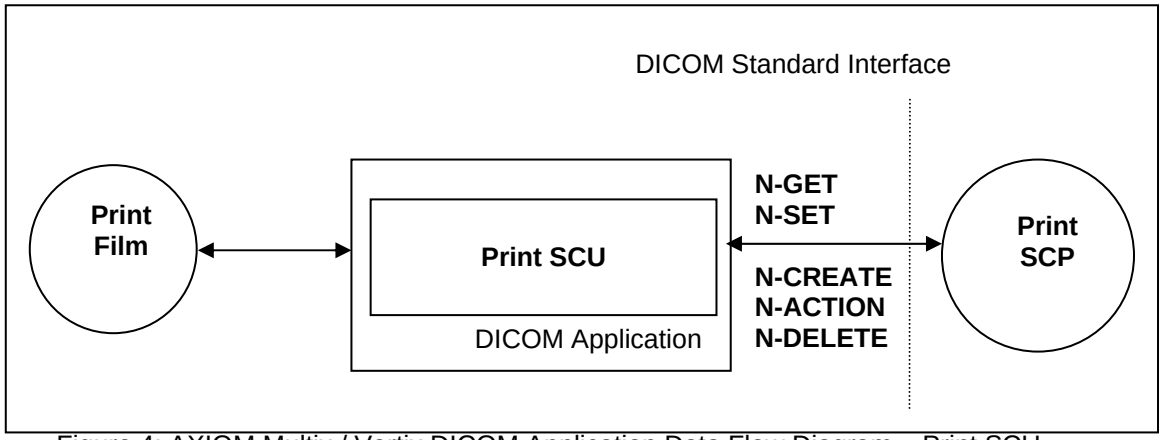

Figure 4: AXIOM Multix / Vertix DICOM Application Data Flow Diagram – Print SCU

8.2 Functional Definition of Application Entities

When image data is captured, it is sent to the printer by using Print Management Service Class.

8.3 Sequencing of Real-World Activities

Not applicable

9 Application Entity Specification Print

9.1 Print Management AE Specification

The AXIOM Multix / Vertix print management SCU invokes print management DIMSE services to transfer images from the local AE to the remote SCP AE to print images with defined layout on a selected network-based DICOM hardcopy printer.

SIEMENS AXIOM Multix / Vertix DICOM products provide Standard Conformance to the following DICOM V3.0 Print Management Meta SOP Classes as an SCU:

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
- Printer SOP Class	1.2.840.10008.5.1.1.16

9.1.1 Association Establishment Policies

9.1.1.1 General

The Print application will initiate an association to the print destination and process the printing of the image.

The default PDU size used will be 128 KB.

9.1.1.2 Number of Associations

The AXIOM Multix / Vertix DICOM application initiates one association at a time for each different print device configured.

9.1.1.3 Asynchronous Nature

The AXIOM Multix / Vertix DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

9.1.1.4 Implementation Identifying Information

Implementation Class UID	1.2.392.200046.100.2
Implementation Version Name	CANON CCR

9.1.2 Association Initiation Policy

The Print Management SCU establishes an association by using the DICOM association services. With the help of the N-GET request for the Printer SOP Class the Status is determined before printing.

9.1.2.1 Associated Real-World Activity

9.1.2.1.1 Associated Real-World Activity – Print Film

Whenever a film-sheet is prepared by the user, it is forwarded to the Printer Job queue. As soon as the associated Printer device is available the job is activated and association is set up.

The film sheet is set up with the related Film Session and Film Box services. The images are internally processed and then sent as image boxes as needed. Status is controlled by awaiting any N-EVENT message all through the transfer until the last image or film-sheet is sent.

If the response from the remote application contains a status other than “Success” or “Warning” the association is aborted. It can be restarted any time by user interaction. An automatic retry can be configured by a CSE. The AXIOM Multix / Vertix writes all warning and failure messages into a log file.

