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syngo.via
VA20B_HF01

[redacted] SY

DICOM Conformance Statement

Rev. 7.0 2013-07-01

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1 CONFORMANCE STATEMENT OVERVIEW

The ***syngo.via*** is comprised of a storage system (***syngo.via* Application Server**), client review workstations (***syngo.via* Client**) and connectivity to DICOM modalities and healthcare information systems. By default one ***syngo.via*** (**AE**) is used. It is possible to configure usage of multiple different AEs for the individual DICOM services.

The ***syngo.via***:

- stores objects (images, reports, encapsulated PDF) sent to it by service class users
- takes responsibility for storage of the objects
- allows object queries based on several query models
- retrieves and transmits requested objects
- displays images to a user
- send/transmit images to a printer
- imports and exports objects from portable interchange media
- uses patient and procedure information from modality worklist requests

The ***syngo.via*** conforms to the DICOM 3.0 2011 Standard and supports the network services as described in Table 1-1 and the media services as described in Table 1-2.

Table 1-1 Network Services

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Verification		
Verification Service	Yes	Yes
Transfer		
12-lead ECG Waveform Storage	Yes	Yes
Ambulatory ECG Waveform Storage	Yes	Yes
Basic Text Structured Report Storage	Yes	Yes
Cardiac Electrophysiology Waveform Storage	Yes	Yes
Color Softcopy Presentation State Storage (store & forward only)	Yes	Yes
Comprehensive Structured Report Storage	Yes	Yes
Computed Radiography Image Storage	Yes	Yes
Computed Tomography Image Storage	Yes	Yes
CSA Non-Image Storage	Yes	Yes
Digital Mammography Image Storage for Presentation	Yes	Yes
Digital Mammography Image Storage for Processing	Yes	Yes
Digital X-Ray Image Storage for Presentation	Yes	Yes

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Digital X-Ray Image Storage for Processing	Yes	Yes
Encapsulated PDF Storage	Yes	Yes
Enhanced Computed Tomography Image Storage (store & forward only)	Yes	Yes
Enhanced Magnetic Resonance Storage	Yes	Yes
Enhanced MR Color Image Storage	Yes	Yes
Enhanced Structured Report Storage	Yes	Yes
General ECG Waveform Storage	Yes	Yes
Grayscale Softcopy Presentation State Storage (store & forward only)	Yes	Yes
Hemodynamic Waveform Storage	Yes	Yes
Key Object Selection Document Storage	Yes	Yes
Magnetic Resonance Image Storage	Yes	Yes
MR Spectroscopy Storage	Yes	Yes
Multi-frame Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes
PET Image Storage	Yes	Yes
Procedure Log Storage	Yes	Yes
Raw DataStorage	Yes	Yes
Real World Value Mapping Storage	Yes	Yes
RT Beams Treatment Record Storage	Yes	Yes
RT Dose Storage	Yes	Yes
RT Image Storage	Yes	Yes
RT Ion Beams Treatment Record Storage	Yes	Yes
RT Ion Plan Storage	Yes	Yes
RT Plan Storage	Yes	Yes
RT Structure Set Storage	Yes	Yes
RT Treatment Summary Record Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Segmentation Storage	Yes	Yes
Spatial Registration Storage	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Ultrasound Multi-Frame Image Storage	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Radiation Dose Structured Report Storage	Yes	Yes
X-Ray Radio-Fluoroscopic Image Storage	Yes	Yes
Query / Retrieve		
Patient Root – Query/Retrieve Information Model – FIND	Yes	Yes
Patient Root – Query/Retrieve Information	Yes	Yes

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Model – MOVE		
Study Root – Query/Retrieve Information Model – FIND	Yes	Yes
Study Root – Query/Retrieve Information Model – MOVE	Yes	Yes
Patient/Study Only – Query/Retrieve Information Model – FIND	Yes	Yes
Patient/Study Only – Query/Retrieve Information Model – MOVE	Yes	Yes
Workflow Management		
Storage Commitment Push Model	Yes	Yes
Modality Worklist Information Model – FIND	Yes	No
Print Management		
Basic Grayscale Print Management Meta SOP Class	Yes	No
Basic Film Session SOP Class	Yes	No
Basic Film Box SOP Class	Yes	No
Basic Grayscale Image Box SOP Class	Yes	No
Printer SOP Class	Yes	No
Print Job SOP Class	Yes	No
Presentation LUT SOP Class	Yes	No
Basic Color Print Management Meta SOP Class	Yes	No
Basic Color Image Box SOP Class	Yes	No

Table 1-2 Media Services

Media Storage Application Profile	Write Files (FSC)	Read Files (FSR)
Compact Disk – Recordable		
STD-GEN-CD	Yes	Yes
DVD – Recordable		
STD-GEN-DVD	Yes	Yes
STD-GEN-DVD-J2K	Yes	Yes
USB		
STD-GEN-USB-J2K	Yes	Yes

The ***syngo.via*** **Application Server** creates ISO files to be burnt by ***syngo.via*** **Client** local burning SW (if hardware and software are available). Therefore it is only possible to update DICOMDIRs before the burning process has been started. When selecting the 'Standard' profile from the export UI, the export job will be handled according to the STD-GEN-XXX profile; depending on which media has been selected. In case the 'Patient' profile is selected, the STD-GEN-XXX-J2K profile will be used, depending on which media or destination has been selected.

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3 INTRODUCTION

3.1 REVISION HISTORY

Version/ Status	Date of Issue	Product / Version	Author	Change & Reason of Change
1.0	2012-06-29	syngo.via VA20A	I DT EVO HU O	First release version for syngo.via VA20A based on version 3.0 of syngo.via VA11B. **Changes in VA20A:** - Corrections in chapter 4.2.1.3.1.4 - Corrections in chapter 8.2.1 - Corrections in chapter 4.2.1.2 and chapter 4.4.2 (default PDU size, max. number of parallel receiving associations) - Correction in chapter 4.2.1.3.1.1 (default retry interval) - Updates in chapter 5.2.1.3 and chapter 8.1 (SOP classes) - Updates in chapter 8.1 (SOP classes and visualization column)
2.0	2012-09-06	syngo.via VA20A	I DT EVO HU O	- Corrections in table 5-2 (FSU is added) - SOP Class “Surface segmentation” is supported - Added chapter 8.7
3.0	2012-09-18	syngo.via VA20A	I DT EVO HU O	- Renamed chapter 4.2.1.3.1.4 to “Encapsulation of SOP classes generated by syngo.via”
4.0	2012-10-11	syngo.via VA20A	I DT EVO HU O	- Corrections in table 8-1 (Grayscale softcopy presentation state, Grayscale Print Management META SOP classes, Color Print Management META SOP classes) - Corrections in table 4-18 (Patient ID) - Correction in chapter 3.6 (References)
5.0	2012-10-15	syngo.via VA20A	I DT EVO HU O	- Added chapter 5.5 (Attribute Confidentiality Profiles)
6.0	2013-05-13	syngo.via VA20B	I DT EVO HU O	This released version for VA20B based on version 5.0 of syngo.via VA20A. -Added Annex A (syngo.Breast Care)
7.0	2013-07-01	syngo.via VA20B_HF01	I DT EVO HU O	- Modification in Chapter 6.1 (Kanji characters)

3.2 GENERAL

The Conformance Statement describes the DICOM interface for the Siemens ***syngo.via*** in terms of part 2 of [1].

3.3 AUDIENCE

This document is intended for hospital staff, health system integrators, software designers or implementers. It is assumed that the reader has a working understanding of DICOM.

3.4 REMARKS

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality as SCU and SCP, respectively.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Siemens and other vendors' medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM 3.0 Standard [1]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity.
- Test procedures should be defined and tests should be performed by the user to validate the connectivity desired. DICOM itself and the conformance parts do not specify this.
- The standard will evolve to meet the users' future requirements. Siemens is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

Siemens reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens representative for the most recent product information.

3.5 ABBREVIATIONS

ACR	American College of Radiology
AE	DICOM Application Entity
ASCII	American Standard Code for Information Interchange
DB	Database
DCS	DICOM Conformance Statement
DSA	Digital Subtraction Angiography
IIDC	Image-Intensifier Distortion Correction
IOD	DICOM Information Object Definition
ISO	International Standard Organization
MWL	Modality Worklist
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
PDU	DICOM Protocol Data Unit
R	Required Key Attribute
RIS	Radiology Information System
SC	Storage Commitment
SCU	DICOM Service Class User
SCP	DICOM Service Class Provider
SOP	DICOM Service-Object Pair
SCS	Specific Character Set
U	Unique Key Attribute

3.6 REFERENCES

[1] Digital Imaging and Communications in Medicine (DICOM), PS 3.1-2011 – PS 3.20-2011, National Electrical Manufacturers Association (NEMA), http://medical.nema.org/

[2] IHE Radiology Technical Framework, Vol. I – IV, http://www.ihe.net/Technical_Framework.

3.7 SCOPE AND FIELD OF APPLICATION

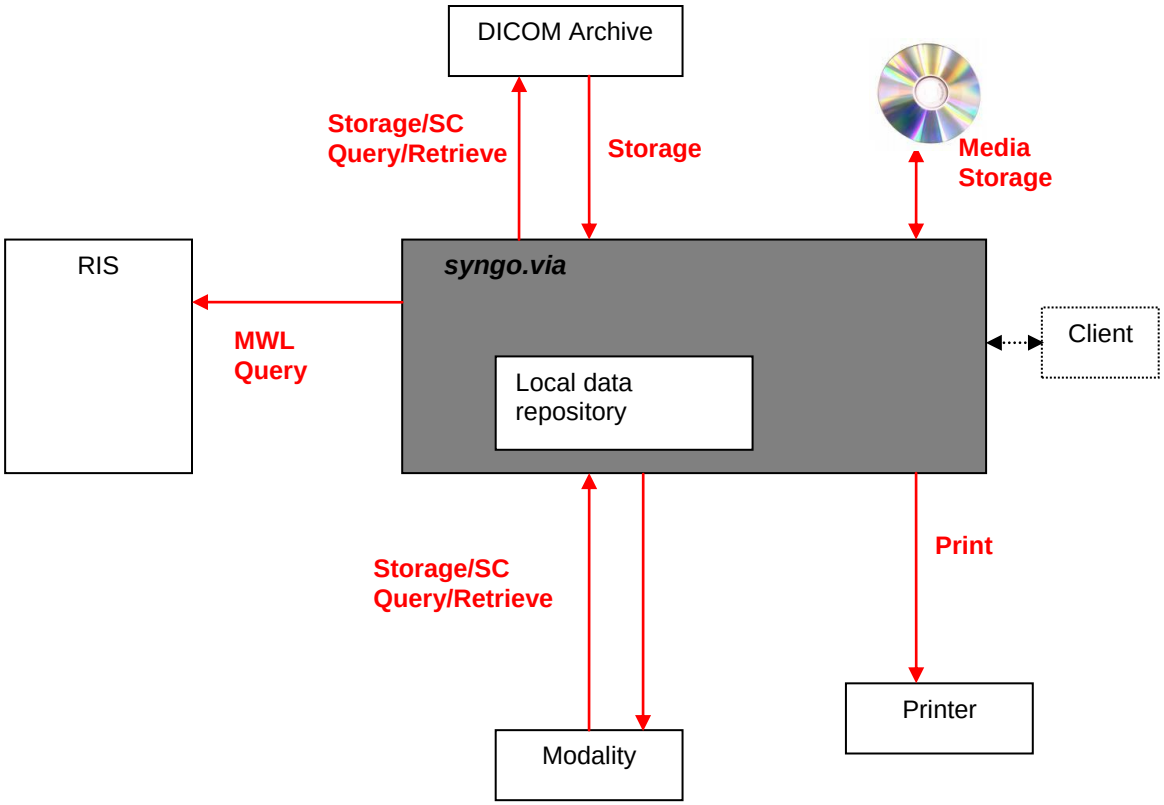


Figure 3.7-1: Overview about DICOM capabilities of *syngo.via* VA20B_HF01

4 NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow

The Application Data Flow diagram in Figure 4.1-1 depicts the DICOM data flow to and from the individual applications within ***syngo.via***.

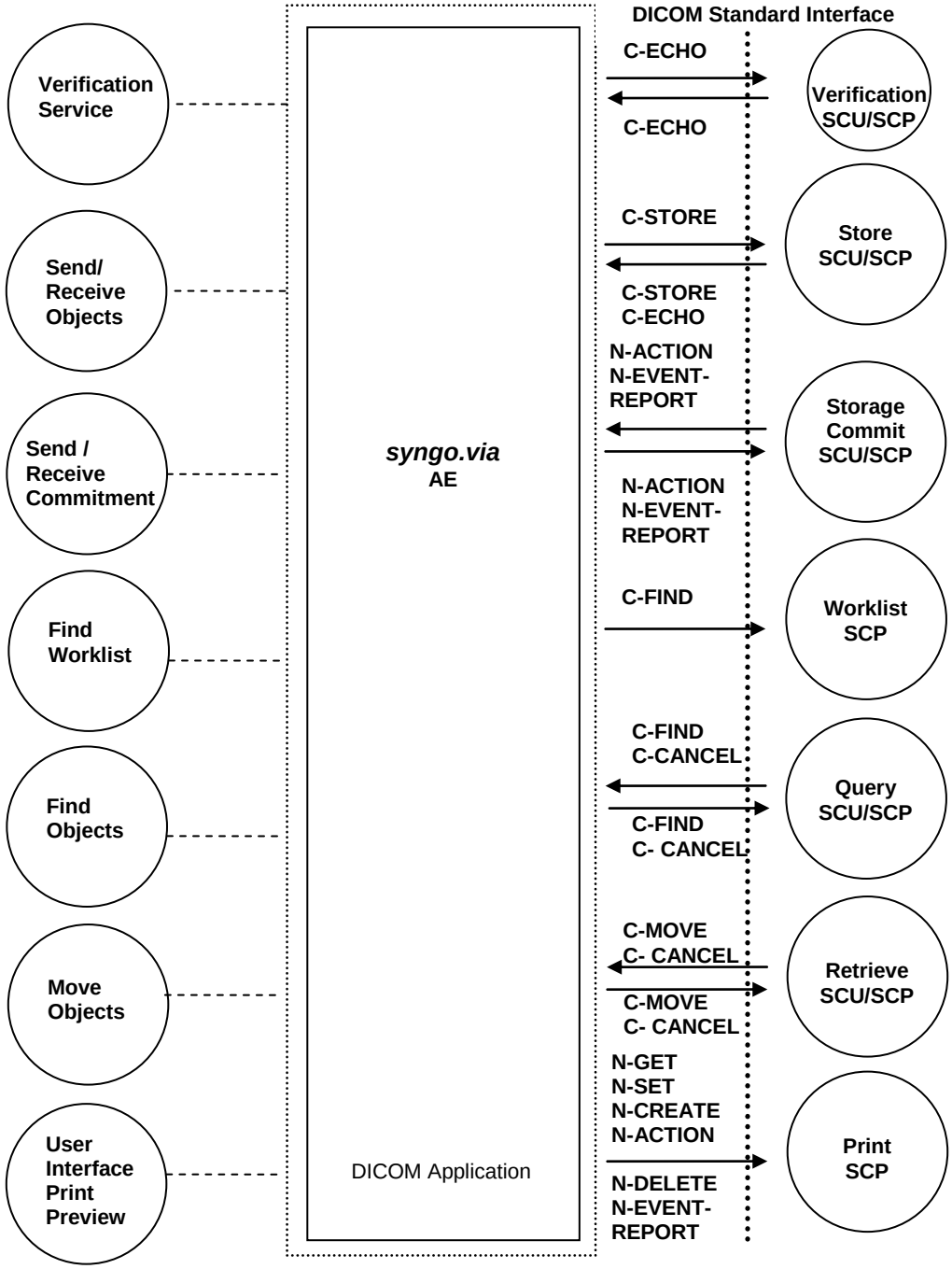


Figure 4.1-1: Application Data Flow Diagram

4.1.2 Functional Definition of AE's

The SCP components of the Application Entities of the ***syngo.via*** operate as background server processes. They exist as soon as the system is powered up and wait for association requests. Upon accepting an association with a negotiated Presentation Context they start to receive and process the requests described in the following sections.

The SCU components of the Application Entity are invoked upon requests from the user interface or indirect by trigger from internal processes.

4.1.2.1 Verification

Verification requests will be processed and responded by the ***syngo.via*** AE. The ***syngo.via*** AE can also initiate an association and request verification to a remote AE.

Verification as SCU is available for each service through the Networking/Printing pages of service configuration:

- Storage configuration
- Storage Commitment configuration
- Query/Retrieve configuration
- Worklist configuration
- Print configuration

4.1.2.2 Storage

The ***syngo.via*** Storage SCU is invoked either directly by the user, by an auto-archive trigger or internally by the Query/Retrieve Application Entity that is responsible for processing retrieve requests. The request consists of data describing the composite objects selected for storage and the destination AET. An association is negotiated with the destination AE and the image data is transferred using the DIMSE C-STORE -Service. The transfer status is reported to the initiator of the Storage request.

The ***syngo.via*** Storage SCP starts to receive the Composite Image Objects and import them into the database after accepting an association with a negotiated Presentation Context. The system can be configured in such a way, that Responses to the Storage Request are sent immediately after reception of the Data, or after persistent storage on the hard disc or after storage & indexing in the DB.

