ACETIAM PRI

DICOM Conformance Statement

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1. Introduction

1.1 Scope and field of application

This document describes ACETIAM PRI conformance to the DICOM 3.0 standard.

This conformance statement describes the conformance specifics of ACETIAM PRI software configurations supporting various Windows compatible devices.

It contains a short description of application involved and provides technical information about data exchange capabilities of the equipment. The main elements describing these capabilities are the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

It should be read in conjunction with the DICOM standard and its addenda.

This statement is conformant with the recommended format as described in PS 3.2 of the DICOM standard.

ACETIAM PRI acts as a SCP for the following Meta SOP Classes:

- Basic Grayscale Print Management
- Basic Color Print Management

ACETIAM PRI also acts as a SCP for the following SOP Classes:

- Verification SOP Class
- Presentation LUT SOP Class

ACETIAM PRI may also be configured to act as a Storage SCP to either perform automatic Store to Print operations, or to fill Print Job information with Patient demographics information found in the incoming stored objects.

1.2 Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document

- ACR American college of Radiology
- ANSI American National Standards Institute
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- DIMSE-C DICOM Message Service Element-Composite
- DIMSE-N DICOM Message Service Element-Normalized
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- SCP Service Class Provider
- SCU Service Class User
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet Protocol
- UID Unique Identifier

1.3 References

[DICOM]

The Digital Imaging and Communications in Medicine (DICOM) standard:

NEMA PS 3.1 - 3.20 (2011), Digital Imaging and Communications in Medicine (DICOM) Set

National Electrical Manufacturers Association (NEMA) - Publication Sales - 1300 N. 17th Street, Suite 1847 - Rosslyn, Va. 22209, United States of America.

1.4 Intended audience

This Conformance Statement is intended for:

- Potential users
- System integrators of medical equipment
- Software designers implementing DICOM interfaces

1.5 Warning to the Reader

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

If another device matches this Conformance Statement based on the comparison with its own Conformance Statement, there is a chance, but no guarantee that they interoperate. DICOM only deals with communication; it is not a standard which specifies what is needed for certain applications to run on a device.

2. Document history

Version	Changes	Authors	Date
1	Creation	Fabien BOISSE	16 Jul 2001
2	Update	Gilles MEVEL	12 Feb 2002
3	Update	Gilles MEVEL / Jérôme GUIGNOT	31 Mar 2003
4	Update	Gilles MEVEL / Jérôme GUIGNOT	01 Jun 2007
5	Update	Gilles MEVEL	10 Mar 2008
6	Update	Gilles MEVEL	20 Jun 2008
7	Update 4.22	Gilles MEVEL	11 Dec 2008
8	Update 4.40	Gilles MEVEL	28 Sep 2009
9	Update 4.60	Gilles MEVEL	19 Nov 2010
10	Update 4.62	Gilles MEVEL	13 Nov 2010
11	Update 4.64	Gilles MEVEL	20 Sep 2011
12	Update 4.66	Gilles MEVEL	04 Mar 2013
13	Update 5.00	Gilles MEVEL	21 Jan 2014
14	Update 5.20	Gilles MEVEL	13 Mar 2015
15	Update 5.30	Gilles MEVEL	11 Jan 2017
16	Update 5.40	Gilles MEVEL	29 Jun 2017
17	Update 5.60	Gilles MEVEL	08 Nov 2018
18	Update 5.70	Gilles MEVEL	19 Dec 2019

