

Philips Medical Systems

DICOM CONFORMANCE STATEMENT

ViewForum 2003 Release 3.1

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TABLE OF CONTENTS

1. INTRODUCTION	5
1.1. Scope and Field of Application	5
1.2. Intended Audience	5
1.3. Contents and Structure	5
1.4. Used Definitions, Terms and Abbreviations	5
1.5. References	5
1.5.1. [DICOM] The Digital Imaging and Communications in Medicine	5
1.6. Important Note to the Reader	6
1.7. General Acronyms and Abbreviations	7
2. IMPLEMENTATION MODEL	8
2.1. Application Data Flow Diagram	9
2.2. Functional definition of Application Entities	10
2.3. Sequencing of Real World Activities	10
3. AE SPECIFICATIONS	11
3.1. ViewForum AE	11
3.1.1. Association Establishment Policies	13
3.1.1.1. General	13
3.1.1.2. Number of Associations	13
3.1.1.3. Asynchronous Nature	13
3.1.1.4. Implementation Identifying Information	13
3.1.2. Association Initiation Policy	14
3.1.2.1. Copy Images from ViewForum (i.e. Image Export)	14
3.1.2.2. Query a Remote Database	17
3.1.2.3. Retrieve Images from a Remote Database	18
3.1.2.4. Print images	19
3.1.2.5. Request for the Printer Status	22
3.1.2.6. Storage Commitment	23
3.1.3. Association Acceptance Policy	24
3.1.3.1. Verify Application Level Communication	24
3.1.3.2. Store Images in the ViewForum Database (i.e. Image Import)	25
3.1.3.3. Query the ViewForum Database	29
3.1.3.4. Retrieve Images from the ViewForum Database	31
3.2. ViewForum AE Media Specification	32
3.2.1. File Meta Information	32
3.2.2. Media related Real-World Activities	32
3.2.2.1. RWA Display Directory	32
3.2.2.2. RWA Write images on CD-R disk	32
3.2.2.3. RWA Read images from CD-R disk	33
3.2.3. Augmented Application Profile	33
4. COMMUNICATION PROFILES	35
4.1. Supported Communication Stacks	35
4.2. TCP/IP Stack	35
4.2.1. Physical Media Support	35
5. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS	36
6. CONFIGURATION	37
6.1. AE Title/Presentation Address mapping	37
6.1.1. Local AE Title and Presentation Address	37
6.1.2. Remote AE Titles and Presentation Addresses	37
6.2. Configurable parameters	37
6.2.1. Configuration per ViewForum system	37
6.2.2. Configuration per remote system	37
6.2.3. Print Configuration	38
7. SUPPORT OF EXTENDED CHARACTER SETS	39





1. INTRODUCTION

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1. Scope and Field of Application

The scope of this DICOM Conformance Statement is to facilitate data exchange with equipment of Philips Medical Systems. This document specifies the compliance to the DICOM standard (formally called the NEMA PS 3.X standards). It contains a short description of the applications involved and provides technical information about the 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.

The field of application is the integration of the Philips Medical Systems equipment into an environment of medical devices. This Conformance Statement should be read in conjunction with the DICOM standard and its addenda [DICOM].

1.2. Intended Audience

This Conformance Statement is intended for:

- (potential) customers
- system integrators of medical equipment
- marketing staff interested in system functionality
- software designers implementing DICOM interfaces

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

1.3. Contents and Structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2.

1.4. Used Definitions, Terms and Abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3 and PS 3.4.

The word Philips in this document refers to Philips Medical Systems.

1.5. References

1.5.1. [DICOM] The Digital Imaging and Communications in Medicine

(DICOM) standard (NEMA PS 3.X):
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1847
Rosslyn, Va. 22209, United States of America

1.6. Important Note to the Reader

This Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

➤ Interoperability

Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.

It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

➤ Validation

Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.

Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

➤ New versions of the DICOM Standard

The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery.

The user should ensure that any non-Philips provider linking to Philips equipment, also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).



1.7. General Acronyms and Abbreviations.

The following acronyms and abbreviations are used in the document.

- ACC American College of Cardiology
- AE Application Entity
- ACR American College of Radiology
- ANSI American National Standard Institute
- DICOM Digital Imaging and Communication in Medicine
- DIMSE DICOM Message Service Element
- ELE Explicit VR Little Endian
- EBE Explicit VR Big Endian
- FSC File Set Creator
- FSR File Set Reader
- FSU File Set Updater
- ILE Implicit VR Little Endian
- IOD Information Object Definition
- NEMA National Electrical Manufacturers Association
- PDU Protocol Data Unit
- RIS Radiology Information System
- RWA Real World Activity
- SCU Service Class User
- SCP Service Class Provider
- SOP Service Object Pair
- TCP/IP Transmission Control Protocol/Internet protocol
- UID Unique Identifier



2. IMPLEMENTATION MODEL

The ViewForum 2003 Release 3.1 system of Philips Medical Systems is a comprehensive range of hardware and software modules that allow for tailored clinical solutions. The software applications are categorized in packages, for instance the Volume package for CT/MR images. The hardware consists of a PC Windows workstations.

ViewForum provides the following DICOM data exchange features:

- It receives images sent to it by remote systems (e.g. workstations or imaging modalities) and stores them in a database.
- It allows the operator to copy images from the database to remote databases and vice versa. For this purpose the operator is able to query remote databases.
- It allows a remote system to query the ViewForum database and to retrieve images from it.
- It allows the operator to print images stored in the database on a DICOM printer.
- It is able to read and write DICOM CD-R disks.

