

DICOM 3.00 Conformance Statement

ETIAM Viewer

Version 3.66

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Summary :

This document presents the conformance statement of ETIAM Viewer that implements as Service Class User (SCU) the following DICOM services: Verification, Basic Worklist Management, Print, Query and Retrieve and Storage. It also implements Storage, Query and Retrieve and Verification as Service Class Provider (SCP) and also acts as CD Media File Set Reader/Creator. It applies to version 3.66 of ETIAM Viewer. (DICOM Suite 2.84m)

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1. Introduction

1.1 Scope and field of application

This document describes ETIAM Viewer conformance to the DICOM 3.0 standard.

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 applies to version 3.66 of ETIAM Viewer and 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.

ETIAM Viewer acts as an SCU for the following SOP Classes:

- Verification
- Storage
- Basic Modality Worklist Management
- Query and Retrieve
- Print
- Modality Performed Procedure Step
- Storage Commitment Push Model

ETIAM Viewer acts as a File Set Reader (FSR) and FSC (File Set Creator) for CD or DVD media

ETIAM Viewer companion application (LtBxSCP) acts as an SCP for the following SOP Classes:

- Verification
- Storage
- Query and Retrieve

However, Query and Retrieve services as SCP are only available when ETIAM Viewer is installed and run with the *Advanced* or the *Publisher* option. Also, media creation (DICOM FSC) functions are available only with *Advanced* or *Publisher* options.

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]

Digital Imaging and Communications in Medicine (DICOM) standard:

NEMA PS 3.1 – to 3.18 and Supplements

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.

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

1.5 Warning to the Reader

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
2.20	Creation	Gilles MEVEL	Sep 2004
2.60	Update	Gilles MEVEL	Jun 2005
2.70	Update	Gilles MEVEL	Sep 2005
3.02	Update	Gilles MEVEL	Apr 2006
3.02g	Update	Gilles MEVEL	Apr 2007
3.20	Update	Gilles MEVEL	Aug 2007
3.40	Update	Gilles MEVEL	Mar 2008
3.40c	Update	Gilles MEVEL	Jul 2008
3.42	Update	Gilles MEVEL	Jan 2009
3.60	Update	Gilles MEVEL	Apr 2010
3.62	Update	Gilles MEVEL	Feb 2011
3.62b	Update	Gilles MEVEL	Apr 2011
3.64	Update	Gilles MEVEL	Sep 2011
3.66	Update	Gilles MEVEL	Jun 2012