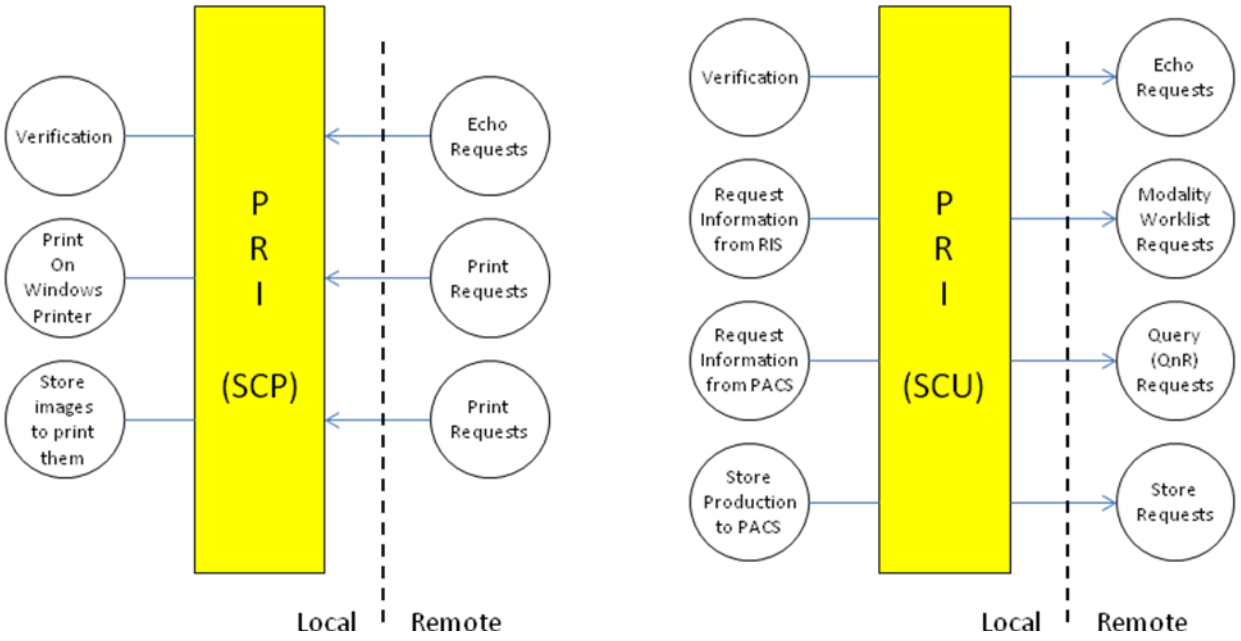
3. Implementation Model

3.1 Application Data Flow Diagram

ACETIAM PRI is a Windows application that allows transforming your PC into a DICOM 3.0 Print Server.

ACETIAM PRI application will appear in the system tray of Windows task bar and run continuously until stopped.

Figure 3.1: ACETIAM PRI Implementation Model



3.2 Functional Definitions of AE's

ACETIAM PRI can be called with different AE Titles. This only allows ACETIAM PRI to drive several printer devices, or to have different behaviors according to the (calling AE Title, called AE Title) pair value.

3.2.1 Verification Service as SCP

ACETIAM PRI waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, ACETIAM PRI expects it to be a DICOM application. ACETIAM PRI will accept associations with Presentation Contexts for Verification Service Class.

3.2.2 Print Services as SCP

Once started, ACETIAM PRI waits for association requests, and, for each accepted request, processes on the association the received print commands compatible with the SOP Classes it supports. Associations are released either on Print SCU request or when an error condition occurs that leads to an association abort.

3.2.3 Storage Services as SCP

ACETIAM PRI may be configured to accept store requests, according to the calling AE Title and the called AE Title or both. When storage requests are accepted, images are received via C-STORE

commands, and stored for later automatic printing. Associations are released either on Print SCU request or when an error condition occurs that leads to an association abort.

3.2.4 Verification Service as SCU

When user performs software configuration, ACETIAM PRI Verification requests to DICOM peers.

Also, when started, ACETIAM PRI may be defined to issue DICOM Verification requests to itself, for self-testing purposes.

3.2.5 Storage Service as SCU

ACETIAM PRI may be configured to save all its production as DICOM Seconday Capture objects of as DICOM PDF files. Those DICOM objects are then sent automatically to a remote DICOM server via DICOM Store operations.

3.2.6 Modality Worklist as SCU

In some situations, when an Accession Number or a Patient ID is decoded using OCR techniques, ACETIAM PRI may be configured to perform queries to a RIS, to get study/patient related information about scheduled studies concerning the Accession Number or the Patient ID. Queries are made by sending C-FIND commands using the Modality Worklist service.

3.2.7 Query/Retrieve as SCU

In some situations, when an Accession Number or a Patient ID is decoded using OCR techniques, ACETIAM PRI may be configured to perform queries to a PACS, to get study/patient related information about performed studies concerning the Accession Number or the Patient ID. Queries are made by sending C-FIND commands using the Query and Retrieve service.

