Technical Publications

Direction 2214334
Revision 1.2, Release C DPrint

GE Viewing Station
GE Extended Viewing Station

Conformance Statement for DICOM v3.0 (ID/Net v3.0)

GE Medical Systems

Contents

1 Introduction

1.1 OVERVIEW

This DICOM Conformance Statement is divided into Sections as described below:

Section 1 (Introduction) describes the overall structure, intent, and references for this Conformance Statement.

Section 2 (Summary) gives a summary of all DICOM services that GEView supports and the references to the chapters where the Conformance Statements of these services are addressed.

Section 3 (Image Storage) specifies compliance of GEView to DICOM standard requirements for Image Storage SOP Classes.

Section 4 (Image Query/Retrieve) specifies the compliance of GEView to DICOM requirements for Image Query/Retrieve SOP Classes.

Section 5 (DICOM Print) specifies compliance of the optional GEView DICOM Print module to DICOM standard requirements for DICOM Print SOP Classes[1].

Section 6 (DICOM File-Set CD-R Reader Application) specifies compliance of GEView to DICOM media interchange application profiles.

Section 7 - 9 give the general information applied to all of the services described in sections 3 -5, like network interface, configuration, character set support, etc.

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[1] DICOM Print Management is only supported by GE Ectended Viewing Station with the optional GEView DICOM Print Module installed.

1.2 OVERALL DICOM CONFORMANCE STATEMENT DOCUMENT STRUCTURE

The Documentation Structure of the GEMS Conformance Statements and their relationship to the DICOM v3.0 Conformance Statements is shown in the illustration below.

ID/Net v3.0

Introduction to the
Integrated
DICOM/Network
v3.0 (ID/Net v3.0)
Conformance
Statement
Direction: 2214334

APPLICATION ENTITY SPECIFICATION
(SERVICE CLASSES, INFORMATION OBJECTS, MESSAGE EXCHANGES, ETC.)

Product Implementation:

CT Advantage

MR Advantage

GE Viewing Station
GE Extended Viewing
Station
Conformance
Statement
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......
Conformance
Statement
Direction:
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DICOM STANDARD

Standard Specification:

DICOM V 3.0

Part 1

V 3.0

2

V 3.0

3

V 3.0

4

DICOM V 3.0

Part 13

This document specifies the DICOM v3.0 implementation. It is entitled:

GE Viewing Station
GE Extended Viewing Station
Revision 1.2, Release C
Conformance Statement for DICOM v3.0
*Direction **2214334***

This DICOM Conformance Statement documents the DICOM v3.0 Conformance Statement and Technical Specification required to interoperate with the GEMS network interface. Introductory information, which is applicable to all GEMS Conformance Statements, is described in the document:

Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)
Conformance Statement
Direction: 2118780.

This Introduction familiarizes the reader with DICOM terminology and general concepts. It should be read prior to reading the individual products' GEMS Conformance Statements.

The GEMS Conformance Statement, contained in this document, also specifies the Lower Layer communications which it supports (e.g., TCP/IP). However, the Technical Specifications are defined in the DICOM v3.0 Part 8 standard.

For more information including Network Architecture and basic DICOM concepts, please refer to the Introduction.

For the convenience of software developers, there is "collector" Direction available. By ordering the collector, the Introduction described above and all of the currently published GEMS Product Conformance Statements will be received. The collector Direction is:

ID/Net v3.0 Conformance Statements
Direction: 2117016

For more information regarding DICOM v3.0, copies of the Standard may be obtained by written request or phone by contacting:

NEMA Publication
1300 North 17th Street
Suite 1847
Rosslyn, VA 22209
USA
Phone: (703) 841-3200

1.3 INTENDED AUDIENCE

The reader of this document is concerned with software design and/or system integration issues. It is assumed that the reader of this document is familiar with the DICOM v3.0 Standards and with the terminology and concepts which are used in those Standards.

If readers are unfamiliar with DICOM v3.0 terminology they should first refer to the document listed below, then read the DICOM v3.0 Standard itself, prior to reading this DICOM Conformance Statement document.

> *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0)*
> *Conformance Statement*
> *Direction: 2118780*

1.4 SCOPE AND FIELD OF APPLICATION

It is the intent of this document, in conjunction with the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780*, to provide an unambiguous specification for GEMS implementations. This specification, called a Conformance Statement, includes a DICOM v3.0 Conformance Statement and is necessary to ensure proper processing and interpretation of GEMS medical data exchanged using DICOM v3.0. The GEMS Conformance Statements are available to the public.

The reader of this DICOM Conformance Statement should be aware that different GEMS devices are capable of using different Information Object Definitions. For example, a GEMS CT Scanner may send images using the CT Information Object, MR Information Object, Secondary Capture Object, etc.

Included in this DICOM Conformance Statement are the Module Definitions which define all data elements used by this GEMS implementation. If the user encounters unspecified private data elements while parsing a GEMS Data Set, the user is well advised to ignore those data elements (per the DICOM v3.0 standard). Unspecified private data element information is subject to change without notice. If, however, the device is acting as a "full fidelity storage device", it should retain and re-transmit all of the private data elements which are sent by GEMS devices.

1.5 IMPORTANT REMARKS

The use of these DICOM Conformance Statements, in conjunction with the DICOM v3.0 Standards, is intended to facilitate communication with GE imaging equipment. However, **by itself, it is not sufficient to ensure that inter-operation will be successful**. The **user (or user's agent)** needs to proceed with caution and address at least four issues:

- **Integration** - The integration of any device into an overall system of interconnected devices goes beyond the scope of standards (DICOM v3.0), and of this introduction and associated DICOM Conformance Statements when interoperability with non-GE equipment is desired. The

responsibility to analyze the applications requirements and to design a solution that integrates GE imaging equipment with non–GE systems is the **user's** responsibility and should not be underestimated. The **user** is strongly advised to ensure that such an integration analysis is correctly performed.

- **Validation** - Testing the complete range of possible interactions between any GE device and non–GE devices, before the connection is declared operational, should not be overlooked. Therefore, the **user** should ensure that any non–GE provider accepts full responsibility for all validation required for their connection with GE devices. This includes the accuracy of the image data once it has crossed the interface between the GE imaging equipment and the non–GE device and the stability of the image data for the intended applications.

  Such a validation is required before any clinical use (diagnosis and/or treatment) is performed. It applies when images acquired on GE imaging equipment are processed/displayed on a non-GE device, as well as when images acquired on non-GE equipment is processed/displayed on a GE console or workstation.

- **Future Evolution** - GE understands that the DICOM Standard will evolve to meet the user's growing requirements. GE is actively involved in the development of the DICOM v3.0 Standard. DICOM v3.0 will incorporate new features and technologies and GE may follow the evolution of the Standard. The GEMS protocol is based on DICOM v3.0 as specified in each DICOM Conformance Statement. Evolution of the Standard may require changes to devices which have implemented DICOM v3.0. **In addition, GE reserves the right to discontinue or make changes to the support of communications features (on its products) reflected on by these DICOM Conformance Statements**. The **user** should ensure that any non–GE provider, which connects with GE devices, also plans for the future evolution of the DICOM Standard. Failure to do so will likely result in the loss of function and/or connectivity as the DICOM Standard changes and GE Products are enhanced to support these changes.

- **To be informed of the evolution of the implementation described in this document, the User is advised to regularly check the GE Internet Server, accessible via anonymous ftp (GE Internet Server Address: ftp.med.ge.com, 192.88.230.11).**

- **Interaction** - It is the sole responsibility of the **non–GE provider** to ensure that communication with the interfaced equipment does not cause degradation of GE imaging equipment performance and/or function.

1.6 REFERENCES

A list of references which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.*

The information object implementation refers to DICOM PS 3.3 (Information Object Definition).