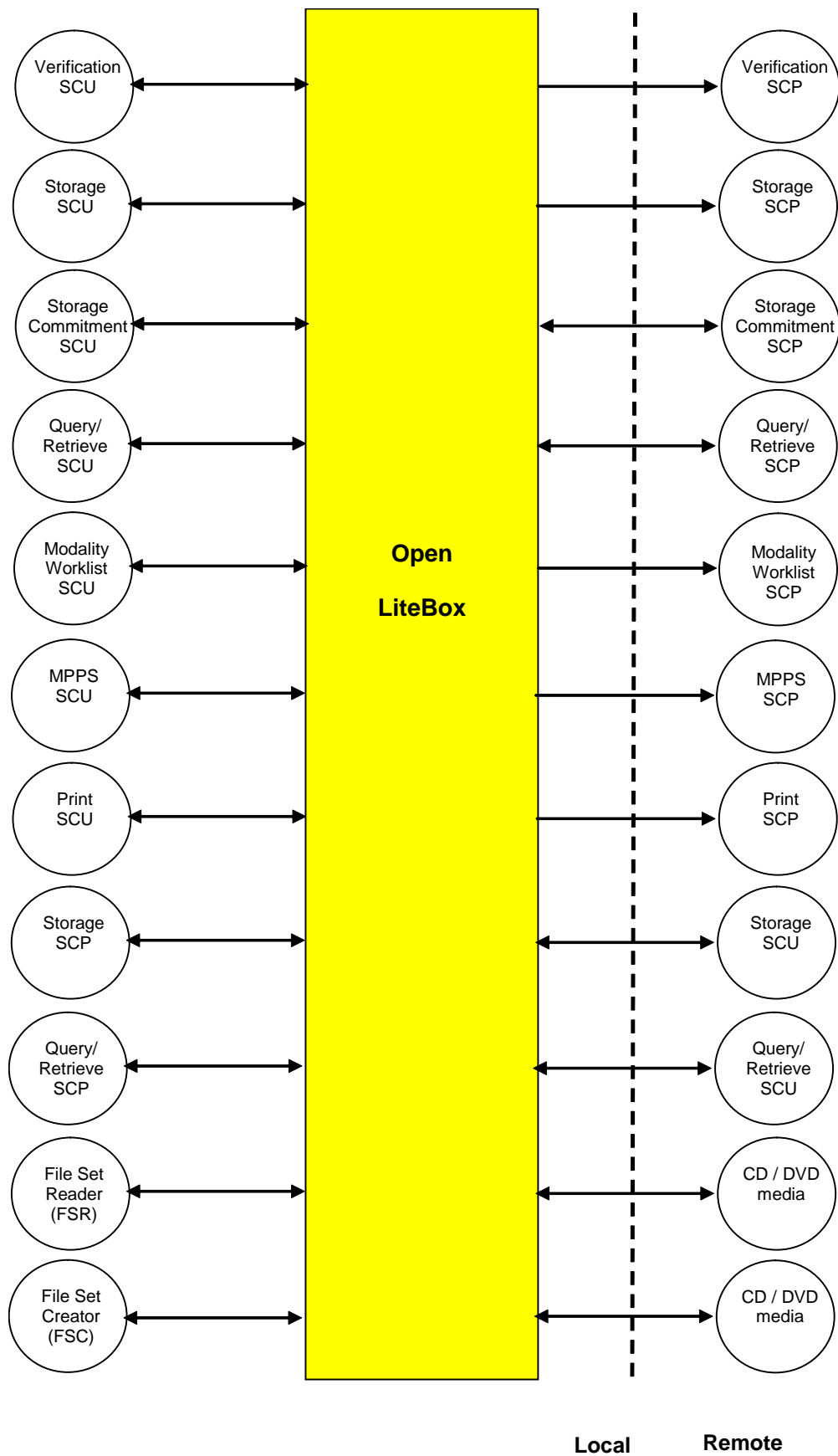
3. Implementation Model

ETIAM Viewer is a Windows 2000/XP/Vista application that may display images from different media: mainly CDs and HD (Hard Drive) data.

It may be used:

- to review CD / HD data;
- to perform data transfer in two ways : Send local data to a remote archive or get receive data from remote sources, either using the Query and Retrieve service or the DICOM storage service;
- to perform Patient Information Reconciliation when sending local data using DICOM storage services. Reconciliation may be done using either a Manuel input, the Basic Worklist Management service or the Query and Retrieve service. In the latter case, only Queries are performed.

3.1 Application Data Flow Diagram



3.2 Functional Definitions of Application Entities

ETIAM Viewer functions may be seen as only one configurable Application Entity, acting as SCU (ETIAM Viewer software itself) or SCP (LtBxSCP companion software provided with ETIAM Viewer).

3.2.1 Verification service as SCU

ETIAM Viewer supports the Echo / Verification service as SCU.

3.2.2 Storage Service as SCU

To store local data, ETIAM Viewer establishes an association with a remote Storage SCP, negotiates its presentation contexts according to instance SOP Classes and their native transfer syntax, and sends all data.

Then ETIAM Viewer closes the association.

3.2.3 Storage Commitment Service as SCU

To send a Storage Commitment request, ETIAM Viewer establishes an association with a remote Storage Commitment SCP, sends an N-CREATE request on this association waits for N-CREATE response.

Then ETIAM Viewer closes the association.

3.2.4 Color / Grayscale Printing Service as SCU

ETIAM Viewer may use the Print services as SCU through its Film Composer to print films to DICOM printers.

The Film Composer establishes one association with the remote Print SCP, performs its print request and closes the association when printing is done, successfully or not.

3.2.5 Modality Worklist Service as SCU

ETIAM Viewer may use the Basic Worklist Management service to get required information to populate Patient Information Reconciliation data when needed.

It establishes one association with the remote Worklist SCP, performs a Find request, wait for responses, and then releases the association.

3.2.6 Modality Performed Procedure Step Service as SCU

ETIAM Viewer may use the MPPS service to keep a PPS Manager informed of imported data.

It establishes one association with the MPPS SCP before object storage, sends an N-CREATE message and then releases the association.

This operation may sequentially be done several times, according to the number of different (Study instance UID, Modality) pairs in the objects to be sent.

When storage is performed, other associations with the MPPS SCP are opened sequentially, a N-SET message is sent and association is released.

3.2.7 Query and Retrieve Service as SCU

ETIAM Viewer may use the Query and Retrieve service to get required information to populate Patient Information Reconciliation data when needed. For such a purpose, only the query part of the service (C_FIND) is used.

It then establishes one association with the remote Query and Retrieve SCP, performs a Find request, wait for responses, and then release the association. It does not and cannot be used to request any move operation.

This service may be also be used to really Retrieve images locally from a PACS.

It then establishes one association with the remote Query and Retrieve SCP, performs a Find request, waits for responses, and then may either release the association or may ask for image/series/study retrieval before releasing the association. This depends on the user request.

3.2.8 Verification Service as SCP

ETIAM Viewer, through LtBxSCP, waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, LtBxSCP expects it to be a DICOM application. LtBxSCP will accept associations with Presentation Contexts for SOP Classes of the Verification Service Class.

3.2.9 Image Storage Service as SCP

ETIAM Viewer, through LtBxSCP, waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, LtBxSCP expects it to be a DICOM application. LtBxSCP will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class. It will receive images on these Presentation Contexts and write them to files in the format compliant to Part 10 of the DICOM standard.

Image filenames are described below, as well as the image directory.

