

RTx 1.8 DICOM Conformance Statement

1 Conformance Statement Overview

Mirada RTx implements the necessary DICOM services to read DICOM images and other objects from the file system and save secondary capture, exported volume data, registrations and reports to a network storage device or the file system.

Table 1 provides an overview of the network services supported by Mirada RTx.

Table 1: Network Services

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
CT Image Storage	Yes	No
Enhanced CT Image Storage	Yes	No
MR Image Storage	Yes	No
Enhanced MR Image Storage	Yes	No
Secondary Capture Image Storage	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	Yes	No
Multi-frame True Color Secondary Capture Image Storage	Yes	No
Nuclear Medicine Image Storage	Yes	No
Spatial Registration Storage	Yes	No
Deformable Spatial Registration Storage	Yes	No
Segmentation Storage	Yes	No
Comprehensive SR	Yes	No
Positron Emission Tomography Image Storage	Yes	No
RT Image Storage	Yes	No
RT Dose Storage	Yes	No
RT Structure Set Storage	Yes	No
RT Plan Storage	Yes	No

Table 2 provides an overview of the Media Storage Application Profiles supported by Mirada RTx.

Table 2: Media Services

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
General Purpose CD-R Interchange	Yes	Yes

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
General Purpose Interchange on DVD-RAM Media	Yes	Yes

2 Table of Contents

Contents

1	Conformance Statement Overview.....	1
2	Table of Contents.....	3
3	Introduction.....	4
3.1	Revision History.....	4
3.2	Audience.....	4
3.3	Remarks.....	4
3.4	Terms and Definitions.....	4
3.5	Basics of DICOM Communication.....	6
3.6	Abbreviations.....	7
3.7	References.....	9
4	Networking.....	10
4.1	Implementation Model.....	10
4.1.1	Application Data Flow.....	10
4.1.2	Functional Definition of AE's.....	10
4.1.2.1	Functional Definition of Storage Application Entity.....	10
4.2	AE Specifications.....	10
4.2.1	Storage Application Entity Specification.....	10
4.2.1.1	SOP Classes.....	10
4.2.1.2	Association Policies.....	11
4.2.1.3	Association Initiation Policy.....	12
4.3	Network Interfaces.....	15
4.4	Configuration.....	16
4.4.1	AE Title/Presentation Address Mapping.....	16
4.4.1.1	Local AE Titles.....	16
4.4.1.2	Remote AE Title/Presentation Address Mapping.....	16
4.4.2	Parameters.....	16
5	Media Interchange.....	16
5.1	Implementation Model.....	16
5.1.1	Application Data Flow Diagram.....	16
5.1.2	Functional definitions of AEs.....	17
5.1.2.1	Functional Definition of Offline-Media Application Entity.....	17
5.1.3	File Meta Information for Implementation Class and Version.....	17
5.2	A.5.2 AE Specifications.....	17
5.2.1	Offline-Media Application Entity Specification.....	17
5.2.1.1	File Meta Information for the Application Entity.....	17
5.2.1.2	Real-World Activities.....	17
5.3	A.5.3 Augmented and Private Application Profiles.....	18
6	Support of Character Sets.....	19
7	Security.....	19

3 Introduction

3.1 Revision History

The revision history provides dates and differences of the different releases of the product and the Conformance Statement.

3.2 Audience

This document is written for the people that need to understand how Mirada RTx will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Mirada RTx and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4 Terms and Definitions

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association – a network communication channel set up between *Application Entities*.

Attribute – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile – the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

Module – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.

Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

Service Class Provider (SCP) – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU) – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: *JPEG* compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an Association (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an Abstract Syntax for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted Transfer Syntaxes. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called Presentation Contexts. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on *Roles* – which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate Information Object Definition, and sent using the negotiated Transfer Syntax.

There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no Association Negotiation possible, they both use a *Media Application Profile* that specifies “pre-negotiated” exchange media format, Abstract Syntax, and Transfer Syntax.