1.7 DEFINITIONS

A set of definitions which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.*

1.8 SYMBOLS AND ABBREVIATIONS

A list of symbols and abbreviations which is applicable to all GEMS Conformance Statements is included in the *Introduction to the Integrated DICOM/Network v3.0 (ID/Net v3.0) Conformance Statement, Direction: 2118780.*

2 Summary

This document is the DICOM Conformance Statement for GE View Applications. By GE View Applications we refer to both the GE Viewing Station and GE Extended Viewing Station products.

GE View Applications are DICOM 3.0 conformant, multimodality medical image viewing workstations. They support the following DICOM functions for the image communication, formatting and removable media exchange:

Service Class Provider (SCP) of the DICOM Verification Service Class

Service Class User (SCU)   of the DICOM Verification Service Class

Service Class Provider (SCP) of the DICOM Storage Service Class

Service Class User (SCU)   of the DICOM Storage Service Class

Service Class User (SCU)   of the DICOM Query / Retrieve Service Class

Service Class User (SCU)[2]   of the DICOM Print Management Service Class

File-Set Reader of the DICOM File Service

These DICOM services have been implemented in a number of applications, which can be configured to share the same DICOM Application Entity Title or use their own DICOM Application Entity Titles. In GE View Applications, all DICOM applications are configured to support the same DICOM Application Entity. In this text, we use the term *GE View DICOM Application Entity* to refer to this global Application Entity. All GE View Applications DICOM applications share the same *GE View DICOM Application Entity Title.* Only for Autorouting, GEView responds to an additional AE Title: this to the global

This text presents the DICOM Conformance Statement information of these applications in several chapters organised logically according to their functionality. In the following, a brief road map to these chapters is given to facilitate the reading of this document:

Image Storage

This chapter includes the SCP and SCU of the DICOM Storage Service Class for image receiving and sending, as well as the SCP and SCU of the DICOM Verification Service Class for testing with a remote DICOM node. Also included in this chapter is the information of the Secondary Capture Images generated in GE Extended Viewing Stations.

Image Query & Retrieve

This chapter includes the SCU of the DICOM Query & Retrieve Service Class for the GE View Applications users to query a remote DICOM Query & Retrieve Service Class Provider and to retrieve images.

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[2] DICOM Print Management is only supported by GE Ectended Viewing Station with the optional GEView DICOM Print Module installed.

DICOM Print Management[3]

This chapter describes the DICOM Print Management Service Class for the optional GEView DICOM Print Module.

DICOM File-Set CD-R Reader

This chapter includes the File-Set Reader support of the DICOM File Service for the basic cardiac X-ray angiographic application profile (STD-XABC-CD) and the general purpose CD-R image interchange profile (STD-GEN-CD).

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[3] DICOM Print Management is only supported by GE Ectended Viewing Station with the optional GEView DICOM Print Module installed.

3 Image Storage

GE View Applications implemented three applications WINSCP, WSTORE and WECHO for receiving and send images, as well as validating the connectivity in a network environment. In addition, WINSCP and WSTORE use internally one Local Image Database (LIDB) and one or several Image Storage Area (ISA) to save the patient, study, series and image attributes and the image pixel data, respectively. The interplay among these components is illustrated in Figure 3-1.
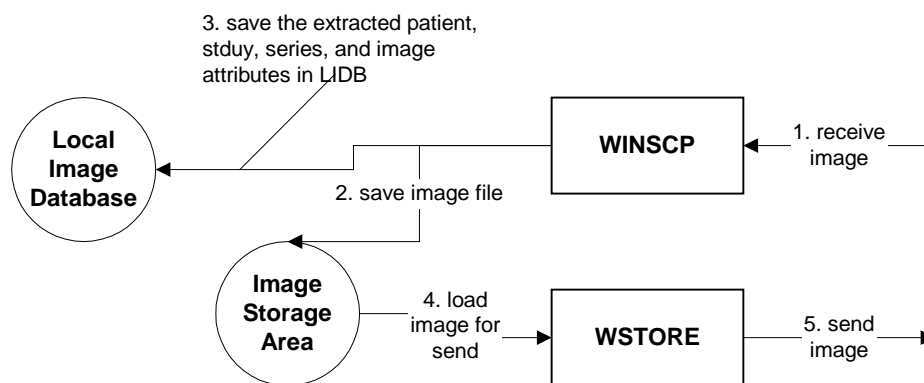
Figure 3-1 The Interplay of WINSCP, WSTORE, LIDB and ISA

Upon receiving an image over the network, the DICOM Image IOD is saved in ISA as a data file, and a number of selected attributes of patient, study, series and image are extracted from the Image IOD and inserted into LIDB. In this way, LIDB keeps a hierarchical structure of all received images and maintains a reference at the image level, in order to link the meta-images in LIDB to the real Image IOD files in ISA.

The use and organisation of ISA, as well as the communication between LIDB and ISA are definitively internal issues in GE View Applications and the management police of ISA is beyond the scope of this Conformance Statement.

3.1 Implementation Model

GE View Applications' DICOM Storage applications are implemented to support the same GE View DICOM Application Entity that receives an association from a remote DICOM Application Entity (WINSCP), as well as requests an association to a remote DICOM Application (WSTORE), for the purpose of transmission of DICOM Image Information Objects between GE View Applications and these remote DICOM Application Entities.

Successfully received images are saved in ISA and inserted in LIDB for a later access in GE View Applications.

LIDB and ISA manage the images saved in GE View Applications. GE View Applications do not guarantee any long term availability of these images, because the images may be removed when it is necessary to make storage capacity to accommodate the newly received images. GE View Applications use an algorithm based on High Water Mark (HWM) and Low Water Mark (LWM) of ISA to remove the least-used images. For details of the image management you are referred to the GE View Service Manual (P/N 2214333).

3.1.1 Application Data Flow Diagram

WINSCP, WSTORE and WECHO are WIN 32 applications able to run on any Microsoft® Windows 95™ or Windows NT™ machine.

WINSCP is automatically started when the machine is booted and WSTORE is invoked by another application of GE View Applications (DCMSVR) when an image sending request is issued. WIN 32 Inter-Process Communication (IPC) methods are used to exchange the data and messages between these processes and other components of GE View Applications

A remote DICOM Application Entity initiates an association for DICOM Storage Service Class to GE View Applications. When WINSCP accepts the association, the remote AE transmits the DICOM Image Information Objects to WINSCP. WINSCP saves the received images in ISA and LIDB as described above.

WSTORE initiates an association for DICOM Storage Service Class to a remote DICOM Application Entity. If the association is accepted by the remote AE, WSTORE transmits the DICOM Image Information Objects to the remote AE. GE View Applications do not define any consequence event for the remote AE after it receives the images.