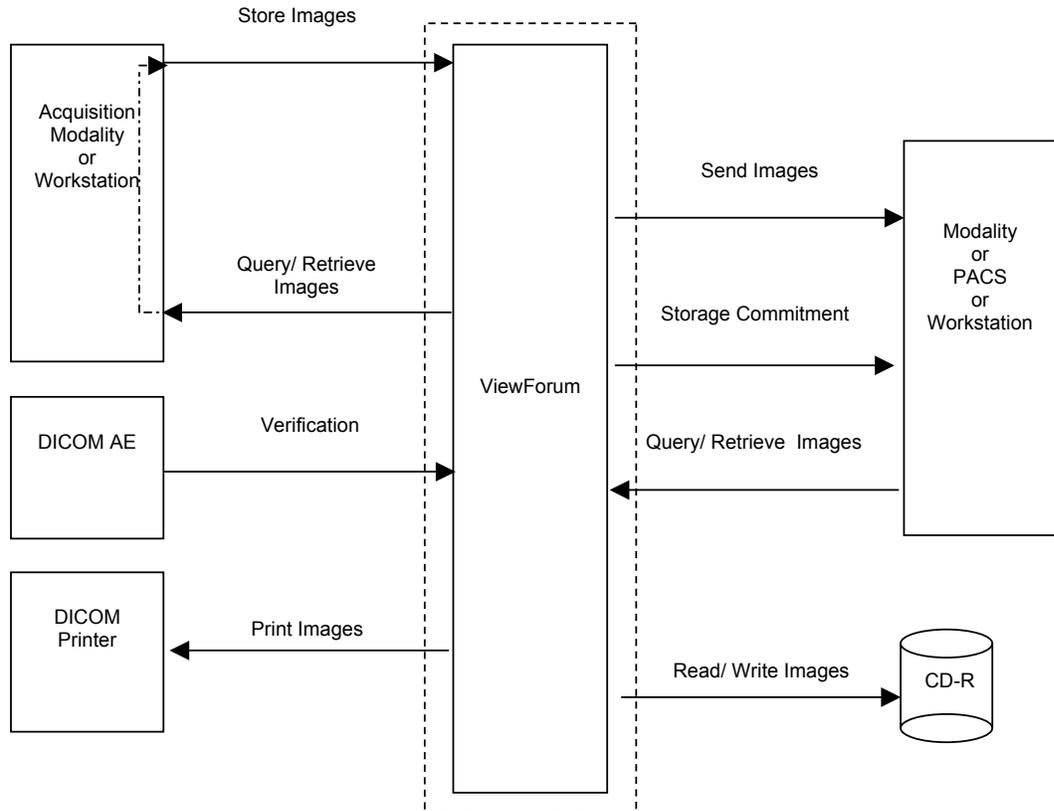


Figure 1. ViewForum in a DICOM network



ViewForum allows the operator also to view, analyze and process the images stored in the database. Some advanced analysis and processing applications are primarily designed for images generated by Philips equipment when sent to the ViewForum.

This Conformance Statement describes the DICOM Conformance of the ViewForum platform. Application package specific DICOM Conformance is described in separate Conformance Statements.

2.1. Application Data Flow Diagram

The ViewForum system behaves as a single Application Entity. Its related Implementation Model is shown in Figure 2.

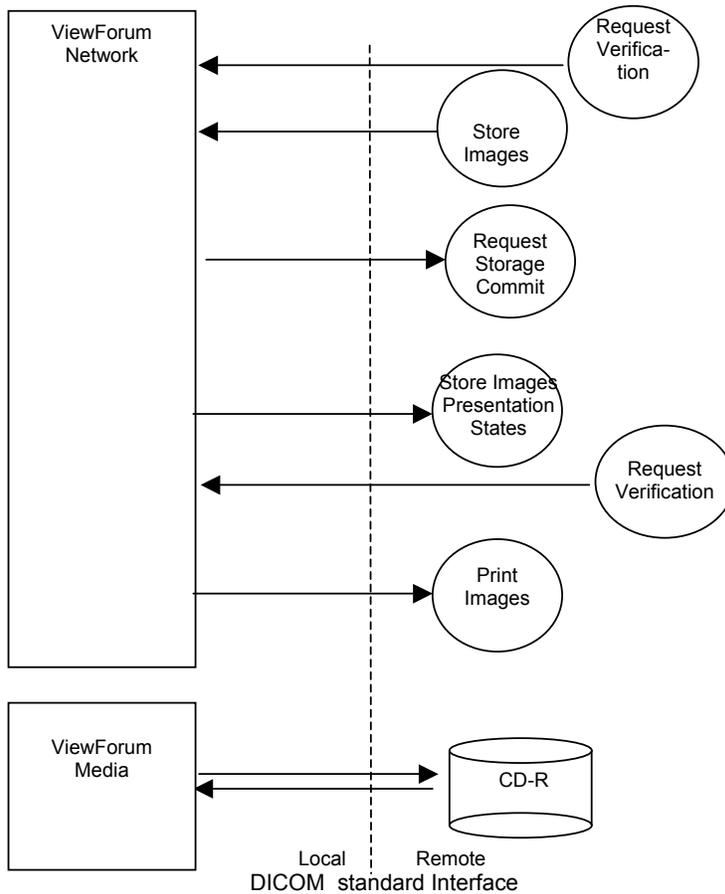


Figure 2. Application Data Flow

As documented in the PS 3.4, the arrows in the diagram have the following meanings:

- An arrow pointing to the right indicates the local application entity initiates an association.
- An arrow pointing to the left indicates the local application entity accepts an association.



The ViewForum operator can request to query a selected remote system, request to copy images from ViewForum to a selected remote system, request storage commitment on exported images, request to retrieve selected images from remote systems and can request to print images. This results in Associations initiated by ViewForum.

ViewForum is able to reply on verification requests, to execute a requested query, to store received images into ViewForum and retrieve requested images from ViewForum. These requests from remote systems are done via Associations initiated by the remote systems.

ViewForum is also able to display the contents (i.e. directory listing) of DICOM CD-Recordable disks and to write, read and update images on/from a DICOM CD-Recordable disk.

2.2. Functional definition of Application Entities

The ViewForum Application Entity acts as a Service Class User (SCU) of Query/Retrieve, Storage commitment and Store service classes. The application acts as a Service Class Provider (SCP) of Verification, Query/Retrieve and Store service classes.

The ViewForum Print functionality acts as Service Class User (SCU) for the Print Service Class.

ViewForum acts also as a File Set Creator (FSC), File Set Reader (FSR) and File Set Updater (FSU) of the Media Service Class.

2.3. Sequencing of Real World Activities

All Real-World Activities as specified in Figure 2 may occur independently from each other, except that the two local Print Real-World Activities are mutual exclusive: A request for the printer status is not done when a request for image printing is busy, vice versa.

3. AE SPECIFICATIONS

The Network capabilities of the system consists of one DICOM Application Entities:

- ViewForum AE

The functions supported by this AE are specified in section 3.1.

The Media functionality is described in section 3.2

3.1. ViewForum AE

The ViewForum Application Entity provides Standard Extended Conformance to the DICOM V3.0 SOP classes as an SCU specified in Table 1. The following remarks are important:

- The list of available SOP Classes out of the full list in Table 1 can be configured per Easy-Vision system at installation time. The SOP Classes to be used as SCU can be configured per remote station.
- In case the remote system does not support the import of a specific Image Storage SOP Class, ViewForum will convert (if configured to do so) these images and sends them via the SC Image SOP Class.
- The Private SOP Classes may be stored in image archives but are to be used in ViewForum systems only.
- The ViewForum requests for a Storage Commitment.