9.1.2.1.2 Proposed Presentation Context - Print Film

The AXIOM Multix / Vertix DICOM print application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

9.1.2.1.3 SOP specific Conformance Statement – Meta SOP Classes

The AXIOM Multix / Vertix DICOM print management SCU conforms to the DICOM Basic Grayscale Print Management Meta SOP Class.

- The application uses a setting platform to define the properties of the connected DICOM SCP.

9.1.2.1.3.1 Basic Film Session SOP class

The Basic Film Session information object definition describes all the user-defined parameters that are common for all the films of a film session. The Basic Film Session refers to one or more Basic Film Boxes that are printed on one hardcopy printer.

The AXIOM Multix / Vertix DICOM print management SCU supports the following DIMSE Service elements for the Basic Film Session SOP Class as SCU:

- N-CREATE
- N-DELETE

The Basic Film Session SOP Class N-CREATE-RQ (SCU) uses the following attributes:

Attribute Name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	Number of copies to be printed for each film of the film session.
Print Priority	(2000,0020)	U	Specifies the priority of the print job. (HIGH or LOW)
Medium Type	(2000,0030)	U	Medium Type. (PAPER,CLEAR FILM,BLUE FILM)
Film Destination	(2000,0040)	U	Film Destination. (MAGAZINE or PROCESSOR)
Film Session Label	(2000,0050)	U	Human readable label that identifies the film session.

9.1.2.1.3.2 Basic Film Box SOP class

The Basic Film Box information object definition describes all the user-defined parameter of one film of the film session. The Basic Film Box information description defines the presentation parameters that are common for all images on a given sheet of film.

The Basic Film Box refers to one or more Image Boxes.

Supported Service Elements as SCU are:

- N-CREATE
- N-ACTION

The Basic Film Box SOP class N-CREATE-RQ message uses the following attributes (the actual values for each attribute depend on DICOM printer configuration within the AXIOM Multix / Vertix DICOM print management SCU):

Attribute Name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	Format specified by the user
Referenced Film Session Sequence	(2010,0500)	M	
> Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	U	Direction of the film specified by the user PORTRAIT or LANDSCAPE
Film Size ID	(2010,0050)	U	Film size identification. 8IN X 10IN, 10IN X 12IN, 10IN X 14IN, 11IN X 14IN, 14IN X 14IN, 14IN X 17IN, 24CM X 24CM, 24CM X 30CM
Magnification Type	(2010,0060)	U	One of the following interpolation types: REPLICATE BILINEAR CUBIC NONE

Attribute Name	Tag	Usage SCU	Supported Values
Smoothing Type	(2010,0080)	U	Further specifies the type of the interpolation function; values are defined in Conformance Statement; only valid for Magnification Type (2010,0060)=CUBIC
Border Density	(2010,0100)	U	Density of border.
Min Density	(2010,0120)	U	Minimum density of the image.
Max Density	(2010,0130)	U	Maximum density of the image.
Trim	(2010,0140)	U	Specifies whether a Trim box shall be printed surrounding each image on the film (ON/OFF).
Configuration Information	(2010,0150)	U	Character string that contains either the ID of the printer configuration table that contains a set of values for implementation specific print parameters or one or more configuration data values, encoded as characters.

9.1.2.1.3.3 Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data that apply to a single image of a sheet of film.

The Grayscale Image Box SOP Class uses only the N-SET-RQ with the following attributes:

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	Position of the image on the film.
Polarity	(2020,0020)	M	Specifies whether minimum pixel values are to be printed black or white.
Requested Image Size	(2020,0030)	M	Width of the image to be printed, in mm.
Basic Grayscale Image Sequence	(2020,0110)	M	Sequence of image.
> Samples per Pixel	(0028,0002)	M	1
> Photometric Interpretation	(0028,0004)	M	MONOCHROME1
> Rows	(0028,0010)	M	Number of pixels in rows in the image data.
> Columns	(0028,0011)	M	Number of pixels in columns in the image data.
> Bits Allocated	(0028,0100)	M	16
> Bits Stored	(0028,0101)	M	12
> High Bit	(0028,0102)	M	11
> Pixel Representation	(0028,0103)	M	000H
> Pixel Data	(7FE0,0010)	M	image data

9.1.2.1.3.4 Printer SOP Class

The Printer SOP Class is the possibility to monitor the status of the hardcopy printer in a synchronous and an asynchronous way.