3.3 Sequencing of Real-World Activities

Not Applicable.

4. Application Entity Specifications

ACETIAM PRI exists as a single Application Entity (AE).

In Advanced Edition, ACETIAM PRI determines its capabilities according to the calling AE Title and the called AE Title specified in the incoming association request. This section provides information on the maximum capabilities of ACETIAM PRI AE.

ACETIAM PRI provides Standard Conformance to the following DICOM SOP Classes as an SCP specified in Tables 4.1a to 4.1f:

Table 4a: Supported SOP Classes for ACETIAM PRI – VERIFICATION as SCU and SCP

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

Table 4b: Supported SOP Classes for ACETIAM PRI – PRINT as SCP

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Basic Color Image Box	1.2.840.10008.5.1.1.4.1
Printer	1.2.840.10008.5.1.1.16
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23

Table 4c: Supported SOP Classes for ACETIAM PRI – STORAGE as SCP

SOP Class Name	SOP Class UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital XRay Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital XRay Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography XRay Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography XRay Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra Oral XRay Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral XRay Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
US Multiframe Image Storage (RET)	1.2.840.10008.5.1.4.1.1.3
US Multiframe Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage (RET)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Multiframe Secondary Capture Single Bit Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Secondary Capture Byte Image Storage	1.2.840.10008.5.1.4.1.1.7.2

SOP Class Name	SOP Class UID
Multiframe Secondary Capture Word Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multiframe Secondary Capture True Color Image Storage	1.2.840.10008.5.1.4.1.1.7.4
XRay Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
XRay Fluoroscopy Image Storage	1.2.840.10008.5.1.4.1.1.12.2
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
Ophthalmic Photography 8Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1
Ophthalmic Photography 16Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced Text SR Storage	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive Text SR Storage	1.2.840.10008.5.1.4.1.1.88.33
XRay Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67
Fuji CR Image Storage (private)	1.2.392.200036.9125.1.1.2

Table 4d: Supported SOP Classes for ACETIAM PRI – STORAGE as SCU

SOP Class Name	SOP Class UID
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1

Table 4e: Supported SOP Classes for ACETIAM PRI – MODALITY WORKLIST as SCU

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

Table 4f: Supported SOP Classes for ACETIAM PRI – QUERY/RETRIEVE as SCU

SOP Class Name	SOP Class UID
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1

4.1 Association Establishment Policies

4.1.1 General

Minimum PDU size accepted: 4096 bytes

Maximum PDU size accepted: 131072 bytes

4.1.2 Number of Associations

The number of simultaneous associations supported may be defined in ACETIAM PRI configuration panel. Default is 25

4.1.3 Asynchronous Nature

ACETIAM PRI does not support asynchronous operations.

4.1.4 Implementation Identifying Information

ACETIAM PRI will respond with the following implementation identifying parameters:

Table 4.1.4 : Application Identification Information for ACETIAM PRI

Name	SOP Class UID
Implementation Class UID	1.2.250.1.59.3.0.3.5.3
Application Context Name	1.2.840.10008.3.1.1.1
Implementation Version Name	ETIAM_DCMTK_353

4.2 Association Initiation by Real-World Activity

For each SCU operation, ACETIAM PRI will open an association with the remote equipement, send a command, wait for its responses and close the association.

4.3 Association Acceptance Policy

According to its configuration, ACETIAM PRI may accept or not associations from remote equipment. This may depend on the Calling AETitle, the called AETitle or both.

4.3.1 Real World Activity

4.3.1.1 Associated Real-World Activity

The application entity waits for incoming associations. No operator action is required to receive ACETIAM PRInt jobs or verification requests.

4.3.1.2 Presentation Context Table

ACETIAM PRI supports the following Presentation Contexts:

Table 4.3.1.2: Presentation Contexts

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification SOP Class	1.2.840.10008.5.1.1	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Storage SOP Class	See table 4c	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None
Storage SOP Class	See table 4d	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None
Study Root Query/Retrieve Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.3.1.3 SOP Specific Conformance for Printer SOP Class

The Printer SOP Class is used to monitor the status of the printer.

