Merge PACS™

8.2

DICOM CONFORMANCE STATEMENT

IBM Watson Health

INDICATIONS FOR USE:

Merge PACS™ is a Picture Archiving and Communication System (PACS) for multi-modality (CT, MR, PT, US, MG, BTO, CR, DR/DX, NM, XA, RF, secondary capture (SC), and other DICOM-compliant modalities) image processing and display, diagnostic reading and reporting, communication, printing, and storage of medical imaging studies and other patient data. Intended clinical users include radiologists, orthopedic and other surgeons, referring physicians, technologists, and other qualified medical professionals.

Data can be received directly from acquisition modalities, CAD systems, and other image processing systems, or indirectly via importing. Data that is not DICOM-compliant, such as photos, can be converted to DICOM format by Merge PACS.

Merge PACS provides image manipulation tools to enable users to view and compare images such as: linking, MPR, MIP, 3D image fusion/ registration of CT, MR, and PET; as well as CVR (Color Volume Rendering), measurements (linear distances, angles, areas, SUV, etc.), and annotations (for example, outline and label regions of interest, label spinal vertebrae).

The Real Time Worklist (RTWL) displays the real-time status of radiology activity and provides customizable workflow management capabilities. Communication of critical results is facilitated and documented through optional, configurable components.

The Patient Dashboard provides a composite view of patient data, both imaging and non-imaging. Multi-tier patient identity matching provides a comprehensive view even when dealing with multiple disparate patient identities.

Order and report information generated by the HIS/RIS and report creation systems are received and displayed via the transmission of HL7 messaging.

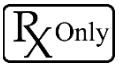
Lossless (reversible) and lossy (irreversible) image compression are supported for viewing, storage and communication. Merge PACS displays full fidelity DICOM images for use in the diagnostic interpretation of mammography using MG or BTO images. Thick slab MIP presentation can be applied to BTO images.

Lossy compressed images and digitized screen film images must not be used for primary diagnosis of mammography studies, and only display monitors that have regulatory clearance for mammography interpretation should be used for the interpretation of mammography studies.

CAUTION: Not for diagnostic use on a mobile device such as a smart phone or a tablet.

If you experience a serious incident that has occurred in relation to this medical device, please report the incident to Watson Health or the regulatory authority in your country.

CANADIAN DEVICE IDENTIFIER: Merge PACS



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Symbols Glossary:

Symbol	Title
REF	Part or Catalog number
	Manufacturer
US	Country of Manufacture
	Date of Manufacture
EC REP	Authorized Representative in the European Community
UK REP	Authorized Representative in the United Kingdom
CE 1639	CE Mark with Notified Body
Rx Only	Prescription Use Only
	Importer
MD	Medical Device
	Consult Instructions for Use

The full symbols glossary can be viewed at **https://www.ibm.com/support/pages/node/6262453**.

INSTRUCTIONS FOR USE:

Instructions for use are available electronically in PDF format. Paper format can be requested for supported languages by contacting Customer Support and will be provided free of charge within seven calendar days of receiving the request. The paper format can also be provided at the time of delivery if so requested at the time of order.

For application support or to report issues with user documentation, contact Customer Support:

1-877-741-5369 (North America)
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Part	Date	Revision	Description
PAX-49675	08/25/2021	1	Initial Release for 8.2

The latest version of this document can be found at **https://mergecustomer.force.com/mergeusercommunity/login**.

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Chapter 1. Executive Overview

The Merge Web/Intranet Image Server is designed to bridge the gap between DICOM devices and the electronic medical record through the application of Internet standards and technologies. The Merge Web/Intranet Image Server is an integrated software system that provides access to medical images for both radiologists and referring physicians with the speed and ease-of-use that is commonly expected of Web browsers. As such, the Merge Web/Intranet Image Server is installed on a computer that is configured with connections to both the DICOM network and the Internet (or intranet) of a facility. The product architecture is optimized to receive all of the imaging studies on a DICOM network as soon as they are available from the imaging modality and to process the imaging study for storage in a form that can be readily accessed via either Internet or DICOM standard protocols on-demand. Two or more Merge Web/Intranet Image Servers can also be configured to effectively and securely route between two DICOM networks via the Internet. Merge technology enables a scalable and flexible product that can be configured for both large and small clients, functioning as a stand-alone product or in combination with PACS and other healthcare information systems. The product can be configured for multiple sites and customer types with varying degrees of clinical capabilities.

NOTE: Images with non-square acquisition pixels are displayed in Merge PACS as square pixels. All measurements (lengths, angles, etc.) will take the exact pixel dimensions (both square and non-square) into account.

The most important characteristic of this device are the supported SOP Classes, the respective roles (Service Class User or Provider, SCU/SCP or Both) and whether each class is viewable within Merge PACS or just capable of being stored, a list of which is provided below:

Table 1.1 Supported DICOM SOP Classes

SOP Class Name	SOP Class UID	Role	View
Verification	1.2.840.10008.1.1	Both	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Both	Yes
Digital X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Both	Yes
Digital X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Both	Yes
Digital Mammography X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Both	Yes
Digital Mammography X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Both	Yes
Digital Intra Oral X-Ray Image Storage For Presentation	1.2.840.10008.5.1.4.1.1.1.3	Both	Yes
Digital Intra Oral X-Ray Image Storage For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	Both	No
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Both	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Both	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Both	Yes
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Both	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Both	Yes
Multi-Frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Both	Yes
Multi-Frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Both	Yes

SOP Class Name	SOP Class UID	Role	View
Multi-Frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Both	Yes
Multi-Frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Both	Yes
12-lead ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.1	Both	No
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Both	No
Ambulatory ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.3	Both	No
Hemodynamic ECG Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Both	No
Cardiac Electrophysiology ECG Waveform	1.2.840.10008.5.1.4.1.1.9.3.1	Both	No
Basic Voice Audio Waveform	1.2.840.10008.5.1.4.1.1.9.4.1	Both	No
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Both	Yes
Color Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.2	Both	No
Pseudo-Color Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.3	Both	No
Blending Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.4	Both	No
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Both	Yes
X-Ray Radio fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Both	Yes
X-Ray Angiographic Bi-plane Image Storage	1.2.840.10008.5.1.4.1.1.12.3	Both	Yes
Breast Tomosynthesis Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Both	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Both	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Both	No
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Both	Yes
Spatial Fiducials	1.2.840.10008.5.1.4.1.1.66.2	Both	No
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Both	Yes
Real World Value Mapping	1.2.840.10008.5.1.4.1.1.67	Both	No
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1	Both	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	Both	Yes
VL Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	Both	No
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	Both	Yes
Stereometric Relationship	1.2.840.10008.5.1.4.1.1.77.1.5.3	Both	No
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	Both	Yes
DICOM Basic Text SR	1.2.840.10008.5.1.4.1.1.88.1	Both	Yes
DICOM SR Objects	1.2.840.10008.5.1.4.1.1.88.11	SCU	No
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	Both	No
Comprehensive Structured Report	1.2.840.10008.5.1.4.1.1.88.33	Both	No
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50	Both	Yes
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Both	Yes
Chest CAD Structured Report	1.2.840.10008.5.1.4.1.1.88.65	Both	Yes
XRay Radiation Dose Structured Report	1.2.840.10008.5.1.4.1.1.88.67	Both	No
ProcedureLog	1.2.840.10008.5.1.4.1.1.88.40	Both	No

SOP Class Name	SOP Class UID	Role	View
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Both	Yes*
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Both	Yes
Radiation Therapy Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Both	Yes
Radiotherapy Structure Set	1.2.840.10008.5.1.4.1.1.481.3	Both	No
Radiation Therapy Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.4	Both	No
Radiation Therapy Plan	1.2.840.10008.5.1.4.1.1.481.5	Both	No
Radiation Therapy Brachy Treatment Record	1.2.840.10008.5.1.4.1.1.481.6	Both	No
Radiation Therapy Treatment Summary Record	1.2.840.10008.5.1.4.1.1.481.7	Both	No
Radiation Therapy Ion Plan	1.2.840.10008.5.1.4.1.1.481.8	Both	No
Radiation Therapy Ion Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.9	Both	No
Patient Root Query/Retrieve - Find	1.2.840.10008.5.1.4.1.2.1.1	SCP	No
Patient Root Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.1.2	SCP	No
Study Root Query/Retrieve - Find	1.2.840.10008.5.1.4.1.2.2.1	Both	No
Study Root Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.2.2	Both	No
Patient/Study Only Query/Retrieve - Find	1.2.840.10008.5.1.4.1.2.3.1	SCP	No
Patient/Study Only Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.3.2	SCP	No
Modality Worklist Query	1.2.840.10008.5.1.4.31	Both	No
Instance Availability Notification	1.2.840.10008.5.1.4.33	SCU	No
Basic Study Content Notification (retired)	1.2.840.10008.1.9	SCU	No
Ultrasound Multi-frame Image Storage (retired)	1.2.840.10008.5.1.4.1.1.3	Both	No
NM Image Storage (retired)	1.2.840.10008.5.1.4.1.1.5	Both	Yes
US Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6	Both	Yes
Text SR Storage - Trial (retired)	1.2.840.10008.5.1.4.1.1.88.1	Both	No

***** Encapsulated PDF reports are viewable within the Report Viewer, not the primary image viewports.

GSPS support includes the following restrictions:

- Merge PACS does not support the Display Shutter Module (0018,1600).
- The Displayed Area Selection Sequence (0070, 005A) is not applied to the display of the image.
- For display of a Graphic Annotation Sequence (0070, 0001):
  - For the Graphic Annotation Units (0070,0005) attribute, DISPLAY and MATRIX values are not supported
  - For the Graphic Filled (0070, 0024) attribute, the 'Y' value is not supported.
  - For the Graphic Type (0070, 0023) attribute, the INTERPOLATED value is not supported.