4.1.2.3 Storage Commitment

The ***syngo.via*** serves as a SCU for the DICOM Storage Commitment service. Upon successful completion of a storage job, the system uses the DIMSE N-ACTION Service to request storage commitment from a DICOM storage commitment SCP. This can either be the same as the storage destination or storage commitment can be requested from a different system depending on the system configuration.
Storage Commitment Request will be sent after a configurable delay of storing the objects. The Storage Commitment SCP will always send the N-EVENT-REPORT Request on a new association.

The ***syngo.via*** can also serve as a SCP for the DICOM Storage Commitment service. Additional to each successfully completed send job, modalities should trigger a Storage Commitment request for the safekeeping of the images sent to the ***syngo.via***.

4.1.2.4 Query

The C-FIND request to the remote SCP is invoked directly by the user. The remote SCP returns a list of responses with defined data, which are displayed to the user. The user can decide to start retrieving any of the responses or to issue another query.

The ***syngo.via*** supports as SCU

- Study Root Query Model.
- Patient Root Query Model
- Patient/Study Only Query Model
- Furthermore the SCU services may issue relational queries, if supported by the SCP node and required by the querying Application.

The C-FIND SCP will perform a query on the local data repository and return the matching items.

The ***syngo.via*** supports as SCP

- Study Root Query Model.
- Patient Root Query Model
- Patient/Study Only Query Model
- Furthermore the C-Find SCP service supports and negotiates relational queries.

4.1.2.5 Retrieve

The ***syngo.via*** initiates a C-MOVE request to the remote Retrieve SCP. The remote Retrieve SCP in turn starts C-STORE sub operations to the ***syngo.via*** Storage SCP.

The ***syngo.via*** supports as SCU

- Study Root Retrieve Model.
- Patient Root Query Model in case relational queries are supported
- Patient/Study Only Query Model in case relational queries are supported

The ***syngo.via*** responds to C-MOVE requests from a remote SCU. C-MOVE requests involve the ***syngo.via*** DICOM Query/Retrieve SCP application to initiate a C-STORE sub-operation to send image objects to a remote Storage SCP.

The ***syngo.via*** supports as SCP

- Study Root Retrieve Model.
- Patient Root Retrieve Model
- Patient/Study Only Retrieve Model

4.1.2.6 Modality Worklist

The ***syngo.via*** worklist SCU issues DICOM Modality Worklist requests using DIMSE C-FIND requests. The results in the C-FIND response are stored in ***syngo.via*** internal database and used for assigning subsequent processing steps in case instances are received via DIMSE C-STORE.

4.1.2.7 Print

The ***syngo.via*** DICOM print application supports print management DIMSE services as SCU.

The ***syngo.via*** Print SCU is invoked by the user interface to setup film-sheet layout and whenever an image is ready to be printed on film. The ***syngo.via*** will hold and maintain all data needed to compile a complete film-sheet from the data (images, layout and configuration) selected. Whenever a film-sheet is ready to be printed, the related data are used to supply the Information to the SOP Classes of the Print Management Service Class. A queue is maintained, in order to intermediately store several film-sheets in case of resource problems on the printer.

The ***syngo.via*** will supply and require the mandatory SOP Classes of the Print Management Service Class as well as the optional Print Job and Presentation LUT SOP Classes.

4.1.3 Sequencing of Real-World Activities

Storage / Storage Commitment:

The communication between ***syngo.via*** and an external DICOM node in case of triggering the transfer of objects from ***syngo.via*** to the external node is depicted in Figure 4.1-2 in more detail.

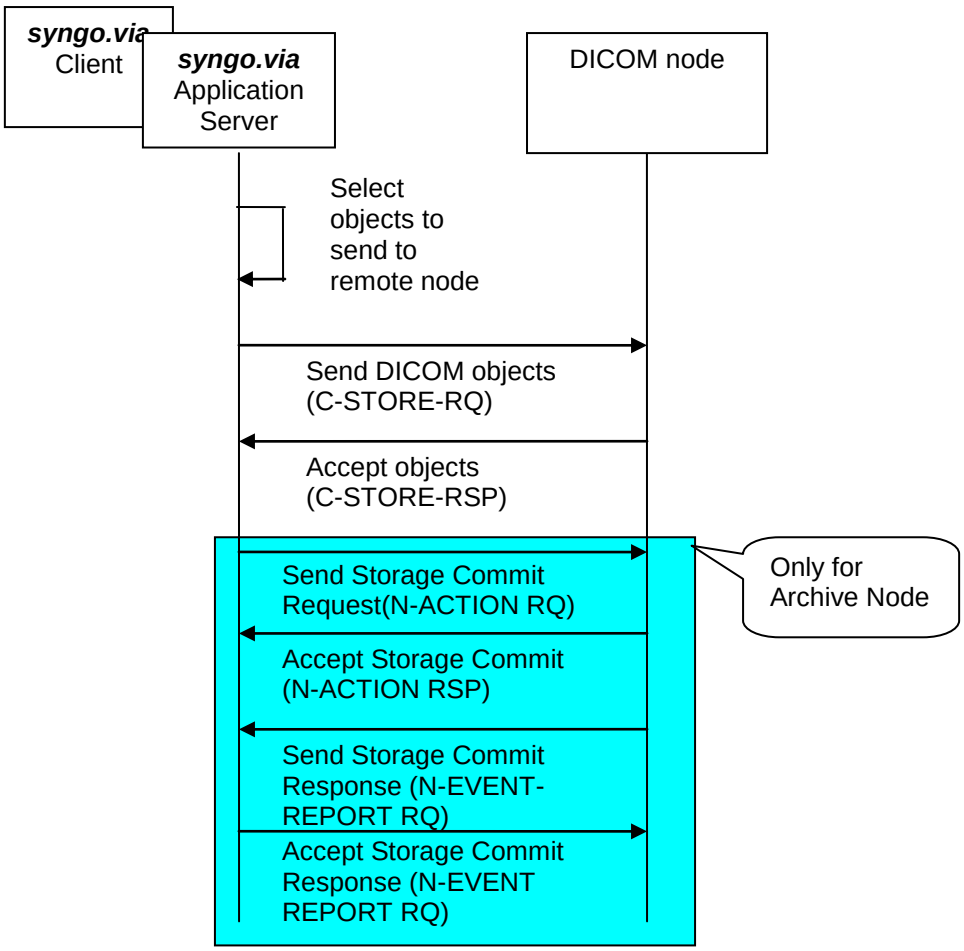


Figure 4.1-2: Sequence diagram – Storage / Storage Commitment

Query and Retrieval:

The communication between ***syngo.via*** and an external DICOM node in case of querying of objects from a remote DICOM node and retrieval to ***syngo.via*** is depicted in Figure 4.1-3 in more detail.

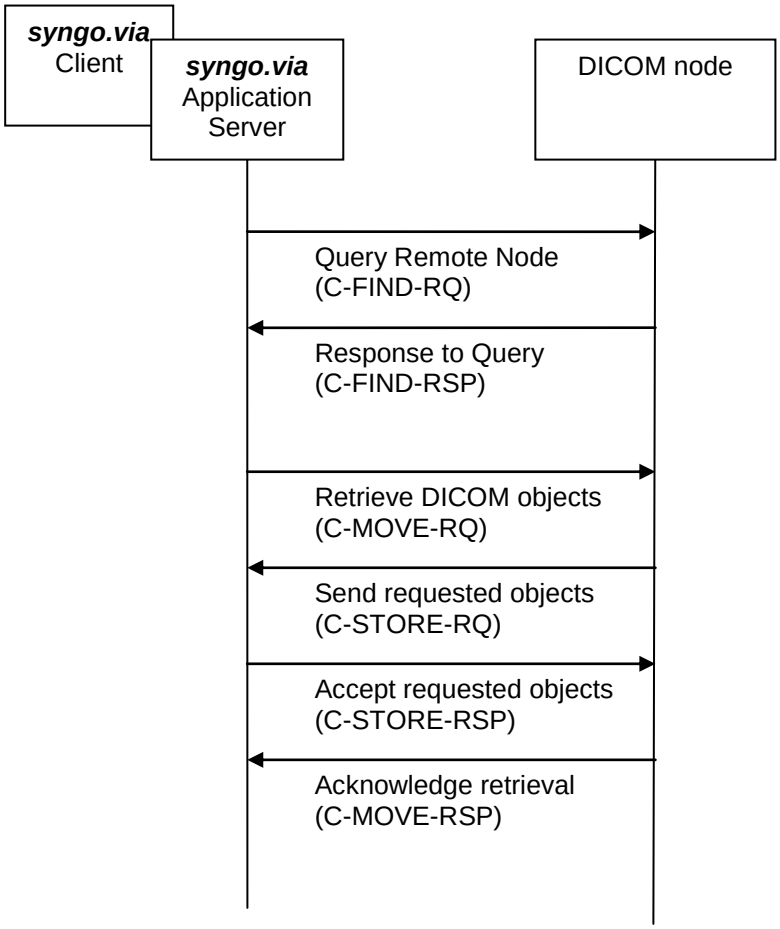


Figure 4.1-3: Sequence diagram – Query/Retrieve

Modality Worklist:

The communication between ***syngo.via*** and an external DICOM node in case of Modality Worklist requests from ***syngo.via*** to a remote DICOM node is depicted in Figure 4.1-4 in more detail.

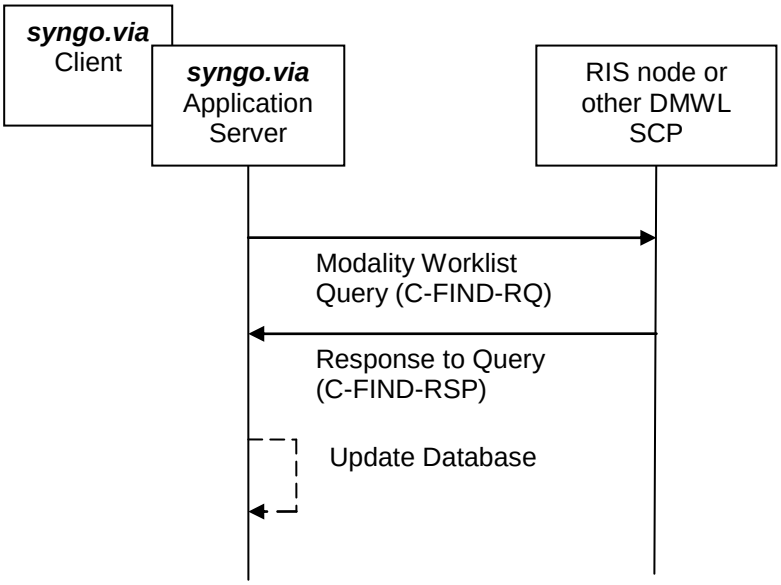
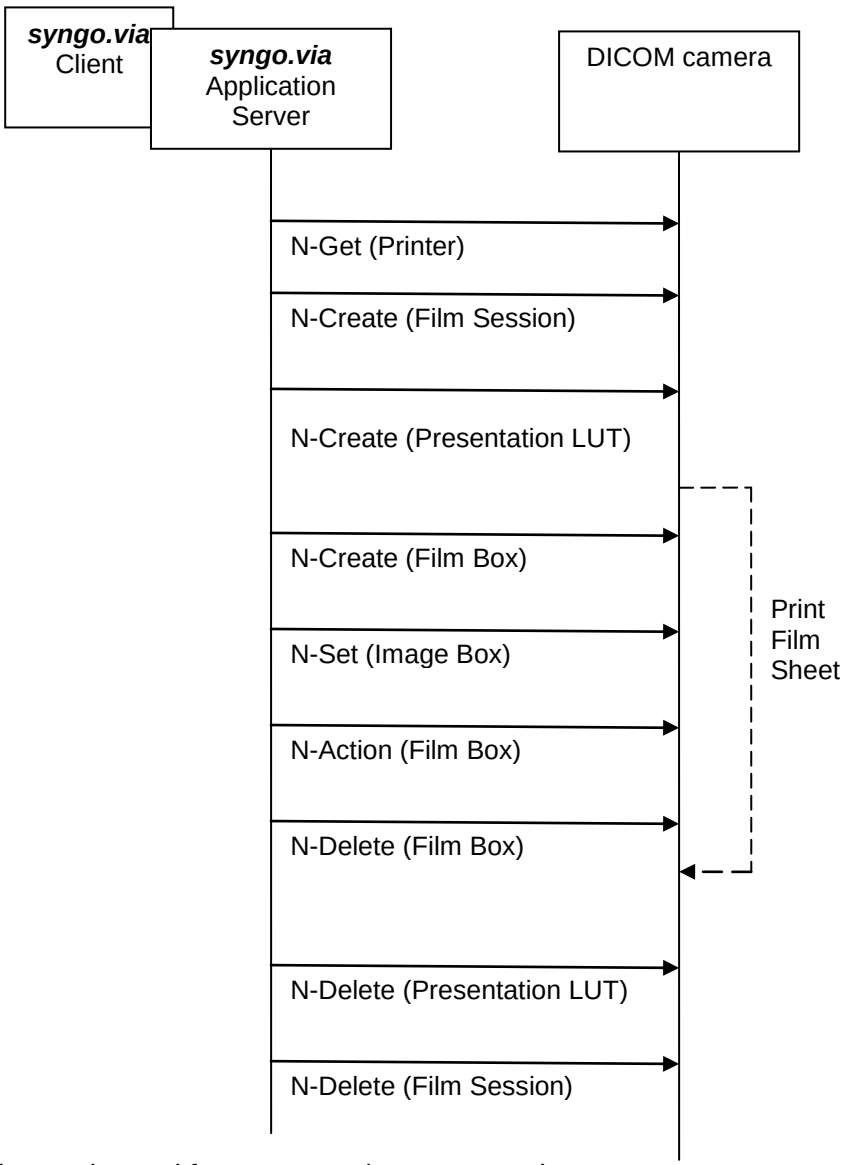


Figure 4.1-4: Sequence diagram – Modality Worklist

Printing:

The communication between ***syngo.via*** and an external DICOM camera in case of printing of images is depicted in Figure 4.1-5 in more detail.



All events (arrows) stand for a request / response pair.

Figure 4.1-5: Sequence diagram – Printing

4.2 AE SPECIFICATIONS

This section outlines the specifications for each of the Application Entities that are part of the ***syngo.via*** solution.

4.2.1 *syngo.via* AE

4.2.1.1 SOP Classes supported

This Application Entity provides Standard Conformance to the SOP Classes listed in Chapter 8 in Table 8-1 SOP CLASSES and Table 8-2: Supported Non-Storage SOP Classes

4.2.1.2 Association Establishment Policies

Table 4-1: Association Policies

Application Context Name	1.2.840.10008.3.1.1.1
PDU size	32 kB [1]
Maximum number of simultaneous associations as an association acceptor	12[1]
Maximum number of simultaneous associations as an association initiator	unlimited

The ***syngo.via*** AE contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.
The maximum number of simultaneous receiving associations (SCP) is configurable at run time, based on the system resources available. By default, the maximum number of associations is set to 12.
There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system. Nevertheless, transfer jobs to one distinct remote system (Send, Retrieve) will be run sequentially one after the other.

4.2.1.2.1 Asynchronous Nature

The ***syngo.via*** supports asynchronous communication (multiple outstanding transactions over a single association). On the SCU side the Window size proposed is infinite. On the SCP Side any non-infinite maximum size will be accepted.

Table 4-2: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	Infinite

4.2.1.2.2 Implementation Identifying Information

Table 4-3: DICOM Implementation Class and Version

Implementation Class UID	1.3.12.2.1107.5.8.15.10.20090701
Implementation Version Name	syngo.via

[1] Default, the value is configurable

4.2.1.3 Association Initiation Policy

syngo.via initiates associations while processing the service operations and internal messages as shown below:

Table 4-4: Association initiation policies

Operation or Real-World Activity	Association for
Verification	C-ECHO
Send / Receive Instance	C-STORE
Storage Commitment	N-ACTION N-EVENT-REPORT
Querying a remote node	C-FIND
Retrieval of Instances	C-MOVE
Querying for Modality Worklist	C-FIND
Print Instance	N-GET N-SET N-CREATE N-ACTION N-DELETE N-EVENT-REPORT

4.2.1.3.1 Activity "Send To"

4.2.1.3.1.1 Description and Sequencing of Activities

Storage of DICOM object is either triggered internally in the ***syngo.via*** (either “Send to” from the UI or triggered by auto-archiving events; see also Figure 4.1-2) or by a C-MOVE request initiated by an external DICOM AE to ***syngo.via***.

If an association to a remote Application Entity could successfully be established, each image will be transferred one after another via the same open association.

Automatic retry mechanism:
it is configurable, how many retry attempts are performed before the job goes to failed.

Retries are performed if:

- the network connection has been lost from SCU perspective. In this case retry is performed as soon as the network connection is available again
- the partner is not reachable for other reasons (e.g. partner node has broken down) that appear to be transient. The number of retries and the interval between the retries are configurable (the default of retries is 2 and the interval is 30 seconds)

In case the transfer fails for a permanent reason (rejection permanent reported by SCP, all Presentation Contexts refused, …) the transfer will not be retried.