The following DIMSE services are supported:

N-EVENT-REPORT

N-GET

➔ N-EVENT-REPORT is used to report the changes of the printer status in an asynchronous way.

The attributes of N-EVENT-REPORT are shown in the following table:

Tag	Name	Comment
(2110,0010)	Printer Status	
(2110,0020)	Printer Status Info	

The printer status will be returned as a combination of the Printer Status attribute (2110,0010) and the Printer Status Info attribute (2110,0020) of the Printer SOP Class.

Printer Status	Printer Status Info	Meaning
NORMAL		Printer OK
WARNING		General printer warning, no specific information is available.
WARNING	SUPPLY EMPTY	Printer dispenser is empty.
WARNING	PRINTER OFFLINE	Printer is Offline
WARNING	FILM JAM	No more paper or film in the Printer
FAILURE		General failure of the printer.

➔ N-GET retrieves an instance of the Printer SOP Class.

The attributes of N-GET are shown in the following table:

Tag	Name	Comment
(2110,0010)	Printer Status	Always returns NORMAL
(2110,0020)	Printer Status Info	Always returns NORMAL
(2110,0020)	Printer Name	Returns the value configured in file DcmPri.cfg
(2110,0020)	Manufacturer	Returns the name configured in file DcmPri.cfg
(2110,0020)	Manufacturer Model Name	Returns the name configured in file DcmPri.cfg
(2110,0020)	Device Serial Number	Returns the name configured in file DcmPri.cfg
(2110,0020)	Software versions	Returns the name configured in file DcmPri.cfg
(2110,0020)	Date Last Calibration	Returns the name configured in file DcmPri.cfg
(2110,0020)	Time Last Calibration	Returns the name configured in file DcmPri.cfg

The SCP will return one of the following status codes for N-GET :

Code	Status	Meaning
0x0000	Success	Success
0x0105	Failure	No such attribute

4.3.1.4 SOP Specific Conformance for Basic Film Session SOP Class

The following DIMSE services are supported:

N-CREATE

N-SET

N-DELETE

N-ACTION

➔ N-CREATE is sent by the SCU AE to create a Basic Film Session SOP instance, when an association has been established. If N-CREATE operation fails, an error message will be returned by the SCP AE. The N-CREATE causes the Basic Film Session to be created and its attributes initialized.

The Basic Film Session SOP instances shall be created before the Film Box SOP Instances are created.

ACETIAM PRI provides the following support for the attributes contained in the N-CREATE DIMSE Service of the Basic Film Session SOP Class:

Tag	Name	Comment
(2000,0010)	Number of copies	Any integer between 1 and 99. Default is 1
(2000,0020)	Print Priority	Enumerated value: LOW, MED or HIGH. Default is MED. Attribute ignored.
(2000,0030)	Medium Type	Enumerated value: PAPER, BLUE FILM or CLEAR FILM. Default is PAPER.
(2000,0040)	Film Destination	Enumerated value: MAGAZINE or PROCESSOR. Attribute ignored.
(2000,0050)	Film Session Label	Up-to 64 characters.

The SCP will return one of the following status codes for N-CREATE:

Code	Status	Meaning
0x0000	Success	Film session is successfully created
0x0106	Failure	Invalid attribute value
0x0213	Failure	Resource limitation
0xB600	Warning	Memory allocation error

Note: ACETIAM PRI has a limitation for the number of created Film Sessions, and thus avoids too many films to be printed simultaneously.

➔ N-SET is used to update an instance of the Basic Film Session SOP Class.

The SCP will return one of the following status codes for N-SET:

Code	Status	Meaning
0x0000	Success	Film session is successfully updated
0x0106	Failure	Invalid attribute value
0xB600	Warning	Memory allocation error

➔ N-DELETE is used to delete the complete Basic Film Session SOP Instance hierarchy.

The SCP will return one of the following status codes for N-DELETE:

Code	Status	Meaning
0x0000	Success	Film session has been successfully deleted

➔ N-ACTION is used to print the film session an instance of the Basic Film Session SOP Class.

