



DICOM Conformance Statement

DicomFactory

Release 4.7.x

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1 Conformance Statement Overview

DicomFactory implements DICOM services to receive DICOM instances over the network or/and to query for DICOM instances to create DICOM compliant CD, DVD or BD media.

DicomFactory is the successor to the application DicomNet CD-Factory (CDF).

This DICOM conformance statement specifies the behavior and functionality of the DicomFactory application.

This software provides the following DICOM capabilities:

- Receive DICOM instances.
- Provide DICOM Query and Retrieve functionality.
- DICOM File Set Creator (FSC) for interchange.

Table 1 presents an overview of the DICOM network services supported by DicomFactory.

Table 1: Network Services

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
General			
Verification	1.2.840.10008.1.1	Yes	Yes
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	No	Yes
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	No	Yes
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	No	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	No	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	No	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	No	Yes
IntravaSCular Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	No	Yes
IntravaSCular Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	No	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	No	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	No	Yes
Query / Retrieve			
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

- **Note:**
The above list contains the factory set of supported SOP Classes. DicomFactory can be optional configured to support additional Storage SOP Classes on customer's request, e.g. specific Private Storage SOP Classes.
- Furthermore, the support of SOP Classes may be restricted due to configuration / or dependent on the capabilities of a DICOM Viewer Application which may be included on the created media.

Table 2 presents an overview of the DICOM media interchange services supported by DicomFactory.

Table 2: Media Interchange

Application Profile	Identifier	Role	SC Option
General Purpose CD-R Interchange	STD-GEN-CD	FSC	Interchange
General Purpose Interchange on DVD-RAM Media	STD-GEN-DVD-RAM	FSC	Interchange
1024 X-RAY Angiographic Studies on CD-R Media	STD-XA1K-CD	FSC	Interchange
1024 X-RAY Angiographic Studies on DVD Media	STD-XA1K-DVD	FSC	Interchange
General Purpose DVD Interchange with JPEG	STD-GEN-DVD-JPEG	FSC	Interchange
Augmented General Purpose CD Interchange	AUG-GEN-CD	FSC	Interchange
Augmented General Purpose DVD Interchange	AUG-GEN-DVD	FSC	Interchange
General Purpose BD Interchange	STD-GEN-BD	FSC	Interchange

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3 Introduction

3.1 Revision History

The revision history provides dates and differences of the different releases of DicomFactory.

Version	Date	Author	Chapter	Remarks
1	24.09.2018	Edgar Lenz	All	Complete revised Document based on Dicom Conformance Statement DicomNet CD-Factory R.3.8.x 28.02.2009
1.1	28.06.2019	S Landree		Revision for DicomFactory Software Release 4.7

3.2 Audience

This Conformance Statement is intended for:

- (potential) customers,
- marketing staff interested in system and data exchange functionality,
- support engineers and system integrators of medical equipment,
- software designers and implementers of DICOM interfaces.
- It is assumed that the reader is familiar with the DICOM standard.

3.3 Remarks

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

Interoperability

Integration of (networked) systems may require application functions that are not specified within the scope of DICOM.

It is the user's (or a user's agent) responsibility to analyze the application requirements and to specify a solution that integrates different vendor's equipment.

Validation

If the comparison of Conformance Statements indicate that the required information exchange should be possible, additional validation tests will be necessary.

It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

3.4 Contents and structure

The DICOM Conformance Statement is contained in chapter 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2-2016.

3.5 Used definitions and terms

For a description of these, see NEMA PS 3.3-2016 and PS 3.4-2016.

3.6 Abbreviations

The following acronyms and abbreviations are used in the document.

ACR	American College of Radiology
AE	Application Entity
ANSI	American National Standard Institute
BD	Blu-ray Disc
CD-R	Compact Disk Recorder
DICOM	Digital Imaging and Communication in Medicine
DVD	Digital Versatile Disc
FSC	File Set Creator
GUI	Graphical User Interface
HIS	Hospital Information System
IOD	Image Object Definition
MWL	Modality Worklist Query/Retrieve
N.A.	Not applicable
NEMA	National Electric Manufacturers Association
NM	Nuclear Medicine
OS	Operating System
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
RIS	Radiology Information System
RWA	Real World Activity
SC	Secondary Capture/Service Class
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet protocol
UID	Unique Identifier
US	Ultra Sound
VR	Value Representation

3.7 References

[DICOM] The Digital Imaging and Communications in Medicine (DICOM) standard:
NEMA PS 3.X.

National Electrical Manufacturers Association (NEMA) Publication Sales

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4 Networking

4.1 Implementation Model

4.1.1 Application Data Flow

Three Application Entities (AE), Query AE, Query Store AE and Store AE represent the DicomFactory networking system; for details of Media Creator AE see chapter 5.

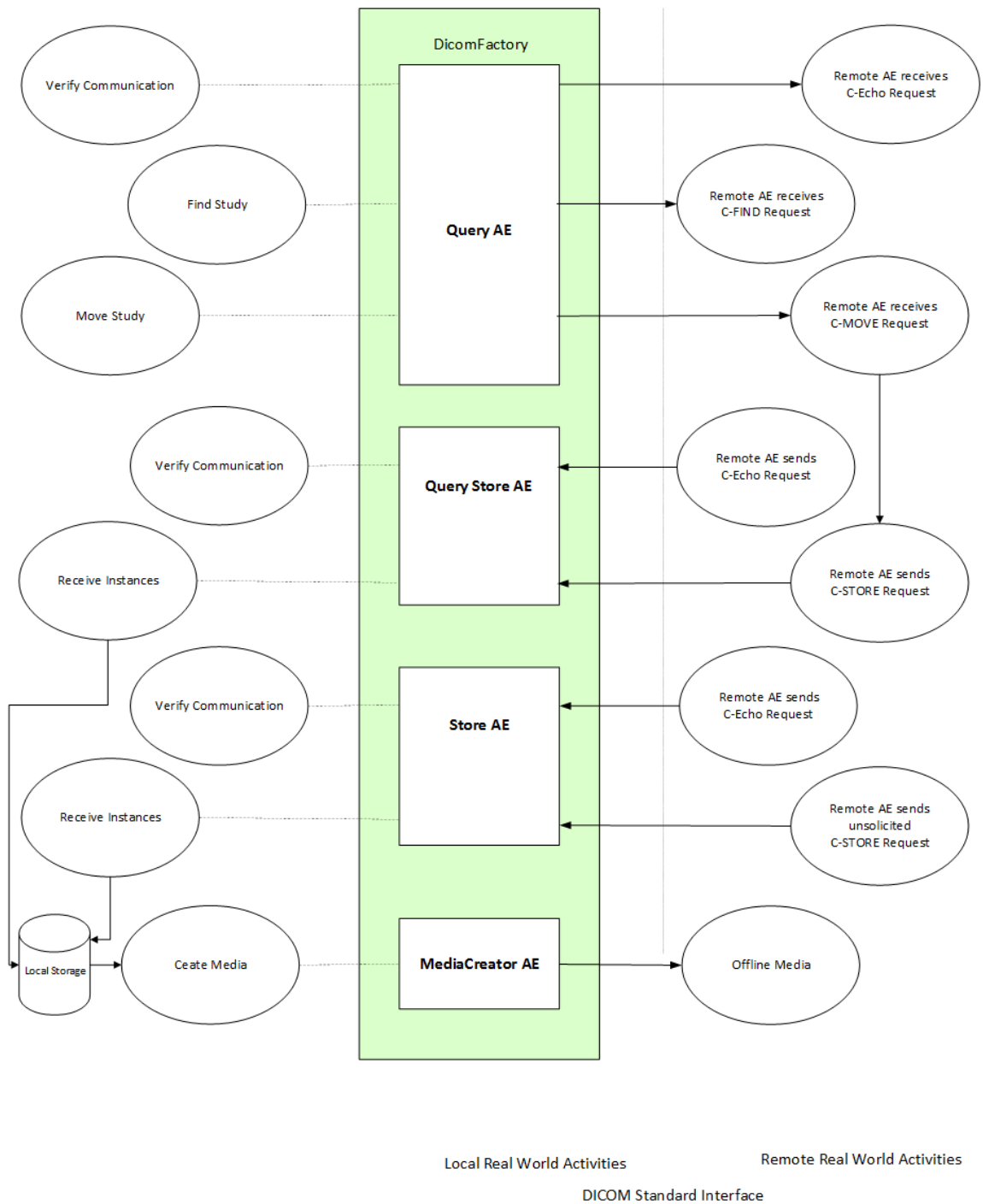


Figure 1: The DicomFactory Application Data Flow Diagram

4.1.2 Functional definition of Application Entities

This section describes in general terms the functions performed by Query AE, Query Store AE and Store AE. For SOP specific conformance see related chapters later in this document.

