DICOM Conformance Statement

*syngo.*via View&GO VA25A

SIEMENS Healthineers

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CONFORMANCE STATEMENT OVERVIEW

The ***syngo.*via View&GO** is lightweight reading software solution with connectivity to DICOM modalities and healthcare information systems. By default one ***syngo.*via View&GO** (**AE**) is used. It is possible to configure usage of multiple different AEs for the individual DICOM services.

The ***syngo.*via View&GO**:

- o requests storage of objects (images, reports, encapsulated PDF)
- o support query and retrieval of objects from a remote node
- o displays images to a user
- o imports objects from portable interchange media
- o exports objects to non-optical storage device (e.g. USB stick)

The ***syngo.*via View&GO** conforms to the DICOM Standard and supports the network services as described in Table 0-1 and the media services as described in Table 0-2.

Table 0-1 Network Services

SOP Classes	Service Class User (SCU)	Service Class Provider (SCP)
Verification		
Verification Service	Yes	Yes
Transfer(Image SOP Class)		
Computed Radiography Image Storage	Yes	Yes
CT Image Storage	Yes	Yes
Digital X-Ray Image Storage - For Presentation	Yes	Yes
Digital X-Ray Image Storage - For Processing	Yes	Yes
Enhanced CT Image Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
Enhanced MR Color Image Storage	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Ultrasound Multi-Frame Image Storage	Yes	Yes
Ultrasound Multi-Frame Image Storage (Retired)	Yes	Yes
X-Ray Angiographic Image Storage	Yes	Yes
X-Ray Radio-Fluoroscopic Image Storage	Yes	Yes
Transfer(Private SOP Class)		
CSA Non-Image Storage	Yes	Yes
Query / Retrieve		
Patient Root – Query/Retrieve Information Model – FIND	Yes	No
Patient Root – Query/Retrieve Information Model – MOVE	Yes	No
Study Root – Query/Retrieve Information Model – FIND	Yes	No
Study Root – Query/Retrieve Information Model –	Yes	No

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

Table 0-2 Media Services

Media Storage Application Profile	Write Files (FSC)	Read Files (FSR)
Compact Disk – Recordable		
STD-GEN-CD (augmented, see 3.2.1)	No	Yes
DVD – Recordable		
STD-GEN-DVD (augmented, see 3.2.1)	No	Yes
STD-GEN-DVD-J2K (augmented, see 3.2.1)	No	Yes
BD - Recordable		
STD-GEN-DVD-J2K (augmented, see 3.2.1)	No	Yes
USB		
STD-GEN-USB-J2K (augmented, see 3.2.1)	Yes	Yes

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1 INTRODUCTION

1.1 REVISION HISTORY

Version/ Status	Date of Issue	Product / Version	Author	Change & Reason of Change
1.0	2020-06-10	*syngo.*via View&GO VA25A	Krisztian Paka (ADV D EU HU OPS 4 3)	Review findings incorporated.
0.1	2020-05-21	*syngo.*via View&GO VA25A	IOD DSEU HU OPS 4 3	Draft version for syngo.via View&GO VA25A based on 3.0 version of VA16A.

1.2 GENERAL

The Conformance Statement describes the DICOM interface for the ***syngo.*via View&GO** in terms of DICOM Part PS3.2 2016a [1].

1.3 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.

1.4 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 Healthineers and other vendors' medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM PS3.1-3.20 2016a 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 Healthineers 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 Healthineers 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.

1.5 TERMS AND DEFINITIONS

Terms used in this document shall be interpreted as defined in the DICOM Standard.

1.6 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
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
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
TLS	Transport Layer Security
U	Unique Key Attribute

1.7 REFERENCES

[1] Digital Imaging and Communications in Medicine (DICOM PS3.1-3.20 2016a), National Electrical Manufacturers Association (NEMA), http://medical.nema.org/

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

1.8 SCOPE AND FIELD OF APPLICATION

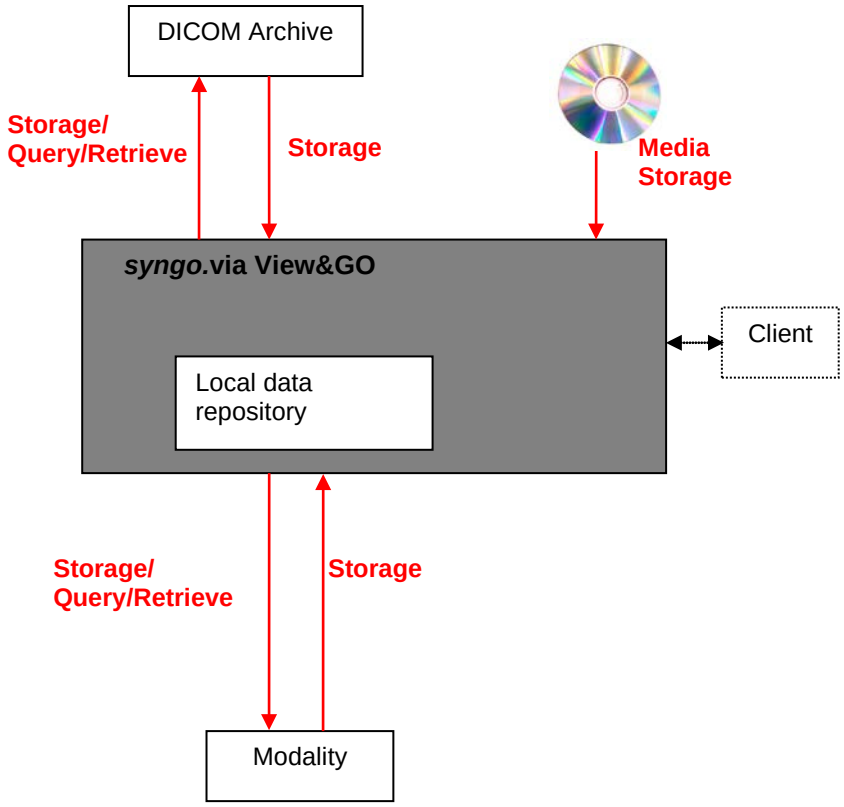

Figure 1.8-1: Overview about DICOM capabilities of *syngo.*via View&GO VA25A

2 NETWORKING

2.1 IMPLEMENTATION MODEL

2.1.1 Application Data Flow

The Application Data Flow diagram in Figure 2.1-1 depicts the DICOM data flow to and from the individual applications within ***syngo.*via View&GO**.

