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0 INTRODUCTION

This document provides the conformance statement for the Heartlab, Inc. DICOMservice program. This program provides DICOM network support for all Heartlab, Inc. products. This conformance statement is supported as of DICOMservice Version 2.06.52 or later.

1 IMPLEMENTATION MODEL

The DICOMservice implements a subset of the DICOM service classes as a Windows NT service.

1.1 Application Data Flow Diagram

The DICOMservice listens on a designated IP socket for incoming DICOM network association requests. The DICOM protocol is supported on this socket. It will accept association requests for any of the configured Local Application Entities on the DICOMservice. The convention of the DICOMservice is to configure at least one Application Entity for each of the available Heartlab, Inc. Information Volumes. Multiple Application Entities can be configured for support by one running instance of the DICOMservice. The Information Volumes are referred to as "Devices" in the Encompass Review Station. An Information Volume, or "Device", is defined as a storage device, a hard disk, a CD or DVD disk, or remote network storage, coupled with a database used to access the DICOM studies contained on the storage device. This can be a Heartlab, Inc. "Preload Index" proprietary flat file database, a DICOMDIR flat file database, or via a Heartlab, Inc. relational database via SQL and ODBC.

Any incoming association requests must request one or more of the DICOMservice supported SOP classes. All requests for unsupported SOP classes will be rejected.

Since the DICOMservice is an NT service, it does not have an application window on the NT desktop as normal Windows applications do. Instead, it has an additional network endpoint that it listens to for Telnet connections. The user can administer the DICOMservice and can initiate certain DICOM functions via a Telnet session. The user can also administer and initiate certain DICOM functions from the DICOMservice GUI, which supplies a window dialog framework to this Telnet connection.

All configuration information is stored in the Windows system registry and all configuration information stored in the registry is non-volatile.

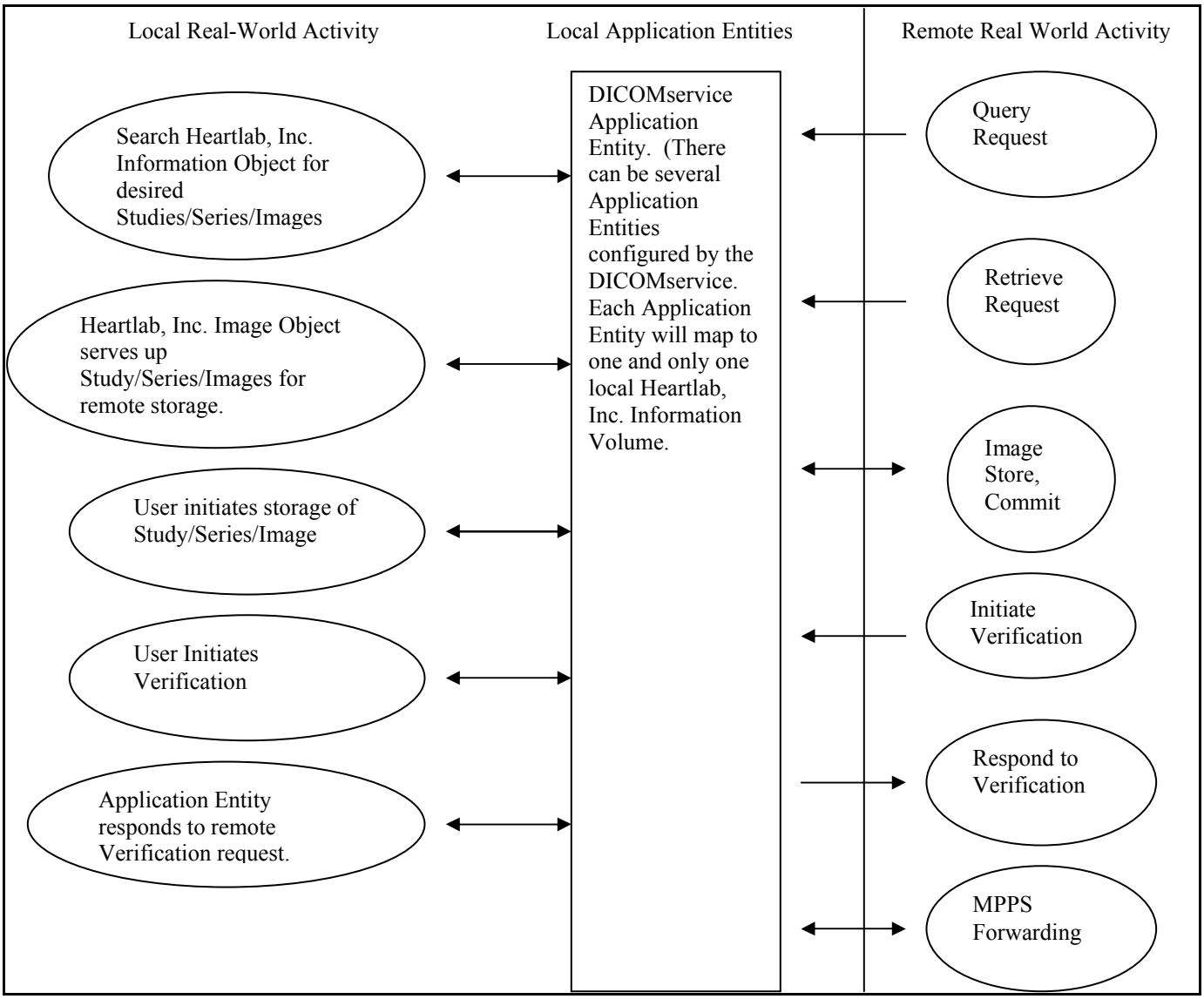

Figure 1.1-1. DICOMservice Implementation Model

1.2 Functional Definition of Application Entities

The DICOMservice contains an Application Entity database. Both local and remote Application Entities are configured in the same database. A Local Application Entity can also be configured as a Remote Application Entity for loop back operation. An Application Entity is defined as "Local" if it is mapped to a local Heartlab, Inc. Information Volume. An application entity can be mapped to one and only one Heartlab, Inc. Information Volume. However, a Heartlab, Inc. Information Volume can be mapped by more than one Application Entity.