3.2.10 Query and Retrieve Service as SCP

ETIAM Viewer, through LtBxSCP, waits for another application to connect at the presentation address configured for its Application Entity Title. When another application connects, LtBxSCP expects it to be a DICOM application. LtBxSCP will accept associations with Presentation Contexts for Find and Move service classes using Study Root Information Model. It will response to query and retrieve requests on these Presentation Contexts.

3.2.11 File Set Reader (FSR)

ETIAM Viewer when first started, will attempt to find a CD or DVD media containing a DICOM Part 10 compliant structure, and if any, will open a DicomDIR browser, allowing the user to display images.

If already started, ETIAM Viewer will detect any such CD/DVD insertion and will also open a DicomDIR browser.

3.2.12 File Set Creator (FSC)

ETIAM Viewer allows user to select a set of studies in its local database, and to copy them on a CD or DVD media.

3.3 Sequencing of Real-World Activities

Real-World Activity for Verification SCU/SCP operations is independent of other operations.

Real-World Activity for Storage SCU/SCP operations is independent of other operations.

Real-World Activity for Storage Commitment SCU operations is independent of other operations.

Real-World Activity for Print SCU operations is independent of other operations.

Real-World Activity for Basic Worklist Management queries is independent of other operations.

Real-World Activity for Query and Retrieve SCU/SCP operations is independent of other operations.

4. Application Entity Specifications

4.1 ETIAM Viewer AE - Specification

ETIAM Viewer provides Standard Conformance to the following DICOM V3.0 SOP Classes as SCU

Table 4.1-1 Supported SOP Classes for Verification SCU

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Table 4.1-2 Supported SOP Classes for Storage SCU

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
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1
<i>US Multiframe Image Storage (RET)</i>	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
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
<i>NM Image Storage (RET)</i>	1.2.840.10008.5.1.4.1.1.5
<i>US Image Storage (RET)</i>	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
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
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiologic Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
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
<i>XRay Angiographic BiPlane Image Storage (RET)</i>	1.2.840.10008.5.1.4.1.1.12.3
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3

RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Stored Print Storage	1.2.840.10008.5.1.1.27
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
Raw Data Storage	1.2.840.10008.5.1.1.66
Spatial Registration Storage	1.2.840.10008.5.1.1.66.1
Spatial Fiducial Storage	1.2.840.10008.5.1.1.66.2
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1
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
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1
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
Stereometric Relationship Storage	1.2.840.10008.5.1.4.1.1.77.1.5.3
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40
Mammography CADSR	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Chest CADSR	1.2.840.10008.5.1.4.1.1.88.65
Xray Radiation Dose SR	1.2.840.10008.5.1.4.1.1.88.67
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Private Fuji CR Image Storage	1.2.392.200036.9125.1.1.2
PrivateToshiba Raw Data Storage	1.2.392.200036.9116.7.8.1.1.1

Table 4.1-3 Supported SOP Classes for Storage Commitment SCU

SOP Class Name	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

Table 4.1-4 Supported SOP Classes for Query/Retrieve 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
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2

Table 4.1-5 Supported Meta SOP Classes for Basic Print SCU

Meta SOP Class Name	Meta SOP Class UID
Basic Grayscale Print Management	1.2.840.10008.5.1.1.9
Basic Color Print Management	1.2.840.10008.5.1.1.18

Table 4.1-6 Supported SOP Classes for Basic Grayscale Print SCU

SOP Class Name	SOP Class UID
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

Table 4.1-7 Supported SOP Classes for Basic Color Printing SCU

SOP Class Name	SOP Class UID
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 Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16

Table 4.1-8 Supported SOP Classes for Modality Worklist SCU

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

Table 4.1-9 Supported SOP Classes for Modality Performed Procedure Step SCU

SOP Class Name	SOP Class UID
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3

ETIAM Viewer provides Standard Conformance to the following DICOM V3.0 SOP Classes as SCP

Table 4.1-10 Supported SOP Classes for Verification SCP

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

Table 4.1-11 Supported SOP Classes for Storage SCP

Same table as 4.1-2

Table 4.1-12 Supported SOP Classes for Query and Retrieve SCP

SOP Class Name	SOP Class UID
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2

ETIAM Viewer provides Standard Conformance to the following DICOM V3.0 SOP Classes as File Set Reader (FSR)

Table 4.1-13 Application Profiles for File Set Reader

Application Profiles Supported	Role	SC Option
See note below	FSR	Interchange

ETIAM Viewer is not restricted to any Application Profile.