WECHO initiates an associations for DICOM Verification Service Class to a remote DICOM Application Entity. It returns a status code to indicate if the verification association is successful or failure.
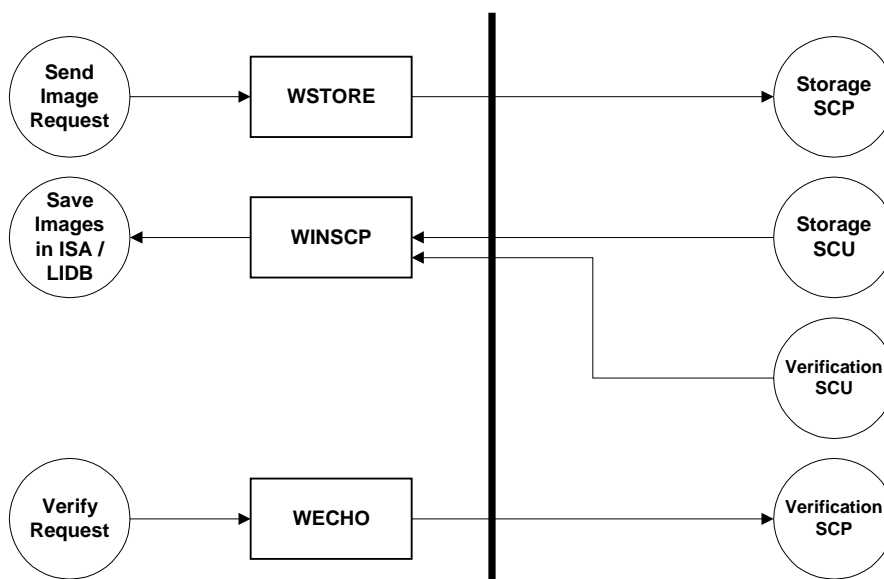

Figure 3-2 WINSCP, WSTORE and WECHO Implementation Model

3.1.2 Functional Definitions

After started, WINSCP is always waiting for an association request from a remote DICOM Application Entity. WINSCP will accept an association with the supported SOP classes for all remote DICOM applications.

WSTORE is invoked when a local image sending request is issued from GE View Applications via some WIN 32 IPC method. It then initiates an association to the specified destination remote DICOM Application Entity and transmits the images if the association is accepted.

3.1.3 Sequencing of Real-World Activities

After receiving images from a remote application, GE View Applications saves the images in LIDB. Each installation of GE View Applications has its own LIDB. While some meta-information of images are saved in LIDB for quick access, the real image data are stored separately in ISA.

GE View Applications neither defines, nor requires any consequence event of the remote DICOM Application Entity after it receives the images over an association originated by WSTORE.

3.2 Application Entity Specifications

In GE View Applications, WINSCP, WSTORE and WECHO share the same GE View DICOM Application Entity Title, which is also shared by other DICOM service applications, e.g., for image query and retrieve, diagnostic report fetching, DICOM CD-R reading.

All operational parameters (such as AE titles, port numbers) of the same GE View DICOM Application Entity are saved in the configuration database of GE View Applications and can be accessed and changed by using the Service Manager of GE View Applications.

WINSCP provides the Standard Conformance to the following DICOM V3.0 SOP Classes as an SCP:

Table 3-1 Image Storage and Verification SOP Classes Supported by WINSCP

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
Computed Radiography Image Information Object Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Information Object Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Information Object Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.20
Retired Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6.1
Retired Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multiple Frame Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3.1

Retired Multiple Frame Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3
Secondary Capture Image Information Object Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Fluoroscopy Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Biplane Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.3

WSTORE provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 3-2 Image Storage SOP Classes Supported by WSTORE

SOP Class Name	SOP Class UID
Computed Radiography Image Information Object Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Information Object Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Information Object Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.20
Retired Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6.1
Retired Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multiple Frame Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3.1
Retired Multiple Frame Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3
Secondary Capture Image Information Object Storage	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Fluoroscopy Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Biplane Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.3

WECHO provides Standard Conformance to the following DICOM V3.0 SOP Class as an SCU:

Table 3-3 Verification SOP Classes Supported by WECHO

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1

3.2.1 Association Establishment Policies

3.2.1.1 General

WINSCP does not initiate any association to a remote DICOM Application Entity.

Both of WSTORE and WECHO will attempt to establish an association for the image transmission purpose when a request is coming from GE View Applications with all valid parameters, including the AE title, TCP port number, host name and network address. WSTORE will only attempt to establish associations if it determines that the image files are valid. Basically, it accepts only the files saved in LIDB.

The maximum PDU size which WSTORE will use is configurable. It default value is 16 KB.

3.2.1.2 Number of Associations

Both WSTORE and WECHO will attempt only one association establishment at a time. But a number of instances of WSTORE and WECHO can run concurrently. The number of concurrent WSTORE and WECHO instances are controlled by the Service Manager of GE View Applications.

WINSCP can accept and process multiple associations simultaneously. Maximally there can be five associations running concurrently. WINSCP will create a new thread for each connection request it receives.

3.2.1.3 Asynchronous Nature

None of WINSCP, WSTORE and WECHO will perform asynchronous operations window negotiation.

3.2.1.4 Implementation Identifying Information

WINSCP, WSTORE and WECHO will provide a single Implementation Class UID of

"1.2.276.0.14.200.1.2.0"

and an implementation version name of

"INNOMED_DCM_120"

3.2.2 Association Initiation Policy

WSTORE and WECHO attempt to initiate a new association for each service requested from GE View Applications. WSTORE will allow to send multiple images in one association.

3.2.2.1 Associated Real-World Activity

The associated Real-World Activity of WSTORE is the attempt to transfer one or several images, or to send a DICOM Verification message.

3.2.2.2 Proposed Presentation Contexts

WSTORE will propose the Presentation Contexts shown in Table 3-4, depending on which SOP Instances should be sent. If an image sending service is requested, the Presentation Context will use the SOP Class UID specified in the header of the image file as the proposed Abstract Syntax.

WSTORE supports only the Transfer Syntax as listed in Table 3-4. If another Transfer Syntax is specified in the header of an image, WSTORE rejects to perform the requested service.

Table 3-4 Presentation Context Proposed by WSTORE

WSTORE Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Computed Radiography Image Information Object Storage	1.2.840.10008.5.1.4.1.1.1			SCU	None
CT Image Information Object Storage	1.2.840.10008.5.1.4.1.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
MR Image Information Object Storage	1.2.840.10008.5.1.4.1.1.4			SCU	None
Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.20			SCU	None
Retired Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.5	DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6.1			SCU	None
Retired Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Ultrasound Multiple Frame Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3.1			SCU	None
Retired Multiple Frame Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3	JPEG Default Transfer Syntax for Lossless JPEG Image Compression	1.2.840.10008.1.2.4.70	SCU	None
Secondary Capture Image Information Object Storage	1.2.840.10008.5.1.4.1.1.7			SCU	None
X-Ray Angiographic Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCU	None
X-Ray Fluoroscopy Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.2			SCU	None
X-Ray Angiographic Biplane Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.3			SCU	None

WECHO will proposes the Presentation Contexts listed in Table 3-5.

Table 3-5 Presentation Context Proposed by WECHO

WECHO Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.2.2.1 Transfer Syntax Proposal Polices

WSTORE proposes a JPEG compression transfer syntax in the following cases:

a) An image to be sent is encoded with one JPEG compression transfer syntax supported by WSTORE, as listed in Table 3-4.

b) A GE View component (usually the viewer) explicitly requests WSTORE to compress an image on-the-fly before sending it. The component shall specify the nature of the compression (lossy or lossless compression).

In case of WSTORE proposes a JPEG compression transfer syntax, it only proposes this (native encoded or requested) transfer syntax. If this transfer syntax is not accepted by the peer application, the association failed.

If WSTORE sends an image with a non-compression transfer syntax, it proposes all of the three non-compression transfer syntaxes listed in Table 3-4 and will use the first accepted transfer syntax to send the image. WSTORE proposes the three transfer syntaxes in the following order:

Explicit VR Little Endian

Explicit VR Big Endian

Implicit VR Little Endian

By setting the run-time options of WSTORE, it is possible to instruct WSTORE only to propose the DICOM Default Transfer Syntax (Implicit VR Little Endian) and the original transfer syntax that an image has been encoded, or only to propose the DICOM Default Transfer Syntax.

3.2.2.2.2 SOP Specific Conformance

3.2.2.2.2.1 *SOP Specific Conformance to Verification SOP Class*

WECHO provides Standard Conformance to the DICOM Verification Service Class.

