

DICOM Conformance Statement

CRystalView QC Workstation

CR Acquisition, Storage, Print and
Modality Worklist Management

1. CONFORMANCE STATEMENT OVERVIEW

The CRystalView QC Workstation implements the DICOM services necessary to download work lists from an information system, save acquired CR images and associated Presentation States to a network storage device or CD-R, print to a networked hardcopy device and inform the information system about the work done.

Table 1.1 provides an overview of the network services supported by the CRystalView QC Workstation.

Table 1.1
NETWORK SERVICES

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
CR Image Storage	Yes	No
Grayscale Softcopy Presentation State	Yes	No
Workflow Management		
Modality Worklist	Yes	No
Storage Commitment Push Model	Yes	No
Modality Performed Procedure Step	Yes	
Print Management		
Basic Grayscale Print Management	Yes	No
Presentation LUT	Yes	No

Table 1.2 provides an overview of the Media Storage Application Profiles supported by CRystalView CR Workstation.

Table 1.2
MEDIA SERVICES

Media Storage Application Profile	Write Files (FSC or FSU)	Read Files (FSR)
Compact Disk - Recordable		
General Purpose CD-R	Yes	Yes

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3. INTRODUCTION

3.1. REVISION HISTORY

Revision	Date	Author	Reason for Change
1.0	May 16, 2006	K. Minser	Initial release
2.0	August 22, 2006	K. Minser	Updated Image Pixel IOD, Storage Commitment operation

3.2. AUDIENCE

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

3.3. 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 the CRystalView QC Workstation. The Conformance Statement should be read and understood in conjunction with the DICOM Standard [DICOM]. 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 the CRystalView QC Workstation and other vendors' equipment.
- Test procedures should be defined to validate the desired level of connectivity.

3.4. DEFINITION, TERMS AND ABBREVIATIONS

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

Abbreviations and terms are as follows:

AE DICOM Application Entity
AET Application Entity Title

CD-R Compact Disk Record able
FSC File-Set Creator
FSU File-Set Updater
FSR File-Set Reader
GSDF Grayscale Standard Display Function
GSPS Grayscale Softcopy Presentation State
IE Information entity
IOD (DICOM) Information Object Definition
ISO International Standard Organization
MPPS Modality Performed Procedure Step
MSPS Modality Scheduled Procedure Step
SCU DICOM Service Class User (DICOM client)
SCP DICOM Service Class Provider (DICOM server)
SOP DICOM Service-Object Pair