Table 1. Supported SOP classes by the ViewForum AE as SCU

SOP class Name	UID
Storage Commitment Push Model	1.2.840.10008.1.20.1
CR 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
DX Image Storage for presentation	1.2.840.10008.5.1.4.1.1.1.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Patient Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Patient/Study Only Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
> Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
> Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
> Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
> Printer SOP Class	1.2.840.10008.5.1.1.16



SOP class Name	UID
3D Volume Storage (Private class)	1.3.46.670589.5.0.1.1
3D Volume Object Storage (Private class)	1.3.46.670589.5.0.2.1
Surface Storage (Private class)	1.3.46.670589.5.0.3.1
CT Synthetic Image (Private class)	1.3.46.670589.5.0.9
MR Synthetic Image (Private class)	1.3.46.670589.5.0.10
MR Cardio Storage (Private class)	1.3.46.670589.5.0.8.1
MR Cardio Analysis Storage (Private class)	1.3.46.670589.5.0.11.1
Specialized X-ray (Private class)	1.3.46.670589.2.3.1.1
CX Image (Private class)	1.3.46.670589.2.4.1.1
CX Synthetic Image (Private class)	1.3.46.670589.5.0.12
Perfusion (Private class)	1.3.46.670589.5.0.13
Perfusion Analysis (Private class)	1.3.46.670589.5.0.14

The ViewForum Application Entity provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCP specified in Table 2. The following remarks are important:

- The list of available SOP Classes out of the full list in Table 2 can be configured per Easy-Vision system at installation time. The SOP Classes to be supported as SCP can be configured per remote station.
- The Private SOP Classes may be stored in image archives but are to be used in ViewForum systems only.

Table 2. Supported SOP classes by the ViewForum AE as SCP

SOP class Name	UID
Verification	1.2.840.10008.1.1
CR 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
DX Image Storage for presentation	1.2.840.10008.5.1.4.1.1.1.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
Presentation State Storage	1.2.840.10008.5.1.4.1.1.11
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Patient Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.2.1
Patient/Study Only Query/Retrieve Info Model - FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve Info Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2
3D Volume Storage (Private class)	1.3.46.670589.5.0.1.1
3D Volume Object Storage (Private class)	1.3.46.670589.5.0.2.1
Surface Storage (Private class)	1.3.46.670589.5.0.3.1
CT Synthetic Image (Private class)	1.3.46.670589.5.0.9
MR Synthetic Image (Private class)	1.3.46.670589.5.0.10
MR Cardio Storage (Private class)	1.3.46.670589.5.0.8.1
MR Cardio Analysis Storage (Private class)	1.3.46.670589.5.0.11.1
Specialized X-ray (Private class)	1.3.46.670589.2.3.1.1

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SOP class Name	UID
CX Image (Private class)	1.3.46.670589.2.4.1.1
CX Synthetic Image (Private class)	1.3.46.670589.5.0.12
Perfusion (Private class)	1.3.46.670589.5.0.13
Perfusion Analysis (Private class)	1.3.46.670589.5.0.14

3.1.1. Association Establishment Policies

3.1.1.1. General

ViewForum as SCU will offer unrestricted maximum PDU size on Associations initiated by ViewForum itself. This is also configurable per remote station.

When ViewForum acts as SCP the maximum number of simultaneous associations is by default unlimited, but the maximum can be limited via the configuration.

3.1.1.2. Number of Associations

The number of simultaneous Associations supported by ViewForum as a Service Class Provider is in principle not limited. The practical maximum number of supported Associations is determined by the amount of resources (CPU, memory, hard disk size).

As a result of local activities, ViewForum will initiate at most 3 simultaneous Associations. One Association is used to issue query requests. The other Association is used to issue store or retrieve and one for print requests. ViewForum will further initiate an Association for each remote retrieve request executed by ViewForum as a MOVE Service Class Provider. These Associations are used to issue the store sub-operations implied by the retrieve requests. The number of simultaneous store Associations for this retrieve purpose is in principle not limited. Storage Commitment can keep open a configurable number of associations.

3.1.1.3. Asynchronous Nature

ViewForum does not support asynchronous operations and will not perform asynchronous window negotiation.

3.1.1.4. Implementation Identifying Information

THE IMPLEMENTATION CLASS UID:	1.3.46.670589.5.2.20
THE IMPLEMENTATION VERSION NAME:	"ViewForum R3.1"



3.1.2. Association Initiation Policy

ViewForum initiates Associations as a result of the following events:

- The ViewForum operator or a remote application copies selected images from the ViewForum database to another database (i.e. image export), see section 3.1.2.1;
- The ViewForum operator queries a remote database, see section 3.1.2.2;
- The ViewForum operator copies selected images from a remote database to another database, see section 3.1.2.3.
- The ViewForum operator requests to print selected images in the ViewForum database, see section 3.1.2.4.
- The ViewForum operator requests for the status of a selected printer, see section 3.1.2.5.

3.1.2.1. Copy Images from ViewForum (i.e. Image Export)

3.1.2.1.1. Associated Real-World Activity

The operator is able to copy all/selected images in a patient folder from the local ViewForum database to another database (i.e. image export) by means of the copy tool in the ViewForum data-handling tool. ViewForum initiates for each selected patient an Association to the selected peer entity and uses it to send C-STORE requests (and receive the associated store replies). The Association is released when all selected images in the selected folder have been transmitted. ViewForum handles operator copy requests one after another.

A remote application copies images from the local ViewForum database to another database by sending a C-MOVE request to ViewForum. ViewForum initiates for each received retrieve request an Association to the requested move destination and uses it to send C-STORE requests (and receive the associated store replies). The Association is released when all instances (images and presentation states) selected by the retrieve request identifier have been transmitted. ViewForum is able to simultaneously handle C-MOVE requests.

The ViewForum DICOM query as SCU for all possible levels all the required and the unique keys. No optional keys are queried.



3.1.2.1.2. Proposed Presentation Contexts

ViewForum will propose the following presentation contexts:

Table 3. Proposed Presentation Contexts for ViewForum to Other

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCU	None
See Note	See Note	ELE	1.2.840.10008.1.2.1	SCU	None
See Note	See Note	EBE	1.2.840.10008.1.2.2	SCU	None

Note: Any of the Standard Image Storage and Private storage SOP classes listed in Table 1, "Supported SOP classes by the ViewForum AE as SCU,".