3.2.2.2.2.2 *SOP Specific Conformance to Storage SOP Classes*

WSTORE will send images of the following two kinds:

a) The images were received by WINSCP. In this case, WINSCP checks the images against to the standard conformance requirements and will send all attributes including private attributes if they exist in the images.

b) GE Extended Viewing Station is able to generate DICOM Secondary Capture Image IODs and to ask WSTORE to send them to some particular destination. In generating the Secondary Capture images, GE View Applications provides the standard conformance by including all the attributes in the images as described in the next section (type 2 and 3 attributes may have a zero value length if no values of these attributes are available).

If WSTORE is unable to determine the appropriate Abstract and Transfer Syntax for an image file, or if the Abstract and Transfer Syntax is not supported by WSTORE, or if the image does not fulfil the requirements of the IOD for the SOP Class, or if the image is rejected by the peer application, WSTORE will report an error message by using some WIN 32 IPC method to the service requester and puts error information in its log file. WSTORE will continue to try to send the rest (if any) images.

WSTORE recognises a successful image transmission only when it receives a SUCCESS status. In case of receiving an ERROR or WARNING status, WSTORE reports a (possibly) failed image transmission to the service requester. WSTORE does not differentiate an ERROR or a WARNING status.

3.2.2.2.2.3 *Supported Attributes in the Secondary Capture Images generated by GE Extended Viewing Station*

GE Extended Viewing Station possesses a feature called TransFile which will generate the Secondary Capture Image IOD from the user-selected modality images or secondary capture images (see the User's Guide Documentation of GE Extended Viewing Station, P/N 2214325).

GE Extended Viewing Station provides the standard conformance to the DICOM Standard Part 3 by including all mandatory (type 1) data attributes and the following optional (type 2 and type 3) data attributes in the generated SC images:

Table 3-6 Data Attributes Supported in SC Images Generated by GE Extended Viewing Station

Patient	Tag	Type	Availability in Image
Patient's Name	(0010,0010)	2	value entered by the user or copied from the original data set
Patient ID	(0010,0020)	2	value entered by the user or copied from the original data set
Patient's Birth Date	(0010,0030)	2	value entered by the user or copied from the original data set
Patient's Sex	(0010,0040)	2	value entered by the user or copied from the original data set
Study (General)			
Study Date	(0008,0020)	2	value supplied by GE View Applications software
Study Time	(0008,0030)	2	value supplied by GE View Applications software
Referring Physician's Name	(0008,0009)	2	value entered by the user or copied from the original data set
Study ID	(0020,0010)	2	value entered by the user or copied from the original data set
Accession Number	(0008,0050)	2	value entered by the user or copied from the original data set
Study Description	(0008,1030)	3	value entered by the user or copied from the original data set
Series (General)			
Series Number	(0020,0011)	2	value supplied by GE View Applications software
Laterality	(0020,0060)	2C	Always 0 length value
Series Date	(0008,0021)	3	value supplied by GE View Applications software
Series Time	(0008,0031)	3	value supplied by GE View Applications software
Performing Physician's Name	(0008,1050)	3	Always 0 length value
Protocol Name	(0018,1030)	3	value entered by the user
Body part examined	(0018,0015)	3	value entered by the user
Equipment (SC)			

Modality	(0008,0060)	3	value copied from the original data set
Secondary Capture Device ID	(0018,1010)	3	value supplied by GE View Applications software
Secondary Capture Device Manufacturer	(0018,1016)	3	value supplied by GE View Applications software
Secondary Capture Device Manufacturer's Model Name	(0018,1018)	3	value supplied by GE View Applications software
Secondary Capture Device Software Version	(0018,1019)	3	value supplied by GE View Applications software
Image (General)			
Image number	(0020,0013)	2	value supplied by GE View Applications software
Other attributes			value copied from the original data set
Image (Pixel)			value copied from the original data set or adapted if necessary (e.g, if the image size is changed, or the image matrix is rotated)
Study (Patient)			Not included
Equipment(General)			Not included

In Table 3-6, if the value of a data attribute is entered by the user or copied from the original data set, the user input will overrides the value of the original data set,

3.2.3 Association Acceptance Policy

WINSCP accepts associations for the purposes of Verification and Storage.

WINSCP accepts an association request from all remote DICOM Application Entity without checking if it is listed in its configuration database.

WINSCP accepts an association only if at least one of the following conditions is met

- The called AE Title is equal to the local AE Title.

- WINSCP is working as part of a GE Extended Viewing Station installation, and the called AE Title is equal to the local AE Title, appended by the extension "AR" (in capital letters).

- WINSCP is working as part of a GE Extended Viewing Station installation, and the called AE Title is equal to a remote AE Title configured in the local configuration database.

When WINSCP accepts an association, it will receive any number of images transmitted on that association and store the images in ISA and LIDB.

3.2.3.1 Associated Real-World Activity

The associated Real-World Activity associated with the C-STORE operation supported by WINSCP is the storage of the received images in ISA and LIDB. WINSCP will make necessary disk space for saving these images by removing the old images with the algorithm described in the previous chapters of this documentation. In the case that WINSCP is unable to save the images, it will return a standard failure code to the association initiator. All images saved in ISA and LIDB can be displayed in GE View Applications.

WINSCP applies the following procedure in order to replace low-quality images by higher-quality images: If WINSCP detects that for a newly received uncompressed image, an image with the same image instance UID is already stored locally, the existing copy is overwritten if it is a lossless or lossy compressed instance of the image. If WINSCP detects that for a newly received lossless compressed image, an image with the same image instance UID is already stored locally, the existing copy is overwritten if it is a lossy compressed instance of the image.

After saving a received image, WINSCP commits that the saved images can be sent directly by WSTORE. There is also a utility program in GE View Applications, which can provide the images saved in LIDB to the outside world in the DICOM V3.0 Part 10 Format. But the storage format in LIDB is not defined in this Conformance Statement.

3.2.3.2 Presentation Context Table

Any of the Presentation Contexts shown in Table 2 are acceptable for WINSCP to confirm the connection or to receive images

Table 3-7 Acceptable Presentation Contexts for WINSCP

WINSCP Acceptable Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None
Computed Radiography Image Information Object Storage	1.2.840.10008.5.1.4.1.1.1			SCP	None
CT Image Information Object Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
MR Image Information Object Storage	1.2.840.10008.5.1.4.1.1.4			SCP	None
Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None

Retired Nuclear Medicine Image Information Object Storage	1.2.840.10008.5.1.4.1.1.5			SCP	None
Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6	DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Retired Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.6.1			SCP	None
Ultrasound Multiple Frame Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3	JPEG Default Transfer Syntax for Lossless JPEG Image Compression	1..2.840.10008.1.2.4.70	SCP	None
Retired Multiple Frame Ultrasound Image Information Object Storage	1.2.840.10008.5.1.4.1.1.3.1			SCP	None
Secondary Capture Image Information Object Storage	1.2.840.10008.5.1.4.1.1.7			SCP	None
X-Ray Angiographic Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG Baseline (Process 1): Default Transfer Syntax for Lossy JPEG 8 Bit Image Compression	1.2.840.10008.1.2.4.50	SCP	None
X-Ray Fluoroscopy Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.2			SCP	None
X-Ray Angiographic Biplane Image Information Object Storage	1.2.840.10008.5.1.4.1.1.12.3			SCP	None

3.2.3.2.1 SOP Specific Conformance

3.2.3.2.1.1 *SOP Specific Conformance to Storage SOP Classes*

WINSCP conforms to the SOP's of the Storage Service Class at Level 2 (Full). No attributes are discarded or coerced by WINSCP, even those attributes specified by tags not included in the DICOM V3.0 Standard will be kept.