Table 1.2 DICOM SOP Classes Disabled by Default

SOP Class Name	SOP Class UID	Role	View
Enhanced CT Storage	1.2.840.10008.5.1.4.1.1.2.1	Both	No
Enhanced MR Storage	1.2.840.10008.5.1.4.1.1.4.1	Both	No

SOP Class Name	SOP Class UID	Role	View
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8	Both	No
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9	Both	No
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10	Both	No
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11	Both	No
Enhanced XA Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Both	No
Enhanced XRF Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Both	No
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	Both	Yes
General Electric Magnetic Resonance Image Storage	1.2.840.113619.4.2	Both	Yes
GE Computed Tomography Image Storage	1.2.840.113619.4.3	Both	Yes

Chapter 2. General

2.1. Acronyms and Abbreviations

The following acronyms and abbreviations are used throughout this document:

Term	Description
ASCII	American Standard Code for Information Interchange
AE	Application Entity
ANSI	American National Standards Institute
BSCN	Basic Study Content Notification
CR	Computerized radiography
CT	Computerized Tomography
DICOM	Digital Imaging and Communications in Medicine
IAN	Instance Availability Notification
IE	Information Entity
IOD	Information Object Definition
ISO	International Standards Organization
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
NM	Nuclear Medicine
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
RF	Radio Fluoroscopy
RWA	Real World Activities
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
US	Ultrasound
VM	Value Multiplicity
VR	Value Representation
XA	X-Ray Angiography

2.2. Related Documents

- *Merge PACS 8.2 DICOM Conformance Statement – Modality Worklist*
- *Merge PACS 8.2 HL7 Interface Guide*

2.3. Scope

This DICOM Conformance statement documents the conformance of the Merge Web/Intranet Image Server software with the Digital Imaging and Communications in Medicine (DICOM) standard. This document is essential in order to evaluate whether or not another DICOM compliant device can communicate with this software product. This statement is conformant with the recommended format as described in PS 3.2 of the DICOM Standard[1].

2.4. How to Use this Document

This statement consists of five important features that one should compare with other devices in order to determine connectivity:

1. **Implementation Model**

   The Implementation Model describes the functional relationship between the device, the so-called "real-world activities" which initiate certain DICOM functionality, and the DICOM services. A DICOM service is implemented on a device by a software process, which is called an "Application Entity" (AE). Each AE has a unique name called the AE Title, which is used to identify it to other AE's. The AE Title is configurable to avoid two devices with the same name on a network. The "bubble diagram" (Application Data Flow Diagram) shows the interaction of the AE with the outside world across the dashed line, *i.e.*, the DICOM interface.

2. **AE Specifications**

   Each AE supports one or more Service-Object-Pair classes or SOP Class, which define the basic functionality. A SOP class consists of a combination of an Object or Information model with specific DICOM services. An example of such a SOP Class is the CT Image Storage Class, which consists of the combination of the DICOM C_STORE command with the CT Image object. Each of these classes is uniquely identified by an Unique Identification number (UID), which is issued by the NEMA. In addition, the "role" of the AE is specified, *i.e.*, User or Provider, which can be compared with acting as a Client or Server. In DICOM terms, this is called a Service Class User or Service Class Provider (SCU or SCP).

   In order to interconnect with another device, the SOP classes as well as their role (SCU or SCP) have to be matched, *i.e.*, a SCU has to match a SCP at another device with an identical SOP class. Make sure to compare the SOP Class UID itself, not the description because there are SOP classes which have the same name, but support a different (newer) Object, which is identified by a different SOP Class UID.

[1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-14, 2016

3. **Presentation Context**

   Each SOP class supports a particular presentation context, which is the combination of the SOP Class as specified under (2) and the Transfer Syntax. The Transfer Syntax defines the encoding of the DICOM basic elements, *i.e.*, its attributes and how the data is represented, *i.e.*, with a data type definition. The encoding of the data type as part of the message, or Value Representation (VR), can be done in two ways - implicitly or explicitly. If a device supports Explicit VR transfer syntax, it means that the transmitted data will include the VR information along with data and attribute tags. Implicit VR means that the VR information will not be included, and the receiving application must determine the VR type from the Attribute Tag. For example, when receiving the Attribute "Patient Name" in Explicit Transfer Syntax, there is an additional type code field (containing "PN" meaning "Person Name") to identify the Value Representation. In the case of Implicit Transfer Syntax, it is assumed to be known by the receiver and not explicitly specified that this attribute has a type of "Person Name".

   The data can be communicated in the Intel or Motorola Byte ordering, AKA "Little Endian" or "Big Endian". This means that for certain 16 bit words; the two 8 bit Bytes might have to be swapped to be able to interpret the information by a device supporting a different byte ordering.

   Lastly, compression can be applied, such as JPEG, which is specified in the transfer syntax. The Transfer Syntax of two devices must match in order for them to communicate.

4. **Communication Profiles**

   This section specifies the communication options. In practice, each device always supports an Application level interface to the OSI level 4 (Transport layer), *i.e.*, TCP/IP stack. However, the Physical Media of two devices have to match for connectivity. Note that matching physical media can be achieved by standard off the shelf devices. For example, if one device supports standard Ethernet 10BaseT, it can be bridged to a Fast Ethernet, ATM, or whatever is supported.

5. **Supported Attributes**

   Many devices specify which DICOM attributes they require and/or store in their internal database. It is important to compare these against the source of the information, particularly if a device requires certain attributes to accomplish specific functionality such as 3-D viewing, image processing, etc. A mismatch could have the effect that certain functionality or applications might fail.

2.5. WARNING to the Reader

CAUTION: **If another device matches this conformance statement based on the comparison with its own conformance statement, there is a chance, but no guarantee that they interoperate. DICOM only deals with communication; it does not specify what is needed for certain applications to run on a device.**

Chapter 3. Implementation Model

3.1. Application Data Flow Diagram

Merge Web/Intranet Image Server software consists of a single Application Entity that deals with the DICOM communication. There are four functions that are provided by the Application entity: Web access to images, archiving, auto routing and verification. In addition, the Application entity also could provide access to scheduling information, however, this is a separate product offering and not described in this conformance statement.

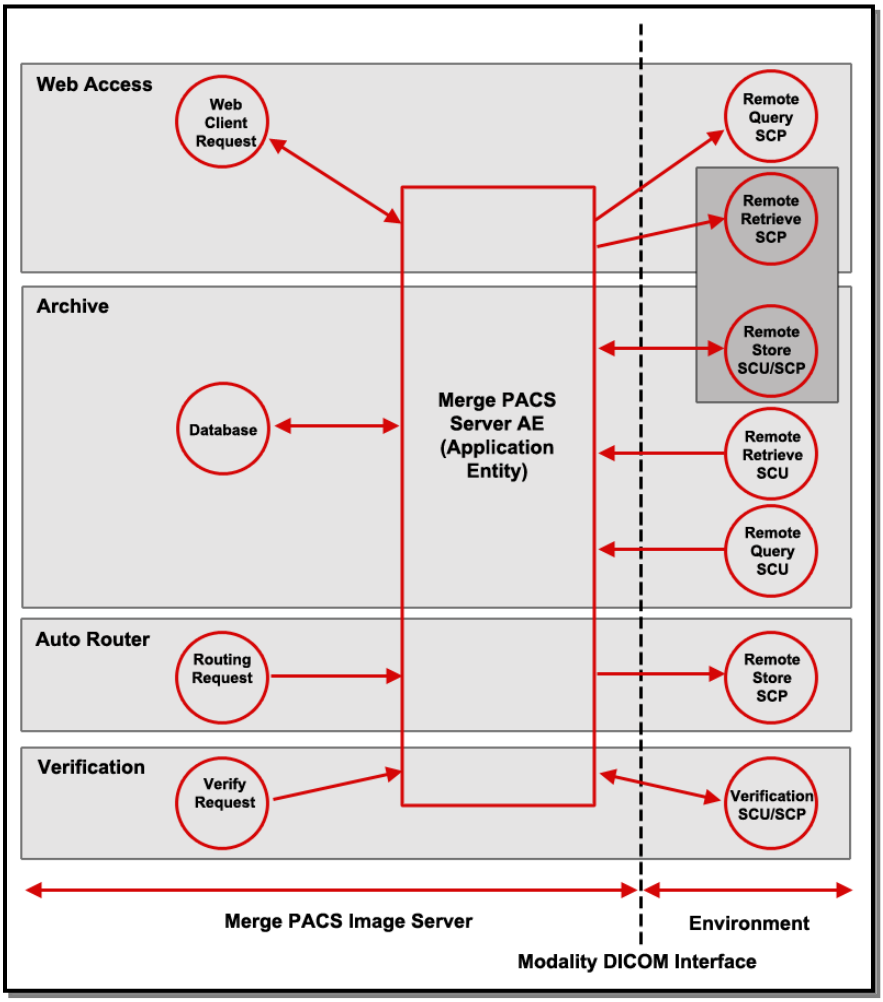

Figure 1: Implementation Model

The Web Access function is implemented by a Web Client request real-world activity. The Client initiates a Query that might result in a Retrieve of DICOM objects (such as images) from other devices, as indicated by the Remote Query SCP and Remote Retrieve SCP in the figure. The Remote Retrieve will initiate sending the images (Remote Store SCU) to the Merge Archive.

The Archive function provides a database and storage of images and other DICOM composite objects. It responds to queries from Remote Query SCU's, and sends the objects to Remote Store SCP's as a result of a request by a Remote Retrieve SCU. In addition, as mentioned above, it will accept images from any Remote Store SCU's initiated by the Remote Retrieve SCP through the web access.

