

## **Ginkgo CADx DICOM Conformance Statement.**

### Disclaimer:

This document is the Ginkgo CADx Conformance Statement for DICOM images and spectroscopy objects obtained over the network, from interchange media, or from files loaded from the local file system. This conformance statement covers both the free open core version and the license version and/or commercial extensions.

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## 1. COVER PAGE

- **Company Name:** MetaEmotion S.L.
- **Product Name:** Ginkgo CADx
- **Version:** 3.6.0
- **Internal document number:** GCDC.3S Rev 6
- **Date:** 2013-12-13

## 2. CONFORMANCE STATEMENT OVERVIEW

Ginkgo CADx application framework supports querying a remote system for a list of DICOM objects that may then be retrieved to the local system. It also supports sending locally loaded images across the network to another system.

All storage SOP Classes defined as of DICOM 2002 can be received, stored and transmitted by the application, but only images and spectroscopy objects may be loaded and viewed. All single and multiframe with grayscale and RGB color images may be displayed.

Only hierarchical query and retrieval is supported.

Table 1: NETWORK SERVICES

SOP Class	User of Service (SCU)	Provider of Service (SCP)
<b>Transfer</b>		
HardcopyGrayscaleImageStorage	Yes	Yes
HardcopyColorImageStorage	Yes	Yes
ComputedRadiographyImageStorage	Yes	Yes
DigitalXRayImageStorageForPresentation	Yes	Yes
DigitalXRayImageStorageForProcessing	Yes	Yes
DigitalMammographyXRayImageStorageForPresentation	Yes	Yes
DigitalMammographyXRayImageStorageForProcessing	Yes	Yes
DigitalIntraOralXRayImageStorageForPresentation	Yes	Yes
DigitalIntraOralXRayImageStorageForProcessing	Yes	Yes
CTImageStorage	Yes	Yes
EnhancedCTImageStorage	Yes	Yes
UltrasoundMultiframeImageStorage	Yes	Yes
RetiredUltrasoundMultiframeImageStorage	Yes	Yes
MRImageStorage	Yes	Yes
EnhancedMRImageStorage	Yes	Yes
MRSpectroscopyStorage	Yes	Yes
EnhancedMRColorImageStorage	Yes	Yes
UltrasoundImageStorage	Yes	Yes
EnhancedUSVolumeStorage	Yes	Yes
SecondaryCaptureImageStorage	Yes	Yes
MultiframeSingleBitSecondaryCaptureImageStorage	Yes	Yes
MultiframeGrayscaleByteSecondaryCaptureImageStorage	Yes	Yes
MultiframeGrayscaleWordSecondaryCaptureImageStorage	Yes	Yes
MultiframeTrueColorSecondaryCaptureImageStorage	Yes	Yes

<b>SOP Class</b>	<b>User of Service (SCU)</b>	<b>Provider of Service (SCP)</b>
XRayRadiofluoroscopicImageStorage	Yes	Yes
XRayAngiographicImageStorage	Yes	Yes
EnhancedXAImageStorage	Yes	Yes
EnhancedXRImageStorage	Yes	Yes
XRay3DAngiographicImageStorage	Yes	Yes
NuclearMedicineImageStorage	Yes	Yes
RawDataStorage	Yes	Yes (Store only)
VLEndoscopicImageStorage	Yes	Yes
VideoEndoscopicImageStorage	Yes	Yes
VLMicroscopicImageStorage	Yes	Yes
VideoMicroscopicImageStorage	Yes	Yes
VLSlideCoordinatesMicroscopicImageStorage	Yes	Yes
VLPhotographicImageStorage	Yes	Yes
VideoPhotographicImageStorage	Yes	Yes
PositronEmissionTomographyImageStorage	Yes	Yes
RTImageStorage	Yes	Yes (Store only)
GrayscaleSoftcopyPresentationStateStorage	Yes	Yes
BasicTextSRStorage	Yes	Yes (Store only)
EnhancedSRStorage	Yes	Yes (Store only)
ComprehensiveSRStorage	Yes	Yes (Store only)
MammographyCADSRStorage	Yes	Yes (Store only)
KeyObjectSelectionDocumentStorage	Yes	Yes (Store only)
SecondaryCaptureImageStorage	Yes	Yes
ArterialPulseWaveformStorage	Yes	Yes
RespiratoryWaveformStorage	Yes	Yes
HemodynamicWaveformStorage	Yes	Yes
TwelveLeadECGWaveformStorage	Yes	Yes
GeneralECGWaveformStorage	Yes	Yes
AmbulatoryECGWaveformStorage	Yes	Yes
CardiacElectrophysiologyWaveformStorage	Yes	Yes
<b>Query/Retrieve</b>		
FIND Patient Root Query/Retrieve Information Model	Yes	No
FIND Study Root Query/Retrieve Information Model	Yes	No

SOP Class	User of Service (SCU)	Provider of Service (SCP)
GET Patient Root Query/Retrieve Information Model	Yes	No
GET Study Root Query/Retrieve Information Model	Yes	No
MOVE Patient Root Query/Retrieve Information Model	Yes	No
MOVE Study Root Query/Retrieve Information Model	Yes	No
<b>Workflow Management</b>		
FIND Modality Worklist Information Model	Yes[GP]	No
Modality Performed Procedure Step	Yes	No
<b>Print Management</b>		
Grayscale Print Management Meta	Yes[GP]	No
Color Print Management Meta		
Presentation LUT	No	No
Printer Configuration	Yes[GP]	No
Print Job	Yes[GP]	No
Basic Annotation	No	No
<b>Notes, Reports, Measurements Transfer</b>		
N/A	N/A	N/A

Table 2: TRANSFER SYNTAXES

Transfer Syntax	Category
LittleEndianImplicitTransferSyntax	Basic
LittleEndianExplicitTransferSyntax	Basic
BigEndianExplicitTransferSyntax	Basic
DeflatedExplicitVRLittleEndianTransferSyntax	Basic
JPEGProcess1TransferSyntax	Image
JPEGProcess2_4TransferSyntax	Image
JPEGProcess14TransferSyntax	Image
JPEGProcess14SV1TransferSyntax	Image
JPEGLSLosslessTransferSyntax	Image
JPEGLSLossyTransferSyntax	Image
JPEG2000LosslessOnlyTransferSyntax	Image
JPEG2000TransferSyntax	Image

JPEG2000Part2MulticomponentImageCompressionLosslessOnlyTransferSyntax	Image
JPEG2000Part2MulticomponentImageCompressionTransferSyntax	Image
RLELosslessTransferSyntax	Image
MPEG2MainProfileAtMainLevelTransferSyntax	Video
MPEG2MainProfileAtHighLevelTransferSyntax	Video
MPEG4HighProfileLevel4_1TransferSyntax	Video
MPEG4BDcompatibleHighProfileLevel4_1TransferSyntax	Video

Table 3: UID VALUES

UID Name	UID Value	Category
HardcopyGrayscaleImageStorage	1.2.840.10008.5.1.1.29	Storage
HardcopyColorImageStorage	1.2.840.10008.5.1.1.30	Storage
ComputedRadiographyImageStorage	1.2.840.10008.5.1.4.1.1.1	Storage
DigitalXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.1	Storage
DigitalXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.1.1	Storage
DigitalMammographyXRayImageStorageFor Presentation	1.2.840.10008.5.1.4.1.1.1.2	Storage
DigitalMammographyXRayImageStorageFor Processing	1.2.840.10008.5.1.4.1.1.1.2.1	Storage
DigitalIntraOralXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3	Storage
DigitalIntraOralXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.3.1	Storage
CTImageStorage	1.2.840.10008.5.1.4.1.1.2	Storage
EnhancedCTImageStorage	1.2.840.10008.5.1.4.1.1.2.1	Storage
UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3.1	Storage
RetiredUltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3	Storage
MRImageStorage	1.2.840.10008.5.1.4.1.1.4	Storage
EnhancedMRImageStorage	1.2.840.10008.5.1.4.1.1.4.1	Storage
MRSpectroscopyStorage	1.2.840.10008.5.1.4.1.1.4.2	Storage
EnhancedMRColorImageStorage	1.2.840.10008.5.1.4.1.1.4.3	Storage
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1	Storage
EnhancedUSVolumeStorage	1.2.840.10008.5.1.4.1.1.6.2	Storage
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	Storage
MultiframeSingleBitSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.1	Storage
MultiframeGrayscaleByteSecondaryCaptureImage Storage	1.2.840.10008.5.1.4.1.1.7.2	Storage
MultiframeGrayscaleWordSecondaryCaptureImage	1.2.840.10008.5.1.4.1.1.7.3	Storage

UID Name	UID Value	Category
Storage		
MultiframeTrueColorSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.4	Storage
XRayRadiofluoroscopicImageStorage	1.2.840.10008.5.1.4.1.1.12.2	Storage
XRayAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.12.1	Storage
EnhancedXAImageStorage	1.2.840.10008.5.1.4.1.1.12.1.1	Storage
EnhancedXRFIImageStorage	1.2.840.10008.5.1.4.1.1.12.2.1	Storage
XRay3DAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.13.1.1	Storage
NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.20	Storage
RawDataStorage	1.2.840.10008.5.1.4.1.1.66	Storage
VLEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1	Storage
VideoEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Storage
VLMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2	Storage
VideoMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Storage
VLSlideCoordinatesMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.3	Storage
VLPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4	Storage
VideoPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Storage
PositronEmissionTomographyImageStorage	1.2.840.10008.5.1.4.1.1.128	Storage
RTImageStorage	1.2.840.10008.5.1.4.1.1.481.1	Storage
GrayscaleSoftcopyPresentationStateStorage	1.2.840.10008.5.1.4.1.1.11.1	Storage
BasicTextSRStorage	1.2.840.10008.5.1.4.1.1.88.11	Storage
EnhancedSRStorage	1.2.840.10008.5.1.4.1.1.88.22	Storage
ComprehensiveSRStorage	1.2.840.10008.5.1.4.1.1.88.33	Storage
MammographyCADSRStorage	1.2.840.10008.5.1.4.1.1.88.50	Storage
KeyObjectSelectionDocumentStorage	1.2.840.10008.5.1.4.1.1.88.59	Storage
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	Storage
ArterialPulseWaveformStorage	1.2.840.10008.5.1.4.1.1.9.5.1	Storage
RespiratoryWaveformStorage	1.2.840.10008.5.1.4.1.1.9.6.1	Storage
HemodynamicWaveformStorage	1.2.840.10008.5.1.4.1.1.9.2.1	Storage
TwelveLeadECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.1	Storage
GeneralECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.2	Storage
AmbulatoryECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.3	Storage
CardiacElectrophysiologyWaveformStorage	1.2.840.10008.5.1.4.1.1.9.3.1	Storage
BasicGrayscalePrintManagementMetaSOPClass	1.2.840.10008.5.1.1.9	Print

UID Name	UID Value	Category
BasicFilmSessionSOPClass	1.2.840.10008.5.1.1.1	Print
BasicFilmBoxSOPClass	1.2.840.10008.5.1.1.2	Print
BasicGrayscaleImageBoxSOPClass	1.2.840.10008.5.1.1.4	Print
PrinterSOPClass	1.2.840.10008.5.1.1.16	Print
PrinterSOPInstance	1.2.840.10008.5.1.1.17	Print
LittleEndianImplicitTransferSyntax	1.2.840.10008.1.2	Transfer Syntax
LittleEndianExplicitTransferSyntax	1.2.840.10008.1.2.1	Transfer Syntax
BigEndianExplicitTransferSyntax	1.2.840.10008.1.2.2	Transfer Syntax
DeflatedExplicitVRLittleEndianTransferSyntax	1.2.840.10008.1.2.1.99	Transfer Syntax
JPEGProcess1TransferSyntax	1.2.840.10008.1.2.4.50	Transfer Syntax
JPEGProcess2_4TransferSyntax	1.2.840.10008.1.2.4.51	Transfer Syntax
JPEGProcess10_12TransferSyntax	1.2.840.10008.1.2.4.55	Transfer Syntax
JPEGProcess14TransferSyntax	1.2.840.10008.1.2.4.57	Transfer Syntax
JPEGProcess14SV1TransferSyntax	1.2.840.10008.1.2.4.70	Transfer Syntax
JPEGLSLosslessTransferSyntax	1.2.840.10008.1.2.4.80	Transfer Syntax
JPEGLSLossyTransferSyntax	1.2.840.10008.1.2.4.81	Transfer Syntax
JPEG2000LosslessOnlyTransferSyntax	1.2.840.10008.1.2.4.90	Transfer Syntax
JPEG2000TransferSyntax	1.2.840.10008.1.2.4.91	Transfer Syntax
JPEG2000Part2MulticomponentImageCompression LosslessOnlyTransferSyntax	1.2.840.10008.1.2.4.92	Transfer Syntax
JPEG2000Part2MulticomponentImageCompression TransferSyntax	1.2.840.10008.1.2.4.93	Transfer Syntax
RLELosslessTransferSyntax	1.2.840.10008.1.2.5	Transfer Syntax
MPEG2MainProfileAtMainLevelTransferSyntax	1.2.840.10008.1.2.4.100	Transfer



UID Name	UID Value	Category
		Syntax
MPEG2MainProfileAtHighLevelTransferSyntax	1.2.840.10008.1.2.4.101	Transfer Syntax
MPEG4HighProfileLevel4_1TransferSyntax	1.2.840.10008.1.2.4.102	Transfer Syntax
MPEG4BDcompatibleHighProfileLevel4_1TransferSyntax	1.2.840.10008.1.2.4.103	Transfer Syntax

Table 4: MEDIA SERVICES

Media Storage Application Profile	Identifier	Write Files (FSC or FSU)	Read files (FSR)
<b>Compact Disk - Recordable</b>			
General Purpose CD-R Interchange	STD-GEN-CD	Yes [GP]	Yes
General Purpose Secure CD-R Interchange	STD-GEN-SEC-CD	-	No
<b>DVD</b>			
General Purpose Interchange on DVD-RAM Media	STD-GEN-DVD-RAM	Yes [GP]	Yes
General Purpose Secure Interchange on DVD-RAM Media	STD-GEN-SEC-DVD-RAM	-	No
<b>USB</b>			
General Purpose USB and Flash Memory	STD-GEN-USB	Yes [GP]	Yes

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## 4. INTRODUCTION

### 4.1. REVISION HISTORY

Table 5: REVISION HISTORY

Document Version	Date of Issue	Author	Description
1.1	February, 08, 2012	MetaEmotion HealthCare	Final version
1.2	March, 23, 2012	MetaEmotion HealthCare	PDF IOD, Generated SOPs included.
1.3	April, 20, 2012	MetaEmotion HealthCare	Fixes, Updates, Printing support included.
1.4	June, 18, 2012	MetaEmotion HealthCare	Updated for new workstation behavior.
1.5	July, 23, 2013	MetaEmotion Healthcare	Updated for modality performed procedure step.