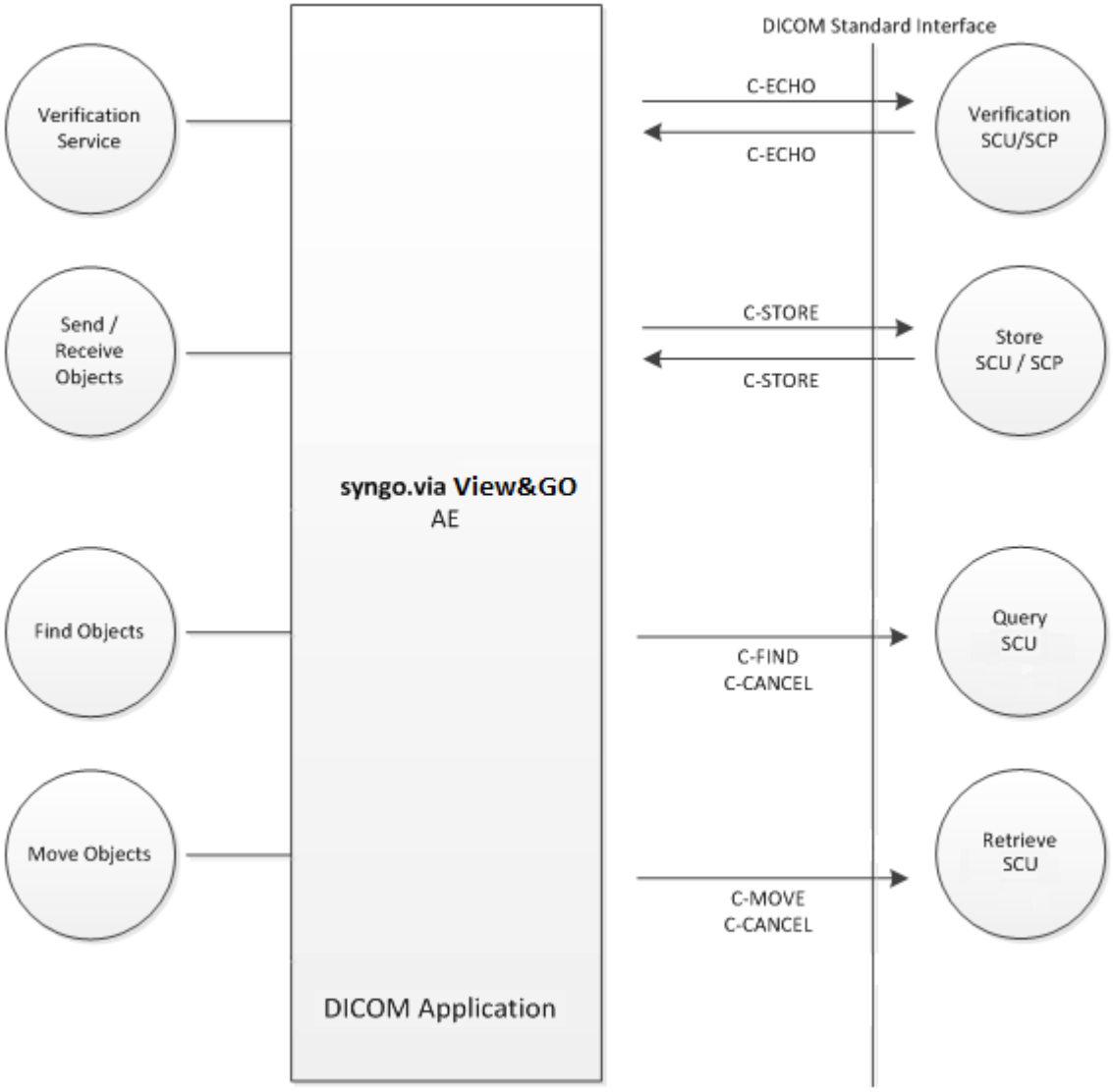

Figure 2.1-1: Application Data Flow Diagram

2.1.2 Functional Definition of AE's

The SCP components of the Application Entities of the ***syngo.*via View&GO** operate as background server processes. They exist as soon as soon as the application starts 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 indirectly triggered from internal processes.

2.1.2.1 Verification

Verification requests (SCP) will be processed and responded by the ***syngo.*via View&GO** AE. The ***syngo.*via View&GO** AE can also initiate an association and request verification to a remote AE (SCU).

2.1.2.2 Storage

The ***syngo.*via View&GO** Storage SCU is invoked directly by the user, or 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 ***syngo.*via View&GO** 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 responses to the Storage Request immediately after reception of the Data.

2.1.2.3 Storage Commitment

The ***syngo.*via View&GO** does not support Storage Commitment.

2.1.2.4 Query

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

As an SCU ***syngo.*via View&GO** supports

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

2.1.2.5 Retrieve

The ***syngo.*via View&GO** 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 View&GO** Storage SCP.

As an SCP ***syngo.*via View&GO** supports

- Study Root Query/Retrieve Information Model (MOVE,GET)
- Patient Root Query/Retrieve Information Model (MOVE,GET)
- Patient/Study Only Query/Retrieve Information Model (MOVE,GET)

2.1.3 Sequencing of Real-World Activities

Verify:

The communication between ***syngo.*via View&GO** and an external DICOM node in case of Verify is depicted in Figure 2.1-2 in more detail.

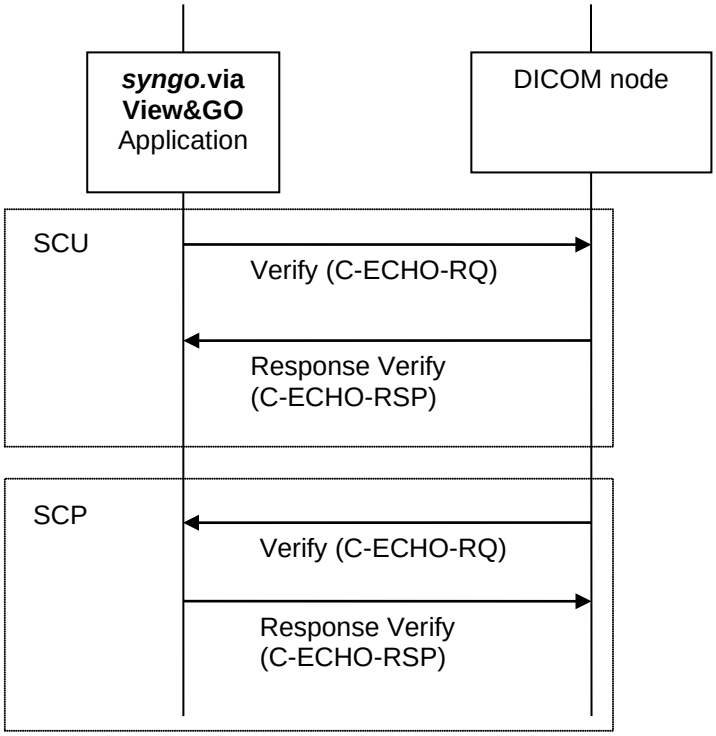

Figure 2.1-2: Sequence diagram – Verify

Storage:

The communication between ***syngo*.via View&GO** and an external DICOM node in case of triggering the transfer or accepting storage requests is depicted in more detail.

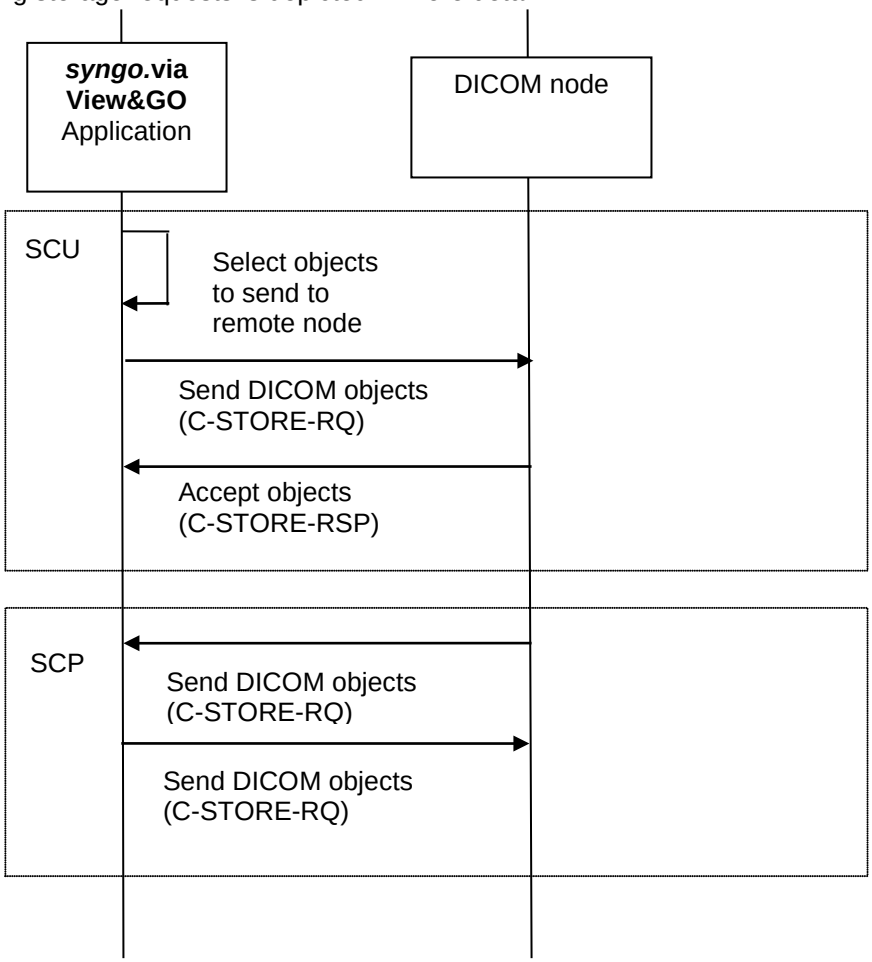

Figure 2.1-3: Sequence diagram – Storage

Query and Retrieve:

The communication between ***syngo.*via View&GO** and an external DICOM node in case of querying of objects from a remote DICOM node and retrieval to ***syngo.*via View&GO** is depicted in Figure 2.1-4 in more detail.