For performance reasons the ELE is preferred.

Extended negotiation is not supported.

3.1.2.1.3. C-STORE SCU Conformance

The store response status is saved in the log file, a user error will be displayed in the GUI.

ViewForum will stop the transfer of the images and release the Association as soon as it receives an unsuccessful or warning store response status. In case a remote application requested the transfer (by means of a C-MOVE request), a move response with status unsuccessful is sent to the retrieve requester.

Some ViewForum applications are able to generate new derived images from a set of received (original) images. An example is a 3D reconstructed image from a CT or MR image set. The attributes in these generated images are not specified in this Conformance Statement but specified in detail in the ViewForum Application specific Conformance Statements.

Important remarks about the exported images:

- ViewForum allows the operator to modify attributes of the stored images. ViewForum does not modify the pixel values of the stored images. Modified images retain their original Study, Series and Image UID.
- In case the remote system does not support a modality specific Image Storage SOP Class, ViewForum will convert (if configured to do so) the images and sends them via the SC Image SOP Class. These Secondary Capture images and additional information (like graphics, text and important attribute information) are burnt-in (if configured). The original bit depth of the Secondary Capture image is kept. Note: only standard DICOM images can be converted, private SOP classes can't be converted.
- In case of color images, all color-coding schemes are sent out just like they are received.
- Attributes e.g. Study Date and Study Time will be added to images to be exported (if not yet present). This is done because there are imaging systems relying on the existence of these attributes.
- The exported ViewForum images do not contain Instance Number if the original images received from modalities do not contain this attribute or provide information in other attributes to ViewForum to generate it.

- Exported CT/MR images relate Scanogram and Slice images in the following way: Attribute 'Referenced Image Sequence' is present in the slice images and points to the related Scanogram image.
Note that Attribute 'Frame of Reference UID' in the Scanogram (Localiser image) and related image slices are not guaranteed to be equal; this depends on the source of the images.
- For SC images only one Window Width and Window Centre value is exported.
- When the location of a graphic or text annotation is specified relatively with regards to the displayed area. (i.e. DICOM attribute: Bounding Box Annotation Units, Ancjor Point Annotation Units or Graphic Annotation Units equals "DISPLAY"), the annotation is not displayed.
- Areas occluded by shutter are always black in ViewForum, whereas it is possible to want it to be white in DICOM.
- On the export of such an image the ViewForum system first sets up an association to determine if the SCP supports the Grayscale softcopy presentation state SOP Class. If the SCP doesn't supports the Grayscale softcopy presentation state service the Graphical information is added to the image object additional a new instance UID is generated for this image.
- All kind of Images sending out from the are included with Performed Procedure Step Tags like: (Start Date, Start Time, ID).

Use of optional, private and retired attributes:

The transmitted Storage SOP instances may include all optional elements specified in the DICOM standard, depending on the source of the images.

The transmitted Storage SOP instances may contain Retired and Private data elements, depending on the source of the images and of the ViewForum configuration.

The ViewForum can convert the transfer syntax when exporting images.

The ViewForum can perform a transfer syntax conversion according to the following table:

Table 4. Transfer Syntax Conversion

Destination Syntax / Source Syntax	ILE	ELE	EBE
ILE	+	+	+
ELE	+	+	+
EBE	+	+	+



3.1.2.2. Query a Remote Database

3.1.2.2.1. Associated Real-World Activity

The operator queries a remote database by means of the query tool in the ViewForum data handling facility. ViewForum initiates an Association to the selected peer entity and uses it to send C-FIND requests (and receive the associated find replies). The Association is released when the find execution completes (the Q/R dialog on the User Interface is closed).

3.1.2.2.2. Proposed Presentation Contexts

ViewForum will propose the presentation contexts as given in the next table.

Table 5. Proposed Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None None None

Note: Any of the Standard Query Retrieve SOP classes listed in Table 1, "Supported SOP classes by the ViewForum AE as SCU,".

For performance reasons the ELE is preferred.

3.1.2.2.3. C-FIND SCU Conformance

ViewForum will not generate queries containing optional keys. ViewForum will not generate relational queries.

In the following tables the supported query's attributes for each SOP class are described.

Table 6. Supported query attributes

	Attributes	Tag	Query Key	Matching key
PatientLevel	Patient's Name	0010,0010	X	X
	Patient ID	0010,0020	X	X
	Patient's Birth Date	0010,0030	X	
	Patient's Sex	0010,0040	X	
StudyLevel	Study Date	0008,0020	X	X
	Study Time	0008,0030	X	
	Accession Number	0008,0050	X	X
	Referring Physician's Name	0008,0090	X	
	Study Description	0008,1030	X	
	Study ID	0020,0010	X	X
Series	Requesting Physician	0032,1032	X	
	Station Name	0008,1010	X	
	Scheduled Procedure Step Start Date	0040,0002	X	
	Performed Station Name	0040,0242	X	
	Performed Procedure Step ID	0040,0253	X	
	Performed Procedure Type Description	0040,0255	X	

	Attributes	Tag	Query Key	Matching key
	Modality	0008,0060	X	
	Performing Physician's Name	0008,1050	X	
	Protocol Name	0018,1030	X	
	Body Part Examined	0018,0015	X	
ImageLevel	SOP Instance UID	0008,0018	X	
	SOP Class UID	0008,0016	X	
	Content Date	0008,0023	X	
	Content Time	0008,0033	X	
	Instance Number	0020,0013	X	

3.1.2.3. Retrieve Images from a Remote Database

3.1.2.3.1. Associated Real-World Activity

The operator is able to copy all/selected images in a patient folder from a remote database to another, local or remote, database by means of the copy tool in the ViewForum data handling facility. ViewForum initiates for each selected study an Association to the selected peer entity and uses it to send C-MOVE requests (and receive the associated move replies). A study may contain both images and presentation states. When ViewForum receives the presentation state objects of such a study before its images, it may remove attributes on patient and study level that are present in the images but not in the presentation states. The Association is released when all selected images have been transmitted.

3.1.2.3.2. Proposed Presentation Contexts

ViewForum will propose the presentation contexts as given in the next table.

Table 7. Proposed Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE ELE EBE	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None None None

Note: Any of the Standard Query Retrieve SOP classes listed in Table 1, "Supported SOP classes by the ViewForum AE as SCU,".
For performance reasons the ELE is preferred.

3.1.2.3.3. C-MOVE SCU Conformance

The AE provides standard conformance.



