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The Intelligent CR Company

XPACS DICOM 3.0 Conformance Statement

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0 INTRODUCTION

0.1 Purpose of this Document

This document is the DICOM Conformance Statement for the XPACS medical imaging software application developed by iCRco. *XPACS* is a service class provider for the DIMSE-C services for the storage, query and retrieval of images. *XPACS* is a service class user for DIMSE-C services for the storage, query and retrieval of images.

0.2 Intended Audience

The intended user of this document is involved with software design and system integration. It is understood that this individual is familiar with the concepts and terms used in the DICOM 3.0 standard.

Readers not familiar with DICOM 3.0 terminology should first read the appropriate parts of the DICOM standard prior to reading this conformance statement.

0.3 Integration

The DICOM 3.0 standard should not be interpreted as a guarantee of connectivity between XPACS and any applications and/or equipment of different vendors. Integration and connectivity of XPACS to different vendors products is the user's responsibility.

0.4 Validation

The user is responsible for testing the inferred connectivity between XPACS and different vendors products.

0.5 Sources for this Document

- American College of Radiology-National Electrical Manufacturers Association (ACR-NEMA) Digital Imaging and Communications v2.0, 1988.
- ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) v3.0, parts 1 through 8, 10 through 12, and 14 through 16, Aug. 2003.

0.7 Typographical Conventions

This section is designed to assist the reader in understanding the terms and typographical conventions used in this document.

