

iQ-VIEW / PRO

DICOM CONFORMANCE STATEMENT

Version 2.6.0 INT EN 002R

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A.0 CONFORMANCE STATEMENT OVERVIEW

The product iQ-VIEW / PRO implements the necessary DICOM services to transfer DICOM datasets (files) via network transmission, to query other DICOM systems for workflow and data information and send print requests to DICOM Print aware systems (printer).

Table 1-1 provides an overview of the network services supported by iQ-VIEW / PRO:

Table 1-1 Network services

NETWORK SERVICES		
SOP Classes	User of service (SCU)	Provider of service (SCP)
Stored Print Storage	(Yes)*	Yes
Hardcopy Grayscale Image Storage	Yes	Yes
Hardcopy Color Image Storage	Yes	Yes
Computed Radiography Image Storage	Yes	Yes
Digital X-Ray Image Storage For Presentation	Yes	Yes
Digital X-Ray Image Storage For Processing	Yes	Yes
Digital Mammography X-Ray Image Storage For Presentation	Yes	Yes
Digital Mammography X-Ray Image Storage For Processing	Yes	Yes
Digital Intra Oral X-Ray Image Storage For Presentation	Yes	Yes
Digital Intra Oral X-Ray Image Storage For Processing	Yes	Yes
CT Image Storage	Yes	Yes
Enhanced CT Image Storage	Yes	Yes
(RETIRED) Ultrasound Multiframe Image Storage	Yes	Yes
Ultrasound Multiframe Image Storage	Yes	Yes
MR Image Storage	Yes	Yes
Enhanced MR Image Storage	Yes	Yes
MR Spectroscopy Storage	(Yes)*	Yes
(RETIRED) Nuclear Medicine Image Storage	Yes	Yes
(RETIRED) Ultrasound Image Storage	Yes	Yes
Ultrasound Image Storage	Yes	Yes
Secondary Capture Image Storage	Yes	Yes
Multiframe Single Bit Secondary Capture Image Storage	Yes	Yes
Multiframe Grayscale Byte Secondary Capture Image Storage	Yes	Yes
Multiframe Grayscale Word Secondary Capture Image Storage	Yes	Yes
Multiframe True Color Secondary Capture Image Storage	Yes	Yes

Standalone Overlay Storage	(Yes)*	Yes
Standalone Curve Storage	(Yes)*	Yes
Twelve Lead ECG Waveform Storage	(Yes)+	Yes
General ECG Waveform Storage	(Yes)+	Yes
Ambulatory ECG Waveform Storage	(Yes)*	Yes
Hemodynamic Waveform Storage	(Yes)*	Yes
Cardiac Electrophysiology Waveform Storage	(Yes)*	Yes
Basic Voice Audio Waveform Storage	(Yes)*	Yes
Standalone Modality LUT Storage	(Yes)*	Yes
Standalone VOI LUT Storage	(Yes)*	Yes
Grayscale Softcopy Presentation State Storage	Yes**	Yes
Color Softcopy Presentation State Storage	(Yes)*	Yes
Pseudo Color Softcopy Presentation State Storage	(Yes)*	Yes
Blending Softcopy Presentation State Storage	(Yes)*	Yes
X-Ray Angiographic Image Storage	Yes	Yes
Enhanced XA Image Storage	Yes	Yes
X-Ray Fluoroscopy Image Storage	Yes	Yes
Enhanced XRF Image Storage	No	Yes
(RETIRED) X-Ray Angiographic BiPlane Image Storage	Yes	Yes
Nuclear Medicine Image Storage	Yes	Yes
Raw Data Storage	(Yes)*	Yes
Spatial Registration Storage	(Yes)*	Yes
Spatial Fiducials Storage	(Yes)*	Yes
Real World Value Mapping Storage	No	Yes
(RETIRED) VL Image Storage	Yes	Yes
VL Endoscopic Image Storage	Yes	Yes
Video Endoscopic Image Storage	Yes	Yes
VL Microscopic Image Storage	Yes	Yes
Microscopic Image Storage	Yes	Yes
VL Slide Coordinates Microscopic Image Storage	No	Yes
VL Photographic Image Storage	Yes	Yes
Video Photographic Image Storage	Yes	Yes
Ophthalmic Photography 8Bit Image Storage	Yes	Yes
Ophthalmic Photography 16Bit Image Storage	Yes	Yes
Stereometric Relationship Storage	(Yes)*	Yes
(RETIRED) VL MultiFrame Image Storage	Yes	Yes

Basic Text SR	Yes	Yes
Enhanced SR	Yes	Yes
Comprehensive SR	Yes	Yes
Procedure Log Storage	(Yes)*	Yes
Mammography CAD SR	(Yes)*	Yes
Key Object Selection Document	(Yes)*	Yes
Chest CAD SR	(Yes)*	Yes
X-Ray Radiation DoseSR	(Yes)*	Yes
Encapsulated PDF Storage	(Yes)*	Yes
PET Image Storage	Yes	Yes
PET Curve Storage	(Yes)*	Yes
RT Image Storage	Yes	Yes
RT Dose Storage	(Yes)*	Yes
RT Structure Set Storage	(Yes)*	Yes
RT Beams Treatment Record Storage	(Yes)*	Yes
RT Plan Storage	(Yes)*	Yes
RT Brachy Treatment Record Storage	(Yes)*	Yes
RT Treatment Summary Record Storage	(Yes)*	Yes
Query/Retrieve		
Patient Root Information Model FIND	Yes	No
Study Root Information Model FIND	Yes	No
Modality Worklist Information Model FIND	Yes	No
Print		
Grayscale Print Management Meta	Yes	No

* These SOP Classes are not supported by the viewer application, but network transfer (C-STORE) will be possible.

** The viewer application only supports Grayscale Softcopy Presentation State Objects created by iQ-VIEW itself. Other GSPS objects will not be stored.

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A.1 INTRODUCTION

A.1.1 OVERVIEW

This DICOM Conformance Statement is written according to part PS 3.2 of the DICOM Standard.

The applications described in this conformance statement are implemented in the Software iQ-VIEW / PRO by IMAGE Information Systems Ltd.

The iQ-View network implementation acts as SCU (user of service) and SCP (provider of service) for the DICOM Verification and Storage Services. It acts as SCU for the Query/Retrieve Service, the DICOM Print Management Service and the Modality Worklist Service.

These services are described in the DICOM Network part of this documentation. The iQ-View Media Storage Service implementation acts as FSC (File Set Creator), FSU (File Set Updater), and FSR (File Set Reader) for the specified application profiles and the related SOP Class instances. These services are described in the Media Storage part of this documentation.

NETWORK SERVICES		
Name of Service	User of Service (SCU)	Provider of Service (SCP)
Verification	Yes	Yes
Storage	Yes	Yes
Query/Retrieve	Yes	No
Modality Worklist Management	Option	No
Basic Grayscale Print Management	Yes	No

MEDIA SERVICES		
Application Profile	FSC and FSU	FSR
STD-GEN-CD	Yes	Yes
STD-GEN-DVD-RAM	Yes	Yes
STD-CTMR-CD	No	Yes
STD-XABC-CD	No	Yes
STD-XA1K-CD	No	Yes

A.1.2 AUDIENCE

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

A.1.3 SCOPE AND FIELD OF APPLICATION

This document is the DICOM conformance statement for the iQ-VIEW Software of IMAGE Information Systems Ltd. This document describes how the iQ-VIEW software collaborates in a DICOM network with other Medical Imaging applications that conform to the DICOM 3.0 standard.

This DICOM Conformance Statement documents the conformance of the iQ-VIEW software with the Digital Imaging and Communications in Medicine standard (DICOM). This document is essential in order to evaluate whether or not another DICOM compliant device can communicate with this software product. This statement is conformant with the recommended format as described in PS 3.2 of the DICOM standard¹.

The software is based on the DICOM tool kit (DcmTK) from OFFIS e.V. Oldenburg and the UCDCM DICOM tool kit from Mark Oskin.