### 4.2. AUDIENCE

The reader of this document is concerned with software design and/or system integration issues, so it is assumed that the reader of this document is familiar with the DICOM 3.0 Standard and with the terminology and concepts which are used in this standard.

This document specifies the compliance of Ginkgo CADx support to the DICOM 3.0 standard.

### 4.3. REMARKS

The author (MetaEmotion S.L.) provides no warranty without explicit link contract complained on software maintaining and/or commercial support services.

Notes:

[GP] Only available with Ginkgo CADx Pro [distribution](http://ginkgo-cadx.com/en/extensions/ginkgo-cadx-pro/).

### 4.4. DEFINITIONS, TERMS AND ABBREVIATIONS

Table 6: DEFINITIONS, TERMS AND ABBREVIATIONS

Term/Abbreviation	Definition
AE	Application Entity
AET	Application Entity Title
ANSI	American National Standards Institute
DICOM	Digital Imaging and Communications in Medicine
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normalized
FSC	File Set Creator.



<b>Term/Abbreviation</b>	<b>Definition</b>
FSR	File Set Reader.
FSU	File Set Updater.
HL7	Health Level Seven (Association).
IHE	Integrating the Healthcare Enterprise (Association).
MPPS	Modality Performed Procedure Step
NEMA	National Electrical Manufacturers Association.
PACS	Picture Archiving and Communication System.
PDU	Protocol Data Unit.
SCP	Service Class Provider.
SCU	Service Class User.
SOP	Service Object Pair.
UID	Unique Identifier.
WADO	Web Access to DICOM Objects.

#### **4.5. REFERENCES**

- **HL7**, <http://www.hl7.org/>
- **IHE**, <http://www.ihe.net/>
- **NEMA**, <http://www.nema.org/>

## 5. NETWORKING

### 5.1. IMPLEMENTATION MODEL

#### 5.1.1. Application Data Flow

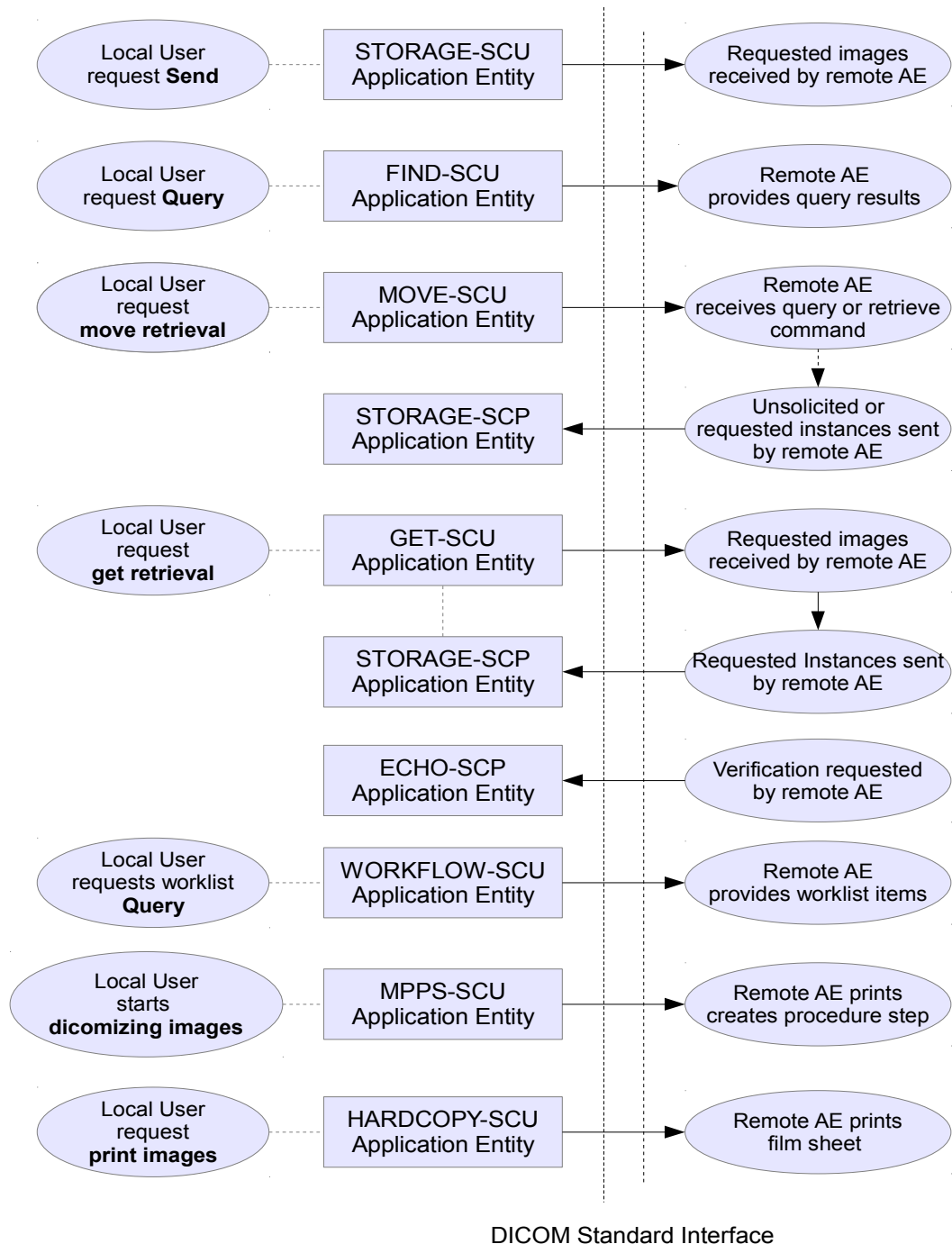


Figure 1: IMPLEMENTATION MODEL

The application is a single pure and native C++ application that provides both a user interface, internal database and network listener that spawns additional threads as when requiring SCUs are

initialized to handle incoming connections, as well as media support.

Conceptually, the network services may be modeled as the following separate AEs though in fact all the AEs share a single (configurable) AE Title:

- ECHO-SCP, which response to on-demand verification requests.
- STORAGE-SCP, which receives incoming images and other composite instances.
- STORAGE-SCU, which sends outbound images and other composite instances.
- FIND-SCU which queries remote AEs for lists of studies, series and instances.
- MOVE-SCU, which retrieves selected studies, series or instances in a P2P strategy.
- GET-SCU, which retrieves selected studies, series or instances in same association, in a STORE Request sequence.
- WORKFLOW-SCU [GP] , which queries remote AEs for list worklist entries.
- MPPS-SCU [GP] , which creates procedure step on a remote AE.
- HARDCOPY-SCU [GP] , which prints images on a remote AE (Printer). It is associated with the local real-world activity “Film Images”. “Film Images” creates a print-job within the print queue containing one or more virtual film sheets composed from images selected by the user.

The Application Entities (AEs) SCP & SCU detailed in the application data flow diagram are all included in the Ginkgo CADx Framework. They may be invoked multiple times and the instances may operate simultaneously and asynchronously.

### **5.1.2. Functional Definition of AE's**

#### **5.1.2.1. ECHO-SCP**

Ginkgo CADx Framework can accept C-ECHO associations at any time.

ECHO-SCP waits in the background for connections, will accept associations with Presentation Context for SOP Class of the Verification Service Class and will respond successfully to any of these requests.

#### **5.1.2.2. STORAGE-SCP**

Ginkgo CADx Framework can accept C-ECHO associations at any time. The preferred presentation contexts are specified depending on configured in the dicom conformance XML file.

STORAGE-SCP waits in the background for connections, will accept associations with Presentation Context for SOP Classes of the Storage Service Class. If any of the instance received are duplicated (same SOP Instance UID), they could be discarded by user interaction. Otherwise, it will store the received instances to the local database there they may subsequently be listed and viewed through the user interface.

They are no restrictions based on the AETitle.

#### **5.1.2.3. STORAGE-SCU**

Ginkgo CADx Framework can send DICOM objects through C-STORE association to a preconfigured AE. The proposed presentation contexts are specified depending on configured in the dicom conformance XML file.

#### **5.1.2.4. FIND-SCU**

Ginkgo CADx can query a for patients, studies, series and images at PATIENT, STUDY, SERIES and IMAGE levels.

FINS-SCU is activated through:

- User interface interaction, querying a specified preconfigured AE. Queries are performed at STUDY level at first query. Refined queries deeps at SERIES level for selected study.
- XML integration workflows. Queries are performed at arbitrary user specified level. In most cases: STUDY level .

IMAGE level is normally not used.

#### **5.1.2.5. MOVE-SCU**

MOVE-SCU is activated through the user interface when user selects a study or serie for retrieval and AE configuration is set with MOVE option.

Depending on AE explicit configuration, MOVE-SCU retrieve is performed at STUDY or SERIES level.

When SERIES level mode is set in AE configuration, complete study retrievals are recursively performed at SERIES level retrievals.

#### **5.1.2.6. GET-SCU**

GET-SCU is activated through the user interface when user selects a study or serie for retrieval and AE configuration is set with GET option.

Depending on AE explicit configuration, GET-SCU retrieve is performed at STUDY or SERIES level.

When SERIES level mode is set in AE configuration, complete study retrievals are recursively performed at SERIES level retrievals.

When GET-SCU is performed, Ginkgo CADx Framework expects to receive sequential C-STORE request in the same association, so no generic STORAGE-SCP is explicitly called.

#### **5.1.2.7. WORKFLOW-SCU**

Ginkgo CADx Pro distribution [GP] provides querying Modality Worklists.

WORKFLOW-SCU is activated through:

- User interface interaction, querying a specified AE. Queries are performed with an implicit parameter (ScheduledStationAETitle matching Ginkgo CADx local's AE) as well as many configurable ones as date range and status.

#### **5.1.2.8. MPPS-SCU**

Ginkgo CADx Pro distribution [GP] provides creation and update of modality worklist items.

MPPS-SCU is activated through:

- User interface interaction, starting image acquisition using information stored in a modality worklist item.

#### **5.1.2.9. HARDCOPY-SCU**

Ginkgo CADx Pro distribution [GP] also provides printing grayscale images.

The HARDCOPY-SCU is always activated by a an explicit request from the user interface. An

association is established with the printer and the printer's status determined. If the printer is operating normally, the film sheets described within the print-job will be printed. Changes in printer status will be detected (e.g. out of film) and reported to the user. If the printer is not operating normally, the print-job will set to an error state and can be restarted by the user via the user interface.

### 5.1.3. Sequencing of Real World Activities

Ginkgo CADx Framework allows to invoke one or more operations asynchronously, although any unrequested SCP invocation is not allowed.

The parallelization is limited to one association type at a time by Ginkgo CADx Framework. There is no limit on derived incoming association concurrency.

## 5.2. AE SPECIFICATIONS:

The allowed Transfer Syntax for each presentation context is dependant on Ginkgo CADx Framework configuration through conformance.xml file.

The negotiated transfer syntaxes are grouped in SOP Classes and storage related negotiations ones are grouped by modality at upper level.

### 5.2.1. ECHO-SCP

#### 5.2.1.1. SOP Classes

ECHO-SCP provides Standard Conformance to the following SOP Classes.

Table 7: SOP CLASSES SUPPORTED BY ECHO-SCP

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	No	Yes

#### 5.2.1.2. Association Policies

#### 5.2.1.3. General

ECHO-SCP accepts but never initiates associations.

Table 8: MAXIMUM PDU SIZE RECEIVED AS SCP FOR ECHO-SCP

Maximum PDU size received	Unlimited
---------------------------	-----------

#### 5.2.1.3.1. Number of Associations.

Table 9: NUMBER OF ASSOCIATIONS AS SCP FOR ECHO-SCP

Maximum number of simultaneous associations	Unlimited
---	-----------

#### 5.2.1.3.2. Asynchronous Nature

ECHO-SCP will only allow a single outstanding operation on an Association. Therefore, ECHO-SCP will not perform asynchronous operations window negotiation.

#### 5.2.1.3.3. Implementation Identifying Information

Table 10: DICOM IMPLEMENTATION CLASS AND VERSION FOR ECHO-SCP

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
--------------------------	-----------------------------

<b>Implementation Version Name</b>	OFFIS_DCMTK_360
------------------------------------	-----------------

#### 5.2.1.4. Association Initiation Policy

ECHO-SCP does not initiate associations.

