DICOM Conformance Statement

syngo.via View&GO

VA30A

siemens-healthineers.com/*syngo*.via-view-and-go

SIEMENS Healthineers

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* View&GO (DICOM Application Entity) is used. It is possible to configure usage of multiple different AEs for the individual DICOM services.

The *syngo*.via View&GO:
- requests storage of objects (images, reports)
- supports query and retrieval of objects from a remote node
- displays images to a user
- imports objects from portable interchange media
- exports objects to non-optical storage device (e.g., USB stick)

The *syngo*.via View&GO conforms to the DICOM 2016a Standard and supports the network services as described in *Table 1: Network Services* and the media services as described in *Table 2: Media Services*.

Table 1: Network Services

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
Verification				
Verification Service		Yes	Yes	No
Transfer (Image SOP Class)				
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	Yes
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
MR Spectroscopy Storage	1.2.840.10008.5.1.4.1.1.4.2	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
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

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
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
X-Ray Radio-Fluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2	Yes	Yes	Yes
Transfer (Private SOP Class)				
Syngo Non-Image Storage	1.3.12.2.1107.5.9.1	Yes	Yes	No
Query/Retrieve				
Patient Root – Query/Retrieve Information Model – FIND	1.2.840.10008.3.1.2.3.3	Yes	No	No
Patient Root – Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No	No
Study Root – Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	No
Study Root – Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	No
Patient/Study Only – Query/ Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Yes	No	No
Patient/Study Only – Query/ Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2	Yes	No	No
Workflow Management				
Storage Commitment Push Model	1.2.840.10008.1.20.1	No	No	No
Print Management				
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

SOP Classes	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)	Visualization
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
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	Yes	No	No
Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	Yes	No	No
Grayscale Softcopy Presentation StateStorage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No	No

Table 2: Media Services

SOP Classes	Write Files (FSC)	Read Files (FSR)
Compact Disk – Recordable		
AUG-GEN-CD	No	Yes
STD-GEN-CD	No	Yes
DVD		
AUG-GEN-DVD	No	Yes
AUG-GEN-DVD-J2K	No	Yes
STD-GEN-DVD	No	Yes
STD-GEN-DVD-J2K	No	Yes
Blu-Ray		
AUG-GEN-BD-J2K	No	Yes
STD-GEN-BD-J2K	No	Yes
USB		
AUG-GEN-USB-J2K	Yes	Yes
STD-GEN-USB-J2K	Yes	Yes

Table 3: Implementation Identifying Information

Name	Value
Compact Disk – Recordable	
Application Context Name	1.2.840.10008.3.1.1.1
Implementation Class UID	1.3.12.2.1107.5.8.20
Implementation Version Name	*syngo*.via View&GO

Table of Contents

1. Introduction

1.1 Revision history

Version/Status	Date of Issue	Product/Version	Author	Change & Reason of Change
1.0	2021-07-16	*syngo*.via View&GO VA30A	Krisztian Paka (ADV D EU HU OPS 4 3)	Review findings incorporated.
0.1	2021-06-30	*syngo*.via View&GO VA30A	Krisztian Paka (ADV D EU HU OPS 4 3)	Draft version for *syngo*.via View&GO VA30A based on 2.0 version of VA27A. Brandville style

1.2 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.

1.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between *syngo*.via View&GO and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM PS3.1-3.20 2016a Standard [1]. DICOM by itself does not guarantee interoperability.

The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

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

- The comparison of conformance statements is the first step towards assessing interconnectivity and interoperability between *syngo*.via View&GO and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipement, as established by the healthcare facility.

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.

1.4 Definitions, Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard.

Additional Abbreviations and terms are as follows:

AE	DICOM Application Entity
AET	Application Entity Title
ASCII	American Standard Code for
DB	Information Interchange Database
DCS	DICOM Conformance Statement
DICOM	Digital Imaging and Communications in Medicine
DSA	Digital Subtraction Angiography
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
IOD	DICOM Information Object Definition
ISO	International Standard Organization
n. a.	not applicable
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 (DICOM client)
SCP	DICOM Service Class Provider (DICOM Server)
SOP	DICOM Service-Object Pair
SR	Structured Report
TLS	Transport Layer Security
U	Unique Key Attribute
UID	Unique Identifier
UTF-8	Unicode Transformation Format-8
VR	Value Representation

1.5 References

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

[2] Integrating the Healtcare Enterprise – IHE Radiology Technical Framework, http://www.ihe.net

1.6 Scope and field of application

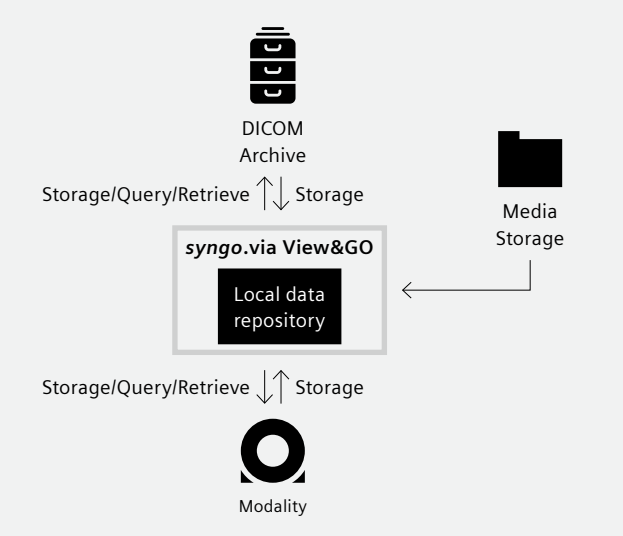

Figure 1: Overview about DICOM capabilities of *syngo*.via View&GO VA30A

2. Networking

2.1 Implementation Model

2.1.1 Application Data Flow

The Application Data Flow diagram in *Figure 2: Application Data Flow Diagram* depicts the DICOM data flow to and from the individual applications within *syngo* View&GO.