In the event of a successful C-STORE operation, the Image has successfully been saved in LIDB. As such, it may be accessed by using the GE View Applications Graphical User Interface. If required, a utility program can be used to export the images from LIDB to the file system of the underlying operating system. The exported images conform the DICOM V3.0 Part 10 Format. Each file contains one image.

A successful C-STORE response ensures that WINSCP has stored a valid DICOM Composite Information Object.

If WINSCP returns one of the following status codes, then the C-STORE was unsuccessful:

- A700 (Out of Resources) - Indicates that there was not enough disk space to store the image. Recovery from this condition is left to the user of GE View Applications.

- A800 (SOP Class Not Supported) - Indicates that the SOP Class of the Image in the C-STORE operation did not match the Abstract Syntax negotiated for the Presentation Context. This indicates a problem with the SCU of the Service Class.

- A900 (Data Set does not match SOP Class) - Indicates that the Data Set does not encode an instance of the SOP Class specified. This indicates a problem with SCU of the Service Class.

- C000 (Cannot understand) - Indicates that the Data Set cannot be parsed into elements by WINSCP. This indicates a problem with the SCU.

GE View Applications support minimal image data set which only include Type 1 data attributes filled with valid values.

GE View Applications support image matrix of any size and any depth. When an image is displayed, it's size may be changed by padding rows and / or columns. But the received images are not changed. When the images are sent out at a later time, it is sent as it was received without any change of any data attributes.

GE View Applications support palette coded colour image.

GE View Applications support RGB and YBR_FULL coded colour images.

GE View Applications support the overlays embedded in the image pixel matrix and display these with the highest intensity value.

GE View Applications do not support YBR_FULL_442 or YBR_PATIAL_422 or other format coded colour images.

GE View Applications do not support any stand-alone overlays and curves.

3.2.3.2.2 Presentation Context Acceptance Criterion

WINSCP will always accept a Presentation Context for the Verification SOP Class with the DICOM Default Transfer Syntax.

WINSCP will accept any number of Presentation Contexts specified in table 2. WINSCP will examine proposed Presentation Contexts in the order proposed. For the Presentation Contexts of the same Abstract Syntax but different Transfer Syntaxes, only one of these Presentation Context will be accepted with the most preferred Transfer Syntax chosen by WINSCP. The policy of making this choice is described in the next section. WINSCP can accept more than one Abstract Syntax in one association.

In the case that a GE View Application runs out of resources, WINSCP will reject the association request.

3.2.3.2.3 Transfer Syntax Selection Policies

WINSCP selects a transfer syntax to accept for the image transmission with the following general rules: First of all, it prefers a transfer syntax which provides the explicit VR representation. After the

VR choice made, WINSCP tries to select the transfer syntax of the same byte coding scheme of multiple byte data element as the one used on the platform it is running.

As GE View Applications run on the Microsoft® Windows 95™ or Windows NT™ Intel platforms, the concrete selection order of WINSCP is listed as follows:

Little Endian Transfer Syntax with Explicit VR

Big Endian Transfer Syntax with Explicit VR

Little Endian Transfer Syntax with Implicit VR

4 Image Query/Retrieve

GE View Applications implemented two applications WFIND and WMOVE for querying a remote DICOM image database server and for retrieving the images from that server, respectively. Although WFIND and WMOVE can operate complete independently, they are applied in GE View Applications in a tightly combined way. Generally, WFIND queries the remote server a number of attributes of the imaging studies and based on the query responses, WMOVE retrieves the images of one or several studies.

WMOVE always limits the move destination to the same GE View DICOM Application Entity used by itself. Therefore, the application WINSCP (see the preceding chapter) will finally received the images, because all DICOM applications of the GE View Applications share the same GE View DICOM Application Entity Title. The interplay among these components is illustrated
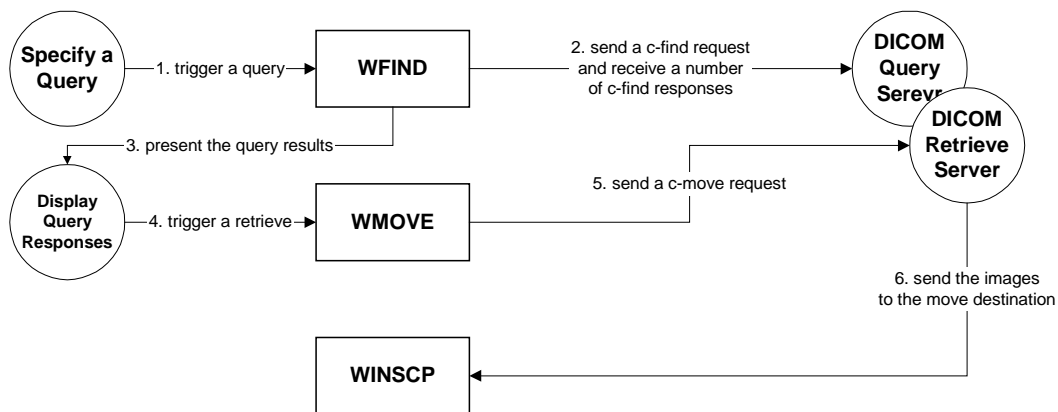
Figure 4-1 The Interplay of WFIND, WMOVE and WINSCP

In the manner depicted in Figure 4-1, the image received over a network, be interactively retrieved or unsolicited sent, will be treated in the same way.

4.1 Implementation Model

GE View Applications DICOM Image Query and Retrieve applications are configured to use the same GE View DICOM Application Entity Title shared with all other GE View Applications DICOM applications.

4.1.1 Application Data Flow Diagram

WFIND and WMOVE are WIN 32 applications able to run on any Microsoft® Windows 95™ or Windows NT™ machine.

In GE View Applications, WFIND and WMOVE are always called through another component DCMQR with a graphical user interface, the interactive user accessible functions are therefore (additionally) limited with the graphical user interface.

When called, WFIND performs a DIMSE-C-FIND command on a request of information query and WMOVE performs a DIMSE-C-MOVE command on a request of image retrieval. Both these kinds of requests are originated from the GE View Applications, usually DCMQR. But other components can also invoke these two applications.

The implementation model of WFIND and WMOVE is depicted in Figure 4-2.

WFIND is invoked by a component of GE View Applications, say, DCMQR, and initiates an association for a DICOM query request to a remote DICOM Application Entity. If the association is accepted by the remote AE, WFIND sends an information query request (C-FIND) based on one of the supported DICOM Query Information Model (see later) and passes each received matching response to the invoking component with some WIN32 IPC method.