#### 5.2.1.5. Association Acceptance Policy

When ECHO-SCP accepts an association, it will respond to echo requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be rejected.

##### 5.2.1.5.1. Activity – Receive Echo Request

##### 5.2.1.5.1.1. Description and Sequencing of Activities

##### 5.2.1.5.1.2. Accepted Presentation Contexts

*Table 11: ACCEPTABLE PRESENTATION CONTEXTS FOR ECHO-SCP*

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
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	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

##### 5.2.1.5.1.3. Extended Negotiation

No extended negotiation is performed.

##### 5.2.1.5.1.4. SOP Specific Conformance

##### 5.2.1.5.1.4.1. SOP Specific Conformance to Verification SOP Class

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

##### 5.2.1.5.1.4.2. Presentation Context Acceptance Criterion

ECHO-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

##### 5.2.1.5.1.4.3. Transfer Syntax Selection Policies

ECHO-SCP prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

- a) First encountered explicit Transfer Syntax.

ECHO-SCP will accept duplicate Presentation Contexts, that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same priority for selecting a Transfer Syntax for each.

## 5.2.2. STORAGE-SCP

### 5.2.2.1. SOP Classes

STORAGE-SCP provides Standard Conformance to the following SOP Classes.

*Table 12: SOP CLASSES SUPPORTED BY STORAGE-SCP*

SOP Class Name	SOP Class UID	SCU	SCP
HardcopyGrayscaleImageStorage	1.2.840.10008.5.1.1.29	No	Yes
HardcopyColorImageStorage	1.2.840.10008.5.1.1.30	No	Yes
ComputedRadiographyImageStorage	1.2.840.10008.5.1.4.1.1.1	No	Yes
DigitalXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.1	No	Yes
DigitalXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.1.1	No	Yes
DigitalMammographyXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.2	No	Yes
DigitalMammographyXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.2.1	No	Yes
DigitalIntraOralXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3	No	Yes
DigitalIntraOralXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.3.1	No	Yes
CTImageStorage	1.2.840.10008.5.1.4.1.1.2	No	Yes
EnhancedCTImageStorage	1.2.840.10008.5.1.4.1.1.2.1	No	Yes
UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3.1	No	Yes
RetiredUltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3	No	Yes
MRImageStorage	1.2.840.10008.5.1.4.1.1.4	No	Yes
EnhancedMRImageStorage	1.2.840.10008.5.1.4.1.1.4.1	No	Yes
MRSpectroscopyStorage	1.2.840.10008.5.1.4.1.1.4.2	No	Yes
EnhancedMRColorImageStorage	1.2.840.10008.5.1.4.1.1.4.3	No	Yes
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1	No	Yes
EnhancedUSVolumeStorage	1.2.840.10008.5.1.4.1.1.6.2	No	Yes
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	No	Yes
MultiframeSingleBitSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.1	No	Yes
MultiframeGrayscaleByteSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.2	No	Yes
MultiframeGrayscaleWordSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.3	No	Yes
MultiframeTrueColorSecondaryCapture	1.2.840.10008.5.1.4.1.1.7.4	No	Yes

SOP Class Name	SOP Class UID	SCU	SCP
ImageStorage			
XRayRadiofluoroscopicImageStorage	1.2.840.10008.5.1.4.1.1.12.2	No	Yes
XRayAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.12.1	No	Yes
EnhancedXAImageStorage	1.2.840.10008.5.1.4.1.1.12.1.1	No	Yes
EnhancedXRFImageStorage	1.2.840.10008.5.1.4.1.1.12.2.1	No	Yes
XRay3DAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.13.1.1	No	Yes
NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.20	No	Yes
RawDataStorage	1.2.840.10008.5.1.4.1.1.66	No	Yes
VLEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1	No	Yes
VideoEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1.1	No	Yes
VLMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2	No	Yes
VideoMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2.1	No	Yes
VLSlideCoordinatesMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.3	No	Yes
VLPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4	No	Yes
VideoPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4.1	No	Yes
PositronEmissionTomographyImageStorage	1.2.840.10008.5.1.4.1.1.128	No	Yes
RTImageStorage	1.2.840.10008.5.1.4.1.1.481.1	No	Yes
GrayscaleSoftcopyPresentationStateStorage	1.2.840.10008.5.1.4.1.1.11.1	No	Yes
BasicTextSRStorage	1.2.840.10008.5.1.4.1.1.88.11	No	Yes
EnhancedSRStorage	1.2.840.10008.5.1.4.1.1.88.22	No	Yes
ComprehensiveSRStorage	1.2.840.10008.5.1.4.1.1.88.33	No	Yes
MammographyCADSRStorage	1.2.840.10008.5.1.4.1.1.88.50	No	Yes
KeyObjectSelectionDocumentStorage	1.2.840.10008.5.1.4.1.1.88.59	No	Yes
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	No	Yes
ArterialPulseWaveformStorage	1.2.840.10008.5.1.4.1.1.9.5.1	No	Yes
RespiratoryWaveformStorage	1.2.840.10008.5.1.4.1.1.9.6.1	No	Yes
HemodynamicWaveformStorage	1.2.840.10008.5.1.4.1.1.9.2.1	No	Yes
TwelveLeadECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.1	No	Yes
GeneralECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.2	No	Yes
AmbulatoryECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.3	No	Yes
CardiacElectrophysiologyWaveformStorage	1.2.840.10008.5.1.4.1.1.9.3.1	No	Yes

#### 5.2.2.2. Association Policies

#### 5.2.2.3. General



STORAGE-SCP accepts but never initiates associations.

*Table 13: MAXIMUM PDU SIZE RECEIVED AS SCP FOR STORAGE-SCP*

Maximum PDU size received	Unlimited
---------------------------	-----------

#### **5.2.2.3.1. Number of Associations.**

*Table 14: NUMBER OF ASSOCIATIONS AS SCP FOR STORAGE-SCP*

Maximum number of simultaneous associations	Unlimited
---	-----------

#### **5.2.2.3.2. Asynchronous Nature**

STORAGE-SCP will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCP will not perform asynchronous operations window negotiation.

#### **5.2.2.3.3. Implementation Identifying Information**

*Table 15: DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCP*

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

#### **5.2.2.4. Association Initiation Policy**

STORAGE-SCP does not initiate associations.

#### **5.2.2.5. Association Acceptance Policy**

When STORAGE-SCP accepts an association, it will respond to STORAGE requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will be rejected.

#### **5.2.2.5.1. Activity – Receive Storage Request**

##### **5.2.2.5.1.1. Description and Sequencing of Activities**

As instances are received they are copied to the local file system.

If they were duplicated (same UID), overwriting is performed if user agrees.

When copy done (or user agrees the overwrite for existing series or instances), a record inserted into the local database. Otherwise, the new instance being transferred is discarded.

##### **5.2.2.5.1.2. Accepted Presentation Contexts**

Table 16: ACCEPTABLE PRESENTATION CONTEXTS FOR STORAGE-SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	Category		
See <a href="#">Storage SCU SOP Classes Table</a>	See <a href="#">Storage SCU SOP Classes Table</a>	See <a href="#">Transfer Syntaxes Table</a>	Basic (when appropriate)	SCU	None
		See <a href="#">Transfer Syntaxes Table</a>	Image (when appropriate)	SCU	None
		See <a href="#">Transfer Syntaxes Table</a>	Video (when appropriate)	SCU	None

#### 5.2.2.5.1.3. Extended Negotiation

No extended negotiation is performed, through STORAGE-SCP:

- Is a Level 2 Storage SCP (Full – does not discard any data elements).
- Does not support digital signatures.
- Does not coerce any received data elements.

#### 5.2.2.5.1.4. SOP Specific Conformance

##### 5.2.2.5.1.4.1. SOP Specific Conformance to Storage SOP Class

STORAGE-SCP provides standard conformance to the Storage Service Class.

##### 5.2.2.5.1.4.2. Presentation Context Acceptance Criterion

STORAGE-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes (configurable by modality in conformance.xml file). More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

##### 5.2.2.5.1.4.3. Transfer Syntax Selection Policies

STORAGE-SCP prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Transfer Syntax:

- a) First encountered and supported explicit Transfer Syntax.

STORAGE-SCP will accept duplicate Presentation Contexts, that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same priority for selecting a Transfer Syntax for each.

##### 5.2.2.5.1.4.4. Response Status

STORAGE-SCP will behave as described in the Table below when generating the C-STORE response command message.

Table 17: RESPONSE STATUS FOR STORAGE-SCP AND RECEIVE STORAGE REQUEST

Service Status	Further Meaning	Status Codes	Reason
Refused	Out of resources	A7XX-A7FF	Association aborted or not enough space on

Service Status	Further Meaning	Status Codes	Reason
			disk.
Error	Dataset does not match SOP Class	A9XX-A9FF	Association aborted
	Cannot understand	CXXX	Association aborted or internal error.
Warning	Coercion of Data Elements	B000	Image transmission is considered successful but some advice has been logged
	Dataset does not match SOP Class	B0007	Image transmission is considered successful but some advice has been logged
	Elements discarded	B0006	Image transmission is considered successful but some advice has been logged
Success		0000	

### 5.2.3. STORAGE-SCU

#### 5.2.3.1. SOP Classes

STORAGE-SCU provides Standard Conformance to the following SOP Classes.

Table 18: SOP CLASSES SUPPORTED BY STORAGE-SCU

SOP Class Name	SOP Class UID	SCU	SCP
HardcopyGrayscaleImageStorage	1.2.840.10008.5.1.1.29	Yes	No
HardcopyColorImageStorage	1.2.840.10008.5.1.1.30	Yes	No
ComputedRadiographyImageStorage	1.2.840.10008.5.1.4.1.1.1	Yes	No
DigitalXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.1	Yes	No
DigitalXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.1.1	Yes	No
DigitalMammographyXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.2	Yes	No
DigitalMammographyXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.2.1	Yes	No
DigitalIntraOralXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3	Yes	No
DigitalIntraOralXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.3.1	Yes	No
CTImageStorage	1.2.840.10008.5.1.4.1.1.2	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
EnhancedCTImageStorage	1.2.840.10008.5.1.4.1.1.2.1	Yes	No
UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3.1	Yes	No
RetiredUltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3	Yes	No
MRImageStorage	1.2.840.10008.5.1.4.1.1.4	Yes	No
EnhancedMRImageStorage	1.2.840.10008.5.1.4.1.1.4.1	Yes	No
MRSpectroscopyStorage	1.2.840.10008.5.1.4.1.1.4.2	Yes	No
EnhancedMRColorImageStorage	1.2.840.10008.5.1.4.1.1.4.3	Yes	No
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1	Yes	No
EnhancedUSVolumeStorage	1.2.840.10008.5.1.4.1.1.6.2	Yes	No
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	Yes	No
MultiframeSingleBitSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.1	Yes	No
MultiframeGrayscaleByteSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.2	Yes	No
MultiframeGrayscaleWordSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.3	Yes	No
MultiframeTrueColorSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.4	Yes	No
XRayRadiofluoroscopicImageStorage	1.2.840.10008.5.1.4.1.1.12.2	Yes	No
XRayAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.12.1	Yes	No
EnhancedXAImageStorage	1.2.840.10008.5.1.4.1.1.12.1.1	Yes	No
EnhancedXRFImageStorage	1.2.840.10008.5.1.4.1.1.12.2.1	Yes	No
XRay3DAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.13.1.1	Yes	No
NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.20	Yes	No
RawDataStorage	1.2.840.10008.5.1.4.1.1.66	Yes	No
VLEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1	Yes	No
VideoEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1.1	Yes	No
VLMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2	Yes	No
VideoMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2.1	Yes	No
VLSlideCoordinatesMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.3	Yes	No
VLPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4	Yes	No
VideoPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4.1	Yes	No
PositronEmissionTomographyImageStorage	1.2.840.10008.5.1.4.1.1.128	Yes	No
RTImageStorage	1.2.840.10008.5.1.4.1.1.481.1	Yes	No

SOP Class Name	SOP Class UID	SCU	SCP
GrayscaleSoftcopyPresentationStateStorage	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
BasicTextSRStorage	1.2.840.10008.5.1.4.1.1.88.11	Yes	No
EnhancedSRStorage	1.2.840.10008.5.1.4.1.1.88.22	Yes	No
ComprehensiveSRStorage	1.2.840.10008.5.1.4.1.1.88.33	Yes	No
MammographyCADSRStorage	1.2.840.10008.5.1.4.1.1.88.50	Yes	No
KeyObjectSelectionDocumentStorage	1.2.840.10008.5.1.4.1.1.88.59	Yes	No
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	Yes	No
ArterialPulseWaveformStorage	1.2.840.10008.5.1.4.1.1.9.5.1	Yes	No
RespiratoryWaveformStorage	1.2.840.10008.5.1.4.1.1.9.6.1	Yes	No
HemodynamicWaveformStorage	1.2.840.10008.5.1.4.1.1.9.2.1	Yes	No
TwelveLeadECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.1	Yes	No
GeneralECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.2	Yes	No
AmbulatoryECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.3	Yes	No
CardiacElectrophysiologyWaveformStorage	1.2.840.10008.5.1.4.1.1.9.3.1	Yes	No

### 5.2.3.2. Association Policies

#### 5.2.3.3. General

STORAGE-SCU initiates but never accepts associations.

Table 19: MAXIMUM PDU SIZE RECEIVED AS SCP FOR STORAGE-SCU

Maximum PDU size received	Unlimited
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#### 5.2.3.3.1. Number of Associations.

Table 20: NUMBER OF ASSOCIATIONS AS SCP FOR STORAGE-SCU

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

#### 5.2.3.3.2. Asynchronous Nature

STORAGE-SCU will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCU will not perform asynchronous operations window negotiation.