3.6 Abbreviations

AE	Application Entity
AET	Application Entity Title
CAD	Computer Aided Detection
CDA	Clinical Document Architecture
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
CR	Computed Radiography
CT	Computed Tomography
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DIT	Directory Information Tree (LDAP)
DN	Distinguished Name (LDAP)
DNS	Domain Name System
DX	Digital X-ray
FSC	File-Set Creator
FSU	File-Set Updater
FSR	File-Set Reader
GSDF	Grayscale Standard Display Function
GSPS	Grayscale Softcopy Presentation State

HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
IO	Intra-oral X-ray
JPEG	Joint Photographic Experts Group
LDAP	Lightweight Directory Access Protocol
LDIF	LDAP Data Interchange Format
LUT	Look-up Table
MAR	Medication Administration Record
MPEG	Moving Picture Experts Group
MG	Mammography (X-ray)
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance Imaging
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NM	Nuclear Medicine
NTP	Network Time Protocol
O	Optional (Key Attribute)
OP	Ophthalmic Photography
OSI	Open Systems Interconnection

PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit
R	Required (Key Attribute)
RDN	Relative Distinguished Name (LDAP)
RF	Radiofluoroscopy
RIS	Radiology Information System.
RT	Radiotherapy
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
UL	Upper Layer
VR	Value Representation

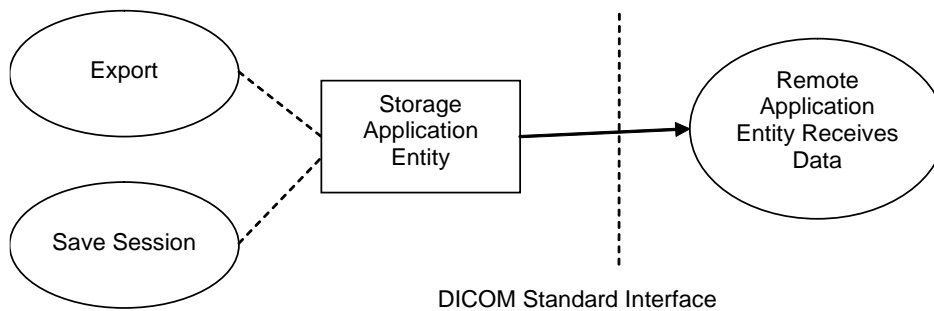
3.7 References

- NEMA PS3 Digital Imaging and Communications in Medicine (DICOM) Standard, available free at <http://medical.nema.org/>.

4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow



- The Storage Application Entity sends images, registrations and structured reports to a remote AE. It is associated with the local real-world activities “Export” and “Save Session”. “Export” is performed upon user request for specific data selected. “Save Session” can be performed on user request or automatically on exit.

4.1.2 Functional Definition of AE’s

4.1.2.1 Functional Definition of Storage Application Entity

The existence of a send-job queue entry with associated network destination will activate the Storage AE. An association request is sent to the destination AE and upon successful negotiation of a Presentation Context the image transfer is started. If the association cannot be opened, the related send-job is set to an error state and can be restarted by the user via job control interface. By default, the Storage AE will not try to initiate another association for this send-job automatically. However, an automatic retry (retry-timer, retry-count) can be configured by a CSE.

4.2 AE Specifications

4.2.1 Storage Application Entity Specification

4.2.1.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

Table 3: SOP Classes for AE Storage

SOP Class Name	SOP Class UID	SCU	SCP
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	No
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	No
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	No
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	No
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	No
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	No
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	No
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	No
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	No

4.2.1.2 Association Policies

4.2.1.2.1 General

The DICOM standard application context name for DICOM 3.0 is always proposed:

Table 4: DICOM Application Context for AE Storage

Application Context Name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

4.2.1.2.2 Number of Associations

Mirada RTX initiates one Association at a time for each destination to which a transfer request is being processed in the active job queue list. Only one job will be active at a time, the other remains pending until the active job is completed or failed.