The AXIOM Multix / Vertix DICOM print manager SCU uses the mandatory N-EVENT-Report DIMSE service to monitor the changes of the printer status in an asynchronous way.

9.1.3 Association Acceptance Policy

Not applicable

10 Communication Profiles

10.1 Supported Communication Stacks

The AXIOM Multix / Vertix DICOM application provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

10.1.1 TCP/IP Stack

The AXIOM Multix / Vertix DICOM application uses the TCP/IP stack from the Windows XP Operating System upon which it executes.

10.1.1.1 API

The AXIOM Multix / Vertix DICOM application is based on a TCP/IP socket interface.

10.1.1.2 Physical Media Support

The AXIOM Multix / Vertix DICOM application is indifferent to the physical medium over which TCP/IP executes; it inherits this from the Windows XP system upon which it executes.

11 Extensions / Specializations / Privatizations

11.1.1 Standard Extended / Specialized / Private SOPs

Not applicable

11.1.2 Private Transfer Syntaxes

Not applicable

12 Configuration

Following environmental configuration information can be set from the UI of the AXIOM Multix / Vertix:

- CALLED APP TITLE
- HOST NAME
- PORT #

13 Support of Extended Character Sets

The AXIOM Multix / Vertix DICOM application supports the

- ISO_IR 6 (ISO 8859 :1990 Default Repertoire ISO 646)
- ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set)
- ISO_IR 101 (ISO 8859-2:1987 Latin Alphabet No. 2 supplementary set)
- ISO_IR 144 (ISO 8859-5:1988 Cyrllic supplementary set)

A APPENDIX

A.1 CR Standard Extended SOP Class

"*overview of supplied attributes – CR image"*

Attribute Name	Tag	Value
Specific Character Set	(0008,0005)	"ISO_IR 6" (ISO 8859 :1990 Default Repertoire ISO 646) "ISO_IR 100" (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set) "ISO_IR 101" (ISO 8859-2:1987 Latin Alphabet No. 2 supplementary set) "ISO_IR 144" (ISO 8859-5:1988 Cyrllic supplementary set)
SOP Class UID	(0008,0016)	
SOP Instance UID	(0008,0018)	
Study Date	(0008,0020)	<yyyymmdd> Date, when study was performed
Series Date	(0008,0021)	<yyyymmdd> Date the series started
Study Time	(0008,0030)	<hhmmss.000000>
Series Time	(0008,0031)	<hhmmss> Time the series was started
Accession Number	(0008,0050)	A RIS or a HIS generated number which identifies the order for the study.
Modality	(0008,0060)	CR
Manufacturer	(0008,0070)	
Institution Name	(0008,0080)	Configurable in service
Referring Physician's Name	(0008,0090)	From Worklist
Station Name	(0008,1010)	
Study Description	(0008,1030)	From Worklist 0040,0007
Series Description	(0008,103E)	
Name of Physician(s) Reading Study	(0008,1060)	Name of the physician(s) reading the study.
Operator's Name	(0008,1070)	Technologist(s) supporting the Series.
Manufacturer's Model Name	(0008,1090)	AXIOM-Multix M
Patient's Name	(0010,0010)	From Modality Worklist or user input (all 5 components)
Patient ID	(0010,0020)	Patient's ID being entered.
Patient's Birth Date	(0010,0030)	Patient's birth date (YYYYMMDD) being entered.
Patient's Sex	(0010,0040)	Patient's sex (Male, Female or Unknown) being entered.
Patient's Age	(0010,1010)	Age of patient.
Patient's Size	(0010,1020)	Height of patient, in meters.
Patient's Weight	(0010,1030)	From Modality Worklist
Body Part Examined	(0018,0015)	Text description of the part of the body examined. SKULL, CSPINE, TSPINE, LSPINE, SSPINE, COCCYX, CHEST, CLAVICLE, BREAST, ABDOMEN, PELVIS, HIP, SHOULDER, ELBOW, KNEE, ANKLE, HAND, FOOT, EXTREMITY
KVP	(0018,0060)	Peak kilo voltage output of the X-ray generator used.
Device Serial Number	(0018,1000)	Serial number
Software Version	(0018,1020)	
Protocol Name	(0018,1030)	Name of organ program
Spatial Resolution	(0018,1050)	Minimum resolution, in mm.
Exposure Time	(0018,1150)	Time of X-ray exposure, in msec.
X-ray Tube Current	(0018,1151)	X-ray tube current, in mA.
Exposure	(0018,1152)	The product of exposure time and X-ray tube current expressed in mAs.
Filter Type	(0018,1160)	Label for the Type of the filter inserted into the Xray