#### 5.2.3.3.3. Implementation Identifying Information

Table 21: DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCU

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

#### 5.2.3.4. Association Initiation Policy

STORAGE-SCU attempts to initiate a new association for each instance it attempts to transfer.

#### 5.2.3.5. Association Acceptance Policy

STORAGE-SCU does not accept associations.

### 5.2.3.5.1. Activity – Send Storage Request

#### 5.2.3.5.1.1. Description and Sequencing of Activities

For each instance selected from the user interface to be transferred, a single attempt will be made to transmit it to the selected remote AE. If the send fails, for whatever reason, no retry will be performed, and the transaction will be aborted.

#### 5.2.3.5.1.2. Proposed Presentation Contexts

*Table 22: PROPOSED PRESENTATION CONTEXTS FOR STORAGE-SCU AND RECEIVE STORAGE REQUEST*

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	Category		
See <a href="#">Storage SCU SOP Classes Table</a>	See <a href="#">Storage SCU SOP Classes Table</a>	See <a href="#">Transfer Syntaxes Table</a>	Basic (when appropriate)	SCU	None
		See <a href="#">Transfer Syntaxes Table</a>	Image (when appropriate)	SCU	None
		See <a href="#">Transfer Syntaxes Table</a>	Video (when appropriate)	SCU	None

STORAGE-SCU will propose Presentation Contexts only for the SOP Class of the instance that is to be transferred.

For that SOP Class, STORAGE-SCU will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, and an additional Presentation Context with all of the supported Transfer Syntaxes (configurable by modality in conformance.xml file), in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

#### 5.2.3.5.1.3. Extended Negotiation

No extended negotiation is performed.

#### 5.2.3.5.1.4. SOP Specific Conformance

##### 5.2.3.5.1.4.1. SOP Specific Conformance to Storage SOP Class

STORAGE-SCU provides standard conformance to the Storage Service Class.

##### 5.2.3.5.1.4.2. Presentation Context Acceptance Criterion

STORAGE-SCU does not accept associations.

##### 5.2.3.5.1.4.3. Transfer Syntax Selection Policies

STORAGE-SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Presentation Context to use for the C-STORE operation:

- a) First encountered explicit Transfer Syntax.

##### 5.2.3.5.1.4.4. Response Status

STORAGE-SCU will behave as described in the Table below in response to the status returned in the C-STORE response command message.

*Table 23: RESPONSE STATUS FOR STORAGE-SCU AND RECEIVE STORAGE REQUEST*

Service Status	Further Meaning	Status Codes	Reason
Refused	Out of resources	A7XX-A7FF	Logged
Error	Dataset does not match SOP Class	A9XX-A9FF	Logged
	Cannot understand	CXXX	Logged
Warning	Coercion of Data Elements	B000	Logged
	Dataset does not match SOP Class	B0007	Logged
	Elements discarded	B0006	Logged
Success		0000	Logged

## 5.2.4. FIND-SCU

### 5.2.4.1. SOP Classes

FIND-SCU provides Standard Conformance to the following SOP Classes.

*Table 24: SOP CLASSES SUPPORTED BY FIND-SCU*

SOP Class Name	SOP Class UID	SCU	SCP
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

### 5.2.4.2. Association Policies

### 5.2.4.3. General

FIND-SCU initiates but never accepts associations.

*Table 25: MAXIMUM PDU SIZE RECEIVED AS SCP FOR FIND-SCU*

Maximum PDU size received	Unlimited
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### 5.2.4.3.1. Number of Associations.

*Table 26: NUMBER OF ASSOCIATIONS AS A SCP FOR FIND-SCU*

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

### 5.2.4.3.2. Asynchronous Nature

FIND-SCU will only allow a single outstanding operation on an Association. Therefore, FIND-SCU will not perform asynchronous operations window negotiation.

### 5.2.4.3.3. Implementation Identifying Information

Table 27: DICOM IMPLEMENTATION CLASS AND VERSION FOR FIND-SCU

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

**5.2.4.4. Association Initiation Policy**

FIND-SCU attempts to initiate a new association when the user performs the query action from the user interface. If this involves recursive queries for lower query levels in the hierarchy, these will be performed on the same association or any other one depending on the AE configuration in Ginkgo CADx Framework.

**5.2.4.5. Association Acceptance Policy**

FIND-SCU does not accept associations.

**5.2.4.5.1. Activity – Send Query Request****5.2.4.5.1.1. Description and Sequencing of Activities**

A single attempt will be made to query the remote AE. If the query fails, for whatever reason, no retry will be performed.

**5.2.4.5.1.2. Proposed Presentation Contexts**

Table 28: PROPOSED PRESENTATION CONTEXTS FOR FIND-SCU AND QUERY REMOTE AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See <a href="#">Find SCU SOP Classes Table</a>	See <a href="#">Find SCU SOP Classes Table</a>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

FIND-SCU will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

**5.2.4.5.1.3. Extended Negotiation**

No extended negotiation is performed.

In particular, relational queries are not supported.

**5.2.4.5.1.4. SOP Specific Conformance****5.2.4.5.1.4.1. SOP Specific Conformance to C-FIND SOP Class**

FIND-SCU provides standard conformance to the service class.

Both Study and Patient Root Information Models are supported.



All queries are initiated at the highest level of the information model (the STUDY level), and then for each response received, recursively repeated at the next lower levels (the SERIES and then IMAGE levels, if needed), in order to completely elucidate the “tree” of instances available on the remote AE (from which the user may subsequently request a retrieval at any level).

CANCEL requests are performed when in some conditions (i.e.: User restrictions in application profiles).

Unexpected attributes returned in a C-FIND response (those not requested) are listed in the browser at the appropriate level if present in the dictionary. Requested return attributes not returned by the SCP are ignored. Non-matching responses returned by the SCP due to unsupported (hopefully optional) matching keys are not filtered locally by the FIND-SCU and thus will still be presented in the browser. No attempt is made to filter out duplicate responses.

Specific Character Set will always be included at every query level. If present in the response, Specific Character Set will be used to identify character sets other than the default character set for display of strings in the browser.

#### 5.2.4.5.1.4.2. Presentation Context Acceptance Criterion

FIND-SCU does not accept associations.

#### 5.2.4.5.1.4.3. Request identifiers

Table 29: STUDY ROOT REQUEST IDENTIFIERS FOR FIND-SCU

Name	Tag	Types of Matching [2]
<b>STUDY Level</b>		
Patient's ID	(0010,0020)	S,*,U
Patient's Name	(0010,0010)	S,*,U
Patient's Birth Date	(0010,0030)	S,*,U,R
Patient's Sex	(0010,0040)	S,*,U
Study ID	(0020,0010)	S,*,U
Study Description	(0008,1030)	S,*,U
Modalities in Study	(0008,0061)	S,*,U
Study Date	(0008,0020)	S,*,U,R
Study Time	(0008,0030)	S,*,U,R
Referring Physician's Name	(0008,0090)	S,*,U
Accession Number	(0008,0050)	S,*,U
Patient's Age	(0010,1010)	S,*,U
Patient's Size	(0010,1020)	S,*,U
Patient's Weight	(0010,1030)	S,*,U
Study Instance UID	(0020,000D)	UNIQUE
<b>SERIES Level</b>		
Series Description	(0020,0011)	S,*,U

Name	Tag	Types of Matching [2]
Modality	(0008,0060)	S,*,U
Series Date	(0008,0021)	S,*,U
Series Time	(0008,0031)	S,*,U
Series Instance UID	(0020,000E)	UNIQUE
<b>IMAGE Level</b>		
Image Comments	(0020,4000)	S,*,U
SOP Instance UID	(0008,0018)	UNIQUE
SOP Class UID	(0008,0016)	NONE
<b>Common to all Query Levels</b>		
Specific Character Set	(0008,0005)	S,*,U

## [2] Types of Matching

The types of Matching supported by the C-FIND SCU. An "S" indicates the identifier attribute uses Single Value Matching, an "R" indicates Range Matching, a n "\*" indicates wildcard matching, a 'U' indicates Universal Matching, and an 'L' indicates that UID lists are sent. "NONE" indicates that no matching is supported, but that values for this Element are requested to be returned (i.e. universal matching), and "UNIQUE" indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

### 5.2.4.5.1.4.4. Transfer Syntax Selection Policies

FIND-SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Presentation Context to use for the C-FIND operation:

- First encountered explicit Transfer Syntax.

### 5.2.4.5.1.4.5. Response Status

FIND-SCU will behave as described in the Table below in response to the status returned in the C-FIND response command message(s).

*Table 30: RESPONSE STATUS FOR FIND-SCU AND QUERY REMOTE AE REQUEST*

Service Status	Further Meaning	Status Codes	Reason
Refused	Out of resources	A7XX-A7FF	Current query is terminated; remaining queries continue
Error	Identifier does not match SOP Class	A9XX-A9FF	Current query is terminated; remaining queries continue
	Unable to process	CXXX	Current query is terminated; remaining queries continue

Service Status	Further Meaning	Status Codes	Reason
Cancel	Matching terminated due to Cancel request	FE00	Current query is terminated; remaining queries terminates.
Success		0000	Current query is terminated; remaining queries continue
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier used to populate browser and trigger recursive lower level queries
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier	FF01	Identifier used to populate browser and trigger recursive lower level queries

### 5.2.5. MOVE-SCU

#### 5.2.5.1. SOP Classes

MOVE-SCU provides Standard Conformance to the following SOP Classes.

*Table 31: SOP CLASSES SUPPORTED BY MOVE-SCU*

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.1.2	Yes	No
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	Yes	No

#### 5.2.5.2. Association Policies

#### 5.2.5.3. General

MOVE-SCU initiates but never accepts associations.

*Table 32: MAXIMUM PDU SIZE RECEIVED AS SCP FOR MOVE-SCU*

Maximum PDU size received	Unlimited
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#### 5.2.5.3.1. Number of Associations.

*Table 33: NUMBER OF ASSOCIATIONS AS A SCP FOR MOVE-SCU*

Maximum number of simultaneous associations	1
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#### 5.2.5.3.2. Asynchronous Nature

MOVE-SCU will only allow a single outstanding operation on an Association. Therefore, MOVE-SCU will not perform asynchronous operations window negotiation.

#### 5.2.5.3.3. Implementation Identifying Information

Table 34: DICOM IMPLEMENTATION CLASS AND VERSION FOR MOVE-SCU

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

**5.2.5.4. Association Initiation Policy**

MOVE-SCU attempts to initiate a new association when the user performs the query action from the user interface.

**5.2.5.5. Association Acceptance Policy**

MOVE-SCU does not accept associations.

**5.2.5.5.1. Activity – Send Storage Request****5.2.5.5.1.1. Description and Sequencing of Activities**

A single attempt will be made to query the remote AE. If the query fails, for whatever reason, no retry will be performed.

**5.2.5.5.1.2. Proposed Presentation Contexts**

Table 35: PROPOSED PRESENTATION CONTEXTS FOR MOVE-SCU AND QUERY REMOTE AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See <a href="#">Move SCU SOP Classes Table</a>	See <a href="#">Move SCU SOP Classes Table</a>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

MOVE-SCU will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

**5.2.5.5.1.3. Extended Negotiation**

No extended negotiation is performed.

**5.2.5.5.1.4. SOP Specific Conformance****5.2.5.5.1.4.1. SOP Specific Conformance to C-MOVE SOP Class**

MOVE-SCU provides standard conformance to the Storage Service Class.

Both Study and Patient Root Information Models are supported.

A retrieval will be performed at the STUDY or SERIES level depending on Remote AE configuration in Ginkgo CADx Framework.

CANCEL requests are performed when in some conditions (i.e.: User restrictions in application profiles).

The retrieval is performed from the AE that was specified in the Retrieve AE attribute returned from the query performed by FIND-SCU as well as by XML integration files. The instances are retrieved to the current application's local database by specifying the destination as the AE Title of the STORE-SCP AE of the local application. This implies that the remote C-MOVE SCP must be preconfigured to determine the presentation address corresponding to the STORE-SCP AE. The STORE-SCP AE will accept storage requests addressed to it from anywhere, so no pre-configuration of the local application to accept from the remote AE is necessary (except in so far as it was necessary to configure FIND-SCU).

*Table 36: STUDY ROOT REQUEST IDENTIFIER FOR MOVE-SCU*

Name	Tag	Types of Matching[3]
<b>STUDY Level</b>		
Study Instance UID	(0020,000D)	UNIQUE
<b>SERIES Level</b>		
Series Instance UID	(0020,000E)	UNIQUE
<b>IMAGE Level</b>		
SOP Instance UID	(0008,0018)	UNIQUE

[3] Types of Matching

The types of Matching supported by the C-MOVE SCU.

#### **5.2.5.5.1.4.2. Transfer Syntax Selection Policies**

MOVE-SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Presentation Context to use for the C-STORE operation:

- a) First encountered explicit Transfer Syntax.

#### **5.2.5.5.1.4.3. Response Status**

MOVE-SCU will behave as described in the Table below in response to the status returned in the C-MOVE response command message(s).

*Table 37: RESPONSE STATUS FOR MOVE-SCU AND RETRIEVE FROM REMOTE AE REQUEST*

Service Status	Further Meaning	Status Codes	Related Fields	Reason
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)	Retrieval is terminated
	Out of Resources - Unable to perform sub-operations	A702	(0000,1020) (0000,1021) (0000,1022)	Retrieval is terminated

Service Status	Further Meaning	Status Codes	Related Fields	Reason
			(0000,1023)	
	Move Destination unknown	A801	(0000,0902)	Retrieval is terminated
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)	Retrieval is terminated
	Unable to process	CXXX	(0000,0901) (0000,0902)	Retrieval is terminated
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
Warning	Sub-operations Complete - One or more Failures	B000	(0000,1020) (0000,1022) (0000,1023)	Retrieval is terminated
Success	Sub-operations Complete – No Failures	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval continues.