The Auto router will route images to destinations if certain events match specific configurable rules communicating with a Remote Store SCP. If configured, the Auto router will also send BSCN and IAN notification messages for each received study.

The verification function will either initiate a Verification of an external device to find out whether another AE can respond, or will respond to a Verification Request.

NOTE: Note that spine annotations are saved as graphic annotations in the DICOM tag (0070,0001) for the key images (KO). However, spine annotations are saved as XML in the private tag (0x0023, 0x0044) for the Presentation State (PR).

NOTE: When sending studies with key images (KO) to a system which doesn't support key images, users can manually create key image collages. Since key image collages will be wrapped up as a secondary capture images, they will be rendered in a compatible format to the destination system.

NOTE: It is possible to get DICOM KOs referencing to multiple images within a study. However, the PACS viewer will not be able to render such DICOM KOs. PACS as such creates KOs referring to only one image within a study.

3.2. Functional Definition of Merge PACS Server AE

The following real world activities will cause the Server to initiate an Association:

Activity	Description
Web Client request	The WEB server will initiate a C-FIND and/or C-MOVE operation to a remote device (*e.g.*, a departmental or long term archive system) upon receiving a request by a Web client.
Routing request	The AE will route the specified DICOM objects to the specified destinations, upon the appropriate trigger events by internal applications.
Remote retrieve request	A remote retrieve by another (external) device will cause the AE to send objects such as images to a destination.
Verification request	A verification request will be initiated upon a user action such as for testing purposes. (Never automatically or gratuitously.)
Study received	The Server will send IAN and/or BSCN notification messages.

The following real world activities will require the server to accept an Association:

Activity	Description
Archive	It will store DICOM objects, such as images, as a Storage SCP, and also will respond to the C-FIND and C-MOVE requests, functioning as a SCP. A C-Move will cause the Server to initiate a C-Store to exchange the DICOM objects to the appropriate destination.
Verification	The server is able respond to a Verification request from an external device.

3.3. Sequencing of Real-World Activities

There is no sequencing or order between the real-world activities within the device.

Chapter 4. AE Specification

NOTE: Merge PACS can only display images with values of 8 or 16 for Bits Allocated (0028,0100).

4.1. Association Establishment Policies

4.1.1. General

The DICOM standard application context name, which is always proposed, is DICOM 3.0:

Name	UID
Application context name	1.2.840.10008.3.1.1.1

The PDU size is configurable and ranges from 4096 - 2**32-1 with as default value 65536.

SOP Class extended negotiation is not supported.

4.1.2. Number of Associations

The maximum number of concurrent associations is limited by the server to the value specified by the MaximumServerThreadCount configuration item in Storageserver.ini. The default value for this configuration item is 25. Any association request above this number is put on hold until another active association is released.

4.1.3. Asynchronous Nature

Asynchronous mode of operation is not supported.

4.1.4. Implementation Identifying Information

The implementation Information of this application is:

Name	UID
Implementation Class UID	1.2.840.113837.7.7.2000
Implementation version name	2.5WIN32-22SEP00

4.2. Association Initiation by Real-World Activities

The following four real-world activities initiate an Association:

- Web Client request
- (External) Remote Retrieve and (internal) Routing request
- A study is received
- Verify request

If a low-level read/write operation to a socket is not returned after a certain time period, the association will be aborted. This time is configurable (“MAX read/write time”).

The Web client will close an association following the execution of a single C-Find or C-Move command (which may affect one or more studies).

Associations opened for the purpose of transmitting images to a C-Store SCP when satisfying routing requests or associations opened for study content notification messages (IAN or BSCN) will remain open for a configurable number of seconds following the most recent C-STORE or N-CREATE command executed on the association. A configurable timer causes the association to be closed after an idle period. The timer starts at the end of each command executed by the SCU. The timer is disabled upon the start of each command. If the timer expires before it is disabled, the association will be released by the requester (Merge Web/Intranet Image Server). The default value for the timer (AssociationIdleTimeout) is 45 seconds.

The association will be released immediately following the execution of a single Verify request when used for testing purposes.

4.2.1. Real-World Activity “Web Client Request”

As part of the Web Access real-world activity, the Merge Web/Intranet Image Server application entity initiates an association when it receives a request from a WEB client web enabled application in the form of a servlet for a Query resulting in a C-FIND and/or Retrieve using the C-MOVE. The C-MOVE will result in the corresponding C-Store, and therefore, the application entity will respond to the request for an association of the appropriate remote application entity.

a. Proposed Presentation Contexts

Table 5.3 Web Client Request Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role
SOP CLASS NAME	SOP Class UID	Name	UID	
Study Root Query/Retrieve Information Model - Find	1.2.840.10008.5.1.4.1.2.2.1	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCU
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	
Study Root Query/Retrieve Information Model- Move	1.2.840.10008.5.1.4.1.2.2.2	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCU
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	

Extended negotiation is not supported; use of relational or hierarchical query can be configured per destination AE title.

b. SOP Specific Conformance for C-FIND SCU

All DICOM Required and Unique keys are supported. Any attribute cataloged in the database may be used as a matching or retrieval key. However, for efficient operation, a query must contain matching value(s) for at least one attribute that is indexed.

Currently indexed attributes include:

Attribute	Description
Patient Level	PatientID, PatientName
Study Level	PatientID, PatientName, AccessionNumber, StudyDate, StudyInstanceUID
Series Level	SeriesInstanceUID
Image Level	SOPInstanceUID

- Additional indices may be added by support; Attributes returned that were not requested are ignored.
- All range, wildcard, UID list, sequence, multiple value, etc. matching is implemented per the DICOM standard.
- PatientName matching normalizes the matching value(s) and matches against the normalized PatientName stored in the database (normalization consists of eliminating spaces and punctuation and converting to all upper case).

c. SOP Specific Conformance for C-MOVE SCU

UID list move is supported.

4.2.2. Real-World Activity “Routing Request”

As part of the routing request real-world activity, the Merge Web/Intranet Image Server application entity initiates an association when it receives a request from an internal application or after a study is received.

a. Proposed Presentation Contexts

The auto router acting as an SCU of the Storage, Instance Availability and Study Content Notification classes proposes whatever abstract syntaxes are necessary to transfer the instances being routed or to send the notification. If an instance is stored on the Merge Web/Intranet Image Server in compressed form, the appropriate compressed transfer syntax will be proposed. In addition, DICOM Explicit VR Little Endian transfer syntax and DICOM Default Implicit Little Endian Transfer Syntax will always be proposed in separate presentation contexts. Only a single transfer syntax will ever be proposed per presentation context. Thus, if an image is stored on the Merge Web/Intranet Image Server in compressed form, 3 presentation contexts will be proposed. If the image is not compressed, only two presentation context proposals will result. For Instance Availability Notification and Basic Study Content Notification service, the Merge Web/Intranet Image Server will propose only DICOM Implicit VR Little Endian transfer syntax with the appropriate SOP class.

Table 5.4 Supported Transfer Syntaxes for Storage and Instance Availability SCU

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

Transfer Syntax	
Name	**UID**
Run Length Encoding (RLE)	1.2.840.10008.1.2.5
JPEG Baseline (Lossy) (Process 1)	1.2.840.10008.1.2.4.50
JPEG Extended (Lossy) (Process 2 (8-bit) and Process 4 (12-bit))	1.2.840.10008.1.2.4.51
JPEG Lossless Non-hierarchical (Process 14)	1.2.840.10008.1.2.4.57
JPEG Default Lossless Non-hierarchical, first-order prediction (Process 14 selection value 1)	1.2.840.10008.1.2.4.70
JPEG 2000 (Lossless only)	1.2.840.10008.1.2.4.90
JPEG 2000 (Lossy or Lossless)	1.2.840.10008.1.2.4.91

Table 5.5 Routing Request Proposed Presentation Contexts Per Abstract Syntax

Abstract Syntax		Transfer Syntax		Role
SOP Class Name	**SOP Class UID**	**Name**	**UID**	
1.2.840.10008.xxx (See Note 1)		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	SCU
1.2.840.10008.xxx (See Note 3)		DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU
1.2.840.10008.xxx (See Notes 1 and 2)		Any Supported Compressed Transfer Syntax	1.2.840.10008.xxxx (See Note 2)	SCU

Note (1): All Storage SOP Classes as specified in the table of Supported DICOM SOP Classes in Chapter 1 above.

Note (2): A proposal requesting a compressed transfer syntax will be added only if the instance being transferred exits on the Merge Web/Intranet Image Server in compressed form. The proposed compressed transfer syntax will be the transfer syntax in which the instance stored on the Merge Web/Intranet Image Server is encoded.

Note (3): All Storage and Notification SOP Classes as specified in table of Supported DICOM SOP Classes in Chapter 1 above.

b. SOP Specific Conformance for C-Store SCU

Errors and warnings are logged. If a user using a GUI interface issued the command, the user is informed.

If not initiated directly by a user, commands encountering errors are retried, *e.g.,* if the Autorouter encounters a network problem when attempting to connect to a destination for an instance transmission. The software continues normally (*i.e.*, does not exit).)

The SCU will propose multiple transfer syntaxes as listed above, one transfer syntax per presentation context. When multiple transfer syntaxes are accepted by the SCP, the SCU will use the compressed transfer syntax if proposed and accepted. Otherwise the SCU will use Explicit Little Endian transfer syntax. If a compressed transfer syntax is not proposed or accepted and Explicit Little Endian transfer syntax is not accepted, then the transfer will be accomplished using Implicit Little Endian transfer syntax. In the event that a compressed instance is being transferred but the proposed compressed transfer syntax is not accepted, the image will be decompressed and transferred using Explicit Little Endian (if accepted) or Implicit Little Endian transfer syntax. The SCU will not compress instances that are not already stored in compressed form on the Merge Web/Intranet Image Server. Such instances will always be transmitted via Explicit or Implicit Little Endian syntax.

c. SOP Specific Conformance for IAN and BSCN notification SCU

The Merge Web/Intranet Image Server will send IAN and/or BSCN notification messages when the study received from a storage SCU is considered to be closed.

