

1 Overview

CoroFlow implements the following DICOM services:

- Download a modality worklist together with demographic patient data from a radiology information system (“RIS”), to facilitate patient registration.
- Store measurements as images (“screenshots”) in an image archive (“PACS - Pictures Archive Communication System”).

SOP Classes Service Class	User (SCU)	Provider of Service (SCP)
Transfer Secondary Capture Image Storage	Yes	No
Workflow Management Modality Worklist Information Model - FIND	Yes	No

2 Implementation Model

The system allows for measurements to be sent as Secondary Capture images to a storage archive (C STORE). Necessary meta-data for the image objects are obtained through a query against a worklist provider (C FIND).

2.1 Worklist Search Real-World Activity

1. The user selects New Patient and clicks on an update button, retrieval of worklist items is started automatically.
2. A list of matching worklist items is displayed.

2.2 Store Image Real-World Activity

An example of a real-world activity as follows:

1. The user selects the Review tab
2. The user selects a stored measurement
3. The user clicks Export and then selects DICOM format
4. The selected measurement is exported.

3 Functional Definition of AE's

3.1 Functional Definition of Workflow AE

Worklist Search attempts to download a worklist from a remote node. If the Workflow AE establishes an association to a remote AE, it will transfer all worklist items via the open association. The worklist response items are counted and the query processing is canceled if the limit of returned items is reached. The results will be displayed in a separate list, which will be cleared with the next Worklist Search.

3.2 Functional Definition of Transfer AE

An association request is sent by the Transfer AE to the destination AE and upon successful negotiation of a presentation context the image transfer is started. If the association cannot be opened, an error is reported to the user and the transfer fails. The Transfer AE will not try to initiate

another association for this transfer automatically.

4 Transfer AE Specification

4.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Yes	No

4.2 Settings

All settings available in the Settings screens under DICOM tab

Settings	
Local AE title	Local Application Entity name, default CLIENT
Remote AE title	DICOM image storage server Application Entity name, default SERVER
Remote host	DICOM image storage server IP-address
Remote port	Port used by DICOM image storage server
Modality	Screen image stored as this modality. Default XA
Timeout (ms)	Storage timeout limit, default 5000ms (5s)

5 Workflow AE Specification

5.1 SOP Classes

This Application Entity provides Standard Conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31	Yes	No

5.2 Settings

All settings available in the Settings screens under DICOM tab

Settings	
Local AE title	Local Application Entity name, default CLIENT
Remote AE title	Worklist server Application Entity name, default SERVER
Remote host	Worklist server IP-address
Remote port	Port used by worklist server
Max Results	Max number of query results

Timeout (ms)	Query timeout, default 5000ms (5s)
Modality	Return patients scheduled for this entity. Default ALL
Date	Return patients scheduled only for current date (Today) or 1-3 days before and after current date

6 IOD contents

6.1 Secondary Capture Image IOD

IE	Module	Ref	Usage
Patient	Patient	C.7.1.1	M
Study	General Study	C7.2.1	M
Series	General Series	C.7.3.1	M
Equipment	General Equipment	C.7.5.1	U
Equipment	SC Equipment	C.8.6.1	M
Image	General Image	C.7.6.1	M
Image	Image Pixel	C.7.6.3	M
Image	SC Image	C.8.6.2	M
Image	SOP Common	C.12.1	M

6.1.1 Patient Module

Attribute name	Tag	Type	Description	Value	Comment
Patient name	0010:0010	2	Full name	Worklist	Blank or entered by user if not worklist
Patient ID	0010:0020	2	Primary hospital identification number/code	Worklist	Blank or entered by user if not worklist
Patient birth date	0010:0030	2	Birth date	Worklist	Blank or entered by user if not worklist
Patient sex	0010:0040	2	Gender M=Male, F=Female, O=Other	Worklist	Blank or entered by user if not worklist

6.1.2 General study module

Attribute name	Tag	Type	Description	Value	Comment
Study Instance UID	0020:000D	1	Unique identifier for study	Worklist	Generated If not worklist
Study date	0008:0020	2	Date the study started	Worklist	Generated If not worklist
Study time	0008:0030	2	Time the study started	Worklist	Generated If not worklist
Referring physicians name	0008:0090	2	Name of referring physician	Worklist	Blank If not worklist
Study ID	0020:0010	2	User or equipment generated Study identifier.	Worklist	Blank If not worklist
Accession number	0008:0050	2	RIS generated number that identifies the order for the Study.	Worklist	Blank If not worklist
Study description	0008:1030	3	Institution-generated description or classification of the Study performed.	Worklist	Blank If not worklist