#### 5.2.5.5.1.4.4. Sub-operation dependent behavior

Since the C-MOVE operation is dependent on completion of C-STORE sub-operations that are occurring on a separate association, the question of failure of operations on the other association(s) must be considered.

MOVE-SCU completely ignores whatever activities are taking place in relation to the STORAGE-SCP AE that is receiving the retrieved instances. Once the C-MOVE has been initiated it runs to completion (or failure) as described in the C-MOVE response command message(s). There is no attempt by MOVE-SCU to confirm that instances have actually been successfully received or locally stored.

Whether or not completely or partially successful retrievals are made available in the local database to the user is purely dependent on the success or failure of the C-STORE sub-operations, not on any explicit action by MOVE-SCU.

Whether or not the remote AE attempts to retry any failed C-STORE sub-operations is beyond the control of MOVE-SCU.

If the association on which the C-MOVE was issued is aborted for any reason, whether or not the C-STORE sub-operations continue is dependent on the remote AE; the local STORAGE-SCP won't continue to accept associations and storage operations until another association were performed.

#### 5.2.6. GET-SCU

**5.2.6.1. SOP Classes**

GET-SCU provides Standard Conformance to the following SOP Classes.

*Table 38: SOP CLASSES SUPPORTED BY GET-SCU*

SOP Class Name	SOP Class UID	SCU	SCP
Patient Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.1.3	Yes	No
Study Root Query/Retrieve Information Model - GET	1.2.840.10008.5.1.4.1.2.2.3	Yes	No

**5.2.6.2. Association Policies****5.2.6.3. General**

GET-SCU initiates but never accepts associations.

*Table 39: MAXIMUM PDU SIZE RECEIVED AS SCP FOR GET-SCU*

Maximum PDU size received	Unlimited
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**5.2.6.3.1. Number of Associations.**

*Table 40: NUMBER OF ASSOCIATIONS AS A SCP FOR GET-SCU*

Maximum number of simultaneous associations	1
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**5.2.6.3.2. Asynchronous Nature**

GET-SCU will only allow a single outstanding operation on an Association. Therefore, GET-SCU will not perform asynchronous operations window negotiation.

**5.2.6.3.3. Implementation Identifying Information**

*Table 41: DICOM IMPLEMENTATION CLASS AND VERSION FOR GET-SCU*

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

**5.2.6.4. Association Initiation Policy**

GET-SCU attempts to initiate a new association when the user performs the query action from the user interface.

**5.2.6.5. Association Acceptance Policy**

GET-SCU does not accept associations.

**5.2.6.5.1. Activity – Send Storage Request****5.2.6.5.1.1. Description and Sequencing of Activities**

A single attempt will be made to query the remote AE. If the query fails, for whatever reason, no retry will be performed.

**5.2.6.5.1.2. Proposed Presentation Contexts**

Table 42: PROPOSED PRESENTATION CONTEXTS FOR GET-SCU AND QUERY REMOTE AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See <a href="#">Get SCU SOP Classes Table</a>	See <a href="#">Get SCU SOP Classes Table</a>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

GET-SCU will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

#### 5.2.6.5.1.3. Extended Negotiation

No extended negotiation is performed.

#### 5.2.6.5.1.4. SOP Specific Conformance

##### 5.2.6.5.1.4.1. SOP Specific Conformance to C-GET SOP Class

GET-SCU provides standard conformance to the Storage Service Class.

Both Study and Patient Root Information Models are supported.

A retrieval will be performed at the STUDY or SERIES level depending on Remote AE configuration in Ginkgo CADx Framework.

CANCEL requests are performed when in some conditions (i.e.: User restrictions in application profiles).

The retrieval is performed from the AE that was specified in the Retrieve AE attribute returned from the query performed by FIND-SCU as well as by XML integration files. The instances are retrieved to the current application's local database by specifying the destination as the AE Title of the STORE-SCP AE of the local application in the same association.

Table 43: STUDY ROOT REQUEST IDENTIFIER FOR GET-SCU

Name	Tag	Types of Matching[4]
<b>STUDY Level</b>		
Study Instance UID	(0020,000D)	UNIQUE
<b>SERIES Level</b>		
Series Instance UID	(0020,000E)	UNIQUE
<b>IMAGE Level</b>		
SOP Instance UID	(0008,0018)	UNIQUE



## [4] Types of Matching

The types of Matching supported by the C-GET SCU.

**5.2.6.5.1.4.2. Transfer Syntax Selection Policies**

GET-SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Presentation Context to use for the C-STORE operation:

- b) First encountered explicit Transfer Syntax.

**5.2.6.5.1.4.3. Response Status**

GET-SCU will behave as described in the Table below in response to the status returned in the C-GET response command message(s).

*Table 44: RESPONSE STATUS FOR GET-SCU AND RETRIEVE FROM REMOTE AE REQUEST*

Service Status	Further Meaning	Status Codes	Related Fields	Reason
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)	Retrieval is terminated
	Out of Resources - Unable to perform sub-operations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)	Retrieval is terminated
	Unable to process	CXXX	(0000,0901) (0000,0902)	Retrieval is terminated
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
Warning	Sub-operations Complete - One or more Failures	B000	(0000,1020) (0000,1022) (0000,1023)	Retrieval is terminated
Success	Sub-operations Complete – No Failures	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval is terminated
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)	Retrieval continues.

**5.2.7. WORKLIST-SCU**

WORKLIST-SCU is available with Ginkgo CADx Pro distribution [GP] .

**5.2.7.1. SOP Classes**

WORKLIST-SCU provides Standard Conformance to the following SOP Classes.

*Table 45: SOP CLASSES SUPPORTED BY WORKLIST*

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes[GP]	No
Modality Performed Procedure Step - CREATE / NSET	1.2.840.10008.3.1.2.3.3	Yes[GP]	No

**5.2.7.2. Association Policies****5.2.7.3. General**

WORKLIST initiates but never accepts associations.

*Table 46: MAXIMUM PDU SIZE RECEIVED AS SCP FOR WORKLIST*

Maximum PDU size received	Unlimited
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**5.2.7.3.1. Number of Associations.**

*Table 47: NUMBER OF ASSOCIATIONS AS A SCP FOR WORKLIST*

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

**5.2.7.3.2. Asynchronous Nature**

WORKLIST will only allow a single outstanding operation on an Association. Therefore, WORKLIST will not perform asynchronous operations window negotiation.

**5.2.7.3.3. Implementation Identifying Information**

*Table 48: DICOM IMPLEMENTATION CLASS AND VERSION FOR WORKLIST*

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

**5.2.7.4. Association Initiation Policy**

WORKLIST attempts to initiate a new association when the user performs the query action from the user interface which will be performed on the same association depending on the AE configuration in Ginkgo CADx Framework.

**5.2.7.5. Association Acceptance Policy**

WORKLIST does not accept associations.

**5.2.7.5.1. Activity – Query Worklist items****5.2.7.5.1.1. Description and Sequencing of Activities**

A single attempt will be made to query the remote AE.

**5.2.7.5.1.2. Proposed Presentation Contexts**

Table 49: PROPOSED PRESENTATION CONTEXTS FOR WORKLIST AND QUERY REMOTE AE

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See <a href="#">WORKLIST-SCU SOP Classes Table</a>	See <a href="#">WORKLIST-SCU SOP Classes Table</a>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

WORKLIST-SCU will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

#### 5.2.7.5.1.3. Extended Negotiation

No extended negotiation is performed.

#### 5.2.7.5.1.4. SOP Specific Conformance

##### 5.2.7.5.1.4.1. SOP Specific Conformance to WORKLIST SOP Class

WORKLIST-SCU provides standard conformance to the service class.

Unexpected attributes returned in a C-FIND response (those not requested) are listed in the browser if present in the dictionary. Requested return attributes not returned by the SCP are ignored. Non-matching responses returned by the SCP due to unsupported (hopefully optional) matching keys are not filtered locally and thus will still be presented in the browser. No attempt is made to filter out duplicate responses.

Specific Character Set will always be included at every query level. If present in the response, Specific Character Set will be used to identify character sets other than the default character set for display of strings in the browser.

##### 5.2.7.5.1.4.2. Presentation Context Acceptance Criterion

WORKLIST-SCU does not accept associations.

##### 5.2.7.5.1.4.3. Request identifiers

Table 50: MODALITY WORKLIST ROOT REQUEST IDENTIFIERS FOR WORKLIST-SCU

Name	Tag	Types of Matching [2]
Specific Character Set	(0008,0005)	NONE
Accession Number	(0008,0050)	NONE
Referring Physician's Name	(0008,0090)	NONE
Patient's Name	(0010,0010)	NONE
Patient's ID	(0010,0020)	NONE

Name	Tag	Types of Matching [2]
Issuer of Patient ID	(0010,0021)	NONE
Patient's Birth Date	(0010,0030)	NONE
Patient's Sex	(0010,0040)	NONE
Pregnancy Status	(0010,21C0)	NONE
Study Instance UID	(0020,000D)	UNIQUE
Requesting Physician	(0032,1032)	NONE
Admission ID	(0038,0010)	NONE
Issuer of Admission ID	(0038,0011)	NONE
Requested Procedure ID	(0040,1001)	UNIQUE
Requested Procedure Priority	(0040,1003)	NONE
Requested Procedure Comments	(0040,1400)	NONE
Placer Order Number	(0040,2016)	NONE
Filler Order Number	(0040,2017)	NONE
Scheduled Procedure Step Sequence	(0040,0100)	L,U
>Modality	(0008,0060)	L,*,U
>Scheduled Station AE Title	(0040,0001)	S,*,U,R
>Scheduled Procedure Step Start Date	(0040,0002)	S,*,U,R
>Scheduled Procedure Step Start Time	(0040,0003)	NONE
>Scheduled Procedure Step Description	(0040,0007)	NONE
>Scheduled Procedure Step ID	(0040,0009)	UNIQUE
>Scheduled Station Name	(0040,0010)	NONE
>Scheduled Procedure Step Location	(0040,0011)	NONE
>Scheduled Procedure Step Status	(0040,0020)	L,*,U
>Scheduled Protocol Code Sequence	(0040,0008)	L,U
>>Code Value	(0008,0100)	NONE
>>Coding Scheme Designator	(0008,0102)	NONE
>>Code Meaning	(0008,0104)	NONE

## [2] Types of Matching

The types of Matching supported by WORKLIST-SCU. An "S" indicates the identifier attribute uses Single Value Matching, an "R" indicates Range Matching, a n"\*" indicates wildcard matching, a 'U' indicates Universal Matching, and an 'L' indicates that UID lists are sent. "NONE" indicates that no matching is supported, but that values for this Element are requested to be returned (i.e. universal matching), and "UNIQUE" indicates that this is the Unique Key for that query level, in which case Universal Matching or Single Value Matching is used depending on the query level.

#### 5.2.7.5.1.4.4. Transfer Syntax Selection Policies

WORKLIST-SCU prefers explicit Transfer Syntaxes. If offered a choice of Transfer Syntaxes in a Presentation Context, it will apply the following priority to the choice of Presentation Context to use for the C-FIND operation:

- b) First encountered explicit Transfer Syntax.

#### 5.2.7.5.1.4.5. Response Status

WORKLIST-SCU will behave as described in the Table below in response to the status returned in the C-FIND response command message(s).

*Table 51: RESPONSE STATUS FOR WORKLIST-SCU AND QUERY REMOTE AE REQUEST*

Service Status	Further Meaning	Status Codes	Reason
Refused	Out of resources	A7XX-A7FF	Current query is terminated; remaining queries continue
Error	Identifier does not match SOP Class	A9XX-A9FF	Current query is terminated; remaining queries continue
	Unable to process	CXXX	Current query is terminated; remaining queries continue
Cancel	Matching terminated due to Cancel request	FE00	Current query is terminated; remaining queries terminates.
Success		0000	Current query is terminated; remaining queries continue
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00	Identifier used to populate browser and trigger recursive lower level queries
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this Identifier	FF01	Identifier used to populate browser and trigger recursive lower level queries

#### 5.2.7.5.2. Activity – Acquire Images

##### 5.2.7.5.2.1. Description and Sequencing of Activities

After querying worklist, user selects a modality worklist item to make an acquisition of images, Ginkgo CADx Pro will automatically send a message to the SCU in order to create a new MPPS SOP Instance.

MPPS status will change to “DISCONTINUED” if the user cancels acquisition process and to “COMPLETED” if all the process has been completed successfully.

#### 5.2.7.5.2.2. Proposed Presentation Contexts

*Table 52: PROPOSED PRESENTATION CONTEXTS FOR REAL-WORLD ACTIVITY ACQUIRE IMAGES*

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See <a href="#">WORKLIST-SCU SOP Classes Table</a>	See <a href="#">WORKLIST-SCU SOP Classes Table</a>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

MPPS handling will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

#### 5.2.7.5.2.3. Extended Negotiation

No extended negotiation is performed.

#### 5.2.7.5.2.4. SOP Specific Conformance for MPPS

The behavior of MPPS workflow when encountering status codes in an MPPS N-CREATE or N-SET response is summarized in the next table. If any other SCP response status than "Success" or "Warning" is received by Ginkgo CADx Pro, a message “MPPS update failed” will appear on the user interface.