Formatting convention	Type of information
Italic type	Application Entity

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1 IMPLEMENTATION MODEL

1.1 Application Data Flow Diagram

Figure 1. Association Initiation

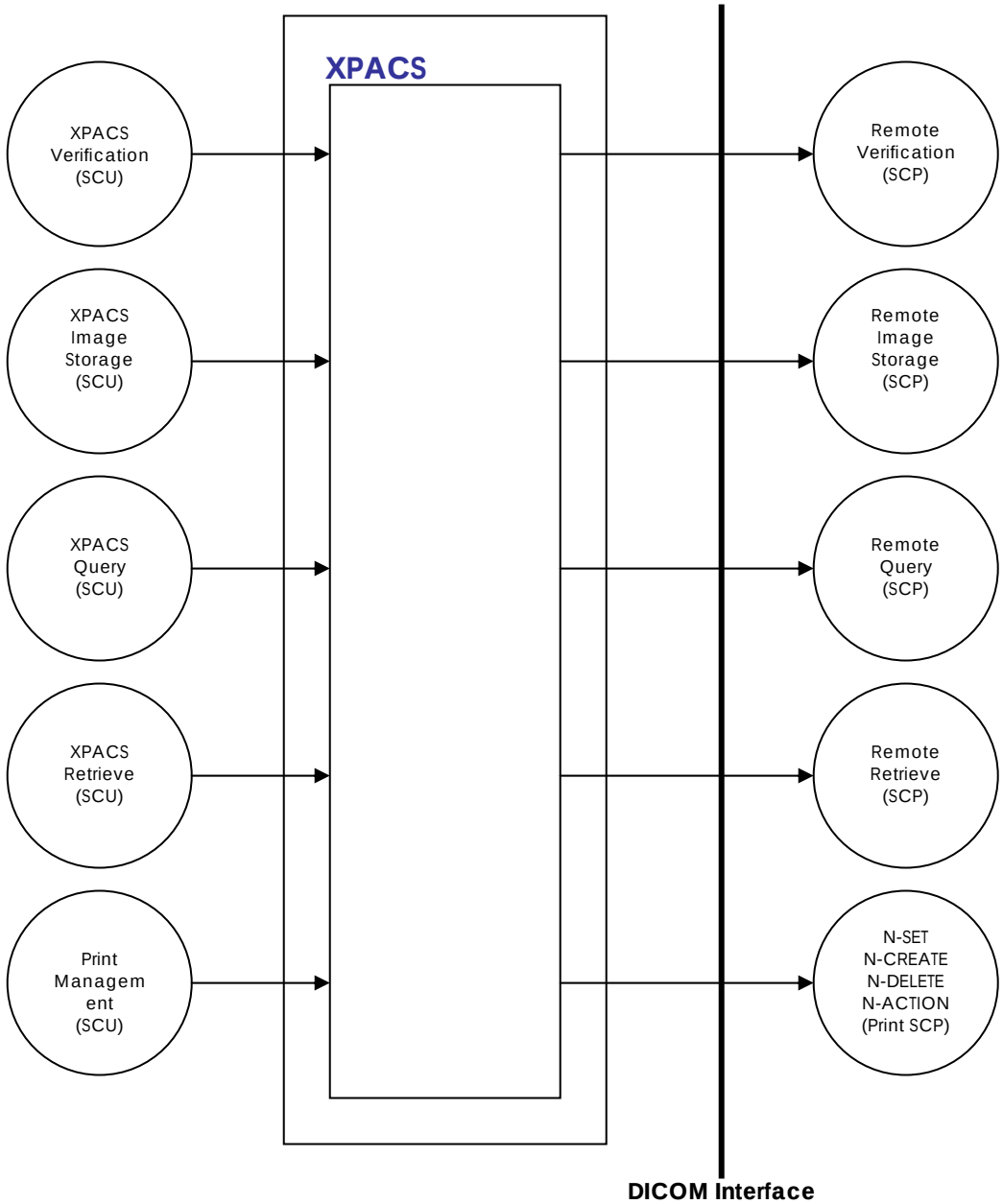
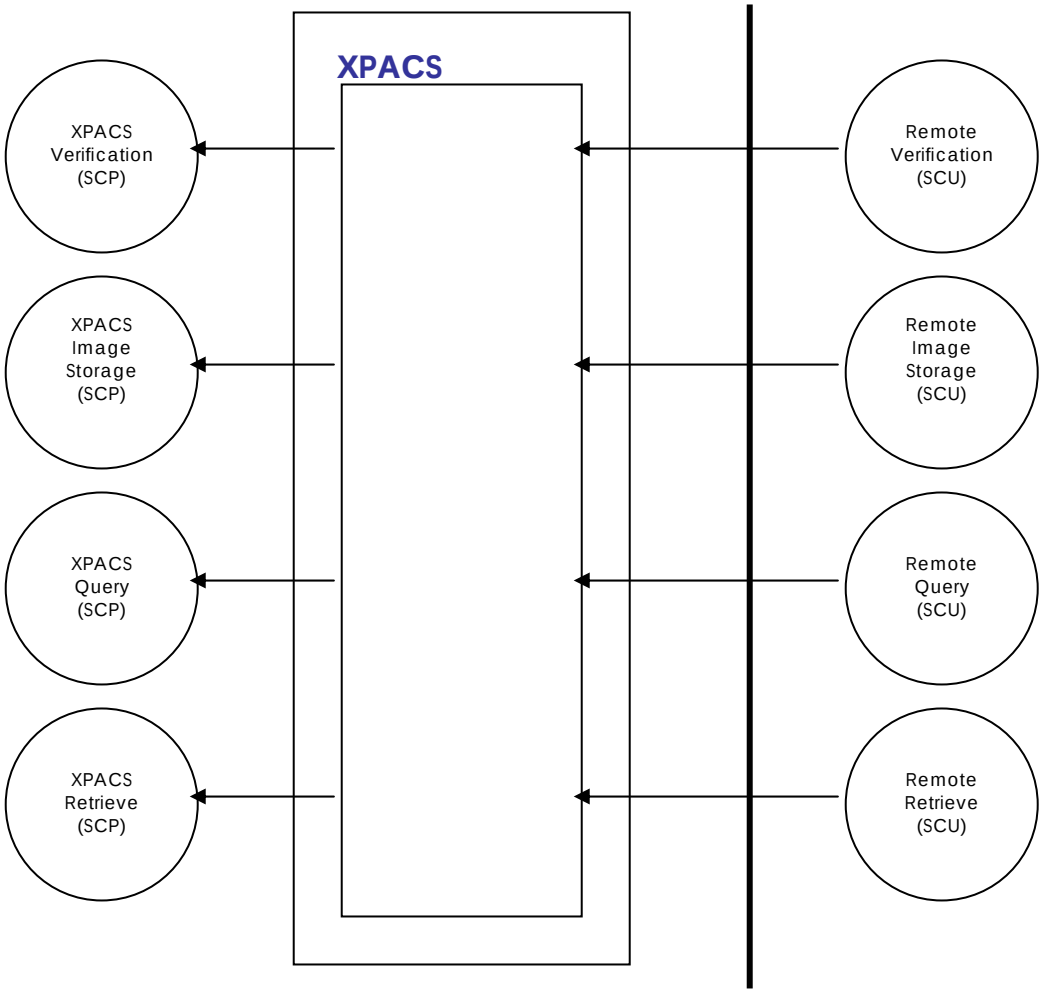


Figure 2. Association Acceptance



XPACS can store images sent to it by service class users. Those images can be retrieved using DICOM. *XPACS* can query other DICOM SCPs based on several standard query models, and can move/retrieve requested images. *XPACS* can also store images to remote DICOM SCPs.