4.1.2.1 Functional Definition of Query Store AE

The Query Store AE is an integrated service of the DicomFactory. The service starts as part of the Operation System. It will wait for connection attempts of other DICOM applications at the configured presentation address. It will accept associations for the following Service Classes and respond to request.

4.1.2.1.1 Verification Service Class

The Query Store AE will respond to C-ECHO request to verify the communication.

4.1.2.1.2 Storage Service Classes

The Query Store AE will accept C-STORE requests and store related instances to its local storage which later will be used to create a DICOM File Set for media creation.

4.1.2.2 Functional Definition of Store AE

The Store AE is an integrated service of the DicomFactory. The service starts as part of the Operation System. It will wait for connection attempts of other DICOM applications at the configured presentation address. It will accept associations for the following Service Classes and respond to request.

4.1.2.2.1 Verification Service Class

The Store AE will respond to C-ECHO request to verify the communication.

4.1.2.2.2 Storage Service Classes

The Store AE will accept C-STORE requests and store related instances to its local storage which later will be used to create a DICOM File Set for media creation.

4.1.2.3 Functional Definition of Query AE

4.1.2.3.1 Verification Service Class

The Query AE can perform the Verification Service as SCU to configured destinations. This is triggered by the operator in the service mode.

4.1.2.3.2 Query Model FIND

The Query AE acts as a SCU of the Query Model FIND Service Class. The FIND request is triggered by the user interface to search for studies located on Remote AEs.

4.1.2.3.3 Query Model MOVE

The Query AE acts as a SCU of the Query Model MOVE Service Class. The MOVE request is triggered by the user interface to retrieve studies located on Remote AEs for media creation.

4.1.3 Sequencing of Real-World Activities

For the purpose of a media creation the DicomFactory supports two basic workflows:

- Unsolicited, a user may just store instances to the DicomFactory's Store AE
- Solicited, a user may use the DicomFactory's web application to query a configured SCP like a PACS or workstation to collect studies to be burned on CD / DVD / BD.

Furthermore, DicomFactory supports several proprietary interfaces to certain PACS systems for smooth integration into their viewing application but they are out of scope for this Conformance Statement.

4.1.3.1 Unsolicited Workflow

The user initiates DICOM C-Store operations to DicomFactory's Store AE. The DicomFactory's Store AE stores the received instances in its local storage sorting the incoming instances by client and study (Study Instance UID).

After a configurable timeout a client's study transmission is stated completed and the DicomFactory hands the received instances over to the MediaCreator AE to create a media set.

Associations containing instances for the same study received after this timeout will result in the creation of another media set.

Note: Media set means: If the size of all instances (including the resulting DICOMDIR and additional data like viewers and proprietary files exceeds the size of a physical media the file set will be split over multiple physical medias according to the DICOM standard.

4.1.3.2 Solicited Workflow

The solicited workflow (so using the DicomFactory's web application) provides much more flexibility to the user in how to create the media.

By using DicomFactory's Query AE the user may query and select studies from multiple (configured) providers and add them to a list of studies to burned to media.

Next the user may select

- Type of media (CD / DVD / BD) if supported by the CD-Robot.
- Type of label printed on media
- Anonymize (De-Identify) the instances (see chapter 7.1.5)
- Add additional comments

After the user accepts the selection DicomFactory will start the retrieval of studies using its Query AE C-Move functionality.

The DicomFactory's Query Store AE will receive the instances and store them into the local storage.

When all C-Move operations in the context of the users selection are completed successful the result is handed over to the MediaCreator AE including the selected meta data to create a media according to the users choices.

4.2 AE Specifications

4.2.1 DicomFactory Query Store AE

4.2.1.1 SOP Classes

The DicomFactory Query Store AE provides Standard Conformance to the following DICOM V 3.0 SOP classes as an SCP.

Table 3: Supported SOP Classes for Query Store AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	No	Yes
Transfer			
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	No	Yes
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	No	Yes
Encapsulated CDA Storage	1.2.840.10008.5.1.4.1.1.104.2	No	Yes
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.2	No	Yes
Pseudo-Color Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.3	No	Yes
Blending Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.4	No	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
X-Ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	No	Yes
X-Ray 3D Craniofacial Image Storage	1.2.840.10008.5.1.4.1.1.13.1.2	No	Yes
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	No	Yes
Enhanced PET Image Storage	1.2.840.10008.5.1.4.1.1.130	No	Yes
IntravaSCular Optical Coherence Tomography Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.14.1	No	Yes
IntravaSCular Optical Coherence Tomography Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.14.2	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No	Yes
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	No	Yes
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5	No	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	No	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	No	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	No	Yes
VL Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
Video Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VL Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
Video Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
VL Slide-Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
VL Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
Video Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
Ophthalmic Photography 8 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.1	No	Yes
Ophthalmic Photography 16 Bit Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.2	No	Yes
Ophthalmic Tomography Image Storage	1.2.840.10008.5.1.4.1.1.77.1.5.4	No	Yes
VL Whole Slide Microscopy Image Storage	1.2.840.10008.5.1.4.1.1.77.1.6	No	Yes
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
Chest CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.65	No	Yes
X-Ray Radiation Dose SR Storage	1.2.840.10008.5.1.4.1.1.88.67	No	Yes
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	No	Yes

- Note:
The above list contains the factory set of accepted SOP Classes.
DicomFactory can be optional configured to support additional Storage SOP Classes, e.g. specific Private Storage SOP Classes or reject SOP Classes on customer's request
- SOP specific Behavior is specified later in the SOP specific conformance section

4.2.1.2 Association Policies

4.2.1.2.1 General

The DicomFactory Query Store AE will accept associations for DICOM Verification and Storage.

The DICOM standard application context name for DICOM 3.0 is always proposed as presented in Table 4.

Table 4: DICOM Application Context

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

4.2.1.2.2 Number of Associations

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

Maximum number of simultaneous associations	N.A.
---	------

Query Store AE will not initiate associations.

Table 6: Number of Associations as an Association Acceptor for Query Store AE

Maximum number of simultaneous associations	Limited by the system or configuration
---	--

4.2.1.2.3 Asynchronous Nature

Query Store AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Table 7: Asynchronous Nature as an Association Initiator for Query Store AE

Maximum number of outstanding asynchronous transactions	N.A.
---	------

4.2.1.2.4 Implementation Identifying Information

The implementation information for Query Store AE is:

Table 8: DICOM Implementation Class and Version for Query Store AE

Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	QDICNET_3X *

* X identifies the version number of the DICOM module.

4.2.1.3 Association Initiation Policy

Query Store AE will not initiate associations.

4.2.1.4 Association Acceptance Policy

The Storage AE accepts association attempts for the (Real-World) Activities Verification and Receive Instances.

4.2.1.4.1 (Real-World) Activity – Verify Communication

4.2.1.4.1.1 Description and Sequencing of Activities

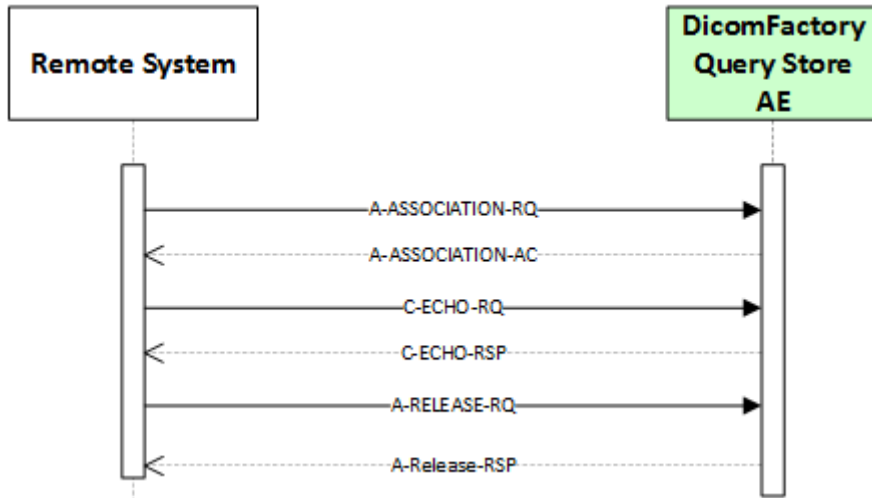


Figure 2: (Real-World) Activity – Verify Communication

4.2.1.4.1.2 Accepted Presentation Contexts

Table 9: Acceptable Presentation Contexts (Real-World) Activity – Verify Communication

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	ILE ELE	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCP	None

4.2.1.4.1.3 SOP Specific Conformance for Verification SOP Class

The possible status responses and communication failures during a C-ECHO-RQ are described in this section

4.2.1.4.1.3.1 Dataset Specific Conformance for (Real-World) Activity – Verify Communication

Possible status responses are shown in the following table:

Table 10: Status Response (Real-World) Activity – Verify Communication

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	C-ECHO request accepted

4.2.1.4.2 (Real World) Activity – Receive Instances

4.2.1.4.2.1 Description and Sequencing of Activities

Remote systems can open associations with DicomFactory: If presentation contexts match and the maximum number of associations has not been reached DicomFactory will accept the association and the remote system may start sending

its C-STORE requests. When the instance has been received and made persistent in the local file system DicomFactory will send the C-STORE response. The remote system may continue sending instances or release the association.