WMOVE is invoked by a component of GE View Applications, say, DCMQR, and initiates an association for a DICOM retrieve request to a remote DICOM Application Entity. If the association is accepted by the remote AE, WMOVE sends an image retrieve request (C-MOVE) to the remote AE based on one of the supported DICOM Retrieve Information Model (see later) by specifying the move destination. WMOVE can inform the invoking component about the moving progress and results with some WIN32 IPC method.
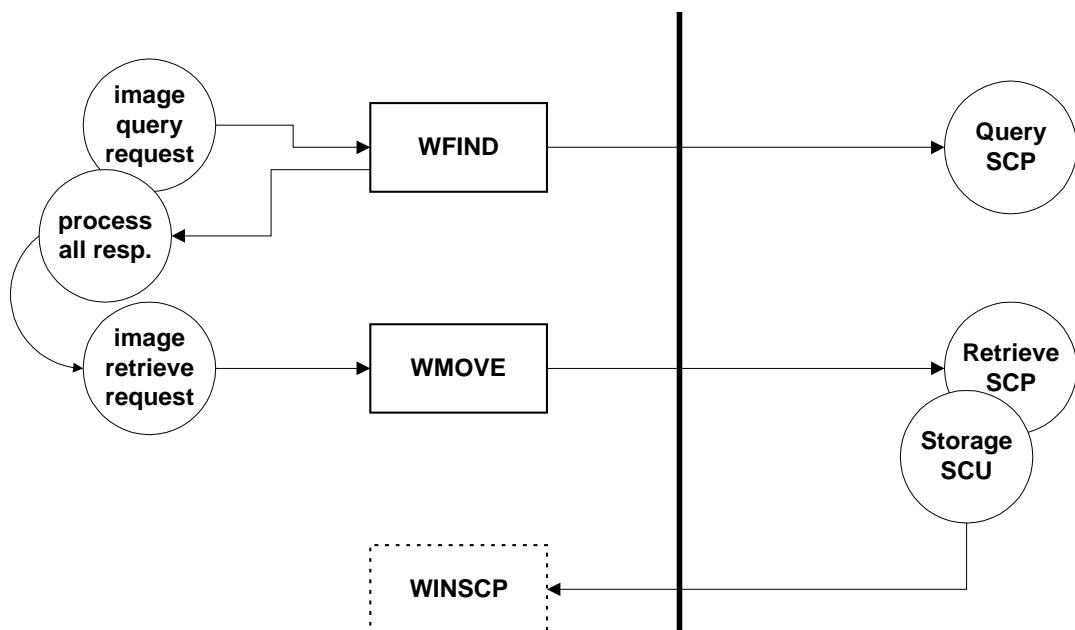

Figure 4-2 WFIND and WMOVE Implementation Model

4.1.2 Functional Definitions of Application Entities

Both WFIND and WMOVE are processes that are started on demand. WFIND is started with a query destination node and a defined query object. WFIND uses DIMSE-C-FIND command to query the specified node and receives a number of responses matching the query object. WMOVE must be started with a retrieve destination node and a number of unique identification numbers which uniquely identify the images to be retrieved. Usually, WFIND is first launched for querying a remote DICOM network node about a particular set of imaging studies and then WMOVE is started to retrieve the images of (a number of) these studies.

The communication among the other components of GE View Applications and WFIND/WMOVE is carried out with some Win32 Inter-Process Communication (IPC) methods and is beyond of the scope of this conformance statement document

4.1.3 Sequencing of Real-World Activities

WMOVE performs an image retrieve request by performing the DIMSE-C-MOVE command.

In GE View Applications, a C-MOVE operation is performed by WMOVE always after one or several C-FIND operations have been performed by WFIND. Even though these two applications can really operate independently, GE View Applications use these in the sequence.

In GE View Applications, the move destination proposed by WMOVE is always limited to the same GE View DICOM Application Entity Title used by WMOVE itself. In fact, the images will be received by WINSCP.

4.2 Application Entity Specifications

As stated as previously, both WFIND and WMOVE use the same GE View DICOM Application Entity Title that all DICOM applications of GE View Applications share.

All operational parameters (such as AE titles, port numbers) of the GE View DICOM Application Entity are saved in the configuration database of GE View Applications and can be accessed and changed by using the Service Manager of GE View Applications.

WFIND provides the Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 4-1 Image Query SOP Classes Supported by WFIND

SOP Class Name	SOP Class UID
Patient Root Query / Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query / Retrieve Information Model - FIND	1.2.840.10008. 5.1.4.1.2.2.1

WMOVE provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU:

Table 4-2 Image Retrieve SOP Classes Supported by WMOVE

SOP Class Name	SOP Class UID
Patient Root Query / Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query / Retrieve Information Model - MOVE	1.2.840.10008. 5.1.4.1.2.2.2

4.2.1 Association Establishment Policies

4.2.1.1 General

When they are launched (by some other component of GE View Applications), WFIND and WMOVE will attempt to establish an association with all valid parameters of the specified remote DICOM node, including the AE title, TCP port number, host name and network address. They will only attempt to establish the association if they determine that the requested parameters are valid with respect to this Conformance Statement. The maximum PDU size which WFIND and WMOVE will use is configurable. The default value 16 K.

4.2.1.2 Number of Associations

Both WFIND and WSTORE will attempt only one association establishment at any given point of time.

GE View Applications keep at most one instance of WFIND or WMOVE running simultaneously. If a new request comes when the current request is still in process, the new request is queued and will be processed later.

4.2.1.2.1 Asynchronous Nature

Neither WFIND nor WMOVE will perform asynchronous operations window negotiation.

4.2.1.2.2 Implementation Identifying Information

WFIND and WMOVE will provide a single Implementation Class UID of

"1.2.276.0.14.200.1.2.0"

and an implementation version name of

" INNOMED_DCM_120"

4.2.2 Association Initiation Policy

WFIND and WMOVE attempt to initiate a new association each time when they are started.

4.2.2.1 Associated Real-World Activity

The associated Real-World Activities are the attempt to perform the service operation DIMSE-C-FIND and DIMSE-C-MOVE. WFIND does not save permanently the received query matching responses. The images retrieved by WMOVE are routed (by specifying the move destination) to the same DICOM Application Entity that all DICOM applications of GE View Applications share. The images will be received by WINSCP and saved in the local image storage area of GE View Applications.

4.2.2.2 Proposed Presentation Contexts

WFIND will propose the Presentation Contexts shown in Table 4-3.

Table 4-3 Presentation Context Proposed by WFIND

WFIND Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Patient Root Query / Retrieve Information Model - FIND	1.2.840.10008. 5.1.4.1.2.1.1	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Study Root Query / Retrieve Information Model - FIND	1.2.840.10008. 5.1.4.1.2.2.1	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

WMOVE will propose the Presentation Contexts shown in Table 4-4.

Table 4-4 Presentation Context Proposed by WMOVE

WMOVE Proposed Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
Patienr Root Query / Retrieve Information Model - MOVE	1.2.840.10008. 5.1.4.1.2.1.2	DICOM Implicit VR Little Endian DICOM Explicit VR Little Endian DICOM Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Study Root	1.2.840.10008.	DICOM Implicit VR	1.2.840.10008.1.2	SCU	None
Query /	5.1.4.1.2.2.2	Little Endian			
Retrieve		DICOM Explicit VR	1.2.840.10008.1.2.1		
Information		Little Endian			
Model - MOVE		DICOM Explicit VR Big	1.2.840.10008.1.2.2		
		Endian			

4.2.2.2.1 SOP Specific Conformance

WFIND and WMOVE provide standard conformance to the DICOM Query / Retrieve Service Class.

WFIND and WMOVE do not provide extension negotiation and do not use relational query. They use only hierarchical queries on Patient, Study, Series or Image levels. Currently, WFIND issues a query only on the patient or study level and WMOVE always retrieve the images on the study level.

WFIND will use the attribute keys in a query as listed in Table 4-5.

Table 4-5 Keys Used in a Query Issued by WFIND

Attribute Name	Tag	Matching Key	Return Key
Patient Name	(0010, 0010)	✔	✔
Patient ID	(0010, 0020)	✔	✔
Patient Birth Date	(0010, 0030)	✔	✔
Patient Sex	(0010, 0040)	✔	✔
Study Date	(0008, 0020)	✔	✔
Study Time	(0008, 0030)	✔	✔
Referring Physician's Name	(0008, 0090)	✔	✔
Accession Number	(0008, 0050)	✔	✔
Study Instance UID	(0020, 000D)		✔
Number of Study Related Series	(0020, 1206)		✔
Number of Study Related Images	(0020, 1208)		✔

WMOVE always retrieves the images on the study level, by specifying the Study Instance UID or Patient ID and Study Instance UID - according to the query / retrieve information model under use.

5 Network Print SCU

5.1 Introduction

> The DICOM Print SCU support is available as an optional add-on module for GE Extended Viewing Station only. This means that this feature is neither present in a standard installation, nor is it configurable on a GE Viewing Station installation.