*Table 53: MPPS N-CREATE/N-SET RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior
Success	Success	0000	The SCP has completed the operation successfully
*	*	Any other status code	The MPPS operation is considered unsuccessful and the error and status message will be logged.

Next table provides a description of the MPPS N-CREATE and N-SET request identifiers sent by Ginkgo CADx. Empty cells in the N-CREATE and N-SET columns indicate that the attribute is not sent. An “x” indicates that an appropriate value will be sent. A “Zero length” attribute will be sent with zero length.

Table 54: MPPS N-CREATE/N-SET REQUEST IDENTIFIER

Name	Tag	N-CREATE	N-SET
Specific Character Set	(0008,0005)	Set by user in configuration	Set by user in configuration
Modality	(0008,0005)	From Modality Worklist or OT.	
Patient's Name	(0010,0010)	From Modality Worklist.	
Patient's ID	(0010,0020)	From Modality Worklist.	
Issuer of Patient ID	(0010,0021)	From Modality Worklist.	
Patient's Birth Date	(0010,0030)	From Modality Worklist.	
Patient's Sex	(0010,0040)	From Modality Worklist.	
Referenced Patient Sequence	(0008,1120)	Zero length	
Performed Station AE Title	(0040,0241)	MPPS AE Title	
Performed Station Name	(0040,0242)	Zero length	
Performed Procedure Step Start Date	(0040,0244)	Actual start date	
Performed Procedure Step Start Time	(0040,0245)	Actual start time	
Performed Procedure Step End Date	(0040,0250)	Zero length	Actual end date
Performed Procedure Step End Time	(0040,0251)	Zero length	Actual end time
Performed Procedure Step Status	(0040,0252)	IN PROGRESS	DISCONTINUED or COMPLETED
Performed Procedure Step ID	(0040,0253)	Automatically created from a timestamp.	
Performed Procedure Step Description	(0040,0254)	Ginkgo Dicomization	Ginkgo Dicomization
Performed Procedure Type Description	(0040,0255)	Zero length	Zero length
Performed Protocol Code Sequence	(0040,0260)		Zero length
Procedure Code Sequence	(0008,1032)	Zero length	Zero length
Study ID	(0020,0010)	Zero length	
Performed Protocol Code Sequence	(0040,0260)	Zero length	
Performed Series Sequence	(0040,0340)	Zero length	
Scheduled Step Attributes sequence	(0040,0270)	One item	

<b>Name</b>	<b>Tag</b>	<b>N-CREATE</b>	<b>N-SET</b>
> Study Instance UID	(0020,000D)	From Modality Worklist	
> Accession Number	(0008,0050)	From Modality Worklist	
> Requested Procedure ID	(0040,1001)	From Modality Worklist	
> Requested Procedure Description	(0032,1060)	From Modality Worklist	
> Scheduled Procedure Step ID	(0040,0009)	From Modality Worklist	
> Scheduled Procedure Step Description	(0040,0007)	From Modality Worklist	
> Scheduled Protocol Code Sequence	(0040,0008)	From Modality Worklist	
Performed Series Sequence	(0040,0340)		One or more items
> Performing Physician's Name			Zero length
> Protocol Name			Zero length
> Operators Name			Zero length
> Series Description			x
> Retrieve AE Title			Zero length
> Referenced Image Sequence			Zero length
> Referenced Non Image Composite Sop Instance Sequence			Zero length
> Series Instance UID			x

## 5.2.8. HARDCOPY-SCU

### 5.2.8.1. SOP Classes

HARDCOPY-SCU provides Standard Conformance to the following SOP Classes.

*Table 55: SOP CLASSES SUPPORTED BY HARDCOPY-SCU*

<b>SOP Class Name</b>	<b>SOP Class UID</b>	<b>SCU</b>	<b>SCP</b>
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No

### 5.2.8.2. Association Policies

### 5.2.8.3. General

HARDCOPY-SCU initiates but never accepts associations.



*Table 56: MAXIMUM PDU SIZE RECEIVED AS SCP FOR HARDCOPY-SCU*

Maximum PDU size received	Unlimited
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**5.2.8.3.1. Number of Associations.***Table 57: NUMBER OF ASSOCIATIONS AS A SCP FOR HARDCOPY-SCU*

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

**5.2.8.3.2. Asynchronous Nature**

HARDCOPY-SCU will only allow a single outstanding operation on an Association. Therefore, HARDCOPY-SCU will not perform asynchronous operations window negotiation.

**5.2.8.3.3. Implementation Identifying Information***Table 58: DICOM IMPLEMENTATION CLASS AND VERSION FOR HARDCOPY-SCU*

Implementation Class UID	1.2.276.0.7230010.3.0.3.6.0
Implementation Version Name	OFFIS_DCMTK_360

**5.2.8.4. Association Initiation Policy**

HARDCOPY-SCU attempts to initiate a new association when the user performs the query action from the user interface.

**5.2.8.5. Association Acceptance Policy**

HARDCOPY-SCU does not accept associations.

**5.2.8.5.1. Activity – Film images****5.2.8.5.1.1. Description and Sequencing of Activities**

A user selects series and requests them to be sent to a specific hardcopy device. The user can select the desired film format and number of copies. Each print-job is forwarded to the job queue and processed individually.

The HARDCOPY-SCU is invoked by the user interface that is responsible for processing network tasks.

The job consists of data describing the images and graphics to be printed as well as the requested layout and other parameters. The film sheet is internally processed and the page images is sent. If no association to the printer can be established, the print-job is switched to a failed state and the user informed.

A typical sequence of DIMSE messages sent over an association between Hardcopy AE and a Printer is:

1. HARDCOPY-SCU opens an association with the Printer
2. N-GET on the Printer SOP Class is used to obtain current printer status information. If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed.
3. N-CREATE on the Film Session SOP Class creates a Film Session.
4. N-CREATE on the Film Box SOP Class creates a Film Box linked to the Film Session. A single Image Box will be created as the result of this operation.

5. N-SET on the Image Box SOP Class transfers the contents of the film sheet to the printer.
6. N-ACTION on the Film Box SOP Class instructs the printer to print the Film Box
7. The printer prints the requested number of film sheets
8. The Printer synchronously reports its status via N-EVENT-REPORT notification (Printer SOP Class). HARDCOPY-SCU requires the NEVENT-REPORT to be sent during an association. If the Printer reports a status of FAILURE, the print-job is switched to a failed state and the user informed.
9. N-DELETE on the Film Session SOP Class deletes the complete Film Session SOP Instance hierarchy.
10. HARDCOPY-SCU closes the association with the Printer Status of the print-job is reported through the job control interface. Only one job will be active at a time for each separate hardcopy device. If any Response from the remote Application contains a status other than Success or Warning, the Association is aborted and the related Job is switched to a failed state. It can be restarted any time by user interaction or, if configured, by automated retry.

#### 5.2.8.5.1.2. Proposed Presentation Contexts

Table 59: PROPOSED PRESENTATION CONTEXTS FOR HARDCOPY-SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See <a href="#">HARDCOPY SCU SOP Classes Table</a>	See <a href="#">HARDCOPY SCU SOP Classes Table</a>	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

HARDCOPY-SCU will propose multiple Presentation Contexts, one for each of the supported Transfer Syntaxes, in order to determine which Transfer Syntaxes the remote SCP supports, and which it prefers.

#### 5.2.8.5.1.3. Extended Negotiation

No extended negotiation is performed.

#### 5.2.8.5.1.4. SOP Specific Conformance

##### 5.2.8.5.1.4.1. SOP Specific Conformance for the Printer SOP Class

HARDCOPY-SCU supports the following DIMSE operations and notifications for the Printer SOP Class:

- N-GET
- N-EVENT-REPORT

Details of the supported attributes and status handling behaviour are described in the following

subsections.

#### 5.2.8.5.1.4.1.1 Printer SOP Class Operations (N-GET)

Hardcopy AE uses the Printer SOP Class N-GET operation to obtain information about the current printer status. The attributes obtained via N-GET are listed in the table below:

*Table 60: PRINTER SOP CLASS N-GET REQUEST ATTRIBUTES*

Name	Tag	Value	Presence	Source
Printer Status	(2110,0010)	Provided by printer	ALWAYS	Printer
Printer Status Info	(2110,0020)	Provided by printer	ALWAYS	Printer

*Table 61: PRINTER SOP CLASS N-GET RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior	Related Fields
Success	Success	0000H	The request to get printer status information was success.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

#### 5.2.8.5.1.4.1.2 Printer SOP Class Notifications (N-EVENT-REPORT)

HARDCOPY-SCU is capable of receiving an N-EVENT-REPORT request at any time during an association. The behavior of Hardcopy AE when receiving Event Types within the N-EVENT-REPORT is summarized in the Table below:

*Table 62: PRINTER SOP CLASS N-EVENT-REPORT BEHAVIOR*

Service Status	Event Type ID	Behavior
Normal	1	The print-job continues to be printed.
Warning	2	The print-job continues to be printed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.
Failure	3	The print-job is marked as failed. The contents of Printer Status Info (2110,0020) is logged and reported to the user via the job-control application.
*	*	An invalid Event Type ID will cause a status code of 0113H to be returned in a N-EVENT-REPORT response.

The reasons for returning specific status codes in a N-EVENT-REPORT response are summarized in the Table below:

*Table 63: PRINTER SOP CLASS N-EVENT-REPORT RESPONSE STATUS REASONS*

Service Status	Further Meaning	Error Code	Reasons
Success	Success	0000H	The notification event has been successfully received.
Failure	Processing failure	Any other	An internal error occurred during processing of the N-EVENTREPORT.

**5.2.8.5.1.4.2. SOP Specific Conformance for the Film Session SOP Class**

HARDCOPY-SCU supports the following DIMSE operations for the Film Session SOP Class:

- N-CREATE
- N-DELETE

Details of the supported attributes and status handling behavior are described in the following subsections.

**5.2.8.5.1.4.2.1 Film Session SOP Class Operations (N-CREATE)**

The attributes supplied in an N-CREATE Request are listed in the Table below:

*Table 64: FILM SESSION SOP CLASS N-CREATE REQUEST ATTRIBUTES*

Name	Tag	Value	Presence	Source
Number of Copies	(2000,0010)	1..*	ALWAYS	User
Medium Type	(2000,0030)	BLUE FILM, CLEAR FILM or PAPER	ALWAYS	User
Film Destination	(2000,0040)	MAGAZINE or PROCESSOR	ALWAYS	User

The behavior of HARDCOPY-SCU when encountering status codes in a N-CREATE response is summarized in the Table below:

*Table 65: FILM SESSION SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior	Related Fields
Success	Success	0000	The SCP has completed the operation successfully.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

**5.2.8.5.1.4.2.2 Film Session SOP Class Operations (N-DELETE)**

The behavior of HARDCOPY-SCU when encountering status codes in a N-DELETE response is summarized in the Table below:

*Table 66: FILM SESSION SOP CLASS N-DELETE RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior	Related Fields
Success	Success	0000	The SCP has completed the operation successfully.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

#### 5.2.8.5.1.4.3. SOP Specific Conformance for the Film Box SOP Class

HARDCOPY-SCU supports the following DIMSE operations for the Film Box SOP Class:

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

Details of the supported attributes and status handling behavior are described in the following subsections.

##### 5.2.8.5.1.4.3.1 Film Box SOP Class Operations (N-CREATE)

The attributes supplied in an N-CREATE Request are listed in the Table below:

*Table 67: FILM BOX SOP CLASS N-CREATE REQUEST ATTRIBUTES*

Name	Tag	Value	Presence	Source
Image Display Format	(2010,0010)	STANDARD\1,1 STANDARD\1,2 STANDARD\2,1 STANDARD\2,2 STANDARD\2,3 STANDARD\2,4 STANDARD\3,3 STANDARD\3,4 STANDARD\3,5 STANDARD\4,4 STANDARD\4,5 STANDARD\4,6 STANDARD\5,6 STANDARD\5,7	ALWAYS	User
Referenced Film Session Sequence	(2010,0500)		ALWAYS	Auto
>Referenced SOP Class UID	(0008,1150)	1.2.840.10008.5.1.1.1	ALWAYS	Auto
>Referenced SOP Instance UID	(0008,1155)	From create Film Session SOP Instance	ALWAYS	Auto
Film Orientation	(2010,0040)	PORTRAIT or LANDSCAPE	ALWAYS	User

Name	Tag	Value	Presence	Source
Film Size ID	(2010,0050)	8INX10IN 8_5INX10IN 10INX12IN 10INX14IN 11INX14IN 11INX17IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM A4 A3	ALWAYS	User
Magnification Type	(2010,0060)	REPLICATE, BILINEAR, CUBIC or NONE	ALWAYS	User
Border Density	(2010,0100)	BLACK or WHITE	ALWAYS	User

The behavior of HARDCOPY-SCU when encountering status codes in a N-CREATE response is summarized in the Table below:

*Table 68: FILM BOX SOP CLASS N-CREATE RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior	Related Fields
Success	Success	0000	The SCP has completed the operation successfully.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

#### 5.2.8.5.1.4.3.2 Film Box SOP Class Operations (N-ACTION)

An N-ACTION Request is issued to instruct the Print SCP to print the contents of the Film Box. The Action Reply argument in an N-ACTION response is not evaluated.