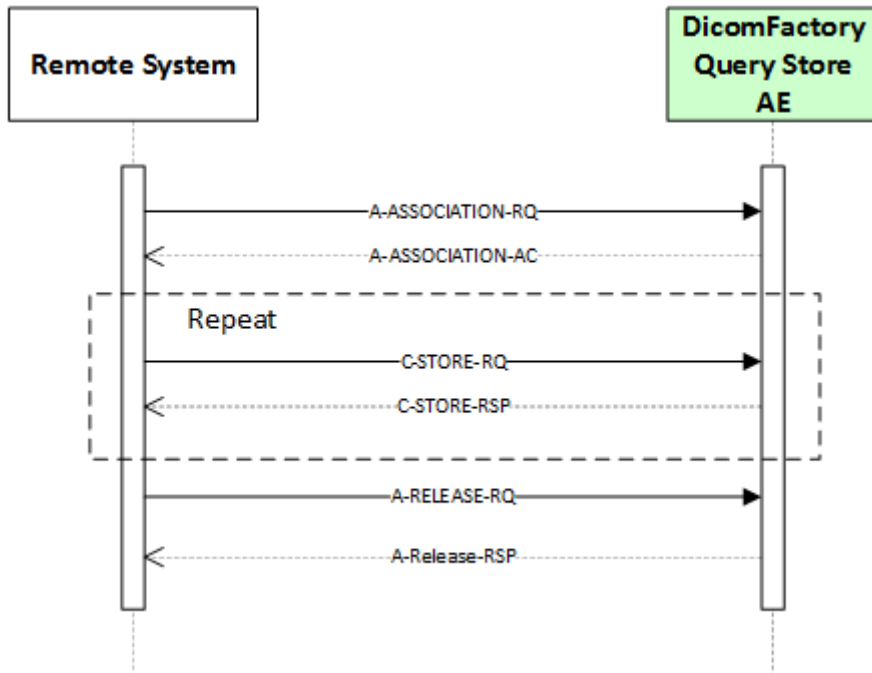


Figure 3: (Real-World) Activity – Receive Instances

4.2.1.4.2.2 Accepted Presentation Contexts

Table 11: Acceptable Presentation Contexts (Real-World) Activity – Receive Instances

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
All Abstract Syntax items from Table 3: Supported SOP Classes for Query Store AE, section "Transfer". Non image storage SOP Classes.		ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1		
All Abstract Syntax items from Table 3: Supported SOP Classes for Query Store AE, section "Transfer" containing literally "Image Storage" in its Abstract Syntax Name. Image Storage SOP Classes.		ILE	1.2.840.10008.1.2	SCP	None
		ELE	1.2.840.10008.1.2.1	SCP	None
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70	SCP	None
		JPEG LS, lossless	1.2.840.10008.1.2.4.80	SCP	None

- Note:
The above list contains the factory set of accepted SOP Classes. DicomFactory can be optional configured to support additional Storage SOP Classes, e.g. specific Private Storage SOP Classes or reject SOP Classes on customer's request.
- The supported Transfer Syntax may be modified on customer's request, see Table 12 for additional configurable Transfer Syntax

Table 12: Additional Acceptable Presentation Contexts (Real-World) Activity – Receive Instances

Transfer Syntax	
Name List	UID List
EBE	1.2.840.10008.1.2.2
RLE lossless	1.2.840.10008.1.2.5
JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90
JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91
JPEG 2000 Part 2 Multi-component Image Compression (Lossless Only)	1.2.840.10008.1.2.4.92
JPEG 2000 Part 2 Multi-component Image Compression	1.2.840.10008.1.2.4.93
MPEG-4 AVC/H.264 High Profile/Level 4.1 *	1.2.840.10008.1.2.4.102
MPEG-4 AVC/H.264 BD-compatible, High Profile/Level 4.1 *	1.2.840.10008.1.2.4.103

Note: All Transfer Syntaxes except EBE will be applied on Image Storage SOP Classes only.

All MPEG Transfer Syntaxes will be applied on Image Storage SOP Classes containing literally the word "Video"

4.2.1.4.2.3 SOP Specific Conformance for Storage SOP Classes

DicomFactory conforms to the SOP Classes of the Storage Service Class as a Level 2 (Full) SCP. No data elements are discarded or coerced.

During the DICOM C-STORE operation no value of any attribute is checked for its presence or value. Thus, the intended archiving may fail although the C-STORE operation itself was stated successful.

In the case any of the following Type 1 attributes turn out to be missing or does not provide a value, the instance will not be archived, details will be logged.

- Study Instance UID
- Series Instance UID
- SOP Instance UID
- SOP Class UID

If any communication error occurs, network or DICOM related, all successful received instances within the association will be discarded to prevent the creation of incomplete media.

After an association has finished, successful received instances are sorted and merged by Study Instance UID and Series Instance UID. They are registered into the DicomFactory local cache to be processed by the Media Creation AE.

In the case of a duplicate Instance UID the instance will either be overwritten or discarded based on the configuration of the DicomFactory.

If instances are not received or processed successfully they are placed in the error folder.

After successful media creation the related instances in the local cache are deleted.

4.2.1.4.2.3.1 Dataset Specific Conformance for Receive Instances

Possible status responses are shown in the following table:

Table 13: Status Response (Real-World) Activity – Receive Instances

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Success	Continue, the instance has been successfully received.
Error	0110	Internal Error	Details are logged, the association is aborted.
	A700	Refused, out of resources	Insufficient storage. Details are logged, the association is aborted

4.2.2 DicomFactory Store AE

The DicomFactory's Store AE behaves exactly the same way like Query Store AE. See chapter 4.2.1 for details.

4.2.3 Query AE

4.2.3.1 SOP Classes

The DicomFactory Query AE provides Standard Conformance to the following DICOM V 3.0 SOP classes as an SCU.

Table 14: Supported SOP Classes for Query AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification	1.2.840.10008.1.1	Yes	No
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Study Root QR Information Model – Move SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

The DicomFactory Query AE does not support DICOM V 3.0 SOP Classes as an SCP.

4.2.3.2 Association Policies

4.2.3.2.1 General

The DICOM standard application context name for DICOM 2.0 is always proposed as presented in Table 15. The PDU size is configurable from a minimum of 4096 bytes.

Table 15: DICOM Application Context

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

4.2.3.2.2 Number of Associations

Query AE will establish a maximum of two associations at a time. Based on local activities, one association may perform Application Level Communication Verification, another association may be used C-FIND operations.

Table 16: Number of Associations as an Association Initiator for Query AE

Maximum number of simultaneous associations	2
---	---

Query AE will not handle incoming associations.

Table 17: Number of Associations as an Association Acceptor for Query AE

Maximum number of simultaneous associations	N.A.
---	------

4.2.3.2.3 Asynchronous Nature

Query AE does not support asynchronous operations and will not perform asynchronous window negotiation.

Table 18: Asynchronous Nature as an Association Initiator for Query AE

Maximum number of outstanding asynchronous transactions	N.A.
---	------

4.2.3.2.4 Implementation Identifying Information

The implementation information for Query AE is:

Table 19: DICOM Implementation Class and Version for Query AE

Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	QDICNET_3X *

* X identifies the version number of the DICOM module.

4.2.3.3 Association Initiation Policy

The Query AE initiates associations as a result of the following events:

- The user requests a Find Study manually using the GUI (see chapter 4.2.3.3.2).
- The user requests a Move Study manually using the GUI (see chapter 4.2.3.3.3).
- In the service mode, the operator verifies application level communication (see chapter 4.2.3.3.1).

4.2.3.3.1 (Real-World) Activity Verify Communication

4.2.3.3.1.1 Description and Sequencing of Activities

For each Verify Application Level Communication Request Query AE initiates and association to the remote system and transmits a C-ECHO request. After the response is received the association is closed.