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1.1.1 Verification as SCU

XPACS sends C-ECHO-RQ messages to a remote DICOM SCP and receives C-EHCO-RSP messages.

1.1.2 Verification as SCP

XPACS accepts incoming C-ECHO-RQ messages from a remote DICOM SCU and returns a C-ECHO-RSP message with a status of “success” or “failed”.

1.1.3 Image Storage as SCP

XPACS stores a received image in its entirety, without change, in its internal data store. *XPACS* extracts the query information with respect to the patient, study, series and image, and stores this information within its internal database.

1.1.4 Image Storage as SCU

XPACS stores an image to a remote DICOM SCP.

1.1.5 Query as SCP

XPACS accepts query requests from a remote DICOM SCU, searches it’s internal database, and sends back search results in query response containing matching patient, study, series, and image information.

1.1.6 Query as SCU

XPACS sends query requests to retrieve patient, study, series, and image information from a remote DICOM SCP.

1.1.7 Retrieve as SCP

XPACS accepts retrieve requests from a remote DICOM SCU, searches it’s internal database, and moves images with matching attributes to a specified remote DICOM SCP.

1.1.8 Retrieve as SCU

XPACS sends retrieve requests to move images directly from a remote DICOM SCP to a different DICOM SCP, potentially to itself.

1.1.9 DICOM Print as SCU

XPACS sends print job requests to PRINT SCP.

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1.2 Functional Definitions of Application Entities

All communications and image transfer with the remove application is accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

Below is a table of the functions supported by XPACS application entities:

SCU	SCP
Verification	Verification
Storage	Storage
Query/Retrieve	Query/Retrieve
Basic Grayscale Print Management	

1.3 Sequencing of Real World Activities

Not applicable.

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2. APPLICATION ENTITY SPECIFICATIONS

2.1 *AE* Specifications for XPACS DICOM Services

XPACS provides Standard Conformance to the following DICOM V3.0 Verification SOP Class as an SCP and as an SCU.

Table 1. Verification SOP CLASS

SOP Class	SOP Class UID
Verification	1.2.840.10008.1.1

XPACS provides Standard Conformance to the following DICOM V3.0 Storage SOP Classes as an SCP.

Table 2. Storage SOP Classes

SOP Class	SOP Class UID
Computed Radiology Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Unknown Storage – stores entire DICOM object without modification.	Any unknown UID

XPACS provides Standard Conformance to the following DICOM V3.0 Storage SOP Classes as an SCU.

Table 3. Storage SOP Classes

SOP Class	SOP Class UID
Computed Radiology Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

XPACS provides Standard Conformance to the following DICOM V3.0 Print Management SOP Class

Table 4. Print Management SOP Classes

SOP Class	SOP Class UID
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9

XPACS provides Standard Conformance to the following DICOM V3.0 Query/Retrieve SOP Classes as an SCP and as an SCU:

Table 5. Query/Retrieve SOP Classes

SOP Class	SOP Class UID
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.3
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.3
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.3

2.1.1 Association Establishment Policies

2.1.1.1 General

The services of XPACS shall offer a maximum PDU size of 16Kb (16384 bytes) upon association initiation, and accept maximum PDU sizes up to 16kB (16384 bytes) on association initiated by remote applications.

2.1.1.2 Number of Associations

XPACS as a default limits the number of concurrent associations as an SCP to 1. The maximum number of simultaneous associations accepted by XPACS is 10. Users may increase this value as needed; however, one should expect performance to degrade as the maximum number of simultaneous associations increases. Increasing the number of concurrent associations as an SCP means that XPACS will listen for incoming associations and spawn a new process to manage each request. This ability means it is possible for XPACS to receive both images and query/retrieve requests from multiple SCUs simultaneously.

2.1.1.3 Asynchronous Nature

XPACS allows a single outstanding operation on any association. Therefore, *XPACS* does not support asynchronous operations window negotiation, other than the default as specified by the DICOM specification.