4.2.1.3.1.2 Proposed Presentation Contexts

For all supported Transfer objects (see SOP Classes in Table 8-1) the following Transfer Syntaxes are supported:

Table 4-5: Proposed Presentation Contexts for Storage

UID value	Transfer Syntax
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian native

UID value	Transfer Syntax
1.2.840.10008.1.2	Implicit Value Representation Little Endian native
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) lossless compressed
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Lossless Only) compressed
1.2.840.10008.1.2.5	RLE Lossless compressed
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4) lossy compressed
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1) lossy compressed
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression lossy compressed

Depending on the Configuration, the Storage SCU Service will choose a compressed or uncompressed Transfer Syntax among those accepted by the SCP. The Transfer Syntax chosen is the preferred one among the compressed and uncompressed ones. The preference order is the order of occurrence in the configuration. It is possible to configure for a specific node, which Transfer Syntax shall be used and which one shall be excluded. The configuration can even be extended, based on the combination of SOP Classes and supported Transfer Syntax. The configuration can be performed in the Service UI.
An instance will be JPEG lossless compressed only if it fulfills the following criteria:

- is an image and not already compressed
- Photometric Interpretation (0028,0004) is MONOCHROME or RGB or YBR_FULL or YBR_FULL_422
- Bits Allocated (0028,0100) equal to 16'D or 8'D
- Bits Stored (0028,0101) is >8
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to 0'D

An instance will be JPEG lossy compressed only if it fulfills the following criteria:

- is an image and not already compressed
- photometric interpretation (0028,0004) is MONOCHROME or RGB
- Bits Allocated (0028,0100) equal to 16'D or 8'D
- Bits Stored (0028,0101) equal to 12'D or 8'D
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to 0'D

An instance will be JPEG 2000 lossless compressed only if it fulfills the following criteria:

- is an image and not already compressed
- Photometric interpretation (0028,0004) not MONOCHROME or RGB or YBR_FULL or YBR_FULL_422
- Bits Allocated (0028,0100) not 16'D or 8'D

An instance will be JPEG 2000 lossy compressed only if it fulfills the following criteria:

- is an image and not already compressed
- Photometric interpretation (0028,0004) is MONOCHROME or RGB
- Bits Stored (0028,0101) equal to 12'D or 8'D

There is no extended negotiation as an SCU.

4.2.1.3.1.3 SOP specific Conformance for SOP classes

The ***syngo.via*** will not add or change private attributes by default, even in case objects are compressed or image header is updated according to IHE [2] Patient Information Reconciliation.

The behavior of ***syngo.via*** when encountering status codes in a C-STORE response is summarized in Table 4-6:

Table 4-6: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Duplicate SOP Instance UID: some of the instances sent to the SCP were already available there.	0x0111	Job is continued till the end and marked as Completed(!). A warning mentions that some images were already available on the remote node. These will not be overwritten.
Error	Out-Of-Resources: The remote node has run out of resources (storage resources for example)	0xA7XX	Job is continued till the end. An according message is shown to the user.
Error	Any other DIMSE Error Status	0xXXXX	Job is continued till the end. An according message is shown to the user. Error is logged in the system log.
Error	Sending partially or completely failed	Any none null Code	Failure reported to user (percentage of transferred instances is shown)
Success	Image is successfully stored on file system.	0000	Success reported to user

Table 4-7: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.1.4 Encapsulation of SOP classes generated by *syngo.via*

Some PACS systems do not support specific SOP classes, like for example:

- Encapsulated PDF (1.2.840.10008.5.1.4.1.1.104.1)
- Real World Value Mapping (1.2.840.10008.5.1.4.1.1.67)
- Spatial Registration (1.2.840.10008.5.1.4.1.1.66.1)
- Segmentation (1.2.840.10008.5.1.4.1.1.66.4)

In order to enable archiving of instances of such SOP classes, ***syngo.via*** packs them into a Basic Text Structured Report (SR) instance to enforce a SOP Class UID (0008,0016) '1.2.840.10008.5.1.4.1.1.88.11', supported by most PACS systems. In case that a PACS system does not even support structured reports, the instance will be packed into a Secondary Capture (SC) image with the SOP Class UID (0008,0016) '1.2.840.10008.5.1.4.1.1.7' if clinical administrator chooses this option.
A well defined list (see Table 4-8) of ***syngo.via*** internally generated objects will be packed. The bulk data (Content Sequence (0040,A730), Modality Image Header Type (0029,0008), Modality Image Header Version (0029,0009), Modality Image Header Info (0029,0010), Pixel Data (7FE0,0010) and Series Description (0008,103E)) of such generated instances contain a coding indicating that this is a Siemens private object created for archival purposes only.

Table 4-8: Packed SOP Classes

SOP Class Name	SOP Class UID

SOP Class Name	SOP Class UID
Basic Text Structured Report	1.2.840.10008.5.1.4.1.1.88.11
Comprehensive Structured Report	1.2.840.10008.5.1.4.1.1.88.33
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5

4.2.1.3.2 Activity "Send Initial Storage Commitment"

4.2.1.3.2.1 Description and Sequencing of Activities

After sending Images to a configured Archive, the ***syngo.via*** will initiate a Storage Commitment request, if configured (see also Figure 4.1-2). The ***syngo.via*** initiates a new association in order to send the N-ACTION-RQ to the SCP.
The Storage Commitment Request will be sent after the storage, delayed by a configurable amount of time in order to make sure that the remote node had enough time to index correctly the instances received (default delay is 10 minutes).

syngo.via will accept the N-Event-Report-RQ in the same association when sent immediately after the N-ACTION-RSP but will not wait for it (association will be closed after 3 seconds).

The system may issue one N-ACTION-RQ for a complete set (bundle) of instances or issue one N-ACTION-RQ per instance. This behavior is configurable; the default value is "bundled".

4.2.1.3.2.2 Proposed Presentation Contexts

Table 4-9: Proposed Presentation Contexts for Storage Commitment

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.2.3 SOP specific Conformance for SOP classes

The behavior of ***syngo.via*** when encountering status codes in an N-ACTION response is summarized in Table 4-10:

Table 4-10: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Any failure that occurs	Any none null Code	Failure reported to user; corresponding object(s) will be marked as "Archived failed"
Success	All Instances are available on the remote node	0000	Success reported to user; in case failures exist, the corresponding instances will be marked as "Archived failed"

Table 4-11: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s); the request will be retried
Association Aborted	Failure reported to user; the request will be retried

4.2.1.3.3 Activity "Send Reply to Commitment Requests on separate associations"

4.2.1.3.3.1 Description and Sequencing of Activities

In case the ***syngo.via*** has received a Storage Commitment request (N-ACTION-RQ) from an external node, the ***syngo.via*** initiates a new association in order to send the N-EVENT-REPORT-RQ to the SCU (Storage Commitment initiator).

4.2.1.3.3.2 Proposed Presentation Contexts

Table 4-12: Proposed Presentation Contexts for Storage Commitment

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.3.3 SOP specific Conformance for SOP classes

The behavior of ***syngo.via*** when encountering status codes in an N-EVENT-REPORT response is summarized in Table 4-13:

Table 4-13: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	Storage Commitment Reply ignored.	Any none null Code	Storage Commitment will be repeated.
Success	Storage Commitment Reply noticed.	0000	Success reported to user.

syngo.via does not support the optional Storage Media File-Set ID and UID attributes in the N-ACTION.

4.2.1.3.4 Activity "Querying a Remote Node" for Instances

4.2.1.3.4.1 Description and Sequencing of Activities

The associated Real-World activity is a C-Find request initiated by the user (see also Figure 4.1-3). The user specifies some attributes and will send a C-Find request (according to the query model) and will then return the results to the initiating application.

4.2.1.3.4.2 Proposed Presentation Contexts

The ***syngo.via*** will propose Presentation Contexts as shown in the following table:

Table 4-14: Proposed Presentation Contexts for Query

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	Yes
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	Yes
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient/Study Only	1.2.840.10008.5.1.4.1.	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No

Query/ Retrieve Information Model – FIND	2.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Table 4-15: Extended Negotiation as an SCU

Name	UID	Extended Negotiation
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	Relational Query will be negotiated if necessary as defined in DICOM PS3.4.
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Relational Query will be negotiated if necessary as defined in DICOM PS3.4.

4.2.1.3.4.3 SOP Specific Conformance Statement to Query SOP classes

The ***syngo.via*** checks for the following status codes in the Query SCP's C-FIND-Response:

Table 4-16: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any none null Code	Failure reported to user
Pending	All optional keys are supported the same manner as Required Keys.	FE00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FE01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table 4-17: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

The ***syngo.via*** supports the following query levels:

- Patient
- Study

- Series
- Instances

Matching Keys on Series and Instance Levels are not supported by ***syngo.via*** as SCU.

The following table lists the various attributes at Patient, Study, Series and Instance levels, which can be used for **relational** queries as well as return values for display. The display capabilities are highly configurable and "yes" indicates that it is possible to configure display of the data:
A "yes" in the **UI** column will indicate that the attribute may be visualized when browsing the Query results with the Browser. The Browser display is additionally influenced by the related Browser configuration

Table 4-18: Attributes supported for instance Query

Attribute name	Tag	Type	Matching	User input	UI
Patient Level [1]					
Patient Name	(0010,0010)	R	Wildcard[2]	enter value	yes
Patient ID	(0010,0020)	U	Wildcard	enter value	yes
Issuer of Patient ID	(0010,0021)	O	Wildcard	-	no
Patient's Birth Date	(0010,0030)	O	universal (Null)	enter value	yes
Patient's Birth Time	(0010,0032)	O	universal (Null)	-	no
Patient's Sex	(0010,0040)	O	universal (Null)	enter value	yes
Other Patient IDs	(0010,1000)	O	universal (Null)	enter value	yes
Other Patient Names	(0010,1001)	O	universal (Null)	enter value	yes
Patient's Age	(0010,1010)	O	universal (Null)	enter value	yes
Patient's Size	(0010,1020)	O	universal (Null)	enter value	yes
Patient's Weight	(0010,1030)	O	universal (Null)	enter value	yes
Ethnic Group	(0010,2160)	O	universal (Null)	enter value	yes
Study Level					
Patient Name[3]	(0010,0010)	R	Wildcard[2]	enter value	yes
Patient ID	(0010,0020)	R	Wildcard	enter value	yes
Issuer of Patient ID	(0010,0021)	O	Wildcard	enter value	yes
Patient's Birth Date	(0010,0030)	O	universal (Null)	enter value	yes
Patient's Birth Time	(0010,0032)	O	universal	-	no
Patient's Sex	(0010,0040)	O	universal (Null)	enter value	yes
Patient's Age	(0010,1010)	O	universal (Null)	-	yes
Patient's Size	(0010,1020)	O	universal (Null)	-	yes
Patient's Weight	(0010,1030)	O	universal (Null)	-	yes
Study Instance UID	(0020,000D)	U	universal (Null)	-	no
Study ID	(0020,0010)	R	universal (Null)	enter value	yes
Study Date	(0008,0020)	R	universal (Null)	enter value[4]	yes
Study Time	(0008,0030)	R	universal (Null)	-	yes
Accession Number	(0008,0050)	R	universal (Null)	enter value	yes
Modalities in Study	(0008,0061)	O	universal (Null)	enter value	yes
Referring Physician's	(0008,0090)	O	universal (Null)	enter value	yes

1 Patient Root Information Model only
2 Always a "*" is appended to the user-supplied string
3 Study Root Information Model only
4 Date range also possible

Attribute name	Tag	Type	Matching	User input	UI
Name					
Study Description	(0008,1030)	O	universal (Null)	enter value	yes
Name of Physician Reading Study	(0008,1060)	O	universal (Null)	enter value	yes
Series Level					
Series Instance UID	(0020,000E)	U	universal (Null)	-	no
Series Number	(0020,0011)	R	universal (Null)	-	yes
Series Date	(0008,0021)	O	universal (Null)	-	yes
Series Time	(0008,0031)	O	universal (Null)	-	yes
Modality	(0008,0060)	R	universal (Null)	enter value	yes
Series Description	(0008,103E)	O	universal (Null)	enter value	yes
Body Part Examined	(0018,0015)	O	universal (Null)	enter value	yes
Institution Name	(0008,0080)	O	universal (Null)	enter value	yes
Instance Level					
SOP Class UID	(0008,0016)	U	single value	-	No
SOP Instance UID	(0008,0018)	U	single value	-	No
Instance Number	(0020,0013)	R	universal (Null)	-	Yes

4.2.1.3.5 Activity "Move SCU"

4.2.1.3.5.1 Description and Sequencing of Activities

The C-MOVE-RQs are used to retrieve the referenced images. The Retrieve AE supports the query model Study Root.

4.2.1.3.5.2 Accepted Presentation Contexts

Table 4-19: Proposed Presentation Contexts for Retrieve and Activity "MOVE SCU"

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Study Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.5.3 SOP Specific Conformance Statement for Move SCU Classes

At association establishment time the C-MOVE presentation context shall be negotiated. When the C-MOVE-RQ is processed, the Move Destination attribute (receiver of images) is ignored. However the Move Destination AE must conform to the DICOM conventions (value representation AE).

The behavior of ***syngo.via*** when encountering status codes in a C-MOVE response is summarized in Table 4-20:

Table 4-20: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any none null Code	Failure reported to user
Pending	Move Operation continues	FF00	Operation continues in background
Success	Move has been performed successfully.	0000	Success reported to user

Table 4-21: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.6 Activity "Querying a Remote Node" for Modality Worklist

4.2.1.3.6.1 Description and Sequencing of Activities

A network application will perform worklist queries with the C-FIND request at regular intervals. In addition it can be triggered by immediate request. The received worklist items will be compared with the contents of the local workflow management database. New items will be inserted into workflow management database. The results are used to prepare subsequent workflow tasks, when receiving instances.

4.2.1.3.6.2 Proposed Presentation Contexts

Table 4-22: Proposed Presentation Contexts for Worklist

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist-FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.3.6.3 SOP Specific Conformance for SOP Classes

- Search Key Attributes of the Worklist C-FIND

The ***syngo.via*** DICOM worklist SCU supports “broad worklist queries” with all required search keys. The following tables describe the “broad query” search keys that the SCU supports. The list is configurable in ‘DICOM Modality Worklist Query’.

Table 4-23: Broad Query search keys

Attribute Name	Tag	Matching Key Type	Query Value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Modality	(0008,0060)	R	“*” or <configured Modality>
>Scheduled Station AE Title	(0040,0001)	R	<own AET> or “*”[1]
>Scheduled Procedure Step Start Date	(0040,0002)	R	Range from UI[2]
>Scheduled Procedure Step Description	(0040,0007)	O	
>Scheduled Station Name	(0040,0010)	O	
>Scheduled Procedure Step Location	(0040,0011)	O	
>Scheduled Procedure Step Status	(0040,0020)	O	
>Scheduled Performing Physician’s Name	(0040,0006)	O	
>Scheduled Protocol Code Sequence	(0040,0008)	O	
>>Code Value	(0008,0100)	O	
Requested Procedure Description	(0032,1060)	O	
Requested Procedure Priority	(0040,1003)	O	
Patient Transport Arrangements	(0040,1004)	O	
Requested Procedure Comments	(0040,1400)	O	
Requested Procedure Code Sequence	(0032,1064)	O	
>Code Value	(0008,0100)	O	
Requesting Physician	(0032,1032)	O	
Referring Physicians Name	(0008,0090)	O	
Current Patient Location	(0038,0300)	O	
Pregnancy Status	(0010, 21C0)	O	
Medical Alerts	(0010,2000)	O	
Allergies	(0010,2110)	O	

[1] This depends on user configuration (Administration Portal->Interface Configuration->DICOM->Local DICOM Node->Worklist) if the "own AET" is provided or not.
[2] A time window can be configured by defining how many days to look into the past and into the future (Administration Portal->Interface Configuration->DICOM->Local DICOM Node->Worklist)

- Return Key Attributes of the Modality Worklist C-FIND

  The ***syngo.via*** DICOM Modality Worklist SCU supports worklist queries with return key attributes of all types. The following tables describe the return keys that the SCU supports.

  An "x" in the **UI** column will indicate that the attribute may be visualized when browsing the Worklist results with the Browser. The Browser display is additionally influenced by the related Browser configuration.