The behavior of HARDCOPY-SCU when encountering status codes in a N-ACTION response is summarized in the Table below:

*Table 69: FILM BOX SOP CLASS N-ACTION RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior	Related Fields
Success	Success	0000	The SCP has completed the operation successfully.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

**5.2.8.5.1.4.3.3 Film Box SOP Class Operations (N-DELETE)**

The attributes supplied in an N-DELETE Request are listed in the Table below:

*Table 70: IMAGE BOX SOP CLASS N-SET RESPONSE STATUS HANDLING BEHAVIOR*

<b>Service Status</b>	<b>Further Meaning</b>	<b>Status Codes</b>	<b>Behavior</b>	<b>Related Fields</b>
Success	Success	0000	The SCP has completed the operation successfully.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

**5.2.8.5.1.4.4. SOP Specific Conformance for the Image Box SOP Class**

HARDCOPY-SCU supports the following DIMSE operations for the Image Box SOP Class:

- N-SET

Details of the supported attributes and status handling behavior are described in the following subsections.

**5.2.8.5.1.4.4.1 Image Box SOP Class Operations (N-SET)**

The attributes supplied in an N-SET Request are listed in the Table below:

*Table 71: IMAGE BOX SOP CLASS N-SET REQUEST ATTRIBUTES*

<b>Name</b>	<b>Tag</b>	<b>Value</b>	<b>Presence</b>	<b>Source</b>
Image Position	(2020,0010)	From image index	ALWAYS	Auto
Basic Grayscale Image Sequence	(2010,0110)		ALWAYS	Auto
>Samples Per Pixel	(0028,0002)	Image dependent	ALWAYS	Auto
>Photometric Interpretation	(0028,0004)	Image dependent	ALWAYS	Auto
>Rows	(0028,0010)	Image dependent	ALWAYS	Auto
>Columns	(0028,0011)	Image dependent	ALWAYS	Auto
>Pixel Aspect Ratio	(0028,0034)	Image dependent	ALWAYS	Auto
>Bits Allocated	(0028,0100)	Image dependent	ALWAYS	Auto
>Bits Stored	(0028,0101)	Image dependent	ALWAYS	Auto
>High Bit	(0028,0102)	Image dependent	ALWAYS	Auto
>Pixel Representation	(0028,1003)	Image dependent	ALWAYS	Auto
>Pixel Sequence	(7FEO,0010)	Pixels of image	ALWAYS	Auto

The behavior of HARDCOPY-SCU when encountering status codes in a N-SET response is summarized in the Table below:

*Table 72: IMAGE BOX SOP CLASS N-SET RESPONSE STATUS HANDLING BEHAVIOR*

Service Status	Further Meaning	Status Codes	Behavior	Related Fields
Success	Success	0000	The SCP has completed the operation successfully.	-
*	Failure	Any other	The Association is aborted using A-ABORT and the print-job is marked as failed. The status meaning is logged and reported to the user.	-

### 5.3. NETWORK INTERFACES

#### 5.3.1. Physical Network Interface

Ginkgo CADx Framework is indifferent to the physical medium over which TCP/IP executes; which is dependent on the underlying operating system and hardware.

#### 5.3.2. Additional Protocols

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

### 5.4. CONFIGURATION

All configuration is performed through the use of Ginkgo CADx INI file(s) stored in pre-defined locations that are specific to the underlying operating system. Refer to the Release Notes for specific details.

#### 5.4.1. AE Title/Presentation Address Mapping

The Calling AE Title of the local application is configurable in the preferences file, and is shared by all of the AEs. The mapping of the logical name by which remote AEs are described in the user interface to Called AE Titles as well as presentation address (hostname or IP address and port number) is configurable in the INI file.

#### 5.4.2. Parameters

Table 73: CONFIGURATION PARAMETERS TABLE

Parameter	Configurable	Default Value
<b>General Parameters</b>		
PDU Size	Yes	16kB
Time-out waiting for acceptance or rejection Response to an Association Open Request. (Application Level timeout)	No	15s
General DIMSE level time-out values	No	10min
Time-out waiting for response to TCP/IP connect() request. (Low-level timeout)	No	15s
Time-out waiting for acceptance of a TCP/IP message over the network. (Low-level timeout)	No	15s
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	No	15s



Parameter	Configurable	Default Value
Any changes to default TCP/IP settings, such as configurable stack parameters.	No	None
<b>AE Specific Parameters</b>		
Size constraint in maximum object size	No	Unlimited
Maximum PDU size the AE can receive <sup>1</sup>	No	Unlimited
Maximum PDU size the AE can send	No	Unlimited
AE specific DIMSE level time-out values	No	10min
Number of simultaneous Associations by Service and/or SOP Class	No	Unlimited
SOP Class support	Yes	All supported SOP Classes always proposed and accepted
Transfer Syntax support	Yes	All supported SOP Classes always proposed and accepted
Other parameters that are configurable	No	None

#### **5.4.2.1. Local AE Titles.**

The local AE title mapping and configuration shall be specified.

#### **5.4.2.2. Remote AE Title/Presentation Address Mapping**

Configuration of remote host names and port numbers shall be specified.

##### **5.4.2.2.1. Remote SCPs**

Configuration of the remote AET port number, host-names, IP addresses and capabilities shall be specified. If applicable, multiple remote SCP's can be specified.

<sup>1</sup> Though the application can support unlimited PDU sizes, it will never offer a Maximum Received PDU Length of zero (unlimited) since this triggers a bug in some older systems.

## 6. MEDIA INTERCHANGE

### 6.1. IMPLEMENTATION MODEL

The Implementation Model identifies the DICOM Application Entities in a specific implementation and relate the Application Entities to Real-World Activities.

#### 6.1.1. Application Data Flow

Ginkgo CADx Framework is a single pure native C++ application that provides a user interface, network support and media support as a File Set Reader.

Conceptually it may be modeled as the following single AE:

- MEDIA-FSR, which loads a user-selected PS 3.10 compliant file, which may be a DICOMDIR or an image or spectroscopy object, either from the local file system or from PS 3.12 compliant media according to one of the General Purpose Media Application Profiles of PS 3.11 (CD-R, DVD-RAM or USB drive)

In effect, the application is media-neutral, since the user is required to browse and locate the DICOMDIR file. Furthermore, any DICOM image or spectroscopy object encoded in one of the standard Transfer Syntaxes may be loaded, even in the absence of a PS 3.10 compliant meta-information header, in which case a “best guess” at the Transfer Syntax will be made.

#### 6.1.2. Functional definitions of AE's

##### 6.1.2.1. MEDIA-FSR

MEDIA-FSR is activated through the user interface to select directories, images and spectra for display, import into the local database or network transmission.

##### 6.1.2.2. MEDIA-FSU

MEDIA-FSU is activated through the user interface to select patient studies from database and export into the specified media or network transmission.

#### 6.1.3. Sequencing of Real World Activities

All FSR activities are sequentially initiated in the user interface, and another activity may not be initiated until the prior activity has completed.

## 6.2. AE SPECIFICATIONS

### 6.2.1. MEDIA-FSR

MEDIA-FSR provides standard conformance to DICOM Interchange Option of the Media Storage Service Class.

Table 74: APPLICATION PROFILES, ACTIVITIES, AND ROLES FOR MEDIA-FSR

Application Profiles Supported	Real World Activity	Role	SC Option
STD-GEN-CD	Load directory or file	FSR	Interchange
STD-GEN-DVD-RAM	Load directory or file	FSR	Interchange
STD-GEN-USB	Load directory or file	FSR	Interchange

#### 6.2.1.1. File Meta Information for the Application Entity

Not applicable, since MEDIA-FSR is not an FSC or FSU

## 6.2.2. MEDIA-FSC

MEDIA-FSC provides standard conformance to DICOM Interchange Option of the Media Storage Service Class.

*Table 75: APPLICATION PROFILES, ACTIVITIES, AND ROLES FOR MEDIA-FSC*

Application Profiles Supported	Real World Activity	Role	SC Option
STD-GEN-CD	Save to directory or file	FSC	Interchange
STD-GEN-DVD-RAM	Save to directory or file	FSC	Interchange
STD-GEN-USB	Save to directory or file	FSC	Interchange

### 6.2.2.1. File Meta Information for the Application Entity

None.

### 6.2.2.2. Real World Activities

#### 6.2.2.2.1. Activity – Load Directory or File

MEDIA-FSR is activated through the user interface when a user selects the File load operation.

If the loaded file is a DICOMDIR, a browser will be displayed, from which instances may be selected and in turn loaded for display, imported into the local database or sent to a remote AE over the network.

If the file is an image or spectroscopy instance, it will be loaded and displayed.

#### 6.2.2.2.1.1. Application Profile Specific Conformance

There are no extensions or specializations.

#### 6.2.2.2.2. Activity – Save Directory or File

MEDIA-FSC is activated through the user interface when a user selects the Export operation.

If the export type is a DICOMDIR, a browser will be displayed, from which instances may be selected, exported to media or sent to a remote AE over the network.

#### 6.2.2.2.2.1. Application Profile Specific Conformance

There are no extensions or specializations.

## 6.3. AUGMENTED AND PRIVATE PROFILES

### 6.3.1. Augmented Profiles

None.

### 6.3.2. Private Profiles

None.

## 6.4. MEDIA CONFIGURATION

None.

## 7. SUPPORT OF CHARACTER SETS

### 7.1. OVERVIEW

The application supports all extended character sets defined in the DICOM 2002 standard, including single-byte and multi-byte character sets as well as code extension techniques using ISO 2022 escapes.

Support extends to correctly decoding and displaying the correct symbol for all names and strings found in the DICOMDIR, in storage instances from media and received over the network, and in the local database.

No specific support for sorting of strings other than in the default character set is provided in the browsers.

### 7.2. CHARACTER SETS

The following Defined Terms for Specific Character Set repertoire is supported:

*Table 76: SUPPORTED SPECIFIC CHARACTER SET DEFINED TERMS*

Character Set Description	Defined Term
UTF-8	ISO_IR 192

### 7.3. CHARACTER SET CONFIGURATION

Whether or not characters are displayed correctly depends on the presence of font support in the underlying operating system. Typically, as described in the Release Notes, it may be necessary for the user to add one of the “all Unicode” fonts to their system configuration in order to correctly display characters that would not typically be used in the default locale (UTF-8).

## **8. SECURITY**

### ***8.1. SECURITY PROFILES***

Ginkgo CADx SCUs conforms to the TLS layer security profile for both authentication and data privacy.

Username/Password Negotiation is also supported.

### ***8.2. ASSOCIATION LEVEL SECURITY***

None supported.

Any Calling AE Titles and/or IP addresses may open an Association.

### ***8.3. APPLICATION LEVEL SECURITY***

Username/Password authentication is supported when specific Ginkgo CADx Framework profile is enabled.

## 9. ANNEXES

### 9.1. IOD CONTENTS

#### 9.1.1. Created SOP Instances

The following tables use a number of abbreviations. The abbreviations used in the “Presence of...” column are:

- VNAP Value Not Always Present.
- ANAP Attribute Not Always Present.
- ALWAYS Always Present.
- EMPTY Attribute is sent without value.

The abbreviations used in the “Source” column:

- MWL The attribute value source Modality Worklist.
- INT The attribute value source is XML Integration or user input.
- USER The attribute value source is from User input only.
- AUTO The attribute value is generated automatically.
- MPSP The attribute value is the same as that use for Modality Performed Procedure Step.
- CONFIG The attribute value source is a configurable parameter.

Note: Ginkgo CADx integration workflow allows to overwrite any attribute implicitly specified its XML integration workflow file.

##### 9.1.1.1. VL PHOTOGRAPHIC IMAGE IOD

**Reference:** Digital Imaging and Communications in Medicine (DICOM)  
Supplement 15: Visible Light Image for Endoscopy, Microscopy, and Photography.

**UID Value:** 1.2.840.10008.5.1.4.1.1.77.1.4.

**UID Name:** VLPhotographicImageStorage.

**Category:** Image.

Table 77: IOD OF CREATED VL PHOTOGRAPHIC SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 83	ALWAYS
Study	General Study	Table 84	ALWAYS
	Patient Study	Table 85	ALWAYS
Series	General Series	Table 86	ALWAYS
Equipment	General Equipment	Table 87	ALWAYS
Image	General Image	Table 88	ALWAYS
	Image Pixel	Table 89	ALWAYS

IE	Module	Reference	Presence of Module
	SOP Common	Table 90	ALWAYS
Private	Private Application	Table 92	Only if reported.
	Retinal Retinal Diagnose	Table 93	Only if generated by retinal Extension.

#### 9.1.1.1.1. Transfer syntaxes

Table 78: TRANSFER SYNTAXES OF CREATED VL PHOTOGRAPHIC SOP INSTANCES

UID	Name
1.2.840.10008.1.2.4.50 (default)	JPEGProcess1TransferSyntax
1.2.840.10008.1.2.4.55	JPEGProcess10_12TransferSyntax
1.2.840.10008.1.2.4.70	JPEGProcess14SV1TransferSyntax
1.2.840.10008.1.2	LittleEndianImplicitTransferSyntax
1.2.840.10008.1.2.1	LittleEndianExplicitTransferSyntax
1.2.840.10008.1.2.2	BigEndianExplicitTransferSyntax

#### 9.1.1.1.2. Specific Character set

The value of specific character set (0008,0005) shall be ISO\_IR 192

#### 9.1.1.1.3. Conversion type

The value of Conversion Type (0008,0064) shall be WSD

#### 9.1.1.1.4. Modality

The value of Modality (0008,0060) should be XC.

#### 9.1.1.1.5. Photometric Interpretation

The Enumerated Values of Photometric Interpretation (0028,0004) shall be:

YBR\_FULL\_422

#### 9.1.1.1.6. Bits Allocated, Bits Stored, and High Bit

The Enumerated Value of Bits Allocated (0028,0100) shall be 8; the Enumerated Value of Bits Stored (0028,0101) shall be 8; and the Enumerated Value of High Bit (0028,0102) shall be 7.