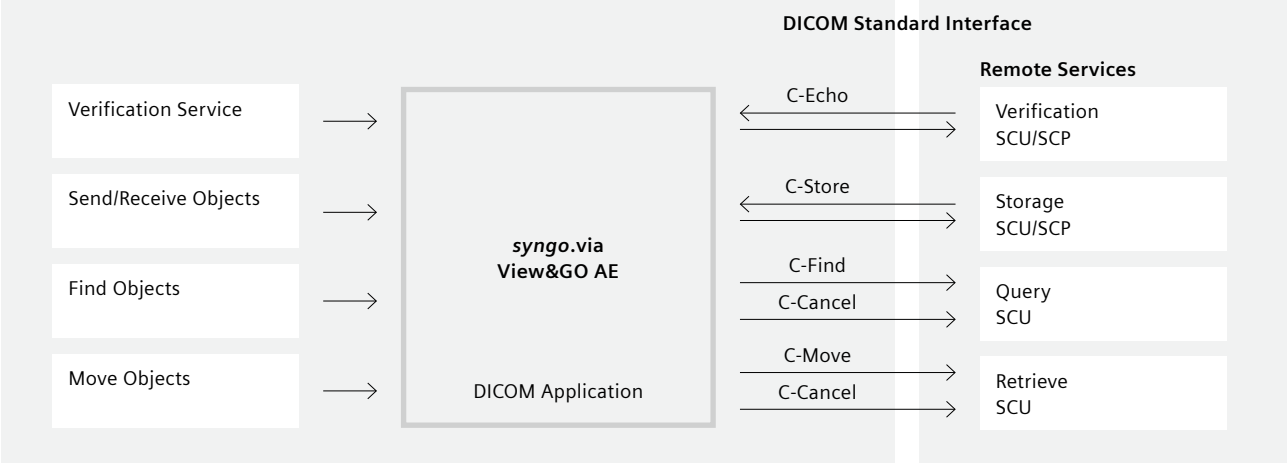

Figure 2: Application Data Flow Diagram

2.1.2 Functional Definitions of Application Entities

The SCP components of the Application Entities of the *syngo*.via View&GO 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.

2.1.2.1 Functional Definition of Verification AE

The *syngo*.via View&GO supports the Verification service as a SCP and SCU. As a SCU, Verification can be activated from the Configuration Panel – Devices tab during system configuration by sending a C-ECHO-Request.

As a SCP of the Verification Service the *syngo*.via View&GO processes and responds to incoming verification requests using the C-ECHO-Response.

2.1.2.2 Functional Definition of Storage AE

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 job consists of data describing the composite objects selected for storage and the destination Application Entity Title. An association is negotiated with the destination Application Entity and the image data is transferred using the C-STORE-Request. The transfer status is reported to the initiator of the Storage request.

The Storage SCP component of the *syngo*.via View&GO starts to receive the Composite Objects and import them into the database after accepting an association with a negotiated Presentation Context. The system responds to the Storage Request immediately after reception of the Data.

2.1.2.3 Functional Definition of the Storage Commitment AE

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

2.1.2.4 Functional Definition of Query/Retrieve AE

The *syngo*.via View&GO supports DICOM Query/Retrieve as a SCU: The user can initiate a query to a remote node using the C-FIND-Request. After matching the specified keys, the remote Query/Retrieve SCP uses the C-FIND-Response to return the results of its search, which will

be displayed to the user. Depending on user action the *syngo*.via View&GO Query/Retrieve DICOM SCU sends a C-MOVE-Request to initiate a C-STORE sub-operation on the SCP to start an image transfer from remote Storage SCU (running on Query/Retrieve SCP) to the system's Storage SCP.

The *syngo*.via View&GO supports the following query models:

- 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 remote Query/Retrieve SCP node and required by the querying Application.

2.1.3 Sequencing of Activities

This section describes the sequencing of Real-World Activities performed by the *syngo*.via View&GO Entities using a UML sequence diagram. Real-World Activities are depicted as vertical bars and arrows show the events exchanged between them.

2.1.3.1 Verify

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

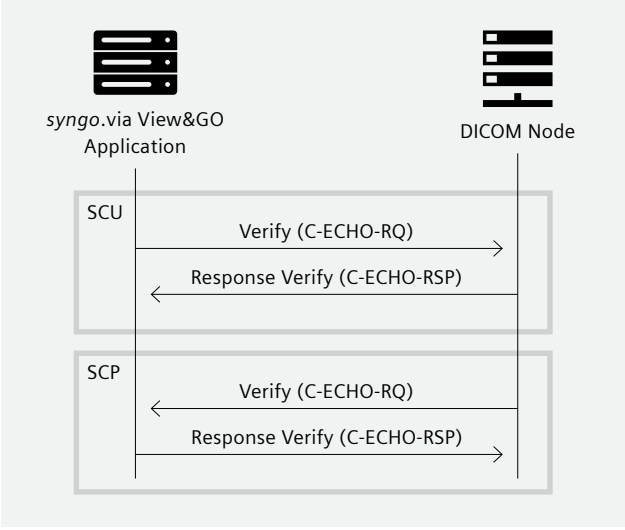

Figure 3: Sequence Diagram for Real World Activities – Verify

2.1.3.2 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.