Table 4-24: Modality Worklist C-Find Return keys

Attribute Name	Tag	Return Key Type	UI	Notes
SOP Common				
Specific Character Set	(0008,0005)	1C	-	
Scheduled Procedure Step				
Scheduled Procedure Step Sequence	(0040,0100)	1		
>Modality	(0008,0060)	1	x	
>Scheduled Station AE Title	(0040,0001)	1	x	"Scheduled Station AE Title" is taken as default for "Performed Station AE Title"
>Scheduled Procedure Step Start Date	(0040,0002)	1	x	
>Scheduled Procedure Step Start Time	(0040,0003)	1	x	
>Scheduled Procedure Step End Date	(0040,0004)	3	-	
>Scheduled Procedure Step End Time	(0040,0005)	3	-	
>Scheduled Performing Physician's Name	(0040,0006)	1	x	"Scheduled Performing Physician's Name" is taken as default for "Performing Physician's Name"
>Scheduled Procedure Step Description	(0040,0007)	1C	x	"Scheduled Procedure Step Description" is taken as default for "Performed Procedure Step Description"
>Scheduled Protocol Code Sequence **	(0040,0008)	1C	-	Uses universal sequence match "Scheduled Protocol Code Sequence" is taken as default for "Performed Protocol Code Sequence"
>>Code Value	(0008,0100)	1C	x	
>>Coding Scheme Designator	(0008,0102)	1C	x	
>>Coding Scheme Version	(0008,0103)	3	x	
>>Code Meaning	(0008,0104)	3	x	
>Scheduled Procedure Step ID	(0040,0009)	1	x	"Scheduled Procedure Step ID" is taken as default for "Performed Procedure Step ID"
>Scheduled Station Name	(0040,0010)	2	x	
>Scheduled Procedure Step Location	(0040,0011)	2	x	"Scheduled Procedure Step Location" is taken as default for "Performed Location"
>Scheduled Procedure Step Status	(0040,0020)	3	x	
>Comments on the Scheduled Procedure Step	(0040,0400)	3	-	

Attribute Name	Tag	Return Key Type	UI	Notes
Requested Procedure				
Study Date	(0008,0020)	3	x	
Referenced Study Sequence **	(0008,1110)	2	-	Uses universal sequence match
>Referenced SOP Class UID	(0008,1150)	1C	-	
>Referenced SOP Instance UID	(0008,1155)	1C	-	
Study Instance UID	(0020,000D)	1	-	
Requested Procedure Description	(0032,1060)	1C	x	
Requested Procedure Code Sequence **	(0032,1064)	1C	-	Uses universal sequence match “Requested Procedure Code Sequence” is taken as default for “Procedure Code Sequence”
>Code Value	(0008,0100)	1C	x	
>Coding Scheme Designator	(0008,0102)	1C	x	
>Coding Scheme Version	(0008,0103)	3	x	
>Code Meaning	(0008,0104)	3	x	
Requested Procedure ID	(0040,1001)	1	x	“Requested Procedure ID” is taken as default for “Study ID”
Reason for the Requested Procedure	(0040,1002)	3	-	
Requested Procedure Priority	(0040,1003)	2	x	
Patient Transport Arrangements	(0040,1004)	2	-	
Confidentiality Code	(0040,1008)	3	-	
Reporting Priority	(0040,1009)	3	-	
Names of intended Recipients of Results	(0040,1010)	3	-	
Requested Procedure Comments	(0040,1400)	3	x	
Imaging Service Request				
Accession Number	(0008,0050)	2	x	
Referring Physician’s Name	(0008,0090)	2	x	
Requesting Physician	(0032,1032)	2	x	
Requesting Service	(0032,1033)	3	x	
Issuing Date of Imaging Service Request	(0040,2004)	3	-	
Issuing Time of Imaging Service Request	(0040,2005)	3	-	
Placer Order Number / Imaging Service Request *	(0040,2016)	3	-	Old tag (0040,2006) is retired and not used.
Filler Order Number / Imaging Service Request *	(0040,2017)	3	-	Old tag (0040,2007) is retired and not used.
Order entered by …	(0040,2008)	3	-	
Order Enterer’s location	(0040,2009)	3	-	
Order Callback Phone Number	(0040,2010)	3	-	
Imaging Service Request Comments	(0040,2400)	3	x	
Visit Identification				
Admission ID	(0038,0010)	2	x	
Issuer of Admission ID	(0038,0011)	3	-	
Visit Status				
Current Patient Location	(0038,0300)	2	x	
Visit Admission				
Admitting Diagnosis Description	(0008,1080)	3	x	
Admitting Date	(0038,0020)	3	-	
Patient Identification				

Attribute Name	Tag	Return Key Type	UI	Notes
Patient's Name	(0010,0010)	1	x	
Patient ID	(0010,0020)	1	x	
Issuer of Patient ID	(0010,0021)	3	-	
Other Patient IDs	(0010,1000)	3	x	
Other Patient Names	(0010,1001)	3	x	
Patient's Birth Name	(0010,1005)	3	-	
Patient Demographic				
Patient's Birth Date	(0010,0030)	2	x	
Patient's Birth Time	(0010,0032)	3	-	
Patient's Sex	(0010,0040)	2	x	
Patient's Insurance Plan Code Sequence **	(0010,0050)	3	-	Uses universal sequence match
>Code Value	(0008,0100)	1C	-	
>Coding Scheme Designator	(0008,0102)	1C	-	
>Coding Scheme Version	(0008,0103)	3	-	
>Code Meaning	(0008,0104)	3	-	
Patient's Age	(0010,1010)	3	x	
Patient's Size	(0010,1020)	3	x	
Patient's Weight	(0010,1030)	2	x	
Patient's Address	(0010,1040)	3	x	
Military Rank	(0010,1080)	3	x	
Branch of Service	(0010,1081)	3	-	
Ethnic Group	(0010,2160)	3	x	
Patient Comments	(0010,4000)	3	x	
Patient Medical				
Medical Alerts	(0010,2000)	2	x	
Allergies	(0010,2110)	2	x	
Pregnancy Status	(0010,21C0)	2	x	
Smoking Status	(0010,21A0)	3	x	
Last Menstrual Date	(0010,21D0)	3	x	
Additional Patient History	(0010,21B0)	3	x	
Special Needs	(0038,0050)	2	x	

The behavior of ***syngo.via*** when encountering status codes in a C-FIND response is summarized in Table 4-25:

Table 4-25: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Error	e.g. Out of Resources; Cancellation; Identifier does not match SOP Class; Unable to process	Any none null Code	Failure reported to user
Pending	All optional keys are supported the same manner as Required Keys.	FE00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FE01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table 4-26: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.7 Activity "Printing to a Remote Node"

4.2.1.3.7.1 Description and Sequencing of Activities

Whenever a film-sheet is prepared by the user, it is forwarded to the Printer Job queue. As soon as the associated Printer device is available the job is activated and association is set up.

The film sheet is internally processed, converted to a Standard/1,1 page and then the page image is sent. Status is controlled by awaiting any N-EVENT-REPORT message all through the transfer until the last image or film-sheet is sent.

If the response from the remote application contains a status other than Success or Warning the printing is stopped and the job status is set to Aborted.

4.2.1.3.7.2 Proposed Presentation Contexts

Table 4-27: Proposed Presentation Contexts for Print

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Print Job SOP Class	1.2.840.10008.5.1.1.14	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.2.1.3.7.3 SOP Specific Conformance Statement for Print SOP classes

The ***syngo.via*** Print SCU conforms to the DICOM Basic Grayscale Print Management Meta SOP Class and the Basic Color Print Management Meta SOP Class.

The application uses a configuration platform to define the properties of the connected DICOM SCP, e.g.:

- supported film sizes of the connected DICOM SCP
- supported film formats of the DICOM SCP

The printing is only suspended in the case of a failure return status of the SCP.

The command communication failure behavior for the following subchapters is identical. So it has been put as only one table to this position:

Table 4-28: DICOM Command Communication Failure Behavior

exception	Behavior
Timeout	Failure reported to user (Timeout configurable; default 30s)
Association Aborted	Failure reported to user

4.2.1.3.7.3.1 Basic Film Session SOP Class

The Basic Film Session information object definition describes all the user-defined parameters, which are common for all the films of a film session. The Basic Film Session refers to one or more Basic Film Boxes that are printed on one hardcopy printer.

The ***syngo.via*** Print Management SCU supports the following DIMSE Service elements for the Basic Film Session SOP Class as SCU:

- N-CREATE
- N-DELETE

The Basic Film Session SOP Class N-CREATE-RQ (SCU) uses the attributes listed in the table below:

Table 4-29: Attributes of N-Create-Request of Basic Film Session

Attribute Name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	1
Medium Type	(2000,0030)	U	BLUE FILM
			CLEAR FILM
			PAPER

The number of Copies sent to the DICOM Printer is always 1, a number higher than 1 is not supported in this version.

The Affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Session (see table below):

Table 4-30: Requested SOP Instance UID for Basic Film Session

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) --> (0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Basic Film Session

The N-DELETE-RQ on the Basic Film Session SOP Class is used to remove the complete Basic Film Session SOP Instance hierarchy.

The Basic Film Session SOP class interprets the status codes (from N-CREATE-RSP messages) listed in the table below:

Table 4-31: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Codes	Behavior
Failed	Film session SOP instances hierarchy does not contain film box SOP instances	C600	Print job fails
	Unable to create print job, print queue is full	C601	Print job fails
	Image size is larger than images box size	C603	Print job fails
Warning	Memory Allocation not supported	B600	Print job continues, warning is logged
Success	Film session successfully created	0000	Print job continues

4.2.1.3.7.3.2 Basic Film Box SOP Class

The Basic Film Box information object definition describes all the user-defined parameter of one film of the film session. The Basic Film Box information description defines the presentation parameters, which are common for all images on a given sheet of film.

The Basic Film Box refers to one or more Image Boxes.

Supported Service Elements as SCU are:

- N-CREATE
- N-ACTION
- N-DELETE

The Basic Film Box SOP Class N-CREATE-RQ message uses the attributes listed below. The actual values for each attribute depend on DICOM printer configuration within the ***syngo.via*** DICOM Print Management SCU:

Table 4-32: Attributes for N-CREATE-RQ of Basic Film Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	STANDARD\C,R
Referenced Film Session Sequence	(2010,0500)	M	

Attribute Name	Tag	Usage SCU	Supported Values
> Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
> Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	M	PORTRAIT, LANDSCAPE
Film Size ID	(2010,0050)	M	8INX10IN, 10INX12IN, 10INX14IN, 11INX14IN,, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	M	BILINEAR, CUBIC, NONE, REPLICATE
Border Density	(2010,0100)	U	BLACK, WHITE
Max Density	(2010,0130)	U	0 < Value
Min Density	(2010,0120)	U	0 < Value < 50
Required if Presentation LUT is present			
Reflective Ambient Light	(2010,0160)	U	0 < Value
Illumination	(2010,015E)	U	0 < Value
Referenced Presentation LUT Sequence	(2050,0500)	U	

For Page Mode printing, the Image Display format used is Standard\1,1.

The N-CREATE-RSP message from the Print SCP includes the Referenced Image Box Sequence with SOP Class/Instance UID pairs which will be kept internally to be further used for the subsequent Basic Image Box SOP Class N-SET-RQ messages.

When all Image Boxes (including parameters) for the film-sheet have been set, the ***syngo.via*** print manager will issue a N-ACTION-RQ message with the SOP Instance UID of the Basic Film Box and the Action Type ID of 1.

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and used for later requests (e.g. N-DELETE-RQ) on the Basic Film Box (see below):

Table 4-33: Requested SOP Instance UID for Basic Film Box

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) => (0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Basic Film Box

The Basic Film Box SOP class interprets the status codes listed in the table below:

Table 4-34: DICOM Command Response Status Handling Behavior for Basic Film Box SOP Class

Service Status	Meaning	Error Codes	Behavior

Service Status	Meaning	Error Codes	Behavior
Failure	Unable to create print job, print queue is full	C602	Print job is marked as failed and the reason is logged
	Image size is larger than images box size	C603	Print job is marked as failed and the reason is logged
Warning	Film box does not contain image box (empty page)	B603	Print job continues and warning is logged
	Requested MinDensity or MaxDensity outside of Printer's operating range	B605	Print job continues and warning is logged
Success	Film accepted for printing	0000	Print job continues

4.2.1.3.7.3.3 Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Grayscale Image Box SOP Class uses only the N-SET-RQ with the attributes listed in the table below:

Table 4-35: Attributes for N-SET-RQ of Basic Grayscale Image Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
BASIC Grayscale Image Sequence	(2020,0110)	M	
> Samples per Pixel	(0028,0002)	M	1
> Photometric Interpretation	(0028,0004)	M	MONOCHROME2
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> Bits Allocated	(0028,0100)	M	8,16
> Bits Stored	(0028,0101)	M	8,12
> High Bit	(0028,0102)	M	7,11
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

The Grayscale Image Box SOP class interprets the status codes as listed below:

Table 4-36: DICOM Command Response Status Handling Behavior for Basic Grayscale Image Box SOP Class

Service Status	Further Meaning	Error Codes	Behavior
Failure	Image contains more pixel than printer can print in Image Box	C603	Print job is marked as failed and the reason is logged
	Insufficient memory in printer to store the image	C605	Print job is marked as failed and the reason is logged
Warning	Requested MinDensity or MaxDensity outside of Printer's operating range	B605	Print job continues and the reason is logged
Success	Image successfully stored in Image Box	0000	Print job continues

4.2.1.3.7.3.4 Basic Color Image Box SOP Class

The Basic Color Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data, which apply to a single image of a sheet of film.

The Color Image Box SOP Class uses only the N-SET-RQ with the attributes listed below:

Table 4-37: Attributes for N-SET-RQ of Basic Color Image Box

Attribute Name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
BASIC Color Image Sequence	(2020,0111)	M	
> Samples per Pixel	(0028,0002)	M	3
> Photometric Interpretation	(0028,0004)	M	RGB
> Planar Configuration	(0028,0006)	M	0
> Rows	(0028,0010)	M	
> Columns	(0028,0011)	M	
> Pixel Aspect Ratio	(0028,0034)	M	
> Bits Allocated	(0028,0100)	M	8
> Bits Stored	(0028,0101)	M	8
> High Bit	(0028,0102)	M	7
> Pixel Representation	(0028,0103)	M	0
> Pixel Data	(7FE0,0010)	M	

The Color Image Box SOP class interprets the status codes listed below:

Table 4-38: DICOM Command Response Status Handling Behavior for Basic Color Image Box SOP Class

Service Status	Meaning	Error Codes	Behavior

Failure	Image contains more pixel than printer can print in Image Box	C603	Print job is marked as failed and the reason is logged
	Insufficient memory in printer to store the image	C605	Print job is marked as failed and the reason is logged
Warning	Image size larger than image box size	B604	Print job continues and the reason is logged
Success	Image successfully stored in Image Box	0000	Print job continues

4.2.1.3.7.3.5 Presentation LUT SOP Class

The objective of the Presentation LUT is to realize image hardcopy printing tailored for specific modalities, applications and user preferences.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately related to human perceptual response. They are intended to facilitate common input for hardcopy. P-Values are intended to be independent of the specific class or characteristics of the hardcopy device.

The Presentation LUT SOP Class uses only the N-CREATE-RQ with the attributes listed below:

Table 4-39: Attributes for N-CREATE-RQ of Presentation LUT SOP Class

Attribute Name	Tag	Usage SCU	Supported Values
Presentation LUT Shape	(2050,0020)	U	IDENTITY

The affected SOP Instance UID received with N-CREATE-RSP message will be kept internally and is used for later requests on the Basic Film Box (N-CREATE-RQ) and on the Presentation LUT (N-DELETE-RQ) - see below:

Table 4-40: Requested SOP Instance UID for Presentation LUT SOP Class

Attribute Name	Tag	Source of Information
Requested SOP Instance UID	(0000,1000) => (0000,1001)	Affected SOP Instance UID of N-CREATE-RSP on Presentation LUT

The Presentation LUT SOP class interprets the status codes listed below:

Table 4-41: DICOM Command Response Status Handling Behavior for Presentation LUT SOP Class

Service Status	Further Meaning	Error Codes	Behavior
Warning	Requested MinDensity or MaxDensity outside of HCD's operating range. HCD will use its respective minimum or maximum density value instead.	B605	Print job continues and the reason is logged
Success	Presentation LUT successfully created	0000	Print job continues

4.2.1.3.7.3.6 Printer SOP Class

The Printer SOP Class is the possibility to monitor the status of the hardcopy printer in a synchronous and in an asynchronous way.

The SCU uses the mandatory N-EVENT-REPORT DIMSE service to monitor the changes of the printer status in an asynchronous way.

It can directly ask the Printer (SCP) for its status or receive Events from the Printer asynchronously:

- N-GET as SCU
- N-EVENT-REPORT as SCU

In both cases the information listed in the two following tables is supported:

Table 4-42: Used Printer N-EVENT-REPORT-RQ attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Normal	1	-	-	-
Warning	2	Printer Status Info	(2110,0020)	U
Failure	3	Printer Status Info	(2110,0020)	U

Table 4-43: Used Printer N-GET-RSP attributes

Attribute Name	Tag	Usage SCP	Supported Values
Printer Status	(2110,0010)	M	NORMAL, FAILURE, WARNING
Printer Status Info	(2110,0020)	M	See table in chapter 8.6 possible values.

4.2.1.3.7.3.7 Print Job SOP Class

The Print Job SOP Class is the possibility to monitor the execution of the print process.

The ***syngo.via*** DICOM Print Management application supports the optional N-EVENT-REPORT DIMSE Service to receive the changes of the Print Job Status in an asynchronous way. It can receive Events from the Print SCP asynchronously.

Note: The ***syngo.via*** DICOM Print Management application does not support receiving N-EVENT-REPORT requests from the camera during print sessions. Normally this is configurable in the camera. Refer to Table 4-44: Used Print Job N-EVENT-REPORT attributes for the N-EVENT-REPORT attributes the ***syngo.via*** DICOM Print Management application can handle.

Table 4-44: Used Print Job N-EVENT-REPORT attributes

Event-type Name	Event	Attributes	Tag	Usage SCU
Pending	1	Execution Status Info	(2100,0030)	U

Event-type Name	Event	Attributes	Tag	Usage SCU
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Printing	2	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Done	3	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Failure	4	Execution Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	-- (Print Queue Management SOP Class not supported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U

4.2.1.4 Association Acceptance Policy

The ***syngo.via*** attempts to accept a new association for

- DIMSE C-STORE
- DIMSE N-ACTION (Storage Commitment)
- DIMSE C-MOVE
- DIMSE C-FIND

service operations.

Generally associations are accepted if all of the following conditions are true:

- The "called AET" matches one of the configured Application Entity Titles of the ***syngo.via***.

- The "calling AET" is known (configured) at ***syngo.via***. This check can be disabled.
- The maximum number of incoming associations is not reached.
- At least one Presentation Context with a minimum of one suitable transfer syntax has been proposed as defined by the "Presentation Context Tables" in the following subsections.
- The system has enough available resources to perform the service requested (e.g. enough free disk space, less than the max. number of associations are already in use)

4.2.1.4.1 Activity "Receive Instances"

4.2.1.4.1.1 Description and Sequencing of Activities

The ***syngo.via*** receiving process will accept an association, receive any objects transmitted on that association and store the objects on disk.