#### 9.1.1.1.7. Pixel Representation

The Enumerated Value of Pixel Representation (0028,0103) shall be 0000H.

Note: A value of 0000H signifies an unsigned integer value.

#### 9.1.1.1.8. Samples per Pixel

The Enumerated Values of Samples per Pixel (0028,0002) shall be:

As the Photometric Interpretation (0028,0004) is YBR\_FULL\_422, then the Enumerated Value of Samples per Pixel (0028,0002) shall be three (3).

#### 9.1.1.1.9. Planar Configuration

If present, the Enumerated Value of Planar Configuration (0028,0006) shall be 0000H. This value shall be always present as Samples per Pixel (0028,0002) has a value greater than 1.

**9.1.1.1.10. Image Type**

The Image Type attribute identifies important image characteristics in a multiple valued data element. For Visible Light, Image Type is specialized as follows:

- a) Value 1 shall identify the Pixel Data Characteristics. Enumerated Values are: ORIGINAL and DERIVED.
- b) Value 2 shall identify the Patient Examination Characteristics. Enumerated Values are: PRIMARY and SECONDARY.

**9.1.1.2. VIDEO PHOTOGRAPHIC IMAGE IOD**

**Reference:** Digital Imaging and Communications in Medicine (DICOM)  
Supplement 47: Visible LightVideo.

**UID Value:** 1.2.840.10008.5.1.4.1.1.77.1.4.1.

**UID Name:** VideoPhotographicImageStorage.

**Category:** Image.

*Table 79: IOD OF CREATED VIDEO PHOTOGRAPHIC SOP INSTANCES*

IE	Module	Reference	Presence of Module
Patient	Patient	Table 83	ALWAYS
Study	General Study	Table 84	ALWAYS
	Patient Study	Table 85	ALWAYS
Series	General Series	Table 86	ALWAYS
Equipment	General Equipment	Table 87	ALWAYS
Image	General Image	Table 88	ALWAYS
	Image Pixel	Table 89	ALWAYS
	SOP Common	Table 90	ALWAYS

**9.1.1.2.1. Transfer syntaxes**

*Table 80: TRANSFER SYNTAXES OF CREATED VIDEO PHOTOGRAPHIC SOP INSTANCES*

UID	Name
1.2.840.10008.1.2.4.100 (default)	MPEG2MainProfileAtMainLevel

**9.1.1.2.2. Specific Character set**

The value of specific character set (0008,0005) shall be ISO\_IR 192

**9.1.1.2.3. Modality**

The value of Modality (0008,0060) should be XC.

**9.1.1.2.4. Photometric Interpretation**

The Enumerated Values of Photometric Interpretation (0028,0004) shall be:

YBR\_PARTIAL\_420

**9.1.1.2.5. Bits Allocated, Bits Stored, and High Bit**



The Enumerated Value of Bits Allocated (0028,0100) shall be 8; the Enumerated Value of Bits Stored (0028,0101) shall be 8; and the Enumerated Value of High Bit (0028,0102) shall be 7.

#### 9.1.1.2.6. Pixel Representation

The Enumerated Value of Pixel Representation (0028,0103) shall be 0000H.

Note: A value of 0000H signifies an unsigned integer value.

#### 9.1.1.2.7. Samples per Pixel

The Enumerated Values of Samples per Pixel (0028,0002) shall be:

As the Photometric Interpretation (0028,0004) is YBR\_PARTIAL\_420, then the Enumerated Value of Samples per Pixel (0028,0002) shall be three (3).

#### 9.1.1.2.8. Planar Configuration

If present, the Enumerated Value of Planar Configuration (0028,0006) shall be 0000H. This value shall be always present as Samples per Pixel (0028,0002) has a value greater than 1.

#### 9.1.1.2.9. Image Type

The Image Type attribute identifies important image characteristics in a multiple valued data element. For Visible Light, Image Type is specialized as follows:

- c) Value 1 shall identify the Pixel Data Characteristics. Enumerated Values are: ORIGINAL and DERIVED.
- d) Value 2 shall identify the Patient Examination Characteristics. Enumerated Values are: PRIMARY and SECONDARY.

#### 9.1.1.3. ENCAPSULATED PDF IOD

**Reference:** Digital Imaging and Communication in Medicine.  
Supplement 104: DICOM Encapsulation of PDF Documents.

**UID Value:** 1.2.840.10008.5.1.4.1.1.104.1

**UID Name:** Encapsulated PDF Storage SOP Class

**Category:** Transfer

*Table 81: IOD OF CREATED ENCAPSULATED PDF SOP INSTANCES*

IE	Module	Reference	Presence of Module
Patient	Patient	Table 83	ALWAYS
Study	General Study	Table 84	ALWAYS
	Patient Study	Table 85	ALWAYS
Series	General Series	Table 86	ALWAYS
Equipment	General Equipment	Table 87	ALWAYS
Image	SOP Common	Table 90	ALWAYS
Encapsulated Data	Encapsulated Data	Table 91	ALWAYS

#### 9.1.1.3.1. Transfer syntaxes

Table 82: TRANSFER SYNTAXES OF CREATED ENCAPSULATED PDF SOP INSTANCES

UID	Name
1.2.840.10008.1.2.1 (default)	LittleEndianExplicitTransferSyntax

**9.1.1.3.2. Specific Character set**

The value of specific character set (0008,0005) shall be ISO\_IR 192

**9.1.1.3.3. Conversion type**

The value of Conversion Type (0008,0064) shall be SD

**9.1.1.3.4. Modality**

The value of Modality (0008,0060) should be SC.

**9.1.1.4. COMMON MODULES**

Table 83: PATIENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Name	0010,0010)	PN	From Modality Worklist or integration. Maximum 64 characters.	VNAP	MWL/INT
Patient ID	(0010,0020)	LO	From Modality Worklist or integration. Maximum 64 characters.	VNAP	MWL/INT
Issuer of Patient ID	(0010,0021)	LO	From Modality Worklist.	ANAP	MWL
Other Patient Ids Sequence	(0010,1002)	SQ	From Modality Worklist.	ANAP	MWL
>Patient ID	(0010,0020)	LO	From Modality Worklist.	VNAP	MWL
>Issuer of Patient ID	(0010,0021)	LO	From Modality Worklist	VNAP	MWL
Patient's Birth Date	(0010,0030)	DA	From Modality Worklist or integration.	VNAP	MWL/INT
Patient's Sex	(0010,0040)	CS	From Modality Worklist or integration.	VNAP	MWL/INT
Admission ID	(0038,0011)	LO	From Modality Worklist	ANAP	MWL
Issuer of Admission ID	(0038,0014)	LO	From Modality Worklist	ANAP	MWL

Table 84: GENERAL STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence	Source
Study Instance UID	(0020,000D)	UI	From Modality Worklist or	ALWAYS	MWL/AUTO

Attribute Name	Tag	VR	Value	Presence	Source
			generated by device		
Study Date	(0008,0020)	DA	<yyyymmdd>	ALWAYS	USER/AUTO
Study Time	(0008,0030)	TM	<hhmmss>	ALWAYS	USER/AUTO
Referring Physician's Name	(0008,0090)	PN	From Modality Worklist or integration workflow	VNAP	MWL/INT
Accession Number	(0008,0050)	SH	From Modality Worklist or generated by device.	VNAP	MWL/AUTO
Study Description	(0008,1030)	LO	Comment text box. Maximum 1024 characters.	VNAP	USER
Referenced Study Sequence	(0008,1110)	SQ	From Modality Worklist.	ANAP	MWL
>Referenced SOP Class UID	(0008,1150)	UI	From Modality Worklist.	ANAP	MWL
>Referenced SOP Instance UID	(0008,1155)	UI	From Modality Worklist.	ANAP	MWL

Table 85: PATIENT STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence	Source
Patient's Age	(0010,1010)	AS	From Modality Worklist or automatic calculation.	VNAP	MWL/AUTO
Patient's Weight	(0010,1030)	DS	From Modality Worklist or user input.	ANAP	MWL/USER

Table 86: GENERAL SERIES MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence	Source
Modality	(0008,0060)	CS	From modality Worklist or IOD default value specification.	ALWAYS	MWL/AUTO
Series Instance UID	(0020,000E)	UI	Generated by device	ALWAYS	AUTO
Series Date	(0008,0021)	DA	<yyyymmdd>	ALWAYS	USER/AUTO
Series Time	(0008,0031)	TM	<hhmmss>	ALWAYS	USER/AUTO

Attribute Name	Tag	VR	Value	Presence	Source
Protocol Name	(0018,1030)	LO	Generated by device	ALWAYS	AUTO
Series Description	(0008,103E)	LO	Comment text box. Maximum 1024 characters.	VNAP	USER
Referenced Performed Procedure Step Sequence	(0008,1111)	SQ	Identifies the MPPPS SOP Instance to which this image is related.	ANAP	MPPS
>Referenced SOP Class UID	(0040,1150)	UI	MPPS SOP Class UID	ANAP	MPPS
>Referenced SOP Instance UID	(0008,1155)	UI	MPPS SOP Instance UID	ANAP	MPPS

Table 87: GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence	Source
Manufacturer	(0008,0070)	LO	“MetaEmotion S.L. <a href="http://metaemotion.com">http://metaemotion.com</a> ”	ALWAYS	AUTO
Institution Name	(0008,0080)	LO	From user configuration.	VNAP	CONF
Station Name	(0008,1010)	SH	From Modality Worklist.	ANAP	MWL
Manufacturer Model Name	(0008,1090)	LO	From Ginkgo CADx Extension name.	ALWAYS	AUTO

Table 88: GENERAL IMAGE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence	Source
Instance Number	(0020,0013)	IS	Sequence generated by device.	ALWAYS	AUTO
Image Comments	(0020,4000)	LT	From user input. Maximum 1024 characters.	VNAP	USER
Patient Orientation	(0020,0020)	CS	Generated by device	EMPTY	AUTO
Image Position Patient	(0020,0032)	DS	Generated by device	ALWAYS	AUTO
Image Orientation	(0020,0037)	DS	Generated by device	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence	Source
Patient					

*Table 89: IMAGE PIXEL MODULE OF CREATED SOP INSTANCES*

Attribute Name	Tag	VR	Value	Presence	Source
Pixel Data	(7FE0,0010)	OW	The image pixel data	ALWAYS	AUTO

*Table 90: SOP COMMON MODULE OF CREATED SOP INSTANCES*

Attribute Name	Tag	VR	Value	Presence	Source
Specific Character Set	(0008,0005)	CS	ISO_IR 192	ALWAYS	AUTO
SOP Class UID	(0008,0016)	UI	From IOD Specification	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	Generated by device	ALWAYS	AUTO

*Table 91: ENCAPSULATED DATA MODULE OF CREATED SOP INSTANCES*

Attribute Name	Tag	VR	Value	Presence	Source
Encapsulated Document	(0042,0011)	OB	Generated by device	ALWAYS	AUTO
MIME Type of Encapsulated Document	(0034,0012)	LO	“application/pdf”	ALWAYS	AUTO

### 9.1.2. Usage of attributes from received IOD's

The local database, remote query and directory browsers make use of the conventional identification attributes to distinguish patients, studies, series and instances. In particular, if two patients have the same value for Patient ID, they will be treated as the same in the browser and the local database.

### 9.1.3. Attribute Mapping

Not applicable.

### 9.1.4. Coerced/Modified fields

No coercion is performed.

### 9.1.5. DATA DICTIONARY OF PRIVATE ATTRIBUTES

Ginkgo CADx reserves private attribute values in group XXXX. The private attributes added to created SOP Instance are listed in the following table:

*Table 92: PRIVATE APPLICATION MODULE OF CREATED SOP INSTANCES*

Attribute Name	Tag	VR	Value	Presence	Source
PrivateCreator	(0011,0010)	SH	Ginkgo CADx module UID	ALWAYS	AUTO
Serialized diagnose and markers	(0011,100B)	LT	Generated by device	ANAP	AUTO
KeyFile Indicator	(0011,1101)	LT	Generated by device	ANAP	AUTO

Ginkgo CADx Retinal Extension adds the following private attributes to its created SOP Instances:

*Table 93: PRIVATE RETINAL MODULE OF CREATED SOP INSTANCES*

Attribute Name	Tag	VR	Value	Presence	Source
Private Creator	(0011,0010)	SH	“METAEMOTION GINKGO RETINAL”	ALWAYS	AUTO
Serialized diagnose and markers	(0011,100B)	LT	Generated by device	ANAP	AUTO
Virtual Aneritra Contrast Image	(0011,100c)	UN	Generated by device	ANAP	AUTO
KeyFile Indicator	(0011,1101)	LT	Generated by device	ANAP	AUTO

### **9.1.6. CODED TERMINOLOGY AND TEMPLATES**

The value for Code Meaning will be displayed for all code sequences. No local lexicon is provided to look up alternative code meanings.

### **9.1.7. GRAYSCALE IMAGE CONSISTENCY**

The high resolution display monitor attached to the product can be calibrated according to the Grayscale Standard Display Function (GSDF). The Service/Installation Tool is used together with a luminance meter to measure the Characteristic Curve of the display system and the current ambient light. See the product Service Manual for details on the calibration procedure and supported calibration hardware. The result of the calibration procedure is a Monitor Correction LUT that will be active within the display subsystem after a system reboot.

### **9.1.8. STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES**

#### ***9.1.8.1. Standard Extended VL Visible Light Photography***

See 9.1.1.1 VL PHOTOGRAPHIC IMAGE IOD

#### ***9.1.8.2. TRANSFER SYNTAXES***

See 9.1.1.1.1 Transfer syntaxes

### **9.1.9. PRIVATE TRANSFER SYNTAXES**

None.