A "Remote" Application Entity is any Application Entity that has an IP address and port number that is used as the connection point when using the Application Entity as a target of a DICOM association.

It is also possible for "Local" Application Entities to configure the local DICOMservice DICOM network connection endpoint as a "Remote" Application Entity. This allows a user using the DICOMservice GUI to specify a "Local" Application Entity as a "Remote" Application Entity. This is loop back operation and can be used for testing purposes and moving studies from one local Information Volume to another.

The Heartlab, Inc. DICOMservice Application Entities support automatic responses to all remote SCU requests as an SCP. The following Real-World scenarios are possible in this mode.

- The DICOMservice can respond to a remote DICOM verification request. The DICOMservice will respond with a positive verification response if the Remote Application Entity is available.
- The DICOMservice can respond to a remote query request. The DICOMservice will respond to the incoming query by passing on the query to the mapped Heartlab, Inc. information object. All query results are then passed back to the Remote Application Entity.
- The DICOMservice can respond to a remote Move request. The DICOMservice will query the mapped information object to Move the requested study, series, or image. The requested study, series, or image is then stored on the destination Application Entity as defined in the Move request.
- The DICOMservice can respond to a storage commitment request. When received, the DICOMservice shall enter the request in a queue. The queue shall be checked periodically and check the availability of listed SOP Instances in the Information Volume. If all of the SOP Instances are available, the DICOMservice shall respond with a positive storage commitment message for the listed SOP instances. If a preconfigured time limit has passed with out a successful commitment, the

DICOMservice shall positively commit to the received SOP instances and fail the commit on the SOP instances that are not available.

- The DICOMservice can forward received MPPS messages to a configured Remote Application Entity. This is needed to conform to the IHE specification for an Image Manager.

With the exception of automatic storing of images as outlined above, the DICOMservice has some DICOM commands that the user can initiate via the telnet or the DICOMservice GUI interface. These Real-World commands are:

- The user can initiate a DICOM verification request to a Remote Application Entity. The results of the verification are displayed to the user.
- The user can initiate a Find to see if a patient, study, series or image is available on a Remote Application Entity. The results of the Find are displayed to the user.
- The user can initiate Storage of a selected study, series or image contained on a Local Application Entity to a Remote Application Entity. The results of the storage are displayed to the user.
- The user can initiate a Retrieve or Move of a selected study, series or image contained on a Remote Application Entity to a destination Application Entity. The results of the Move operation are displayed to the user.
- The user can initiate the printing of selected images on a remote DICOM interface equipped printer.
- The user can initiate a request of the status of a remote DICOM interface equipped printer.

1.3 Sequencing of Real World Activities

See the sequencing of real world activities defined for each service class later in this document.

2 APPLICATION ENTITY SPECIFICATIONS

There is one type of Application Entity supported in the DICOMservice. However, there may be several instances of this type Application Entity available by any given instance of the DICOMservice.

2.1 DICOMservice - Specification

This Application Entity provides Standard Conformance to the following DICOM V3.0 SOP Classes as an SCU or SCP.

Supported SOP Classes as an SCU	SOP Class UID
Verification Service Class	1.2.840.10008.1.1
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 Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi Frame Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi Frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Storage SOP Class	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage SOP Class	1.2.840.10008.5.1.4.1.1.9
12 Lead ECG Waveform Storage SOP	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.4.1
Standalone Modality LUT Storage SOP Class	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage SOP Class	1.2.840.10008.5.1.4.1.1.11
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi Plane Image Storage SOP	1.2.840.10008.5.1.4.1.1.12.3

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Supported SOP Classes as an SCU	SOP Class UID
Class (RET.)	
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20
VL Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.77.1
VL Multi Frame Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.77.2
VL Endoscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide Coordinates Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.4
Positron Emission Tomography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.128
Standalone PET Curve Storage SOP Class	1.2.840.10008.5.1.4.1.1.129
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.7
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Modality Performed Procedure Step Sop Class	1.2.840.10008.3.1.2.3.3
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammography X Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra Oral X Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral X Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2

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Supported SOP Classes as an SCU	SOP Class UID
Multi Frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65

Table 2 – 1. Supported SOP Classes as and SCU

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DICOMservice makes use of DICOMstore to index images into the Database, and this imposes limitations on the types of files that can be indexed. The DICOMstore Conformance Statement is needed to determine which SOP classes are accessible in a Heartlab, Inc. Information Volume

Supported SOP Classes as an SCP	SOP Class UID
Verification Service Class	1.2.840.10008.1.1
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi Frame Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.3
Ultrasound Multi Frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Storage SOP Class	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage SOP Class	1.2.840.10008.5.1.4.1.1.9
12 Lead ECG Waveform Storage SOP	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.4.1
Standalone Modality LUT Storage SOP Class	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage SOP Class	1.2.840.10008.5.1.4.1.1.11
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2
X-Ray Angiographic Bi Plane Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.12.3
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20
VL Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.77.1
VL Multi Frame Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.77.2
VL Endoscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide Coordinates Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.4
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128