6.1.3 General Series Module

Attribute name	Tag	Type	Description	Value	Comment
Series Instance UID	0020:000E	1	Unique identifier of the Series.	Generated	Generated at each export
Series Number	0020:0011	2	A number that identifies this Series	Generated	Set to 1

6.1.4 General Equipment Module

Attribute name	Tag	Type	Description	Value	Comment
Manufacturer	0008:0070	2	Manufacturer of the equipment	Configured in SW	
Institution name	0008:0080	3	Institution where the equipment is located	Configured by user	
Software Version	0018:1020	3	Revision number of the CoroFlow software	Built-in	

6.1.5 Secondary Capture Equipment Module

Attribute name	Tag	Type	Description	Value	Comment
Conversion Type	0008:0064	1	Describes the kind of image conversion. Defined Terms: DV=Digitized Video; DI=Digital Interface; DF=Digitized Film; WSD=Workstation; SD=Scanned Document; SI=Scanned Image; DRW=Drawing; SYN=Synthetic Image	"WSD"	
Modality	0008:0060	3	Source equipment for the image. This type definition shall override the definition in the General Series Module.	Configured by user. Options: OT, XA, HD, FFR	FFR is not in the DICOM standard but included per user preference

6.1.6 General image module

Attribute name	Tag	Type	Description	Value	Comment
Instance number	0020:0013	2	Image identification number	Generated	Counter, set to =1 for first image
Patient orientation	0020:0020	2C	Patient direction of the rows and columns of the image. Required if image does not require Image Orientation (Patient) (0020,0037) and Image Position (Patient) (0020,0032). May be present otherwise. See PS3.3 C.7.6.1.1.1 for further explanation.	Generated	Set field to zero length
Content date	0008:0023	2C	The date the image pixel data creation started. Required if image is part of a series in which the images are temporally related.	Generated	Image generation date
Content time	0008:0033	2C	The time the image pixel data creation started. Required if image is part of a series in which the images are temporally related.	Generated	Image generation time
Image Laterality	0020,0062	1	Laterality of (possibly paired) body part (as described in Anatomic	Left blank	

			Region Sequence (0008,2218) examined. Enumerated Values: R right L left U unpaired B both left and right		
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6.1.7 Image Pixel Module

Attribute name	Tag	Type	Description	Value	Comment
Samples per Pixel	0028:0002	1	Number of samples (planes) in this image	3	
Photometric Interpretation	0028:0004	1	Specifies the intended interpretation of the pixel data	RGB	
Rows	0028:0010	1	Number of rows in the image	1080	
Columns	0028:0011	1	Number of columns in the image	1920	
Bits Allocated	0028:0100	1	Number of bits allocated for each pixel sample. Each sample shall have the same number of bits allocated	8	
Bits Stored	0028:0101	1	Number of bits stored for each pixel sample. Each sample shall have the same number of bits stored	8	
High Bit	0028:0102	1	Most significant bit for pixel sample data. Each sample shall have the same high bit	7	
Pixel Representation	0028:0103	1	Data representation of the pixel samples. Each sample shall have the same pixel representation. Enumerated Values: 0000H = unsigned integer; 0001H = 2's complement.	0	
Planar Configuration	0028:0006	1C	Indicates whether the pixel data are sent color-by-plane or color-by-pixel. Required if Samples per Pixel (0028,0002) has a value greater than 1.	0	
Pixel Data	7FE0:0010	1C	A data stream of the pixel samples that comprise the Image		

6.1.8 SOP common module

Attribute name	Tag	Type	Description	Value	Comment
SOP Class UID	0008:0016	1	Uniquely identifies the SOP Class.	1.2.840.10008.5.1.4.1.1.7	SOP Class for Secondary storage
SOP Instance UID	0008:0018	1	Uniquely identifies the SOP Instance.	Generated	Generated

7 Change Log

Rev. No.	Date	Version description
01	2018-04-01	First version
02	2021-08-27	Update related to CoroFlow 3.4 Added chapter 6 IOD Content