This section of the DICOM Conformance Statement specifies the compliance to DICOM conformance requirements for the relevant Grayscale **Network Printing** features on this GEMS product. Note that the format of this section strictly follows the format defined in DICOM Standard PS 3.2 (Conformance). Please refer to that part of the standard while reading this section.

Please also note the details of the DICOM conformance related to other Information Objects and Information Models supported by this product are included in subsequent sections of this DICOM Conformance Statement.

5.2 Implementation Model

5.2.1 Application Data Flow Diagram

The Basic and Specific Application models for this device are shown in the following Illustration. The creation and execution of a DICOM Print operation is divided into three several successive steps.

The first step (left) includes the local print activities necessary to prepare a print job to be issued by GEView: film composition and selection of the printer options. Once the definition of the print job is completed, GEView initiates an association as a DICOM Print SCU (centre). Within this association, the print request and data are submitted to the DICOM Print SCP's print queue. The actual performance of the print job (right) usually occurs after the association between GEView and the printer device was already released.
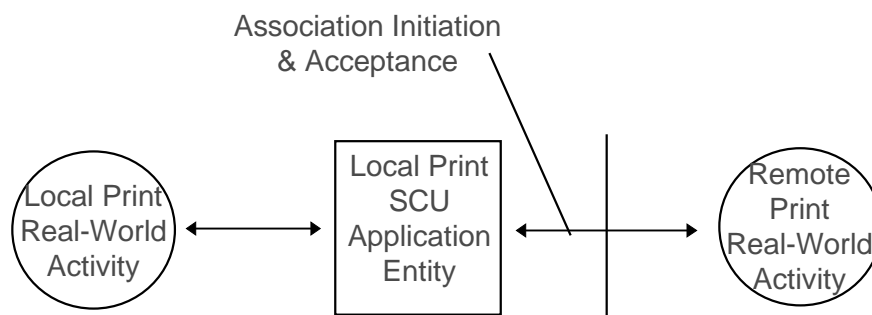
Application Data Flow Diagram

5.2.2 Functional Definition of AEs

GEView uses its general local Application Entity Title for the initiation of a DICOM Print association as a Service Class User (SCU).

The role of the Service Class User in this context is to request an association and to retrieve the available printer options from the SCP. Then a film session of one or more film boxes is created, each containing a number of image boxes. After the appropriate initialization of these data objects, they are transferred to the SCP and then deleted locally. When the SCP acknowledges or rejects the receipt of the data, the association is released again.

5.2.3 Sequencing of Real-World Activities

5.2.3.1 Image Print

The sequence of real-world activities for a print operation can be described as follows:

1. GEView initiates a DICOM association and selects a Presentation Context.
2. Using an N-GET command, GEView retrieves the printer status from the well known Printer SOP Instance.
3. Using an N-CREATE command, a Basic Film Session SOP Instance is created.
4. Using N-CREATE commands, a Basic Film Box SOP Instance is created for each film.
5. Using N-SET commands, the Basic Film Box SOP Instances are initialized with Image Box SOP Instances for each image on the film
6. GEView makes no use of collation, but always prints by a series of N-ACTION commands on the Basic Film Box SOP Instances, each followed by N-DELETE commands of the Basic Film Box SOP Instances.
7. GEView receives N-EVENT-REPORTs of the well known Printer SOP Instance indicating printer status up to the last N-DELETE command. However, the contents of the report are ignored.
8. GEView releases the DICOM association after the submittal to the print queue was acknowledged or a failure has been signaled to the user

5.3 AE Specifications

5.3.1 AE Specification

In the context of DICOM Print operation, this Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an **SCU**.

(Note that GEView uses the same AE Title for all operations supported, so refer to the respective chapters of this document in order to compile a complete list of supported SOP classes.)

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

Note: Support of the Basic Grayscale Print Management Meta SOP Class as an SCU mandates support for the Basic Film Session, Basic Film Box, Basic Grayscale Image Box and Printer SOP Classes as an SCU.

In the context of DICOM Print operation, this Application Entity provides no Standard Conformance to the following DICOM V3.0 SOP Classes as an **SCP**.

(Note that GEView uses the same AE Title for all operations supported, so refer to the respective chapters of this document in order to compile a complete list of supported SOP classes.)

5.3.1.1 Association Establishment Policies

5.3.1.1.1 General

The DICOM Application Context Name (ACN), which is always proposed, is:

Application Context Name	1.2.840.10008.3.1.1.1

The Maximum Length PDU negotiation is included in all association establishment requests.
The maximum length PDU for an association initiated by GEView is:

Maximum Length PDU	16,384 B

The Print Management Service Class does not support extended negotiation.
The maximum number of Presentation Context Items that will be proposed is one.
The user information Items sent by this product are :

- Maximum PDU Length
- Implementation UID
- Implementation Version Name

5.3.1.1.2 Number of Associations

The implementation will not open multiple associations in order to establish multiple film sessions.

5.3.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. All operations will be performed synchronously.

5.3.1.1.4 Implementation Identifying Information

The Implementation UID for this DICOM v3.0 Implementation is:

Implementation UID	1.2.276.0.14.200.1.2.0

The Implementation Version Name for this DICOM v3.0 Implementation is:

Implementation Version Name	INNOMED_DCM_120

5.3.1.2 Association Initiation Policy

5.3.1.2.1 Real-World Activity

5.3.1.2.1.1 Associated Real-World Activity

5.3.1.2.1.2 Proposed Presentation Context Table

Presentation Context Table - Proposed					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended**
Name	**UID**	**Name List**	**UID List**		**Negotiation**
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

5.3.1.2.1.2.1 SOP Specific DICOM Conformance Statement for Print Management SOP Classes

For each of the supported Print Management SOP and Meta SOP Classes, the optional attributes and service elements supported, the valid range of values for mandatory and optional attributes are described in the following subsections.

5.3.1.2.1.2.2 SOP Specific DICOM Conformance Statement for Basic Film Session SOP Class

The following table lists the attributes and service modules supported within the Basic Film Session SOP class and the valid ranges for these attributes.

List of supported Attributes and Values		
Attribute Name	**Valid Values**	**Role**
Number of Copies	1, 2, 3...	Number of copies to be printed for each film of the film session.
Print Priority	HIGH MED LOW	Specifies the priority of the print job
Medium Type	PAPER CLEAR FILM BLUE FILM	Type of medium on which the print job will be printed
Film Destination	MAGAZINE PROCESSOR	Film destination

5.3.1.2.1.2.3 SOP Specific DICOM Conformance Statement for Basic Film Box SOP Class

The following table lists the attributes and service modules supported within the Basic Film Box SOP class and the valid ranges for these attributes.

List of supported Attributes and Values		
Attribute Name	**Valid Values**	**Role**
Image Display Format	STANDARD/C/R	Type of image display format
Film Orientation	PORTRAIT LANDSCAPE	Film Orientation
Film Size ID	8 IN x 10 IN 10 IN x 12 IN 10 IN x 14 IN 11 IN x 14 IN 14 IN x 14 IN 14 IN x 17 IN 24 CM x 24 CM 24 CM x 30 CM	Film size identification
Magnification Type	REPLICATE BILINEAR CUBIC NONE	Interpolation type by which the printer magnifies the image in order to fit the image box on film.
Border Density	BLACK	Density of the film areas surrounding and between images on the film.
Empty Image Density	BLACK	Density of the image box area on the film that contains no image.
Trim	NO	Specifies whether a trim box shall be printed surrounding each image on the film.

5.3.1.2.1.2.4 SOP Specific DICOM Conformance Statement for Image Box SOP Class

The following table lists the attributes and service modules supported within the Image Box SOP class and the valid ranges for these attributes.