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Supported SOP Classes as an SCP	SOP Class UID
SOP Class	
Standalone PET Curve Storage SOP Class	1.2.840.10008.5.1.4.1.1.129
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Set Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Brachy Treatment Record Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.6
RT Treatment Summary Record Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.7
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital Mammography X Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra Oral X Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra Oral X Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
MR Spectroscopy Image Storage	1.2.840.10008.5.1.4.1.1.4.2
Multi Frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multi Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2
Multi Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3
Multi Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22

Supported SOP Classes as an SCP	SOP Class UID
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Chest CAD SR	1.2.840.10008.5.1.4.1.1.88.65

Table 2 – 1. Supported SOP Classes as and SCP

2.1.1 Association Establishment Policies

The Application Context Name used by the DICOMservice is the DICOM V3.0 Application Context Name.

Application Context Name	1.2.840.10008.3.1.1.1

2.1.1.1 General

The maximum PDU size negotiation as determined by Part 7 is handled in association establishment requests.

The DICOMservice will honor any request by a Remote Application Entity to limit the maximum PDU size during association negotiation. This is done via the maximum length to send sub-item. The DICOMservice is capable of receiving a maximum PDU size of 1 Mbyte. The default received PDU size for the DICOMservice is 1 Mbyte, and is configurable.

There is no maximum number of supported Presentation Context Items that can be presented to the AE. However, only the Presentation Contexts listed in Tables 2.1 will result in a successful association negotiation. If any Proposed Presentation Contexts are present that are not in Tables 2.1, then the association request will be rejected.

The user information sub-items supported by the DICOMservice are:

- Maximum length to send (maximum PDU Length)
- Implementation UID
- Implementation Name
- SCU/SCP Role Negotiation
- Asynchronous Operations Window

The optional extended negotiations, Asynchronous Operations Window, and Extended SOP Class Negotiation, are trivial support only to respond to vendors who inquire about such services.

2.1.1.2 Number of Associations

The DICOMservice supports multiple concurrent associations, as both an SCU and as an SCP, at any given time with any configured Application Entity. All local and remote Application Entities must be configured into the DICOMservice Application Entity database before use.

During the automated storage of a study or a series as an SCU, the DICOMservice shall request only one association at a time. However, multiple users or DICOM associations may request image storage as an SCU at the same time. Since the DICOMservice is multithreaded it is possible that there will multiple SCU sessions being processed at the same time to support different associations or users.
The numbers of simultaneous association that will be accepted by the DICOMservice is limited only by the Windows NT parameters of the underlying TCP/IP implementation. The DICOMservice is multithreaded and shall create a new thread for each connection request it receives. Therefore, the DICOMservice can have multiple simultaneous connections and there are no inherent limitations on the total number of simultaneous associations that the DICOMservice can maintain.

2.1.1.3 Asynchronous Nature

Asynchronous mode is not supported. However, the DICOMservice does support extended asynchronous operations window negotiation as defined in Part 7 of the DICOM standard, when responding to association requests. The DICOMservice shall always respond with only synchronous mode operation being supported.

As an SCU, the DICOMservice shall be configured to include asynchronous operations window negotiation as defined in Part 7 of the DICOM standard. However, if this option is added to the association request, it shall only ask for synchronous operation.

2.1.1.4 Implementation Identifying Information

The Implementation Class UID for this Application Entity is:

DICOMservice Implementation Class UID	1.2.840.113815.4.2.buildnum

The suffix after the Heartlab, Inc. UID root: 1.2.840.113815 is subject to change without notice.

The Implementation Name for this Application Entity is:

DICOMservice Implementation Name	Heartlab DICOMTK

2.1.1.5 SCU/SCP Role Negotiation

As an SCU, SCU/SCP Role Negotiation is configurable to be present or not present in the association request to a Remote Application Entity. The default is to be present. If present, the SCU will identify itself as operating as an "SCU only." SCU/SCP role selection negotiation is required and supported for Storage Commitment, allowing the association requestor to act as SCP for the N-EVENT-REPORT DIMSE service.

As an SCP, the DICOMservice shall respond to any SCU/SCP Role Negotiation requests when accepting an association. The DICOMservice shall identify itself as operation as "SCP only."

2.1.2 Association Acceptance Policy

As an SCP, the DICOMservice accepts associations that meet these requirememts: The Called-AEtitle is a Local AETitle, the Calling-AEtitle is a Remote AETitle, the Presentation Context list contains an acceptable SOP Class UID, and one of the associated Transfer Syntaxes is an Acceptable Transfer Syntax.

If the DICOMservice rejects an association it provides this information:

ASSOCIATION REJECTION REASONS

Result	Source	Reason/Diag	Explanation
1 – rejected permanent	2 – DICOM UL service-provider	1 – no-reason given	No Presentation Context is acceptable
1 – rejected permanent	1 – DICOM UL service-user	3 – calling-AEtitle-not recognized	
1 – rejected permanent	1 – DICOM UL service-user	7 – called-AEtitle-not recognized	

2.1.3 Association Initiation Policy

As an SCU, the DICOMservice shall initiate a new association under the following circumstances.

When a user initiates a DICOM SCU command, such as Verification or Storage, between two Application Entities, a new association is initiated to perform the SCU command. The association terminates following the completion of each command.

As an SCU, extended negotiation is not used as a default. See section 2.1.2, for the extended negotiation options.

For SCP services, the DICOMservice listens for association requests on one or more designated IP network endpoints and waits for Remote Application Entities to initiate an association.