A.1.4 IMPORTANT CONSIDERATIONS FOR THE READER

- This document on its own should not be interpreted as a guarantee of connectivity between iQ-VIEW and any equipment and/or applications offered by other vendors.
- Integration of iQ-VIEW with the equipment and/or applications of different vendors, including IMAGE INFORMATION SYSTEMS, are outside the scope of the DICOM 3.0 standard and product conformance statements. Integration and interoperability of different equipment/applications are the sole responsibility of the user.
- In the case of any possible connectivity inferred by a user to exist between iQ-VIEW and another product, the user is responsible for testing and verifying the inferred connectivity.
- Future changes to the DICOM 3.0 standard may require alterations to be made to iQ-VIEW. IMAGE INFORMATION SYSTEMS reserves the right to modify the iQ-VIEW architecture as needed, in order to meet changing standards.
- The user should ensure that any existing DICOM equipment also changes with the future developments of the DICOM standards. Failure to keep pace with any alterations in the DICOM standards may result in decreased or lost connectivity.
- All trade names mentioned in this document are recognized.

A.1.5 REVISION HISTORY

VERSION	DATE	AUTHOR	DESCRIPTION
2.6.0	16.05.2009	Sabine Stridde	Creation of document on the basis of "iQ-VIEW 2 5 0 b DICOM Conformance Statement INT EN - 001R"
2.6.0	16.05.2009	Sabine Stridde	Transformation to corporate design
2.6.0	25.05.2009	Yves Neumann	Changes regarding SCP redesign
2.6.0	27.09.2009	Andreas Knopke	Changes regarding SCU / viewer
2.6.0	29.09.2009	Sabine Stridde	Adaptations in formatting; changes regarding handling of

¹ Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-15, 2000.

			Structured Report SOP Classes; adaptation of Application Data Flow Diagram
2.6.0	29.09.2009	Sabine Stridde	Adding information regarding support of presentation states (PR)
2.6.0	29.09.2009	Arpad Bischof	Verification of the document
2.6.0	29.09.2009	Arpad Bischof	Release of the document

A.1.6 ABBREVIATIONS AND ACRONYMS

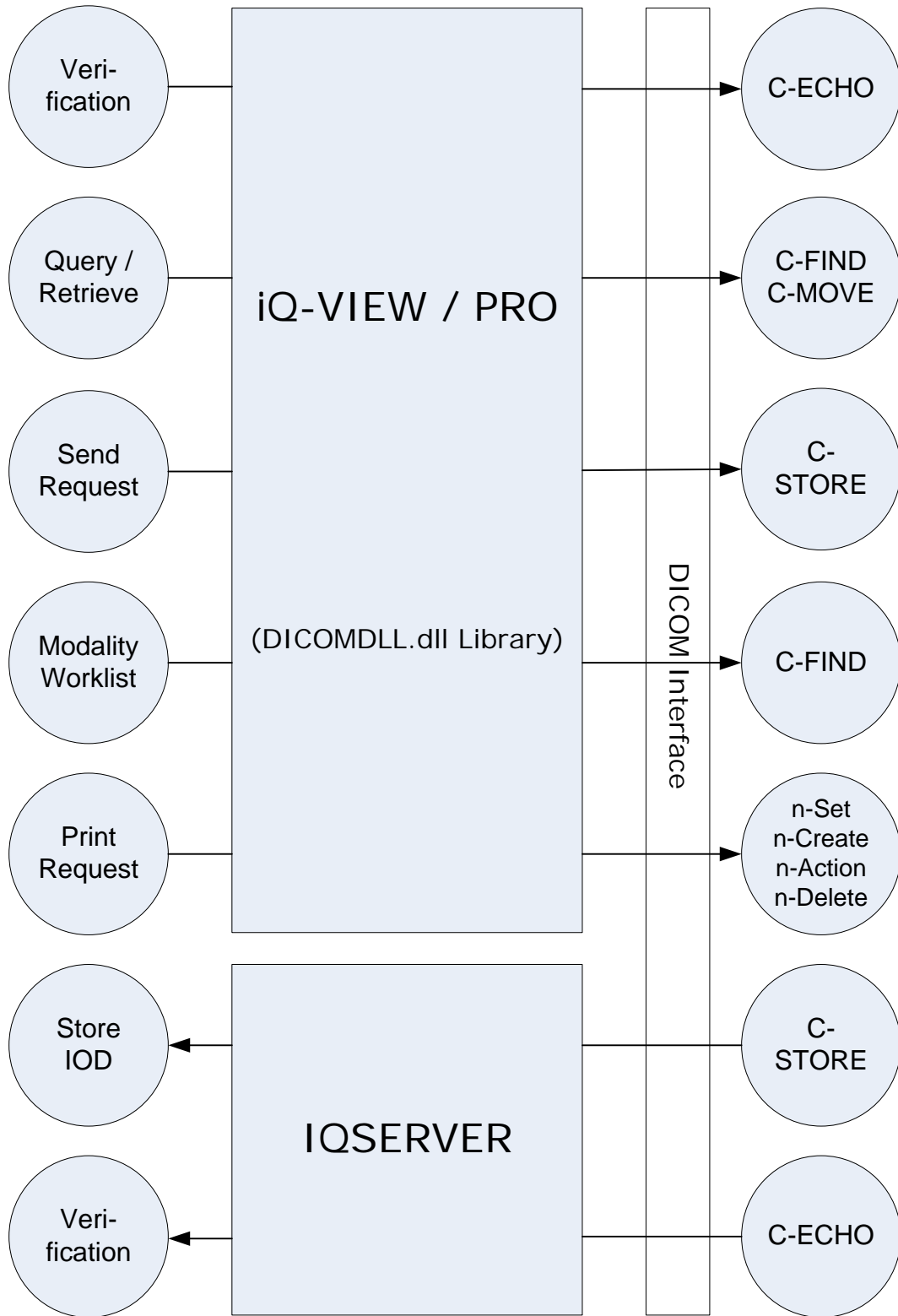
ASCII	American Standard Code for Information Interchange
AE	Application Entity
AE-Title	name of an AE
ANSI	American National Standards Institute
CR	Computed Radiography
CT	Computed Tomography
ISDN	Integrated Service Digital Network
DCMTK	OFFIS DICOM Toolkit
DICOM	Digital Imaging and Communications in Medicine
ECR	European Congress of Radiology
GPRS	General Packet Radio Service
GSPS	Grayscale Softcopy Presentation State
HIMSS	Healthcare Information and Management Systems Society
IE	Information Entity
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
ISO	International Standards Organization
NEMA	National Electrical Manufacturers Association
OSI	Open Systems Interconnection
PDU	Protocol Data Unit
RSNA	Radiological Society of North America
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol / Internet Protocol
TLS	Transport Layer Security
UID	Unique Identifier
VM	Value Multiplicity
VR	Value Representation

A.2 DICOM CONFORMANCE STATEMENT NETWORK IMPLEMENTATION MODEL

A.2.1 APPLICATION DATA FLOW DIAGRAM

This DICOM Conformance Statement specifies the behavior and functionality of the iQ-VIEW Software, release 2.x. This software provides the following capabilities:

- Reads and displays uncompressed and compressed (RLE, JPEG) DICOM images of all modalities and image SOP classes.
- Sends and receives DICOM objects via the DICOM Storage Service Class.
- Reads, displays and writes Structured Reports (SR) of all three SR SOP Classes defined in NEMA PS.3-2000. Update procedures are limited to Basic SR objects created by an iQ-VIEW workstation.
- Allows sending DICOM Query, Retrieve and moving requests to DICOM Store-SCPs.
- Retrieves DICOM Modality Worklist from remote systems.



Application data flow diagram

The DICOM server (iQ-Server) runs as a service or pseudo-service process. It starts when the system is started and shuts down when the system is turned off.

A.2.2 FUNCTIONAL DEFINITIONS

All communications and image transfer with the remote application is accomplished utilizing the DICOM protocol over a network using the TCP/IP protocol stack.

Below is a table of the functions supported by iQ-VIEW application entities:

SCU	SCP
Verification	Verification
Storage	Storage
Query/Retrieve	
Modality Worklist Management	
Basic Grayscale Print Management	

A.3 DICOM NETWORK AE SPECIFICATIONS

A.3.1 iQ-VIEW SOFTWARE - AE

The iQ-VIEW software-AE provides standard conformance to the following DICOM V3.0 SOP classes. The SOP classes in the following table can be processed and displayed by iQ-VIEW.