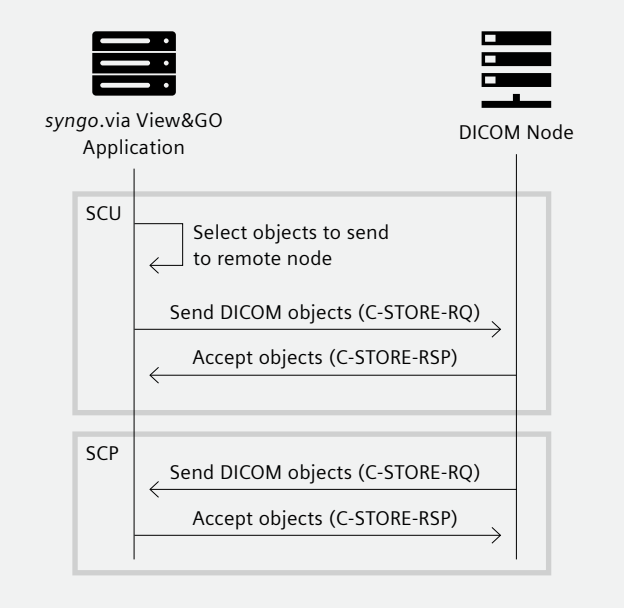

Figure 4: Sequence Diagram for Real World Activities – Storage

2.1.3.3 Query and Retrieval

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 more detail.

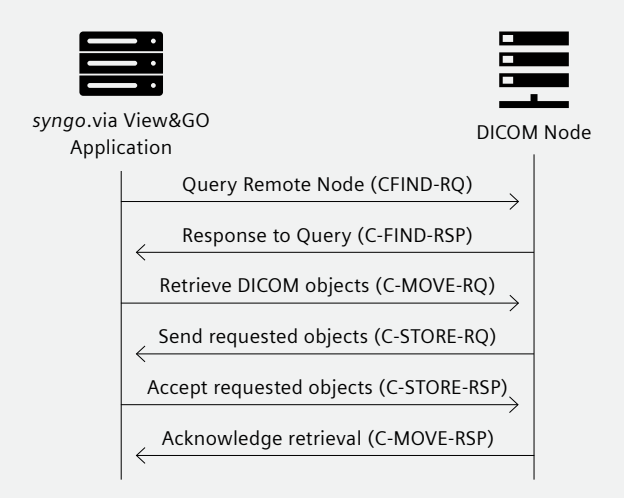

Figure 5: Sequence Diagram for Real World Activities – Query/Retrieve

2.2 Application Entity Specification

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

2.2.1 Verification AE Specification

2.2.1.1 SOP Classes

The Verification AE of the *syngo*.via View&GO provides standard conformance to the Verification SOP Class l isted in *Table 1: Network Services* section "Verification" in the "Conformance Statement Overview".

2.2.1.2 Association Policy

The *syngo*.via View&GO Admin Portal attempts to open an association for verification request whenever the Verification function is activated.

Table 4: 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 size is supported.

Table 5: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	infinite

2.2.1.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to *Table 3: Implementation Identifying Information* in the "Conformance Statement Overview".

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 6: 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

2.2.1.3.1 Activity – "Send Verification" Request

2.2.1.3.1.1 Description and Sequencing of Activity

The *syngo*.via View&GO serves as a SCU of the Verification Service Class. A C-ECHO-Request is initiated by the Configuration Panel whenever "Verification" is requested. If an association to a remote Application Entity is successfully established, Verification with the configured AET is requested via the open association. If the C-ECHO Response from the remote Application contains a status other than "Success" this will be indicated to the user and the association is closed.

[1] *Default; the value is configurable.*

2.2.1.3.1.2 Proposed Presentation Contexts

Table 7: Presentation Context Table "Verification" below lists the supported presentation contexts for verification requests.

Table 7: Presentation Context Table "Verification"

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
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 – Verification SCU

The ECHO-SCU provides standard conformance to the Verification Service Class.

2.2.1.4 Association Acceptance Policy

2.2.1.4.1 Activity – "Receive Verification Request"

2.2.1.4.1.1 Description and Sequencing of Activity

The *syngo*.via View&GO serves as a SCP of the Verification Service Class. If the Verification SCP accepts an association, it will respond to C-ECHO-Requests. If the Called AE Title does not match any pre-configured AE Title shared by SCP, the association will be rejected.

2.2.1.4.1.2 Accepted Presentation Contexts

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

Table 8: Presentation Context Table "Verification"

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
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 – Verification SCP

The ECHO-SCP provides standard conformance to the Verification Service Class.

2.2.2 Storage AE Specification

2.2.2.1 SOP Classes

The Storage AE provides Standard Conformance to the the SOP Classes listed in *Table 1: Network Services* section "SOP Classes Created by the *syngo*.via View&GO" and "SOP Classes Managed by the *syngo*.via View&GO" in the "Conformance Statement Overview".

2.2.2.2 Association Policy

Table 9: 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 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 6.

There is no inherent limit to the number of outgoing associations (SCU), other than limits imposed by the computer operating system.

2.2.2.2.1 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 10: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	infinite

2.2.2.2.2 Implementation Identifying Information

For Implementation Identifying Information please refer to *Table 3: Implementation Identifying Information* in the "Conformance Statement Overview".

2.2.2.3 Association Initiation Policy

2.2.2.3.1 Activity – "Send To"

2.2.2.3.1.1 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.

2.2.2.3.1.2 Proposed Presentation Contexts

For all Image Objects listed in Table 1 in the "Conformance Statement Overview" the Transfer Syntaxes marked with "Yes" in the Image Objects Column of the table below are supported.