All DICOMservice associations support a "command watchdog timer". The default is 600 seconds (10 minutes) but is user selectable. When the association becomes idle during the processing of a command the watchdog timer starts. If the association is idle long enough for the timer to expire, then the DICOMservice sends an A-ABORT PDU and closes the association. The ARTIM timeout is 15 seconds.

As an SCP, the DICOMservice shall answer with the trivial responses to any and all extended negotiation requests. See section 2.1.2 for extended negotiation behavior.

2.1.3.1 Real-World Activity Verification

2.1.3.1.1 Associated Real World Activity

The user can initiate DICOM verification as an SCU to verify that a DICOM association is possible and working correctly between two Application Entities. The DICOMservice can also respond to verification requests as an SCP.

2.1.3.1.2 Proposed Presentation Contexts

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation?
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	BOTH	See section 2.1.1

Table 2.1.2.1.2 – 1. Verification Service Presentation Contexts

2.1.3.1.2.1 SOP Specific Conformance Statement for Verification

There is nothing unusual about verification as an SCU or SCP.

2.1.3.2 Real-World Activity Storage

2.1.3.2.1 Associated Real-World Activity

The DICOMservice supports the following storage SOP classes as both an SCU and SCP. As an SCU, the storage SOP Classes shall store designated SOP Instances to a Remote Application Entity. As an SCP, received SOP Instances shall be stored in a Heartlab Information Volume that is associated with the receiving Application Entity.

The storage SCU activity is invoked by either a user via the telnet or the DICOMservice GUI or in response to a Move SCP command on another DICOM association.

2.1.3.2.2 Proposed Presentation Contexts

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DICOMservice makes use of DICOMstore to index images into the Database, and this imposes limitations on the types of files that can be indexed. The DICOMstore Conformance Statement is needed to determine which SOP classes are accessible in a Heartlab, Inc. Information Volume

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation?
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	See Note	See Note	BOTH	See Section 2.1.1
Ultrasound Multi Frame Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.3	See Note	See Note	BOTH	See Section 2.1.1
Ultrasound Multi Frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1	See Note	See Note	BOTH	See Section 2.1.1
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	See Note	See Note	BOTH	See Section 2.1.1
Nuclear Medicine Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.5	See Note	See Note	BOTH	See Section 2.1.1
Ultrasound Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.6	See Note	See Note	BOTH	See Section 2.1.1
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6.1	See Note	See Note	BOTH	See Section 2.1.1
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	See Note	See Note	BOTH	See Section 2.1.1
Standalone Overlay Storage SOP Class	1.2.840.10008.5.1.4.1.1.8	See Note	See Note	BOTH	See Section 2.1.1
Standalone	1.2.840.10008.5.1.	See Note	See Note	BOTH	See Section

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Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation?
Curve Storage SOP Class	4.1.1.9				2.1.1
12 Lead ECG Waveform Storage SOP	1.2.840.10008.5.1.4.1.1.9.1.1	See Note	See Note	BOTH	See Section 2.1.1
General ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.2	See Note	See Note	BOTH	See Section 2.1.1
Ambulatory ECG Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.1.3	See Note	See Note	BOTH	See Section 2.1.1
Hemodynamic Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.2.1	See Note	See Note	BOTH	See Section 2.1.1
Cardiac Electrophysiology Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.3.1	See Note	See Note	BOTH	See Section 2.1.1
Basic Voice Audio Waveform Storage SOP Class	1.2.840.10008.5.1.4.1.1.9.4.1	See Note	See Note	BOTH	See Section 2.1.1
Standalone Modality LUT Storage SOP Class	1.2.840.10008.5.1.4.1.1.10	See Note	See Note	BOTH	See Section 2.1.1
Standalone VOI LUT Storage SOP Class	1.2.840.10008.5.1.4.1.1.11	See Note	See Note	BOTH	See Section 2.1.1
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	See Note	See Note	BOTH	See Section 2.1.1

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Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation?
X-Ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	See Note	See Note	BOTH	See Section 2.1.1
X-Ray Radiofluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	See Note	See Note	BOTH	See Section 2.1.1
X-Ray Angiographic Bi Plane Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.12.3	See Note	See Note	BOTH	See Section 2.1.1
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	See Note	See Note	BOTH	See Section 2.1.1
VL Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.77.1	See Note	See Note	BOTH	See Section 2.1.1
VL Multi Frame Image Storage SOP Class (RET.)	1.2.840.10008.5.1.4.1.1.77.2	See Note	See Note	BOTH	See Section 2.1.1
VL Endoscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.1	See Note	See Note	BOTH	See Section 2.1.1
VL Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.2	See Note	See Note	BOTH	See Section 2.1.1
VL Slide Coordinates Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.3	See Note	See Note	BOTH	See Section 2.1.1

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Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation?
VL Photographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.4	See Note	See Note	BOTH	See Section 2.1.1
Positron Emission Tomography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.128	See Note	See Note	BOTH	See Section 2.1.1
Standalone PET Curve Storage SOP Class	1.2.840.10008.5.1.4.1.1.129	See Note	See Note	BOTH	See Section 2.1.1
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1	See Note	See Note	BOTH	See Section 2.1.1
RT Dose Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.2	See Note	See Note	BOTH	See Section 2.1.1
RT Structure Set Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.3	See Note	See Note	BOTH	See Section 2.1.1
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	See Note	See Note	BOTH	See Section 2.1.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	See Note	See Note	BOTH	See Section 2.1.1
RT Brachy Treatment Record Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.6	See Note	See Note	BOTH	See Section 2.1.1
RT Treatment Summary Record Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.7	See Note	See Note	BOTH	See Section 2.1.1

Table 2.1.2.2.2 – 1 – Storage Service Presentation Contexts

Note: The DICOMservice acting as SCU reads in the file as stored on the disk and asks for an association based on the Abstract Syntax UID and Transfer Syntax UID found in the file. The DICOMservice does have the ability to transform a dataset to another transfer syntax. For every Storage SOP class DICOMservice has a list of Supported Transfer Syntaxes which is presented after the file Transfer Syntax UID. If the Remote Application Entity cannot accept the proposed transfer syntaxes then the transfer does not take place.