Commands encountering errors are retried, *e.g.*, if the Autorouter encounters a network problem when attempting to connect to a destination for an instance transmission, as BSCN is robust, it will be sent upon study close following successful network connectivity.

For IAN messages, the server does not interpret the status of the response, any response status other than success is logged and the message is discarded.

For BSCN messages, any response status code between 0 and 3 inclusively is considered success. When receiving a failure response status, the server will retry the BSCN message for a configurable number of times.

Table 5.6 Content of BSCN C-STORE Request Message

Attribute Name	Tag	Value	Presence of value
Instance Creation Date	0008,0012	The date when the study became available in the server	Always
Instance Creation Time	0008,0013	The time when the study became available in the server (120 seconds after receiving the last instance)	Always
SOP Class UID	0008,0016	1.2.840.10008.1.9	Always
SOP Instance UID	0008,0018	Generated by the server	Always
Patient's Name	0010,0010	The patient name from the received study	Always
Patient ID	0010,0020	The patient ID from the received study	Always
Study Instance UID	0020,000D	The received study instance UID	Always
Study ID	0020,0010	The received study ID	Always
Referenced Series Sequence	0008,1115	One item for each series	Always
> Series Instance UID	0020,000E	The Instance UID of the received series	Always
> Referenced Image Sequence	0008,1140	One item for each instance in the series	Always
>> Retrieve AE Title	0008,0054	The configured AE Title of the Merge Web/Intranet Image Server	Always
>> Referenced SOP Class UID	0008,1150	The SOP Class UID of the received instance	Always
>> Referenced SOP Instance UID	0008,1155	The SOP Instance UID of the received instance	Always

Table 5.7 Contents of IAN N-CREATE Request Message

Attribute Name	Tag	Value	Presence of value
Instance Creation Date	0008,0012	The date when the study became available in the server	Always
Instance Creation Time	0008,0013	The time when the study became available in the server (120 seconds after receiving the last instance)	Always

Attribute Name	Tag	Value	Presence of value
SOP Class UID	0008,0016	1.2.840.10008.5.1.4.33	Always
SOP Instance UID	0008,0018	Generated by the server	Always
Referenced Performed Procedure Step Sequence	0008,1111	Empty sequence (no items)	Always
Study Instance UID	0020,000D	The received study instance UID	Always
Referenced Series Sequence	0008,1115	One item for each series	Always
> Series Instance UID	0020,000E	The Instance UID of the received series	Always
> Referenced SOP Sequence	0008,1199	One item for each instance in the series	Always
>> Instance Availability	0008,0056	ONLINE	Always
>> Retrieve AE Title	0008,0054	The configured AE Title of the Merge Web/Intranet Image Server	Always
>> Referenced SOP Class UID	0008,1150	The SOP Class UID of the received instance	Always
>> Referenced SOP Instance UID	0008,1155	The SOP Instance UID of the received instance	Always

4.2.3. Real-World Activity “Verify Request”

As part of the verification real-world activity, the Merge Web/Intranet Image Server application entity initiates an association when it receives an internal request for Verification.

The following table describes the proposed presentation contexts:

Table 5.8 Verify Request Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role
SOP CLASS NAME	SOP Class UID	Name	UID	
Verification	1.2.840.10008.1.1	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCU
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	

4.3. Association Acceptance Policy by Real-World activities

The following (external) real-world activities will cause a request for an association acceptance:

- Remote Store request
- Remote Query/Retrieve request
- Remote Verification request

If a TCP/IP connection is made by a requestor and not followed up by a DICOM association request within a certain time period, the acceptor will drop the association. This period is configurable (“ARTIM”).

When the association has been established, there is also a time-out value for a command to be received. When there is no activity within this time, an ARelease-RQ will be issued to release the association. This time period is configurable (“MAX Incoming association lifetime”).

4.3.1. Real-World activity Remote Store Request

The Store request will happen because of an external Archive request, as a result of a C-Move by a remote Retrieve SCP typically initiated by a Merge Web/Intranet Image Server Web client, or as the result of a CStore request by any CStore SCU.

a. Accepted Presentation Contexts for CStore SCP

The default behavior of the CStore SCP is to accept as a SCP all presentation contexts containing a combination of a supported abstract syntax (see note 1 below) and a supported transfer syntax:

Table 5.9 Remote Store Request Accepted Presentation Contexts

Abstract Syntax		Transfer Syntax	
SOP Class Name	SOP Class UID	Name	UID
Any configured - see Note (1) **1.2.840.10008.xxx**		**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
		Run Length Encoding (RLE)	1.2.840.10008.1.2.5
		JPEG Baseline (Lossy) (Process 1)	1.2.840.10008.1.2.4.50
		JPEG Extended (Lossy) (Process 2 (8-bit) and Process 4 (12-bit))	1.2.840.10008.1.2.4.51
		JPEG Lossless Non-hierarchical (Process 14)	1.2.840.10008.1.2.4.57
		JPEG Default Lossless Non-hierarchical, first-order prediction (Process 14 selection value 1)	1.2.840.10008.1.2.4.70
		JPEG 2000 (Lossless only)	1.2.840.10008.1.2.4.90
		JPEG 2000 (Lossy or Lossless)	1.2.840.10008.1.2.4.91

Note (1): When acting as an archive only, the Merge Web/Intranet Image Server can be configured to accept any proposed storage class. When used for web access as well, the list of supported SOP Classes as specified in Table 5.2 SOP Classes Supported as SCP applies.

b. Transfer Syntax Selection Policy

In the event that a single proposed presentation context contains multiple supported transfer syntaxes, the accepted transfer syntax is chosen according to the following order of precedence:

1. JPEG2000 Lossless (1.2.840.10008.1.2.4.90)
2. JPEG Default Lossless Non-hierarchical, first-order prediction (Process 14 selection value 1) (1.2.840.10008.1.2.4.70)
3. JPEG Lossless Non-hierarchical (Process 14) (1.2.840.10008.1.2.4.57)

4. RLE (1.2.840.10008.1.2.5)
5. JPEG 2000 Lossy or Lossless (1.2.840.10008.1.2.4.91)
6. The first encountered supported compressed transfer syntax other than those listed above
7. Little Endian Explicit (1.2.840.10008.1.2.1)
8. Implicit Little Endian (1.2.840.10008.1.2)

c. SOP Specific Conformance for Storage SOP Class SCP

The Explicit VR transfer syntax is accepted as the preferred transfer syntax.

A non-null Patient ID (0010, 0020) is strongly recommended. If missing or null, a Patient ID is generated upon image reception. This will be generated as follows:

Use the Patient Name field if it is non-null, otherwise use “unknown”. When using the Patient Name, any “\” will be converted to “_”.

Coercion (replacing the attribute when needed for proper identification) will take place in the image objects without changing the SOP Instance UID, as long as the interpretation is not affected. For example, Patient name coercion will not result in a new SOP Instance UID.

A new SOP Instance UID will only be generated upon applying lossy compression to an image.

The Web clients support the photometric interpretation values listed in the following table:

Table 5.10 Supported Image Types for Viewing

Photometric Interpretation	Samples Per Pixel	Planar Configuration
MONOCHROME1	1	n/a
MONOCHROME2	1	n/a
RGB	3	00 or 01
YBR_FULL	3	00 or 01
YBR_FULL_422	3	00 or 01
YBR_ICT (Note 1)	3	00 or 01
YBR_RCT (Note 2)	3	00 or 01
PALETTE COLOR	3	00 or 01

Note (1): Supported only for images received using JPEG 2000 lossy image compression.
Note (2): Supported only for images received using JPEG 2000 lossless image compression.

Instances specifying an unsupported value for Photometric Interpretation may be rejected.

i. Archived Attributes

The list of attributes cataloged in the local database is configurable. The standard configuration is as follows:

- All received attributes are stored exactly as received (including private attributes).
- All stored attributes are returned as received when images are retrieved (via C- Move) or transmitted (via C-Store).
- The cataloged attributes shown below are those attributes that are extracted from the set of stored attributes and cataloged in the database.

- The cataloged attributes are usable as matching/retrieval values for C-Find. Note that all attributes (standard or private) are returned when instances are retrieved or transmitted, not just the ones shown below.
- Received string type attributes exceeding the maximum storage capacity for the database column used to catalog such attributes are subject to truncation without warning. Matching/retrieval of truncated attributes will match against and return the truncated value in a query response. Values returned upon retrieval are unaffected by truncation. The database is configured by default to provide at least the capacity to store at least the maximum DICOM attribute length of a single value for all cataloged attributes. Cataloging for certain attributes provides support for storage of some longer non-truncated multi-valued attributes. The database can be reconfigured by Merge Healthcare Support to provide more storage space for certain attributes. Contact Merge Healthcare Support for details of maximum per-attribute storage length or reconfiguration assistance.