SOP CLASSES AS SCU AND SCP ²	
Storage and Display	
ComputedRadiographyImageStorage	1.2.840.10008.5.1.4.1.1.1
DigitalXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.1
DigitalMammogr.XRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.2
DigitalIntraOralXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3
CTImageStorage	1.2.840.10008.5.1.4.1.1.2
RETIRED_UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3
UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3.1
MRImageStorage	1.2.840.10008.5.1.4.1.1.4
RETIRED_NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.5
RETIRED_UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7
Multifrm.SingleBitSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.1
Multifrm.GrayscaleByteSec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.2
Multifrm.GrayscaleWordSec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.3
Multifrm.TrueColorSec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.4
XRayAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.12.1
XRayFluoroscopyImageStorage	1.2.840.10008.5.1.4.1.1.12.2
RETIRED_XRayAngiographicBiPlaneImageStorage	1.2.840.10008.5.1.4.1.1.12.3
NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.20
BasicTextSR	1.2.840.10008.5.1.4.1.1.88.11
EnhancedSR	1.2.840.10008.5.1.4.1.1.88.22
ComprehensiveSR	1.2.840.10008.5.1.4.1.1.88.33
PETImageStorage	1.2.840.10008.5.1.4.1.1.128

All SOP classes in the following table can only be stored or processed with iQ-VIEW.

² **Note:** a configuration file allows to enable/disable support for each individual SOP Class shown in the list

SOP CLASSES AS SCU AND SCP	
VerificationSOPClass	1.2.840.10008.1.1
Storage	
StoredPrintStorage	1.2.840.10008.5.1.1.27
HardcopyGrayscaleImageStorage	1.2.840.10008.5.1.1.29
HardcopyColorImageStorage	1.2.840.10008.5.1.1.30
DigitalXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.1
DigitalMammogr.XRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.2.1
DigitalIntraOralXRayImageStorageForProcessing	1.2.840.10008.5.1.4.1.1.1.3.1
EnhancedCTImageStorage	1.2.840.10008.5.1.4.1.1.2.1
EnhancedMRIImageStorage	1.2.840.10008.5.1.4.1.1.4.1
MRSpectroscopyStorage	1.2.840.10008.5.1.4.1.1.4.2
StandaloneOverlayStorage	1.2.840.10008.5.1.4.1.1.8
StandaloneCurveStorage	1.2.840.10008.5.1.4.1.1.9
TwelveLeadECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.1
GeneralECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.2
AmbulatoryECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.3
HemodynamicWaveformStorage	1.2.840.10008.5.1.4.1.1.9.2.1
CardiacElectrophysiologyWaveformStorage	1.2.840.10008.5.1.4.1.1.9.3.1
BasicVoiceAudioWaveformStorage	1.2.840.10008.5.1.4.1.1.9.4.1
StandaloneModalityLUTStorage	1.2.840.10008.5.1.4.1.1.10
StandaloneVOILUTStorage	1.2.840.10008.5.1.4.1.1.11
GrayscaleSoftcopyPresentationStateStorage	1.2.840.10008.5.1.4.1.1.11.1
RawDataStorage	1.2.840.10008.5.1.4.1.1.66
SpatialRegistrationStorage	1.2.840.10008.5.1.4.1.1.66.1
SpatialFiducialsStorage	1.2.840.10008.5.1.4.1.1.66.2
VLEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1
VideoEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1.1
VLMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2
MicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2.1
VLSlideCoordinatesMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.3
VLPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4
VideoPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4.1
ProcedureLogStorage	1.2.840.10008.5.1.4.1.1.88.40
MammographyCADSR	1.2.840.10008.5.1.4.1.1.88.50
KeyObjectSelectionDocument	1.2.840.10008.5.1.4.1.1.88.59

ChestCADSR	1.2.840.10008.5.1.4.1.1.88.65
PETCurveStorage	1.2.840.10008.5.1.4.1.1.129
RTImageStorage	1.2.840.10008.5.1.4.1.1.481.1
RTDoseStorage	1.2.840.10008.5.1.4.1.1.481.2
RTStructureSetStorage	1.2.840.10008.5.1.4.1.1.481.3
RTBeamsTreatmentRecordStorage	1.2.840.10008.5.1.4.1.1.481.4
RTPlanStorage	1.2.840.10008.5.1.4.1.1.481.5
RTBrachyTreatmentRecordStorage	1.2.840.10008.5.1.4.1.1.481.6
RTTreatmentSummaryRecordStorage	1.2.840.10008.5.1.4.1.1.481.7

SOP CLASSES EXCLUSIVELY AS SCU	
Query/Retrieve	
Study Root Query/Retrieve Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Modality Worklist Management	
Modality Worklist Information Model-FIND1	1.2.840.10008.5.1.4.31

A.3.1.1 ASSOCIATION ACCEPTANCE AND ESTABLISHMENT POLICIES

A.3.1.1.1 GENERAL

The DICOM Application Context Name (ACN) proposed by iQ-VIEW is 1.2.840.10008.3.1.1. The maximum PDU size which can be transmitted by iQ-VIEW is fixed at 16 Kbytes (16384 bytes). The maximum PDU size which can be received by the iQ-VIEW DICOM Server is 128Kbytes (131072 bytes). The minimum PDU size is 4Kbyte (4096 bytes)..

There is no limit on the number of Presentation Context Items that will be proposed.

The iQ-VIEW software accepts incoming association requests on a single port number defined in the configuration file. It accepts association requests if at least one presentation context of the association is accepted.

The access rights are checked by the AE-Title and the IP address of the calling device. So name resolving of IP addresses to host names and reverse is necessary within the network environment.

- Extended negotiations are not supported for any of the supported service classes.
- The only supported network protocol is TCP/IP. Any physical media supporting TCP/IP may be used to connect to iQ-VIEW software. iQ-VIEW software uses the TCP/IP stack of the under-layering operating system.

A.3.1.1.2 NUMBER OF ASSOCIATIONS

iQ-Server currently supports either one association at the same time or an unlimited number of simultaneous associations in multi-thread mode (default mode). See Administration Guide for further information about available server parameters.

A.3.1.1.3 ASYNCHRONOUS NATURE

Asynchronous operations on an association are not supported.

A.3.1.1.4 IMPLEMENTATION IDENTIFYING INFORMATION

The implementation class UID is 1.2.826.0.1.3680043.2.1208.0, the implementation version is "iQ-VIEW".

A.3.1.2 ASSOCIATION ACCEPTANCE AND ASSOCIATION INITIATION

iQ-VIEW initiates associations for the following activities:

- DICOM communication verification between iQ-VIEW and a remote system.
- Sending images from the local iQ-VIEW database to a remote system.
- Queries of remote database contents.
- Retrieval of images from a remote database to the local iQ-VIEW database.
- Retrieving a Modality Worklist from a remote system.

A.3.1.2.1 COMMUNICATION CHANNEL VERIFICATION

A.3.1.2.1.1 ASSOCIATED REAL-WORLD ACTIVITY

Verification as SCP is initiated by an external DICOM AE wishing to verify the existence of a DICOM communication channel. The iQ-VIEW DICOM Server will answer the request if running.

Verification as SCU is initiated by the user selecting a remote server and clicking "echo".

A.3.1.2.1.2 PRESENTATION CONTEXT ACCEPTANCE

The iQ-VIEW software implements the verification service class as SCP and SCU.

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
Verification Service Class	1.2.840.10008.1.1	SCP	None

Following transfer syntaxes are accepted with the verification service class:

TRANSFER SYNTAX	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicite VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicite VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

A.3.1.2.1.3 PROPOSED PRESENTATION CONTEXTS

The iQ-VIEW Software is configured to check the communication channel to the Target AE, it proposes the Verification Service class as SCU:

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
Verification Service Class	1.2.840.10008.1.1	SCU	None

The following transfer syntaxes are proposed:

TRANSFER SYNTAX	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicite VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicite VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

A.3.1.2.2 IMAGE STORAGE

A.3.1.2.2.1 ASSOCIATED REAL-WORLD ACTIVITY

The user selects one or more studies from the search dialog after querying the local database and clicks the transfer button. A list of AEs appears, from which the user selects one.

A.3.1.2.2.2 PRESENTATION CONTEXT ACCEPTANCE

The iQ-VIEW software accepts each presentation context containing one of the supported image storage service classes and one of the transfer syntaxes in the order of appearance within following table if run in default mode. This behavior can be changed with the file setup.cfg, located in the server directory (see Administrator Guide).