2.1.3.2.3 SOP Specific Conformance Statement for Storage

DICOMservice as Storage SCP will accept any Transfer Syntax in a Presentation Context which is in its list of Acceptable Transfer Syntaxes

Result	Conditions	Service Status	Error Codes	Related DICOM Fields.
Success	Successful Store	Success	0000	None
Processing Failure	Processing Failure	Failed	0110	None
Missing Attribute	Required Attribute not present in Store Command.	Failed	0120	(0000, 0901), (0000, 0902)
Unrecognized Operation	Invalid Command	Failed	0211	(0000, 0901), (0000, 0902)
No Resources	Disk Full	Failed	A700	None
Invalid Dataset	(0000,0002) is different SOP class	Failed	A900	None
Cannot Understand	Invalid DUL protocol	Failed	C000	None

Table 2.1.2.2.3 – Storage SCP Status Codes

Service Status	Further Meaning	Error Code	Behavior	Related DICOM Fields.
Success	Successful Store	0000	Successful Store	None
Warning	Warning Element Coercion	B000	Successful Store	(0000, 0901), (0000, 0902)
Warning	Warning Elements Discarded	B006	Successful Store	(0000, 0901), (0000, 0902)
Warning	Warning Dataset Not SOP Class	B007	Successful Store	None
Error	Processing Failure	0110	Failed Store	None
Refused	Failure Refused No Resources	A7xx	Failed Store	None
Error	All others	xxxx	Failed Store, may Retry	None

Table 2.1.2.2.3 – Storage SCU Status Code handling

2.1.3.3 Real-World Activity Storage Commitment

2.1.3.3.1 Associated Real-World Activity

After receiving a Storage Commitment Push Model N-ACTION request the DICOMservice may wait a configurable time until the listed SOP instances are indexed into the Database. An Association Request is then sent to the peer AE and upon successful negotiation of the required Presentation Context the outstanding N-EVENT-REPORT is sent. The maximum number of times the STORAGE-COMMITMENT-SCP AE will attempt to resend an N-EVENT-REPORT is configurable, along with the amount of time to wait between attempts to resend.

2.1.3.3.2 Proposed Presentation Contexts

Abstract Syntax Name	Abstract Syntax UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation?
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	See section 2.1.1

Table 2.1.2.3.2 – 1. Storage Commitment Service Presentation Contexts

2.1.3.3.3 SOP Specific Conformance Statement for Storage Commitment

The Storage Commitment AE supports the following elements for this SOP class. The Transaction UID Attribute (0008,1195) value uniquely identifies each Storage Commitment Request.

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Table 2.1.2.3.3 – 1. Storage Commitment Request Attributes

The Storage Commitment SCP returns the following status codes: Success, Failed.

Result	Conditions	Service	Error	Related

		Status	**Codes**	**DICOM Fields.**
Success	Success.	Success	0000	

Table 2.1.2.3.3 – 2. Storage Commitment SCP Status Codes

2.1.3.3.4 Storage Commitment Result

If *DICOMservice* determines that it has successfully completed storage commitment, *DICOMservice* issues an N-EVENT-REPORT to the SCU including references to the successfully stored SOP Instances contained in the N-ACTION.
The N-EVENT-REPORT contains the Transaction UID value contained in the initiating N-ACTION.
The N-EVENT-REPORT is sent on a separate association from the N-ACTION operation.

Action Type Name	Action Type ID	Attribute Name	Tag
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

This N-EVENT-REPORT is sent if some of the SOP instances are not Committed.

Action Type Name	Action Type ID	Attribute Name	Tag
Storage Commitment Request Complete – Failures Exist	2	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Failed SOP Sequence	(0008,1198)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		>Failure Reason	(0008,1197)

2.1.3.4 Real-World Activity Find

2.1.3.4.1 Associated Real-World Activity

The user, via the telnet or GUI interface, can initiate DICOM queries as an SCU to enquire about studies, series or SOP instances on a Remote Application Entity. Searches can be restricted via the key attributes listed in section 2.1.2.4.4.

The DICOMservice supports DICOM queries as an SCP from a Remote Application Entity. The incoming Find is passed on to the mapped Heartlab, Inc. information volume. The returned query results from the information volume are passed on the Remote Application Entity.

2.1.3.4.2 Proposed Presentation Contexts

The DICOMservice uses the following presentation contexts shown in the following table to support the Find service.

Abstract Syntax Name	Abstract Syntax UID	Name List	UID List	Role	Extended Neg.
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	BOTH	See section 2.1.1
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	BOTH	See section 2.1.1

Table 2.1.2.4.2 – 1. Find Service Presentation Contexts

2.1.3.4.3 SOP Specific Conformance Statement Find

The DICOMservice supports hierarchical queries and not relational queries with all mandatory Key Attributes. Attributes are only returned if requested in the query with the exception of Retrieve AETitle, Instance Availability, and Query-Retrieve Level which are always required by IHE and DICOM. The following table describes the Key Attributes supported at a given query/retrieve information model.