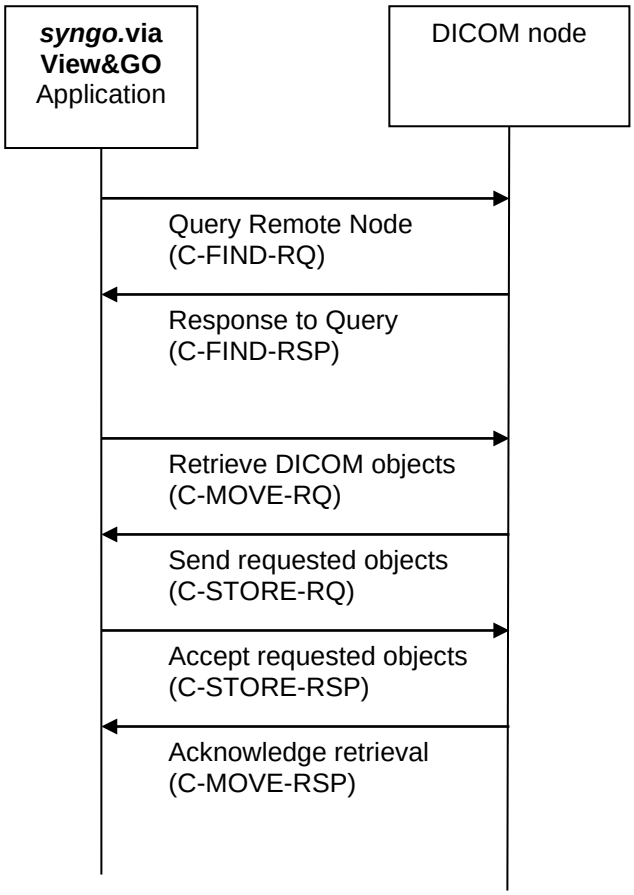

Figure 2.1-4: Sequence diagram – Query/Retrieve

2.2 AE SPECIFICATIONS

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

2.2.1 *syngo.*via View&GO AE

2.2.1.1 SOP Classes supported

This Application Entity provides Standard Conformance to the SOP Classes listed in Table 6-1 SOP CLASSES and.

2.2.1.2 Association Establishment Policies

Table 2-1: 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	6[1]
Maximum number of simultaneous associations as an association initiator	unlimited

The ***syngo.*via View&GO** AE contains a limitation of 512 kB for the maximum PDU size. By default, the 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 6. 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.

2.2.1.2.1 Asynchronous Nature

The ***syngo.*via View&GO** 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 2-2: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	Infinite

2.2.1.2.2 Implementation Identifying Information

Table 2-3: DICOM Implementation Class and Version

Implementation Class UID	1.3.12.2.1107.5.8.15.10.20090701
Implementation Version Name	syngo.ViewAndGO

2.2.1.3 Association Initiation Policy

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

Table 2-4: Association initiation policies

Operation or Real-World Activity	Association for
Verification	C-ECHO
Send / Receive Instance	C-STORE
Querying a remote node	C-FIND
Retrieval of Instances	C-MOVE

[1] Default, the value is configurable

2.2.1.3.1 Activity "Verification"

2.2.1.3.1.1 Description and Sequencing of Activities

The ***syngo.*via View&GO** verification process will accept an association, send ECHO request and receive reply.

2.2.1.3.1.2 Accepted Presentation Contexts

Table 2-5: Acceptable Presentation Contexts for Verification Activity

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	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		

2.2.1.3.1.3 SOP specific Conformance for SOP classes

***syngo.*via View&GO** provides standard conformance to the Verification service SCU.

2.2.1.3.2 Activity "Send To"

2.2.1.3.2.1 Description and Sequencing of Activities

Storage of DICOM object is triggered internally in the ***syngo.*via View&GO**.

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.

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

2.2.1.3.2.2 Proposed Presentation Contexts

For all supported Transfer objects (see SOP Classes in Table 6-1) the following Transfer Syntaxes are supported:

Table 2-6: Proposed Presentation Contexts for Storage

UID value	Transfer Syntax	Type
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian native	Image / non-image
1.2.840.10008.1.2	Implicit Value Representation Little Endian native	Image / non-image
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) lossless compressed	Image

UID value	Transfer Syntax	Type
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Lossless Only) compressed	Image
1.2.840.10008.1.2.5	RLE Lossless compressed	Image
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4) lossy compressed	Image
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1) lossy compressed	Image
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression lossy compressed	Image

Storage SCU Service will choose a compressed or uncompressed Transfer Syntax among those accepted by the SCP for images.

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 or 8
- Bits Stored (0028,0101) equal to 12 or 8
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to 0

An instance will be JPEG lossy compressed only if the following criteria is fulfilled:

- is an image
- photometric interpretation (0028,0004) is MONOCHROME or RGB
- Bits Allocated (0028,0100) equal to 16 or 8
- Bits Stored (0028,0101) equal to 12 or 8
- High Bit (0028,0102) equal to Bits Stored (0028,0101) - 1
- Pixel Representation (0028,0103) equal to 0
- Only lossy transfer syntaxes are supported (Implicit Little Endian is not supported) at the remote side

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) is either MONOCHROME or RGB or YBR_FULL or YBR_FULL_422
- Bits Allocated (0028,0100) equal to 16 or 8

An instance will be JPEG 2000 lossy compressed only if the following criteria is fulfilled:

- is an image
- Photometric interpretation (0028,0004) is MONOCHROME or RGB
- Bits Stored (0028,0101) equal to 12 or 8
- Only lossy transfer syntaxes are supported (Implicit Little Endian is not supported) at the remote side

There is no extended negotiation as an SCU.

2.2.1.3.2.3 SOP specific Conformance for SOP classes

The ***syngo*.via View&GO** 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 View&GO** when encountering status codes in a C-STORE response is summarized in Table 2-7:

Table 2-7: 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.	0111	Job is continued till the end.
Error	Out-Of-Resources: The remote node has run out of resources (storage resources for example)	A7XX	Job is continued till the end. The result can be checked by checking the availability of the data on the target node.
Error	Any other DIMSE Error Status	XXXX	User does not get notified. Job is continued till the end. Error is logged in the system log. The result can be checked by checking the availability of the data on the target node.
Success	Image is successfully stored on file system.	0000	User does not get notified. The result can be checked by checking the availability of the data on the target node.

Table 2-8: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	User does not get notified. The result can be checked by checking the availability of the data on the target node.
Association Aborted	User does not get notified. The result can be checked by checking the availability of the data on the target node.

2.2.1.3.2.4 CT Derived object for LungCAD findings generated by ***syngo.*via View&GO**

Attribute	Tag	Type	Description
Specific Character Set	(0008, 0005)	1C	Copied from Input Image
Image Type	(0008,0008)	1	Value 1: DERIVED Value 2: SECONDARY Value 3: AXIAL Value 4: AlgorithmName_AlgorithmVersion_DO
Instance Creation Date	(0008,0012)	3	DO[1] instance creation date
Instance Creation Time	(0008,0013)	3	DO[1] instance creation time
SOP Class UID	(0008,0016)	1	Copied from Input Image
SOP Instance UID	(0008,0018)	1	1.3.12.2.1107.5.99.3.99.UID[2]
Study Date	(0008,0020)	2	Copied from Input Image
Series Date	(0008,0021)	3	Creation Date of the DO[1] in <YYYYMMDD> format
Acquisition Date	(0008,0022)	3	Copied from Input Image
Study Time	(0008,0030)	2	Copied from Input Image
Series Time	(0008,0031)	3	Creation Time of the DO[1] in <HHMMSS> format
Acquisition Time	(0008,0032)	3	Copied from Input Image
Accession Number	(0008,0050)	2	Copied from Input Image
Modality	(0008,0060)	1	Copied from Input Image
Manufacturer	(0008,0070)	2	Copied from Input Image