The SCP will return one of the following status codes for N- ACTION:

Code	Status	Meaning
0x0000	Success	Films in the film session are accepted for printing
0xC600	Failure	Film Session SOP Instance hierarchy does not contain Film Box SOP Instances.
0xB602	Warning	Film Session SOP Instance hierarchy does not contain Image Box SOP Instances (empty page).
0xC604	Failure	Image position collision: multiple images are assigned to a single image position.
0x0213	Failure	Resources limitation

4.3.1.5 SOP Specific Conformance for Basic Film Box SOP Class

The following DIMSE services are supported:

N-CREATE

N-SET

N-DELETE

N-ACTION

➔ N-CREATE is sent by the SCU AE to create a Basic Film Box, once a Film Session has been successfully created.

The attributes of N-CREATE are shown in the following table:

Tag	Name	Comment
(2010,0010)	Image Display Format	STANDARD\m,n ROW\r1,r2,… COL\c1,c2,…
(2010,0040)	Film Orientation	Enumerated value: PORTRAIT or LANDSCAPE. Default is PORTRAIT.
(2010,0050)	Film Size ID	Enumerated value: 8INX10IN 10INX12IN 10INX14IN 11INX14IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM A3 or A4 *See note*
(2010,0060)	Magnification Type	Enumerated value: NONE, BILINEAR. Default is BILINEAR. Any other value will be considered and treated as BILINEAR.
(2010,0080)	Smoothing Type	Attribute ignored
(2010,0100)	Border Density	Enumerated value: WHITE or BLACK. Attribute ignored. Always BLACK.
(2010,0110)	Empty Image Density	Enumerated value: WHITE or BLACK, or a valid Optical Density. Default is BLACK.
(2010,0120)	Minimum Density	Default is 20 or may be found in GSDF calibration file
(2010,0130)	Maximum Density	Default is 300 or may be found in GSDF calibration file
(2010,0140)	Trim	Default is NO. Attribute ignored.
(2020,0500)	Referenced Presentation LUT Sequence	Accepted if the Presentation LUT SOP class has been negotiated, and a Presentation LUT SOP Instance has been successfully created.
(0008,1150)	> Referenced SOP Instance UID	Required if sequence is present.
(0008,1155)	> Referenced SOP Class UID	Required if sequence is present.
(2010,015E)	Illumination	Accepted if the Presentation LUT SOP class has been negotiated, and a Presentation LUT SOP Instance has been successfully created. Default is 150, but may be set in the GSDF configuration file associated to the printer.
(2010,0160)	Reflected Ambient light	Accepted if the Presentation LUT SOP class has been negotiated, and a Presentation LUT SOP Instance has been successfully created. Default is 0.

Note: ACETIAM PRI performs a mapping between DICOM defined terms and common paper sizes. This mapping overrides the input enumerated values and is user defined in ACETIAM PRI configuration menu.

The SCP will return one of the following status codes for N-CREATE:

Code	Status	Meaning
0x0000	Success	Film Box is successfully created
0x0120	Failure	Missing one or more mandatory attributes
0x0106	Failure	Invalid attribute value
0x0117	Failure	Invalid object instance
0x0110	Failure	Processing failure
0x0213	Failure	Resources limitation

➔ N-SET DIMSE service will allow updating the following Film Box attributes:

Tag	Name
(2010,0060)	Magnification Type
(2010,0080)	Smoothing Type
(2010,0100)	Border Density
(2010,0110)	Empty Image Density
(2010,0120)	Minimum Density
(2010,0130)	Maximum Density
(2010,0140)	Trim
(2010,0150)	Configuration Information

The SCP will return one of the following status codes for N-SET:

Code	Status	Meaning
0x0000	Success	Film Box is successfully created
0x0106	Failure	Invalid attribute value
0x0110	Failure	Processing failure
0x0105	Failure	No such attribute

➔ N-DELETE is used to delete the Basic Film Box.

The SCP will return one of the following status codes for N- DELETE:

Code	Status	Meaning
0x0000	Success	Film Box has been successfully deleted

➔ N-ACTION is used to print one or more copies of a single film of the Film Session.