Specific Character Set will be included if needed at every query level. If present in the response, Specific Character Set will be used to identify character sets other than the default character set for display of strings.

2.1.3.4.4 Wildcard Matching

Conforms to part 4, section C.2.2.2, with the following exceptions:

1. Not case sensitive
2. '?' does not include the blank " " character.
3. In a PN value representation, the last three name components, middle initial, prefix and suffix are treated as a '*' if the field is blank.
4. The free form name is contained in the last name field.
5. The comma (,) is also used as a delimiter along with the DICOM standard caret (^) delimiter.

Attribute Name	Tag	Attribute Type	Matching	Value Representation
Specific Character Set	(0008,0005)	O	None	CS
Patient Level				
Patient Name	(0010,0010)	R	Single Value, Wildcard, Null	PN
Patient ID	(0010,0020)	U (Patient root) R (Study Root)	Single Value, Wildcard, Null	LO
Patient Birth Date	(0010,0030)	O	Single Value, Date Range, Null	DA
Patient Sex	(0010,0040)	O	Single Value, Null	CS
Study Level				
Study Instance UID	(0020,000D)	U	Single Value, UID List	UI
Study ID*	(0020,0010)	R	Null	SH
Study Date	(0008,0020)	R	Single Value, Date Range, Null	DA
Study Time	(0008,0030)	R	Null	TM
Accession Number	(0008,0050)	R	Null	SH
Study Description	(0008,1030)	O	Null	LO
Referring Physician	(0008/0090)	O	Single Value, Wildcard, Null	PN
Series Level				
Series Instance UID	(0008,000E)	U	Single Value, UID List	UI
Series Number*	(0020,0011)	R	Null	IS
Modality	(0008,0060)	R	Single Value, Null	CS
Series Date*	(0008,0021)	O	Single Value, Date Range, Null	DA
Series Time	(0008,0031)	O	Null	TM
Series Description*	(0008,103E)	O	Null	LO

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Attribute Name	Tag	Attribute Type	Matching	Value Representation
Performing Physician	(0008/050)	O	Single Value, Wildcard, Null	PN
Image Level				
SOP Instance UID	(0008,0018)	U	Single	UI
Image Number	(0020,0013)	R	Null	IS

Table 2.1.2.4.4 – 1. Find Key Attributes

* - These keys are ignored when searching the HL preload information volume type.

NOTE: - The 'Performing Physician' key is not part of the standard Query and Retrieve Service Class, but is included because of customer necessity.

Result	Conditions	Service Status	Error Codes	Related DICOM Fields.
Matching is complete – No final identifier is supplied	Matching dataset found successfully and no matching identifier is supplied.	Success	0000	None
Matches are continuing	Current match is supplied and any Optional keys were supported in the same manner as Required keys.	Pending	FF00	Identifier
Matches are continuing	Warning that one or more Optional keys were not supported for existence and/or matching for this identifier.	Pending	FF01	Identifier
Failed at performing DIMSE service user.	Failed	Failed	C001	(0000, 0901), (0000, 0902)
C-FIND terminated due to Cancel request	Due to C-FIND Cancel indication primitive.	Cancel	FE00	None

Table 2.1.2.4.4 – 2. Find Status Codes

2.1.3.5 Real World Activity Move

2.1.3.5.1 Associated Real World Activity

The user, via the telnet or GUI interface, can initiate DICOM Move as an SCU to copy a study, series or SOP instance to a destination Application Entity.

The DICOMservice also supports DICOM Move as an SCP from a Remote Application Entity. The incoming Move request shall transfer a copy of the designated study, series or SOP instance to the Destination Application Entity. The Destination Application Entity may or may not be the Application Entity that requested the retrieval of the study, series or SOP instance.

2.1.3.5.2 Proposed Presentation Contexts

The DICOMservice uses the following Presentation Contexts to support the Move service.

Abstract Syntax Name	Abstract Syntax UID	Name List	UID List	Role	Extended Neg.
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	BOTH	See Section 2.1.1
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	BOTH	See Section 2.1.1

Table 2.1.2.5.2 – 1. Move Service Presentation Contexts

2.1.3.5.3 SOP Specific Conformance Statement for Move

When the Move Service Class services a C-MOVE-RQ as an SCP, it shall query the Heartlab, Inc. Information Volume to get the file locations of each SOP instance to copy to the Destination Application Entity. It then spawns a secondary association to store each SOP instance on the Destination Application Entity. One association shall store only one SOP instance. So there can be several secondary associations used to store a study or a series. However, the associations are executed one at a time, not all at once.