2.1.1.4 Implementation Identifying Information

XPACS supplies value of 1.2.826.0.1.3680043.2.1074 as Implementation Class UID. Implementation version is also provided in the form of "V.M.R" where V is major version number, M is minor version number, and R is revision number.

2.1.1.5 Called/Calling Titles

The calling title that *XPACS* will use is configurable. *XPACS* validates the Called or Calling Title of the requesting SCU during association negotiation. The internal user-configurable database of AE titles is used for validation.

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2.1.2 Association Initiation Policy (SCU)

XPACS initiates associations for the following activities:

- DICOM communication verification between XPACS and a remote system.
- Sending images from the local XPACS database to a remote system.
- Queries of remote database contents
- Retrieval of images from a remote database to the local XPACS database.
- Print images

2.1.2.1 Verify Communication with a Remove System (SOP Class Verification)

2.1.2.1.1 Associated Real World Activity (SOP Class Verification)

The user selects a remote system AET from the list of targets and clicks “Test”.

2.1.2.1.2 Proposed Presentation Contexts (SOP Class Verification)

Table 6. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 7. Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Verification	1.2.840.10008.1.1	All from Table 6	SCU	None

2.1.2.1.3 SOP Specific Conformance Statement (SOP Class Verification)

XPACS provides standard conformance to the DICOM Verification Service Class. *XPACS* returns one of the following status codes.

Table 8. Verification status codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Error	Failed	C000		The operation was not successful.
Success	Success	0000		Operation performed properly.

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2.1.2.2 Send Images to a Remote System (SOP Class Image Storage)

2.1.2.2.1 Associated Real World Activity (SOP Class Image Storage)

XPACS will issue a Storage request when a user of *XPACS* wishes to send one or more images to a remote DICOM SCP. The user selects one or more patients, studies or images from the main application dialog and clicks the Send button. A list of targets appear, from which the user selects one.

2.1.2.2.2 Proposed Presentation Contexts (SOP Class Image Storage)

XPACS supports the transfer syntaxes listed in Table 9. For a Storage request, *XPACS* will propose the Presentation Contexts listed in Table 10.

Table 9. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Baseline JPEG Huffman-encoded pixel data set	1.2.840.10008.1.2.4.50
Extended JPEG Huffman-encoded pixel data set	1.2.840.10008.1.2.4.51

Table 10. Storage SOP Classes

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	All from Table 9	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	All from Table 9	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3	All from Table 9	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	All from Table 9	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5	All from Table 9	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	All from Table 9	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 9	SCU	None

2.1.2.2.3 SOP Specific Conformance Statement (SOP Class Image Storage)

Images stored in the XPACS database that are to be sent to the remote systems are converted to instances of the corresponding SOP Storage class(es). Images are then sent sequentially to the remote system(s).

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2.1.2.3 Query a Remote Database (SOP Class Query)

2.1.2.3.1 Associated Real World Activity (SOP Class Query)

XPACS will issue a FIND request when a user of *XPACS* wishes to view patient and study information from a remote DICOM SCP.

2.1.2.3.2 Proposed Presentation Contexts (SOP Class Query)

XPACS supports the transfer syntaxes listed in Table 11. For a QUERY request, *XPACS* will propose the Presentation Contexts listed in Table 12.

Table 11. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1

Table 12. Query SOP Classes

Abstract Syntax		**Transfer Syntax**	Role	Extended Negotiation
SOP Class	SOP Class UID			
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	All from Table 11	SCU	See Note 1
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1	All from Table 11	SCU	See Note 1
Patient Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1	All from Table 11	SCU	See Note 1

2.1.2.3.3 SOP Specific Conformance Statement (SOP Class Query)

2.1.2.4 Retrieve from a Remote System (SOP Class Retrieve)

2.1.2.4.1 Associated Real World Activity (SOP Class Retrieve)

XPACS will issue a MOVE request when a user of *XPACS* wishes to move one or more studies from a remote DICOM SCP back to *XPACS* or another remote DICOM SCP.

2.1.2.4.2 Proposed Presentation Contexts (SOP Class Retrieve)

XPACS supports the transfer syntaxes listed in Table 13. For a MOVE request, *XPACS* will propose the Presentation Contexts listed in Table 14.