List of supported Attributes and Values		
Attribute Name	**Valid Values**	**Role**
Image Statuse Position	index within STANDARD/C/R	Position of the image on the film
Polarity	NORMAL	Specifies whethr minimum pixel values are to be printed black or white

Magnification Type	REPLICATE BILINEAR CUBIC NONE Explicitly set to the same value as for Film Box	Interpolation type by which the printer magnifies the image in order to fit the image box on film.

5.3.1.2.1.2.5 SOP Specific DICOM Conformance Statement for Printer SOP Class

The following table lists the attributes and service modules supported within the Printer SOP class and the valid ranges for these attributes.

<table>
<tr><th colspan="3">List of supported Attributes and Values</th></tr>
<tr><th>Attribute Name</th><th>Valid Values</th><th>Role</th></tr>
<tr><td>Printer Status</td><td>NORMAL
WARNING
FAILURE</td><td>Printer device status

(used only as log information)</td></tr>
<tr><td>Printer Status Info</td><td>any</td><td>Additional Information about Printer Status

(used only as log information)</td></tr>
<tr><td>Printer Name</td><td>any</td><td>User defined name identifying the printer
(used only as log information)</td></tr>
<tr><td>Manufacturer</td><td>any</td><td>Manufacturer of the printer
(used only as log information)</td></tr>
<tr><td>Manufacturer Model Name</td><td>any</td><td>Manufacturer's model name of the printer
(used only as log information)</td></tr>
<tr><td>Device Serial Number</td><td>any</td><td>Manufacturer's serial number of the printer
(used only as log information)</td></tr>
<tr><td>Software Versions</td><td>any</td><td>Manufacturer's designation of software version of the printer
(used only as log information)</td></tr>
<tr><td>Date of Last Calibration</td><td>any date</td><td>Date when the printer was last calibrated
(used only as log information)</td></tr>
<tr><td>Time of Last Calibration</td><td>any time</td><td>Time when the printer was last calibrated
(used only as log information)</td></tr>
</table>

5.4 Communication Profiles

5.4.1 Supported Communication Stacks (PS 3.8, PS 3.9)

The communication stacks are inherited from the Windows Operating System.

5.4.2 OSI Stack

OSI stack not supported

5.4.2.1 International Standardized Profile (ISP)

Not applicable to this product.

5.4.2.2 API

Not applicable to this product.

5.4.2.3 Physical Media Support

Not applicable to this product.

5.4.3 TCP/IP Stack

The TCP/IP stack is inherited from the Windows Operating System.

5.4.3.1 API

Not applicable to this product.

5.4.3.2 Physical Media Support

DICOM is indifferent to the Physical medium over which TCP/IP executes (e.g. Ethernet V2.0,IEEE 802.3, ATM, FDDI)

> **Note:**   For more information about the Physical Media available on GEView, please refer to the Product Data Sheet.

5.4.4 Point-to-Point Stack

A 50-pin ACR-NEMA connection is not applicable to this product.

5.5 Extensions/Specializations /Privatizations

Not applicable for this product.

5.6 Configuration

5.6.1 AE Title/Presentation Address Mapping

5.6.2 Configurable Parameters

The following fields are configurable for this AE (local):

- Local AE Title

- Local IP Address

- Local Listening Port Number (not used for DICOM Print operations)

- Local IP Netmask

The following fields are configurable for every remote DICOM AE:

- Remote AE Title

- Remote IP Address or Symbolic Hostname

- Listening TCP/IP Port Number

> **Note:**   All configurations must be performed by a GE Field Engineer.

5.7 Support of Extended Character Sets

No extended character sets supported.

6 DICOM File-Set CD-R Reader Application

GE Extended Viewing Station implemented the support of the DICOM File Service for reading DICOM CD-R with two parts:

- The application CDREADER implemented the DICOM File Service M-READ command to read the DICOMDIR file on a DICOM CD-R and presents the contents in a form of a number of patient folders in a graphical user interface. CDREADER allows for the users to browse the DICOMDIR file following the DICOM standard information model and to select images on the study or series level for loading into the viewer component for the visualisation.

- A built-in DICOM codec in the viewer component of GE View Applications is able to decode the image object files on the DICOM CD-R and to display the images.

The communication between CDREADER and the viewer component of GE View Applications is performed with some WIN32 IPC method and beyond to the scope of this Conformance Statement document.

GE View Applications support the following DICOM removable media application profiles.

6.1 Basic Cardiac X-ray Angiographic Application Profile

GE View Applications support the File Set Read (FSR) role of the following basic cardiac X-ray angiographic application profile:

STD-XABC-CD

GE View Applications supports the following SOP classes in the basic cardiac X-ray angiographic application profile STD-XABC-CD:

Table 6-1 SOP Classes and Transfer Syntaxes Supported for Basic Cardiac Application Profile

IOD	SOP Class	Transfer Syntax
Basic Directory	1.2.840.10008.1. 3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Angiographic Image	1.2.840.10008.5. 1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70

6.2 General Purpose CD-R Image Interchange Profile

GE View Applications support the File Set Read (FSR) role of the following general purpose CD-R image interchange profile:

      STD-GEN-CD

GE View Applications supports the following SOP classes in the general purpose CD-R image interchange profile STD-GEN-CD:

Table 6-2 SOP Classes and Transfer Syntaxes Supported general purpose CD-R image interchange profile

IOD	SOP Class	Transfer Syntax
Basic Directory	1.2.840.10008.1. 3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
All Composite Image Storage IOD listed in Table 3-7.	All Composite Image Storage SOP Classes listed in Table 3-7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

7 Communication Profiles

7.1 Supported Communications Stacks

All DICOM applications of the GE View Applications provide DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

7.2 TCP/IP Stack

All DICOM applications of the GE View Applications use the TCP/IP stack from the Microsoft® Windows 95™ or Windows NT™ operating systems upon which it is running.

7.2.1 API

All DICOM applications of the GE View Applications use a library that is based on the WinSocket interface.

7.2.2 Physical Media Support

All DICOM applications of the GE View Applications are indifferent to the physical medium over which TCP/IP executes; it inherits this from the Microsoft® Windows 95™ or Windows NT™ operating systems upon which it is running.

As usually, a machine running the GE View Applications software is connected to a 10 Base T or 100 base T Ethernet with twist-pair cables.

7.3 Point-to-Point Stack

Not applicable.

8 Extensions/Specializations/Privatizations

Not Applicable.

9 Configuration

GE View Applications save the configuration information (both the network DICOM nodes and the GE View DICOM Application Entity itself) in a configuration database which is created automatically when the application is installed.

GE View Applications provides a graphical user interface for the users to add, delete or change the DICOM nodes in the configuration database.

9.1 AE Title/Presentation Address Mapping

For each DICOM node added into the configuration database, GE View Applications will ask for the following parameters:

- Application Entity Tile identifying the node

- Symbolic Host Name or Network IP Address or Telephone Number identifying the machine on which the node runs

- TCP Port Number that the node uses

    If a telephone number is assigned to identify a remote node, GE View Applications automatically assume that this node is connected with a modem to the local machine and will use Windows™ RAS service to connect it.

In this way, the configuration database provide the mapping between the presentation address and the network address of a DICOM node.

Other network parameters, like Subnet Mask, Routers, etc., can be set up in the Windows™ operating systems.

9.2 Configurable Parameters

The Application Entity Titles, host names and TCP port numbers are configurable. As default, GE View DICOM Application Entity uses the standard TCP port number 104, if it is not specified else by the users.

10 Support of Extended Character Sets

GE View Applications DICOM applications currently support the following character set:

ISO-IR 100 (ISO 8859-1:1987).

The character set ISO-IR 6 is supported as the DICOM default character repertoire.

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