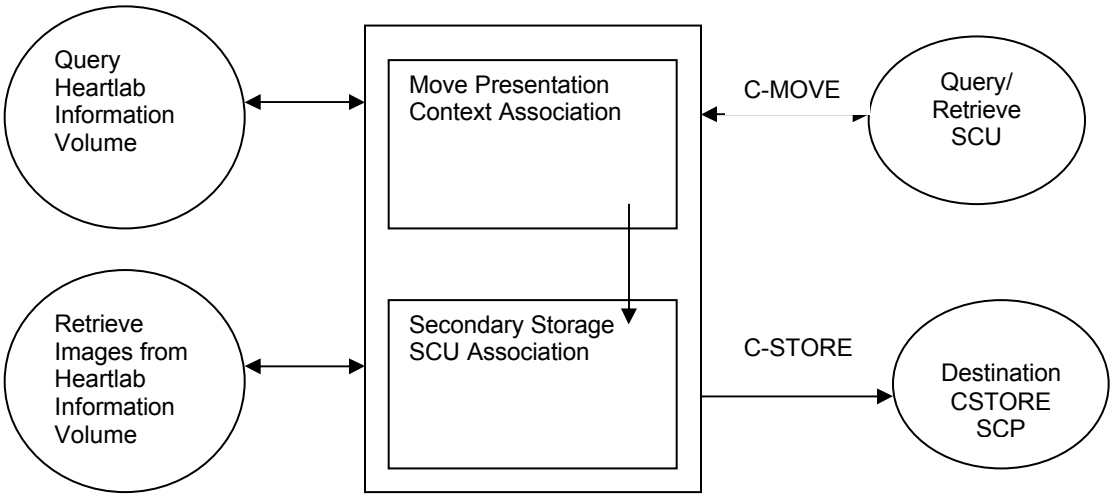

Figure 2.1.2.4.3 – 1. DICOMservice Move Real-World Activity Diagram

The C-MOVE SCP returns the following status codes: Refused, Failed, Cancel, Success and Pending.

Result	**Conditions**	**Service Status**	**Error Codes**	**Related DICOM Fields.**
Sub operations complete	Matches are found and all sub-operations are completed.	Success	0000	(0000,1020), (0000,1021), (0000,1022), (0000,1023)
Out of Resources	Unable to perform sub operations.	Refused	A702	(0000,1020), (0000,1021), (0000,1022), (0000,1023)
Destination Unknown	Move destination not found.	Refused	A801	(0000, 0901)
Failed	Failed.	Failed	C000	(0000, 0901), (0000, 0902)
C-MOVE terminated due to Cancel request	Due to C-MOVE Cancel indication primitive.	Cancel	FE00	(0000,1020), (0000,1021), (0000,1022), (0000,1023)
Sub operations are continuing	Matches are found and the sub operations are continuing.	Pending	FF00	(0000,1020), (0000,1021), (0000,1022), (0000,1023)

Table 2.1.2.5.3 – 2. Move Status Codes

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When the Move Service sends a message with status = Pending (FF00), this will also include a progress report on the Move with:

Number of Remaining Sub operations	(0000,1020)
Number of Completed Sub operations	(0000,1021)
Number of Failed Sub operations	(0000,1022)
Number of Warning Sub operations	(0000,1023)

At the completion of the Move, with no Failed sub operations and even if there are Warning sub operations (C-STORE retries) the status is Success (0000) and includes:

Number of Remaining Sub operations	(0000,1020)
Number of Completed Sub operations	(0000,1021)
Number of Failed Sub operations	(0000,1022)
Number of Warning Sub operations	(0000,1023)

2.1.3.6 Real World Activity Print

2.1.3.6.1 Associated Real World Activity

The user, via the telnet or GUI interface, can initiate DICOM print as an SCU to print one or more frames contained in one or more SOP Instances on a remote DICOM printer.

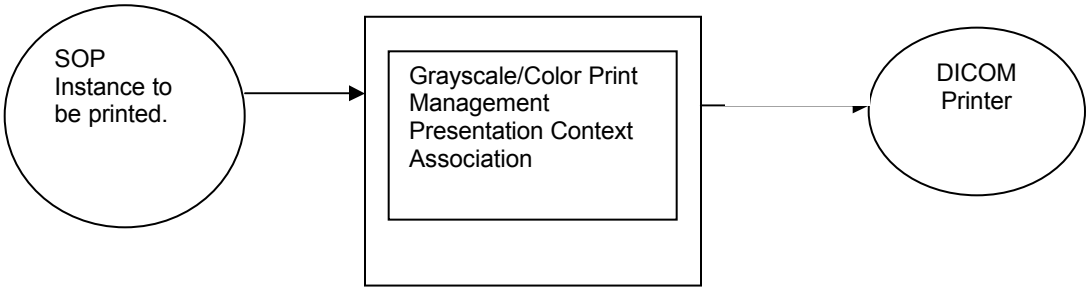

Figure 2.1.2.4.3 – 1. DICOMservice Print Real-World Activity Diagram

The DICOMservice does not support any DICOM PRINT SOP Class support as an SCP.

2.1.3.6.2 Proposed Presentation Contexts

The DICOMservice uses the following Presentation Contexts to support the Print service.

Abstract Syntax Name	Abstract Syntax UID	Name List	UID List	Role	Extended Neg.
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	See Section 2.1.1
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	See Section 2.1.1

Table 2.1.2.5.2 – 1. Print Service Presentation Contexts

2.1.3.6.3 SOP Specific Conformance Statement for Print

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When the Print Service Class services a print request, the print service shall scan all of the image types in the print request for the photometric interpretation. The following rules shall be applied to the printing of images:

- If any images are compressed, they shall be uncompressed before sending to a printer.
- If all of the images are grayscale, then the Grayscale Print Management SOP Class shall be used.
- For mixed color and grayscale images, if the default option is used, then the grayscale images shall be converted to RGB color and the Color Print Management SOP Class shall be used.
- For mixed color and grayscale images, if the "Grayscale" option is specified, then the color images shall be converted to grayscale and the Grayscale Print Management SOP Class shall be used.
- If all of the images are color, then the Color Print Management SOP Class shall be used unless the "Grayscale" option is specified. If it is, then the images are converted to grayscale and the Grayscale Print Management SOP Class shall be used.
- Color images that have a photometric interpretation other than RGB shall be converted to the RGB photometric interpretation before sending to a printer.

2.1.3.7 Real World Activity Modality Worklist Information Model - FIND

2.1.3.7.1 Associated Real World Activity

The user, via the telnet or GUI interface, can retrieve a worklist for a station from an Application Entity that supports the Worklist.