Instead, it can display the following objects with the associated Transfer Syntax:

Table 4.1-14 File Set Reader Displayable Objects

Abstract Syntax	Transfer Syntax	Role
All image objects of Table 4.1-2	Explicit VR Little Endian	FSR
All image objects of Table 4.1-2	JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	FSR
All image objects of Table 4.1-2	JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression	FSR
All image objects of Table 4.1-2	JPEG Lossless, Non-Hierarchical (Process 14)	FSR
All image objects of Table 4.1-2	JPEG Lossless, Non-Hierarchical, First-Order Prediction	FSR
All image objects of Table 4.1-2	JPEG2000 Lossless only	FSR
All image objects of Table 4.1-2	JPEG 2000	FSR
All image objects of Table 4.1-2	MPEG2 Main Profile @ Main Level	FSR
All image objects of Table 4.1-2	MPEG2 Main Profile @ High Level	FSR
All image objects of Table 4.1-2	RLE Lossless	FSR
All SR objects of Table 4.1-2	Explicit VR Little Endian	FSR
Encapsulated PDF Storage (1.2.840.10008.5.1.4.1.1.104.1)	Explicit VR Little Endian	FSR

ETIAM Viewer provides Standard Conformance to the following DICOM V3.0 SOP Classes as File Set Creator (FSC)

Table 4.1-15 Application Profiles for File Set Creator

Application Profiles Supported	Role	SC Option
See note below	FSC	Interchange

Unless specially configured ETIAM Viewer is not restricted to any Application Profile. Configuration lets an administrator specify a DICOM profile. Some profile characteristics and restrictions (SOP Class, Transfer Syntax, Photometric interpretation of images, Modality) will be used to reference of not objects in the created DICOMDIR. Directory records in the DICOMDIR will be independent of the selected profile if any.

When no profile is specified (default), all DICOM objects which are DICOM Part 10 compliant will be referenced in the DICOMDIR file.

4.1.1 Association Establishment Policies

4.1.1.1 General

Before any SOP classes can be exchanged between ETIAM Viewer (SCU) and a SCP Application Entity, an association stage happens to negotiate and exchange the capabilities of the SCU and SCP.

ETIAM Viewer shall release the association it established. The SCP may however abort the association.

The calling AE Title of ETIAM Viewer may be configured in its user interface.

The maximum PDU length for the PDU offered or received by ETIAM Viewer is 16384 bytes.

4.1.1.2 Number of Associations

ETIAM Viewer maximum number of associations established simultaneously depends on operations and user requests.

Store SCU operations may be processed in background or not. Only one background storage operation may be active at the same time. As user may also perform synchronous storage operations, maximum number of simultaneous storage operations is 2.

Retrieve (C-MOVE) SCU operations may be processed in background or not. Only one background Retrieve (C-MOVE) operation may be active at the same time. As user may also perform synchronous Query and Retrieve operations, maximum number of simultaneous Query and Retrieve operations is 2.

Only one DICOM Printing operation may be processed at the same time.

4.1.1.3 Asynchronous Nature

ETIAM Viewer does not support asynchronous communication.

4.1.1.4 Implementation Identifying Information

ETIAM Viewer will respond with the following implementation identifying parameters:

Table 4.1.1.4-1 Application Identification Information

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

4.1.2 Association Initiation Policy

4.1.2.1 General

4.1.2.1.1 Verification SCU

ETIAM Viewer may initiate an association with a Verification SCP within its configuration panel to check remote SCP availability. Association is then opened, negotiated and closed synchronously.

4.1.2.1.2 Storage SCU

ETIAM Viewer will initiate an association with a Storage SCP to store local data. All data will be stored on the same association.

Only one background storage operation may occur at the same time.

4.1.2.1.3 Print SCU

ETIAM Viewer will initiate an association with a Print SCP when a DICOM Print operation is requested through the ETIAM Viewer Film Composer. All printing request will be processed on the same association.

4.1.2.1.4 Worklist SCU

ETIAM Viewer will initiate a separate association for each Find request.

4.1.2.1.5 Modality Performed Procedure Step SCU

When acting as image/object importer, for each group of objects to import ETIAM Viewer will initiate sequentially as much associations as needed according to the number of different (Study Instance UID, modality) pairs found among objects to import. For each pair, two associations will be opened: one for N-CREATE operations, another for N-SET operations.

4.1.2.1.6 Query and Retrieve SCU

ETIAM Viewer will initiate a separate association for each Find request and each Move request.

Only one background Move request operation may occurs at the same time.

4.1.2.2 Real World Activity : Verification SCU

4.1.2.2.1 Associated Real-World Activity

The associated real world activity for ETIAM Viewer Verification (SCU) is to check within the Configuration panel the availability of a DICOM peer providing the corresponding SCP service.

4.1.2.2.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following different Presentation Contexts:

Table 4.1.2.2.2-1 Verification Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None

4.1.2.3 Real World Activity : Storage SCU

4.1.2.3.1 Associated Real-World Activity

The associated real world activity for ETIAM Viewer storage (SCU) is the transfer of local data to remote equipment over the network.