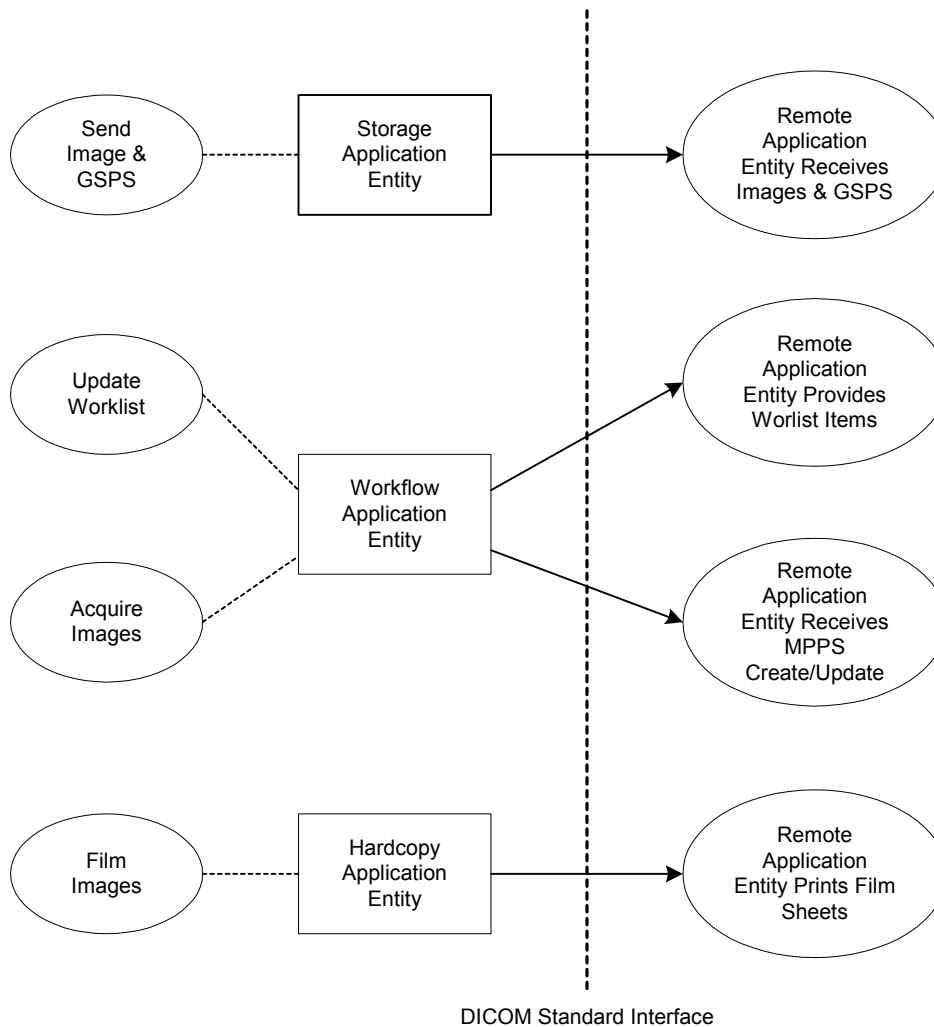
3.5. REFERENCES

[DICOM]Digital Imaging and Communications in Medicine (DICOM), NEMA PS 3.1-3.16, 2001

4. NETWORKING

4.1. IMPLEMENTATION MODEL

4.1.1. Application Data Flow Diagram



4.1.2. Functional Definitions of Application Entities

4.1.2.1. Functional Definition of Storage AE

The CRystalView QC Workstation Storage AE sends images and Presentation States to a remote AE (Archive Device). It is associated with the local real-world activity "Send Images". "Send Images" is performed upon user request for each study completed or for specific studies selected. If the remote AE is configured as an archive device the Storage

AE will request Storage Commitment and if a commitment is successfully obtained will record this information in the local database.

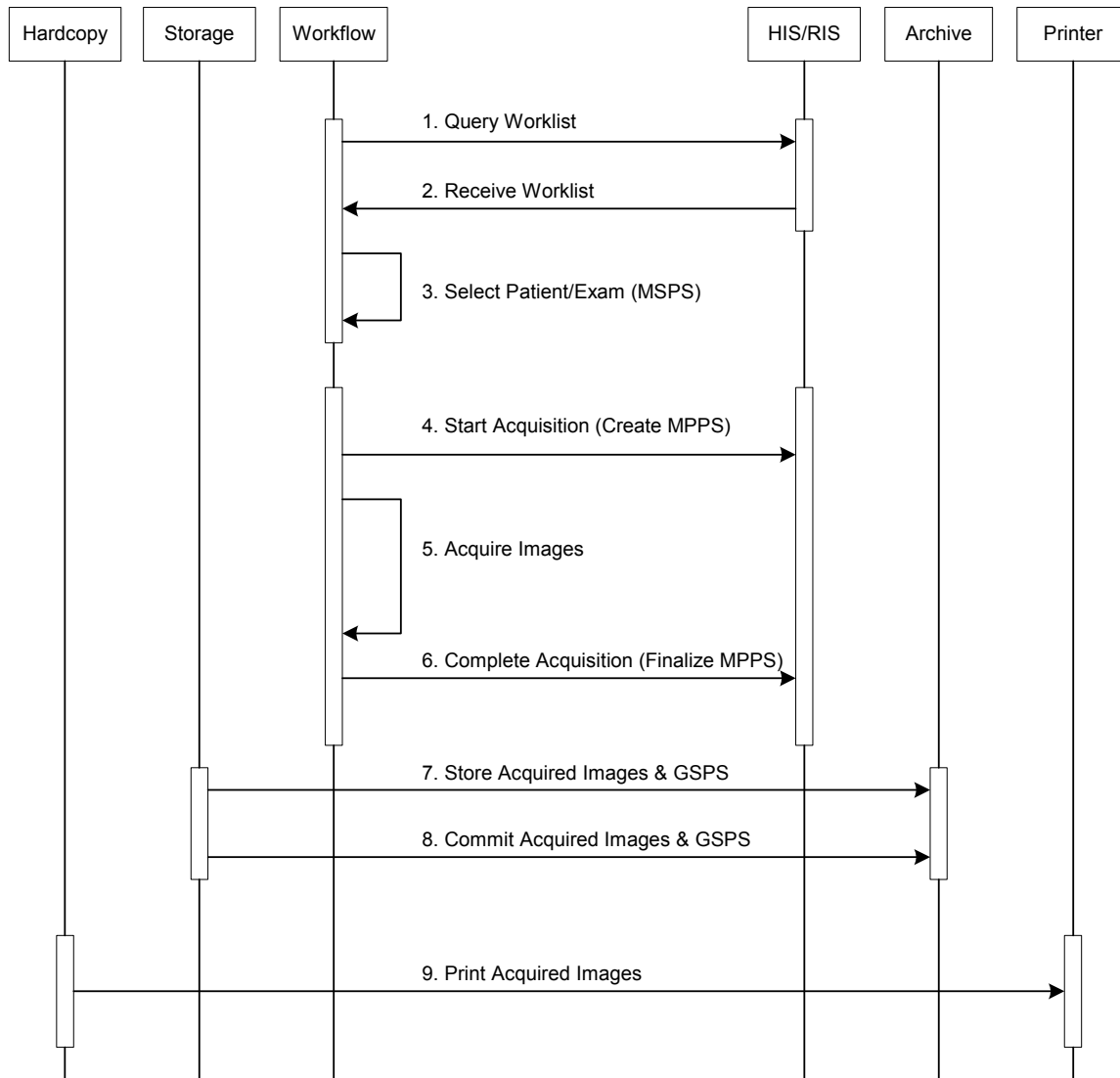
4.1.2.2. Functional Definition of Workflow AE