For all Non-Image Objects listed in Table 1 in the "Conformance Statement Overview" the Transfer Syntaxes marked with "Yes" in the Non-Image Objects Column of the table below are supported.

For a distinction between Image and Non-Image Objects please refer to the DICOM Standard PS3.3 Section A.1.4 "Overview of the Composite IOD Module Content" [1].

[1] *Default; the value is configurable.*

Table 11: Proposed Presentation Contexts for Storage

UID value	Transfer Syntax	Image Objects	Non-Image Objects
1.2.840.10008.1.2	Implicit Value Representation Little Endian native	Yes	Yes
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian native	Yes	Yes
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1) lossy compressed	Yes	No
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4) lossy compressed	Yes	No
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) lossless compressed	Yes	No
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Lossless Only) compressed	Yes	No
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression lossy compressed	Yes	No
1.2.840.10008.1.2.5	RLE Lossless compressed	Yes	No

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 either MONOCHROME1, MONOCHROME2, RGB, 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 during transfer only if the following criteria is fulfilled:
- Is an image
- Photometric Interpretation (0028,0004) is either MONOCHROME1, MONOCHROME2 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, RGB, YBR_FULL or YBR_FULL_422
- Bits Allocated (0028,0100) equal to ‘16' or ‘8'

An instance will be RLE lossless compressed only if it fulfills the following criteria:
- Is an image and not already compressed
- Photometric Interpretation (0028,0004) is MONOCHROME, RGB, YBR_FULL or RGB
- Bits Allocated (0028,0100) neither ‘16' nor ‘8'

An instance will be JPEG 2000 lossy compressed during transfer 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.

2.2.2.3.1.3 SOP specific Conformance for SOP classes
The *syngo*.via View&GO does not add or change private attributes by default, even in case objects are compressed or the image header is updated according to IHE [2] Patient Information Reconciliation Profile.

The behavior of *syngo*.via View&GO when encountering status codes in a C-STORE response is summarized in Table 12.

Table 13 indicates the behavior if exceptions occur.

Table 12: 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	Duplicated SOP Instances are ignored, job is continued until 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 13: DICOM Command Communication Failure Behavior

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

2.2.3 Query/Retrieve AE Specification

2.2.3.1 SOP Classes

The Storage AE provides Standard Conformance to the the SOP Classes listed in *Table 1: Network Services* section “SOP Classes Created by the *syngo*.via View&GO” and “SOP Classes Managed by the *syngo*.via View&GO” in the “Conformance Statement Overview”.

2.2.3.2 Association Policy

Table 14: 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 contains a limitation of 512 kB for the maximum PDU size. By default, the maximum PDU size is set to 32kB.

[1] *Default; the value is configurable.*

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.

2.2.3.2.1 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 15: Asynchronous Nature as an Association Initiator

Maximum number of outstanding asynchronous transactions	infinite

2.2.3.2.2 Implementation Identifying Information
For Implementation Identifying Information please refer to *Table 3: Implementation Identifying Information* in the "Conformance Statement Overview".

2.2.3.3 Association Initiation Policy
2.2.3.3.1 Activity "Querying a Remote Node" for Instances
2.2.3.3.1.1 Description and Sequencing of Activities
The *syngo*.via View&GO serves as a SCU for the following SOP Classes

- Patient Root Q/R Information Model – FIND SOP Class
- Study Root Q/R Information Model – FIND SOP Class
- Patient/Study only Q/R Information Model – FIND SOP Class

Using the attributes specified by the user as Query Keys (in accordance with the query model) the Query SCU initiates a C-FIND Request and displays the responses to the user.

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

Table 16: Proposed Presentation Contexts for Query

Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
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 17: 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	Implicit VR Little Endian
		Explicit VR Little Endian
		Explicit VR Big Endian
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.2.1	Implicit VR Little Endian
		Explicit VR Little Endian
		Explicit VR Big Endian
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.3.1	Implicit VR Little Endian
		Explicit VR Little Endian
		Explicit VR Big Endian

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

Table 18: 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	User does not get notified. Job is continued till the end. Error is logged in the system log.
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 is reported to user.

Table 19 below indicates the behavior if exceptions occur:

Table 19: DICOM Command Communication Failure Behavior

Exception	Behavior
Timeout	User does not get notified. Job is continued till the end. Error is logged in the system log.
Association Aborted	User does not get notified. Job is continued till the end. Error is logged in the system log.

The *syngo*.via View&GO supports the following query levels:
- Study
- Series

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

The following table lists the various attributes at Study and Series level, 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:

Table 20: Attributes supported for Study/Series 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

Legend:
U Unique Key Attribute R Required Key Attribute O Optional Key Attribute

Attribute Name	Tag	Type	User input	UI
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

Legend:
U Unique Key Attribute R Required Key Attribute O Optional Key Attribute

2.2.3.3.2 Activity "Retrieve Instances from a remote node"

2.2.3.3.2.1 Description and Sequencing of Activities

The *syngo*.via View&GO serves as a SCU for the following SOP Classes

- Patient Root Q/R Information Model – MOVE SOP Class
- Study Root Q/R Information Model – MOVE SOP Class
- Patient/Study only Q/R Information Model – MOVE SOP Class

The C-MOVE-Request is used to retrieve the selected imaging objects. The Retrieve AE supports the query model Patient Root, Study Root, Patient/Study Root.

2.2.3.3.2.2 Proposed Presentation Contexts

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

Table 21: Proposed Presentation Contexts for Retrieve and Activity "MOVE SCU"

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name List**	**UID List**		
Patient Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.2.1	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		
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	1.2.840.10008.5.1.4.1.2.2.3	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		

2.2.3.3.2.3 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 22.