4.1.2.3.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following different Presentation Contexts:

Table 4.1.2.3.2-1 Storage Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See below	See below	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
See below	See below	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
See below	See below	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
See below	See below	JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	None
See below	See below	JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression	1.2.840.10008.1.2.4.51	SCU	None
See below	See below	JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCU	None
See below	See below	JPEG 2000 Lossless	1.2.840.10008.1.2.4.90	SCU	None
See below	See below	JPEG 2000	1.2.840.10008.1.2.4.91	SCU	None
See below	See below	MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCU	None
See below	See below	MPEG2 Main Profile @ High Level	1.2.840.10008.1.2.4.101	SCU	None
See below	See below	RLE Lossless	1.2.840.10008.1.2.5	SCU	None

Note: Abstract syntaxes and their UIDs are those listed in Table 4.1-2

ETIAM Viewer applies the following rules for the presentation contexts proposed:

- A Presentation Context containing the 3 uncompressed transfer syntaxes is proposed for all storage operations excepted for MPEG2 encoded datasets which will never be proposed uncompressed.
- A specific Presentation Context containing only Little Endian Implicit VR is proposed if datasets that cannot support Explicit VR encoding are to be stored. This concerns for example datasets having US, DS, or some other attributes longer than 64K bytes.
- If an image is encoded, its corresponding native transfer syntax is proposed also in a separate Presentation Context, and will be preferred by SCU if both compressed and uncompressed transfer syntaxes are accepted by SCP.
- If SCP does not accept encoded transfer syntaxes, ETIAM Viewer will try to uncompress the related images on the fly.

4.1.2.3.3 SOP Specific Conformance

Images sent by ETIAM Viewer using Storage SCU operation contain their native information. ETIAM Viewer never attempts to modify local stored datasets.

However, when images are stored by ETIAM Viewer and some Patient Reconciliation Request is performed, images are modified on the fly, and then sent to the DICOM Store SCP. Previous information values may be saved on the fly in the stored datasets, according to DICOM 2004 - CP 526.

Table 4.1.2.3.3-1 Additional Reconciliation Attributes (CP 526)

Attribute Name	Tag	Type	Attribute Value
Original Attributes Sequence	(0400,0561)	3	
>Source of Previous Values	(0400,0564)	2	Empty value
>Attribute Modification Datetime	(0400,0562)	1	Date and time the reconciliation occurred
>Modifying System	(0400,0563)	1	ETIAM Viewer <version-string>
>Reason for the Attribute Modification	(0400,0565)	1	COERCE
>Modified Attributes Sequence	(0400,0550)	1	
>>Any Attribute from the main data set that was modified or removed			

Also, according to software configuration (IHE IRWF), ETIAM Viewer may also insert a sequence item related to the Contributing Equipement.

Table 4.1.2.3.3-2 Contributing Equipment Item Attributes

Attribute Name	Tag	Type	Attribute Value
Contributing Equipment Sequence	(0018,A001)	3	
> Purpose of Reference Code Sequence	(0040,A170)	1	
>> Code Value	(0008,0100)	1	MEDIM
>> Code Scheme Designator	(0008,0102)	1	DCM
>> Code Scheme Version	(0008,0103)	1C	
>> Code Meaning	(0008,0104)	1	Portable Media Importer
> Manufacturer	(0008,0070)	1	ETIAM
> Institution Name	(0008,0080)	3	Institution Name declared in application
> Station Name	(0008,1010)	3	Application AETitle
> Contribution Date Time	(0018,A002)	3	Date and Time of Instance Import according to IHE IRWF
> Contribution Description	(0018,A003)	3	IHE IRWF Profile

4.1.2.4 Real World Activity : Storage Commitment Push Model SCU

4.1.2.4.1 Associated Real-World Activity

The associated real world activity for ETIAM Viewer Storage Commitment (SCU) is request for storage commitment of objects when stored to an Image archive which is

declared within the Configuration panel to support this service. For each group of objects stored to the server declared as been a Storage Commitment SCP peer, a Storage Commitment N-ACTION will be sent. ETIAM Viewer will then close the association and expect LtBxSCP to receive N-EVENT-REPORT messages during ETIAM Viewer session. On reception of N-EVENT-REPORT messages, ETIAM Viewer only displays the result in the background process window. When closing ETIAM Viewer, all expected Storage Commitment transactions are removed. When receiving unsolicited N-EVENT-REPORT messages linked to previous ETIAM Viewer sessions, those messages are discarded.

4.1.2.4.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following different Presentation Contexts:

Table 4.1.2.4.2-1 Storage Commitment Push Model Proposed Presentation Contexts

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

4.1.2.5 Real-World Activity : Basic Print Management SCU

4.1.2.5.1 Associated Real-World Activity

The associated real world activity for ETIAM Viewer Printing (SCU) is the printing of images to DICOM Print SCP equipment over the network, through the Film Composer.

4.1.2.5.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following different Presentation Contexts:

Table 4.1.2.5.2-1 Basic Print Management Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	DICOM Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	DICOM Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None

4.1.2.6 Real World Activity: Basic Modality Worklist Management SCU

4.1.2.6.1 Associated Real-World Activity

The associated real World Activity for ETIAM Viewer Worklist SCU is the obtaining of Worklist items that will be presented to the user to perform data reconciliation.