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Table 13. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1

Table 14. Move SOP Classes

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	All from Table 13	SCU	See Note 2
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2	All from Table 13	SCU	See Note 2
Patient Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2	All from Table 13	SCU	See Note 2

2.1.2.4.3 SOP Specific Conformance Statement (SOP Class Retrieve)

2.1.2.5 Print to a Remote Laser Imager (SOP Class Basic Grayscale Print Management Meta Classes)

2.1.2.5.1 Associated Real World Activity (SOP Class Basic Grayscale Print Management Meta Classes)

The user selects the desired image(s) and selects the Printer icon on the toolbar then they either select Print Page or Film Composer. The user can click on the Print icon on the toolbar and select Settings to change the default printer.

2.1.2.5.2 Proposed Presentation Contexts (SOP Class Basic Grayscale Print Management Meta Classes)

XPACS supports the transfer syntaxes listed in Table 15. For a CREATE request, *XPACS* will propose the Presentation Contexts listed in Table 16.

Table 15. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

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Table 16. Query SOP Classes

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	All from Table 15	SCU	None

2.1.2.5.3 SOP Specific Conformance Statement (SOP Class Basic Grayscale Print Management Meta Classes)

Below are the mandatory print SOP classes supported by XPACS for the Basic Grayscale Management Meta class.

Table 17. Basic Grayscale Print Management Meta SOP Classes

Basic Grayscale Print Management Meta Class: Supported SOP Classes	
SOP Class Name	**SOP Class UID**
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
Printer	1.2.840.10008.5.1.1.16

2.1.2.5.3.1 Conformance for SOP Class Basic Film Session

XPACS includes the following N-Create attributes for the Basic Film Session SOP class:

Table 18. Basic Film Session SOP class N-CREATE: Attributes

Description	Tag
Number of Copies	(2000,0010)
Print Priority	(2000,0020)
Medium Type	(2000,0030)
Film Destination	(2000,0040)
Film Session Label	(2000,0050)
Memory Allocation	(2000,0060)
Owner ID	(2000,0160)

N-Set and N-Action are not used; however, N-Delete is used to delete the complete Basic Film Session SOP instance hierarchy.

2.1.2.5.3.2 Conformance for SOP Class Basic Film Box

The table below lists the N-Create attributes for the Basic Film Box SOP class.

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Table 18. Basic Film Box SOP class N-CREATE: Attributes

Description	Tag
Image Display Format	(2010,0010)
Annotation Display Format ID	(2010,0030)
Film Orientation	(2010,0040)
Film Size ID	(2010,0050)
Magnification Type	(2010,0060)
Smoothing Type	(2010,0080)
Border Density	(2010,0100)
Empty Image Density	(2010,0110)
Minimum Density	(2010,0120)
Maximum Density	(2010,0130)
Trim	(2010,0140)
Configuration Information	(2010,0150)
Illumination	(2010,015E)
Reflected Ambient Light	(2010,0160)
Requested Resolution ID	(2020,0050)

The N-Set is currently unused; however, the N-Action is used to print a complete Basic Film Box SOP instance and N-Delete is used to delete it after printing.

2.1.2.5.3.3 Conformance for SOP Class Basic Grayscale Image Box

The following attributes are included in XPACS N-Set for the Basic Grayscale Image SOP class.

Table 18. Basic Grayscale Image SOP Box: N-Set Attributes

Description	Tag
Image Position	(2020,0010)
Polarity	(2020,0020)
Magnification Type	(2010,0060)
Smoothing Type	(2010,0080)
Configuration Information	(2010,0150)
Requested Image Size	(2020,0030)
Requested Decimate/Crop Behavior	(2020,0040)
> Samples Per Pixel	(0028,0002)
> Photometric Interpretation	(0028,0004)
> Rows	(0028,0010)
> Columns	(0028,0011)
> Pixel Aspect Ratio	(0028,0034)
> Bits Allocated	(0028,0100)
> Bits Stored	(0028,0101)
> High Bit	(0028,0102)
> Pixel Representation	(0028,0103)
> Pixel Data	(7FE0,0010)

XPACS supports 8-bit and 16-bit printing.

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2.1.2.5.3.4 Conformance for SOP Class Printer

XPACS uses N-GET for the Printer SOP class to get information from the SCP.

2.1.2.5.4 Optional SOP Classes for Basic Grayscale Print Management Meta

These SOP classes are not yet supported by XPACS.