Table 5.11 Archive Service - Cataloged Attributes

Attribute Name	Notes	Attribute (Group, Element)
Study Instance UID	K	(0020, 000D)
Study Date		(0008, 0020)
Study Time		(0008, 0030)
Study ID	S	(0020, 0010)
Study Description		(0008, 1030)
Accession Number	S	(0008, 0050)
Referring Physician		(0008, 0090)
Reading Physician		(0008, 1060)
Referenced Study Sequence		(0008, 1110)
> SOP Class		(0008, 1150)
> Study Instance UID		(0008, 1155)
Patient Name	S, N	(0010, 0010)
Patient ID	S	(0010, 0020)
Issuer of Patient ID	S	(0010, 0021)
Patient Birth Date	S	(0010, 0030)
Patient Sex	S	(0010, 0040)
Patient Age		(0010, 1010)
Patient Weight		(0010, 1030)
Number of Study Related Series		(0020, 1206)
Number of Study Related Images		(0020, 1208)
Series Instance UID	K	(0020, 000E)
Series Number	S	(0020, 0011)
Series Date		(0008, 0021)
Series Time		(0008, 0031)
Modality	S	(0008, 0060)
Institution Name		(0008, 0080)

Attribute Name	Notes	Attribute (Group, Element)
Station Name	S	(0008, 1010)
Operator Name		(0008, 1070)
Series Description		(0008, 103E)
Patient Position		(0018, 5100)
Position Reference		(0020, 1040)
Frame Of Reference UID		(0020, 0052)
SOP Instance UID	K	(0008, 0018)
Image Type	S	(0008, 0008)
SOP Class UID	S	(0008, 0016)
Image Number	S	(0020, 0013)
Image Date	S	(0008, 0023)
Image Time	S	(0008, 0033)
Image Position Patient	S	(0020, 0032)
Image Orientation Patient	S	(0020, 0037)
Slice Location	S	(0020, 1041)
Pixel Spacing	S	(0028, 0030)
Number of Rows	S	(0028, 0010)
Number of Columns	S	(0028, 0011)
Contrast Bolus Agent		(0018, 0010)
Sequence Variant		(0018, 0021)
Slice Thickness		(0018, 0050)
KVP		(0018, 0060)
Repetition Time		(0018, 0080)
Echo Time		(0018, 0081)
Inversion Time		(0018, 0082)
Number Of Averages		(0018, 0083)
Echo Numbers		(0018, 0086)
Spacing Between Slices		(0018, 0088)
Data Collection Diameter		(0018, 0090)
Percent Phase FOV		(0018, 0094)
Trigger Time		(0018, 1060)
Gantry Detector Tilt		(0018, 1120)
X-Ray Tube Current		(0018, 1151)
Flip Angle		(0018, 1314)
Photometric Interpretation		(0028, 0004)
Bits Allocated		(0028, 0100)
Bits Stored		(0028, 0101)
Pixel Representation		(0028, 0103)

Attribute Name	Notes	Attribute (Group, Element)
Window Center		(0028, 1050)
Window Width		(0028, 1051)
Rescale Intercept		(0028, 1052)
Rescale Slope		(0028, 1053)
Number of Frames		(0028, 0008)
Lossy Compression	S	(0028, 2110)

Notes:

K - This attribute is used as a unique key.

S - Strict checking is performed on this attribute when an instance is stored. If the instance being stored has a key that is the same as one already in the database, a duplicate is assumed. Attributes marked with an S must match the values already in the database. If one or more strictly-checked attributes do not match, the instance is accepted into the Jail® holding area rather than into the database. Attributes not marked for strict checking are also compared. If any of the attributes that are not strictly checked differ from those already in the database, the stored instance is accepted into the database and a coercion warning is returned to the SCU. This checking can be disabled server-wide on a per attribute basis if necessary to accommodate special situations. Contact Merge Healthcare Support for assistance.

N - This attribute is also stored in a normalized version. Normalization consists of eliminating spaces and punctuation and converting to all upper case. When matching is performed against such attributes, the candidate key is normalized and matched against the normalized version. This effectively implements case-insensitive matching as well as matching that is insensitive to punctuation and spacing differences.

ii. Error Handling

The following error messages will be generated upon unsuccessful processing of the C-Store command:

Table 5.12 CStoreRSP Error/Warning Response Codes

Status Code	ERROR COMMENT	Meaning	Invalid Elements List Returned?
0111	Rejected attempt to update existing SOP instance.	Attempt to store an instance with the same UID as a previous instance but one or more checked attributes with different values than instance already stored in database detected. Attempted to save the instance to the "Jail" holding area instead also failed due to an internal program error, out of space, etc.	No.
0120	Unable to store: Missing SOP Instance UID.	The SOP instance UID attribute was missing from the stored dataset.	Yes. (0008, 0018)
0120	Required non-null data element(s) missing.	Attempt to store an instance with one or more missing or null type 0 attributes detected. Attempted to save the instance to the "Jail" holding area instead also failed due to an internal program error, out of space, etc.	Yes. List of the missing or null attributes.
A700	Out of storage space.	File storage space is exhausted.	No.
A700	Error creating directory.	Unable to create directory to contain instance file.	No.

Status Code	ERROR COMMENT	Meaning	Invalid Elements List Returned?
0110	Internal SCP error	A program error was detected while processing the query (*e.g.*, program logic error, etc.).	No.
0110	Unable to connect to local database.	The SCP is unable to establish a connection to its underlying RDBMS.	No.
B000	Data element(s) differed from previously stored values	Warning that the stored instance contained the same instance UID as an instance already existing in the database, but that the instance being stored contained one or more attributes differing in value from the instance already stored in the database. Certain attributes are strictly checked. A mismatch on the strictly checked attribute values results in the stored instance being placed in the "Jail" holding area. Any differences in the attributes not strictly checked result in this warning. Note that this warning implies coercion, *i.e.*, the stored instance is being coerced to match the instance already in the database with the same instance UID. The list of attributes that are strictly checked is configurable.	No.
C006	Storage error.	Unspecified internal error while processing Cstore request.	No.
C018	Error in local database configuration (device map).	Internal SCP error. Misconfigured logical storage device map.	No.
C019	Error accessing SQL database.	Internal SCP error while generating filename for instance file.	No.
C020	Error while creating file to hold SOP instance.	Internal program error. Unable to create unique filename to contain instance after repeated attempts.	No.
C021	Internal move file error (errno = <errno>).	Program error encountered while performing a file move operation. <errno> is replaced with the operating system dependent errno style error code.	No.
C022	Error saving SOP Instance to file (file in use).	Internal program error. Attempted to overwrite an existing instance file.	No.
C023	Error saving SOP Instance to file.	Error while encoding DICOM dataset or writing instance file.	No.
C025	Internal program error in <object:method>.	Internal program error. Unexpected return code from method invocation. <object.method> is replaced by the signature of the failed method.	
C026	Database error while cataloging SOP Instance in database.	An error was encountered while storing instance attributes to the underlying RDBMS.	No.
C027	Unable to store: Unable to connect to local database.	The SCP is unable to establish a connection to its underlying RDBMS.	No.

Status Code	ERROR COMMENT	Meaning	Invalid Elements List Returned?
C0028	Rejected: Unsupported PhotometricInterpretation (xxxxx)	The instance being stored specified an unsupported value for PhotometricInterpretation.	Yes (0028,0004)

4.3.2. Real-World Activity Remote Query/Retrieve Request

A remote device can submit a query and retrieve for a DICOM image or other composite object.

a. Accepted Presentation Contexts for Q/R SCP

The default behavior of the Q/R SCP is to accept as SCP for each of the supported SOP classes all presentation contexts containing the following transfer syntax:

Table 5.13 Remote Query/Retrieve Presentation Contexts

Abstract Syntax		Transfer Syntax		Role
SOP Class Name	SOP Class UID	Name	UID	
Patient Root Query/Retrieve - Find	1.2.840.10008.5.1.4.1.2.1.1	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCP
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	
Patient Root Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.1.2	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCP
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	
Study Root Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.2.2	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCP
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	
Patient/Study Only Query/Retrieve - Find	1.2.840.10008.5.1.4.1.2.3.1	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCP
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	
Patient/Study Only Query/Retrieve - Move	1.2.840.10008.5.1.4.1.2.3.2	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCP
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	

Extended negotiation is not supported; relational query is not accepted.

b. SOP Specific Conformance for FIND SOP Class as a SCP

When performing queries, matching values for Patient Names will be normalized. Spaces and punctuation are eliminated and all remaining characters are converted to upper case. Matching is performed against the normalized version of the Patient Name cataloged in the server's database. Normalization of the matching value does not affect . Thus, case-, space-, and punctuation-insensitive matching is performed for Patient Names.

Matching will be performed for all attributes listed in Table 5.12 Archive Service - Cataloged Attributes (matching against additional attributes is supported if those attributes are configured for cataloging). Certain attributes are indexed for better query performance. It is strongly recommended to supply at least one of the indexed attributes as a key. The list of attributes that are indexed for enhanced query performance is configurable. The standard list follows:

Table 5.14 Archive Server - Indexed Attributes

Attribute Name	Attribute (Group, Element)
Patient Name	(0010, 0010)
Patient ID	(0010, 0020)
Study Instance UID	(0020, 000D)
Study Date	(0008, 0020)
Accession Number	(0008, 0050)
Series Instance UID	(0020, 000E)
SOP Instance UID	(0008, 0018)

Hierarchical query only is supported, *i.e.*, no relational queries. Attributes specified as matching keys or retrieval keys must be at the requested query level or above. For example, for a Patient query, only attributes defined in Patient modules are accepted as keys. For a Study query, Patient or Study attributes are acceptable, etc. Any other attribute in the database may be used as a matching or retrieval key. It is strongly recommended, but not required, that all queries contain at least one non-null matching value for one of the indexed attributes. Indexes may be added by customer support to solve specific site-related query problems.

All available items matched will be returned. The maximum number of items returned in a query response is configurable. The default maximum number of items returned in a query response is 5000. The limit on the maximum number of items returned in a query response can be disabled. If a query matches more items than the limit, an error response is returned with Status = 0xA700 and error comment = "Query too broad. Too many items selected."