4.1.2.6.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following Presentation Context:

Table 4.1.2.6.2-1 Basic Worklist Management Proposed Presentation Contexts

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

4.1.2.6.3 SOP Specific Conformance

ETIAM Viewer provides standard conformance to the DICOM Basic Worklist Management Service Class. ETIAM Viewer requests the following matching key types:

Key type matching	
SV	Single value Matching
WC	Wild card Matching
RM	Range Matching

Table 4.1.2.6.3-1 Modality Worklist Information model attributes

Module	Attribute Name	Tag	Match
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040, 0100)	
	> Scheduled Station AETitle	(0040, 0001)	SV
	> Scheduled Procedure Step Start Date	(0040, 0002)	RM
	> Scheduled Procedure Step Start Time	(0040, 0003)	
	> Scheduled Procedure Step End Date	(0040, 0004)	
	> Scheduled Procedure Step End Time	(0040, 0005)	
	> Modality	(0008, 0060)	SV
	> Scheduled Performing Physician's Name	(0040, 0006)	SV / WC
	> Scheduled Station Name	(0040, 0010)	
	> Scheduled Procedure Step Location	(0040, 0011)	
	> Pre Medication	(0040, 0012)	
	> Scheduled Procedure Step ID	(0040, 0009)	
	> Scheduled Procedure Step Status	(0040, 0020)	
	> Comments On Scheduled Procedure Step Status	(0040, 0400)	
	> Requested Contrast Agent	(0032, 1070)	
Requested Procedure	Requested Procedure ID	(0040, 1001)	
	Study Instance UID	(0020, 000D)	
	Reason For The Requested Procedure	(0020, 1002)	
	Requested Procedure Priority	(0040, 1003)	
	Patient Transport Arrangements	(0040, 1004)	
	Names Of Intended Recipients Of Results	(0040, 1010)	
	Requested Procedure Comments	(0040, 1400)	
Imaging Service Request	Accession Number	(0008, 0050)	SV
	Requesting Physician	(0032, 1032)	
	Referring Physician's Name	(0008, 0090)	
	Requesting Service	(0032, 1033)	
	Reason For The Imaging Service Request	(0040, 2001)	
	Imaging Service Request Comments	(0040, 2400)	
	Placer Order Number / Imaging Service Request	(0040, 2016)	
Visit Identification	Admission ID	(0038, 0010)	
Visit Status	Current Patient Location	(0038, 0300)	
Patient Identification	Patient's Name	(0010, 0010)	SV / WC
	Patient ID	(0010, 0020)	SV
Patient Demographic	Patient's Birth Date	(0010, 0030)	RM
	Patient's Birth Time	(0010, 0032)	
	Patient's Sex	(0010, 0040)	SV
	Patient's Size	(0010, 1020)	
	Patient's Weight	(0010, 1030)	
	Confidentiality Constraint On Patient Data Description	(0010, 3001)	
	Ethnic Group	(0010, 2160)	
	Patient Comments	(0010, 4000)	
Patient Medical	Patient State	(0038, 0500)	
	Medical Alerts	(0010, 2000)	
	Contrast Allergies	(0010, 2110)	
	Special Needs	(0038, 0050)	
	Additional Patient History	(0010, 21B0)	
	Last Patient Menstrual Date	(0010, 21D0)	

4.1.2.7 Real World Activity: Modality Performed Procedure Step SCU

4.1.2.7.1 Associated Real-World Activity

The associated real World Activity for ETIAM Viewer MMPS SCU is to keep a PPS manager informed of objects being imported.

4.1.2.7.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following Presentation Context:

Table 4.1.2.7.2-1 MMPS Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None

4.1.2.7.3 SOP Specific Conformance

ETIAM Viewer provides standard conformance to the DICOM MMPS Service Class.

Table 4.1.2.7.3-1 MMPS Attributes

Attribute Name	Tag	VR	N-CREATE	N-SET
Specific Character Set	(0008,0005)	CS	ISO_IR 100	
Modality	(0008,0060)	CS	From imported data	
Procedure Code Sequence	(0008,1032)	SQ		
Referenced Patient Sequence	(0008,1120)	SQ	empty	
Patient's Name	(0010,0010)	PN	[IRWF note]	
Patient ID	(0010,0020)	LO	[IRWF note]	
Patient's Birth Date	(0010,0030)	DA	[IRWF note]	
Patient's Sex	(0010,0040)	CS	[IRWF note]	
Study ID	(0020,0010)	SH	[IRWF note]	
Performed Station AE Title	(0040,0241)	AE	Configuration	
Performed Station Name	(0040,0242)	SH	Configuration	
Performed Location	(0040,0243)	SH		
Performed Procedure Step Start Date	(0040,0244)	DA	Import start date	
Performed Procedure Step Start Time	(0040,0245)	TM	Import start time	
Performed Procedure Step End Date	(0040,0250)	DA		Import end date
Performed Procedure Step End Time	(0040,0251)	TM		Import end time
Performed Procedure Step Status	(0040,0252)	CS	IN PROGRESS	DISCONTINUED or COMPLETED
Performed Procedure Step ID	(0040,0253)	SH	[IRWF note]	
Performed Procedure Step Description	(0040,0254)	LO	[IRWF note]	
Performed Procedure Type Description	(0040,0255)	LO		
Performed Protocol Code Sequence	(0040,0260)	SQ	{ IRWF001, IHERADTF, Import }	