3.1.2.4. Print images

3.1.2.4.1. Associated Real-World Activity

The operator will select the print destination (out of choice list of configured printers) and some print parameters (depending on the configuration and the selected printer), these values can also be configured. As a result, ViewForum will initiate an association to the selected printer and uses it to send the Print Service Elements of the Print SOP Classes.

ViewForum allows having a print preview first.

3.1.2.4.2. Proposed Presentation Contexts

ViewForum will propose the presentation contexts as given in the next table.

Table 8. Proposed Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

Note: Any of the Print SOP classes listed in Table 1, "Supported SOP classes by the ViewForum AE as SCU,". For performance reasons the ELE is preferred.

3.1.2.4.3. Conformance to the Print SOP Classes

ViewForum provides standard conformance to the Basic Grayscale Print Management Meta SOP Class.

The applied order of Print Service Elements (DIMSE) is specified in Table 7. A description and the applied optional (i.e. non-mandatory attributes as Print SCU) attributes in these Service Elements are specified too. Note that the Service Elements order is not specified by the DICOM standard.

An explicit N-DELETE Request on the created instances is not done by ViewForum; these are deleted implicitly when releasing the association.

Overlay, Annotation (showing the values of some major identifying attributes) and Shutter information is processed in the images sent to the printer (i.e. burnt-in in the image).

Table 9. The applied order of Print Service Elements and its optional attributes

Service Element of SOP Class	Description and applied optional attributes
N-GET of the Printer SOP Class	Purpose is to retrieve printer information.
N-CREATE of the Basic Film Session SOP Class	ViewForum specifies the DICOM Printer about some general presentation parameters, applicable for all films in the Film Session. Applied optional attributes are: Number of Copies, Print Priority, Medium Type, Film Destination



Service Element of SOP Class	Description and applied optional attributes
N-CREATE of the Basic Film Box SOP Class	ViewForum specifies the DICOM Printer about some general presentation parameters, applicable for all images in the Film Box. Applied optional attributes are: Film Orientation, Film Size ID, Magnification Type, Max. Density, Configuration Information, Trim.
N-SET of the Basic Grayscale Image Box SOP Class	ViewForum will send the images to be printed. Applied optional attributes are: Polarity
N-ACTION of the Basic Film Box SOP Class	ViewForum triggers the DICOM Printer to print, this actual print action is done at film box level. No (optional) attributes are present.

The table below specifies the supported Service Elements which may be generated by the Printer at any time during the association.

Table 10. The applied sequence of Print Service Elements and its optional attributes

Service Element of SOP Class	Note
N-EVENT-REPORT of the Printer SOP Class	May be sent at any moment by the Printer SCP (i.e. the DICOM Printer). ViewForum will ignore the contents of these events. However, the printer status is polled via a separate association, see section See 3.1.2.5.

The Status Codes of DIMSE Responses (Success, Warning, Failure) as returned by the printer will also be logged (for service purposes) and are mapped onto general print job status messages towards the operator. These User Interface messages indicate:

- “Job Completed” and has the meaning that the print job is accepted by the printer; the actual printing will be done afterwards.
- “General Print Error” indicating that a failure occurred during the DICOM Print. Also, most warning cases (like default printer values applied on optional print attributes) are interpreted as a print error because this will mostly result in a different print quality or print layout than expected.
- The only warning code on which the Print Job is continued is 0x0107 (Attribute list error) in the N-GET-RSP.

The following implementation remarks are important to achieve successful printing:

- The number of Film Boxes per Film Session is **one**.
- The number of images per Film Box is **one**.
The images to be printed on one film are rendered by ViewForum into one logical image. This logical image is very large, depending on the pixel matrix size (pixels per line, lines per image). A rough indication is 20 MByte. One should take this into account when selecting the DICOM printer and the printer configuration (e.g. the amount of memory).
- ViewForum will release the association when the print command is given (i.e. the N-ACTION Request); the association is not kept open for receiving N-EVENT-REPORTs of the Printer SOP Class.
- On status-errors/warnings in a DIMSE response, the data transfer will be stopped and film will not be printed.



-
- The only warning code on which the Print Job is continued is 0x0107 (Attribute list error) in the N-GET-RSP.

This section gives an overview of the applied attributes in the applied Service Elements of the supported SOP Classes.

The list of possible attribute values is given. The situation that an attribute is present conditionally. The standard DICOM Conditions and Defined Terms and Enumerated Values are applicable



3.1.2.5. Request for the Printer Status

3.1.2.5.1. Associated Real-World Activity

ViewForum will periodically request for the printer status. This is only done when no association is set-up for a print job. In case of a print job association the printer status is requested in that association.

The received printer status is displayed in the Printer Status Tool.

3.1.2.5.2. Proposed Presentation Contexts

ViewForum will propose the presentation contexts as given in the next table.

Table 11. Proposed Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
Printer SOP Class	1.2.840.10008.5.1.1.16	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

For performance reasons the ELE is preferred.

3.1.2.5.3. Conformance to the Printer SOP Class

ViewForum provides standard conformance to this SOP Class.

The applied optional attributes in the N-GET Service Element are specified in Table 1.

Table 12. The applied optional attributes in the N-GET Service Element

Service Element of SOP Class	Note
N-GET of the Printer SOP Class	Purpose is to retrieve printer information. Applied optional attributes are: Printer Status, Printer Status Info, Printer Name, Manufacturer, Manufacturer Model Name

The Status Codes of Printer N-GET Responses (Success, Warning, Failure) as returned by the printer will also be logged (for service purposes) and are not indicated towards the operator.

This section gives an overview of the applied attributes in the applied Service Elements of the supported SOP Classes.

The ViewForum does not send an attribute list to the printer, therefore the only attributes that are needed to be supported by the printer, are the mandatory attributes listed in Table 3-18, "Printer SOP Class - N-GET,"

3.1.2.6. Storage Commitment

3.1.2.6.1. Associated Real-World Activity

After every C-STORE a new association concerning Storage Commitment will be started. This association will be open till the remote archive sends a commit response or when the configured maximum time is passed. When this maximum configured period is passed it is the responsibility of the archive to setup a connection with ViewForum and send the commit response.

3.1.2.6.2. Presentation Context Table

ViewForum will propose the presentation contexts as given in the next table.

Table 13. Proposed Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
Storage Commitment Push Model	1.2.840.10008.1.20.1	ILE	1.2.840.10008.1.2	SCU	None
		ELE	1.2.840.10008.1.2.1	SCU	None
		EBE	1.2.840.10008.1.2.2	SCU	None

For performance reasons the ELE is preferred.