Attribute	Tag	Type	Description
Institution Name	(0008,0080)	3	Copied from Input Image
Referring Physician's Name	(0008,0090)	2	Copied from Input Image
Study Description	(0008,1030)	3	Copied from Input Image
Series Description	(0008,103E)	3	Series description as configured by the application
Name Of Physician(s) Reading Study	(0008,1060)	3	Copied from Input Image
Manufacturer's Model Name	(0008,1090)	3	Copied from Input Image
Derivation description	(0008,2111)	3	Set AlgorithmName_AlgorithmVersion_DO value. For example: LUNGCAD_VD10C_DO
Source Image Sequence	(0008,2112)	3	Set input image SOP class UID and input image SOP instance UID from original image
>Reference SOP Class UID	(0008,1150)		From original image's SOP Class UID
>Reference SOP Instance UID	(0008.1155)		From original image's SOP Instance UID
Patient Name	(0010,0010)	2	Copied from Input Image
Patient ID	(0010,0020)	2	Copied from Input Image
Patient's Birth Date	(0010,0030)	2	Copied from Input Image
Patient's Sex	(0010,0040)	2	Copied from Input Image
Patient's Size	(0010,1020)	3	Copied from Input Image
Patient's Weight	(0010,1030)	3	Copied from Input Image
Pregnancy Status	(0010,21C0)	3	Copied from Input Image
Imager Pixel Spacing	(0018,1164)	3	Copied from Input Image
Patient Position	(0018,5100)	2C	Copied from Input Image
View Position	(0018,5101)	3	Copied from Input Image
Detector Element Physical Size	(0018,7020)	3	Copied from Input Image
Detector Element Spacing	(0018,7022)	3	Copied from Input Image
Study Instance UID	(0020,000D)	1	Copied from Input Image
Series Instance UID	(0020,000E)	1	1.3.12.2.1107.5.99.3.99.UID[2]
Study ID	(0020,0010)	2	Copied from Input Image
Series Number	(0020,0011)	2	Series Number as configured by the user
Patient Orientation	(0020,0020)	2	Copied from Input Image
Image Laterality	(0020,0062)	1	Copied from Input Image
Samples PerPixel	(0028,0002)	1	Copied from input image
Photometric Interpretation	(0028,0004)	1	Copied from input image
Rows	(0028,0010)	1	Copied from input image
Columns	(0028,0011)	1	Copied from input image
Pixel Spacing	(0028,0030)	1	Copied from input image
Bits Allocated	(0028,0100)	1	Copied from input image
Bits Stored	(0028,0101)	1	Copied from input image
High Bit	(0028,0102)	1	Copied from input image
Pixel Representation	(0028,0103)	1	Copied from input image
Window Center	(0028,1050)	1	Copied from Input Image
Window Width	(0028,1051)	1	Copied from Input Image
Rescale Intercept	(0028,1052)	1	Copied from input image

Attribute	Tag	Type	Description
Rescale Slope	(0028,1053)	1	Copied from input image
Rescale Type	(0028,1054)	1	Copied from input image
Presentation Creator's Name	(0070,0084)	2	Algorithm Name_Version_DO[1]
Study Comments	(0032,4000)	3	Copied from input image
Pixel Data	(7FE0,0010)	1	Sets the Derived Pixel data

1 – Derived Object
2 – UID generated by syngo.via View@GO

2.2.1.3.3 Activity "Querying a Remote Node" for Instances

2.2.1.3.3.1 Description and Sequencing of Activities

The associated Real-World activity is a C-Find request initiated by the user (see also Figure 2.1-4). 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.

2.2.1.3.3.2 Proposed Presentation Contexts

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

Table 2-9: 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 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	SCU	No
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

Table 2-10: 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 as defined in DICOM PS3.4 2016a.
Study Root Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Relational Query will be negotiated as defined in DICOM PS3.4 2016a.

2.2.1.3.3.3 SOP Specific Conformance Statement to Query SOP classes

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

Table 2-11: DICOM Command Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Failure	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.	FF00	Pending state is indicated to user
	Matching Operation continues; some of the optional keys were not supported the same way as the required keys	FF01	Pending state is indicated to user
Success	Query has been performed successfully.	0000	Success reported to user

Table 2-12: 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 View&GO** supports the following query levels:

- Study
- Series

Matching Keys on Instance Level is not supported by ***syngo.*via View&GO** as SCU.

The following table lists the various attributes at Study and Series levels, which can be used for **hierarchical** 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 2-13: Attributes supported for instance Query - SCU

Attribute Name	Tag	Type	User input	UI
Study Level				
Patient's Name	(0010,0010)	O	enter value	yes
Patient ID	(0010,0020)	O	enter value	yes
Issuer of Patient ID	(0010,0021)	O	enter value	yes
Patient's Birth Date	(0010,0030)	O	enter value	yes
Patient's Birth Time	(0010,0032)	O	enter value	yes
Patient's Sex	(0010,0040)	O	enter value	yes
Accession Number	(0008,0050)	O	enter value	yes
Study ID	(0020,0010)	O	enter value	yes
Study Instance UID	(0020,000D)	U	enter value	yes
Study Date	(0008,0020)	O	enter value	yes
Study Time	(0008,0030)	O	enter value	yes
Referring Physician' s Name	(0008,0090)	O	enter value	yes
Study Description	(0008,1030)	O	enter value	yes
Number of Study related Instances	(0020,1208)	O	-	yes
Modalities in Study	(0008,0061)	O	enter value	yes
Number of Study Related Series	(0020,1206)	O	-	yes
Series Level				
Modality	(0008,0060)	O	enter value	yes
Series Date	(0008,0021)	O	enter value	yes
Series Time	(0008,0031)	O	enter value	yes
Number of Series related Instances	(0020,1209)	O	-	yes
Series Number	(0020,0011)	O	enter value	yes
Series Description	(0008,103E)	O	enter value	yes
Request Attributes Sequence \ Requested Procedure ID	(0040,0275) \ (0040,1001)	O	enter value	yes
Request Attributes Sequence \ Scheduled Procedure Step ID	(0040,0275) \ (0040,0009)	O	enter value	yes
Performed Procedure Step Start Date	(0040,0244)	O	enter value	yes
Performed Procedure Step Start Time	(0040,0245)	O	enter value	yes
Series Instance UID	(0020,000E)	U	-	yes

2.2.1.3.4 Activity Retrieving Instances from a remote node

2.2.1.3.4.1 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.

2.2.1.3.4.2 Accepted Presentation Contexts

Table 2-14: 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**		
Patient Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	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		
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		
Patient Study Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	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		

2.2.1.3.4.3 SOP Specific Conformance Statement for Move SCU Classes

The behavior of ***syngo*.via View&GO** when encountering status codes in a C-MOVE response is summarized in Table 2-15:

Table 2-15: 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; Move destination unknown	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 2-16: DICOM Command Communication Failure Behavior

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

2.2.1.4 Association Acceptance Policy

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

- DIMSE C-STORE
  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 View&GO**.
- The "calling AET" is known (configured) at ***syngo.*via View&GO**.
- 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)

2.2.1.4.1 Activity "Verification"

2.2.1.4.1.1 Description and Sequencing of Activities

The ***syngo.*via View&GO** verification process will accept an association, receive ECHO request and send reply.

2.2.1.4.1.2 Accepted Presentation Contexts

Table 2-17: Acceptable Presentation Contexts for Verification Activity

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Ext. Neg.**
Name	**UID**	**Name List**	**UID List**		
Verification	1.2.840.10008.1.1	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		

2.2.1.4.1.3 SOP specific Conformance for SOP classes

***syngo.*via View&GO** provides standard conformance to the Verification service SCP.

2.2.1.4.2 Activity “Receive Instances”

2.2.1.4.2.1 Description and Sequencing of Activities

The ***syngo.*via View&GO** receiving process will accept C-STORE association requests, receive any objects transmitted on that association and store the objects on disk.

2.2.1.4.2.2 Accepted Presentation Contexts

For all supported Transfer objects (see SOP Classes in Table 6-1) the Transfer Syntaxes described in Table 2-6 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.

There is no Extended Negotiation as an SCP

2.2.1.4.2.3 SOP-specific Conformance Statement for Storage SOP classes

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

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

***syngo.*via View&GO** AE returns the status “success” when the data is received and a minimal image header validation has been performed.

The following header attributes must be available and filled:

- SOP Class UID,
- Study Instance UID,
- Series Instance UID and
- SOP Instance UID.