Scheduled Step Attributes Sequence	(0040,0270)	SQ		
> Accession Number	(0008,0050)	SH		From MWL if any. Empty if unscheduled
> Referenced Study Sequence	(0008,1110)	SQ		
>> Referenced SOP Class UID	(0008,1150)	UI		
>> Referenced SOP Instance UID	(0008,1155)	UI		
> Study Instance UID	(0020,000D)	UI		
> Requested Procedure Description	(0032,1060)	LO	[IRWF note]	
> Scheduled Procedure Step Description	(0040,0007)	LO	[IRWF note]	
> Scheduled Protocol Code Sequence	(0040,0008)	SQ	[IRWF note]	
> Scheduled Procedure Step ID	(0040,0009)	SH	[IRWF note]	
> Requested Procedure ID	(0040,1001)	SH	[IRWF note]	
Performed Procedure Step Discontinuation Reason Code Sequence	(0040,0281)	SQ	empty	According to user selection if storage operation and job not done in background. Otherwise : { 110523, DCM, Object Set incomplete }
Performed Series Sequence	(0040,0340)	SQ		
> Retrieve AE Title	(0008,0054)	AE		
> Series Description	(0008,103E)	LO		
> Performing Physician's Name	(0008,1050)	PN		
> Operator's Name	(0008,1070)	PN		
> Referenced Image Sequence	(0008,1140)	SQ	empty	Imported image objects information if any
>> Referenced SOP Class UID	(0008,1150)	UI		
>> Referenced SOP Instance UID	(0008,1155)	UI		
> Protocol Name	(0018,1030)	LO		
> Series Instance UID	(0020,000E)	UI		
> Referenced Non Image Composite Instance Seq.	(0040,0220)	SQ	empty	Imported non-image objects information if any
>> Referenced SOP Class UID	(0008,1150)	UI		
>> Referenced SOP Instance UID	(0008,1155)	UI		

[IRWF note] : Application detailed behavior regarding MPPS messages is detailed in Annex A-5 of IHE TF vol II

4.1.2.8 Real World Activity: Query and Retrieve SCU

4.1.2.8.1 Associated Real-World Activity

The associated Real World Activity for ETIAM Viewer Query and Retrieve SCU is the retrieving of remote studies.

It may however be also the obtaining of patient and study related information to perform Patient Reconciliation. In such a case, only C_FIND requests are performed.

4.1.2.8.2 Proposed Presentation Contexts

ETIAM Viewer will propose the following Presentation Context:

Table 4.1.2.8.2-1 Query and Retrieve Proposed Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian Transfer syntax	1.2.840.10008.1.2.1	SCU	None
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCU	None
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian Transfer syntax	1.2.840.10008.1.2.1	SCU	None

4.1.2.8.3 SOP Specific Conformance statement

ETIAM Viewer provides standard conformance to the DICOM Query and Retrieve Service Class. ETIAM Viewer requests the following matching key types:

Key type matching	
SV	Single value Matching
WC	Wild card Matching
RM	Range Matching

Table 4.1.2.8.3-1 Query and Retrieve matching key types

Attribute Name	Tag	Match
Study Date	(0008, 0020)	RM
Accession Number	(0008, 0050)	SV
Patient's Name	(0010, 0010)	SV / WC
Patient ID	(0010, 0020)	SV

ETIAM Viewer will query for the following attributes:

Table 4.1.2.8.3-2 Query Attributes

Attribute Name	Tag
Specific Character Set	(0008,0005)
Retrieve AE Title	(0008,0055)
Instance Availability	(0008,0056)
PatientName	(0010,0010)
PatientID	(0010,0020)
PatientBirthDate	(0010,0030)
PatientSex	(0010,0040)
StudyInstanceUID	(0020,000D)
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
ReferringPhysiciansName	(0008,0090)
StudyDescription	(0008,1030)
StudyID	(0020,0010)
SeriesInstanceUID	(0020,000E)
Modality	(0008,0060)
SeriesNumber	(0020,0011)
SOPInstanceUID	(0008,0018)

4.1.3 Association Acceptance Policy

4.1.3.1 Real World Activity: Verification SCP

4.1.3.1.1 Associated Real-World Activity

See 3.2.6

4.1.3.1.2 Presentation Context Table

ETIAM Viewer (through LtBxSCP) will accept the following different Presentation Contexts for Verification SCP:

Table 4.1.3.1.2-1 Acceptable Presentation Contexts for Verification SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCP	None

4.1.3.1.3 SOP Specific Conformance

ETIAM Viewer (through LtBxSCP) provides standard conformance to the DICOM Verification Service Class.