3.1.2.6.3. Storage Commitment Push Conformance

The ViewForum provides standard conformance. The storage commitment service is only configurable for one remote node.

3.1.3. Association Acceptance Policy

ViewForum accepts Associations for the following purposes:

- To allow remote applications to verify application level communication with ViewForum, see section 3.1.3.1;
- To allow remote applications to store images in the ViewForum database (i.e. image import), see section 3.1.3.2;
- To allow remote applications to query the ViewForum database, see section 3.1.3.3;
- To allow remote applications to retrieve images from the ViewForum database, see section 3.1.3.2.

The ViewForum Application Entity rejects Association requests from unknown applications, i.e. applications that offer an unknown “calling AE title”. An application is known if and only if it is defined during configuration of the ViewForum system. The ViewForum Application Entity rejects Association requests from applications that do not address the ViewForum AE, i.e. that offer a wrong “called AE title”. The ViewForum AE title is defined during configuration of the ViewForum system.

3.1.3.1. Verify Application Level Communication

3.1.3.1.1. Associated Real-World Activity

ViewForum accepts Associations from systems that wish to verify application level communication using the C-ECHO command.

3.1.3.1.2. Presentation Context Table

ViewForum will accept the presentation contexts as given in the next table.

Table 14. Accepted Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
Verification	1.2.840.10008.1.1	ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

For performance reasons the ELE is preferred.

3.1.3.1.3. C-ECHO SCP Conformance

ViewForum provides standard conformance.

3.1.3.1.4. Presentation Context Acceptance Criterion

ViewForum accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that ViewForum accepts multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes. There is no check for duplicate contexts, which are therefore accepted.

3.1.3.1.5. Transfer Syntax Selection Policies

Any of the presentation context show in Table 13, are acceptable.



3.1.3.2. Store Images in the ViewForum Database (i.e. Image Import)

3.1.3.2.1. Associated Real-World Activity

ViewForum accepts Associations from systems that wish to store images in the ViewForum database using the C-STORE command.

3.1.3.2.2. Presentation Context Table

ViewForum will propose the following presentation contexts:

Table 15. Proposed Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCP	None
See Note	See Note	ELE	1.2.840.10008.1.2.1	SCP	None
See Note	See Note	EBE	1.2.840.10008.1.2.2	SCP	None

Note: Any of the Standard Image Storage and Private SOP classes listed in Table 2, “Supported SOP classes by the ViewForum AE as SCP,”. For performance reasons the ELE is preferred.

3.1.3.2.3. C-STORE SCP Conformance

ViewForum provides conformance for the Storage Service Class. In the event of a successful C-STORE operation, the image has been stored in the ViewForum database.

The C-STORE is unsuccessful if ViewForum returns one of the following status codes:

Table 16. Exception handling by the ViewForum

Error Type	STATUS Response	Error	Action
Refused	A700	Indicates the database is full. Recovery from this condition is left to the Service Class User.	Notification sent, logging and connection abort
	A900	Indicates that the SOP class of the image does not match the abstract syntax negotiated for the presentation context	Notification sent, logging and connection abort
Failure	C000	Indicates that the image cannot be parsed.	Notification sent, logging and connection abort
Success	0000		

When the ViewForum imports images and during the association negotiation the Presentation State SOP class is not negotiated the ViewForum system creates a Presentation State Instance at the import of an Image.

The following table gives an overview of the Image formats that can be viewed (other formats can only be stored):

Table 17. Photometric Interpretation Supported

Photometric Interpretation	Storing	Viewing
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MONOCHROME1	Yes	Yes
MONOCHROME2	Yes	Yes
RGB	Yes	Yes, Instances are not sorted
YBR_FULL	Yes	No
YBR_FULL_422	Yes	No
YBR_PARTIAL_422	Yes	No
PALETTE COLOR	Yes	No
Others	Yes	No

If ViewForum receives improper DICOM, ViewForum tries as much as possible (if configured so), to make them proper DICOM. However, ViewForum also tries to remain as transparent on images as possible. So, on export the images must be changed only as far as really necessary. Therefore, it is not guaranteed that all DICOM violations of incoming images are repaired (e.g. attributes as one with enumerated values, are not changed). So, improper DICOM input to the ViewForum can result in improper DICOM output (no Checks are available for incorrect UIDs, Date-Time formats etc.).

Important implementation remarks and restrictions:

- ViewForum allows the operator to modify attributes of the stored images. ViewForum does not modify the pixel values of the stored images. Modified images retain their original Study, Series and Image UID.
- The DICOM standard does not guarantee that the advanced ViewForum applications can process the received images. This depends on the presence and consistency of a set of attributes in these images. The conditions for running the ViewForum applications are specified in separate ViewForum application Conformance Statements.
- On the export of imported images the ViewForum adds private attributes to the image.
- ViewForum does NOT support IVUS (Intravascular Ultrasound) Ultrasound images.
- If during the image transfer the Presentation States instances are transferred before the images the ViewForum changes the content of the Images: Following attributes present in the original images and are removed by ViewForum:
 - (0008,1120) Referenced Patient Seq.
 - (0008,1032) Proc. Code Seq.
 - (0040,0260) Performed Action Item Code Seq.
 - (0040,0275) Requested Attributes Seq.
 - (0040,0280) Comments on the Performed Proc. Steps.
 Following attributes with a value in the original images, are set to a zero length value in the exported images:
 - (0010,0032) Patient Birth Date
 - (0010,1000) Other Patient ID's
 - (0010,1001) Other Patient Names
 - (0010,2160) Ethnic Group
 - (0010,4000) Patient Comments
 - (0010,1010) Patient's Age
 - (0010,1020) Patient's Size

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-
- (0010,1030) Patient's Weight
 - (0010,2180) Occupation
 - (0010,21B0) Additional Patient's History

Support for additional Standard, Private and Retired attributes:

ViewForum stores all additional Standard, Private and Retired attributes in received images. Retrieval of these attributes is only possible (by means of a C-MOVE request) if the following conditions are satisfied:

- The image was encoded (when ViewForum was C-STORE SCP) using one of the explicit value representations or
- The image was encoded (when ViewForum was C-STORE SCP) using implicit value representation and the move destination (i.e. a C-STORE Service Class Provider) has accepted implicit value representation as the only transfer syntax applicable to the storage SOP class of the image (when ViewForum is C-STORE SCU).



3.1.3.2.4. Presentation Context Acceptance Criterion

ViewForum accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes are accepted by ViewForum.