2.1.3 Association Acceptance Policy

XPACS accepts associations for the activities listed below:

- DICOM communication verification between XPACS and a remote system.
- Image transfer from a remote system to XPACS
- Processing remote system queries
- Initiation of image transfer to a remote system in response to a request for retrieval

2.1.3.1 Verify Communication with a Remote System (SOP Class Verification)

2.1.3.1.1 Associated Real Word Activity (SOP Class Verification)

XPACS will respond to Verification requests to provide an SCU with the ability to determine if *XPACS* is receiving DICOM requests.

2.1.3.1.2 Presentation Context Table (SOP Class Verification)

XPACS supports the transfer syntaxes listed in Table 19. *XPACS* will accept any of the Presentation Contexts listed in Table 20 for Verification.

Table 19. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2

Table 20. Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Verification	1.2.840.10008.1.1	All from Table 19	SCP	None

2.1.3.1.3 SOP Specific Conformance Statement (SOP Class Verification)

XPACS provides standard conformance to the DICOM Verification Service Class. *XPACS* returns one of the following status codes.

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Table 21. Verification status codes

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Error	Failed	C000		The operation was not successful.
Success	Success	0000		Operation performed properly.

2.1.3.1.4 Presentation Context Acceptance Criterion (SOP Class Verification)

XPACS will always accept a Presentation Context for the Verification SOP Class with the default DICOM transfer syntax listed in Table 20.

2.1.3.1.5 Transfer Syntax Selection Policies (SOP Class Verification)

Since no DICOM data object is associated with a Verification command, only the default DICOM transfer syntax is required/supported.

2.1.3.2 Receive Images from a Remote System (SOP Class Storage)

2.1.3.2.1 Associated Real World Activity (SOP Class Storage)

XPACS will archive images that are sent to it from an SCU.

2.1.3.2.2 Presentation Context Table (SOP Class Storage)

XPACS supports the following transfer syntaxes listed in Table 22. *XPACS* will accept any of the Presentation Contexts listed in Table 23 for Storage.

Table 22. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Baseline JPEG Huffman-encoded pixel data set	1.2.840.10008.1.2.4.50
Extended JPEG Huffman-encoded pixel data set	1.2.840.10008.1.2.4.51

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Table 28. Presentation Contexts

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Computed Radiography Image	1.2.840.10008.5.1.4.1.1.1	All from Table 27	SCP	N/A
Storage CT Image Storage	1.2.840.10008.5.1.4.1.1.2	All from Table 27	SCP	N/A
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3	All from Table 27	SCP	N/A
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	All from Table 27	SCP	N/A
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.5	All from Table 27	SCP	N/A
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	All from Table 27	SCP	N/A
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	All from Table 27	SCP	N/A
Unknown Storage	Any unknown UID	All from Table 27	SCP	N/A

2.1.3.2.3 SOP Specific Conformance Statement (SOP Class Storage)

XPACS conforms to the DICOM Storage Service Class at Level 2 (Full). No elements are discarded or coerced by *XPACS*. In the event of a successful C-STORE operation the image is written to internal storage. Note: Storage extended negotiation is not currently supported.

XPACS returns one of the following status codes.

Table 24. C-STORE status codes.

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Error	Failed	C000		The operation was not successful.
Success	Success	0000		Operation performed properly

2.1.3.2.4 Presentation Context Acceptance Criterion (SOP Class Storage)

XPACS will accept any number of Storage Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.1.3.2.5 Transfer Syntax Selection Policies (SOP Class Storage)

XPACS supports the Default Little Endian transfer syntax.

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2.1.3.3 Query the XPACS Database (SOP Class Query)

2.1.3.3.1 Associated Real World Activity (SOP Class Query)

XPACS will respond to query requests sent to it from an SCU by searching it's internal database and sending back results in a query response.

2.1.3.3.2 Presentation Context Table (SOP Class Query)

XPACS supports the following transfer syntaxes listed in Table 25. *XPACS* will accept any of the Presentation Contexts listed in Table 26 for Query.

Table 25. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1

Table 26. Query SOP Classes

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	All from Table 27	SCP	See Note 1
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1	All from Table 27	SCP	See Note 1
Patient Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1	All from Table 27	SCP	See Note 1

2.1.3.3.3 SOP Specific Conformance Statement (SOP Class Query)

XPACS performs information retrieve in response to query made at the following levels:
PATIENT
STUDY
SERIES
IMAGE

XPACS supports query for all unique, required, and some optional attributes for a particular Q/R Information Model and level. Universal, exact, wildcard, and range (for dates and times) attribute matching is supported. Summarily query for the following attributes is supported:

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Table 27. Supported C-FIND attributes.