The following errors will be returned upon unsuccessful C-FIND processing:

Table 5.15 CFindRSP Error/Warning Response Codes

Status Code	Error Comment	Meaning	Invalid Elements List Returned?
0110	Internal SCP error	A program error was detected while processing the query (*e.g.,* program logic error, etc.).	No.
0110	Unable to connect to local database.	The SCP is unable to establish a connection to its underlying RDBMS.	No.
0120	Missing required keys/values: <list>	One or more type 0 attributes were missing in the request. <list> in the error comment is replaced by a list of the missing attributes.	Yes. List of missing or empty required attributes.

Status Code	Error Comment	Meaning	Invalid Elements List Returned?
A700	Query too broad. Too many items selected.	The number of items matched exceeded the configurable limit on maximum number of items returned in a query response.	No.
C001	Query error.	Unspecified error while processing query.	No.
C002	Internal program error at CFind service provider.	Internal program error in query processor, *e.g.*, null pointer, etc.	No.
C007	Query/Retrieve level missing from request.	The query did not specify the query/retrieve level: attribute (0008, 0052) was missing or empty.	Yes. (0008, 0052)
C008	Unrecognized Q/R level (<level>) requested.	The SCU specified an unrecognized (*i.e.*, not "PATIENT", "STUDY", "SERIES", or "IMAGE") query/retrieve level in attribute (0008, 0052). <level> in the error comment is replaced by the invalid value specified by the SCU.	Yes. (0008, 0052)
C009	Invalid Q/R level (<level>) requested.	The query level specified by the SCU is not valid for the query model being used (*e.g.*, PATIENT query level specified while using the Study Root query model). <level> in the error comment is replaced by the invalid value specified by the SCU.	Yes. (0008, 0052)
C010	Internal error - Invalid query passed to QueryDatabase().	Internal program error. The query translator produced an empty SQL query.	No.
C011	Internal error - Invalid argument to QueryDatabase().	Internal program error. The query translator produced an invalid SQL query.	No.
C012	Internal error - Invalid database schema on SCP.	Internal program error. The configurable database schema cannot be processed.	No.
C013	Internal SCP error - SQL query preparation failed.	Internal program error. The query translator produced an invalid SQL query or a database error occurred.	No.
C014	Internal SCP error - SQL bind failed.	Internal program error. The query translator produced an invalid SQL query or a database error occurred.	No.
C015	Internal SCP error - SQL query error.	Internal program error. The query translator produced an invalid SQL query or a database error occurred while executing query.	No.
C016	Internal error - SQL result retrieval failure on SCP.	Internal program error. An error occurred while reading query results from the database.	No.
C017	Internal error - Result set encoding failure on SCP.	Internal program error. An error occurred while encoding query results into DICOM dataset	No.

Status Code	Error Comment	Meaning	Invalid Elements List Returned?
C018	Error in local database configuration (device map).	Internal program error. Storage device map misconfigured.	No.
FE00		Matching terminated due to Cancel request.	No.
FF00		Matching continues. Current match is supplied. Any optional keys were supported in the same manner as required keys.	No.
FF01		Matching continues. Current match is supplied. Warning that one or more optional keys were not supported for existence and/or matching for this identifier.	No.

c. SOP Specific Conformance for MOVE SOP Class

A correct pending move response is returned per instance transferred reporting exactly all applicable counters.

The following status codes will be returned upon unsuccessful processing of the C-MOVE command:

Table 5.16 CMoveRSP Error/Warning Response Codes

Status Code	Error Comment	Meaning	Invalid Elements List Returned?
0110	Internal SCP error	A program error was detected while processing the query (*e.g.*, program logic error, etc.).	No.
0110	Unable to connect to local database.	The SCP is unable to establish a connection to its underlying RDBMS.	No.
0120	Missing required keys/values: <list>	One or more type 0 attributes were missing in the request. <list> in the error comment is replaced by a list of the missing attributes.	Yes. List of missing or empty required attributes.
A700	Query too broad. Too many items selected.	The number of items matched exceeded the configurable limit on maximum number of items returned in a query response.	No.
A801	Move destination unknown.	Unable to map the specified move destination AE title to a network address (IP address/port #). Or, not configured to move instances to requested destination.	No.
B000	One or more CSTORE sub-operations failed.	One or more but not all of the requested SOP instances were transmitted successfully.	No.
C001	Query error.	Unspecified error while processing query.	No.
C003	Destination for CMOVE not specified in command.	The Move Destination attribute (0000, 0600) for a CMove operation was not present in the request.	No.
C004	All CSTORE sub-operations failed.	None of the requested SOP instances were transmitted successfully.	No.

Status Code	Error Comment	Meaning	Invalid Elements List Returned?
C005	Can't connect to MOVE destination AE <AETitle>.	The SCP is unable to establish a network connection to the move destination. <AETitle> is replaced by the move destination specified in the request.	No.
C007	Query/Retrieve level missing from request.	The query did not specify the query/retrieve level: attribute (0008, 0052) was missing or empty.	Yes. (0008, 0052)
C008	Unrecognized Q/R level (<level>) requested.	The SCU specified an unrecognized (*i.e.*, not "PATIENT", "STUDY", "SERIES", or "IMAGE") query/retrieve level in attribute (0008, 0052). <level> in the error comment is replaced by the invalid value specified by the SCU.	Yes. (0008, 0052)
C009	Invalid Q/R level (<level>) requested.	The query level specified by the SCU is not valid for the query model being used (*e.g.*, PATIENT query level specified while using the Study Root query model). <level> in the error comment is replaced by the invalid value specified by the SCU.	Yes. (0008, 0052)
C010	Internal error - Invalid query passed to QueryDatabase().	Internal program error. The query translator produced an empty SQL query.	No.
C011	Internal error - Invalid argument to QueryDatabase().	Internal program error. The query translator produced an invalid SQL query.	No.
C012	Internal error - Invalid database schema on SCP.	Internal program error. The configurable database schema cannot be processed.	No.
C013	Internal SCP error - SQL query preparation failed.	Internal program error. The query translator produced an invalid SQL query or a database error occurred.	No.
C014	Internal SCP error - SQL bind failed.	Internal program error. The query translator produced an invalid SQL query or a database error occurred.	No.
C015	Internal SCP error - SQL query error.	Internal program error. The query translator produced an invalid SQL query or a database error occurred while executing query.	No.
C016	Internal error - SQL result retrieval failure on SCP.	Internal program error. An error occurred while reading query results from the database.	No.
C017	Internal error - Result set encoding failure on SCP.	Internal program error. An error occurred while encoding query results into DICOM dataset	No.
C018	Error in local database configuration (device map).	Internal program error. Storage device map misconfigured.	No.

4.3.3. Real-World Activity Remote Verification Request

Another device can request a verification to the Server.

The default behavior of the Store SCP is to accept as SCP for each of the supported SOP classes all presentation contexts containing the following transfer syntax:

Table 5.17 Remote Verification Request Presentation Contexts

Abstract Syntax		Transfer Syntax		Role
SOP Class Name	SOP Class UID	Name	UID	
Verification	1.2.840.10008.1.1	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCU
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1	

4.4. DICOM Print

4.4.1. Proposed Presentation Contexts

Abstract Syntax		Transfer Syntax		Role
SOP CLASS NAME	SOP Class UID	Name	UID	
Basic Grayscale Print Management	1.2.840.1000.8.5.1.1.9	**DICOM Implicit VR Little Endian Transfer Syntax**	1.2.840.10008.1.2	SCU

4.4.2. SOP Specific Conformance Statement for the SOP Classes of the Basic Grayscale Print Management Meta SOP Class

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

Table 5.18 Basic Grayscale Print Management Meta Class: Supported SOP Classes

SOP Class Name	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Printer	1.2.840.10008.5.1.1.16

4.4.3. Conformance for SOP Class Basic Film Session

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

Table 5.19 Basic Film Session SOP class N-CREATE: Attributes

Description	Tag	Usage
Number of Copies	(2000,0010)	A
Print Priority	(2000,0020)	C

Description	Tag	Usage
Medium Type	(2000,0030)	C
Film Destination	(2000,0040)	C

4.4.4. Conformance for SOP Class Basic Film Box

The table below lists the N-Create attributes for the Basic Film Box SOP class, where A means the attribute is always sent and C means the attribute is only sent when not empty.

Table 5.20 Basic Film Box SOP class N-CREATE: Attributes

Description	Tag	Usage
Image Display Format	(2010,0010)	A
Referenced Film Session Sequence	(2010,0500)	A
> Referenced SOP Class UID	(0008,1150)	A
> Referenced SOP Instance UID	(0008,1155)	A
Film Orientation	(2010,0040)	C
Film Size ID	(2010,0050)	C
Magnification Type	(2010,0060)	C
Maximum Density	(2010,0130)	C
Configuration Information	(2010,0150)	C
Smoothing Type	(2010,0080)	C
Border Density	(2010,0100)	C
Empty Image Density	(2010,0110)	C
Minimum Density	(2010,0120)	C
Trim	(2010,0140)	C
Resolution	(2020,0050)	C

The N-Set is currently unused; however, the N-Action is used to print a complete Basic Film Box SOP instance.

4.4.5. Conformance for SOP Class Basic Grayscale Image Box

The following attributes are included in Merge PACS N-Set for the Basic Grayscale Image SOP class. “A” stands for attributes which are always sent to the printer, while “C” stands for attributes that are only sent when they contain data.