4.2.1.4.1.2 Accepted Presentation Contexts

For all supported Transfer objects (see SOP Classes in Table 8-1) the Transfer Syntaxes described in Table 4-5 are supported.

Generally all Presentation Contexts are accepted as long as they contain at least one suitable Transfer Syntax. All other Presentation Contexts are rejected.

If a Proposed Presentation Context contains more than one Transfer Syntax, the one in the following priority list is chosen (if applicable for the SOP class):

Table 4-45: Priority list of chosen Transfer Syntax

Order	Presentation Context
1	Explicit Value Representation Little Endian
2	Implicit Value Representation Little Endian
3	Explicit Value Representation Big Endian
4	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14)
5	JPEG 2000 Image Compression (Lossless Only)
6	RLE Lossless
7	JPEG Extended (Process 2 & 4)
8	JPEG Baseline (Process 1)
9	JPEG 2000 Image Compression

There is no Extended Negotiation as an SCP

4.2.1.4.1.3 SOP-specific Conformance Statement for Storage SOP classes

The ***syngo.via*** conforms to the Full Storage Class at Level 2.

In case of a successful C-STORE operation, the image has successfully been written on disk either in Explicit Little Endian format or in the compression format received.

The Storage AE of the ***syngo.via*** returns the status “success” when the data is stored to disk and a minimal image header validation has been performed.

The following header attributes must be available and filled:

- Patient Name,
- Study Instance UID,
- Series Instance UID and
- SOP Instance UID.

Table 4-46: Storage C-STORE Response Status

Service Status	Further Meaning	Error Code	Reason
success	success	0x0000	Image received correctly (success notification is done after receiving, before indexing and storing)
failure	Out-of-resource	0xA700	Not resource left in the Short Term Storage
failure	Unable to Process	0xCxxx	Error during instance reception
failure	DataSet does not match SOP Class	0xA9xx	The DataSet is not conform to the SOP Class contained in the resource.

Restriction: successful operation does not guarantee storage of header data in the database.

4.2.1.4.1.4 Other SOP specific behavior

- If an image is received that is already stored in the database - identified by the SOP Instance UID - the new image will be ignored. The existing instance is not superseded.
- The Patient Quadruplet (Patient's Name, Patient ID, Date of Birth, Patient Sex) is internally used for unique identification. The Patient ID is specified as a "type 2" attribute by DICOM. Therefore the attribute must be in the message but it may be empty. If the Patient ID is missing one will be generated and inserted to the index by the ***syngo.via*** for internal purposes.

4.2.1.4.2 Activity “Receive Initial Storage Commitment Request”

4.2.1.4.2.1 Description and Sequencing of Activities

When receiving an initial Storage Commitment request (N-ACTION-RQ) the ***syngo.via*** will accept it with an N-ACTION-RSP and trigger a check in the database for the required instances.

The subsequently issued N-EVENT-REPORT-RQ will always be sent in a second association.

syngo.via will store SOP instances indefinitely unless the instances are manually deleted by a user or automatically by a watermark system, if the images have been routed to a PACS and the PACS committed the images back to ***syngo.via***. The manual deletion may lead to deletion of acknowledged instances before archiving to PACS has happened.

4.2.1.4.2.2 Accepted Presentation Contexts

Table 4-47: Acceptable Presentation Contexts for Storage Commitment and Activity "Receive Commitment Request

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.4.2.3 SOP-Specific Conformance Statement for SC SOP classes

There are only 2 different return status codes for the commitment request itself. They indicate only whether the request was successfully received or not. The real response is sent via N-EVENT-REPORT-RQ either on the same or on a different association.

Success or failure of Storage Commitment will be signaled via the N-EVENT-REPORT primitive.

The SCU is responsible for creating a unique Transaction UID. The SCP will not check, whether the UID is already in use or not.

Table 4-48: Storage Commitment N-EVENT-REPORT Response Status

Service Status	Further Meaning	Error Codes	Reason
success	success	0x0000	Image received correctly (success notification is done after receiving, before indexing and storing)
failure	Unable to Process	0xCxxx	Error during instance reception
failure	DataSet does not match SOP Class	0xA9xx	The DataSet is not conform to the SOP Class contained in the resource.

4.2.1.4.3 Activity "Receive Instance Retrieve Requests"

4.2.1.4.3.1 Description and Sequencing of Activities

The ***syngo.via*** responds to requests issued by an SCU with the query model Patient Root, Study Root and Patient/Study Only.

Hierarchical and relational retrieve operations are both supported.

4.2.1.4.3.2 Accepted Presentation Contexts

The ***syngo.via*** will accept Presentation Contexts as shown in Table 4-49.

Table 4-49: Acceptable Presentation Contexts Activity "Receive Instance Retrieve Request"

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Yes
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Yes
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient/Study Only Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Table 4-50: Extended Negotiation as an SCP

SOP Class Name	SOP Class UID	Extended Negotiation
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Relational Query will be negotiated if necessary as defined in DICOM PS3.4
Study Root Query/ Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Relational Query will be negotiated if necessary as defined in DICOM PS3.4

4.2.1.4.3.3 SOP Specific Conformance Statement to Query SOP classes

The ***syngo.via*** Query AE supports all Query attributes of Table 4-18.

The query attribute contents will be treated case-sensitive except all PN attributes, which will always be treated case-insensitive. Additionally following attributes are also treated case-insensitive:

- "Body Part Examined" (0018,0015)

- “Study Description” (0008,1030)

Wildcards (*, ?) will not replace trailing component separators (=).

The Query AE of the ***syngo.via*** does not return any Media File-Set ID or UID, they always return the Retrieve AET (0008,0054). Furthermore, "Instance Availability" (0008,0056) is always returned.

Enterprise Query:

It is possible to group several ***syngo.via*** systems in an “Enterprise Group” (via configuration). A special Query SCP AET is available which spans the Query to the complete Enterprise Group. This AET is automatically created and has always the following syntax: “<Hostname>_E”, where <Hostname> is the AET of the corresponding ***syngo.via*** server, automatically shortened to 14 characters in order to keep the total AET length beneath 16 char (DICOM Conformance).
A Query sent to this AET will return all matching attributes present in all ***syngo.via*** systems configured in the Enterprise Group. The returned Retrieve AET allows to retrieve the instances directly from the ***syngo.via*** storing them.

4.2.1.4.3.4 Hierarchical and Relational Queries

Independent of the negotiation for relational queries, each C-FIND request is treated as if it was a relational query. The SCP allows any combination of keys at or above the provided Query/Retrieve level in the hierarchy. Keys below Query/Retrieve level return an error.

But if for example a series level attribute is requested in a study level query, an error will be returned by ***syngo.via*** (code “0106”).

4.2.1.4.3.5 Return Codes

Table 4-51: Query C-FIND / C-CANCEL Response Status

Service Status	Further Meaning	Error Codes	Reason
Processing failure	Parsing or translation of the DICOM request failed. A response could not be generated. The response could not be sent to the SCU. The query of the database failed.	C001	Any error during Query in the DataBase
Success	Matching is complete - No final Identifier is supplied	0000	
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Further Items will be returned;
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01	Further Items will be returned; Some of Required Attributes are not present in the DataBase

The maximum number of matches returned can be configured. The status of the final response will always be SUCCESS whether the clipping occurred or not.

4.2.1.4.4 Activity “Move SCP”

4.2.1.4.4.1 Description and Sequencing of Activities

The Retrieve AE responds to retrieve requests of an SCU. The requests are used to retrieve the referenced images. The Retrieve AE supports the query model Study Root.

4.2.1.4.4.2 Accepted Presentation Contexts

Table 4-52: Acceptable Presentation Contexts for Retrieve and Activity "MOVE SCP"

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Study Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient/Study Only Query/ Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

4.2.1.4.4.3 SOP Specific Conformance Statement for Move SCP Classes

At association establishment time the C-MOVE presentation context shall be negotiated. When the C-MOVE-RQ is processed, the Move Destination attribute (receiver of images) is ignored. However the Move Destination AE must conform to the DICOM conventions (value representation AE).

The Retrieve AE sends continuously C-MOVE responses to indicate progress about the de-archiving of images. The C-MOVE-RSP contains the Service parameters listed in Table 4-53.

Table 4-53: C-MOVE-RSP Service Parameters

Attribute	Meaning
Number of Remaining Sub-Operation	Is sent if the C-MOVE-RSP has the status Pending. Indicates the number of images which have not yet been sent.
Number of Completed Sub-Operation	Indicates the number of images which were sent.
Number of Failed Sub-Operation	Number of failing images within the Sending Association (C-STORE)
Number of Warning Sub-Operation	Always 0.

The final C-MOVE-RSP is sent after all images have been de-archived either successfully or unsuccessfully. No C-STORE operations are done in series of a C-MOVE-RQ for the Retrieve AE.

4.2.1.4.4.4 Hierarchical and Relational Queries

Independent of the negotiation for relational queries, each C-FIND request is treated as if it was a relational query. The SCP allows any combination of keys at or above the provided Query/Retrieve level in the hierarchy. Keys below Query/Retrieve level return an error.

But if for example a series level attribute is requested in a study level query, an error will be returned by ***syngo.via*** (code “0106”).

4.2.1.4.4.5 Return Codes

Table 4-54: Retrieve C-MOVE Response Status

Service Status	Further Meaning	Error Code	Reason
success	success	0x0000	Image received correctly (success notification is done after receiving, before indexing and storing)
failure	Out-of-resource	0xA700	Not resource left in the Short Term Storage
failure	Unable to Process	0xCxxx	Error during instance reception
failure	DataSet does not match SOP Class	0xA9xx	The DataSet is not conforming to the SOP Class contained in the resource.

4.3 NETWORK INTERFACES

4.3.1 Physical Network Interface

The ***syngo.via*** provides DICOM 3.0 TCP/IP network communication support as defined in Part 8 of [1]. The network communication is independent from the physical medium over which TCP/IP executes; it inherits this from the Windows OS system upon which it executes.

4.3.2 Additional Protocols

none

4.3.3 IPv4 and IPv6 Support

IPv4 and IPv6 are supported. Regarding IPv6 please note, that the complete networking infrastructure in the hospital (firewalls, DNS-Servers, …) must support IPv6 in order to get a functioning communication.

4.4 CONFIGURATION

4.4.1 AE Title/Presentation Address Mapping

AE Titles shall be unique within the hospital. A common way to achieve that is to use the hostname as part of the AE Titles. The string can be up to 16 characters and must not contain any extended characters. Only 7-bit ASCII characters (excluding Control Characters) are allowed according to DICOM [1].

4.4.1.1 Local AE Titles

The ***syngo.via*** allows to configure AETitles, Ports and Services in any wished way. Default delivery is that all services are using the same AE title and only one port number. In case the connected systems cannot handle this default, the customer service engineer is able to configure for each service its own AE title and Port number.

Parameter	Configurable	Default Value
Default AE title	Yes	hostname in uppercase characters; limited to 16 characters
Default Port	Yes	104

4.4.1.2 Remote AE Title/Presentation Address Mapping

4.4.1.2.1 Remote Association Initiators

All relevant remote applications that may setup DICOM associations towards ***syngo.via*** need to be configured in ***syngo.via***, before the association can be established. This behavior is configurable but it is recommended, not to change this behavior.

The mapping of external AE Titles to TCP/IP addresses and ports is configurable and initially set at the time of installation by Installation Personnel. Changes can later on also be performed by the local system administrator. The Application Entity Titles and supported transfer syntaxes need to be known for configuration.

To enable a fast and efficient configuration possibility Siemens will deliver templates for known configuration examples, so that the behavior (usage of one AE title, default port numbers, supported services) is determined already through the template.

Remote Application Entities can be configured without restarting the process.

4.4.1.2.2 Remote SCP's

For remote applications that shall be able to accept DICOM associations from ***syngo.via***, the following information needs to be available:

- Application Entity Title
- Host Name / IP address on which the remote application service runs
- Port number on which the remote application accepts association requests.

The remote system will be indicated in the UI of ***syngo.via*** with a logical name, that is also entered when configuring the node in the administration UI.

To enable a fast and efficient configuration possibility Siemens will deliver templates for known configuration examples, so that the behavior (usage of one AE title, default port numbers, supported services) is determined already through the template.

Remote Application Entities can be configured without restarting the process.

4.4.2 Parameters

The next table lists configuration parameters, which are true for all Application Entities.

Table 4-55: Parameter List

Parameter	Configurable	Default Value
max PDU size	Yes	32768 Bytes
time-out for accepting/rejecting an association request	Yes	30 s
time-out for responding to an association open/close request	Yes	30 s
time-out for accepting a message over network	Yes	30 s
time-out for waiting for data between TCP/IP-packets	Yes	5 s
time-outs for waiting for a Service Request/Response message from the remote node (Storage SCP/SCU)	Yes	30 s
time-outs for waiting for a Service Request/Response message from the remote node (Query/Retrieve SCP/SCU)	Yes	30 s
time-out for waiting for a C-MOVE-RSP	No	1200 s
number of image collection before saving to database	Yes	20
max matches query limit	Yes	100
max number of parallel receiving associations	Yes	12

5 MEDIA INTERCHANGE

5.1 IMPLEMENTATION MODELS

5.1.1 Application Data Flow Diagram

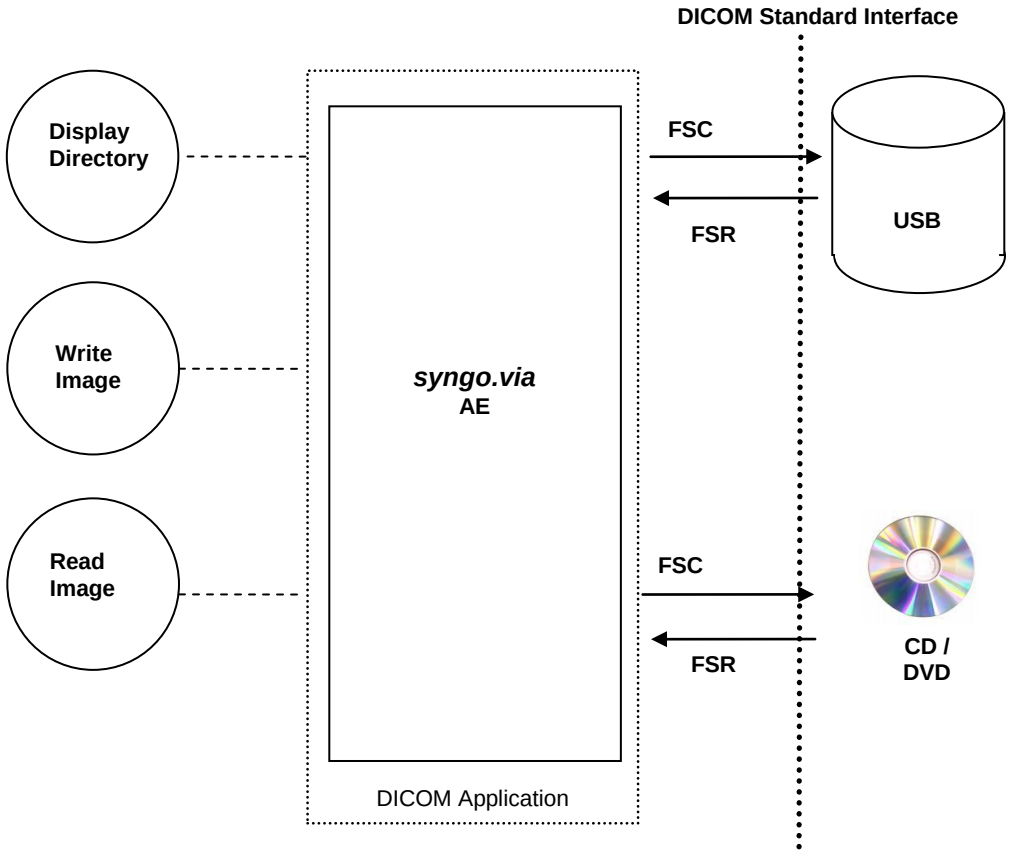


Figure 5.1-1: Media Interchange Application Data Flow Diagram

The ***syngo.via*** provides the functionality to Import or Export DICOM Instances from and to the File System. During export, a DICOMDIR may also be generated (user selection). A complete ISO Image ready-to-burn can also be generated. All SOP Classes defined in Table 5-3 and Table 5-4 are supported for the Import/Export functionality.

5.1.2 Functional definitions of AEs

The ***syngo.via*** application is capable of

- creating a new File-set in the File System (Export to ...)

- importing SOP Instances from the medium onto local storage
- writing the File-sets DICOMDIR information into the file system and joining it to an ISO image.

5.1.3 Sequencing of Real-World Activities

Whenever data shall be written to an external media, ***syngo.via*** will create a DICOMDIR from the selected data and create an ISO image of the selected data on the local hard disk. Depending on the selected data and options (selected media size, with or without compression) either General Purpose CD profile or DVD-J2K profile is used.