Attribute Name	Tag	Value
		beam.
Imager Pixel Spacing	(0018,1164)	Pixel pitch of sensor.
Collimator/grid Name	(0018,1180)	Label describing any collimator/grid inserted.
Date of Last Calibration	(0018,1200)	Date (YYYYMMDD) when the last calibration was performed.
Time of Last Calibration	(0018,1201)	Time (HHMMSS.000000) when the last calibration was performed.
Acquisition Device Processing Code	(0018,1401)	Code of image processing.
View Position	(0018,5101)	One of the following: AP = Anterior / Posterior PA = Posterior / Anterior LL = Left Lateral RL = Right Lateral RLD = Right Lateral Decubitus LLD = Left Lateral Decubitus RLO = Right Lateral Oblique LLO = Left Lateral Oblique
Study Instance UID	(0020,000D)	1.2.392.200046.100.2.1.(S/N).(Internal study No.).(Year, month, date and time of study exposure)
Series Instance UID	(0020,000E)	1.2.392.200046.100.2.1.(S/N).(Internal study No.).(Year, month, date and time of study exposure).(Series No.)
Study ID	(0020,0010)	Internal study number.
Series Number	(0020,0011)	A number that identifies this Series.
Instance Number	(0020,0013)	A number that identifies the internal image.
Laterality	(0020,0060)	Laterality of (paired) body part examined. Required if the body part examined is a paired structure. Enumerated Values: R=right, L=left
Image Comments	(0020,4000)	Comments on Images.
Samples per Pixel	(0028,0002)	1
Photometric Interpretation	(0028,0004)	MONOCHROME1
Rows	(0028,0010)	Number of pixels in rows in the image data.
Columns	(0028,0011)	Number of pixels in columns in the image data.
Bits Allocated	(0028,0100)	16
Bits Stored	(0028,0101)	12
High Bit	(0028,0102)	11
Pixel Representation	(0028,0103)	0000H
Window Center	(0028,1050)	Window center for display. 2048
Window Width	(0028,1051)	Window width for display. 4095

A.2 Private Data

All private data are used in group 19.

A.3 AXIOM Multix / Vertix Worklist Identifier

- **X** mark in the column of Matching Key indicates tag that sets the value for C-FIND request