Table 5.21 Basic Grayscale Image SOP Box: N-Set Attributes

Description	Tag	Usage
Image Position	(2020,0010)	A
Preformatted Grayscale Image Sequence	(2020,0110)	A
Requested Image Size	(2020,0030)	C
> Samples Per Pixel	(0028,0002)	A
> Photometric Interpretation	(0028,0004)	A

Description	Tag	Usage
> Rows	(0028,0010)	A
> Columns	(0028,0011)	A
> Pixel Aspect Ratio	(0028,0034)	A
> Bits Allocated	(0028,0100)	A
> Bits Stored	(0028,0101)	A
> High Bit	(0028,0102)	A
> Pixel Representation	(0028,0103)	A
> Pixel Data	(7FE0,0010)	A
Requested Decimate/Crop Behaviour	(2020,0040)	C

4.4.6. Conformance for SOP Class Printer

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

4.5. Communication Profiles

4.5.1. Supported Communication Stacks

DICOM Upper Layer over TCP/IP is supported.

4.5.2. OSI / Point to point Stack

Neither one is supported.

4.5.3. TCP/IP Stack

The TCP/IP stack is inherited from the underlying operating system

The application makes use of the Berkeley Sockets interface on Unix and of the WinSock interface on Win32 platforms.

4.5.4. Physical Media Support

DICOM is indifferent to the physical medium over which TCP/IP executes. When a complete system (hardware as well as software) is provided, Merge Healthcare Support will provide support for Ethernet (10, 100, or 1000 Mbit/sec). It is strongly recommended to consult your reseller and/or Merge Healthcare Support for detailed information.

4.6. Configurable Parameters

- Maximum PDU size: (4096 - 2**32-1 (default = 65536)) separately configurable for incoming and outgoing PDUs, DICOM rules strictly followed

- Time out values are as follows:

Table 5.22 Time Out Values

Value	Description
Association request, Reject, Release Timer (ARTIM)	This timer starts when a TCP/IP connection has been made by the requestor and causes a time-out when no Associate request is received within the time specified. It is also used to monitor the time for the receiver to close the connection. The default value is 180 seconds.
MAX incoming association lifetime	Time-out for waiting for a command on an open association. Default value is 12 hours. A value of 0 sets it to infinity.
MAX read/write time	This is used to monitor the time it takes for a read/write operation on sockets. Default value is 5 minutes, a value of 0 sets it to infinity.
AssociationIdleTimeout	This timer is used to time out and release associations used by the instance autorouter. If an association opened by the autorouter has been idle for the specified number of seconds, the association is released. Default value is 45 seconds. A value of 0 disables idle association timeout.

- Local AE title
- Remote AE Title fields
- List of accepted calling AE titles (default = any)
- AE Title to IP address/port translation for Move Destination
- Local IP address and Netmask (listens on all interfaces; uses IP addresses assigned to underlying system)
- Responding TCP/IP ports and addresses (listen port configurable; listens on all interfaces)
- List of accepted abstract syntaxes
- Auto routing rules: (written in standard SQL)
- Auto routing error retry maximum count and retry interval (default = 15 retries at intervals of 1,5,5,5,5,5,10,10,10,30,30,30,60, 60, and 60 minutes)
- Maximum number of concurrent outgoing associations per destination for auto routing (default = 2)
- Maximum total concurrent outgoing associations for auto routing (default = 8)
- List of attributes extracted from stored SOP instances and cataloged in RDBMS to support DICOM Q/R
- Maximum number of items returned in response to a CFind request (default = 5000)
- Maximum number of items returned in response to a CMove request (default = 5000)
- Accepted values for PhotometricInterpretation in (image) instances received by CStore SCP (default = MONOCHROME1, MONOCHROME2, RGB, YBR_FULL, YBR_FULL_422, YBR_ICT, YBR_RCT, PALETTE COLOR). Note that configuring the server to accept any values for PhotometricInterpretation that are not supported by the web viewer is not recommended. Refer to Table 5.9 Supported Image Types for Viewing.
- Maximum number of simultaneous associations

4.7. Support of extended character sets

This application supports only ISO_IR 100 (ISO 8859-1 Latin 1) as an extended character set.

Chapter 5. Media Interchange

5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

5.1.1. Application Data Flow Diagrams

a. Burn CD/DVD

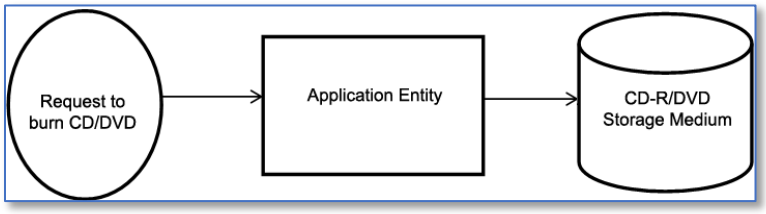

Figure 2: Burn CD/DVD Implementation Model

Merge PACS Viewer is to record DICOM Compact Disc Recordable (CD-R) or Digital Versatile Disc (DVD) with the studies selected by the user. It contains options for including Reports, AU Objects (including Merge PACS VoiceClips), Key Images, PR Objects, CAD Markings, and the Merge PACS or eFilm Lite Viewer on disc, and can be set to Auto-Launch Patient when the CD/DVD is loaded.

Merge PACS Viewer burns DICOM files to CD/DVD in response to user actions performed through the “Burn CD” Graphical User Interface (GUI). These actions normally correspond to the selection of the studies to be copied to the optical medium. Merge PACS Viewer acts as a File Set Creator (FSC): it stores DICOM files that are compliant with the Part 10 of the DICOM 3.0 standard.

It has the following capabilities:

- Image Conversion (Compression or Decompression, as applicable)
- Support for IHE-compliant media creation
- Full compliance with DICOM Part 10 specification, including DICOMDIR creation and Group 0002 Meta headers

b. Read from CD/DVD

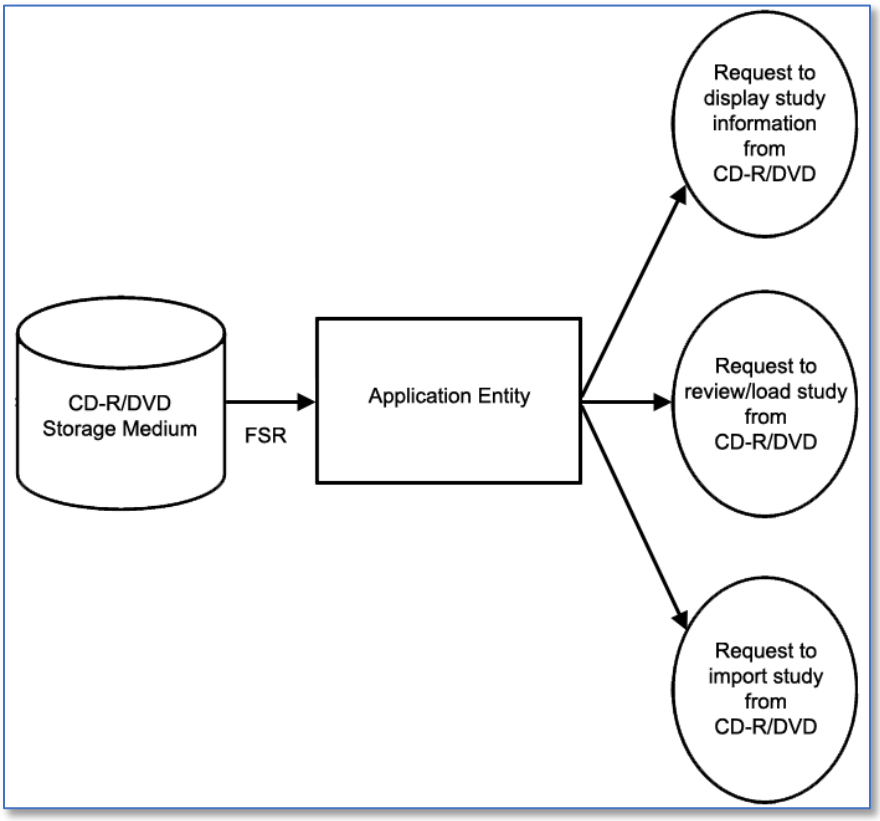

Figure 3: Read from CD/DVD Implementation Model

Merge PACS Viewer supports listing studies found on a CD/DVD, loading a study from CD/DVD directly into the viewer (without first importing it into the system), and importing one or more studies from a CD/DVD into the system. Merge PACS Viewer acts as a File Set Reader in these cases.

5.1.2. Functional definitions of AE's

Merge PACS Viewer supports and initializes CD-R/DVD media, and writes new DICOM File Sets onto those media.

Merge PACS Viewer supports viewing studies directly from CD-R/DVD/file system, or importing those studies into Merge PACS.

Merge PACS Viewer supports reading and writing data with default DICOM or Latin 1 character sets.

5.1.3. Sequencing of Real-World activities

Through the “Burn CD/DVD” GUI of the Merge PACS Viewer software application, the operator selects entries from the patient-study-series-instance hierarchy and initiates the transfer of DICOM images to the optical medium. The entries appearing in the patient-study-series-instance hierarchy have been previously received through the DICOM protocol or imported from local disks.

Through the "Local Study" page of the Merge PACS Viewer, the list of studies found on a CD-R, DVD, or file system location can be presented to the operator. The operator can choose to directly view (load) one of these studies (*e.g.*, loading directly from CD-R). Alternatively, the operator can choose to import one of more of the studies, at which point the user will be given options for matching the studies to an existing patient, or defining a new patient in the system.