4.1.3.2 Real World Activity: Storage SCP

4.1.3.2.1 Associated Real-World Activity

See 3.2.7

4.1.3.2.2 Presentation Context Table

ETIAM Viewer (through LtBxSCP) will accept the following different Presentation Contexts for Storage SCP:

Table 4.1.3.2.2-1 Storage Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See below	See below	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
See below	See below	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
See below	See below	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
See below	See below	JPEG Baseline : Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	None
See below	See below	JPEG Extended (Process 2 & 4): Default Transfer Syntax for Lossy JPEG 12 Bit Image Compression	1.2.840.10008.1.2.4.51	SCP	None
See below	See below	JPEG Lossless, Non-Hierarchical, First-Order Prediction	1.2.840.10008.1.2.4.70	SCP	None
See below	See below	MPEG2 Main Profile @ Main Level	1.2.840.10008.1.2.4.100	SCP	None
See below	See below	MPEG2 Main Profile @ High Level	1.2.840.10008.1.2.4.101	SCP	None
See below	See below	RLE Lossless	1.2.840.10008.1.2.5	SCP	None

Note : Abstract syntaxes and their UIDs are those listed in Table 4.1-2

4.1.3.2.3 SOP Specific Conformance

ETIAM Viewer (through LtBxSCP) provides standard conformance to the DICOM Storage Service Class.

4.1.3.2.4 Presentation Context Acceptance Criterion

No control is made concerning the Abstract/Transfer syntax consistency.

4.1.3.2.5 Transfer Syntax Acceptance Selection Policies

ETIAM Viewer (through LtBxSCP) will prefer, for storage operations, in decreasing order:

- Encoded transfer syntax
- Explicit VR Little Endian transfer syntax
- Implicit VR Little Endian transfer syntax
- Explicit VR Big Endian transfer syntax

4.1.3.3 Real World Activity: Query and Retrieve SCP

4.1.3.3.1 Associated Real-World Activity

See 3.2.8

4.1.3.3.2 Presentation Context Table

ETIAM Viewer (through LtBxSCP) will accept the following different Presentation Contexts for Query and Retrieve SCP:

Table 4.1.3.3.2-1 Query and Retrieve Accepted Presentation Contexts

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCP	None
Study Root Find	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian Transfer syntax	1.2.840.10008.1.2.1	SCP	None
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian Transfer syntax	1.2.840.10008.1.2	SCP	None
Study Root Move	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Little Endian Transfer syntax	1.2.840.10008.1.2.1	SCP	None

4.1.3.3.3 SOP Specific Conformance

ETIAM Viewer (through LtBxSCP) provides standard conformance to the DICOM Query and Retrieve Service Class.

4.1.3.3.4 Presentation Context Acceptance Criterion

No control is made concerning the Abstract/Transfer syntax consistency.

4.1.3.3.5 Transfer Syntax Acceptance Selection Policies

ETIAM Viewer (through LtBxSCP) will prefer, for query and retrieve operations, in decreasing order:

- Explicit VR Little Endian transfer syntax
- Implicit VR Little Endian transfer syntax

C-FIND SCP Conformance

Queries against the standard Study Root Query/Retrieve Information Model are supported to return attribute values of Objects known to ETIAM Viewer, as recorded in its database.

Optional keys supported for the Study Root Q/R Model are listed in the table below. The support differs based on the query level specified in the required Level Tag (0008,0052).

Table 4.1.3.3.5-1 Query and Retrieve supported attributes

Level	Description	Tag	Type
STUDY	Study Instance UID	(0020,000D)	U
	Study ID	(0020,0010)	R
	Patient ID	(0010,0020)	R
	Patient's Name	(0010,0010)	R
	Study Date	(0008,0020)	R
	Accession Number	(0008,0050)	R
	Study Description	(0008,1030)	O
	Patient's Birth Date	(0010,0030)	O
	Patient's Sex	(0010,0040)	O
SERIES	Modality	(0008,0060)	R
	Series Number	(0020,0011)	R
	Series Instance UID	(0020,000E)	U
	Series Description	(0008,103E)	O
IMAGE	SOP Instance UID	(0008,0018)	U
	SOP Class UID	(0008,0016)	O
	Instance Number	(0020,0013)	R

C-MOVE SCP Conformance

The ETIAM Viewer AE supports C-MOVE sub-operations for each of the Storage Service Class SOP Classes list in Table 4.1-2.

When performing C-STORE operations on behalf of a C-MOVE request from a remote DICOM application entity, periodic C-MOVE PENDING response messages are sent to the C-MOVE SCU for each object. The ETIAM Viewer AE notifies the remote C-MOVE SCU about the number of successful, failed, refused or warning messages received from the remote C-STORE SCP.

5. Communication Profiles

5.1 Supported Communications Stacks

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

5.2 TCP/IP Stack

ETIAM Viewer inherits its TCP/IP stack from the Windows system upon which it executes. Default Windows TCP/IP stack is supported.

5.3 Physical Media Support

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

6. Extensions/Specializations/Privatizations

None

7. Configuration

ETIAM Viewer configuration is detailed in ETIAM Viewer User's Guide and ETIAM Viewer Inside book.

The following parameters may be configured :

- ETIAM Viewer AE Title : Default value is the PC hostname, uppercased
- ETIAM Viewer / LtBxSCP TCP/IP port. Default value is 8007
- Media profiles restrictions for media creation (FSC)

8. Support of Extended Character Sets

ETIAM Viewer supports Extended Character Set "ISO_IR 100" Latin Alphabet N° 1, supplementary set.