Table 5: Number of Associations as an Association Initiator for AE Storage

Maximum number of simultaneous associations	1
---	---

4.2.1.2.3 Asynchronous Nature

Mirada RTX does not support asynchronous communication (multiple outstanding transactions over a single Association).

Table 6: Asynchronous Nature as an Association Initiator for AE Storage

Maximum number of outstanding asynchronous transactions	1
---	---

4.2.1.2.4 Implementation Identifying Information

The implementation information for this Application Entity is:

Table 7: DICOM Implementation Class and Version for AE Storage

Implementation Class UID	1.2.826.0.1.3680043.8.691.0.21
Implementation Version Name	1.8

4.2.1.3 Association Initiation Policy

4.2.1.3.1 Activity – Export and Save Session

4.2.1.3.1.1 Description and Sequencing of Activities

A user can select images, bookmarks, volumes, etc. and request them to be sent to an SCP. The Storage AE is invoked by the export task which initiates a C-STORE request to store images. If the process successfully establishes an Association to a remote Application Entity, it will transfer each marked instance one after another via the open Association. Only one export task will be active at a time. If the C-STORE Response from the remote Application contains a status other than Success or Warning, the Association is aborted and user notified.

The Storage AE attempts to initiate a new Association in order to issue a C-STORE request. If the task contains multiple images then multiple C-STORE requests will be issued over the same Association.

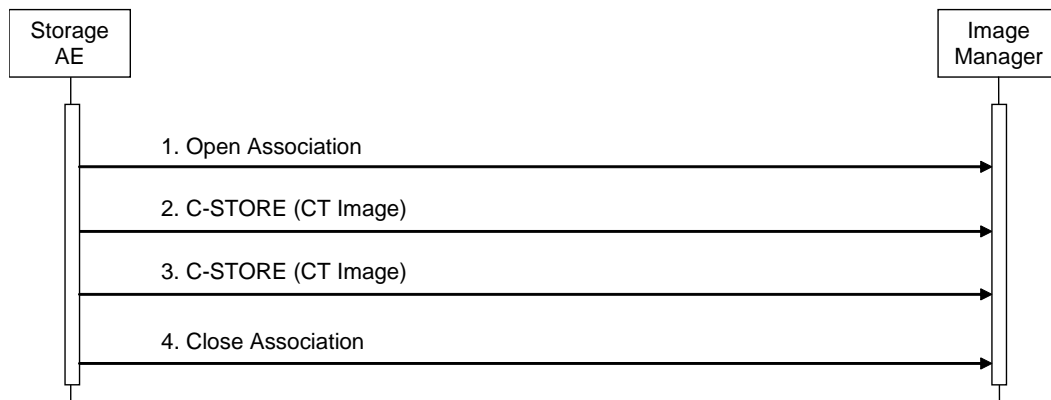


Figure 1: Sequencing of Activity: Export

A possible sequence of interactions between the Storage AE and an Image Manager (e.g. a storage or archive device supporting the Storage and Storage Commitment SOP Classes as an SCP) is illustrated in Figure B.4.2-1:

1. The Storage AE opens an association with the Image Manager
2. An exported CT image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
3. Another exported CT image is transmitted to the Image Manager using a C-STORE request and the Image Manager replies with a C-STORE response (status success).
4. The Storage AE closes the association with the Image Manager.

