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DICOM Conformance Statement

EasyViz 8.3 - RIS

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Table of Contents

Document History

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Conformance Statement Overview

The EasyViz RIS implements a Radiology Information System (RIS). The EasyViz RIS implements the necessary DICOM services to receive and process modality worklist queries from remote DICOM Application Entities.

The DICOM Networking Services supported by EasyViz RIS are listed in Table 1. EasyViz RIS does not support any DICOM Media Interchange Services.

Networking SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Workflow Management		
Modality Worklist Information Model – FIND	No	Yes
Modality Performed Procedure Step SOP Class	No	Yes
Connectivity Verification		
Verification	No	Yes

Table 1: Network Services supported by EasyViz RIS.

Introduction

Audience

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

Remarks

DICOM, by itself, does not guarantee interoperability. However, the Conformance Statement facilitates a first-level validation for interoperability between different applications supporting the same DICOM functionality.

This Conformance Statement is not intended to replace validation with other DICOM equipment to ensure proper exchange of information intended.

The scope of this Conformance Statement is to facilitate communication with Vital Images A/S and other vendors' medical equipment. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [1]. However, by itself it is not guaranteed to ensure the desired interoperability and a successful interconnectivity.

The user should be aware of the following important issues:

- The comparison of different conformance statements is the first step towards assessing interconnectivity between Vital Images A/S and non-Vital Images A/S equipment.
- Test procedures should be defined to validate the desired level of connectivity.
- The DICOM Standard will evolve to meet the users' future requirements. Vital Images A/S is actively involved in developing the standard further and therefore reserves the right to make changes to its products or to discontinue its delivery.

Terms and Abbreviations

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard. A list of abbreviations and terms can be seen in Table 2.

Term	Description
AE	DICOM Application Entity.
AET	Application Entity Title.
DICOM	Digital Imaging and Communications in Medicine.
MWL	Modality Worklist.
PPS	Performed Procedure Step.
SCP	DICOM Service Class Provider (DICOM Server).
SCU	DICOM Service Class User (DICOM Client).
SOP	DICOM Service-Object Pair.
SPS	Scheduled Procedure Step.

Table 2: Terms and abbreviations.

Networking

Implementation Model

The EasyViz RIS DICOM Services are implemented in a single daemon process launched at system startup.

Application Data Flow

Application data flow diagram for the EasyViz RIS can be seen on Figure 1 .
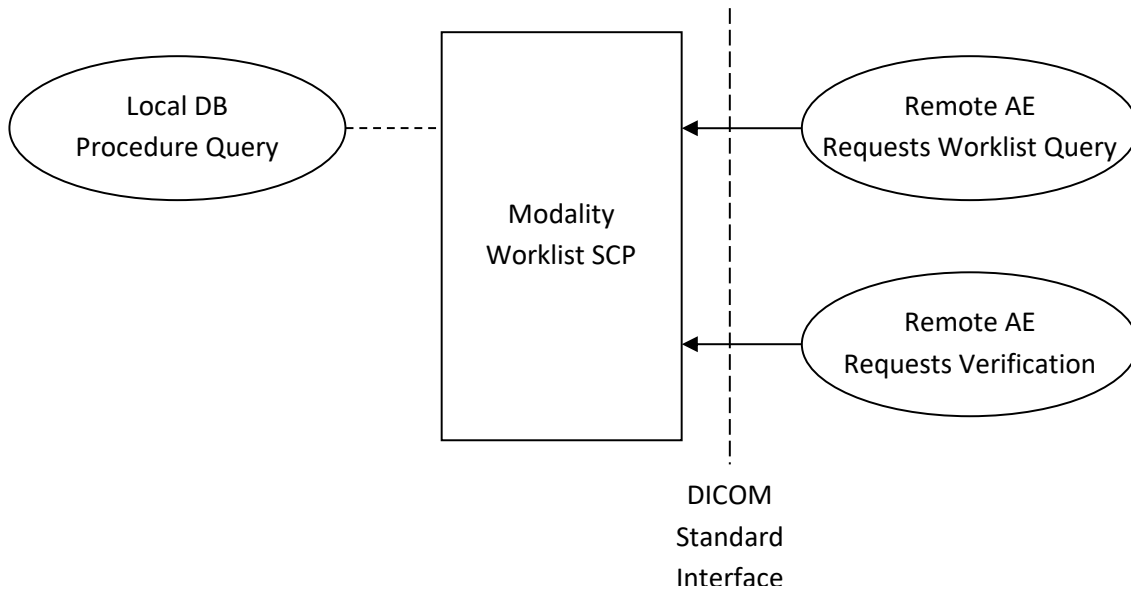
Figure 1: Application Data Flow Diagram.