PRESENTATION CONTEXT ACCEPTANCE	
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2
Implicit VR Little Endian	1.2.840.10008.1.2
Default JPEG lossless compressed	1.2.840.10008.1.2.4.70
RLE Compressed	1.2.840.10008.1.2.5
JPEG Baseline - Process 1 (default 8-bit lossy JPEG compression)	1.2.840.10008.1.2.4.50
JPEG Extended - Process 2 & 4 (default 12-bit lossy JPEG compression)	1.2.840.10008.1.2.4.51
JPEG 2000 (Lossless Only)	1.2.840.10008.1.2.4.90
JPEG 2000	1.2.840.10008.1.2.4.91

A.3.1.2.2.3 PROPOSED PRESENTATION CONTEXTS

iQ-VIEW Software proposes the required presentation context containing one of the supported image storage service classes and one of the transfer syntaxes in the order of appearance within following table:

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
HardcopyGrayscaleImageStorage	1.2.840.10008.5.1.1.29	SCU	None
HardcopyColorImageStorage	1.2.840.10008.5.1.1.30	SCU	None
ComputedRadiographyImageStorage	1.2.840.10008.5.1.4.1.1.1	SCU	None
DigitalXRayImageStorage- ForPresentation	1.2.840.10008.5.1.4.1.1.1.1	SCU	None
DigitalXRayImageStorage- ForProcessing	1.2.840.10008.5.1.4.1.1.1.1.1	SCU	None
DigitalMammographyXRayImage- StorageForPresentation	1.2.840.10008.5.1.4.1.1.1.2	SCU	None
DigitalMammogr.XrayImage- StorageForProcessing	1.2.840.10008.5.1.4.1.1.1.2.1	SCU	None
DigitalIntraOralXRayImage- StorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3	SCU	None
DigitalIntraOralXRayImage- StorageForProcessing	1.2.840.10008.5.1.4.1.1.1.3.1	SCU	None
CTImageStorage	1.2.840.10008.5.1.4.1.1.2	SCU	None
EnhancedCTImageStorage	1.2.840.10008.5.1.4.1.1.2.1	SCU	None

RETIRED_Ultrasound-MultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3	SCU	None
UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3.1	SCU	None
MRImageStorage	1.2.840.10008.5.1.4.1.1.4	SCU	None
EnhancedMRImageStorage	1.2.840.10008.5.1.4.1.1.4.1	SCU	None
MRSpectroscopyStorage	1.2.840.10008.5.1.4.1.1.4.2	SCU	None
RETIRED_NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.5	SCU	None
RETIRED_UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6	SCU	None
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1	SCU	None
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7	SCU	None
Multifrm.SingleBit-SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.1	SCU	None
Multifrm.GrayscaleByte-Sec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.2	SCU	None
Multifrm.GrayscaleWord-Sec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.3	SCU	None
Multifrm.TrueColor-Sec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.4	SCU	None
StandaloneOverlayStorage	1.2.840.10008.5.1.4.1.1.8	SCU	None
StandaloneCurveStorage	1.2.840.10008.5.1.4.1.1.9	SCU	None
TwelveLeadECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.1	SCU	None
GeneralECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.2	SCU	None
AmbulatoryECGWaveformStorage	1.2.840.10008.5.1.4.1.1.9.1.3	SCU	None
HemodynamicWaveformStorage	1.2.840.10008.5.1.4.1.1.9.2.1	SCU	None
CardiacElectrophysiology-WaveformStorage	1.2.840.10008.5.1.4.1.1.9.3.1	SCU	None
BasicVoiceAudioWaveformStorage	1.2.840.10008.5.1.4.1.1.9.4.1	SCU	None
StandaloneModalityLUTStorage	1.2.840.10008.5.1.4.1.1.10	SCU	None
StandaloneVOILUTStorage	1.2.840.10008.5.1.4.1.1.11	SCU	None
GrayscaleSoftcopy-PresentationStateStorage	1.2.840.10008.5.1.4.1.1.11.1	SCU	None
XRyAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.12.1	SCU	None
XRyFluoroscopyImageStorage	1.2.840.10008.5.1.4.1.1.12.2	SCU	None
RETIRED_Xray-AngiographicBiPlaneImageStorage	1.2.840.10008.5.1.4.1.1.12.3	SCU	None
NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.20	SCU	None
RawDataStorage	1.2.840.10008.5.1.4.1.1.66	SCU	None

SpatialRegistrationStorage	1.2.840.10008.5.1.4.1.1.66.1	SCU	None
SpatialFiducialsStorage	1.2.840.10008.5.1.4.1.1.66.2	SCU	None
VLEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1	SCU	None
VideoEndoscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.1.1	SCU	None
VLMicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2	SCU	None
MicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.2.1	SCU	None
VLSlideCoordinates- MicroscopicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.3	SCU	None
VLPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4	SCU	None
VideoPhotographicImageStorage	1.2.840.10008.5.1.4.1.1.77.1.4.1	SCU	None
BasicTextSR	1.2.840.10008.5.1.4.1.1.88.11	SCU	None
EnhancedSR	1.2.840.10008.5.1.4.1.1.88.22	SCU	None
ComprehensiveSR	1.2.840.10008.5.1.4.1.1.88.33	SCU	None
ProcedureLogStorage	1.2.840.10008.5.1.4.1.1.88.40	SCU	None
MammographyCADSR	1.2.840.10008.5.1.4.1.1.88.50	SCU	None
KeyObjectSelectionDocument	1.2.840.10008.5.1.4.1.1.88.59	SCU	None
ChestCADSR	1.2.840.10008.5.1.4.1.1.88.65	SCU	None
PETImageStorage	1.2.840.10008.5.1.4.1.1.128	SCU	None
PETCurveStorage	1.2.840.10008.5.1.4.1.1.129	SCU	None
RTImageStorage	1.2.840.10008.5.1.4.1.1.481.1	SCU	None
RTDoseStorage	1.2.840.10008.5.1.4.1.1.481.2	SCU	None
RTStructureSetStorage	1.2.840.10008.5.1.4.1.1.481.3	SCU	None
RTBeamsTreatmentRecordStorage	1.2.840.10008.5.1.4.1.1.481.4	SCU	None
RTPlanStorage	1.2.840.10008.5.1.4.1.1.481.5	SCU	None
RTBrachyTreatmentRecordStorage	1.2.840.10008.5.1.4.1.1.481.6	SCU	None
RTTreatmentSummaryRecordStorage	1.2.840.10008.5.1.4.1.1.481.7	SCU	None

Following transfer syntaxes can be proposed, according to the original transfer syntax of the DICOM object and the optional additional transfer syntax (see Administration Guide for further details). Implicit VR Little Endian TS will always be proposed according to the DICOM standard.

TRANSFER SYNTAX	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2
Default JPEG lossless compressed	1.2.840.10008.1.2.4.70

JPEG Baseline - Process 1 (default 8-bit lossy JPEG compression)	1.2.840.10008.1.2.4.50
JPEG Extended - Process 2 & 4 (default 12-bit lossy JPEG compression)	1.2.840.10008.1.2.4.51
JPEG 2000 (Lossless Only)	1.2.840.10008.1.2.4.90
JPEG 2000	1.2.840.10008.1.2.4.91

A.3.1.2.3 QUERY/RETRIEVE

A.3.1.2.3.1 ASSOCIATED REAL-WORLD ACTIVITY

The user clicks on the remote exams list in the study browser dialog, selects one or more AE's from the list of known DICOM nodes, enters the search criteria, and then clicks Search. "Begins with" searching is used, allowing partial search criteria to be entered.