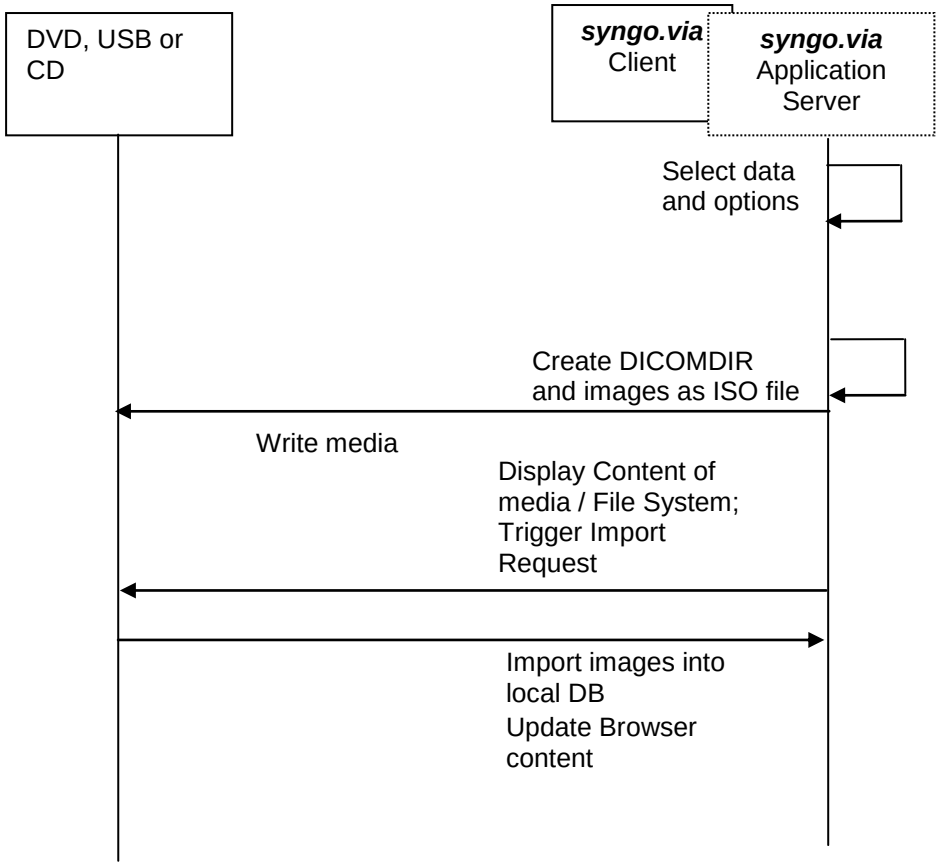


Figure 5.1-2: Sequence diagram – Media creation

5.1.4 File Meta Information for Implementation Class and Version

This section describes the values assigned to the File Meta Information attributes (see [1]part PS 3.10) that pertain to the Implementation Class and Version. The implementation Class UID and the Implementation Version name in the File Meta Header are the same as the values specified for networking.

Table 5-1: Implementation Class/Version Name - Media Interchange

File Meta Information Version	0x0001

Implementation Class UID	1.3.12.2.1107.5.8.15.10.20090701
Implementation Version Name	syngo.via

5.2 AE SPECIFICATIONS

5.2.1 Media Storage AE – Specification

The ***syngo.via*** provides conformance to the following Application Profiles as an FSC as well as an FSR. FSU is supported only on a non-optical storage device (e.g. USB stick).

In addition augmented conformance is provided to store extra data attributes important for the full feature support of the *syngo*®-based products. Details are listed below:

Table 5-2: Media - Application Profiles and Real-World Activities

Application Profiles Supported	Real-World Activity	Role	Service Class Option
AUG-GEN-CD	Browse Directory Information Import into Application Export to local Archive Media	FSR , FSC , FSU	Interchange
AUG-GEN-DVD			
AUG- GEN-DVD-J2K			
AUG- GEN-USB-J2K			
STD-GEN-CD	Browse Directory Information Import into Application Export to local Archive Media	FSR , FSC , FSU	Interchange
STD-GEN-DVD			
STD-GEN-DVD-J2K			
STD-GEN-USB-J2K			

5.2.1.1 File Meta Information for *syngo.via*

5.2.1.2 Real-World Activities

5.2.1.2.1 Activity "Browse Directory Information"

The ***syngo.via*** acts as FSR using the interchange option when requested to read the media directory.

The ***syngo.via*** will read the DICOMDIR and insert those directory entries that are valid for the application profiles supported, into a local database. The database then is used for browsing media contents.

Note: The "Icon Image Sequence" is also supported in DICOMDIR. But only those Icon Images with "Bits Allocated" (0028,0100) equal to 8 and size of 64x64 or 128x128 pixels are imported into database and are visible in the Browser.

5.2.1.2.1.1 Media Storage Application Profiles

See Table 5-2 for the Application Profiles listed that invoke this Application Entity for the Browse Directory Information

5.2.1.2.2 Activity "Import into Application"

The ***syngo.via*** application acts as FSR using the interchange option when requested to read SOP Instances from the medium into the application.

The SOP Instance selected from the media directory will be copied into the running Application. Only SOP Instances, that are valid for the application profile supported and supported by ***syngo.via*** (seeTable 8-1), can be retrieved from media.

5.2.1.2.3 Real-World Activity "Export to local Archive Media"

The ***syngo.via*** application acts as FSU (for media with existing DICOM file-set) or FSC (media not initialized) using the interchange option when requested to copy SOP Instances from the local storage to local Archive Medium. The activity as FSU is only possible as long as the local burning SW of ***syngo.via*** **Client** has not already processed the generated ISO file.

The ***syngo.via*** application will receive a list of SOP Instances to be copied to the local archive medium. Depending on the profile selected (Standard: uncompressed, with DICOMDIR; Patient: compressed with DICOMDIR) the SOP Instances will be taken and an ISO file is being generated that includes the DICOMDIR and the corresponding objects.

It is then up to ***syngo.via*** **Client** local configuration (if equipped with a local media burner) to burn the ISO file to the appropriate media.

5.2.1.2.4 Media Storage Application Profiles

See Table 5-2 for the Application Profiles listed that invoke this Application Entity for the local Archive Media Real-World Activity.

5.2.1.3 SOP Classes and Transfer Syntaxes

These Application Profiles are based on the Media Storage Service Class with the Interchange Option. In the table below (Table 5-3) the Transfer Syntax UID "RLE Lossless "only applies for decompression.

Table 5-3: SOP Classes and Transfer Syntaxes for STD-GEN-DVD-J2K and STD-GEN-USB-J2K

Information Object Definition	SOP Class UID	Transfer Syntax UID
Basic Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Breast Tomosythesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90

Information Object Definition	SOP Class UID	Transfer Syntax UID
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Color Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
CT image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
DX Image – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
MG Image – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
MG Image – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70

Information Object Definition	SOP Class UID	Transfer Syntax UID
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Encapsulated PDF	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced CT Image	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Enhanced Magnetic Resonance	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Enhanced MR Color Image	1.2.840.10008.5.1.4.1.1.4.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian Uncompressed

Information Object Definition	SOP Class UID	Transfer Syntax UID
		1.2.840.10008.1.2.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Multi-frame Grayscale Byte SC Image	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Multi-frame Grayscale Word SC Image	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Multi-frame Single Bit SC Image	1.2.840.10008.5.1.4.1.1.7.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Multi-frame True Color SC Image	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91

Information Object Definition	SOP Class UID	Transfer Syntax UID
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
PET Image	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Raw Data	1.2.840.10008.5.1.4.1.1.66	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Real World Value Mapping	1.2.840.10008.5.1.4.1.1.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Dose	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Image	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51

Information Object Definition	SOP Class UID	Transfer Syntax UID
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Ion Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.9	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Ion Plan	1.2.840.10008.5.1.4.1.1.481.8	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Plan	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Structure Set	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
RT Treatment Summary Record	1.2.840.10008.5.1.4.1.1.481.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91

Information Object Definition	SOP Class UID	Transfer Syntax UID
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image (retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Ultrasound Multi-frame (retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

Information Object Definition	SOP Class UID	Transfer Syntax UID
		JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70
		Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
		JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51
		RLE Lossless 1.2.840.10008.1.2.5
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91

Table 5-4: SOP Classes and Transfer Syntaxes for STD-GEN-CD and STD-GEN-DVD Profile

Information Object Definition	SOP Class UID	Transfer Syntax UID
Basic Directory	1.2.840.10008.1.3.10	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Breast Tomosythesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Color Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed

Information Object Definition	SOP Class UID	Transfer Syntax UID
		1.2.840.10008.1.2.1
CT Image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
DX Image – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
DX Image – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MG Image – For Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MG Image – For Presentation	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Encapsulated PDF	1.2.840.10008.5.1.4.1.1.104.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced CT Image	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced Magnetic Resonance	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced MR Color Image	1.2.840.10008.5.1.4.1.1.4.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
General ECG Waveform	1.2.840.10008.5.1.4.1.1.9.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame Grayscale Byte SC Image	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame Grayscale Word SC Image	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame Single Bit SC Image	1.2.840.10008.5.1.4.1.1.7.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Multi-frame True Color SC Image	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
PET Image	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Procedure Log	1.2.840.10008.5.1.4.1.1.88.40	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Raw Data	1.2.840.10008.5.1.4.1.1.66	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Real World Value Mapping	1.2.840.10008.5.1.4.1.1.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Dose	1.2.840.10008.5.1.4.1.1.481.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Image	1.2.840.10008.5.1.4.1.1.481.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Ion Beams Treatment Record	1.2.840.10008.5.1.4.1.1.481.9	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Ion Plan	1.2.840.10008.5.1.4.1.1.481.8	Explicit VR Little Endian Uncompressed

Information Object Definition	SOP Class UID	Transfer Syntax UID
		1.2.840.10008.1.2.1
RT Plan	1.2.840.10008.5.1.4.1.1.481.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Structure Set	1.2.840.10008.5.1.4.1.1.481.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
RT Treatment Summary Record	1.2.840.10008.5.1.4.1.1.481.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image (retired)	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Multi-frame (retired)	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

5.3 AUGMENTED AND PRIVATE APPLICATION PROFILES

5.3.1 Augmented Application Profiles

With no private Siemens Non-Images stored onto Medium, the definitions of the STD-GEN-XXX Profiles are applicable to denote the augmentations for the STD-GEN-XXX Standard Profile.

Table 5-5: Private SOP Classes and Transfer Syntaxes for Augmented Media Profiles

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR
CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	O	M

The Siemens non-image is typically used for raw data and 3D private data.

5.4 MEDIA CONFIGURATION

none

5.5 ATTRIBUTE CONFIDENTIALITY PROFILES

5.5.1 De-identification

The ***syngo.via*** application can de-identify attributes using two different levels. During export to filesystem it is the user responsibility to select the appropriate anonymization level.
For Level 1 anonymization private attributes are not included in anonymized Studies. For Level 2 anonymization all private attributes are included in anonymized Studies.

Table 5-6: Application Level Confidentiality Profile Attributes

DICOM Tag	Attribute Name	Level 1	Level 2
(0008,0014)	Instance Creator UID	Yes	No
(0008,0018)	SOP Instance UID (Replaced by new UID)	Yes	Yes
(0008,0050)	Accession Number	Yes	No
(0008,0080)	Institution Name	Yes	No
(0008,0081)	Institution Address	Yes	No
(0008,0090)	Referring Physician's Name	Yes	Yes
(0008,0092)	Referring Physician's Address	Yes	Yes
(0008,0094)	Referring Physician's Telephone Numbers	Yes	Yes
(0008,1010)	Station Name	Yes	Yes
(0008,1030)	Study Description	Yes	No
(0008,103E)	Series Description	Yes	No
(0008,1040)	Institutional Department Name	Yes	No
(0008,1048)	Physician(s) of Record	Yes	Yes
(0008,1050)	Performing Physicians' Name	Yes	Yes
(0008,1060)	Name of Physician(s) Reading Study	Yes	Yes
(0008,1070)	Operators' Name	Yes	Yes
(0008,1080)	Admitting Diagnoses Description	Yes	No
(0008,1111)	Referenced Performed Procedure Step Sequence	Yes	No
(0008,1120)	Referenced Patient Sequence	Yes	No
(0008,1140)	Referenced Image Sequence	Yes	No
(0008,1155)	Referenced SOP Instance UID	Yes	No
(0008,2111)	Derivation Description (append 'EP Force Anonymity')	Yes	No
(0010,0010)	Patient's Name (set to Dummy Value)	Yes	Yes
(0010,0020)	Patient ID (set to Dummy Value)	Yes	Yes
(0010,0030)	Patient's Birth Date	Yes	No
(0010,0032)	Patient's Birth Time	Yes	No
(0010,0040)	Patient's Sex (set to 'O')	Yes	No
(0010,0050)	Patient's Insurance Plan Code Sequence	Yes	No
(0010,1000)	Other Patient Ids	Yes	Yes
(0010,1001)	Other Patient Names	Yes	Yes
(0010,1005)	Patient's Birth Name	Yes	Yes
(0010,1010)	Patient's Age	Yes	No
(0010,1020)	Patient's Size	Yes	No
(0010,1030)	Patient's Weight	Yes	No
(0010,1040)	Patient's Address	Yes	Yes
(0010,1060)	Patient's Mother's Birth Name	Yes	Yes
(0010,1090)	Medical Record Locator	Yes	No
(0010,2154)	Patient's Telephone Numbers	Yes	Yes
(0010,2160)	Ethnic Group	Yes	No
(0010,2180)	Occupation	Yes	No
(0010,21B0)	Additional Patient's History	Yes	Yes
(0010,4000)	Patient Comments	Yes	Yes

DICOM Tag	Attribute Name	Level 1	Level 2
(0012,0062)	Patient Identity Removed	Yes	Yes
(0012,0063)	De-identification Method	Yes	Yes
(0018,1000)	Device Serial Number	Yes	No
(0018,1030)	Protocol Name	Yes	No
(0020,000D)	Study Instance UID	Yes	Yes
(0020,000E)	Series Instance UID	Yes	Yes
(0020,0010)	Study ID	Yes	No
(0020,0052)	Frame of Reference UID	Yes	No
(0020,0200)	Synchronization Frame of Reference UID	Yes	No
(0020,4000)	Image Comments	Yes	No
(0040,0275)	Request Attributes Sequence	Yes	No
(0040,A124)	UID	Yes	No
(0040,A730)	Content Sequence	Yes	No
(0088,0140)	Storage Media File-set UID	Yes	No
(3006,0010)	Referenced Frame of Reference Sequence	Yes	No
(3006,0020)	Structure Set ROI Sequence	Yes	No
(3006,0024)	Referenced Frame of Reference UID	Yes	No
(3006,00C2)	Related Frame of Reference UID	Yes	No

6 SUPPORT OF CHARACTER SETS

6.1 CHARACTER SETS FOR syngo.via

The ***syngo.via*** DICOM application supports the following character sets as defined in the three tables below.

Table 6-1: Single-Byte Character Sets without Code Extension

Character Set Description	Defined Term	ISO registration number	Character Set
Default repertoire	none	ISO_IR 6	ISO 646:
Latin alphabet No. 1	ISO_IR 100	ISO_IR 100	Supplementary set
		ISO_IR 6	ISO 646:
Latin alphabet No. 2	ISO_IR 101	ISO_IR 101	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 3	ISO_IR 109	ISO_IR 109	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 4	ISO_IR 110	ISO_IR 110	Supplementary set
		ISO_IR 6	ISO 646
Cyrillic	ISO_IR 144	ISO_IR 144	Supplementary set
		ISO_IR 6	ISO 646
Arabic	ISO_IR 127	ISO_IR 127	Supplementary set
		ISO_IR 6	ISO 646
Greek	ISO_IR 126	ISO_IR 126	Supplementary set
		ISO_IR 6	ISO 646
Hebrew	ISO_IR 138	ISO_IR 138	Supplementary set
		ISO_IR 6	ISO 646
Latin alphabet No. 5	ISO_IR 148	ISO_IR 148	Supplementary set
		ISO_IR 6	ISO 646
Japanese	ISO_IR 13	ISO_IR 13	JIS X 0201: Katakana
		ISO_IR 14	JIS X 0201: Romaji
Thai	ISO_IR166	ISO_IR166	TIS 620-253 (1990)
		ISO_IR 6	ISO 646

Table 6-2: Single-Byte Characters Sets with Code Extension

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
Default repertoire	ISO 2022 IR 6	ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.1	ISO 2022 IR 100	ISO 2022	ESC 02/13 04/01	ISO-IR 100	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.2	ISO 2022 IR 101	ISO 2022	ESC 02/13 04/02	ISO-IR 101	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.3	ISO 2022 IR 109	ISO 2022	ESC 02/13 04/03	ISO-IR 109	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646
Latin alphabet No.4	ISO 2022 IR 110	ISO 2022	ESC 02/13 04/04	ISO-IR 110	Supplementary set
		ISO 2022	ESC 02/08 04/02	ISO-IR 6	ISO 646

Multi-Byte Character Sets without Code Extension

Table 6-3: Multi-Byte Character Sets without Code Extension

Character Set Description	Defined Term	ISO registration number	Character Set
Unicode	ISO_IR 192	ISO 10646	Unicode in UTF-8
Chinese	GB18030	GB18030	GB 18030-2000 (China Association for Standardization)

Table 6-4: Multi-Byte Character Sets with Code Extension

Character Set Description	Defined Term	Standard for Code Extension	ESC sequence	ISO registration number	Character Set
Japanese	ISO 2022 IR 159	ISO 2022	ESC 02/04 02/08 04/04	ISO-IR 159	JIS X 0212: Supplementary Kanji set
Korean	ISO 2022 IR 149	ISO 2022	ESC 02/04 02/09 04/03	ISO-IR 149	KS X 1001: Hangul and Hanja

All SCS listed above are supported for incoming Data. When creating new Instances, the system will use the default SCS (or SCS List) configured on the machine.

When there is a mismatch between the given character set in attribute (0008,0005) and the characters in an IOD received by the system, then the following measures are taken to make the characters DICOM conform:

- Convert each illegal character to a '?'.