Table 22: 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	User does not get notified. Job is continued till the end. Error is logged in the system log.
Pending	Move Operation continues	FF00	Operation continues in the background.
Success	Move has been performed successfully.	0000	Success is reported to user.

Table 23 below indicates the behavior if exceptions occur:

Table 23: DICOM Command Communication Failure Behavior

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

2.2.3.4 Association Acceptance Policy
2.2.3.4.1 Activity "Receive Instances"
2.2.3.4.1.1 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.

2.2.3.4.1.2 Accepted Presentation Contexts
For all supported Transfer objects (see SOP Classes in Table 1) the Transfer Syntaxes described in Table 11 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

2.2.3.4.1.3 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

2.2.3.4.1.4 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.

Table 24: 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.

2.3 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 the DICOM 2016a Standard. 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 to get a functioning communication.

2.4 Configuration

2.4.1 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 the DICOM 2016a Standard.

2.4.1.1 Local AE Titles

The *syngo*.via View&GO 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 Basic Port	Yes	104
Default Secure Port	Yes	2762

2.4.1.2 Remote AE Title/Presentation Address Mapping

2.4.1.2.1 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.

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.

2.4.1.2.2 Remote Association Acceptors

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 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.

2.4.1.3 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 Administrator Online Help. Note: The default DICOM port will change to 2762.

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.

2.4.2 Parameters

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

Table 25: Parameter List

Parameter	Default Value
max PDU size	32,768 Bytes
time-out for accepting/ rejecting an association request	30 s
time-out for responding to an association open/close request	30 s
time-out for accepting a message over network	30 s
time-out for waiting for data between TCP/IP-packets	5 s
time-outs for waiting for a Service Request/Response message from the remote node (Storage SCP/SCU)	30 s
time-outs for waiting for a Service Request/Response message from the remote node (Query/Retrieve SCP/SCU)	30 s
time-out for waiting for a C-MOVE-RSP	1200 s
number of image collection before saving to database	20
max matches query limit	100
max number of parallel receiving associations	6

3. Media Interchange

3.1 Implementation Model

3.1.1 Application Data Flow Diagram

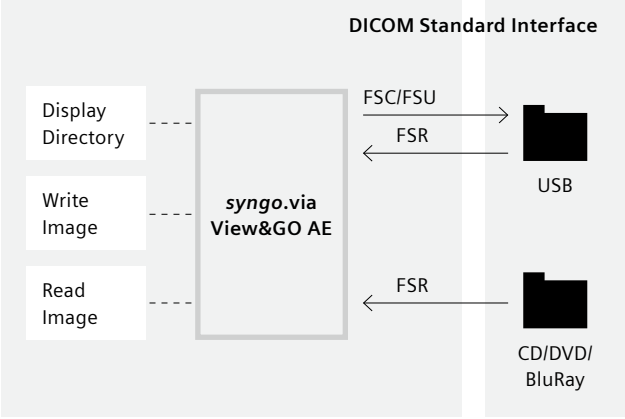

Figure 6: Media Interchange Application Data Flow Diagram

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 1 and Table 27 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 creates a DICOMDIR may be created for the selected data.

3.1.4 File Meta Information for Implementation Class and Version

This section describes the values assigned to the File Meta Information attributes (see 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.

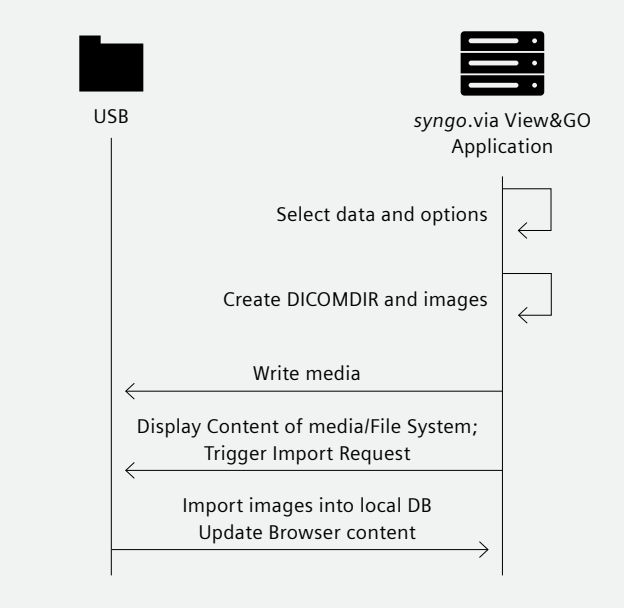

Figure 7: Sequence diagram – Media creation

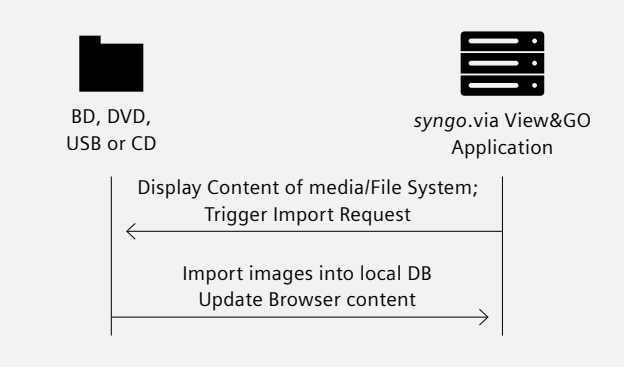

Figure 8: Sequence diagram – Media Import

Table 26: Implementation Class/Version Name – Media Interchange

File Meta Information Version	0001
Implementation Class UID	1.3.12.2.1107.5.8.20.10.20090701
Implementation Version Name	*syngo*.via View&GO

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 objects important for the full feature support of the *syngo*®-based products. Details are listed in *Table 2: Media Services*.