- There is no check for duplicate contexts which are therefore accepted.



3.1.3.3. Query the ViewForum Database

3.1.3.3.1. Associated Real-World Activity

ViewForum accepts Associations from systems that wish to query the ViewForum database using the C-FIND command.

3.1.3.3.2. Presentation Context Table

ViewForum will accept the presentation contexts as given in the next table.

Table 18. Accepted Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

Note: Any of the Standard Query Retrieve SOP classes listed in Table 2, “Supported SOP classes by the ViewForum AE as SCP,”. For performance reasons the ELE is preferred.

3.1.3.3.3. C-FIND SCP Conformance

ViewForum simultaneously handles simultaneous C-FIND requests.

The ViewForum database distinguishes two patients with the same Patient ID but different Patient Name or Patient Birth Date. Because the DICOM Query model has Patient ID as Unique Key at patient level, two patients with the same Patient ID cannot be distinguished via the DICOM Standard Query SOP Class.

NOTE: In case a query is performed with the “Patient- Study Only” SOP class on “Patient” Level the ViewForum always send back the “Patient’s Name” (0010,0010) attribute (also when it’s not queried for).

The C-FIND-RQ with query-model 'Study Root Model' and query-level 'STUDY' responds with a C-FIND-RSP status xC000 'Unable to Process' in stead of proper 'Success' query-responses.

Table 19. Supported query attributes

	Attributes	Tag	Supported Matching Keys
PatientLevel	Patient’s Name	0010,0010	X
	Patient ID	0010,0020	X
StudyLevel	Study Date	0008,0020	X
	Study Time	0008,0030	X
	Accession Number	0008,0050	X
	Study Instance UID	0020,000D	X
Series	Study ID	0020,0010	X
	Modality	0008,0060	X
	Series Instance UID	0020,000E	X
	Series Number	0020,0011	X
ImageLevel	SOP Instance UID	0008,0018	X
	Instance Number	0020,0013	X

Table 20. Handling of status codes for the ViewForum



Error Type	Status Code	Action
Refused	0xCxxx	Notification sent, logging and connection abort
	0xB000	Notification sent, logging and connection abort
Error	0xAxxx	Notification sent, logging and connection abort Abort association and logging Notification sent, logging and connection abort Logging and connection abort
	0xh100	Logging
Success	0x000	

3.1.3.3.4. **Presentation Context Acceptance Criterion**

ViewForum accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that ViewForum accepts multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes. There is no check for duplicate contexts and are therefore accepted.

3.1.3.4. Retrieve Images from the ViewForum Database

3.1.3.4.1. *Associated Real-World Activity*

ViewForum accepts Associations from systems that wish to retrieve images from the ViewForum database using the C-MOVE command.

3.1.3.4.2. *Presentation Context Table*

ViewForum will accept the presentation contexts as given in the next table.

Table 21. Accepted Presentation Contexts

Abstract Syntax Name	UID	Transfer Syntax Name List	UID List	Role	Ext. Neg.
See Note	See Note	ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		EBE	1.2.840.10008.1.2.2	SCP	None

Note: Any of the Standard Query Retrieve SOP classes listed in Table 2, “Supported SOP classes by the ViewForum AE as SCP,”.
For performance reasons the ELE is preferred.

3.1.3.4.3. *C-MOVE SCP Conformance*

ViewForum supports all Query Retrieve SOP classes listed in Table 3. A C-STORE connection is built after the C-MOVE request, for C-STORE conformance see section 3.1.2.1 and Table 1.

ViewForum does not send Intermediate C-MOVE response with status pending.

3.1.3.4.4. *Presentation Context Acceptance Criterion*

ViewForum accepts all contexts in the intersection of the proposed and acceptable Presentation Contexts. This means that ViewForum accepts multiple proposed Presentation Contexts with the same SOP Class but different Transfer Syntaxes.

There is no check for duplicate contexts and are therefore accepted.

3.2. ViewForum AE Media Specification

The ViewForum AE provides Standard Conformance to the DICOM Media Storage Service and File Format (PS 3.10 [DICOM]) and the Media Storage Application Profiles (PS 3.11 [DICOM]) STD-GEN-CD for reading and writing. ViewForum supports multi-patient and multi-session (both for reading and writing) CD-R disks.

The supported Application Profiles, their Roles and the Service Class (SC) options, all defined in DICOM terminology, are listed in Table 3-24.

Table 22. Application Profile, Activities and Roles of the DICOM Media part of ViewForum

Application Profile	Identifier	Real World Activity	Role	SC Option
General Purpose CD-R Image Interchange Profile	STD-GEN-CD	Display Directory of CD-R disk Write image(s) on CD-R disk Read image(s) from CD-R disk	FSR FSC/FSU FSR	Interchange Interchange Interchange

Only adding on instances is supported for the FSU, deleting is not supported.

3.2.1. File Meta Information

The (Source) Application Entity Title is specified in section 6.1.1. The Implementation Class UID and the Implementation Version Name in the File Meta Header is specified in section 3.1.

3.2.2. Media related Real-World Activities

3.2.2.1. RWA Display Directory

The ViewForum AE will act as a FSR when reading the directory of the medium. This will result in an overview of the patients, studies, series and images on the ViewForum screen.

3.2.2.1.1. Application Profile(s) for this RWA

See Table 20.

3.2.2.1.2. Required and optionally DICOMDIR Keys

The Mandatory DICOMDIR Keys are required for the correct display of Directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series, Image.

Possibly present optional DICOMDIR Keys are not displayed.

3.2.2.2. RWA Write images on CD-R disk

The ViewForum AE will act as a FSC/FSU when writing all/selected images in a patient folder onto the CD-R medium.

3.2.2.2.1. Application Profile(s) for this RWA

See Table 20.

3.2.2.2.2. Support for Attributes in the images



The same remarks as in section 3.1.2.1 about the existence of Optional, Retired and Private Attributes are applicable.

The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified as Mandatory in the DICOMDIR definition in DICOM Media, a dummy value will be filled in.

Implementation remarks and restriction:

- When writing the DICOMDIR records the keys values are generated when no value of the corresponding attribute is supplied:
 - - PATIENT_ID
 - - STUDY_ID
 - - STUDY_INSTANCE_UID
 - - SERIES_NUMBER
 - - SERIES_INSTANCE_UID
 - - IMAGE_NUMBER
 - - SOP_INSTANCE_UID
- The mechanism of generating a value for PATIENT_ID creates each time a new value based on PATIENT_NAME for each new study written to the CD-R, even if this study belongs to a patient recorded earlier.
- The default value for the Pixel Intensity Relationship (0028,1040) is set to DISP.