Table 2-18: Storage C-STORE Response Status

Service Status	Further Meaning	Error Code	Reason
Success	success	0000	Image received correctly (success notification is done after receiving, before indexing and storing)
Failure	Out-of-resource	A700	No resource left in the Short Term Storage
Failure	Unable to Process	Cxxx	Error during instance reception
Failure	Data set does not match SOP Class	A9xx	The data set is not conform to the SOP Class contained in the resource.

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

2.2.1.4.2.4 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.

2.3 NETWORK INTERFACES

2.3.1 Physical Network Interface

The ***syngo.*via View&GO** provides DICOM 3.0 TCP/IP network communication support as defined in Part 8 of DICOM [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.

2.3.2 Additional Protocols

none

2.3.3 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.

2.4 CONFIGURATION

2.4.1 AE Title/Presentation Address Mapping

AE Titles shall be unique within the network of the interconnected DICOM nodes. 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].

2.4.1.1 Secure DICOM Communication

The system supports configuring the DICOM communication to use secure channel (TLS) between ***syngo.*via View&GO** and configured remote nodes. As a security measure the certificate thumbprint or certificate trust chain of the remote nodes shall be added (pinned) to the ***syngo.*via View&GO** system to authorize the incoming connection.

Detailed instructions how to set up secure DICOM communication are available in the Operator Manual.

Note: The default DICOM basic port is 104, default DICOM TLS port is 2762 (both can be reconfigured).

If the certificate of remote node contains Enhanced Key Usage (Extended Key Usage) field, then:

- If the remote node acts as DICOM SCP it shall contain Server Authentication (1.3.6.1.5.5.7.3.1)

- If the remote node acts as a DICOM SCU it shall contain Client Authentication (1.3.6.1.5.5.7.3.2)

Otherwise syngo.via View&GO will not accept the certificate.

2.4.1.2 Local AE Titles

The ***syngo.*via View&GO** allows to configure AETitles, Ports any way. Default delivery is that all services are using the same AE title and only one port number.

Parameter	Configurable	Default Value
Default AE title	Yes	hostname in uppercase characters; limited to 16 characters
Default Port	Yes	104
Default Secure Port	Yes	2762

2.4.1.3 Remote AE Title/Presentation Address Mapping

2.4.1.3.1 Remote Association Initiators

All relevant remote applications that may setup DICOM associations towards ***syngo.*via View&GO** need to be configured in ***syngo.*via View&GO**, 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. The Application Entity Titles and supported transfer syntaxes need to be known for configuration.

To enable a fast and efficient configuration possibility Siemens Healthineers 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.

2.4.1.3.2 Remote SCP's

For remote applications that shall be able to accept DICOM associations from ***syngo.*via View&GO**, 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 View&GO** with a logical name that is also entered when configuring the node in the configuration UI.

To enable a fast and efficient configuration possibility Siemens Healthineers 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.

3 MEDIA INTERCHANGE

3.1 IMPLEMENTATION MODELS

3.1.1 Application Data Flow Diagram

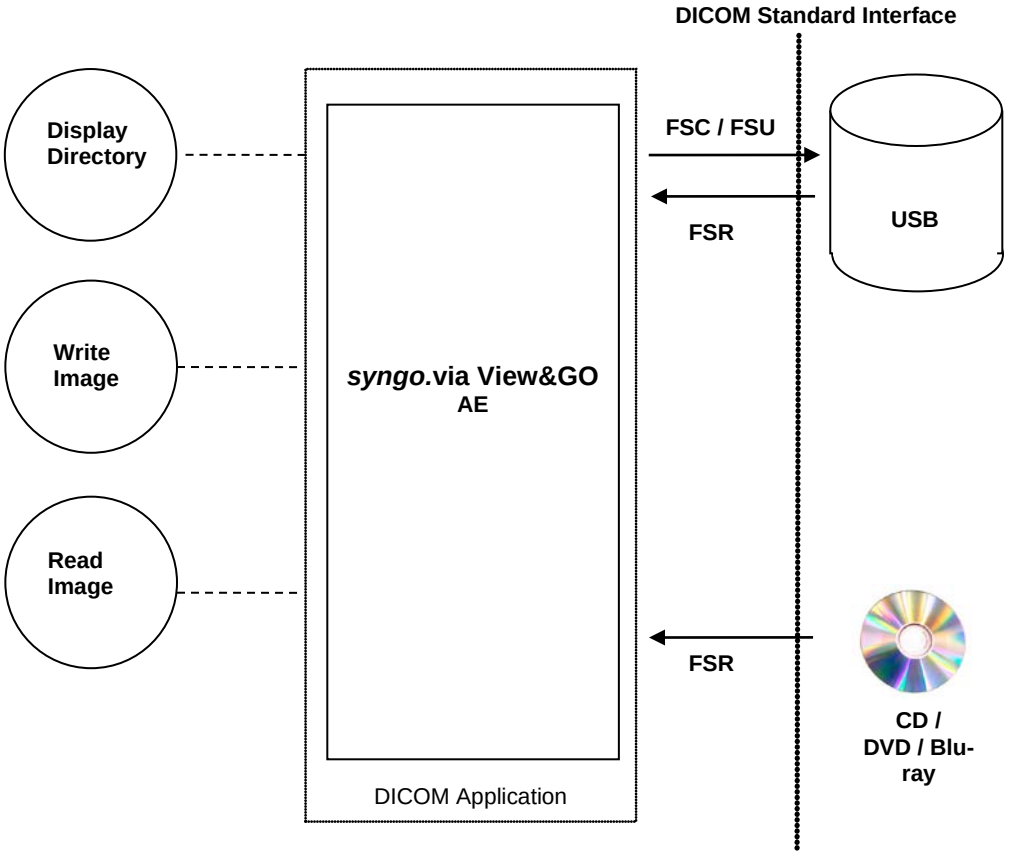

Figure 3.1-1: Media Interchange Application Data Flow Diagram

The ***syngo.*via View&GO** 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). All SOP Classes defined in Table 3-3 and are supported for the Import/Export functionality.

3.1.2 Functional definitions of AEs

The ***syngo.*via View&GO** 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

3.1.3 Sequencing of Real-World Activities

Whenever data is written to an external media, ***syngo.*via View&GO** a DICOMDIR may be created for the selected data.