A.3.1.2.3.2 PRESENTATION CONTEXT ACCEPTANCE

iQ-VIEW Software accepts the presentation context containing one of the supported query/retrieve service classes and one of the transfer syntaxes in the order of appearance within following table:

PRESENTATION CONTEXT ACCEPTANCE	
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2
Implicit VR Little Endian	1.2.840.10008.1.2

A.3.1.2.3.3 PROPOSED PRESENTATION CONTEXTS

iQ-VIEW Software proposes the query/retrieve service class as SCU as received from the source AE. The following service class is supported:

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
Study Root Query/Retrieve Information Model - MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCU	None

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
Study Root Query/Retrieve Information Model - FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU	None

Following transfer syntaxes are proposed with the service class:

TRANSFER SYNTAX	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2

A.3.1.2.3.4 SOP SPECIFIC CONFORMANCE STATEMENT FOR SOP QUERY CLASS

iQ-VIEW supports C-Find response values as defined in DICOM v.3.0 Part 4. All Required (R) and Unique (U) Study, Series, and Image level keys are supported for Study Root Query/Retrieve information models. In addition, certain Optional (O) keys are supported. For a Study Root Query/Retrieve the following keys are supported:

STUDY ROOT QUERY/RETRIEVE: SUPPORTED KEYS			
Data Level	Description	Tag	Type
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Study Accession Number	(0008,0050)	R
Study	Patient Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Instance UID	(0020,000D)	U
Study	Referring Physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Patient Date of Birth	(0010,0030)	O
Study	Modalities in Study	(0008,0061)	O
Series	Series Description	(0008,103E)	O
Series	Series Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Series Time	(0008,0031)	O
Series	Patient Position	(0018,5100)	O
Series	Body Part Examined	(0018,0015)	O

A.3.1.2.4 RETRIEVING A MODALITY WORKLIST FROM A REMOTE SYSTEM

A.3.1.2.4.1 ASSOCIATED REAL WORLD ACTIVITY

iQ-VIEW can query for a Modality Worklist to aid in merging patient demographics into DICOM images. This prevents the need to enter patient demographics manually.

A.3.1.2.4.2 PROPOSED PRESENTATION CONTEXT

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
Modality Worklist Information Model - Find	1.2.840.10008.5.1.4.31	SCU	None

A.3.1.2.4.3 SOP SPECIFIC CONFORMANCE STATEMENT FOR THE MODALITY WORKLIST MANAGEMENT CLASS

iQ-VIEW provides standard conformance; a list of supported keys is given in the table below:

MODALITY WORKLIST MANAGEMENT: SUPPORTED KEYS			
Module Description Tag Type	Description	Tag	Type
Scheduled Procedure Step	Schedule Procedure Step Sequence	(0040,0100)	R
	> Scheduled Procedure Step Start Date	(0040,0002)	R
	> Scheduled Station AE Title	(0040,0001)	R
	> Scheduled Procedure Step Start Time	(0040,0003)	R
	> Modality	(0008,0060)	R
Requested Procedure	Study Instance UID	(0020,000D)	O
Image Service Request	Accession Number	(0008,0050)	O
Patient Identification	Patient's Name	(0010,0010)	R
	Patient ID	(0010,0020)	R
Patient Demographics	Patient's Birth Date	(0010,0030)	O
	Patient's Sex	(0010,0040)	O

iQ-VIEW may fill none, one or multiple attributes in the query request with a non-empty value. iQ-VIEW may thus request matching on Optional Matching Key Attributes. The fields listed above may be included in the query request to ask the SCP to return them for each response. The user can decide for each individual attribute whether to include it in the request or not. iQ-VIEW expects the SCP to return values for all 'R' attributes whereas the attributes marked with 'O' may be optionally filled. iQ-VIEW treats these attributes as Type 3 Return Key Attributes.

A.3.1.2.5 PRINT ON A REMOTE LASER IMAGER

A.3.1.2.5.1 ASSOCIATED REAL WORLD ACTIVITY

The user selects the desired image(s) by clicking on the upper right-hand square of each image and then selects Print Manager from the file menu. He or she selects the appropriate printer, makes any necessary changes to the printer settings, and then clicks Print.

A.3.1.2.5.2 PROPOSED PRESENTATION CONTEXTS

ABSTRACT SYNTAX		ROLE	EXTENDED NEGOTIATION
Name	UID		
Basic Grayscale Print Management Meta	1.2.840.1000.8.5.1.1.9	SCU	None

Below (following page) are the mandatory print SOP classes supported by iQ-VIEW for the Basic Grayscale Management Meta class.

BASIC GRAYSCALE PRINT MANAGEMENT META CLASS	
SOP Class Name	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4
Printer	1.2.840.10008.5.1.1.16

A.3.1.2.5.2.1 CONFORMANCE FOR THE SOP CLASS BASIC FILM SESSION

iQ-VIEW includes the following N-Create attributes for the Basic Film Session SOP class:

BASIC FILM SESSION SOP CLASS N-CREATE: ATTRIBUTES	
Description	Tag
Number of Copies	(2000,0010)
Print Priority	(2000,0020)
Medium Type	(2000,0030)
Film Destination	(2000,0040)
Memory Allocation	(2000,0060)

A.3.1.2.5.2.2 CONFORMANCE FOR THE SOP CLASS BASIC FILM BOX

The table below lists the N-Create attributes for the Basic Film Box SOP class, where A means the attribute is always sent and C means the attribute is only sent when not empty.

BASIC FILM BOX SOP CLASS N-CREATE ATTRIBUTE		
Description	Tag	Usage
Print Priority	(2000,0020)	C
Image Display Format	(2010,0010)	C
Referenced Film Session Sequence	(2010,0500)	A
> Referenced SOP Class UID	(0008,1150)	A
> Referenced SOP Instance UID	(0008,1155)	A
Film Orientation	(2010,0040)	C
Film Size ID	(2010,0050)	C
Magnification Type	(2010,0060)	A
Maximum Density	(2010,0130)	C
Configuration Information	(2010,0150)	A
Smoothing Type	(2010,0080)	C
Border Density	(2010,0100)	C
Minimum Density	(2010,0120)	C

A.3.1.2.5.2.3 CONFORMANCE FOR THE SOP CLASS BASIC GRAYSCALE IMAGE BOX

The following attributes are included in iQ-VIEW's N-Set for the Basic Grayscale Image SOP class. A stands for attributes that are always sent to the printer while C stands for attributes that are only sent if they contain data.

BASIC GRAYSCALE IMAGE SOP CLASS N-SET ATTRIBUTE		
Description	Tag	Usage
Image Position	(2020,0010)	A
Preformatted Grayscale Image Sequence	(2020,0110)	C
> Samples Per Pixel	(0028,0002)	A
> Photometric Interpretation	(0028,0004)	A
> Rows	(0028,0010)	A
> Columns	(0028,0011)	A
> Pixel Aspect Ratio	(0028,0034)	A
> Bits Allocated	(0028,0100)	A

> Bits Stored	(0028,0101)	A
> High Bit	(0028,0102)	A
> Pixel Representation	(0028,0103)	A
> Pixel Data	(7FE0,0010)	A
Magnification Type	(2010,0060)	A
Smoothing Type	(2010,0080)	A
Polarity	(2020,0020)	A

iQ-VIEW only supports 8bit printing.

A.3.1.2.5.2.4 CONFORMANCE FOR THE SOP CLASS PRINTER

The iQ-VIEW software uses N-GET for the Printer SOP class to get information from the SCP.

A.3.1.2.6 iQ-VIEW DICOM MEDIA SERVER

iQ-VIEW conforms to DICOM Media Storage Service and File Format (PS 3.10) and the Media Storage Application Profiles (PS 3.11) for reading images on CD-Recordable media.

iQ-VIEW supports through its supported application profile the real world activities "Display Directory of CD-R Disk" and "Read Images from CD-R Disk".

A.3.1.2.6.1 REAL WORLD ACTIVITY: DISPLAY DIRECTORY OF CD-R DISC

iQ-VIEW assumes the role of FSR when reading the CD-R disk directory. Reading this directory will display an overview of the studies organized in the following way:

TYPE OF QUERY	
Type of Query	Levels
Study Root Query	Study

The following DICOMDIR keys are used for distinguishing between the objects.

DICOMDIR KEYS			
Query Type	Level	Field	Tag
Study Root	Study	Patient Name	(0010,0010)
Study Root	Study	Patient ID	(0010,0020)
Study Root	Study	Accession Number	(0008,0050)
Study Root	Study	Modality	(0008,0060)

Study Root	Study	Study Description	(0008,1030)
Study Root	Study	Study Date	(0008,0020)
Study Root	Study	Study Time	(0008,0030)
Study Root	Study	Study Instance UID	(0020,000D)

A.3.1.2.6.2 REAL WORLD ACTIVITY: READ IMAGES FROM CD-R DISC

When reading images from a CD-R iQ-VIEW Workstation will assume the role of a DICOM-FSR (File Set Reader).