Functional Definitions of AE's

Functional Definition: Modality Worklist SCP

The Modality Worklist SCP Application Entity provides DICOM Services to receive and process modality worklist queries from remote DICOM Application Entities.
Moreover, the Modality Worklist SCP provides DICOM Verification Services for connectivity verification.
The Modality Worklist SCP Application Entity Provides DICOM Services to:
- Receive and process DICOM Modality Worklist queries using the DICOM Modality Worklist SOP (Acting as SCP).
- Verify the connection to DICOM peer Application Entities using the DICOM Verification SOP (Acting as SCP).

Sequencing of Real World Activities

The sequencing constraints for the EasyViz RIS Application Entities can be seen on Figure 2.

Figure 2: Modality Worklist SCP Sequencing Constraints.

Request Modality Worklist

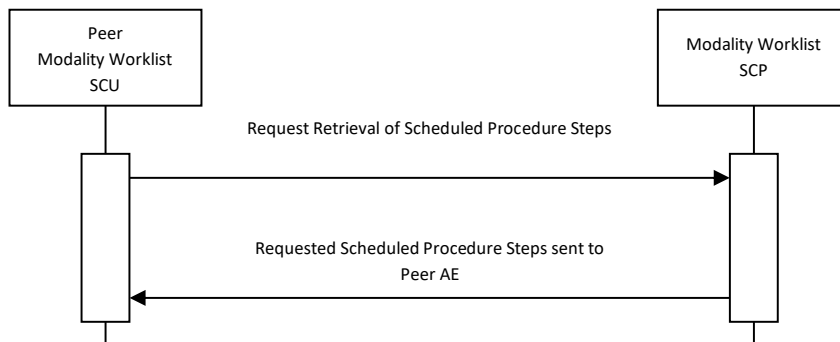1. A peer Modality Worklist SCU queries the EasyViz RIS Modality Worklist SCP for Scheduled Procedure Steps.
2. The Modality Worklist SCP returns the requested Scheduled Procedure Steps.

AE Specifications

AE Specification: Modality Worklist SCP

SOP Classes

The Modality Worklist SCP provides Standard Conformance to the SOP Classes listed in Table 3.

SOP Class Name	SOP Class UID	SCU	SCP
Workflow Management			
Modality Worklist Information – FIND	1.2.840.10008.5.1.4.31	No	Yes
Connectivity Verification			
Verification SOP Class	1.2.840.10008.1.1	No	Yes

Table 3: Modality Worklist SCP: Supported SOP Classes.

Association Policies

General

The Modality Worklist SCP will accept Association Requests for DICOM Workflow Management Services. The DICOM standard application context name for DICOM 3.0 is always accepted, see Table 4.

Application Context Name	1.2.840.10008.3.1.1.1

Table 4: Modality Worklist SCP: DICOM Application Context.

Number of Associations

The Modality Worklist SCP does not support multiple simultaneous associations, see Table 5.

Maximum number of simultaneous associations	1 – Not configurable.

Table 5: Modality Worklist SCP: Number of simultaneous associations.

Asynchronous Nature

The Modality Worklist SCP does not support asynchronous communication. Multiple outstanding transactions are not supported, see Table 6.

Maximum number of outstanding asynchronous transactions	1 – Not configurable.

Table 6: Modality Worklist SCP: Asynchronous nature.

Implementation Identifying Information

The identifying information for the Modality Worklist SCP can be seen in Table 7.

Implementation Class UID	1.3.6.1.4.1.16978.0.3.5.4.31
Implementation Version Name	EV-3.5.4-31

Table 7: Modality Worklist SCP: DICOM Implementation Class and Version.

Association Initiation Policy

The Modality Worklist SCP does not initiate associations.

Association Acceptance Policy

Activity: Modality Worklist Query

Description and Sequencing of Activities

A remote DICOM Application Entity acting as a Modality Worklist SCU may establish an association with the Modality Worklist SCP. The Modality Worklist SCP will accept these associations for the purpose of returning matched scheduled procedure step.

Accepted Presentation Contexts

The Modality Worklist SCP accepts the Application Presentation Contexts listed in Table 8 for the Modality Worklist Query activity.

Abstract Syntax		Transfer Syntax		Role	Ext. Neg
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

Table 8: Modality Worklist SCP, Modality Worklist Query: Accepted Presentation Contexts.