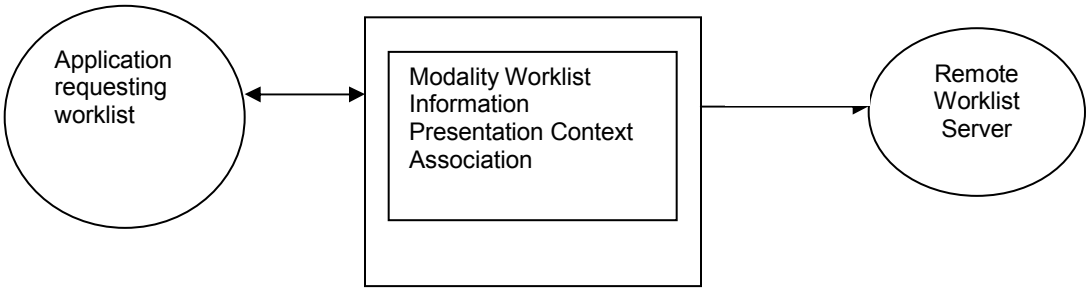

Figure 2.1.2.4.3 – 1. DICOMservice Print Real-World Activity Diagram

The DICOMservice does not support any Modality Worklist Information SOP Class support as an SCP.

2.1.3.7.2 Proposed Presentation Contexts

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The DICOMservice uses the following Presentation Contexts to support the Print service.

Abstract Syntax Name	Abstract Syntax UID	Name List	UID List	Role	Extended Neg.
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Implicit VR Little Endian, Explicit VR Big Endian, Explicit VR Little Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	See Section 2.1.1

Table 2.1.2.5.2 – 1. Modality Worklist Information Model - FIND Presentation Contexts

2.1.3.7.3 SOP Specific Conformance Statement for Modality Worklist Information Model -FIND

The Worklist information request can request using the following qualifiers:

Attribute Name	Tag	Attribute Type	Matching	Value Representation
Patient Name	(0010,0010)	O	According to associated SCP Rules	PN
Patient ID	(0010,0020)	U	According to associated SCP Rules	LO
Patient Birth Date	(0010,0030)	O	According to associated SCP Rules	DA
Patient Sex	(0010,0040)	O	According to associated SCP Rules	CS
Study Status ID	(0032,000A)	O	SCHEDULED, null	CS
Study Instance UID	(0020,000D)	U	According to Associated SCP Rules	UI
Referring Physician	(0008,0090)	O	According to Associated SCP Rules	PN
Performing Physician	(0008,1050)	O	According to Associated SCP Rules	PN
Accession Number	(0008,0050)	O	According to Associated SCP Rules	SH

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Attribute Name	Tag	Attribute Type	Matching	Value Representation
Requested Procedure Description	(0032,1060)	O	According to Associated SCP Rules	LO
Scheduled Procedure Step Sequence	(0040,0100)	O	According to Associated SCP Rules	SQ
Scheduled Station AE Title	>(0040,0001)	O	According to Associated SCP Rules	AE
Scheduled Procedure Step Start Date	>(0040,0002)	O	According to Associated SCP Rules	DA

3 COMMUNICATION PROFILES

3.1 Supported Communication Stacks (Parts 8 and 9)

The DICOMservice provide DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8.

3.2 TCP/IP Stack

The DICOMservice uses the Microsoft provided implementation of WinSock 1.1 and WinSock 2.0.
The DICOM services wait on Port 104 for any incoming association requests

3.2.1 Physical Media Support

The DICOMservice is indifferent to the physical medium over which the TCP/IP executes.

3.2.2 Point-to-Point Stack

The DICOMservice does not support the 50-pin (part 9) ACR-NEMA connection.

4 Extensions/Specializations/Privatizations of SOP Classes and Transfer Syntaxes

Not Applicable.

5 Configuration

The following parameters are necessary for configuring the DICOMservice:

* Listening Hostname (This is automatically configured by the DICOMservice. Multiple addresses are possible)
* Listening Port number to use (port 104 is used as a default. Multiple ports are possible)
* Local AE(s) to use. This includes:
  - Local AE Title(s).
  - Local Mappings of Application Entity Titles to Heartlab, Inc. Information Volumes
* Remote AE(s) to use. This includes:
  - Remote Application Entity Title
  - Remote Application Entity hostname or IP address
  - Remote Application Entity Port number

The following parameters are optional for configuring the DICOMservice:

DicomDataSet

"Enable Group Length Tags" = 0

DicomUpperLayerServer

"Acceptable Transfer Syntax UIDs" = "1.2.840.10008.1.2.4.50|1.2.840.10008.1.2.4.70|1.2.840.10008.1.2.5|1.2.840.10008.1.2.1|1.2.840.10008.1.2.2|1.2.840.10008.1.2"

"ARTIM Timeout" = 15

"SC Query Timeout Minutes" = 60

"SC Resend Timeout Minutes" = 24*60

A-Association-RQ Settings

"Async Operation Window Sub-Item" = 0

MaximumLengthPDU" = 0

"Match Offered MaximumLengthPDU" = 0

"SCU SCP Role Negotiation Sub-Item" = 1

"SOPClass Extended Negotiation Sub-Item" = 0

6 Support of Extended Character Sets

DICOMservice supports the following character sets:

a. ISO-IR 6 (ASCII)
b. ISO-IR 100 (Latin-1)
c. ISO-2022-IR 87 (kanji and full width kana)
d. ISO-IR 13 (half width kana)
e. ISO-IR 14 (Romaji)

f. ISO-IR 159 (kanji)

This document was approved by:

Signatures:

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