In order to store the images contained on a CD-R correctly, iQ-VIEW requires the following mandatory DICOM image attributes (DICOM Part 10):

MANDATORY KEYS: DICOM PART 10 FILE IMPORT		
IOD	Field	Tag
Patient	Patient Name	(0010,0010)
<i>Patient</i>	<i>Patient ID</i>	<i>(0010,0020)</i>
<i>Study</i>	<i>Study ID</i>	<i>(0020,0010)</i>
<i>Study</i>	<i>Study Date</i>	<i>(0008,0020)</i>
<i>Study</i>	<i>Study Time</i>	<i>(0008,0030)</i>
Study	Study UID	(0020,000D)
Series	Series UID	(0008,000E)
<i>Series</i>	<i>Modality</i>	<i>(0008,0060)</i>
Series	Series Number	(0020,0011)
Image	Referenced SOP Class UID in File	(0004,1510)
Image	Referenced SOP Instance UID in File	(0004,1511)
Image	Referenced Transfer Syntax UID in File	(0004,1512)
Image	Referenced File ID	(0004,1500)
Image	Image Number	(0020,0013)

The fields in italic print are defined as mandatory in DICOM part 10. iQ-VIEW will invent an appropriate value if it is not present in the dataset.

iQ-VIEW can only import and display images from the following SOP classes:

SUPPORTED SOP CLASSES: DICOM PART 10 IMPORT	
Name	UID
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2

DX Image Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.1.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage (retired)	1.2.840.10008.5.1.4.1.1.6
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
US Multi-Frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
US Multi-Frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
MG Storage (Raw)	1.2.840.10008.5.1.4.1.1.1.2.1
NM Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
XA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
XA Biplane Image Storage(Retired)	1.2.840.10008.5.1.4.1.1.12.3
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Standard PET Image Storage	1.2.840.10008.5.1.4.1.1.128

A.3.1.2.6.3 IMAGE EXPORT FOR CD-R RECORDING

iQ-VIEW supports the General Purpose CD-R Image Interchange Profile as a File Set Creator. Multi-session writes are supported as well.

Images will be converted to Explicit VR, Little Endian transfer syntax, before writing to disc. A DICOM part 10 conformant DicomDIR file will be placed in the CD-R's root dir.

A.4 COMMUNICATION PROFILES

A.4.1 SUPPORTED COMMUNICATION STACKS

DICOM Part 8 is supported by iQ-VIEW through TCP/IP.

A.4.2 OSI STACK

The ISO communication stack is not supported.

A.4.3 TCP/IP STACK

The only supported network protocol is TCP/IP. Any physical media supporting TCP/IP may be used to connect to the iQ-VIEW software. iQ-VIEW uses the TCP/IP stack of the under-laying operating system.

A.4.4 POINT-TO-POINT STACK

This implementation supports the Point-to-Point protocol that emulates a TCP/IP stack.

A.5 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

A.5.1 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP

Not applicable

A.5.2 PRIVATE TRANSFER SYNTAXES

Not applicable

A.6 CONFIGURATION

A.6.1 AE TITLE / PRESENTATION ADDRESS MAPPING

The local AE title of the DICOM server (store SCP) can be changed in the server admin tool application. The AETs of the move SCU and query/retrieve SCU processes can be set in the “local settings” in the main application (iQ-VIEW.exe).

A.6.2 CONFIGURABLE PARAMETERS

Following parameters are configurable:

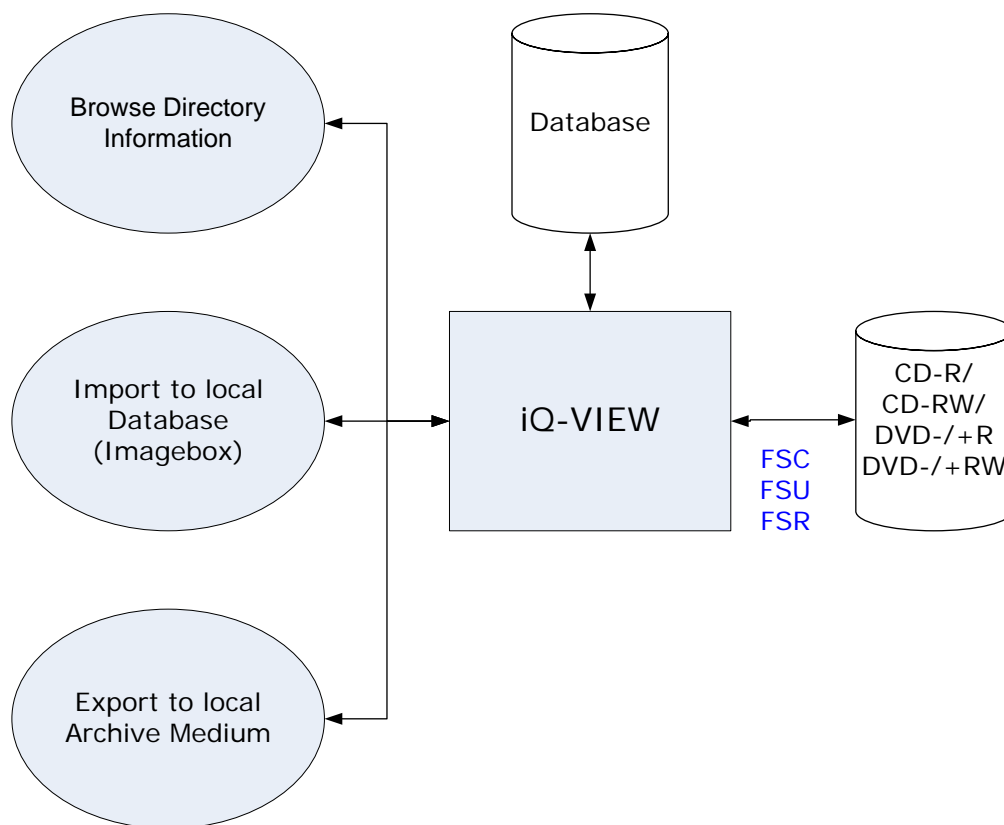
- IP port number
- List of application entity title(s), their presentation address and preferred transfer syntax

A.7 SUPPORT OF EXTENDED CHARACTER SETS

iQ-VIEW Software does not support multi-byte character sets.

B.1 DICOM CONFORMANCE STATEMENT MEDIA STORAGE IMPLEMENTATION MODEL

B.1.1 APPLICATION DATA FLOW DIAGRAM



Application flow diagram

iQ-VIEW will serve as an interface to the CD+R/RW/DVD+R/RW medium device. It serves as interface to include the off-line media directory into the browser and to copy SOP instances to a medium or retrieve SOP instances from medium into local storage.

iQ-VIEW supports 120mm CD-R and DVD-R.

The FSU role will update new SOP instances only to media with pre-existing File-sets conforming to the Application Profiles supported.

B.1.2 FUNCTIONAL DEFINITIONS

The iQ-VIEW application consists of the DICOM Archive application entity serving all interfaces to access off-line media. The DICOM Archive application is capable of:

- creating a new File-set onto an unwritten medium (CD+R/RW, DVD+R/RW)
- updating an existing File-set by writing new SOP instances onto the medium
- importing SOP instances from the medium onto local storage

- reading the File-set's DICOMDIR information into database temporarily and permanently and pass it to the display application

B.1.3 IMPLEMENTATION IDENTIFYING INFORMATION

The implementation class UID is 1.2.826.0.1.3680043.2.1208.0, the implementation version is "iQ-VIEW".

B.2 OFFLINE MEDIA AE SPECIFICATIONS

iQ-VIEW provides standard conformance to the Media Storage Service Class (Interchange Option).

APPLICATION PROFILES, ACTIVITIES AND ROLES FOR OFFLINE-MEDIA			
Application Profiles Supported	Real World Activity	Role	SC Option
STD-GEN-CD	Export to CD-+R/RW	FSC/FSU/FSR	Interchange
STD-GEN-DVD-RAM	Export to DVD-+R/RW	FSC/FSU/FSR	Interchange
STD-CTMR-CD	Import into local storage	FSR	Interchange
STD-XABC-CD	Import into local storage	FSR	Interchange
STD-XA1K-CD	Import into local storage	FSR	Interchange

B.2.1 FILE META INFORMATION FOR THE APPLICATION ENTITY

The Source Application Entity Title included in the File Meta Header is 'C-PACS'.