There are now three categories of character sets which have to be differentiated because of their different encoding formats:

- Conventional ISO character sets: ISO_IR 6, ISO 2022 IR 6, ISO_IR 100, etc. → encoded in ISO 2022
- ISO_IR 192 → encoded in UTF-8
- GB18030 → encoded in GB18030

It is not possible to recognize the following mismatches automatically on receiving or importing:

- An attribute value is encoded in ISO_IR 192 ←→ (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in GB18030 ←→ (0008,0005) contains a conventional ISO character set as primary character set
- An attribute value is encoded in ISO 2022 ←→ (0008,0005) contains ISO_IR 192

- An attribute value is encoded in ISO 2022 ←→ (0008,0005) contains GB18030

An IOD that contains one of the above mentioned inconsistencies is not DICOM conform. As these kinds of inconsistencies cannot be recognized by the system, the IOD will not be rejected but the character data might be corrupted.

The ***syngo.via*** supports Kanji characters in the byte zone after 74 (79, 7A, 7B and 7C).

7 SECURITY

7.1 SECURITY PROFILES

Time Synchronization Profiles: ***syngo.via*** acts as an NTP Client in the Maintain Time Transaction.

7.2 ASSOCIATION LEVEL SECURITY

It is possible to configure whether the SCP will only answer to known AETs or to any AET.

7.3 APPLICATION LEVEL SECURITY

- User must login with own password
- For configuration and Maintenance, Service Technician must login with a separate password.

8 ANNEXES

8.1 SOP Classes supported

Table 8-1 SOP CLASSES for Storage

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Supported Storage SOP Classes				
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	Yes	No
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	Yes	No
Basic Text Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.11	Yes	Yes	No
Blending Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.4	Yes	Yes	No
Breast Tomosynthesis Image Storage	1.2.840.10008.5.1.4.1.1.13.1.3	Yes	Yes	Yes
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	Yes	No
Color Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.2	Yes	Yes	No
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Yes	Yes	No
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes
Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2	Yes	Yes	Yes
Deformable Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.3	Yes	Yes	No
Digital Mammography Image Storage for Presentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	Yes	Yes
Digital Mammography Image Storage for Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	Yes	Yes
Digital X-Ray Image Storage- for Presentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	Yes	Yes
Digital X-Ray Image Storage – for Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	Yes	Yes
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1	Yes	Yes	No
Enhanced Computed Tomography Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes	No
Enhanced Magnetic Resonance Storage	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes	Yes
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3	Yes	Yes	Yes
Enhanced Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.22	Yes	Yes	No
Enhanced XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	Yes	Yes
Enhanced XRF Image Storage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	Yes	Yes
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	Yes	No
Grayscale Softcopy Presentation State Storage (store & forward only)	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes	No
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	Yes	No
Key Object Selection Document Storage	1.2.840.10008.5.1.4.1.1.88.59	Yes	Yes	Yes
Magnetic Resonance Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes	Yes

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Mammography CAD SR Storage	1.2.840.10008.5.1.4.1.1.88.50	Yes	Yes	No
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes	No
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Yes	Yes	Yes
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Yes	Yes	Yes
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Yes	Yes	Yes
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Yes	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes	Yes
Pseudo-Color Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.3	Yes	Yes	No
PET Image Storage	1.2.840.10008.5.1.4.1.1.128	Yes	Yes	Yes
Procedure Log Storage	1.2.840.10008.5.1.4.1.1.88.40	Yes	Yes	No
Raw DataStorage	1.2.840.10008.5.1.4.1.1.66	Yes	Yes	No
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67	Yes	Yes	No
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4	Yes	Yes	No
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	Yes	Yes	Yes
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	Yes	Yes	Yes
RT Ion Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.9	Yes	Yes	No
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	Yes	Yes	No
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	Yes	Yes	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	Yes	Yes	Yes
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7	Yes	Yes	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	Yes
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4	Yes	Yes	No
Spatial Fiducials Storage	1.2.840.10008.5.1.4.1.1.66.2	Yes	Yes	No
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	Yes	Yes	No
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5	Yes	Yes	No
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Yes	Yes	Yes
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Yes	Yes	Yes
Ultrasound Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Yes	Yes	Yes
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Yes	Yes	Yes
X-Ray 3D Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	Yes	Yes
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	Yes
X-Ray Radiation Dose Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.67	Yes	Yes	No
X-Ray Radio-Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes	Yes
Supported private Storage SOP Classes				
CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Yes	Yes	No

Table 8-2: Supported Non-Storage SOP Classes

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Supported Verification SOP Classes				
Verification	1.2.840.10008.1.1	Yes	Yes	No
Supported Storage Commitment SOP Classes				
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	Yes	No
Storage Commitment Push Model well known SOP Instance	1.2.840.10008.1.20.1.1	Yes	Yes	No
Supported Query/Retrieve SOP Classes				
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes	No
Patinet /Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Yes	Yes	No
Modality Worklist Information SOP Class				
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No	No
Grayscale Print Management META SOP classes				
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No	No
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	No
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	No
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No	No
- Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No	No
Color Print Management META SOP classes				
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No	No
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No	No
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No	No
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No	No
- Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No	No

8.2 IOD CONTENTS

8.2.1 Created SOP Instance(s)

The applications from ***syngo.via*** create objects of the following SOP Classes during Transferring, Post-Processing and Reading:

Table 8-3: List of created SOP Classes

SOP Class Name	SOP Class UID
Basic Text Structured Report	1.2.840.10008.5.1.4.1.1.88.11

SOP Class Name	SOP Class UID
Comprehensive Structured Report Storage	1.2.840.10008.5.1.4.1.1.88.33
Encapsulated PDF Storage	1.2.840.10008.5.1.4.1.1.104.1
Enhanced MR Color Image Storage	1.2.840.10008.5.1.4.1.1.4.3
Enhanced Structured Report	1.2.840.10008.5.1.4.1.1.88.22
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66
Real World Value Mapping Storage	1.2.840.10008.5.1.4.1.1.67
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.4
Siemens AX frame sets	1.3.12.2.1107.5.99.3.11
Siemens CT MR volume files	1.3.12.2.1107.5.99.3.10
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1
Surface Segmentation Storage	1.2.840.10008.5.1.4.1.1.66.5

See chapter 4.2.1.3.1.4 for further details about encapsulation.

8.2.2 Data Dictionary of Private Attributes

The following table Table 8-4: Private Data Element Dictionary lists all private attributes created by ***syngo.via***, which may be included in the generated instances. These private attributes may be deprecated or replaced with standard DICOM SOP Classes or attributes in the future.

Table 8-4: Private Data Element Dictionary

DICOM Tag	Name	VR	VM
(0027,SIEMENS SYNGO ENHANCED IDATASET API,01)	Business Unit Code	CS	1
(0027,SIEMENS SYNGO ENHANCED IDATASET API,02)	Application Type	LO	1
(0027,SIEMENS SYNGO ENHANCED IDATASET API,03)	Application Attributes Sequence	SQ	1
(0029,SIEMENS SYNGO FUNCTION ASSIGNMENT,01)	Data Reference	LO	1
(0009,SIEMENS SYNGO INDEX SERVICE,20)	Object Insertion Date	DA	1
(0009,SIEMENS SYNGO INDEX SERVICE,A0)	Sender System Device Name	LO	1
(0029,SIEMENS SYNGO VOLUME,12)	Slices	US	1
(0029,SIEMENS SYNGO VOLUME,14)	Volume Histogram	OB	1
(0029,SIEMENS SYNGO VOLUME,18)	Volume Level	IS	1

DICOM Tag	Name	VR	VM
(0029,SIEMENS SYNGO VOLUME,30)	Voxel Spacing	DS	3
(0029,SIEMENS SYNGO VOLUME,32)	Volume Position (Patient)	DS	3
(0029,SIEMENS SYNGO VOLUME,37)	Volume Orientation (Patient)	DS	9
(0029,SIEMENS SYNGO VOLUME,40)	Resampling Flag	CS	1
(0029,SIEMENS SYNGO VOLUME,42)	Normalization Flag	CS	1
(0029,SIEMENS SYNGO VOLUME,44)	SubVolume Sequence	SQ	1-n
(0071,SIEMENS SYNGO REGISTRATION,20)	Registered Image Sequence	SQ	1
(0071,SIEMENS SYNGO REGISTRATION,21)	Registration Is Validated Flag	CS	1
(0071,SIEMENS SYNGO REGISTRATION,20)	Registered Image Sequence	SQ	1
(0071,SIEMENS SYNGO REGISTRATION,21)	Registration Is Validated Flag	CS	1
(7FDF,SIEMENS SYNGO DATA PADDING,FC)	Pixel Data Leading Padding	OB	1

8.2.3 Usage of Attributes from received IODs

N/A

8.2.4 Attribute mapping

There is currently no mapping from attributes received in DICOM Modality Worklist to other attributes.

8.2.5 Coerced / Modified fields

N/A

8.3 CODED TERMINOLOGY AND TEMPLATES

See application specific annexes.

8.3.1 Context Groups

See application specific annexes.

8.3.2 Template Specifications

See application specific annexes.

8.3.3 Private Code definitions

See application specific annexes.

8.4 GRAYSCALE IMAGE CONSISTENCY

N/A

8.5 STANDARD EXTENDED / SPECIALIZED / PRIVATE SOP CLASSES

N/A

8.6 DICOM Print SCU – detailed status displays

The following tables document the behavior of the ***syngo.via*** DICOM Print AE in response to messages received for the printer SOP class and the print job SOP class.

Definitions of camera symbols:

- Idle: Camera is installed and ready; idle icon is displayed.
- Interact: The user has to react in near future, but not immediately.
  Example: A camera was low in 8x10 clear sheets: LOW 8x10 CLR was sent by N-EVENT-REPORT.
- Queue Stopped: The user has to react immediately. Either the camera needs immediate interaction or a job has been aborted.
  Example: A camera is out of 8x10 clear sheets, or camera is down, or a film job is aborted.

Note: different camera symbols are displayed according to the Printer Status Info.

8.6.1 Common Status Information

"Common Status Info evaluation"

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
NORMAL	Camera is ready	Camera is ready	<None>/idle
BAD RECEIVE MGZ	There is a problem with the film receive magazine. Films from the printer cannot be transported into the magazine.	Problem with receive magazine.	<None>/interact
BAD SUPPLY MGZ	There is a problem with the film supply magazine. Films from this magazine cannot be transported into the printer.	Problem with supply magazine.	<None>/interact
CALIBRATING	Printer is performing self calibration, it is expected to be available for normal operation shortly.	Self calibration. Please wait.	<None>/idle
CALIBRATION ERR	An error in the printer calibration has been detected, quality of processed films may not be optimal.	Problem in calibration. Film quality may not be optimal.	<None>/interact
CHECK CHEMISTRY	A problem with the processor chemicals has been detected, quality of processed films may not be optimal.	Problem with chemistry. Film quality may not be optimal.	<None>/interact
CHECK SORTER	There is an error in the film sorter	Error in film sorter.	<None>/interact
CHEMICALS EMPTY	There are no processing chemicals in the processor, films will not be printed and processed until the processor is back to normal.	Camera chemistry empty. Please check.	<None>/interact
CHEMICALS LOW	The chemical level in the processor is low, if not corrected, it will probably shut down soon.	Camera chemistry low. Please check.	<None>/interact
COVER OPEN	One or more printer or processor covers, drawers, doors are open.	Camera cover, drawer or door open.	<None>/interact
ELEC CONFIG ERR	Printer configured improperly for this job.	Camera configured improperly for this job. Queue stopped.	**Queue for this camera will be STOPPED/ Queue stopped**
ELEC DOWN	Printer is not operating due to some unspecified electrical hardware problem.	Camera electrical hardware Problem.	<None>/interact
ELEC SW ERROR	Printer not operating for some unspecified software error.	Camera software problem. Queue stopped.	**Queue for this camera will be STOPPED/**

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
			Queue stopped
EMPTY 8X10	The 8x10 inch film supply magazine is empty.	8x10 film supply empty.	<None>/interact
EMPTY 8X10 BLUE	The 8x10 inch blue film supply magazine is empty.	8x10 blue film supply empty.	<None>/interact
EMPTY 8X10 CLR	The 8x10 inch clear film supply magazine is empty.	8x10 clear film supply empty.	<None>/interact
EMPTY 8X10 PAPR	The 8x10 inch paper supply magazine is empty.	8x10 paper supply empty.	<None>/interact
EMPTY 10X12	The 10x12 inch film supply magazine is empty.	10x12 film supply empty.	<None>/interact
EMPTY 10X12 BLUE	The 10x12 inch blue film supply magazine is empty.	10x12 blue film supply empty.	<None>/interact
EMPTY 10X12 CLR	The 10x12 inch clear film supply magazine is empty.	10x12 clear film supply empty.	<None>/interact
EMPTY 10X12 PAPR	The 10x12 inch paper supply magazine is empty.	10x12 paper supply empty.	<None>/interact
EMPTY 10X14	The 10x14 inch film supply magazine is empty.	10x14 film supply empty.	<None>/interact
EMPTY 10X14 BLUE	The 10x14 inch blue film supply magazine is empty.	10x14 blue film supply empty.	<None>/interact
EMPTY 10X14 CLR	The 10x14 inch clear film supply magazine is empty.	10x14 clear film supply empty.	<None>/interact
EMPTY 10X14 PAPR	The 10x14 inch paper supply magazine is empty.	10x14 paper supply empty.	<None>/interact
EMPTY 11X14	The 11x14 inch film supply magazine is empty.	11x14 film supply empty.	<None>/interact
EMPTY 11X14 BLUE	The 11x14 inch blue film supply magazine is empty.	11x14 blue film supply empty.	<None>/interact
EMPTY 11X14 CLR	The 11x14 inch clear film supply magazine is empty.	11x14 clear film supply empty.	<None>/interact
EMPTY 11X14 PAPR	The 11x14 inch paper supply magazine is empty.	11x14 paper supply empty.	<None>/interact
EMPTY 14X14	The 14x14 inch film supply magazine is empty.	14x14 film supply empty.	<None>/interact
EMPTY 14X14 BLUE	The 14x14 inch blue film supply magazine is empty.	14x14 blue film supply empty.	<None>/interact
EMPTY 14X14 CLR	The 14x14 inch clear film supply magazine is empty.	14x14 clear film supply empty.	<None>/interact
EMPTY 14X14 PAPR	The 14x14 inch paper supply magazine is empty.	14x14 paper supply empty.	<None>/interact
EMPTY 14X17	The 14x17 inch film supply magazine is empty.	14x17 film supply empty.	<None>/interact
EMPTY 14X17 BLUE	The 14x17 inch blue film supply magazine is empty.	14x17 blue film supply empty.	<None>/interact
EMPTY 14X17 CLR	The 14x17 inch clear film supply magazine is empty.	14x17 clear film supply empty.	<None>/interact
EMPTY 14X17 PAPR	The 14x17 inch paper supply magazine is empty.	14x17 paper supply empty.	<None>/interact
EMPTY 24X24	The 24x24 inch film supply magazine is empty.	24x24 film supply empty.	<None>/interact
EMPTY 24X24 BLUE	The 24x24 inch blue film supply magazine is empty.	24x24 blue film supply empty.	<None>/interact
EMPTY 24X24 CLR	The 24x24 inch clear film supply magazine is empty.	24x24 clear film supply empty.	<None>/interact
EMPTY 24X24 PAPR	The 24x24 inch paper supply magazine is empty.	24x24 paper supply empty	<None>/interact
EMPTY 24X30	The 24x30 inch film supply magazine is empty.	24x30 film supply empty.	<None>/interact
EMPTY 24X30 BLUE	The 24x30 inch blue film supply magazine is empty.	24x30 blue film supply empty.	<None>/interact
EMPTY 24X30 CLR	The 24x30 inch clear film supply magazine is empty.	24x30 clear film supply empty.	<None>/interact
EMPTY 24X30 PAPR	The 24x30 inch paper supply magazine is empty.	24x30 paper supply empty.	<None>/interact
EMPTY A4 PAPR	The A4 paper supply magazine is empty.	A4 paper supply empty	<None>/interact
EMPTY A4 TRANS	The A4 transparency supply magazine is empty.	A4 transparency supply empty.	<None>/interact
EXPOSURE FAILURE	The exposure device has failed due to some unspecified reason.	Exposure device has failed.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
FILM JAM	A film transport error has occurred and a film is jammed in the printer or processor.	Film jam.	<None>/interact
FILM TRANSP ERR	There is a malfunction with the film transport, there may or may not be a film jam.	Film transport problem.	<None>/interact
FINISHER EMPTY	The finisher is empty.	Finisher is empty.	<None>/interact
FINISHER ERROR	The finisher is not operating due to some unspecified reason	Finisher problem.	<None>/interact
FINISHER LOW	The finisher is low on supplies.	Finisher low.	<None>/interact
LOW 8X10	The 8x10 inch film supply magazine is low.	8x10 film supply low.	<None>/interact
LOW 8X10 BLUE	The 8x10 inch blue film supply magazine is low.	8x10 blue film supply low.	<None>/interact
LOW 8X10 CLR	The 8x10 inch clear film supply magazine is low.	8x10 clear film supply low.	<None>/interact
LOW 8X10 PAPR	The 8x10 inch paper supply magazine is low.	8x10 paper supply low.	<None>/interact
LOW 10X12	The 10x12 inch film supply magazine is low.	10x12 film supply low.	<None>/interact
LOW 10X12 BLUE	The 10x12 inch blue film supply magazine is low.	10x12 blue film supply low.	<None>/interact
LOW 10X12 CLR	The 10x12 inch clear film supply magazine is low.	10x12 clear film supply low.	<None>/interact
LOW 10X12 PAPR	The 10x12 inch paper supply magazine is low.	10x12 paper supply low.	<None>/interact
LOW 10X14	The 10x14 inch film supply magazine is low.	10x14 film supply low.	<None>/interact
LOW 10X14 BLUE	The 10x14 inch blue film supply magazine is low.	10x14 blue film supply low.	<None>/interact
LOW 10X14 CLR	The 10x14 inch clear film supply magazine is low.	10x14 clear film supply low.	<None>/interact
LOW 10X14 PAPR	The 10x14 inch paper supply magazine is low.	10x14 paper supply low.	<None>/interact
LOW 11X14	The 11x14 inch film supply magazine is low.	11x14 film supply low.	<None>/interact
LOW 11X14 BLUE	The 11x14 inch blue film supply magazine is low.	11x14 blue film supply low.	<None>/interact
LOW 11X14 CLR	The 11x14 inch clear film supply magazine is low.	11x14 clear film supply low.	<None>/interact
LOW 11X14 PAPR	The 11x14 inch paper supply magazine is low.	11x14 paper supply low.	<None>/interact
LOW 14X14	The 14x14 inch film supply magazine is low.	14x14 film supply low.	<None>/interact
LOW 14X14 BLUE	The 14x14 inch blue film supply magazine is low.	14x14 blue film supply low.	<None>/interact
LOW 14X14 CLR	The 14x14 inch clear film supply magazine is low.	14x14 clear film supply low.	<None>/interact
LOW 14X14 PAPR	The 14x14 inch paper supply magazine is low.	14x14 paper supply low.	<None>/interact
LOW 14X17	The 14x17 inch film supply magazine is low.	14x17 film supply low.	<None>/interact
LOW 14X17 BLUE	The 14x17 inch blue film supply magazine is low.	14x17 blue film supply low.	<None>/interact
LOW 14X17 CLR	The 14x17 inch clear film supply magazine is low.	14x17 clear film supply low.	<None>/interact
LOW 14X17 PAPR	The 14x17 inch paper supply magazine is low.	14x17 paper supply low.	<None>/interact
LOW 24X24	The 24x24 inch film supply magazine is low.	24x24 film supply low.	<None>/interact
LOW 24X24 BLUE	The 24x24 inch blue film supply magazine is low.	24x24 blue film supply low.	<None>/interact
LOW 24X24 CLR	The 24x24 inch clear film supply magazine is low.	24x24 clear film supply low.	<None>/interact
LOW 24X24 PAPR	The 24x24 inch paper supply magazine is low.	24x24 paper supply low.	<None>/interact
LOW 24X30	The 24x30 inch film supply magazine is low.	24x30 film supply low.	<None>/interact
LOW 24X30 BLUE	The 24x30 inch blue film supply magazine is low.	24x30 blue film supply low.	<None>/interact