Attribute name	*DICOM data (group,element)*
Study Instance UID	(0x0020,0x000D)
Accession Number	(0x0008,0x0050)
Patient ID	(0x0010,0x0020)
Patient Name	(0x0010,0x0010)
Patient DOB	(0x0010,0x0030)
Study Date	(0x0008,0x0020)
Study Time	(0x0008,0x0030)
Study ID	(0x0020,0x0010)
Study Description	(0x0008,0x1030)
Patient Sex	(0x0010,0x0040)
Series Instance UID	(0x0020,0x000E)
Modality	(0x0008,0x0060)
Series Number	(0x0020,0x0011)
SOP Instance UID	(0x0008,0x0018)
SOP Class UID	(0x0008,0x0016)
Image Number	(0x0020,0x0013)

XPACS returns one of the following status codes.

Table 28. C-FIND status codes.

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Error	Failed	C000		The operation was not successful.
Success	Success	0000		Operation performed properly

2.1.3.3.4 Presentation Context Acceptance Criterion (SOP Class Query)

XPACS will accept any number of Query Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.1.3.3.5 Transfer Syntax Selection Policies (SOP Class Query)

XPACS supports the Default Little Endian transfer syntax.

2.1.3.4 Retrieve from XPACS (SOP Class Retrieve)

2.1.3.4.1 Associated Real World Activity (SOP Class Retrieve)

XPACS will response to image move requests sent to it from an SCU by searching it's internal database and storing matching images at a specified remote SCP.

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2.1.3.4.2 Presentation Context Table (SOP Class Retrieve)

XPACS supports the following transfer syntaxes listed in Table 29. *XPACS* will accept any of the Presentation Contexts listed in Table 30 for Move.

Table 29. Transfer Syntaxes

Transfer Syntax	UID
DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1

Table 30. Move SOP Classes

Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
SOP Class	SOP Class UID			
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	All from Table 30	SCP	See Note 2
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2	All from Table 30	SCP	See Note 2
Patient Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2	All from Table 30	SCP	See Note 2

2.1.3.4.3 SOP Specific Conformance Statement (SOP Class Retrieve)

XPACS performs information retrieve in response to move requests made at the following levels:
PATIENT
STUDY
SERIES
IMAGE
The image move is always performed at IMAGE level.

XPACS returns one of the following status codes.

Table 31. C-MOVE status codes.

Service Status	Further Meaning	Protocol Codes	Related Fields	Description
Error	Failed	C000		The operation was not successful.
Success	Success	0000		Operation performed properly

2.1.3.4.4 Presentation Context Acceptance Criterion (SOP Class Retrieve)

XPACS will accept any number of Move Presentation Contexts per association request. Any one Abstract Syntax may be specified more than once in an association request, if the Transfer Syntaxes differ between the Presentation Contexts.

2.1.3.4.5 Transfer Syntax Selection Policies (SOP Class Retrieve)

XPACS supports the Default Little Endian transfer syntax.

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3 COMMUNICATION PROFILES

XPACS provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

3.1 TCP/IP STACK

XPACS inherits its TCP/IP stack from the computer system upon which it executes.

3.1.1 Physical Media Support

XPACS is indifferent to the physical medium over which TCP/IP executes; it inherits the medium from the computer system upon which it executes.

4 EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

XPACS provides Conformance to the following General Electric Medical Systems ID/Net 2 ("ACR/NEMA 2 with DICOM V3.0 extensions") Storage SOP Classes as an SCP.

Table 32. GE ID/Net 2 Storage SOP Classes

SOP Class	SOP Class UID
CT Image Storage	1.2.840.113619.4.3
MR Image Storage	1.2.840.113619.4.2

XPACS automatically converts the received ID/Net 2 information object to the corresponding DICOM v.3.0 information object.

5 CONFIGURATION

XPACS obtains configuration information form the following sources:

- Mapping from Application Entity Title to Presentation Address is provided by the database.
- Configuration table stores Application Entity Title

6 SUPPORT FOR EXTENDED CHARACTER SETS

XPACS is known to support the following character sets:

- ISO-IR 6 (default) Basic GO Set
- ISO-IR 100 Latin Alphabet No. 1

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7 Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document.

AE	Application Entity
ACR	American College of Radiology
ANSI	American National Standards Institute
DICOM	Digital Imaging and Communications 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