B.2.2 REAL-WORLD ACTIVITIES

B.2.2.1 ACTIVITY – EXPORT TO CD-R/RW / DVD-R/RW

iQ-VIEW acts as an FSC using the interchange option when requested to export SOP Instances from the local database to a CD-R medium.

A dialog will be presented providing control over the available media capacity. The user will be informed if the contents of the current selection do not fit on a single medium; automatic separation into multiple export jobs is not supported. The contents of the export job will be written together with a corresponding DICOMDIR to a single-session CD-R/RW/DVD-R/RW. Media will always be written in multi-session mode. An option for finalizing the disc is provided. If the media already contains a DICOMDIR and corresponding DICOM objects and is not already finalized, iQ-VIEW will act as an FSU and update the media content.

The user can cancel an export job in the job queue.

Supported SOP Classes and Transfer Syntaxes as FSC/FSU:

IODS, SOP CLASSES AND TRANSFER SYNTAXES FOR OFFLINE MEDIA			
IOD	SOP Class UID	Transfer Syntax ³	TS UID
Media Storage Directory Storage	1.2.840.10008.1.3.10	Explicit VR Little Endian	1.2.840.10008.1.2.1

³ **Note:** default TS is Explicit VR Little Endian but the user can configure iQ-View to allow other TS like Little Endian Implicit or Jpeg Lossless/Lossy TS which might lead to a non-conformant Application Profile

ComputedRadiographyl mageStorage	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
DigitalXRayImageStorage ForPresentation	1.2.840.10008.5.1.4.1.1.1.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
DigitalMammogr.XRayIm ageStorageForPresentati on	1.2.840.10008.5.1.4.1.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
DigitalIntraOralXRayImag eStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
CTImageStorage	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
RETIRED_UltrasoundMultifr amelmageStorage	1.2.840.10008.5.1.4.1.1.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
UltrasoundMultiframelma geStorage	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
MRImageStorage	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
RETIRED_NuclearMedicin elmageStorage	1.2.840.10008.5.1.4.1.1.5	Explicit VR Little Endian	1.2.840.10008.1.2.1
RETIRED_UltrasoundImag eStorage	1.2.840.10008.5.1.4.1.1.6	Explicit VR Little Endian	1.2.840.10008.1.2.1
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
SecondaryCaptureImag eStorage	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian	1.2.840.10008.1.2.1
Multifrm.SingleBitSecond aryCaptureImageStorag e	1.2.840.10008.5.1.4.1.1.7.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
Multifrm.GrayscaleByteSe c.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
Multifrm.GrayscaleWordS ec.CaptureImageStorag e	1.2.840.10008.5.1.4.1.1.7.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
Multifrm.TrueColorSec.Ca ptureImageStorage	1.2.840.10008.5.1.4.1.1.7.4	Explicit VR Little Endian	1.2.840.10008.1.2.1
XRayAngiographicImage Storage	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian	1.2.840.10008.1.2.1
XRayFluoroscopyImageSt orage	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian	1.2.840.10008.1.2.1
RETIRED_XRayAngiograph icBiPlanelmageStorage	1.2.840.10008.5.1.4.1.1.12.3	Explicit VR Little Endian	1.2.840.10008.1.2.1
NuclearMedicineImageSt orage	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian	1.2.840.10008.1.2.1
BasicTextSR	1.2.840.10008.5.1.4.1.1.88.11	Explicit VR Little Endian	1.2.840.10008.1.2.1

EnhancedSR	1.2.840.10008.5.1.4.1.1.88.22	Explicit VR Little Endian	1.2.840.10008.1.2.1
ComprehensiveSR	1.2.840.10008.5.1.4.1.1.88.33	Explicit VR Little Endian	1.2.840.10008.1.2.1
PETImageStorage	1.2.840.10008.5.1.4.1.1.128	Explicit VR Little Endian	1.2.840.10008.1.2.1
(GrayscaleSoftcopyPresentationState)*	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Little Endian	1.2.840.10008.1.2.1

* Presentation States of the SOP Class Grayscale Softcopy Presentation State Storage will only be written onto CD-R/RW / DVD-R/RW media if the presentation states were created by iQ-VIEW itself. Other GSPS objects will not be transferred to media.

B.2.2.2 REAL WORLD ACTIVITY: DISPLAY DIRECTORY OF CD-R DISC

iQ-VIEW assumes the role of FSR when reading the CD-R/DVD-R disk directory. Reading this directory will display an overview of the studies organized in the following way:

TYPE OF QUERY	
Type of Query	Levels
Study Root Query	Study, Series, Image

The following DICOMDIR keys are used to distinguish between the objects:

DICOMDIR KEYS			
Query Type	Level	Field	Tag
Study Root	Study	Patient Name	(0010,0010)
Study Root	Study	Patient ID	(0010,0020)
Study Root	Study	Accession Number	(0008,0050)
Study Root	Study	Modalities in Study	(0008,0061)
Study Root	Study	Study Description	(0008,1030)
Study Root	Study	Study Date	(0008,0020)
Study Root	Study	Study Time	(0008,0030)
Study Root	Study	Study Instance UID	(0020,000D)
Study Root	Series	Series Number	(0020,0011)
Study Root	Series	Series Description	(0008,103E)
Study Root	Series	Body Part	(0018,0015)
Study Root	Series	Patient Position	(0018,5100)
Study Root	Series	Modality	(0008,0060)
Study Root	Series	Series Date	(0008,0021)
Study Root	Series	Series Time	(0008,0031)

Study Root	Series	Protocol Name	(0018,1030)
Study Root	Series	Series Instance UID	(0020,000E)
Study Root	Image	Instance Number	(0020,0013)
Study Root	Image	Image Type	(0008,0008)
Study Root	Image	Slice Location	(0020,1041)
Study Root	Image	Number of Frames	(0028,0008)
Study Root	Image	SOP Instance UID	(0008,0018)

B.2.2.3 REAL WORLD ACTIVITY: READ IMAGES FROM CD-R DISC

When reading images from a CD/DVD iQ-VIEW Workstation will assume the role of a DICOM-FSR (File Set Reader).

In order to store the images contained on a CD-R correctly, iQ-VIEW requires the following mandatory DICOM image attributes (DICOM Part 10) in the DICOMDIR:

MANDATORY KEYS: DICOM PART 10 FILE IMPORT		
IOD	Field	Tag
Patient	Patient Name	(0010,0010)
<i>Patient</i>	<i>Patient ID</i>	<i>(0010,0020)</i>
<i>Study</i>	<i>Study ID</i>	<i>(0020,0010)</i>
<i>Study</i>	<i>Study Date</i>	<i>(0008,0020)</i>
<i>Study</i>	<i>Study Time</i>	<i>(0008,0030)</i>
Study	Study UID	(0020,000D)
Series	Series UID	(0008,000E)
<i>Series</i>	<i>Modality</i>	<i>(0008,0060)</i>
Series	Series Number	(0020,0011)
Image	Referenced SOP Class UID in File	(0004,1510)
Image	Referenced SOP Instance UID in File	(0004,1511)
Image	Referenced Transfer Syntax UID in File	(0004,1512)
Image	Referenced File ID	(0004,1500)
Image	Image Number	(0020,0013)

The fields in italic print are defined as mandatory in DICOM part 10. Nevertheless, iQ-VIEW will not necessarily reject the DICOMDIR as invalid if these attributes are missing.

iQ-VIEW acts as FSR using the interchange option when requested to read SOP Instances from the medium into the local storage.

The SOP Instance selected from the media directory will be copied into the local storage. Only SOP Instances that are supported by the Storage SCP can be retrieved from media storage. This is due to the fact that the Browse Directory Information will filter all SOP Instances not matching the Application profiles supported.