Module Name Attribute Name	Matching Key	Tag	Remarks
SOP Common			
Specific Character Set		0008,0005	
Scheduled Procedure Step			
Scheduled Procedure Step Sequence		0040,0100	
> Scheduled Station AET	X	0040,0001	Single Value / Universal matching
> Scheduled Procedure Step Start Date	X	0040,0002	Single Value / Range /Universal matching
> Scheduled Procedure Step Start Time	X	0040,0003	Range /Universal matching
> Modality	X	0008,0060	Single Value / Universal matching
> Scheduled Performing Physician's Name	X	0040,0006	Single Value / Wild card matching
> Scheduled Procedure Step Description		0040,0007	
> Scheduled Action Item Code Sequence		0040,0008	Usable for receiving / giving body part information
>> Code Value		0008,0100	
>> Coding Scheme Designator		0008,0102	
>> Coding Scheme Version		0008,0103	
>> Code Meaning		0008,0104	
> Scheduled Station Name		0040,0010	
> Scheduled Procedure Step Location		0040,0011	
> Pre-Medication		0040,0012	
> Scheduled Procedure Step ID		0040,0009	
> Requested Contrast Agent		0032,1070	
Requested Procedure			
Requested Procedure ID		0040,1001	
Requested Procedure Description		0032,1060	
Reason for the Requested Procedure		0040,1002	
Study Instance UID		0020,000D	
Imaging Service Request			
Accession Number	X	0008,0050	
Requesting Physician		0032,1032	
Referring Physician's Name		0008,0090	
Requesting Service		0032,1033	
Patient Identification			
Patient Name	X	0010,0010	
Patient ID	X	0010,0020	
Patient Demographic			
Patient's Birth Date		0010,0030	
Patient's Sex		0010,0040	
Patient's Weight		0010,1030	
Patient's Size		0010,1020	
Patient's Age		0010,1010	
Patient Medical			
Pregnancy Status		0010,21C0	
Medical Alerts		0010,2000	
Contrast Allergies		0010,2110	

A.4 Modality Performed Procedure Step Identifiers

X mark in the column of N-SET indicates tag that sets the value on receiving N-SET notice

Attribute Name	Tag	N-SET	Remarks
SOP Common Specific Character Set	(0008,0005)		
Performed Procedure Step Relationship Scheduled Step Attributes Sequence	(0040,0270)		
> Accession Number	(0008,0050)		Same as the value received by MWL
> Study Instance UID	(0020,000D)		Same as the value received by MWL
> Requested Procedure ID	(0040,0009)		Same as the value received by MWL
> Scheduled Procedure Step ID	(0040,0009)		Same as the value received by MWL
Patient's Name	(0010,0010)		Same as the value received by MWL
Patient ID	(0010,0020)		Same as the value received by MWL
Patient's Birth Date	(0010,0030)		Same as the value received by MWL
Patient's Sex	(0010,0040)		Same as the value received by MWL
Performed Procedure Step Information Performed Procedure Step ID	(0040,0020)		
Performed Station AE Title	(0040,0241)		
Performed Procedure Step Start Date	(0040,0244)		
Performed Procedure Step Start Time	(0040,0245)		
Performed Procedure Step End Date	(0040,0250)		
Performed Procedure Step End Time	(0040,0251)		
Performed Procedure Step Status	(0040,0252)		
Performed Procedure Step Description	(0040,0254)		
Performed Procedure Step Start Date	(0040,0244)		
Performed Procedure Step Start Time	(0040,0245)		
Performed Procedure Step End Date	(0040,0250)		
Performed Procedure Step End Time	(0040,0251)		
Performed Procedure Step Status	(0040,0252)		
Performed Procedure Step Description	(0040,0254)		
Image Acquisition Results Modality	(0008,0060)		Default is "CR"
Performed Protocol Code Sequence	(0040,0260)	**X**	
> Code Value	(0008,0100)	**X**	
> Code Scheme Designator	(0008,0102)	**X**	
> Code Meaning	(0008,0104)	**X**	
Performed Series Sequence	(0040,0340)	**X**	
> Performing Physician's Name	(0008,1050)	**X**	
> Protocol Name	(0018,1030)	**X**	
> Series Instance UID	(0020,000E)	**X**	
> Series Description	(0008,103E)	**X**	
> Referenced Image Sequence	(0008,1140)	**X**	
>> Referenced SOP Class UID	(0008,1150)	**X**	
>> Referenced SOP Instance UID	(0008,1155)	**X**	
Billing and Material Management Codes Film Consumption Sequence	(0040,0321)	**X**	Number of films is set for each size of film

Attribute Name	Tag	N-SET	Remarks
> Number of Films	(2100,0170)	**X**	
> Film Size ID	(2010,0050)	**X**	
Radiation Dose Total Number of Exposure	(0040,0301)	**X**	Optional
Image Area Dose Product	(0018,115E)	**X**	If entered in UI