4.2.1.3.1.2 Proposed Presentation Contexts

Mirada RTX is capable of proposing the Presentation Contexts shown in the following table:

Table 8: Proposed Presentation Contexts for AE Storage

Abstract Syntaxes		Transfer Syntaxes		Role	Extended Negotiation
CT Image Storage	1.2.840.1000 8.5.1.4.1.1.2	Little Endian Implicit VR	1.2.840.10008.1.2	SCU	None
Enhanced CT Image Storage	1.2.840.1000 8.5.1.4.1.1.2.1	Little Endian Explicit VR	1.2.840.10008.1.2.1		
MR Image Storage	1.2.840.1000 8.5.1.4.1.1.4	Big Endian Explicit VR	1.2.840.10008.1.2.2		
Enhanced MR Image Storage	1.2.840.1000 8.5.1.4.1.1.4.1	Deflated Little Endian Explicit VR	1.2.840.10008.1.2.1.99		
Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7	Lossless JPEG Image Compression	1.2.840.10008.1.2.4.57		
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7.1	Lossless JPEG Image Compression with first-order prediction	1.2.840.10008.1.2.4.70		
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7.2	Lossless JPEG 2000 Image Compression	1.2.840.10008.1.2.4.90		
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7.3	Lossy JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91		
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7.4	Lossy JPEG Baseline Image Compression	1.2.840.10008.1.2.4.50		
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7.5	Lossy JPEG Extended Image Compression	1.2.840.10008.1.2.4.51		

Abstract Syntaxes	Transfer Syntaxes	Role	Extended Negotiation
Multi-frame True Color Secondary Capture Image Storage	1.2.840.1000 8.5.1.4.1.1.7. 4		
Nuclear Medicine Image Storage	1.2.840.1000 8.5.1.4.1.1.2 0		
Deformable Spatial Registration SOP Class	1.2.840.1000 8.5.1.4.1.1.6 6.3		
Segmentation SOP Class	1.2.840.1000 8.5.1.4.1.1.6 6.4		
Comprehensive SR	1.2.840.1000 8.5.1.4.1.1.8 8.33		
Positron Emission Tomography Image Storage	1.2.840.1000 8.5.1.4.1.1.1 28		
RT Image Storage	1.2.840.1000 8.5.1.4.1.1.4 81.1		
RT Dose Storage	1.2.840.1000 8.5.1.4.1.1.4 81.2		
RT Structure Set Storage	1.2.840.1000 8.5.1.4.1.1.4 81.3		
RT Plan Storage	1.2.840.1000 8.5.1.4.1.1.4 81.5		

4.2.1.3.1.3 SOP Specific Conformance for SOP Classes

All Storage SOP Classes supported by the Storage AE exhibit the same behavior, except where stated, and are described together in this section.

If a SOP Instance is included in the task and a corresponding Presentation Context is not accepted then the Association is aborted using A-P-ABORT and the task is failed. The failure is logged and reported to the user.

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has successfully stored the SOP Instance. If all SOP Instances have status success then the task is marked as complete.
Refused	Out of Resources	A700-A7FF	The Association is aborted using A-ABORT and the task is marked as failed. The status meaning is logged and the task failure is reported to the user. This is a transient failure.
Error	Data Set does not match SOP Class	A900-A9FF	The Association is aborted using A-ABORT and the task is marked as failed. The status meaning is logged and the task failure is reported to the user.
Error	Cannot Understand	C000-CFFF	The Association is aborted using A-ABORT and the task is marked as failed. The status meaning is logged and the job failure is reported to the user.
Warning	Coercion of Data Elements	B000	Image transmission is considered successful but the status meaning is logged.
Warning	Data Set does not match SOP Class	B007	Image transmission is considered successful but the status meaning is logged.
Warning	Elements Discarded	B006	Image transmission is considered successful but the status meaning is logged.
*	*	Any other status code.	The Association is aborted using A-ABORT and the task is marked as failed. The status code is logged and the task failure is reported to the user.

The behavior of Storage AE during communication failure is summarized in the Table below:

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application.

4.3 Network Interfaces

No network interfaces are implemented by this software.

4.4 Configuration

4.4.1 AE Title/Presentation Address Mapping

4.4.1.1 Local AE Titles

The Storage AE Title may be configured through the application configuration file.

Table 9: AE Title Configuration Table

Application Entity	Default AE Title	Default TCP/IP Port
AE Storage	FUSIONXD_SCU	Not Applicable

4.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications are configured using the Options dialog box accessible from the Tools menu.