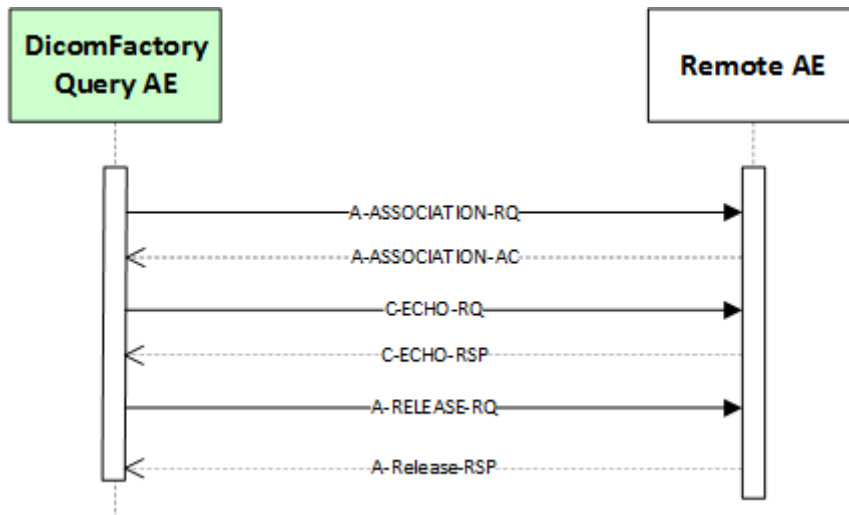


Figure 4:Sequencing of (Real-World) Activity Verify Communication

4.2.3.3.1.2 Proposed Presentation Contexts

The presentation context proposed by Query AE Verify Communication is defined in Table 20

The implementation will choose ELE transfer syntax in the case multiple transfer syntaxes are accepted by the SCP.

Table 20: Proposed Presentation Contexts for Query AE Verify Communication

Presentation Context table					
Name	UID	Transfer Syntax		Role	Extended Negotiation
		Name List	UID List		
Verification	1.2.840.10008.1.1	ILE ELE	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.3.3.1.3 SOP Specific Conformance for SOP Classes

The behavior of the Query AE for status codes in a Verification response is presented in Table 21.

Table 21: Response Status Handling Behavior for Query AE Verify Communication

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The success is reported to the user
*	Any other code	*	The failure is reported to the user

The behavior of the Query AE during communication failure is presented in Table 22.

Table 22: Communication Failure Behavior for Query AE Verify Communication

Exception	Behavior
Timeout	The reason is logged, a failure status is reported to the user.
Association aborted	The reason is logged, a failure status is reported to the user.
Association rejected	The reason is logged, a failure status is reported to the user.

4.2.3.3.2 (Real-World) Activity Find Studies

4.2.3.3.2.1 Description and Sequencing of Activities

For each Find Studies request, the Query AE opens an association to the Query Retrieve SCP and sends a C-FIND request. After retrieval of all responses the association is closed. The GUI is populated with the returned study items and presented to the user.

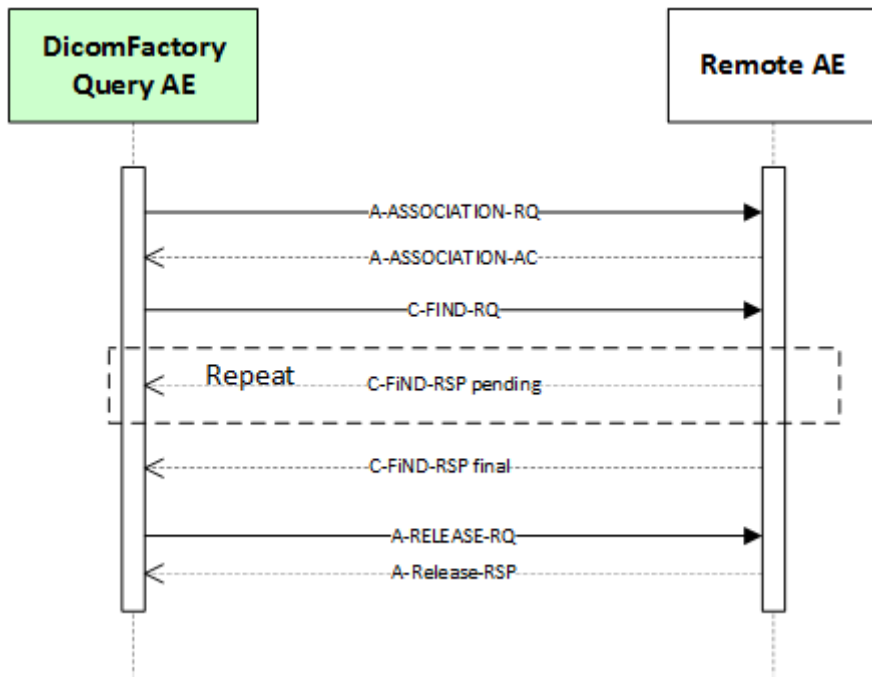


Figure 5:Sequencing of (Real-World) Activity Find Studies

4.2.3.3.2.2 Proposed Presentation Contexts

The presentation context proposed by Query AE Query Studies is defined in Table 23.

The implementation will choose ELE transfer syntax in the case multiple transfer syntaxes are accepted by the SCP.

Table 23: Proposed Presentation Contexts for Query AE (Real-World) Activity Find Studies

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model – FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	ILE ELE	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.3.3.2.3 SOP Specific Conformance for (Real-World) Activity Find Studies

Note:

Query attributes, their usage as search key, their display in the GUI and mapping to IOD values is highly configurable. The following tables reflects the default settings after installation.

DicomFactories Find Studies supports Study Root Queries with all required search keys.

Table 24 describes the supported required and optional search keys.

Table 24: Search Key Attributes for Query AE (Real-World) Activity Find Studies

Module Name Attribute Name	Tag	VR	M	Query Value
Study Date	0008,0020	DA	S/R	
Study Time	0008,0030	TM	S/R	
Accession Number	0008,0050	SH	S/W	
Patient's Name	0010,0010	PN	S/W	
Patient ID	0010,0020	LO	S	
Patient's Birth Date	0010,0030	DA	S	
Study ID	0020,0010	SH	S/W	

The above table should be read as follows:

Tag: DICOM tag for this attribute.

VR: DICOM VR for this attribute.

M: Matching keys for Query Studies, a "S" indicates Single Value Matching, a "R" indicates Range Matching, a "W" indicates Wild Card Matching.

Table 25 below presents the request identifier of Query AE Find Studies queries and specifies if the attributes presented in the GUI as well as attributed copied to the image IODs. Unexpected attributes in the returned response are ignored, unsupported attributes (by the SCP) are set to have no value.

Table 25: SROOT Study Request Identifier for Query AE (Real-World) Activity Find Studies

Module Name Attribute Name	Tag	VR	UI	IOD	Notes
Specific Character Set	0008,0005	CS			ISO_IR 100
Query / Retrieve Level	0008,0052	CS			STUDY
Study Date	0008,0020	DA	*		
Study Time	0008,0030	TM			
Accession Number	0008,0050	SH	*		
Referring Physicians Name	0008,0090	PN	*		
Study Description	0008,1030	LO	*		
Patient's Name	0010,0010	PN	*	*	
Patient ID	0010,0020	LO	*	*	
Patient's Birth Date	0010,0030	DA	*	*	
Patients' Sex	0010,0040	CS	*	*	
Study Instance UID	0020,000D	UI			
StudyID	0020,0010	SH	*		

The behavior of the Query AE for status codes in a SROOT Study Level C-FIND response is presented in Table 26.

Table 26: Response Status Handling Behavior for Query AE (Real-World) Activity Find Studies

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete – No final Identifier is supplied	The association is closed. The result is imported to the internal study result set, this is presented to the user and is logged.
Refused	A700	Out of Resources	The association is closed. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.
Failed	A900	Identifier does not match SOP Class	The association is closed. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.
	C001	Unable to process	The association is closed. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.
Cancel	FE00	Matching terminated due to Cancel request	The association is closed. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.
Pending	FF00	Matches are continuing – Current match is supported in the same manner as supplied and any optional keys were required keys.	The association is kept. Continues with processing the find responses.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence for this identifier.	The association is kept. Continues with processing the find responses.
*	Any other code	*	The association is closed. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.

The behavior of the Query AE during communication failure is presented in Table 27.

Table 27: Communication Failure Behavior for Query AE (Real-World) Activity Find Studies

Exception	Behavior
Timeout	The association is aborted using A-ABORT. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.
Association aborted	The association is aborted using A-ABORT. C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.
Association rejected	C-Find Responses are not processed, the reason is logged, a failure status is reported to the user.

4.2.3.3.3 (Real-World) Activity Move Study

4.2.3.3.3.1 Description and Sequencing of Activities

For each Move Study request, the Query AE opens an association to the Query Retrieve SCP and sends a C-Move request. After retrieval of all responses the

association is closed. The GUI is populated with the returned responses and presented to the user.