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 64 x 64 or 128 x 128 pixels are imported into database and are visible in the Browser.

3.2.1.1.1.1 Media Storage Application Profiles
See Table 2: Media Services for the Application Profiles listed that invoke this Application Entity for the Browse Directory Information.

3.2.1.1.2 Real World 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 can be retrieved from media.

3.2.1.1.2.1 Media Storage Application Profiles
See *Table 2: Media Services* for the Application Profiles listed that invoke this Application Entity for the Browse Directory Information.

3.2.1.2 SOP Classes and Transfer Syntaxes
These Application Profiles are based on the Media Storage Service Class with the Interchange Option. The *syngo*.via View&GO provides Standard Conformance to the the SOP Classes listed in *Table 1: Network Services,* section "SOP Classes Created by the *syngo*.via View&GO" and "SOP Classes Managed by the *syngo*.via View&GO" in the "Conformance Statement Overview".

In the table below (Table 27) the Transfer Syntax UID "RLE Lossless "only applies for decompression.

Using the Application Profiles supporting compression (STD-GEN-DVD-J2K, STD-GEN-USB-J2K, STD-GEN-BD-J2K) the following Transfer Syntaxes are supported:

Table 27: Transfer Syntaxes for STD-GEN-DVD-J2K, STD-GEN-BD-J2K and STD-GEN-USB-J2K

UID value	Transfer Syntax	Image Objects	Non-Image Objects
1.2.840.10008.1.2.1	Explicit Value Representation Little Endian native	Yes	Yes
1.2.840.10008.1.2.4.50	JPEG Baseline (Process 1) lossy compressed	Yes	No
1.2.840.10008.1.2.4.51	JPEG Extended (Process 2 & 4) lossy compressed	Yes	No
1.2.840.10008.1.2.4.70	JPEG Lossless, Non-Hierarchical, First-Order Prediction (Process 14) lossless compressed	Yes	No
1.2.840.10008.1.2.4.90	JPEG 2000 Image Compression (Lossless Only) compressed	Yes	No
1.2.840.10008.1.2.4.91	JPEG 2000 Image Compression lossy compressed	Yes	No
1.2.840.10008.1.2.5	RLE Lossless compressed	Yes	No

Using the Application Profiles that do not support compression (STD-GEN-CD, STD-GEN-DVD) only Explicit Value Representation Little Endian (1.2.840.10008.1.2.1) is supported.

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.

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

Table 28: 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

3.4 Media Configuration

None

4. Support of Extended Character Sets

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

Table 29: 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 ISO_IR 6	TIS 620-253 (1990) ISO 646

Table 30: 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 31: 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 32: 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 Special Character Sets (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 '?'

There are 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. Attribute confidentiality profiles

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 33: Application Level Confidentiality Profile attributes (standard tags)

DICOM Tag	Attribute Name
(0000, 1000)	Affected SOP Instance UID
(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
(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

DICOM Tag	Attribute Name
(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

DICOM Tag	Attribute Name
(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
(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

DICOM Tag	Attribute Name
(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

DICOM Tag	Attribute Name
(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

DICOM Tag	Attribute Name
(0040, 0250)	Performed Procedure Step End Date
(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

DICOM Tag	Attribute Name
(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)

DICOM Tag	Attribute Name
(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
(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

DICOM Tag	Attribute Name
(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

6. Security

6.1 Security Profiles

6.1.1 Time Synchronization Profiles

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

6.1.2 Basic TLS Secure Transport Connection Profile

Basic TLS Secure Transport Connection Profile supports TLS version 1.0, 1.1 and 1.2 protocols 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

The default secure DICOM port is 2762 (can be reconfigured).

6.2 Association Level Security

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

6.3 Application Level Security

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

7. Annexes

7.1 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 34: List of created SOP Classes

SOP Class Name	SOP Class UID
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Grayscale Softcopy Presentation StateStorage	1.2.840.10008.5.1.4.1.1.11.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7

7.2 IOD Contents

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

Table 35: List of created SOP Classes

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	DO1 instance creation date
Instance Creation Time	(0008, 0013)	3	DO1 instance creation time
SOP Class UID	(0008, 0016)	1	Copied from Input Image
SOP Instance UID	(0008, 0018)	1	1.3.12.2.1107.5.8.20.UID2
Study Date	(0008, 0020)	2	Copied from Input Image
Series Date	(0008, 0021)	3	Creation Date of the DO1 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 DO1 in <HHMMSS> format
Acquisition Time	(0008, 0032)	3	Copied from Input Image

Attribute	Tag	Type	Description
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
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	1.3.12.2.1107.5.8.20.UID2
Study ID	(0020, 0010)	2	Copied from Input Image

Attribute	Tag	Type	Description
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
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_DO1
Study Comments	(0032, 4000)	3	Copied from input image
Pixel Data	(7FE0, 0010)	1	Sets the Derived Pixel data