3.2.2.3. RWA Read images from CD-R disk

The ViewForum AE will act as a FSR when reading all/selected images from the CD-R medium.

3.2.2.3.1. Application Profile(s) for this RWA

See Table 20.

3.2.2.3.2. Support for Attributes in the images

The Mandatory Attributes of the DICOM images are required for the correct storage of the images in the ViewForum internal image database. Optionally Attributes and Retired/Private Attributes are stored too if present; this is equivalent with the Level 2 (Full) conformance for the Storage Service Class in the Network support, see section 3.1.3.2.

The same remarks as in section 3.1.3.2.3 about the storage of images and about requirements to process read images via the dedicated ViewForum application functions, are applicable.

3.2.3. Augmented Application Profile

Instances of the Private SOP Classes (see Table 1) may be written on the CD-R disk.

Patient Directory Record Augmentation

Pat Birth Date	0010,0030
Patient's Sex	0010,0040

Study Directory Record Augmentation

Ref.Phys. Name	0008,0090
----------------	-----------

Image Directory Record Augmentation

Image Type	0008,0008
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SOP Class UID	0008,0016
SOP Inst. UID	0008,0018
Content Date	0008,0023
Content Time	0008,0033
Rows	0028,0010
Columns	0028,0011

Series Directory Record Augmentation

Perf.Phys. Name	0008,1050
Body Part Exam.	0018,0015
Protocol Name	0018,1030
PPS Start Time	0040,0245
PPS ID	0040,0253
PPS Description	0040,0254

Presentation State Directory Record Augmentation

SOP Class UID	0008,0016
SOP Inst. UID	0008,0018



4. COMMUNICATION PROFILES

4.1. Supported Communication Stacks

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

4.2. TCP/IP Stack

ViewForum inherits its TCP/IP stack from the SUN Solaris system upon which it executes.

4.2.1. Physical Media Support

- Ethernet ISO.8802-3. Standard AUI, optional twisted pair 10/100-BaseT.



5. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

The Standard DICOM SOP Classes may be Extended with additional attributes:

- Standard attributes of other SOP Classes; the presence of these attributes in exported images can be configured, see section 6.2
- Retired (from ACR NEMA 1.0 or 2.0) attributes; the presence of these attributes in exported images can be configured, see section 6.2
- Private attributes; the presence of these attributes in exported images can be configured, see section 6.2.

The Table 21 list the supported Private SOP Classes. The usage of these SOP Classes are in the ViewForum domain only. However instances of these Private SOP Classes may be exported towards a PACS environment and stored in a (central) DICOM archive and should be configured in order to make this possible.

Table 23. Private SOP classes of ViewForum

SOP Class	Description
3D Volume Storage (Private class)	1.3.46.670589.5.0.1.1
3D Volume Object Storage (Private class)	1.3.46.670589.5.0.2.1
Surface Storage (Private class)	1.3.46.670589.5.0.3.1
CT Synthetic Image (Private class)	1.3.46.670589.5.0.9
MR Synthetic Image (Private class)	1.3.46.670589.5.0.10
MR Cardio Storage (Private class)	1.3.46.670589.5.0.8.1
MR Cardio Analysis Storage (Private class)	1.3.46.670589.5.0.11.1
Specialized X-ray (Private class)	1.3.46.670589.2.3.1.1
CX Image (Private class)	1.3.46.670589.2.4.1.1
CX Synthetic Image (Private class)	1.3.46.670589.5.0.12
Perfusion (Private class)	1.3.46.670589.5.0.13
Perfusion Analysis (Private class)	1.3.46.670589.5.0.14



6. CONFIGURATION

The ViewForum system is configured by means of a configuration program. This program is accessible at start-up of the ViewForum system. It is password protected and intended to be used by Philips Customer Support Engineers only. The program prompts the Customer Support Engineer to enter configuration information needed by the ViewForum application.

6.1. AE Title/Presentation Address mapping

6.1.1. Local AE Title and Presentation Address

The ViewForum AE title is default equal to the IP host name. The Customer Support Engineer at installation can change this host name. The ViewForum AE can be changed independently.

ViewForum listens on port 3010. This port number is not configurable.

6.1.2. Remote AE Titles and Presentation Addresses

All relevant remote applications able to setup a DICOM Association towards ViewForum must be configured at ViewForum configuration time. The Customer Support Engineer must provide the following information for each remote application:

- The Application Entity title.
- The SOP classes and Transfer Syntaxes for which ViewForum accepts Associations.

All relevant remote applications able to accept DICOM Associations from ViewForum, the following information must be provided:

- The Application Entity title.
- The host name/IP address on which the remote application resides.
- The port number at which the remote application accepts Association requests.

6.2. Configurable parameters

6.2.1. Configuration per ViewForum system

The following items are configurable per ViewForum installation:

- The SOP classes (out of the full list of SOP Classes in Table 1 and Table 2) and Transfer Syntaxes (out of the full list in Presentation Context tables in this Statement) to be used.
- The maximum PDU size for associations initiated by ViewForum (default is 0 meaning unlimited PDU size)

6.2.2. Configuration per remote system

The following items are configurable per remote system:

- The SOP classes and Transfer Syntaxes for which ViewForum sets-up and accepts Associations.

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- Storage Commitment request must be sent after Storage request. The Storage Commitment service can be configured for one node only. This node is configured as archive.
 - Automatic conversion of images of SOP classes not supported by remote systems into SC Image Storage SOP instances,
 - The maximum PDU size for Associations initiated by ViewForum,
 - Export of 'pure' DICOM images (i.e. only the standard DICOM attributes defined in the related IOD) or extended DICOM images (with additional Standard DICOM, Private and Retired Attributes)
 - Support of Overlays for DICOM 99 and for CD.

6.2.3. Print Configuration

Configurable per ViewForum installation:

- The DICOM printers to be selected by the operator.

The following print parameters are configurable per DICOM printer type:

- The Medium Type
- Film Size ID (i.e. Media Size)
- Resolution (300,600 dpi)
- Color model (8,16 bits), color

These print parameters can be selected from choice lists. These choice lists are defined via so-called prototypes for each type of printer and print medium. These prototypes are also configurable.



7. SUPPORT OF EXTENDED CHARACTER SETS

ViewForum supports the replacement Character Set "ISO_IR 100", which is the Latin alphabet No 1, supplementary set.