Printer Status Info/ Execution Status Info	Description	Message string visible in 'Status Bar'	Other action for UI/ 'camera symbol'
LOW 24X30 CLR	The 24x30 inch clear film supply magazine is low.	24x30 clear film supply low.	<None>/interact
LOW 24X30 PAPR	The 24x30 inch paper supply magazine is low.	24x30 paper supply low.	<None>/interact
LOW A4 PAPR	The A4 paper supply magazine is low.	A4 paper supply low.	<None>/interact
LOW A4 TRANS	The A4 transparency supply magazine is low.	A4 transparency supply low.	<None>/interact
NO RECEIVE MGZ	The film receive magazine is not available.	Film receiver not available.	<None>/interact
NO RIBBON	The ribbon cartridge needs to be replaced.	Replace ribbon cartridge.	<None>/interact
NO SUPPLY MGZ	The film supply magazine is not available.	Film supply not available.	<None>/interact
CHECK PRINTER	The printer is not ready at this time, operator intervention is required to make the printer available.	Check camera.	<None>/interact
CHECK PROC	The processor is not ready at this time, operator intervention is required to make the printer available.	Check processor.	<None>/interact
PRINTER DOWN	The printer is not operating due to some unspecified reason.	Camera down.	<None>/interact
PRINTER INIT	The printer is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Camera initializing.	<None>/Idle
PRINTER OFFLINE	The printer has been disabled by an operator or service person.	Camera off-line.	<None>/interact
PROC DOWN	The processor is not operating due to some unspecified reason.	Processor down.	<None>/interact
PROC INIT	The processor is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Processor initializing.	<None>/Idle
PROC OVERFLOW FL	Processor chemicals are approaching the overflow full mark.	Processor chemicals near overflow.	<None>/interact
PROC OVERFLOW HI	Processor chemicals have reached the overflow full mark.	Processor chemicals overflow.	<None>/interact
QUEUED	Print job in Queue	--	<None>/Idle
RECEIVER FULL	The film receive magazine is full.	Receiver full.	<None>/interact
REQ MED NOT INST	The requested film, paper, or other media supply magazine is installed in the printer, but may be available with operator intervention.	Install media supply.	<None>/interact
REQ MED NOT AVAI	The requested film, paper, or other media requested is not available on this printer.	Media supply not available on this camera. Queue stopped. Change camera.	Queue for this camera will be STOPPED/ Queue stopped
RIBBON ERROR	There is an unspecified problem with the print ribbon.	Error with print ribbon.	<None>/interact
SUPPLY EMPTY	The printer is out of film.	Camera out of film.	<None>/interact
SUPPLY LOW	The film supply is low.	Film supply low.	<None>/interact
UNKNOWN	There is an unspecified problem.	Unspecified problem with camera.	<None>/interact

8.6.2 Additional DICOM Execution Status Information

Printer Status Info and Execution Status Info are defined terms and can therefore be extended or reduced by camera manufacturers. Therefore ***syngo.via*** shall be flexible.
If any other printer status info or execution status info is received (as described in Table 8.6.1, ***syngo.via*** will react as shown in the following table:

Printer Status / Execution	Printer / Execution Status Info	Description	Message string visible in the Job status bar	Other action for syngo / camera symbol
WARNING	<any other>	<not defined status info>	Camera info: <status info>	<None>/Interact
FAILURE	<any other>	<not defined status info>	Camera info:	Queue for this

Printer Status / Execution	Printer / Execution Status Info	Description	Message string visible in the Job status bar	Other action for syngo / camera symbol
			<status info> Queue stopped.	camera will be STOPPED/ Queue stopped

8.7 *syngo.via* tasks

8.7.1 CT Neuro Perfusion

CT Grayscale image result of CT Neuro Perfusion task may contain HU or US values in rescale type (0028,1054) with the appropriate image comment (0020,4000) according to the following table :

Table 8-5: CT Grayscale image result of CT Neuro Perfusion task

DICOM - Storage as CT Image, i.e. SOP Class UID = 1.2.840.10008.5.1.4.1.1.2 Image Type (0008,0008) Value 1 to 4 in all these result volumes is: DERIVED\SECONDARY\AXIAL\CT PERFUSION Photometric Interpretation = MONOCHROME2 Bits allocated = 16,12,11 and Samples per Pixel = 1						
Type of CT Neuro Perfusion Result Volume	**Calculation Model**	**Image Type value 5 (0008,0008)**	**Rescale Intercept (0028,1052)**	**Rescale Slope (0028,1053)**	**Rescale Type (0028,1054)**	**Proper unit is visible in the image comment (0020, 4000)**
Temporal MIP	Standard	MIP	-1024	1	HU	HU
Temporal Average	Standard	AVG	-1024	1	HU	HU
Baseline	Standard	BASE	-1024	1	HU	HU
Time to Start	Standard	TTSM	-102.4	0.1	US	s
Time to Start	Deconvolution	TTSD	-102.4	0.1	US	s
Time to Peak	Standard	TTPM	-102.4	0.1	US	s
Time to Drain	Deconvolution	TTDD	-102.4	0.1	US	s
Mean Transit Time	Deconvolution	MTTD	-102.4	0.1	US	s
TMax	Deconvolution	TMAXD	-102.4	0.1	US	s
Flow Extraction Product	Deconvolution	FED	-102.4	0.1	US	mL/100mL/min
Cerebral Blood Flow	Maximum Slope	CBFM	-1024	1	US	mL/100mL/min
Cerebral Blood Flow	Deconvolution	CBFD	-1024	1	US	mL/100mL/min
Cerebral Blood Volume	Maximum Enhancement	CBVM	-102.4	0.1	US	mL/100mL
Cerebral Blood Volume	Deconvolution	CBVD	-102.4	0.1	US	mL/100mL

8.8 *ANNEX A – syngo.Breast Care*

8.8.1 syngo.Breast Care

The syngo.Breast Care application allows reviewing and reporting on mammography and breast tomosynthesis images.

8.8.1.1 SOP Specific Conformance to Viewing Application

The following SOP classes are recognized and displayed by the syngo.Breast Care software:

- Digital Mammography Image Storage – For Presentation: 1.2.840.10008.5.1.4.1.1.1.2

  The following constraints must be met in order to recognize images as digital mammography:

Table 8-6: Requirements for Mammography Images

Attribute Name	Tag	Constraint
SOP class UID	(0008,0016)	Value = “1.2.840.10008.5.1.4.1.1.1.2”
Patient orientation	(0020,0020)	Must be present and valid.

- Breast Tomosynthesis Images encoded as CT Image Storage: 1.2.840.10008.5.1.4.1.1.2

  The following constraints must be met in order to recognize images as breast tomosynthesis slices:

Table 8-7: Requirements for Breast Tomosynthesis Image encoded as CT

Attribute Name	Tag	Constraint (case insensitive)
SOP class UID	(0008,0016)	Value = “1.2.840.10008.5.1.4.1.1.2”
Manufacturer	(0008,0070)	Value = “SIEMENS”
Manufacture’s model name	(0008,1090)	Value = “MAMMOMAT INSPIRATION”
Image orientation	(0020,0037)	Must be present and valid.

For the two SOP classes Digital Mammography Image Storage – For Presentation and Breast Tomosynthesis Images encoded as CT Image Storage, the following constraints must be met:

Table 8-8: Common Requirements for Mammography and Breast Tomosynthesis Images

Attribute Name	Tag	Constraint
Pixel representation	(0028,0103)	Value = 0
Bits allocated	(0028,0100)	Value = 8 or value = 16
High bit	(0028,0102)	Bits stored in {8, 10, 12, 14, 15, 16} and bits stored = high bit + 1
Bits stored	(0028,0101)	
Samples per pixel	(0028,0002)	Value = 1

Attribute Name	Tag	Constraint
Photometric interpretation	(0028,0004)	Value = “MONOCHROME1” or Value = “MONOCHROME2”

Only image data meeting all requirements is displayed correctly. If any constraints are violated, the image data may not be automatically displayed, displayed with reduced information or not be displayed at all. In this case a warning message is displayed to the user.

- Mammography CAD SR: 1.2.840.10008.5.1.4.1.1.88.50

  The following constraints must be met in order to recognize images as mammography computer-aided detection structured reports:

Table 8-9: Requirements for Mammography CAD SR

Attribute Name	Tag	Constraint (case insensitive)
SOP class UID	(0008,0016)	Value = “1.2.840.10008.5.1.4.1.1.88.50”
Manufacturer	(0008,0070)	Supported values: “SIEMENS”, “iCAD, Inc.”, “VuCOMP”
Software Version(s)	(0018,1020)	The following software versions are supported per manufacturer: • “SIEMENS”: “syngo MammoCAD” • “iCAD, Inc.”: “7.2-H+”, “Premier-D” • “VuCOMP”: “CAD 2.0.0.0”, “CAD 2.1.0.0”

CAD structured reports of manufacturers or other software versions of the listed manufacturers may or may not be displayed correctly. A warning message is not displayed to the user in this case.

For CAD SRs meeting these constraints, only those single image findings are displayed that meet the following constraints:

Concept Name	Code Sequence	Constraint (case insensitive)
Single Image Finding	EV (111059, DCM, “Single Image Finding”)	Supported values: • EV (F-01775, SRT, “Calcification Cluster”) • EV (F-01775, SRT 1.1, “Calcification Cluster”) • EV (F-01796, SRT, “Mammography breast density“) • EV (F-01796, SRT 1.1, “Mammography breast density“) • EV (F-01776, SRT, “Individual Calcification”) (Only if not part of a calcification cluster) • EV (F-01776, SRT 1.1, “Individual Calcification”) (Only if not part of a calcification cluster) • EV (F-01710, SRT, “Breast Composition”) (regardless of rendering intent)
Rendering Intent	EV (111056, DCM, “Rendering Intent”)	Value = EV (111150, DCM, "Presentation Required: Rendering device is expected to present") if single image finding is not EV (F-01710, SRT, “Breast Composition”)
Outline	EV (111041, DCM, “Outline”)	If single image finding is EV (F-01710, SRT, “Breast Composition”), the outline may or may not be present. For other single image findings, the value must be present and contain at least one point.

8.8.1.2 IOD Contexts for Image Text

The following information is displayed as image text, if present.

The specified data is mandatory or optional as defined by the DICOM standard [1]. For not available data attributes, either nothing or “n./a.” is displayed in the image text.

Table 8-10: DICOM Tags used for Image Text

Attribute / Concept Name	Tag / Code Sequence	Comment
Acquisition Date and Time		
Acquisition date	(0008,0022)	Fallback: Study date and time.
Acquisition time	(0008,0032)	

Attribute / Concept Name	Tag / Code Sequence	Comment
Study date	(0008,0020)	Displayed if acquisition date and time are not set. In this case, a disclaimer message is also displayed.
Study time	(0008,0020)	
Patient and Study Data		
Accession number	(0008,0050)	
Institution name	(0008,0080)	
Institution address	(0008,0081)	
Station name	(0008,1010)	
Patient's name	(0010,0010)	
Patient ID	(0010,0020)	
Patient's birth date	(0010,0030)	
Patient's age	(0010,1010)	
Image Acquisition		
Manufacturer	(0008,0070)	
Operator's name	(0008,1070)	
Manufacturer's model name	(0008,1090)	
KVP	(0018,0060)	
Gantry ID	(0018,1008)	
Device serial number	(0018,1000)	
Exposure time	(0018,1150)	
Exposure	(0018,1152)	
Software versions	(0018,1020)	
Anode target material	(0018,1191)	
Body part thickness	(0018,11A0)	
Compression force	(0018,11A2)	
Relative x-ray exposure	(0018,1405)	
Positioner primary angle	(0018,1510)	
Sensitivity	(0018,6000)	
Detector ID	(0018,700A)	
Date of last detector calibration	(0018,700C)	
Filter material	(0018,7050)	
Image comment	(0020,4000)	
Organ dose	(0040,0316)	
Entrance dose in mGy	(0040,8302)	
View and Laterality		
View	(0054,0220)	If the view (0054,0220) or view code modifier sequence (0054,0222) contain

Attribute / Concept Name	Tag / Code Sequence	Comment
View code modifier sequence	(0054,0222)	invalid values, the view type may be displayed as “?”.
Image laterality	(0020,0062)	If one of these tags is present but contains an invalid value, the software may fall back to unpaired (“U”).
Laterality	(0020,0060)	
Lookup Tables		
LUT explanation	(0028,3003)	Only one of both is used, depending on which LUT is used.
Window explanation	(0028,1055)	
Window center	(0028,1050)	
Window width	(0028,1051)	
Measurements		
Imager pixel spacing	(0018,1164)	Used for display of resolution and magnification factor. Variant A: If estimated radiographic magnification factor (0018,1114) is not available, distance source to patient (0018,1111) and detector (0018,1110) is used.
Estimated radiographic magnification factor	(0018,1114)	
Distance source to patient	(0018,1111)	
Distance source to detector	(0018,1110)	
Pixel spacing	(0028,0030)	Used for display of resolution and magnification factor. Variant B: Used if variant A fails.
Image plane pixel spacing	(3002,0011)	Used for display of resolution and magnification factor. Variant C: Used if variants A and B fail.
Breast Tomosynthesis		
Derivation description	(0008,2111)	
Instance number	(0020,0013)	Used for display of slice number.
Images in acquisition	(0020,1002)	Used for display of total number of slices.
Computer-Aided Detection		
Manufacturer	(0008,0070)	Manufacturer of CAD SR
Software Version(s)	(0018,1020)	Software versions of CAD software which generated the CAD SR
Content Date	(0008,0023)	Content date of CAD SR
Content Time	(0008,0033)	Content time of CAD SR
Algorithm Name	EV(111001, DCM, “Algorithm Name”)	Algorithm names of the displayed single image findings.
Algorithm Version	EV (111003, DCM, “Algorithm	Algorithm versions of the displayed single image findings.

Attribute / Concept Name	Tag / Code Sequence	Comment
	Version")	
Breast Composition	EV (F-01710,SRT, "Breast composition")	Breast composition value of the breast composition single image finding (if present).
Glandular Tissue	EV (111046, DCM, "Percent Fibroglandular Tissue")	Glandular tissue value of the breast composition single image finding (if present).
Summary of Detections	EV (111064, DCM, "Summary of Detections")	
Summary of Analyses	EV (111065, DCM, "Summary of Analyses")	
Area	EV (G-A166, SNM3, „Area")	If present for single image finding.
Long Axis	EV (G-A185, SNM3, "Long Axis")	If present for single image finding.
Number of Calcifications	EV (111038, DCM, "Number of Calcifications")	For calcification clusters, if present for single image finding.
Certainty of Finding	EV (111012, DCM, "Certainty of Finding")	If present for single image finding.
Distance from Nipple	EV (121242, DCM, "Distance from Nipple")	If present for single image finding.
Distance from Chest Wall	EV (121244", "DCM", " Distance from Chest Wall")	If present for single image finding.