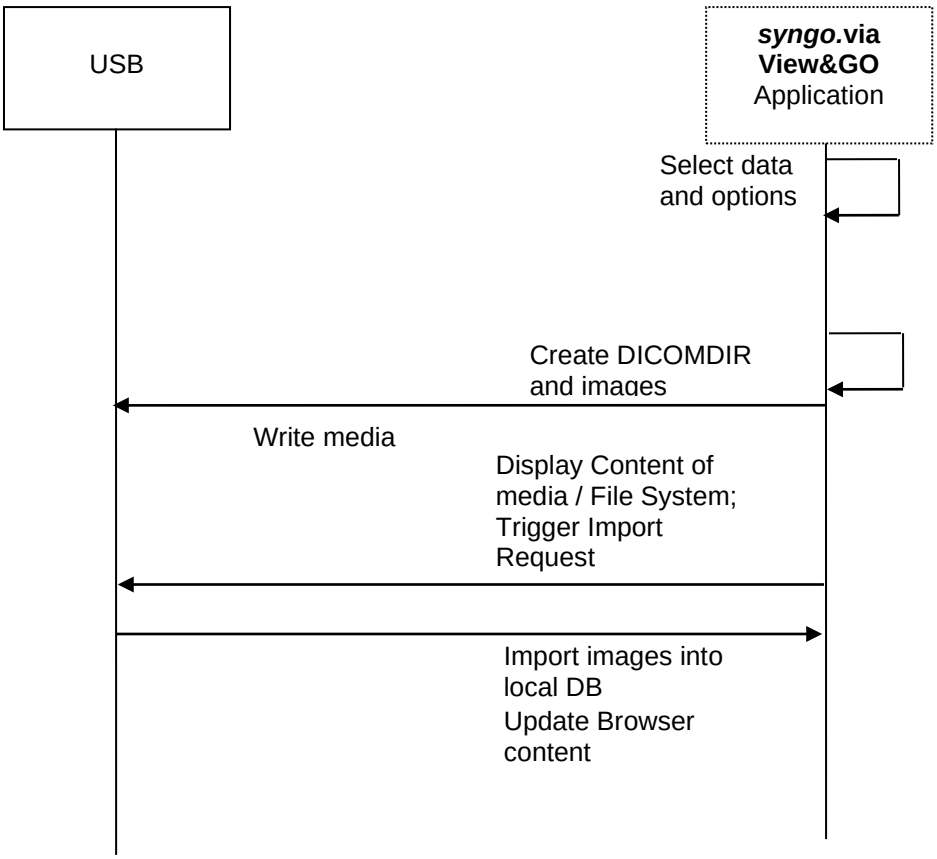

Figure 3.1-2: Sequence diagram – Media creation on USB

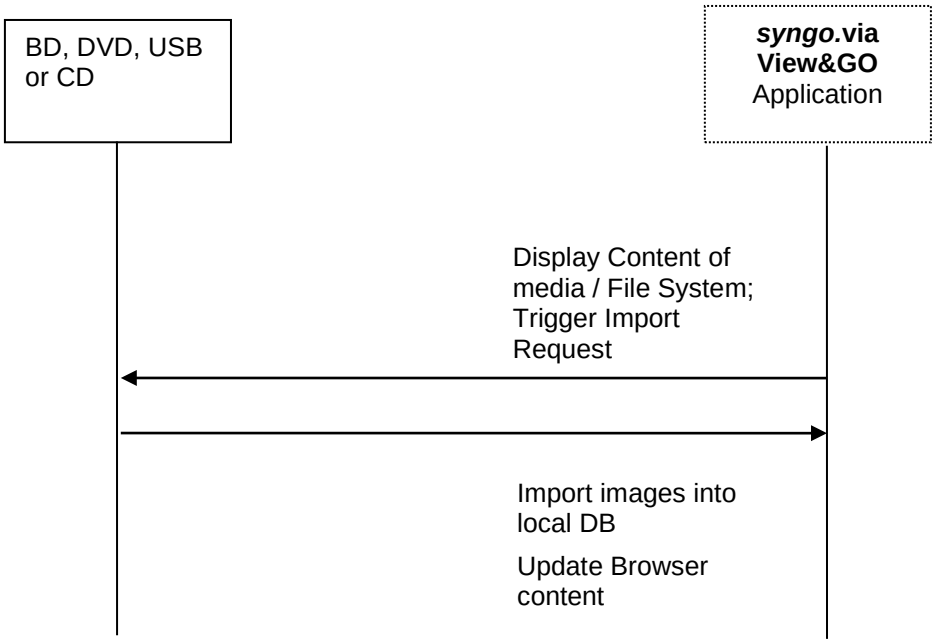

Figure 3.1-3: Sequence diagram – Media import

3.1.4 File Meta Information for Implementation Class and Version

This section describes the values assigned to the File Meta Information attributes (see DICOM [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 3-1: Implementation Class/Version Name - Media Interchange

File Meta Information Version	0001
Implementation Class UID	1.3.12.2.1107.5.8.15.10.20090701
Implementation Version Name	syngo.ViewAndGO

3.2 AE SPECIFICATIONS

3.2.1 Media Storage AE – Specification

The ***syngo*.via View&GO** provides conformance to the following Application Profiles as an FSR. FSC and FSU are 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 3-2: 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	FSR	Interchange
AUG-GEN-DVD			
AUG- GEN-DVD-J2K			
AUg-GEN-BD-J2K			
AUG- GEN-USB-J2K	Browse Directory Information Import into Application Export to local Archive Media	FSR, FSC , FSU	
STD-GEN-CD	Browse Directory Information Import into Application	FSR	Interchange
STD-GEN-DVD			
STD-GEN-DVD-J2K			
STD-GEN-BD-J2K			
STD-GEN-USB-J2K	Browse Directory Information Import into Application Export to local Archive Media	FSR, FSC , FSU	

3.2.1.1 Real-World Activities

3.2.1.1.1 Activity "Browse Directory Information"

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

The ***syngo.*via View&GO** 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.

3.2.1.1.1.1 Media Storage Application Profiles

See for the Application Profiles listed that invoke this Application Entity for the Browse Directory Information

3.2.1.1.2 Activity "Import into Application"

The ***syngo.*via View&GO** 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 View&GO** (see Table 6-1), can be retrieved from media.

3.2.1.1.3 Media Storage Application Profiles

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

3.2.1.2 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 3-3) the Transfer Syntax UID “RLE Lossless “only applies for decompression.

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

Information Object Definition	SOP Class UID	Transfer Syntax UID
CR Image Storage	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 Storage	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
Digital X-Ray Image Storage - 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
Enhanced CT Image Storage	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 MR Image Storage	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 Storage	1.2.840.10008.5.1.4.1.1.4.3	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
		JPEG 2000 Lossless 1.2.840.10008.1.2.4.90
		JPEG 2000 Lossy 1.2.840.10008.1.2.4.91
MR Image Storage	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
Nuclear Medicine Image Storage	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
Secondary Capture Image Storage	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
Ultrasound Image Storage	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 Storage (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

Information Object Definition	SOP Class UID	Transfer Syntax UID
		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 storage	1.2.840.10008.5.1.4.1.1.3.1	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
X-Ray Angiographic Image Storage	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

Table 3-4: SOP Classes and Transfer Syntaxes for STD-GEN-CD and STD-GEN-DVD Profile

Information Object Definition	SOP Class UID	Transfer Syntax UID
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Digital X-Ray Image Storage - 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
Digital X-Ray Image Storage - 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
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Enhanced MR Image Storage	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 Storage	1.2.840.10008.5.1.4.1.1.4.3	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
MR Image Storage	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
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1
Ultrasound Image Storage	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 Storage 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 Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1

3.3 AUGMENTED AND PRIVATE APPLICATION PROFILES

3.3.1 Augmented Application Profiles

The standard application profiles are augmented with private object Siemens CSA Non-Image.

Table 3-5: 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.

3.4 MEDIA CONFIGURATION

none

3.5 Attribute confidentiality profiles

3.5.1 De-identification

The ***syngo.*via View&GO** application can de-identify attributes. During export to file system it is the user responsibility to select anonymization.
For anonymization private attributes are not included in anonymized Studies.

The following table contains the attributes that are anonymized:

Table 3-6: Application Level Confidentiality Profile Attributes (standard tags)

DICOM Tag	Attribute Name
(0000,1001)	Requested SOP Instance UID
(0002,0003)	Media Storage SOP Instance UID
(0004,1511)	Referenced SOP Instance UID in File
(0008,0014)	Instance Creator UID
(0008,0015)	Instance Coercion DateTime
(0008,0018)	SOP Instance UID
(0008,0020)	Study Date
(0008,0021)	Series Date
(0008,0022)	Acquisition Date
(0008,0023)	Content Date
(0008,0024)	Overlay Date
(0008,0025)	Curve Date
(0008,002A)	Acquisition DateTime
(0008,0030)	Study Time
(0008,0031)	Series Time
(0008,0032)	Acquisition Time
(0008,0033)	Content Time
(0008,0034)	Overlay Time
(0008,0035)	Curve Time
(0008,0050)	Accession Number
(0008,0058)	Failed SOP Instance UID List
(0008,0080)	Institution Name
(0008,0081)	Institution Address
(0008,0082)	Institution Code Sequence
(0008,0090)	Referring Physician's Name
(0008,0092)	Referring Physician's Address