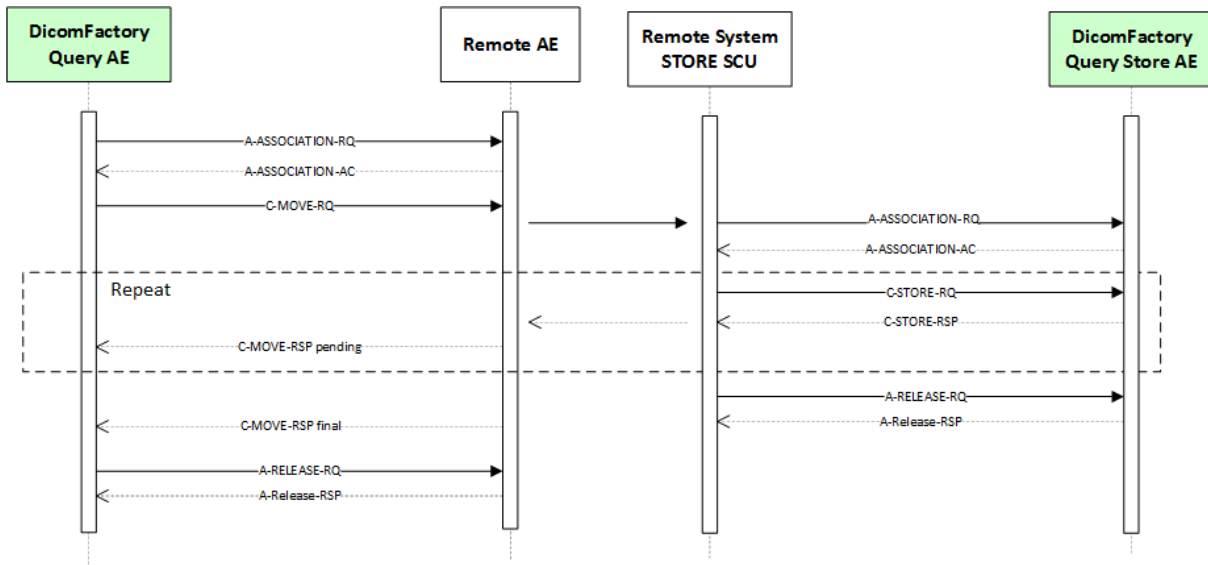


Figure 6:Sequencing of (Real-World) Activity Move Study

4.2.3.3.2 Proposed Presentation Contexts

The presentation context proposed by Query AE Move Study is defined in Table 23. The implementation will choose ELE transfer syntax in the case multiple transfer syntaxes are accepted by the SCP.

Table 28: Proposed Presentation Contexts for Query AE (Real-World) Activity Move Stud<

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Study Root QR Information Model – MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	ILE ELE	1.2.840.10008.1.2 1.2.840.10008.1.2.1	SCU	None

4.2.3.3.3 SOP Specific Conformance for (Real-World) Activity Move Study

The behavior of the Query AE for status codes in a SROOT Study Level C-MOVE response is presented in Table 26.

Table 29: Response Status Handling Behavior for Query AE (Real-World) Activity Move Study

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation completed	The association is closed. The related received instances are stated valid, this is presented to the user and is logged.
Pending	FF00	Sub-Operations are continuing	Continues processing.
*	Any other code	*	The association is closed. The related received instances are stated invalid, this is presented to the user and is logged.

The behavior of the Query AE during communication failure is presented in Table 27.

Table 30: Communication Failure Behavior for Query AE (Real-World) Activity Move Study

Exception	Behavior
Timeout	The association is aborted using A-ABORT. Related received instances are not processed, the reason is logged, a failure status is reported to the user.
Association aborted	The association is aborted using A-ABORT. Related received instances are not processed, the reason is logged, a failure status is reported to the user.
Association rejected	The reason is logged, a failure status is reported to the user.

4.2.3.4 Association Acceptance Policy

DicomFactory's Query AE does not accept associations.

4.3 Network Interfaces

4.3.1 Physical Network Interface

The DicomFactory provides DICOM V3.0 TCP/IP Network Communication. The TCP/IP stack is inherited from the Windows operating system.

4.3.2 Additional Protocols

Additional protocols like DHCP, DNS, NTP may be present in the Windows operating system, its usage is transparent for DicomFactory.

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

4.4 Configuration

The DicomFactory Query AE, Query Store AE and Store AE are configured via the Service / Installation Tool. Parts of the Service / Installation Tool is intended to be used by DEKOM Service Engineers only. The configuration is stored in configuration repositories.

4.4.1 AE Title/Presentation Address Mapping

4.4.1.1 Local AE Titles

The Application Entities may be configured to use the same local AE Title.

Application Entity	Default AE Title	Default TCP/IP Port
Query AE	QR_SCU	N.A.
Query Store AE	STORE_SCP_QRS	7500
Store AE	STORE_SCP_BURN	7510

DEKOM Service may configure multiple nodes of the DicomFactory's Store AE node type to support different postprocessing for unsolicited media creation (see chapter 4.1.3).

4.4.1.2 Remote AE Titles/Presentation Address Mapping

The AE Title, host names / IP addresses and port numbers of remote applications are configured using the DicomFactory Service/Installation Tool.

4.4.1.2.1 Query AE

The AE Title of the local Query SCU and the AE Title, host name / IP address and port number of the remote Query SCPs is configured using the DicomFactory Service/Installation Tool.

Multiple DICOM Q/R SCP remote systems can be configured.

4.4.1.2.2 Query Store AE

The AE Title and port number of the local STORE SCP is configured using the DicomFactory Service/Installation Tool.

This STORE SCP shall solely be used as MOVE destination for C-MOVE operations.

This node shall not be used for unsolicited STORE operations.

In opposite to the Store AE only one instance of this node type can be defined.

4.4.1.2.3 Store AE

The AE Title and port number of the local STORE SCP is configured using the DicomFactory Service/Installation Tool.

The Store AE shall solely be used as destination for unsolicited C-Store operations.

This node shall not be used as destination for C-MOVE operations.

In opposite to the Query Store AE multiple instances of this node type with different behavior regard media creation can be defined (e.g. different label printing, study or patient level collection, anonymization).

5 Media Interchange

5.1 Implementation Model

5.1.1 Application Data Flow

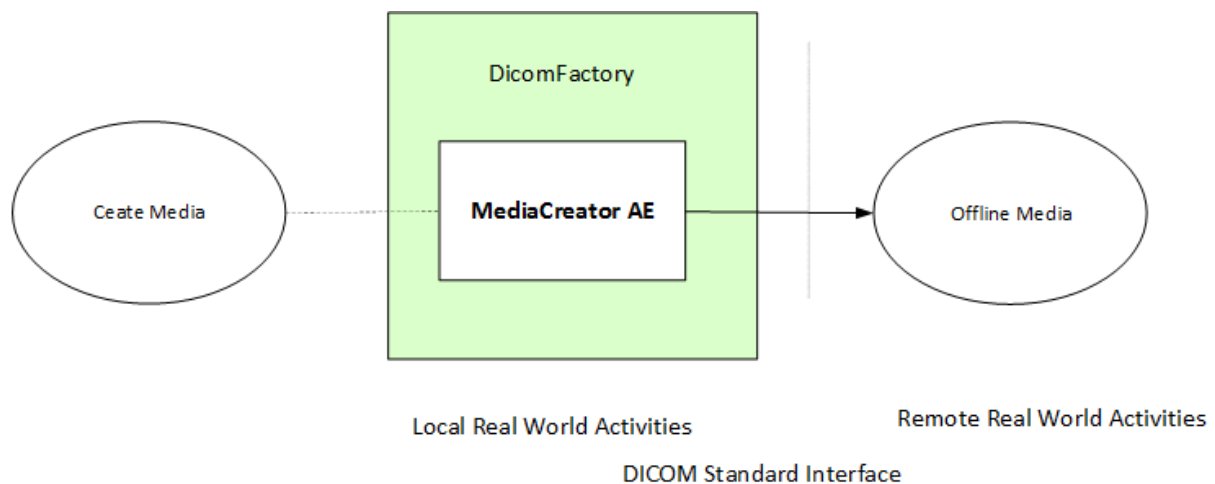


Figure 7: Application Data Flow Media Interchange

The MediaCreator AE exports instances received by Query Store AE and Store AE to a CD-R, DVD or BD medium. The local Real World Activity CreateMedia is executed automatically whenever the Query Store AE has received a complete set of instances by C-Move operations encapsulated by a operators Media Production definition using the GUI (see chapter 4.1.3).

Unsolicited instances received by Store AE are sorted on patient or study level depending on postprocessing options defined in the configuration of the Store AE instance into patient or study folders. CreateMedia is automatically executed on those patient/study folders after a configurable timeout to allow multiple associations to end up on one media.