During operation no "Attribute Value Precedence" is applied to the SOP Instances. Detached Patient Management is not supported.

iQ-VIEW can only import and display images from the following SOP classes:

Supported SOP Classes and Transfer Syntaxes as FSR

IODS AND SOP CLASSES FOR OFFLINE MEDIA	
IOD	SOP Class UID
Media Storage Directory Storage	1.2.840.10008.1.3.10
ComputedRadiographyImageStorage	1.2.840.10008.5.1.4.1.1.1
DigitalXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.1
DigitalMammogr.XRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.2
DigitalIntraOralXRayImageStorageForPresentation	1.2.840.10008.5.1.4.1.1.1.3
CTImageStorage	1.2.840.10008.5.1.4.1.1.2
RETIRED_UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3
UltrasoundMultiframeImageStorage	1.2.840.10008.5.1.4.1.1.3.1
MRImageStorage	1.2.840.10008.5.1.4.1.1.4
RETIRED_NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.5
RETIRED_UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6
UltrasoundImageStorage	1.2.840.10008.5.1.4.1.1.6.1
SecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7
Multifrm.SingleBitSecondaryCaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.1
Multifrm.GrayscaleByteSec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.2
Multifrm.GrayscaleWordSec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.3
Multifrm.TrueColorSec.CaptureImageStorage	1.2.840.10008.5.1.4.1.1.7.4
XRayAngiographicImageStorage	1.2.840.10008.5.1.4.1.1.12.1
XRayFluoroscopyImageStorage	1.2.840.10008.5.1.4.1.1.12.2
RETIRED_XRayAngiographicBiPlaneImageStorage	1.2.840.10008.5.1.4.1.1.12.3
NuclearMedicineImageStorage	1.2.840.10008.5.1.4.1.1.20
BasicTextSR	1.2.840.10008.5.1.4.1.1.88.11
EnhancedSR	1.2.840.10008.5.1.4.1.1.88.22
ComprehensiveSR	1.2.840.10008.5.1.4.1.1.88.33
PETImageStorage	1.2.840.10008.5.1.4.1.1.128

The following Transfer Syntaxes are supported for import of images from Offline Media into local DB:

TRANSFER SYNTAX	
Name List	UID List
Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2
Explicite VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1
Explicite VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2
Default JPEG lossless compressed	1.2.840.10008.1.2.4.70
JPEG lossy Process 1 (8bit)	1.2.840.10008.1.2.4.50
JPEG lossy Process 2&4 (12bit)	1.2.840.10008.1.2.4.51
RLE Compression Transfer Syntax	1.2.840.10008.1.2.5
JPEG 2000 Lossless Transfer Syntax	1.2.840.10008.1.2.4.90
JPEG 2000 Lossy Transfer Syntax	1.2.840.10008.1.2.4.91

B.3 AUGMENTED AND PRIVATE PROFILES

iQ-VIEW does not support any augmented for private application profiles.

B.4 MEDIA CONFIGURATION

iQ-VIEW can be configured to strictly conform to the Application Profiles STD-GEN-CD and STD-GEN-DVD-RAM (default). In order to do so, the option "AlwaysExportLittleEndianExplicit" must be set to 1 in the configuration file iQ-VIEW.ini.

It is also recommended to set up the storage SCP IQSERVER to write all received datasets with LittleEndianExplicit TS (default). See administration guide for further information.

B.4.1 SUPPORT OF CHARACTER SETS

iQ-VIEW supports ISO_IR 100 (ISO 8859-1:1987 Latin Alphabet No. 1 supplementary set) only.

B.5 SECURITY

iQ-VIEW does not support any specific security measures.

It is assumed that iQ-VIEW is used within a secured environment. It is also assumed that a secured environment includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to iQ-VIEW.
- Firewall or router protections to ensure that iQ-VIEW only has network access to approved external hosts and services.
- Any communication with external hosts and services outside the locally secured environment use appropriate secure network channels (e.g. such as a Virtual Private Network (VPN))
- A regularly updated virus scanner is active

Other network security procedures such as automated intrusion detection may be appropriate in some environments. Additional security features may be established by the local security policy and are beyond the scope of this conformance statement.

C.1 ANNEX

C.1.1 IOD CONTENTS

C.1.1.1 CREATED SOP CLASSES

C.1.1.1.1 SECONDARY CAPTURE IMAGES

iQ-VIEW is able to produce Secondary Capture Images with the following fields:

ATTRIBUTE	TAG	VR	CONTENT
Identifying Group			
0008,0005	SpecificCharacterSet	CS	ISO_IR 100
0008,0008	ImageType	CS	ORIGINAL\PRIMARY\OTHER
0008,0012	InstanceCreationDate	DA	
0008,0013	InstanceCreationTime	TM	
0008,0016	SOPClassUID	UI	
0008,0018	SOPInstanceUID	UI	
0008,0020	StudyDate	DA	
0008,0021	SeriesDate	DA	
0008,0030	StudyTime	TM	
0008,0031	SeriesTime	TM	
0008,0032	AcquisitionTime	TM	
0008,0033	ContentTime	TM	
0008,0050	AccessionNumber	SH	
0008,0060	Modality	CS	
0008,0064	ConversionType	CD	WSD
0008,0070	Manufacturer	LO	IIS
0008,0080	InstitutionName	LO	
0008,0090	ReferringPhysiciansName	PN	
0008,1030	StudyDescription	LO	
0008,103E	SeriesDescription	LO	
0008,1050	PerformingPhysiciansName	PN	
0008,1070	OperatorsName	PN	
Patient Module			
0010,0010	PatientsName	PN	
0010,0020	PatientID	LO	
0010,0030	PatientsBirthDate	DA	

0010,0040	PatientsSex	CS	
Acquisition Group			
0018,0015	BodyPartExamined	CS	
Patient Group			
0020,000D	StudyInstanceUID	UI	
0020,000E	SeriesInstanceUID	UI	
0020,0010	StudyID	SH	1
0020,0011	SeriesNumber	IS	
0020,0013	InstanceNumber	IS	
0020,0020	PatientOrientation	CS	
Image Presentation Group			
0028,0002	SamplesPerPixel	US	
0028,0004	PhotometricInterpretation	CS	
0028,0006	PlanarConfiguration	US	
0028,0008	NumberOfFrames	IS	
0028,0010	Rows	US	
0028,0011	Columns	US	
0028,0100	BitsAllocated	US	
0028,0101	BitsStored	US	
0028,0102	HighBit	US	
0028,0103	PixelRepresentation	US	1
0028,1050	WindowCenter	DS	
0028,1051	WindowWidth	DS	
0028,1052	RescaleIntercept	DS	0
0028,1053	RescaleSlope	DS	
Pixel Data Group			
7FE0,0010	PixelData	OB/OW	

C.1.1.1.2 DICOMDIR

iQ-VIEW produces DICOMDIR files (1.2.840.10008.1.3.10) with the following fields:

ATTRIBUTE	TAG	VR	CONTENT
Patient Level			
0008,0005	SpecificCharacterSet	CS	
0010,0010	PatientsName	PN	

0010,0020	PatientID	LO	
0010,0030	PatientsBirthDate	DA	
0010,0040	PatientsSex	CS	
Study Level			
0008,0005	SpecificCharacterSet	CS	
0008,0020	StudyDate	DA	
0008,0030	StudyTime	TM	
0008,0050	AccessionNumber	SH	
0008,0090	ReferringPhysiciansName	PN	
0008,1030	StudyDescription	LO	
0020,000D	StudyInstanceUID	UI	
0020,0010	StudyID	SH	
Series Level			
0008,0005	SpecificCharacterSet	CS	
0008,0060	Modality	CS	
0008,103E	SeriesDescription	LO	
0020,000E	SeriesInstanceUID	UI	
0020,0011	SeriesNumber	IS	
Image Level			
0004,1500	ReferencedFileID	CS	
0004,1510	ReferencedSOPClassUIDInFile	UI	
0004,1511	ReferencedSOPInstanceUIDInFile	UI	
0004,1512	ReferencedTransferSyntaxUIDInFile	UI	
0008,0005	SpecificCharacterSet	CS	
0008,0008	ImageType	CS	
0020,0013	InstanceNumber	IS	

C.1.1.2 USED FIELDS IN RECEIVED IODS

iQ-VIEW saves IODs as they are transferred. No translation is performed, as the internal format is DICOM.

C.1.1.3 ATTRIBUTE MAPPING

The relationship between attributes, received via DICOM Modality Worklist stored in acquired images, is the same as stated in DICOM part 4, Annex M.6.

C.1.1.4 DATA DICTIONARY OF PRIVATE ATTRIBUTES

iQ-VIEW does not write nor interpret so called private attributes.

C.1.2 CODED TERMINOLOGY AND TEMPLATES

Not supported.

C.1.3 GRAYSCALE IMAGE CONSISTENCY

Not supported.

C.1.4 EXTENSIONS / SPECIALIZATIONS / PRIVATIZATIONS

Not supported.

C.1.5 PRIVATE TRANSFER SYNTAX

Not supported.

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