The SCP will return one of the following status codes for N- ACTION:

Code	Status	Meaning
0x0000	Success	Film accepted for printing
0xB603	Warning	Film Box SOP Instance hierarchy does not contain Image Box SOP Instances (empty page).
0xC604	Failure	Image position collision: multiple images are assigned to a single image position.
0x0213	Failure	Resources limitation

4.3.1.6 SOP Specific Conformance for Basic Grayscale Image Box SOP Class

The following DIMSE services are supported:

N-SET

➔ N-SET may be used to update an instance of the Basic Grayscale Image Box.

The attributes of N-SET are shown in the following table:

Tag	Name	Comment
(2020,0010)	Image Position	
(2020,0020)	Polarity	Enumerated value: NORMAL or REVERSE. Attribute ignored. Always NORMAL.
(2010,0060)	Magnification Type	Enumerated value: NONE, BILINEAR. Default is BILINEAR. Any other value will be considered and treated as BILINEAR.
(2010,0080)	Smoothing Type	Attribute ignored.
(2020,0030)	Requested Image Size	
(2020,0110)	Basic Grayscale Image Sequence	
(0028,0002)	>Samples Per Pixel	1
(0028,0004)	>Photometric Interpretation	Enumerated value: MONOCHROME1 or MONOCHROME2. Mandatory. No default.
(0028,0010)	>Rows	Mandatory. No default.
(0028,0011)	>Columns	Mandatory. No default.
(0028,0100)	>Bits Allocated	Valid range is 8 to 16. Mandatory. No default.
(0028,0101)	>Bits Stored	Valid range is 8 to 16. Mandatory. No default.
(0028,0102)	>High Bit	Valid range is 8 to 16. Mandatory. No default. Should be (Bits Stored - 1)
(0028,0103)	>Pixel Representation	Mandatory. No default
(0028,0034)	>Pixel Aspect Ratio	
(7FE0,0010)	>Pixel Data	Mandatory. No default

The SCP will return one of the following status codes for N-SET :

Code	Status	Meaning
0x0000	Success	Image successfully stored in Image Box
0x0106	Failure	Invalid attribute value
0x0110	Failure	Processing failure
0x0120	Failure	Missing one or more mandatory attributes

4.3.1.7 SOP Specific Conformance for Basic Color Image Box SOP Class

The following DIMSE services are supported:

N-SET

➔ N-SET may be used to update an instance of the Basic Grayscale Image Box.

The attributes of N-SET are shown in the following table:

Tag	Name	Comment
(2020,0010)	Image Position	
(2020,0020)	Polarity	Enumerated value: NORMAL or REVERSE. Attribute ignored. Always NORMAL.
(2010,0060)	Magnification Type	Attribute ignored. Always BILINEAR assumed.
(2010,0080)	Smoothing Type	Attribute ignored.
(2020,0030)	Requested Image Size	
(2020,0110)	Basic Grayscale Image Sequence	
(0028,0002)	>Samples Per Pixel	3
(0028,0004)	>Photometric Interpretation	RGB. Mandatory.
(0028,0006)	>Planar Configuration	0 or 1
(0028,0010)	>Rows	Mandatory. No default.
(0028,0011)	>Columns	Mandatory. No default.
(0028,0100)	>Bits Allocated	8
(0028,0101)	>Bits Stored	8
(0028,0102)	>High Bit	7
(0028,0103)	>Pixel Representation	
(0028,0034)	>Pixel Aspect Ratio	
(7FE0,0010)	>Pixel Data	Mandatory. No default

The SCP will return one of the following status codes for N-SET:

Code	Status	Meaning
0x0000	Success	Image successfully stored in Image Box
0x0106	Failure	Invalid attribute value
0x0110	Failure	Processing failure
0x0120	Failure	Missing one or more mandatory attributes

4.3.1.8 SOP Specific Conformance for Presentation LUT SOP Class

The following DIMSE services are supported:

N-CREATE

➔ N-CREATE may be used to create an instance of the Presentation LUT SOP Class.

The attributes of N-CREATE are shown in the following table:

Tag	Name	Comment
(2050,0010)	Presentation LUT Sequence	
(0028,3002)	> LUT Descriptor	
(0028,3003)	> LUT Explanation	
(0028,3006)	> LUT Data	
(2050,0020)	Presentation LUT Shape	Enumerated values IDENTITY, INVERSE, LIN OD

The SCP will return one of the following status codes for N-CREATE:

Code	Status	Meaning
0x0000	Success	Image successfully stored in Image Box
0x0105	Failure	Unknown or unsupported attribute
0x0110	Failure	Processing failure
0x0111	Failure	Duplicate SOP Instance

4.3.1.9 SOP Specific Conformance for Storage SOP Classes

The following DIMSE services are supported:

C-STORE

➔ C-STORE requests are used by the SCU to store datasets to ACETIAM PRI.