5.1.2 Functional Definition of AEs

5.1.2.1 Functional Definition of MediaCreator AE

MediaCreator AE generates and writes a DICOM File Set (FSC) to media in one activity.

5.1.3 Sequencing of Real World Activities

See chapter 4.1.3 for an overview of sequencing and chapter 5.2.1.2.1 for specific media creation sequencing.

5.2 AE Specifications

5.2.1 MediaCreator AE Specification

DicomFactory's MediaCreator AE provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The supported Application Profiles and roles are listed below:

Table 31: Supported Application Profiles, Activities and Roles for MediaCreator AE

Application Profile	Real World Activity	Role	Option
STD-GEN-CD	Create Media	FSC	Interchange
STD-XA1K	Create Media	FSC	Interchange
STD-GEN-DVD	Create Media	FSC	Interchange
STD-GEN-DVD-JPEG	Create Media	FSC	Interchange
AUG-GEN-CD	Create Media	FSC	Interchange
AUG-GEN-DVD	Create Media	FSC	Interchange
STD-GEN-BD	Create Media	FSC	Interchange

Note:

AUG-GEN-CD and AUG-GEN-DVD is the factory default used by DicomFactory. To create media of all other mentioned Application Profiles the supported SOP Classes and Transfer Syntax must be configured using the Service Tool for a specific Store AE node to match the allowed SOP Classes and Transfer Syntax for the Application Profile (see chapter 5.2.1.2.1.1).

5.2.1.1 File Meta Information for MediaCreator AE

MediaCreator will write the following information to the File Meta Header

Table 32: File Meta Information for MediaCreator AE

Source Application Entity Title	QDicomWriter
Implementation Class UID	2.16.840.1.113669.632.16
Implementation Version Name	1_8_2_0

5.2.1.2 Real World Activities for MediaCreator AE

5.2.1.2.1 Activity Create Media

Once triggered, the Create Media Activity will collect the related instances from the local cache and create an instance of the Directory Storage SOP Class (DICOMDIR). In the case the created File Set does not fit onto the media, the File Set is split to multiple volumes. For each volume a new instance of the Directory Storage SOP Class will be created.

Before actually create the image to be burned to media MediaCreator will check if a blank media of the correct type (CD /DVD /BD) is present in the recorder(s).

MediaCreate will create one image per recorder at a time. Other orders for media creation will be queued.

The status of each order is displayed in the user interface.

Attributes from the file set will be used to create a label printed to the media (if applicable) for media identification.

5.2.1.2.1.1 Media Storage Application Profiles for activity Create Media

See chapter 5.2.1.2.1.1 for a list of Application profiles supported by Create Media

5.2.1.2.1.1.1 Options for STD-GEN-CD and STD-GEN-DVD

Table 33: IODS, SOP Classes and Transfer Syntaxes for MediaCreator RWA Create Media STD-GEN-CD, STD-GEN-DVD and STD-GEN-BD

Definitions	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Directory Storage	1.2.840.10008.1.3.10	ELE	1.2.840.10008.1.2.1
All SOP Classes defined in Table 3		ELE	1.2.840.10008.1.2.1

5.2.1.2.1.1.2 Options for STD-XA1K

Table 34: IODS, SOP Classes and Transfer Syntaxes for MediaCreator RWA Create Media STD-XA1K

Definition	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Directory Storage	1.2.840.10008.1.3.10	ELE	1.2.840.10008.1.2.1
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	JPEG lossless Process 14	1.2.840.10008.1.2.4.70
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	ELE	1.2.840.10008.1.2.1

5.2.1.2.1.1.3 Options for STD-GEN-DVD-JPEG

Table 35: IODS, SOP Classes and Transfer Syntaxes for MediaCreator RWA Create Media STD-GEN-DVD-JPEG

Definitions	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Directory Storage	1.2.840.10008.1.3.10	ELE	1.2.840.10008.1.2.1
All SOP Classes defined in Table 3		ELE	1.2.840.10008.1.2.1
		JPEG Process 1, baseline, lossy (8 bit)	1.2.840.10008.1.2.4.50
		JPEG Process 14, selection value 1, lossless	1.2.840.10008.1.2.4.70

5.3 Augmented and Private Application Profiles

5.3.1 Augmented Application Profiles

5.3.1.1 Multi Modality Interchange Profile AUG-GEN-CD and AUG-GEN-DVD

The Multi Modality Interchange Profile is an augmented General Purpose CD-R /DVD Image Interchange Profile STD-GEN-CD /STD-GEN-DVD.

AUG-GEN-CD and AUG-GEN-DVD add support for all Presentation Contexts which are acceptable by DicomFactory's Query Store AE and Store AE according to Table 11 and Table 12 see chapter 4.2.1.4.2.2.

5.3.1.1.1 Options for STD-GEN-CD and STD-GEN-DVD

Table 36: IODS, SOP Classes and Transfer Syntaxes for MediaCreator RWA Create Media STD-GEN-CD, STD-GEN-DVD and STD-GEN-BD

Definitions	SOP Class UID	Transfer Syntax	Transfer Syntax UID
Directory Storage	1.2.840.10008.1.3.10	ELE	1.2.840.10008.1.2.1
All SOP Classes and Transfer Syntaxes according to the supported Presentation Context according to chapter 5.2.1.2.1.1.1			

5.3.2 Private Application Profiles

MediaCreator AE does not use any private application profile.

6 Support of Character Sets

The following character sets are supported by DicomFactory DICOM applications:

ISO_IR 100 (ISO 8859-1 Latin Alphabet No. 1 supplementary set)

7 Security

The DICOM applications of DicomFactory do not support any specific security measures except the Attribute Confidentiality Profile (see chapter 7.1.5).

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

- Firewall or routers protections to ensure that only approved external hosts have network access to DicomFactory.
- Firewall or router protections to ensure that DicomFactory 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 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.

7.1 Security Profiles

7.1.1 Security use Profiles

N.A.

7.1.2 Security Transport Connection Profiles

N.A.

7.1.3 Digital Signature Profiles

N.A.

7.1.4 Media Storage Security Profiles

N.A.

7.1.5 Attribute Confidentiality Profiles

No instances of the encrypted attributes data set are created. Transfer syntaxes for encoding\decoding of encrypted attributes data sets are not supported.

The DicomFactory supports anonymization (De-Identification) in analogy to the Basic Application Level Confidentiality Profile DICOM PS3.15 E.

The handling of attributes is defined within a template which can be adjusted to the customer's needs. The default handling is listed in the table below. The abbreviations used are:

K: keep as is

Z: make empty if present

X: remove

D: Dummy value if present

U: Generated UID if present

All private attributes from instances will be removed.

Table 37: Basic Application Kevel Confidentially Profile Attributes

Attribute Name	Tag		Replacement Value
Study Date	0008,0020	D	Timestamp Format ("yyyyMMdd")
Series Date	0008,0021	D	Timestamp Format ("yyyyMMdd")
Acquisition Date	0008,0022	D	Timestamp Format ("yyyyMMdd")
Content Date	0008,0023	D	Timestamp Format ("yyyyMMdd")
Acquisition DateTime	0008,002A	D	Timestamp Format ("yyyyMMddHHmmss")
Study Time	0008,0030	D	Timestamp Format ("HHmmss")
Series Time	0008,0031	D	Timestamp Format ("HHmmss")
Acquisition Time	0008,0032	D	Timestamp Format ("HHmmss")
Content Time	0008,0033	D	Timestamp Format ("HHmmss")
Accession Number	0008,0050	D	Autogenerated random number
Institution Name	0008,0080	D	Institution
Institution Code Sequence	0008,0082	D	<Tag ID="(0008,0080)">Institution</Tag>
Station Name	0008,1010	D	Station Name
Operators' Name	0008,1070	D	Anonymous^Operator
Operators' Identification Sequence	0008,1072	D	<TagList> <Tag ID="(0008,0100)">D-0001</Tag> <Tag ID="(0008,0102)">99DEKOM-DI</Tag> <Tag ID="(0008,0104)">Anonymous^Operator</Tag> </TagList>
Referenced Performed Procedure Step Sequence	0008,1111	K	
Patient's Name	0010,0010	D	Anonymous^Patient^autogenerated random number
Patient ID	0010,0020	D	"Pat" + autogenerated random number
Patient's Birth Date	0010,0030	D	18900101
Patient's Sex	0010,0040	D	O
Contrast Bolus Agent	0018,0010	D	Contrast Bolus Agent
Device Serial Number	0018,1000	D	"DevID" + autogenerated random number
Protocol Name	0018,1030	D	Protocol Name
Acquisition Device Processing Description	0018,1400	D	Acquisition Device Processing Description
Detector ID	0018,700A	D	"DetID" + autogenerated random number
Start Acquisition DateTime	0018,9516	D	Timestamp Format ("yyyyMMddHHmmss")
End Acquisition DateTime	0018,9517	D	Timestamp Format ("yyyyMMddHHmmss")
Study ID	0020,0010	D	"Std" + autogenerated random number
Person Identification Code Sequence	0040,1101	D	<TagList> <Tag ID="(0008,0100)">D-0002</Tag> <Tag ID="(0008,0102)">99DEKOM-DI</Tag> <Tag ID="(0008,0104)">Anonymous^Person</Tag> </TagList>
Verifying Observer Sequence	0040,A073	K	
Verifying Observer Name	0040,A075	D	Anonymous^Observer
Person Name	0040,A123	D	Anonymous^Person