SOP Specific Conformance for the Modality Worklist SOP Class

The Modality Worklist SCP does not support matching on any of the optional matching keys attributes – only matching on required matching key attributes are supported.
The Modality Worklist SCP supports case-insensitive matching on the Person Name VR elements listed in Table 9.

Description/Module	Tag
Scheduled Procedure Step	
Scheduled Performing Physician's Name	(0040, 0006)
Patient Identification	
Patient Name	(0010, 0010)

Table 9: Modality Worklist SCP: Patient Name VR Elements with Case-Insensitive Matching.

The Modality Worklist SCP support the return key attributes listed in Table 10. The list contains all supported return key attributes regarding of type. The Modality Worklist SCP does not support templates for the Protocol Context Sequence.

Description/Module	Tag	Remark
SOP Common		
Specific Character Set	(0008, 0005)	
Scheduled Procedure Step		
> Scheduled Station AE Title	(0040, 0001)	
> Scheduled Procedure Step Start Date	(0040, 0002)	
> Scheduled Procedure Step Start Time	(0040, 0003)	
> Modality	(0008, 0060)	
> Scheduled Performing Physician's Name	(0040, 0006)	Type 2 return key attribute. Always empty.
> Scheduled Procedure Step Description	(0040, 0007)	

Description/Module	Tag	Remark
> Scheduled Protocol Code Sequence	(0040, 0008)	
>> Code Value	(0008, 0100)	
>> Coding Scheme Designator	(0008, 0102)	
>> Code Meaning	(0008, 0104)	Optional return key attribute.
> Scheduled Procedure Step ID	(0040, 0009)	
Requested Procedure		
Requested Procedure ID	(0040, 1001)	
Requested Procedure Description	(0032, 1060)	
Requested Procedure Code Sequence	(0032, 1064)	
> Code Value	(0008, 0100)	
> Coding Scheme Designator	(0008, 0102)	
> Code Meaning	(0008, 0104)	Optional return key attribute.
Study Instance UID	(0020, 000D)	
Referenced Study Sequence	(0008, 1110)	Type 2 return key attribute. Always empty.
> Referenced SOP Class UID	(0008, 1150)	
> Referenced SOP Instance UID	(0008, 1155)	
Requested Procedure Priority	(0040, 1003)	
Patient Transport Arrangements	(0040, 1004)	Type 2 return key attribute. Always empty.
Imaging Service Request		
Accession Number	(0008, 0050)	
Requesting Physician	(0032, 1032)	
Referring Physician's Name	(0008, 0090)	Type 2 return key attribute. Always empty.
Visit Identification		
Admission ID	(0038, 0010)	Type 2 return key attribute. Always empty.
Visit Status		
Current Patient Location	(0038, 0300)	Type 2 return key attribute. Always empty.
Visit Relationship		
Referenced Patient Sequence	(0008, 1120)	Type 2 return key attribute. Always empty.
> Referenced SOP Class UID	(0008, 1150)	
> Referenced SOP Instance UID	(0008, 1155)	
Patient Identification		
Patient's Name	(0010, 0010)	
Patient ID	(0010, 0020)	
Patient Demographic		
Patients Birth Date	(0010, 0030)	
Patient's Sex	(0010, 0040)	

Description/Module	Tag	Remark
Patient's Weight	(0010, 1030)	Type 2 return key attribute. Always empty.
Confidentiality Constraint on Patient Data	(0040, 3001)	Type 2 return key attribute. Always empty.
Patient Medical		
Patient State	(0038, 0500)	Type 2 return key attribute. Always empty.
Pregnancy Status	(0010, 21C0)	Type 2 return key attribute. Always empty.
Medical Alerts	(0010, 2000)	
Contrast Allergies	(0010, 2110)	Type 2 return key attribute. Always empty. OBS: Contrast allergies are specified in Medical Alerts.
Special Needs	(0038, 0050)	Type 2 return key attribute. Always empty.

Table 10: Modality Worklist SCP. Support Return Key Attributes.

Activity: Verification

Description and Sequencing of Activities

A remote DICOM Application Entity acting as a Verification SCU may establish an association with the Modality Worklist SCP. The Modality Worklist SCP will accept these associations for the purpose of verifying the network connection.

Accepted Presentation Contexts

The Modality Worklist SCP accepts the Application Presentation Contexts listed in Table 11 for the Verification activity.

Abstract Syntax		Transfer Syntax		Role	Ext. Neg
Name	**UID**	**Name List**	**UID List**		
Verification SOP Class	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	None

Table 11: Modality Worklist SCP, Verification: Accepted Presentation Contexts.