4.3.1.10 Presentation Context Acceptance Criterion

N/A

4.3.1.11 Transfer Syntax Selection Policies

ACETIAM PRI will always prefer Little Endian Explicit VR transfer syntax when provided by SCU clients. However, it may be configured to NOT support Little Endian Explicit VR.

5. Communication Profiles

5.1 Supported Communications Stacks

ACETIAM PRI provides DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3-8 of the DICOM Standard.

5.2 TCP/IP Stack

ACETIAM PRI inherits its TCP/IP stack from the Windows system upon which it executes.

5.3 Physical Media Support

ACETIAM PRI is indifferent to the physical medium over which TCP/IP executes; it inherits this from the system upon which it executes.

6. Extensions/Specialization/Privatization

No extensions defined.

7. Configuration

ACETIAM PRI configuration is included in the application user interface through the Configuration Dialog.

7.1 AE Title/Presentation Address Mapping

Not Applicable.

7.2 Configurable Parameters

7.2.1 Standard Configuration

ACETIAM PRI configurable parameters may be defined in the Configuration Dialog Box of the user interface. They are the following:

- TCP/IP port : default is 3100
- AE Title : default is PRINT
- Support of Basic Grayscale Print Management (on/off)
- Support of Basic Color Print Management (on/off)
- Support of Presentation LUT (on/off)
- Support of Storage to Print facility (on/off)
- Log events: Log all events or not (verbose) in the log window of the application.
- Debug: creates a detailed log file in a *logfiles* subdirectory besides the application.

- Film Size Matching: This option lets you specify the matching rules between DICOM defined Film IDs and common paper sizes.
- GSDF calibration: As ACETIAM PRI may manage several printers, you may define for each printer a GSDF calibration file that specifies: the default Illumination, the max DDL value, for a range of DDL input values, ranging from 0 to the maximum value, the corresponding measured ODs.

ACETIAM PRI has a limitation for the number of created Film Sessions, and thus avoids too many films to be printed simultaneously. Maximum number of simultaneous created Film Sessions is 6.

ACETIAM PRI may be configured to handle printing requests from client that have a strange (even illegal) interpretation of the standard. Two common cases are the following:

Print SCU negotiates successfully Grayscale and Color printing. Films boxes are then created using the grayscale presentation context for example, and thus grayscale image box instances are created and returned to the SCU. However, some SCU ignore the SOP Class of the returned image boxes, and do not hesitate to fill them with color pixel data using an N-SET command message on images. For this, in the N-SET message, the SCU even change the SOP Class UID of image to Color ImageBox SOP Class.
To handle this frequent illegal SCU behavior, ACETIAM PRI introduces internal "Proxy image boxes", that accept to dynamically change image box SOP Classes. ACETIAM PRI configuration panel allows making use of these "proxy" images boxes. This is however not the default.

Some Print SCU implementation of some well-known vendors will fail if an N-CREATE-RSP message for a FilmBox creation contains the optional Referenced Film Session information. ACETIAM PRI configuration panel let user change default SCP behavior, which is to NOT to return the Referenced Film Session Information.

7.2.2 Optional Configuration

7.2.2.1 Called AE Title routing

According to ACETIAM PRI versions, it may possible to use the Called AE Title and the medium type to select a destination printer if several printers are available (local or network).

This particular configuration does not alter the general behavior of the software, and is described in a dedicated separate document (Administrator's Guide).

7.2.2.2 Calling AE Title limitations

ACETIAM PRI may be configured to accept print requests from only a restricted set of Calling AE Titles.

This particular configuration does not alter the general behavior of the software, and is described in a dedicated separate document (Administrator's Guide).

8. Support of Extended Character Sets

ACETIAM PRI supports Extended Character Set "ISO_IR 100" Latin alphabet N° 1, supplementary set.

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