Attribute Name	Tag		Replacement Value
Graphic Annotation Sequence	0070,0001	K	
Requested SOP Instance UID	0000,1001	U	Generated UID
Media Storage SOP Instance UID	0002,0003	U	Generated UID
Referenced SOP Instance UID in File	0004,1511	U	Generated UID
Instance Creator UID	0008,0014	U	Generated UID
SOP Instance UID	0008,0018	U	Generated UID
Failed SOP Instance UID List	0008,0058	U	Generated UID
Context Group Extension Creator UID	0008,010D	U	Generated UID
Referenced Image Sequence	0008,1140	K	
Referenced SOP Instance UID	0008,1155	U	Generated UID
Transaction UID	0008,1195	U	Generated UID
Source Image Sequence	0008,2112	K	
Irradiation Event UID	0008,3010	U	Generated UID
Creator Version UID	0008,9123	U	Generated UID
Device UID	0018,1002	U	Generated UID
Target UID	0018,2042	U	Generated UID
Study Instance UID	0020,000D	U	Generated UID
Series Instance UID	0020,000E	U	Generated UID
Frame of Reference UID	0020,0052	U	Generated UID
Synchronization Frame of Reference UID	0020,0200	U	Generated UID
Concatenation UID	0020,9161	U	Generated UID
Dimension Organization UID	0020,9164	U	Generated UID
Palette Color Lookup Table UID	0028,1199	U	Generated UID
Large Palette Color Lookup Table UID	0028,1214	U	Generated UID
Referenced General Purpose Scheduled Procedure Step Transaction UID	0040,4023	U	Generated UID
UID	0040,A124	U	Generated UID
Observation UID	0040,A171	U	Generated UID
Referenced Observation UID (Trial)	0040,A172	U	Generated UID
Observation Subject UID (Trial)	0040,A402	U	Generated UID
Template Extension Organization UID	0040,DB0C	U	Generated UID
Template Extension Creator UID	0040,DB0D	U	Generated UID
Tracking UID	0062,0021	U	Generated UID
Fiducial UID	0070,031A	U	Generated UID
Presentation Display Collection UID	0070,1101	U	Generated UID
Presentation Sequence Collection UID	0070,1102	U	Generated UID
Storage Media Fileset UID	0088,0140	U	Generated UID
Referenced Frame of Reference UID	3006,0024	U	Generated UID
Related Frame of Reference UID	3006,00C2	U	Generated UID
Dose Reference UID	300A,0013	U	Generated UID
Affected SOP Instance UID	0000,1000	X	Remove
Instance Coercion DateTime	0008,0015	X	Remove
Overlay Date	0008,0024	X	Remove
Curve Date	0008,0025	X	Remove

Attribute Name	Tag		Replacement Value
Overlay Time	0008,0034	X	Remove
Curve Time	0008,0035	X	Remove
Institution Address	0008,0081	X	Remove
Referring Physician's Address	0008,0092	X	Remove
Referring Physician's Telephone Numbers	0008,0094	X	Remove
Referring Physician Identification Sequence	0008,0096	X	Remove
Consulting Physician Identification Sequence	0008,009D	X	Remove
Timezone Offset From UTC	0008,0201	X	Remove
Study Description	0008,1030	X	Remove
Series Description	0008,103E	X	Remove
Institutional Department Name	0008,1040	X	Remove
Physician(s) of Record	0008,1048	X	Remove
Physician(s) of Record Identification Sequence	0008,1049	X	Remove
Performing Physicians' Name	0008,1050	X	Remove
Performing Physician Identification Sequence	0008,1052	X	Remove
Name of Physician(s) Reading Study	0008,1060	X	Remove
Physician(s) Reading Study Identification Sequence	0008,1062	X	Remove
Admitting Diagnoses Description	0008,1080	X	Remove
Admitting Diagnoses Code Sequence	0008,1084	X	Remove
Referenced Patient Sequence	0008,1120	X	Remove
Derivation Description	0008,2111	X	Remove
Identifying Comments	0008,4000	X	Remove
Issuer of Patient ID	0010,0021	X	Remove
Patient's Birth Time	0010,0032	X	Remove
Patient's Insurance Plan Code Sequence	0010,0050	X	Remove
Patient's Primary Language Code Sequence	0010,0101	X	Remove
Patient's Primary Language Modifier Code Sequence	0010,0102	X	Remove
Other Patient IDs	0010,1000	X	Remove
Other Patient Names	0010,1001	X	Remove
Other Patient IDs Sequence	0010,1002	X	Remove
Patient's Birth Name	0010,1005	X	Remove
Patient's Age	0010,1010	X	Remove
Patient's Size	0010,1020	X	Remove
Patient's Weight	0010,1030	X	Remove
Patient Address	0010,1040	X	Remove
Insurance Plan Identification	0010,1050	X	Remove
Patient's Mother's Birth Name	0010,1060	X	Remove
Military Rank	0010,1080	X	Remove
Branch of Service	0010,1081	X	Remove
Medical Record Locator	0010,1090	X	Remove

Attribute Name	Tag		Replacement Value
Referenced Patient Photo Sequence	0010,1100	X	Remove
Medical Alerts	0010,2000	X	Remove
Allergies	0010,2110	X	Remove
Country of Residence	0010,2150	X	Remove
Region of Residence	0010,2152	X	Remove
Patient's Telephone Numbers	0010,2154	X	Remove
Patient's Telecom Information	0010,2155	X	Remove
Ethnic Group	0010,2160	X	Remove
Occupation	0010,2180	X	Remove
Smoking Status	0010,21A0	X	Remove
Additional Patient's History	0010,21B0	X	Remove
Pregnancy Status	0010,21C0	X	Remove
Last Menstrual Date	0010,21D0	X	Remove
Patient's Religious Preference	0010,21F0	X	Remove
Responsible Person	0010,2297	X	Remove
Responsible Organization	0010,2299	X	Remove
Patient Comments	0010,4000	X	Remove
Plate ID	0018,1004	X	Remove
Generator ID	0018,1005	X	Remove
Cassette ID	0018,1007	X	Remove
Gantry ID	0018,1008	X	Remove
Acquisition Comments	0018,4000	X	Remove
Acquisition Protocol Description	0018,9424	X	Remove
Contribution Description	0018,A003	X	Remove
Modifying Device ID	0020,3401	X	Remove
Modifying Device Manufacturer	0020,3404	X	Remove
Modified Image Description	0020,3406	X	Remove
Image Comments	0020,4000	X	Remove
Frame Comments	0020,9158	X	Remove
Image Presentation Comments	0028,4000	X	Remove
Study ID Issuer	0032,0012	X	Remove
Scheduled Study Location	0032,1020	X	Remove
Scheduled Study Location AE Title	0032,1021	X	Remove
Reason for Study	0032,1030	X	Remove
Requesting Physician	0032,1032	X	Remove
Requesting Service	0032,1033	X	Remove
Requested Contrast Agent	0032,1070	X	Remove
Study Comments	0032,4000	X	Remove
Referenced Patient Alias Sequence	0038, 0004	X	Remove
Admission ID	0038,0010	X	Remove
Issuer of Admission ID	0038,0011	X	Remove
Scheduled Patient Institution Residence	0038,001E	X	Remove
Admitting Date	0038,0020	X	Remove
Admitting Time	0038,0021	X	Remove
Discharge Diagnosis Description	0038,0040	X	Remove