Legend:
1 Derived Object 2 UID generated by *syngo*.via View&GO

7.2.2 XP Reprocessing tool 2D and 3D derived object

Table 36: XP Reprocessing tool 2D Derived object

Attribute	Tag	Type	Description
Implementation Version Name	(0002, 0013)	3	Copied from Input Image
Specific Character Set	(0008, 0005)	1C	ISO_IR 100
Image Type	(0008, 0008)	1	“DERIVED\SECONDARY\SPINE\VC10B”
SOP Class UID	(0008, 0016)	1	1.2.840.10008.5.1.4.1.1.1
SOP Instance UID	(0008, 0018)	1C	1.3.12.2.1107.5.8.20.UID2
Study Date	(0008, 0020)	2	Copied from Input Image
Series Date	(0008, 0021)	3	Copied from Input Image
Acquisition Date	(0008, 0022)	3	Copied from Input Image
Content Date	(0008, 0023)	2	Copied from Input Image
Study Time	(0008, 0030)	2	Copied from Input Image
Series Time	(0008, 0031)	3	Copied from Input Image
Acquisition Time	(0008, 0032)	3	Copied from Input Image
Content Time	(0008, 0033)	2	Copied from Input Image
Accession Number	(0008, 0050)	2	Copied from Input Image
Modality	(0008, 0060)	1	“CR”
Manufacturer	(0008, 0070)	2	“Siemens Healthineers”
Institution Name	(0008, 0080)	3	Copied from Input Image
Institution Address	(0008, 0081)	3	Copied from Input Image
Referring Physician's Name	(0008, 0090)	2	Copied from Input Image
Station Name	(0008, 1010)	3	Copied from Input Image
Study Description	(0008, 1030)	3	Copied from Input Image
Series Description	(0008, 103E)	3	Copied from Input Image
Institutional Department Name	(0008, 1040)	3	Copied from Input Image
Physician(s) of Record	(0008, 1048)	3	Copied from Input Image
Manufacturer's Model Name	(0008, 1090)	1	Copied from Input Image
Derivation Description	(0008, 2111)	3	Copied from Input Image
Patient's 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

Attribute	Tag	Type	Description
Patient's Sex	(0010, 0040)	2	Copied from Input Image
Patient's Age	(0010, 1010)	3	Copied from Input Image
Patient's Size	(0010, 1020)	3	Copied from Input Image
Patient's Weight	(0010, 1030)	3	Copied from Input Image
Medical Alerts	(0010, 2000)	3	Copied from Input Image
Contrast Allergies	(0010, 2110)	3	Copied from Input Image
Body Part Examined	(0018, 0015)	2	Copied from Input Image
KVP	(0018, 0060)	3	Copied from Input Image
Device Serial Number	(0018, 1000)	3	Copied from Input Image
Software Version(s)	(0018, 1020)	1C	Copied from Input Image
Protocol Name	(0018, 1030)	3	Copied from Input Image
Image and Fluoroscopy Area Dose Product	(0018, 115E)	3	Copied from Input Image
Laterality	(0020, 0060)	2C	Copied from Input Image if present.
Image Laterality	(0020, 0062)	1	Copied from Input Image
Samples Per Pixel	(0028, 0002)	1	1
Photometric Interpretation	(0028, 0004)	1	Copied from Input Image
Rows	(0028, 0010)	1	Based upon source data and the specific reprocessing configuration
Columns	(0028, 0011)	1	Based upon source data and the specific reprocessing configuration
Pixel Spacing	(0028, 0030)	1	Based upon source data and the specific reprocessing configuration
Bits Allocated	(0028, 0100)	1	16
Bits Stored	(0028, 0101)	1	16
High Bit	(0028, 0102)	1	15
Pixel Representation	(0028, 0103)	1	0
Smallest Image Pixel Value	(0028, 0106)	3	Based upon source data and the specific reprocessing configuration
Largest Image Pixel Value	(0028, 0107)	3	Based upon source data and the specific reprocessing configuration
Pixel Padding Value	(0028, 0120)	1C	Copied from Input Image
Burned in Annotation	(0028, 0301)	3	Copied from Input Image

Attribute	Tag	Type	Description
Pixel Intensity Relationship	(0028, 1040)	1	Copied from Input Image
Window Center	(0028, 1050)	1C	Based upon source data and the specific reprocessing configuration
Window Width	(0028, 1051)	1C	Based upon source data and the specific reprocessing configuration
Rescale Intercept	(0028, 1052)	1	Based upon source data and the specific reprocessing configuration
Rescale Slope	(0028, 1053)	1	Based upon source data and the specific reprocessing configuration
Rescale Type	(0028, 1054)	1	“US”
Pixel Data	(7FE0, 0010)	1	Based upon source data and the specific reprocessing configuration

Table 37: XP Reprocessing tool 3D Derived object

ee private element	Tag	Type	Description
Implementation Version Name	(0002, 0013)	3	Copied from Input Image
Specific Character Set	(0008, 0005)	1C	ISO_IR 100
Image Type	(0008, 0008)	1	“DERIVED\PRIMARY\AXIAL\NONE\3DRAX\ TXR”
SOP Class UID	(0008, 0016)	1	1.2.840.10008.5.1.4.1.1.2
SOP Instance UID	(0008, 0018)	1C	1.3.12.2.1107.5.8.20.UID2
Study Date	(0008, 0020)	2	Copied from Input Image
Series Date	(0008, 0021)	3	Copied from Input Image
Acquisition Date	(0008, 0022)	3	Copied from Input Image
Content Date	(0008, 0023)	2	Copied from Input Image
Study Time	(0008, 0030)	2	Copied from Input Image
Series Time	(0008, 0031)	3	Copied from Input Image
Acquisition Time	(0008, 0032)	3	Copied from Input Image
Content Time	(0008, 0033)	2	Copied from Input Image
Accession Number	(0008, 0050)	2	Copied from Input Image
Modality	(0008, 0060)	1	“CT”
Manufacturer	(0008, 0070)	2	“Siemens Healthineers”
Institution Name	(0008, 0080)	3	Copied from Input Image
Referring Physician's Name	(0008, 0090)	2	Copied from Input Image