Network Interfaces

Physical Network Interface

The EasyViz RIS Application Entities are indifferent to the physical medium over which TCP/IP is executed. This is entirely dependent on the underlying operating system and hardware.

Additional Protocols

When hostnames rather than IP addresses are used to specify presentation addresses for remote Application Entities, the EasyViz RIS Application Entities depends on the name resolution mechanism of the underlying operating system for proper operation.

Configuration

AE Title/Presentation Address Mapping

Local AE Titles

The default Application Entity title and port number of the EasyViz RIS Application Entities are listed in Table 12.

Application Entity	Default AE Title	Default Port Number
Modality Worklist SCP	WL _SCP	30210

Table 12: Local AE Titles.

Remote AE Title/Presentation Address Mapping

Remote AE/Presentation Address Mapping

It is not possible to restrict access to the Modality Worklist SCP based on calling AET, it is therefore not required to setup remote AE for the Modality Worklist SCP.

Parameters

The configurable parameters of EasyViz RIS are listed in Table 13.

Parameter	Configurable	Default Value
General Parameters		
PDU Size	No	32Kb
Time-out waiting for acceptance or rejection Response of an Association Open Request (Application level timeout)	No	None
General DIMSE level time-out values	No	None
Time-out waiting for response to TCP/IP connect request (Low-level timeout)	Yes	180s [OS Specific]
Time-out waiting for acceptance of a TCP/IP message over the network (Low-level timeout)	Yes	180s [OS Specific]
Time-out waiting for data between TCP/IP packets (Low-level timeout)	Yes	Adaptive 0.2-120s [OS Specific]
Any changes to default TCP/IP setting such as configurable stack parameters	No	None
AE Specific Parameters		
Size constraint in maximum object size	No	None
Maximum PDU Size that the AE can receive	No	32Kb
Maximum PDU Size that the AE can send	No	32Kb

AE specific DIMSE level time-out values	No	None	13
SOP Class Support	No	All supported SOP Classes always proposed and accepted	
Transfer Syntax Support	No	All supported Transfer Syntaxes always proposed and accepted	

Table 13: Configurable Parameters.

Media Interchange

EasyViz RIS does not support any DICOM Media Interchange Services.

Support of Character Sets

Overview

EasyViz RIS supports the default character repertoire. Support extends to correctly decoding and displaying the correct symbol for all names and strings received over the network or found in the local database.
No specific support for sorting of strings other than in the default character set is provided by the EasyViz RIS.

Character Sets

EasyViz supports the extended character sets listed in Table 14.

Defined Term	Character Set Description
ISO_IR 100	Latin alphabet No. 1

Table 14: Supported specific character set defined terms.

Character Set Configuration

Whether or not characters are displayed correctly depends on the presence of font support in the underlying operating system.
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.

Security

Security Profiles

The EasyViz RIS does not support any DICOM security profiles.

Association Level Security

The EasyViz RIS Modality Worklist SCP accepts all association requests, i.e. it is not possible to restrict associations based on Calling AET. The Modality Worklist SCP only verifies that it has been called with the correct AET.

Application Level Security

The EasyViz RIS applications can be configured to use the either MIT Kerberos or the internal database for user authentication. It is not possible to configure the EasyViz RIS not to require user authentication. By default, the internal database is used.

When using MIT Kerberos for user authentication, it is possible to integrate the EasyViz RIS with Microsoft Active Directory. This allows Microsoft Windows users to use their regular username and password to access the EasyViz RIS.

Annexes

IOD Contents

Created SOP Instance(s)

EasyViz RIS does not create SOP instances.

Usage of Attributes of Received IOD's

The local database and remote query make use of 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 patient by the EasyViz RIS.

Attribute Mapping

Not applicable.

Coerced/Modified Fields

EasyViz RIS does not perform any coercion.

Data Dictionary of Private Attributes

EasyViz RIS does not define any private attributes.

Coded Terminology and Templates

The value for Coded Meaning will be displayed for all coded values. The EasyViz RIS does not provide a local lexicon to lookup alternative code meanings.

Grayscale Image Consistency

Not applicable.

Standard Extended/Specialized/Private SOP Classes

EasyViz RIS does not use Standard Extended/Specialized/Private SOP classes.

Private Transfer Syntaxes

EasyViz RIS does not use private transfer syntaxes.

References

[1] National Electrical Manufacturers Association (NEMA), Digital Imaging and Communications in Medicine (DICOM), NEMA PS3.1-3.21, 2021d, 1300N 17th Street, Rosslyn, Virginia 22209.