5.2. Application Entity Specification – Media Storage

This section in the DICOM Conformance Statement specifies the Media Application Entity for reading and writing to and from CD and DVD. Merge PACS Viewer provides Standard Conformance to the Interchange Option of the Media Storage Service Class. The application profiles and roles are listed in the table below:

Table 6.3 Application Profiles and Roles

Supported Application Profile	Identifier	Real-World Activities	Roles
CT/MR Studies on CD-R	STD-CTMR-CD	Save Study/Studies to CD/DVD	FSC
		Display Study Information from CD/DVD	FSR
		Review/Load Study from CD/DVD	FSR
		Import Study from CD/DVD	FSR
General Purpose CD-R Interchange	STD-GEN-CD	Save Study/Studies to CD/DVD	FSC
		Display Study Information from CD/DVD	FSR
		Review/Load Study from CD/DVD	FSR
		Import Study from CD/DVD	FSR
CT/MR Studies on DVD Media	STD-CTMR-DVD	Save Study/Studies to CD/DVD	FSC
		Display Study Information from CD/DVD	FSR
		Review/Load Study from CD/DVD	FSR
		Import Study from CD/DVD	FSR
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Save Study/Studies to CD/DVD	FSC
		Display Study Information from CD/DVD	FSR
		Review/Load Study from CD/DVD	FSR
		Import Study from CD/DVD	FSR
General Purpose DVD Interchange with JPEG 2000	STD-GEN-DVD-J2K	Save Study/Studies to CD/DVD	FSC
		Display Study Information from CD/DVD	FSR
		Review/Load Study from CD/DVD	FSR
		Import Study from CD/DVD	FSR

5.2.1. File Meta Information for the Application Entity

Merge PACS Viewer writes the following Meta Information attributes in the Part 10-compliant DICOM files it produces:

Name	Value
Implementation Class UID	1.2.840.113837.7.7.2000
Implementation Version Name	2.5WIN32-22SEP00

5.2.2. Real World Activities

The Merge PACS Viewer supports the following Real World Activities associated with media storage:

- Save Study/Studies to CD/DVD
- Display Study Information from CD/DVD
- Review/Load Study from CD/DVD
- Import Study from CD/DVD

5.2.3. Real World Activity: Save Study/Studies to CD/DVD

a. In General

Merge PACS Viewer acts as an FSC using the interchange option when writing a DICOM compliant CD/DVD. The AEs can create DICOM CD/DVD for the following (based on user selection).

- A complete Exam (Study)
- Multiple Exams from the same patient.
- Multiple Exams from different patients

Implicit in the above list is that there is sufficient disk space to store the selected exam(s). Spanning exams across multiple disks is not supported.

The list of studies to be written is identified by other components of the system like clicking the Burn CD/DVD icon. Burn CD/DVD dialog displays this list of study added by the user. The user initiates this Real World Activity by requesting the "Create" operation. Burn CD/DVD gathers the studies to be written and performs any necessary processing, such as compression. Burn CD/DVD tracks space used and space available on the destination media. When either all selected studies have been gathered and processed or the data to be written will fill target media, a DICOMDIR is generated (space needed for the DICOMDIR is included in running space calculations) and the media is written.

Merge PACS Viewer will not write a CD/DVD with no studies. User has an option to include a viewer on disc (Merge PACS or eFilm Lite).

The current version of the Merge PACS Viewer supports Transfer Syntax conversion for most images: the DICOM images are stored and burnt to CD/DVD with the original Transfer Syntax used during the DICOM Store operation or with the Explicit Little Endian transfer syntax depending on user preference.

Merge PACS Viewer will write the SOP instances as provided by the Real World Activity to the recordable DICOM medium and a corresponding DICOMDIR is created.

NOTE: Spine annotations are saved as graphic annotations in the DICOM tag (0070,0001) for the key images (KO). However, spine annotations are saved as XML in the private tag (0x0023, 0x0044) for the Presentation State (PR).

b. DICOM Directory

The Merge PACS Viewer writes directory records Patient, Study, Series and Image. Images are referenced via the Image Directory Entry attribute Referenced File ID (0004, 1500).

Merge PACS Viewer does not employ Multi-Referenced Directory Entries.

c. Media Storage Directory IOD

The following tables specify the directory record keys and optional attributes used by Merge PACS Viewer in the Media Storage Directory IOD (DICOMDIR file):

Table 6.4 Patient Record Keys

Description	Tag
Patient's Name	(0010,0010)
Patient ID	(0010,0020)

Table 6.5 Study Record Keys

Description	Tag
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Study Description	(0008,1030)
Study Instance UID	(0020,000D)
Study ID	(0020,0010)

Table 6.6 Series Record Keys

Description	Tag
Modality	(0008,0060)
Series Description	(0008,103E)
Series Instance UID	(0020,000E)
Series Number	(0020,0011)

Table 6.7 Instance Record Keys

Description	Tag
Image Type	(0008,0008)
Instance Number	(0020,0013)

d. Support of IHE PDI Profile

The Merge PACS Viewer Application Entity supports the IHE Portable Document Interface (PDI) profile, according to which it will burn the current study, along with its Presentation State (GSPS), to a CD or DVD by using the Microsoft Standard IMAPI (included in Windows OS) with no external third party software required.

The DICOM images are encoded either using uncompressed transfer syntax (to allow most other viewers to be able to read the CD/DVD) or in JPEG 2000 lossless format (to reduce the file sizes). The format can be chosen by the user on the Burn CD/DVD dialog through the “Use Jpeg 2000 encoding” check-box, which is enabled or disabled depending on matching site preferences.

A separate Web Content directory is also created that includes the same images rendered with their annotations in a JPEG format, viewable using generated HTML content pages on the disk.

Note the following:

- Merge PACS provides reliable interchange of image data, diagnostic reports, and DICOM AUs (including Merge PACS VoiceClips) on CDs/DVDs for importing, printing, or, optionally, displaying in a browser.
- Merge PACS uses the DICOMDIR file as an index for the content written to or read from CD/DVD.
- Merge PACS supports web-viewable format of the information, suitable for viewing in a browser (HTML).
- Merge PACS supports viewing of images using both the PACS viewer and the E-film viewer to view the images in PACS.
- Merge PACS provides a README.TXT file on the media which can help identify the institution and software that produced the media.

e. Media Storage Application Profile

Table 6.8 Supported Application Profiles

Application Profile	Identifier	Real-World Activity	Role	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	Save study/studies to CD-R/DVD	FSC	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Save study/studies to CD-R/DVD	FSC	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Save study/studies to CD-R/DVD	FSC	Interchange
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Save study/studies to CD-R/DVD	FSC	Interchange
General Purpose DVD Interchange with JPEG 2000	STD-GEN-DVD-J2K	Save study/studies to CD-R/DVD	FSC	Interchange

5.2.4. Real World Activity: Display Study Information from CD/DVD

a. In General

Merge PACS Viewer acts as an FSR using the interchange option when requested to display study information for studies residing on CD/DVD media. A list of studies found on the CD/DVD is presented on the Local Study page.

b. Media Storage Application Profile

Table 6.9 Supported Application Profiles

Application Profile	Identifier	Real-World Activity	Role	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	Display study information from CD-R/DVD	FSR	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Display study information from CD-R/DVD	FSR	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Display study information from CD-R/DVD	FSR	Interchange
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Display study information from CD-R/DVD	FSR	Interchange
General Purpose DVD Interchange with JPEG 2000	STD-GEN-DVD-J2K	Display study information from CD-R/DVD	FSR	Interchange

5.2.5. Real World Activity: Review/Load Study from CD/DVD

a. In General

Merge PACS Viewer acts as an FSR using the interchange option when requested to load a study residing on media (without first importing the study into the system).

b. Media Storage Application Profile

Table 6.10 Supported Application Profiles

Application Profile	Identifier	Real-World Activity	Role	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	Review/load study from CD-R/DVD	FSR	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Review/load study from CD-R/DVD	FSR	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Review/load study from CD-R/DVD	FSR	Interchange
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Review/load study from CD-R/DVD	FSR	Interchange
General Purpose DVD Interchange with JPEG 2000	STD-GEN-DVD-J2K	Review/load study from CD-R/DVD	FSR	Interchange

5.2.6. Real World Activity: Import Study from CD/DVD

a. In General

Merge PACS Viewer acts as an FSR using the interchange option when requested to import a study residing on media.

Merge PACS Viewer supports importing a single study or multiple studies for the same patient, in one operation.

Studies can be imported to an existing patient in the system, or to a new patient. Merge PACS Viewer will automatically search the system for any patient with the same Name, Date of Birth, and Sex as the study to be imported (the first study from the search results is used for matching purposes, in the case where multiple studies are being imported at once). The user can choose whether to select this patient, search for (and select) a different patient, or to define a new patient. Depending upon the selection, some patient and study level attributes are modifiable during the import process.

b. Media Storage Application Profile

Table 6.11 Supported Application Profiles

Application Profile	Identifier	Real-World Activity	Role	SC Option
CT/MR Studies on CD-R	STD-CTMR-CD	Import study from CD-R/DVD	FSR	Interchange
General Purpose CD-R Interchange	STD_GEN-CD	Import study from CD-R/DVD	FSR	Interchange
CT/MR Studies on DVD Media	STD-CTMR-DVD	Import study from CD-R/DVD	FSR	Interchange
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	Import study from CD-R/DVD	FSR	Interchange
General Purpose DVD Interchange with JPEG 2000	STD-GEN-DVD-J2K	Import study from CD-R/DVD	FSR	Interchange

5.3. Extensions, Specializations, Privatizations of SOP Classes and Transfer Syntaxes

None

5.4. Other Extensions

None

5.5. Configuration

The Merge PACS Viewer software supports several application-level configurations, available through its GUI. Nevertheless, none of these configuration parameters affects the conformance of Merge PACS Viewer with media profiles.