ee private element	Tag	Type	Description
Station Name	(0008, 1010)	3	Copied from Input Image
Study Description	(0008, 1030)	3	Copied from Input Image
Series Description	(0008, 103E)	3	Copied from Input Image + reprocessed name (e.g., smooth, sharp, ...)
Institutional Department Name	(0008, 1040)	3	Copied from Input Image
Manufacturer's Model Name	(0008, 1090)	1	Copied from Input Image
Derivation Description	(0008, 2111)	3	Copied from Input Image
Patient's 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 Age	(0010, 1010)	3	Copied from Input Image
Patient's Size	(0010, 1020)	3	Copied from Input Image
Patient's Weight	(0010, 1030)	3	Copied from Input Image
Medical Alerts	(0010, 2000)	3	Copied from Input Image
Contrast Allergies	(0010, 2110)	3	Copied from Input Image
Body Part Examined	(0018, 0015)	2	Copied from Input Image
Slice Thickness	(0018, 0050)	2	Based upon source data and the specific reprocessing configuration
KVP	(0018, 0060)	3	Copied from Input Image
Device Serial Number	(0018, 1000)	3	Copied from Input Image
Software Version(s)	(0018, 1020)	1C	Copied from Input Image
Protocol Name	(0018, 1030)	3	Copied from Input Image
Reconstruction Diameter	(0018, 1100)	3	Based upon source data and the specific reprocessing configuration
Image and Fluoroscopy Area Dose Product	(0018, 115E)	3	Copied from Input Image
Convolution Kernel	(0018, 1210)	3	“HU\Default”
Patient Position	(0018, 5100)	3	Copied from Input Image
CTDIvol	(0018, 9345)	3	Copied from Input Image
CTDI Phantom Type Code Sequence	(0018, 9346)	3	Based upon source data and the specific reprocessing configuration
Study Instance UID	(0020, 000D)	1	Copied from Input Image

ee private element	**Tag**	**Type**	**Description**
Series Instance UID	(0020, 000E)	1	Generated
Study ID	(0020, 0010)	2	Copied from Input Image
Series Number	(0020, 0011)	2	Copied from Input Image
Acquisition Number	(0020, 0012)	2	Copied from Input Image
Instance Number	(0020, 0013)	2	Copied from Input Image
Image Position (Patient	(0020, 0032)	1	Based upon source data and the specific reprocessing configuration
Image Orientation (Patient)	(0020, 0037)	1	Based upon source data and the specific reprocessing configuration
Laterality	(0020, 0060)	2C	Copied from Input Image if present.
Image Laterality	(0020, 0062)	1	Copied from Input Image
Position Reference Indicator	(0020, 1040)	2	Copied from Input Image
Samples Per Pixel	(0028, 0002)	1	1
Photometric Interpretation	(0028, 0004)	1	“MONOCHROME2”
Rows	(0028, 0010)	1	Copied from Input Image
Columns	(0028, 0011)	1	Copied from Input Image
Pixel Spacing	(0028, 0030)	1	Based upon source data and the specific reprocessing configuration
Bits Allocated	(0028, 0100)	1	16
Bits Stored	(0028, 0101)	1	16
High Bit	(0028, 0102)	1	15
Pixel Representation	(0028, 0103)	1	0
Smallest Image Pixel Value	(0028, 0106)	3	Copied from Input Image
Largest Image Pixel Value	(0028, 0107)	3	Copied from Input Image
Window Center	(0028, 1050)	1C	Copied from Input Image
Window Width	(0028, 1051)	1C	Copied from Input Image
Rescale Intercept	(0028, 1052)	1	Based upon source data and the specific reprocessing configuration
Rescale Slope	(0028, 1053)	1	Based upon source data and the specific reprocessing configuration
Rescale Type	(0028, 1054)	1	“HU”
Pixel Data	(7FE0, 0010)	1	Based upon source data and the specific reprocessing configuration

7.3 Data Dictionary of Private Attributes

Table 38: 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 38: 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

7.3.1 Usage of Attributes from received IODs

N/A

7.3.2 Attribute mapping

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

7.3.3 Coerced/Modified fields

N/A

7.4 Coded Terminology and Templates

See application specific annexes.

7.4.1 Context Groups

See application specific annexes.

7.4.2 Template Specifications

See application specific annexes.

7.4.3 Private Code definitions

See application specific annexes.

7.5 Grayscale Image Consistency

N/A

7.6 Standard Extended/Specialized/Private SOP Classes

N/A

Annex A: CT Plugin Applications

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

Annex B: Index of Tables

Annex C: Table of Figures

On account of certain regional limitations of sales rights and service availability, we cannot guarantee that all products included in this brochure are available through the Siemens sales organization worldwide. Availability and packaging may vary by country and are subject to change without prior notice.

Some/All of the features and products described herein may not be available in the United States or other countries.

The information in this document contains general technical descriptions of specifications and options as well as standard and optional features that do not always have to be present in individual cases.

Siemens reserves the right to modify the design, packaging, specifications and options described herein without prior notice. Please contact your local Siemens sales representative for the most current information.

In the interest of complying with legal requirements concerning the environmental compatibility of our products (protection of natural resources and waste conservation), we recycle certain components. Using the same extensive quality assurance measures as for factory-new components, we guarantee the quality of these recycled components.

Siemens Healthineers Headquarters
Siemens Healthcare GmbH
Henkestr. 127
91052 Erlangen, Deutschland
Telefon: +49 9131 84-0
siemens-healthineers.com

Published by Siemens Healthcare GmbH · 1221 online · *© Siemens Healthcare GmbH, 2021*