DICOM Tag	Attribute Name
(0008,0094)	Referring Physician's Telephone Numbers
(0008,0096)	Referring Physician's Identification Sequence
(0008,010D)	Context Group Extension Creator UID
(0008,0201)	Timezone Offset From UTC
(0008,1010)	Station Name
(0008,1030)	Study Description
(0008,103E)	Series Description
(0008,1040)	Institutional Department Name
(0008,1048)	Physician(s) of Record
(0008,1049)	Physician(s) of Record Identification Sequence
(0008,1050)	Performing Physicians' Name
(0008,1052)	Performing Physicians' Identification Sequence
(0008,1060)	Name of Physician(s) Reading Study
(0008,1062)	Physician Reading Study Identification Sequence
(0008,1070)	Operators' Name
(0008,1072)	Operators' Identification Sequence
(0008,1080)	Admitting Diagnoses Description
(0008,1084)	Admitting Diagnoses Code Sequence
(0008,1110)	Referenced Study Sequence
(0008,1111)	Referenced Performed Procedure Step Sequence
(0008,1120)	Referenced Patient Sequence
(0008,1140)	Referenced Image Sequence
(0008,1155)	Referenced SOP Instance UID
(0008,1195)	Transaction UID
(0008,2111)	Derivation Description
(0008,2112)	Source Image Sequence
(0008,3010)	Irradiation Event UID
(0008,4000)	Identifying Comments
(0008,9123)	Creator Version UID
(0010,0010)	Patient's Name
(0010,0020)	Patient ID
(0010,0021)	Issuer of Patient ID
(0010,0030)	Patient's Birth Date
(0010,0032)	Patient's Birth Time
(0010,0040)	Patient's Sex
(0010,0050)	Patient's Insurance Plan Code Sequence
(0010,0101)	Patient's Primary Language Code Sequence
(0010,0102)	Patient's Primary Language Modifier Code Sequence
(0010,1000)	Other Patient IDs
(0010,1001)	Other Patient Names
(0010,1002)	Other Patient IDs Sequence
(0010,1005)	Patient's Birth Name
(0010,1010)	Patient's Age
(0010,1020)	Patient's Size
(0010,1030)	Patient's Weight
(0010,1040)	Patient Address
(0010,1050)	Insurance Plan Identification
(0010,1060)	Patient's Mother's Birth Name
(0010,1080)	Military Rank
(0010,1081)	Branch of Service
(0010,1090)	Medical Record Locator
(0010,1100)	Referenced Patient Photo Sequence
(0010,2000)	Medical Alerts
(0010,2110)	Allergies
(0010,2150)	Country of Residence
(0010,2152)	Region of Residence
(0010,2154)	Patient's Telephone Number
(0010,2160)	Ethnic Group
(0010,2180)	Occupation
(0010,21A0)	Smoking Status
(0010,21B0)	Additional Patient's History
(0010,21C0)	Pregnancy Status
(0010,21D0)	Last Menstrual Date
(0010,21F0)	Patient's Religious Preference
(0010,2203)	Patient Sex Neutered
(0010,2297)	Responsible Person
(0010,2299)	Responsible Organization
(0010,4000)	Patient Comments
(0018,0010)	Contrast Bolus Agent
(0018,1000)	Device Serial Number

DICOM Tag	Attribute Name
(0018,1002)	Device UID
(0018,1004)	Plate ID
(0018,1005)	Generator ID
(0018,1007)	Cassette ID
(0018,1008)	Gantry ID
(0018,1030)	Protocol Name
(0018,1400)	Acquisition Device Processing Description
(0018,2042)	Target UID
(0018,4000)	Acquisition Comments
(0018,700A)	Detector ID
(0018,9424)	Acquisition Protocol Description
(0018,9516)	Start Acquisition DateTime
(0018,9517)	End Acquisition DateTime
(0018,A003)	Contribution Description
(0020,000D)	Study Instance UID
(0020,000E)	Series Instance UID
(0020,0010)	Study ID
(0020,0052)	Frame of Reference UID
(0020,0200)	Synchronization Frame of Reference UID
(0020,3401)	Modifying Device ID
(0020,3404)	Modifying Device Manufacturer
(0020,3406)	Modified Image Description
(0020,4000)	Image Comments
(0020,9158)	Frame Comments
(0020,9161)	Concatenation UID
(0020,9164)	Dimension Organization UID
(0028,1199)	Palette Color Lookup Table UID
(0028,1214)	Large Palette Color Lookup Table UID
(0028,4000)	Image Presentation Comments
(0032,0012)	Study ID Issuer
(0032,1020)	Scheduled Study Location
(0032,1021)	Scheduled Study Location AE Title
(0032,1030)	Reason for Study
(0032,1032)	Requesting Physician
(0032,1033)	Requesting Service
(0032,1060)	Requested Procedure Description
(0032,1070)	Requested Contrast Agent
(0032,4000)	Study Comments
(0038,0004)	Referenced Patient Alias Sequence
(0038,0010)	Admission ID
(0038,0011)	Issuer of Admission ID
(0038,001E)	Scheduled Patient Institution Residence
(0038,0020)	Admitting Date
(0038,0021)	Admitting Time
(0038,0040)	Discharge Diagnosis Description
(0038,0050)	Special Needs
(0038,0060)	Service Episode ID
(0038,0061)	Issuer of Service Episode ID
(0038,0062)	Service Episode Description
(0038,0300)	Current Patient Location
(0038,0400)	Patient's Institution Residence
(0038,0500)	Patient State
(0038,4000)	Visit Comments
(0040,0001)	Scheduled Station AE Title
(0040,0002)	Scheduled Procedure Step Start Date
(0040,0003)	Scheduled Procedure Step Start Time
(0040,0004)	Scheduled Procedure Step End Date
(0040,0005)	Scheduled Procedure Step End Time
(0040,0006)	Scheduled Performing Physician Name
(0040,0007)	Scheduled Procedure Step Description
(0040,000B)	Scheduled Performing Physician Identification Sequence
(0040,0010)	Scheduled Station Name
(0040,0011)	Scheduled Procedure Step Location
(0040,0012)	Pre-Medication
(0040,0241)	Performed Station AE Title
(0040,0242)	Performed Station Name
(0040,0243)	Performed Location
(0040,0244)	Performed Procedure Step Start Date
(0040,0245)	Performed Procedure Step Start Time
(0040,0250)	Performed Procedure Step End Date

DICOM Tag	Attribute Name
(0040,0251)	Performed Procedure Step End Time
(0040,0253)	Performed Procedure Step ID
(0040,0254)	Performed Procedure Step Description
(0040,0275)	Request Attributes Sequence
(0040,0280)	Comments on Performed Procedure Step
(0040,0555)	Acquisition Context Sequence
(0040,1001)	Requested Procedure ID
(0040,1004)	Patient Transport Arrangements
(0040,1005)	Requested Procedure Location
(0040,1010)	Names of Intended Recipient of Results
(0040,1011)	Intended Recipients of Results Identification Sequence
(0040,1101)	Person Identification Code Sequence
(0040,1102)	Person Address
(0040,1103)	Person Telephone Numbers
(0040,1400)	Requested Procedure Comments
(0040,2001)	Reason for Imaging Service Request
(0040,2008)	Order Entered By
(0040,2009)	Order Enterer Location
(0040,2010)	Order Callback Phone Number
(0040,2016)	Placer Order Number of Imaging Service Request
(0040,2017)	Filler Order Number of Imaging Service Request
(0040,2400)	Imaging Service Request Comments
(0040,3001)	Confidentiality Constraint on Patient Data Description
(0040,4005)	Scheduled Procedure Step Start DateTime
(0040,4010)	Scheduled Procedure Step Modification DateTime
(0040,4011)	Expected Completion Date Time
(0040,4023)	Referenced General Purpose Scheduled Procedure Step Transaction UID
(0040,4025)	Scheduled Station Name Code Sequence
(0040,4027)	Scheduled Station Geographic Location Code Sequence
(0040,4028)	Performed Station Name Code Sequence
(0040,4030)	Performed Station Geographic Location Code Sequence
(0040,4034)	Scheduled Human Performers Sequence
(0040,4035)	Actual Human Performers Sequence
(0040,4036)	Human Performers Organization
(0040,4037)	Human Performers Name
(0040,4050)	Performed Procedure Step Start DateTime
(0040,4051)	Performed Procedure Step End DateTime
(0040,4052)	Procedure Step Cancellation DateTime
(0040,A027)	Verifying Organization
(0040,A073)	Verifying Observer Sequence
(0040,A075)	Verifying Observer Name
(0040,A078)	Author Observer Sequence
(0040,A07A)	Participant Sequence
(0040,A07C)	Custodial Organization Sequence
(0040,A088)	Verifying Observer Identification Code Sequence
(0040,A123)	Person Name
(0040,A124)	UID
(0040,A171)	Observation UID
(0040,A172)	Referenced Observation UID (Trial)
(0040,A192)	Observation Date (Trial)
(0040,A193)	Observation Time (Trial)
(0040,A307)	Current Observer (Trial)
(0040,A352)	Verbal Source (Trial)
(0040,A353)	Address (Trial)
(0040,A354)	Telephone Number (Trial)
(0040,A358)	Verbal Source Identifier Code Sequence (Trial)
(0040,A402)	Observation Subject UID (Trial)
(0040,A730)	Content Sequence
(0040,DB0C)	Template Extension Organization UID
(0040,DB0D)	Template Extension Creator UID
(0070,0001)	Graphic Annotation Sequence
(0070,0084)	Content Creator's Name
(0070,0086)	Content Creator's Identification Code Sequence
(0070,031A)	Fiducial UID
(0088,0140)	Storage Media Fileset UID
(0088,0200)	Icon Image Sequence
(0088,0904)	Topic Title
(0088,0906)	Topic Subject
(0088,0910)	Topic Author