4.4.2 Parameters

The ARTIM timeout may be configured for each remote application.

5 Media Interchange

5.1 Implementation Model

5.1.1 Application Data Flow Diagram

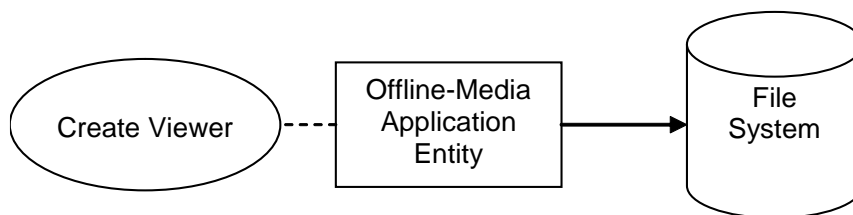


Figure 2: Application Data Flow Diagram for Media Storage

The Offline-Media Application Entity exports images and Presentation States to CD-R, DVD-RAM or any other location in the file system. It is associated with the local real-world activity “Create Viewer”.

5.1.2 Functional definitions of AEs

5.1.2.1 Functional Definition of Offline-Media Application Entity

Activation of the “Create Viewer” command will save the selected data to the Offline-Media Application Entity. The SOP Instances associated with the selection will be collected into one or more export tasks. The contents of each export task will be written to the file system if the user selects ‘File’.

5.1.3 File Meta Information for Implementation Class and Version

The implementation information written to the File Meta Header in each file is:

Table 10: DICOM Implementation Class and Version for Media Storage

Implementation Class UID	1.2.826.0.1.3680043.8.691.0.21
Implementation Version Name	1.8

5.2 AE Specifications

5.2.1 Offline-Media Application Entity Specification

The Offline-Media Application Entity provides standard conformance to the Media Storage Service Class. The Application Profiles and roles are listed below:

Table 11: Application Profiles, Activities and Roles for Offline-Media

Application Profiles Supported	Real World Activity	Role
STD-GEN-CD	Create Viewer	FSC
STD-GEN-DVD-RAM	Create Viewer	FSC

The STD-GEN-CD Application Profile is supported in conjunction with a CD writing application and hardware.

The STD-GEN-DVD-RAM Application Profile is supported in conjunction with a DVD-RAM writing application and hardware.

5.2.1.1 File Meta Information for the Application Entity

The Source Application Entity Title included in the File Meta Header is not sent.

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity – Create Viewer

The Offline-Media Application Entity acts as an FSC when requested to create a viewer application on the file system.

5.2.1.2.1.1 Media Storage Application Profiles

The Offline-Media Application Entity supports the STD-GEN-CD and STD-GEN-DVD-RAM Application Profiles.

5.2.1.2.1.2 Options

The Offline-Media Application Entity supports the SOP Classes and Transfer Syntaxes listed in the Table below:

Table 12: IODs, SOP Classes and Transfer Syntaxes for Offline-Media

Information Object Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1
Multi-frame Greyscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1
Deformable Spatial Registration SOP Class	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
Segmentation SOP Class	1.2.840.10008.5.1.4.1.1.66.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian	1.2.840.10008.1.2.1

5.3 Augmented and Private Application Profiles

Mirada RTx does not support any augmented or private application profiles.

6 Support of Character Sets

All Mirada RTx DICOM applications support:

- UTF-8
- ISO_IR 6
- ISO_IR 13
- ISO_IR 87
- ISO_IR 100
- ISO_IR 101
- ISO_IR 109
- ISO_IR 110
- ISO_IR 126
- ISO_IR 127
- ISO_IR 138
- ISO_IR 144
- ISO_IR 148
- ISO_IR 159
- ISO_IR 166
- GB18030

7 Security

Mirada RTx does not support any specific security measures.

It is assumed that Mirada RTx is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to Mirada RTx.
- Firewall or router protections to ensure that Mirada RTx only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.