Attribute Name	Tag		Replacement Value
Special Needs	0038,0050	X	Remove
Service Episode ID	0038,0060	X	Remove
Issuer of Service Episode ID	0038,0061	X	Remove
Service Episode Description	0038,0062	X	Remove
Current Patient Location	0038,0300	X	Remove
Patient's Institution Residence	0038,0400	X	Remove
Patient State	0038,0500	X	Remove
Visit Comments	0038,4000	X	Remove
Performed Station Name Code Sequence	0040, 4028	X	Remove
Scheduled Station AE Title	0040,0001	X	Remove
Scheduled Procedure Step Start Date	0040,0002	X	Remove
Scheduled Procedure Step Start Time	0040,0003	X	Remove
Scheduled Procedure Step End Date	0040,0004	X	Remove
Scheduled Procedure Step End Time	0040,0005	X	Remove
Scheduled Performing Physician Name	0040,0006	X	Remove
Scheduled Procedure Step Description	0040,0007	X	Remove
Scheduled Performing Physician Identification Sequence	0040,000B	X	Remove
Scheduled Station Name	0040,0010	X	Remove
Scheduled Procedure Step Location	0040,0011	X	Remove
PreMedication	0040,0012	X	Remove
Performed Station AE Title	0040,0241	X	Remove
Performed Station Name	0040,0242	X	Remove
Performed Location	0040,0243	X	Remove
Performed Procedure Step Start Date	0040,0244	X	Remove
Performed Procedure Step Start Time	0040,0245	X	Remove
Performed Procedure Step End Date	0040,0250	X	Remove
Performed Procedure Step End Time	0040,0251	X	Remove
Performed Procedure Step ID	0040,0253	X	Remove
Performed Procedure Step Description	0040,0254	X	Remove
Request Attributes Sequence	0040,0275	X	Remove
Comments on the Performed Procedure Step	0040,0280	X	Remove
Acquisition Context Sequence	0040,0555	X	Remove
Requested Procedure ID	0040,1001	X	Remove
Patient Transport Arrangements	0040,1004	X	Remove
Requested Procedure Location	0040,1005	X	Remove
Names of Intended Recipient of Results	0040,1010	X	Remove
Intended Recipients of Results Identification Sequence	0040,1011	X	Remove
Person Address	0040,1102	X	Remove
Person's Telephone Numbers	0040,1103	X	Remove
Person's Telecom Information	0040,1104	X	Remove
Requested Procedure Comments	0040,1400	X	Remove
Reason for the Imaging Service Request	0040,2001	X	Remove

Attribute Name	Tag		Replacement Value
Order Entered By	0040,2008	X	Remove
Order Enterer Location	0040,2009	X	Remove
Order Callback Phone Number	0040,2010	X	Remove
Order Callback Telecom Information	0040,2011	X	Remove
Imaging Service Request Comments	0040,2400	X	Remove
Confidentiality Constraint on Patient Data Description	0040,3001	X	Remove
Scheduled Procedure Step Start DateTime	0040,4005	X	Remove
Scheduled Procedure Step Modification DateTime	0040,4010	X	Remove
Expected Completion DateTime	0040,4011	X	Remove
Scheduled Station Name Code Sequence	0040,4025	X	Remove
Scheduled Station Geographic Location Code Sequence	0040,4027	X	Remove
Performed Station Geographic Location Code Sequence	0040,4030	X	Remove
Scheduled Human Performers Sequence	0040,4034	X	Remove
Actual Human Performers Sequence	0040,4035	X	Remove
Human Performers Organization	0040,4036	X	Remove
Human Performers Name	0040,4037	X	Remove
Performed Procedure Step Start DateTime	0040,4050	X	Remove
Performed Procedure Step End DateTime	0040,4051	X	Remove
Procedure Step Cancellation DateTime	0040,4052	X	Remove
Verifying Organization	0040,A027	X	Remove
Author Observer Sequence	0040,A078	X	Remove
Participant Sequence	0040,A07A	X	Remove
Custodial Organization Sequence	0040,A07C	X	Remove
Observation Date (Trial)	0040,A192	X	Remove
Observation Time (Trial)	0040,A193	X	Remove
Current Observer (Trial)	0040,A307	X	Remove
Verbal Source (Trial)	0040,A352	X	Remove
Address (Trial)	0040,A353	X	Remove
Telephone Number (Trial)	0040,A354	X	Remove
Verbal Source Identifier Code Sequence (Trial)	0040,A358	X	Remove
Content Sequence	0040,A730	X	Remove
Content Creator's Identification Code Sequence	0070,0086	X	Remove
Icon Image Sequence(see Note 12)	0088,0200	X	Remove
Topic Title	0088,0904	X	Remove
Topic Subject	0088,0906	X	Remove
Topic Author	0088,0910	X	Remove
Topic Keywords	0088,0912	X	Remove
Digital Signature UID	0400,0100	X	Remove

Attribute Name	Tag		Replacement Value
Referenced Digital Signature Sequence	0400,0402	X	Remove
Referenced SOP Instance MAC Sequence	0400,0403	X	Remove
MAC	0400,0404	X	Remove
Modified Attributes Sequence	0400,0550	X	Remove
Original Attributes Sequence	0400,0561	X	Remove
Text String	2030,0020	X	Remove
Source Serial Number	3008,0105	X	Remove
Reason for Omission Description	300C,0113	X	Remove
Arbitrary	4000,0010	X	Remove
Text Comments	4000,4000	X	Remove
Results ID Issuer	4008,0042	X	Remove
Interpretation Recorder	4008,0102	X	Remove
Interpretation Transcriber	4008,010A	X	Remove
Interpretation Text	4008,010B	X	Remove
Interpretation Author	4008,010C	X	Remove
Interpretation Approver Sequence	4008,0111	X	Remove
Physician Approving Interpretation	4008,0114	X	Remove
Interpretation Diagnosis Description	4008,0115	X	Remove
Results Distribution List Sequence	4008,0118	X	Remove
Distribution Name	4008,0119	X	Remove
Distribution Address	4008,011A	X	Remove
Interpretation ID Issuer	4008,0202	X	Remove
Impressions	4008,0300	X	Remove
Results Comments	4008,4000	X	Remove
Curve Data	50xx,xxxx	X	Remove
Overlay Data	60xx,3000	X	Remove
Overlay Comments	60xx,4000	X	Remove
Digital Signatures Sequence	FFFA,FFFA	X	Remove
Data Set Trailing Padding	FFFC,FFFC	X	Remove
Private attributes	gggg,eeee where gggg is odd	X	Remove
Referring Physician's Name	0008,0090	Z	Empty
Consulting Physician's Name	0008,009C	Z	Empty
Referenced Study Sequence	0008,1110	Z	Empty
Patient Sex Neutered	0010,2203	Z	Empty
Requested Procedure Description	0032,1060	Z	Empty
Placer Order Number / Imaging Service Request	0040,2016	Z	Empty
Filler Order Number / Imaging Service Request	0040,2017	Z	Empty
Verifying Observer Identification Code Sequence	0040,A088	Z	Empty
Content Creator's Name	0070,0084	Z	Empty
Reviewer Name	300E,0008	Z	Empty
Unformatted Text Value	0070,0006	D	#pattern(#dcm("00700006"),"DE-IDENTIFIED")

7.1.6 Network Address Management Profiles

N.A.

7.1.7 Time Synchronization Profiles

N.A.

7.1.8 Application Configuration Management Profiles

7.1.9 Audit Trail Profiles

N.A.

7.2 Association Level Security

7.3 Application Level Security

8 Annexes

8.1 Created SOP Instances

DicomFactory's MediaCreator AE creates Instances of the SOP Class Directory Storage, SOP Class UID 1.2.840.10008.1.3.10 .

8.1.1 Options

In the DICOMDIR the Basic Directory IOD is present. The supported directory record types are PATIENT, STUDY, SERIES, IMAGE, STUDY COMPONENT, VISIT, ICON, PRESENTATION, SR DOCUMENT, RT DOSE, RT STRUCTURE SET, RT PLAN, RT TREAT RECORD, RAW DATA, HANGING PROTOCOL, WAVEFORM, KEY OBJECT DOC, SPECTROSCOPY, REGISTRATION, FIDUCIAL, ENCAP DOC, STEREOMETRIC and VALUE MAP.

The following table describes the optional directory keys of the MediaCreator AE.

Table 38: Optional DICOMDIR Keys of MediaCreator AE

Attribute Name	Tag	VR	Description
Patient Keys			
Patient Birth Date	(0010,0030)	DA	Explicit additional DICOMDIR key for Application Profile STD-XA1K-CD, implicit additional key for all other supported profiles.
Patient Sex	(0010,0040)	CS	Explicit additional DICOMDIR key for Application Profile STD-XA1K-CD, implicit additional key for all other supported profiles.
Study Keys			
Referring Physician's Name	(0008,0090)	PN	Explicit additional DICOMDIR key for Application Profile STD-XA1K-CD, implicit additional key for all other supported profiles.
Series Keys			
Institution Name	(0008,0080)	LO	Explicit additional DICOMDIR key for Application Profile STD-XA1K-CD, implicit additional key for all other supported profiles.
Image Keys			
Image Type	(0008,0008)	CS	Explicit additional DICOMDIR key for Application Profile STD-XA1K-CD, implicit additional key for all other supported profiles.