DICOM Tag	Attribute Name
(0088,0912)	Topic Keywords
(0400,0100)	Digital Signature UID
(0400,0402)	Referenced Digital Signature Sequence
(0400,0403)	Referenced SOP Instance MAC Sequence
(0400,0404)	MAC
(0400,0550)	Modified Attributes Sequence
(0400,0561)	Original Attributes Sequence
(2030,0020)	Text String
(3006,0024)	Referenced Frame of Reference UID
(3006,00C2)	Related Frame of Reference UID
(3008,0105)	Source Serial Number
(300A,0013)	Dose Reference UID
(300E,0008)	Reviewer Name
(4000,0010)	Arbitrary
(4000,4000)	Text Comments
(4008,0042)	Results ID Issuer
(4008,0102)	Interpretation Recorder
(4008,010A)	Interpretation Transcriber
(4008,010B)	Interpretation Text
(4008,010C)	Interpretation Author
(4008,0111)	Interpretation Approver Sequence
(4008,0114)	Physician Approving Interpretation
(4008,0115)	Interpretation Diagnosis Description
(4008,0118)	Results Distribution List Sequence
(4008,0119)	Distribution Name
(4008,011A)	Distribution Address
(4008,0202)	Interpretation ID Issuer
(4008,0300)	Impressions
(4008,4000)	Results Comments
(50xx,xxxx)	Curve Data
(60xx,0100)	Overlay Bits Allocated
(60xx,0102)	Overlay Bit Position
(60xx,3000)	Overlay Data
(60xx,4000)	Overlay Comments
(FFFA,FFFA)	Digital Signatures Sequence
(FFFC,FFFC)	Data Set Trailing Padding

Table 3-7: Application Level Confidentiality Profile Attributes (private tags)

DICOM Tag	Attribute Name
(0019,0005)	Multiphase UID
(0019, SIEMENS CT VA0 COAD, 90)	Osteo offset
(0019, SIEMENS CT VA0 COAD, 92)	Osteo Regression Line Slope
(0019, SIEMENS CT VA0 COAD, 93)	Osteo Regression Line Intercept
(0019, SIEMENS CT VA0 COAD, 96)	Osteo Phantom Number
(0021, SIEMENS MR SDS 01, 19)	MR Phoenix Protocol
(0029, SIEMENS CT EXAM IMAGE,49)	Metal Artifact Reduction Type
(0029, SIEMENS CSA ENVELOPE, 10)	Syngo Report Data
(0029, SIEMENS CSA ENVELOPE, 11)	Syngo Report Presentation
(0029, SIEMENS CSA HEADER, 08)	Modality Image Header Type
(0029, SIEMENS CSA HEADER, 09)	Modality Image Header Version
(0029, SIEMENS CSA HEADER, 10)	Modality Image Header Info
(0029, SIEMENS CSA HEADER, 18)	Modality Series Header Type
(0029, SIEMENS CSA HEADER, 19)	Modality Series Header Version
(0029, SIEMENS CSA HEADER, 20)	Modality Series Header Info
(0029, SIEMENS MEDCOM HEADER, 40)	Application Header Sequence
(0029, SIEMENS MEDCOM HEADER, 41)	Application Header Type
(0029, SIEMENS MEDCOM HEADER, 42)	Application Header ID
(0029, SIEMENS MEDCOM HEADER, 43)	Application Header Version
(0029, SIEMENS MEDCOM HEADER, 44)	Application Header Info
(0029, SIEMENS CT APPL DATASET, 00)	Dual Energy Algorithm Parameters
(0029, SIEMENS CT APPL ALG PARAMS, 20)	Perfusion Result Set Id
(0043, GEMS_PARM_01, 1E)	GE Delta Start Time
(0049, SIEMENS CT SPP HEADER, 10)	Raw Data Container

4 SUPPORT OF CHARACTER SETS

4.1 CHARACTER SETS FOR *syngo.*via View&GO

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

Table 4-1: 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 4-2: 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 4-3: 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 4-4: 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 ISO-IR 87	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 Specific Character Set 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 '?'.

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 View&GO** supports Kanji characters in the byte zones after 74 (79, 7A, 7B and 7C).

5 SECURITY

5.1 SECURITY PROFILES

5.1.1 Time Synchronization Profiles

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

5.1.2 Basic TLS Secure Transport Connection Profile

Basic TLS Secure Transport Connection Profile supports TLS version 1.0 protocol with the following features:

Supported TLS Feature	Mechanism
Entity Authentication	RSA based certificates
Exchange of Master Secrets	RSA
Data Integrity	SHA
Privacy	Triple DES EDE, CBC

For configuration see chapter **Secure DICOM Communication**.

5.2 ASSOCIATION LEVEL SECURITY

The Echo SCP will answer to AETs.

SIEMENS Healthineers

6 Annexes

6.1 SOP Classes supported

Table 6-1 SOP CLASSES for Storage

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Supported Storage SOP Classes				
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	Yes	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	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	No
Enhanced CT Image Storage	1.2.840.10008.5.1.4.1.1.2.1	Yes	Yes	Yes
Enhanced MR Image 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
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Yes	Yes	Yes
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes	Yes
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Yes	Yes	Yes
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	Yes	Yes
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	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 Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Yes	Yes	Yes
Supported private Storage SOP Classes				
CSA Non-Image Storage	1.3.12.2.1107.5.9.1	No	Yes	No

Table 6-2: Supported Non-Storage SOP Classes

SOP Class Name	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Supported Verification SOP Classes			
Verification	1.2.840.10008.1.1	Yes	Yes
Supported Storage Commitment SOP Classes			
Storage Commitment Push Model	1.2.840.10008.1.20.1	No	No
Storage Commitment Push Model well known SOP Instance	1.2.840.10008.1.20.1.1	No	No
Supported Query/Retrieve-FIND SOP Classes			
Patient Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.1.1	Yes	No
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No
Patient /Study Only Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.3.1	Yes	No
Supported Query/Retrieve-MOVE SOP Classes			
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Patient/Study Only Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.3.2	Yes	No
Modality Worklist Information SOP Class			
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No
Grayscale Print Management META SOP classes			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
- Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	Yes	No
Color Print Management META SOP classes			
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No
- Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
Print Job SOP Class	1.2.840.10008.5.1.1.14	Yes	No

6.2 IOD CONTENTS

6.2.1 Created SOP Instance(s)

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

Table 6-3: List of created SOP Classes

SOP Class Name	SOP Class UID	Internally used (neither SCU nor SCP is applicable)
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	No
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	No

6.2.2 Data Dictionary of Private Attributes

The following table Table 6-4: Private Data Element Dictionary lists all private attributes created by ***syngo.*via View&GO**, which may be included in the generated instances. These private attributes may be deprecated or replaced with standard attributes in the future.

Table 6-4: 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
(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

Interpretation of the Dicom Tags from the above table:
(gggg, pp,ee) -> (gggg, ppee)

gggg - odd group number
pp - private creator identification code
ee - private element

6.2.3 Usage of Attributes from received IODs

N/A

6.2.4 Coerced / Modified fields

N/A

6.3 CODED TERMINOLOGY AND TEMPLATES

See application specific annexes.

6.3.1 Context Groups

See application specific annexes.

6.3.2 Template Specifications

See application specific annexes.

6.3.3 Private Code definitions

See application specific annexes.

6.4 GRAYSCALE IMAGE CONSISTENCY

N/A

6.5 STANDARD EXTENDED / SPECIALIZED / PRIVATE SOP CLASSES

N/A

6.6 *ANNEX A – CT Plugin Applications*

6.6.1 Standard Extensions of RAW Data Storage SOP Class

The following table lists the standard extensions for RAW Data Storage SOP Class.

Attribute Name	Tag	Value
Referenced Series Sequence	(0008,1115)	Private stored information about used algorithms.

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