The CRystalView QC Workstation Workflow AE receives Worklist information from and sends MPPS information to a remote AE (HIS/RIS). It is associated with the local real-world activities “Update Worklist” and “Acquire Images”. When the “Update Worklist” activity is performed the Workflow Application Entity queries a remote AE for worklist items and provides the set of worklist items matching the query request. “Update Worklist” is performed when the user opens the Modality Worklist dialog. When the “Acquire Images” activity is performed the Workflow AE creates and updates Modality Performed Procedure Step instances managed by a remote AE. Acquisition of images will result in the automated creation of an MPPS Instance. Completion of the MPPS is performed as the result of the user closing the study.

4.1.2.3. Functional Definition of Hardcopy AE

The CRystalView QC Workstation Hardcopy AE prints images on a remote AE (Film 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.

4.1.3. Sequencing of Real-World Activities



SEQUENCING CONSTRAINTS

Under normal scheduled workflow conditions the following sequencing constraints apply:

1. Query Worklist
2. Receive Worklist of Modality Scheduled Procedure Steps (MSPS)
3. Select item from Worklist (MSPS)
4. Start acquisition and create MPPS

5. Acquire Images
6. Complete acquisition and finalize MPPS
7. Store (send) acquired images and any associated Presentation State (GSPS)
8. If Archive supports Storage Commitment, the Storage AE will request Storage Commitment for the images and associated GSPS instances.
9. Print acquired images (optional step)

Printing could be omitted completely if no printer is connected or hardcopies are not required.

4.2. AE SPECIFICATIONS

4.2.1. SOP Classes

The CRystalView CR Workstation provides Standard Conformance to the following SOP Classes:

SOP CLASSES FOR AE STORAGE

SOP Class Name	SOP Class UID	SCU	SCP
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No
Verification	1.2.840.10008.1.1	No	Yes

SOP CLASSES FOR AE WORKFLOW

SOP Class Name	SOP Class UID	SCU	SCP
Modality Worklist Information Model	1.2.840.10008.5.1.4.3.1	Yes	No
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Yes	No

SOP CLASSES FOR AE PRINT

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Yes	No
Presentation LUT	1.2.840.10008.5.1.1.23	Yes	No

4.2.2. Association Policies

4.2.2.1. General

The DICOM standard application context name for DICOM 3.0 is always proposed:

DICOM APPLICATION CONTEXT NAME

Application Context Name	1.2.840.10008.3.1.1.1
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4.2.2.2. Number of Associations

The CRystalView CR Workstation initiates one Association at a time for each destination to which a transfer request is being processed. Only one job will be active at a time, the others remain pending until the active job completes or fails.

NUMBER OF ASSOCIATIONS INITIATED

Maximum number of simultaneous associations	1
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4.2.2.3. Asynchronous Nature

The CRystalView CR Workstation does not support asynchronous communication (multiple outstanding transactions over a single association).

4.2.2.4. Implementation Identifying Information

The implementation information for CRystalView CR Workstation AE is:

DICOM IMPLEMENTATION CLASS AND VERSION

Implementation Class UID	1.2.840.114401.207
Implementation Version Name	CVWS_V14

4.2.3. Association Initiation Policy

The CRystalView CR Workstation attempts to initiate a new association for every service.

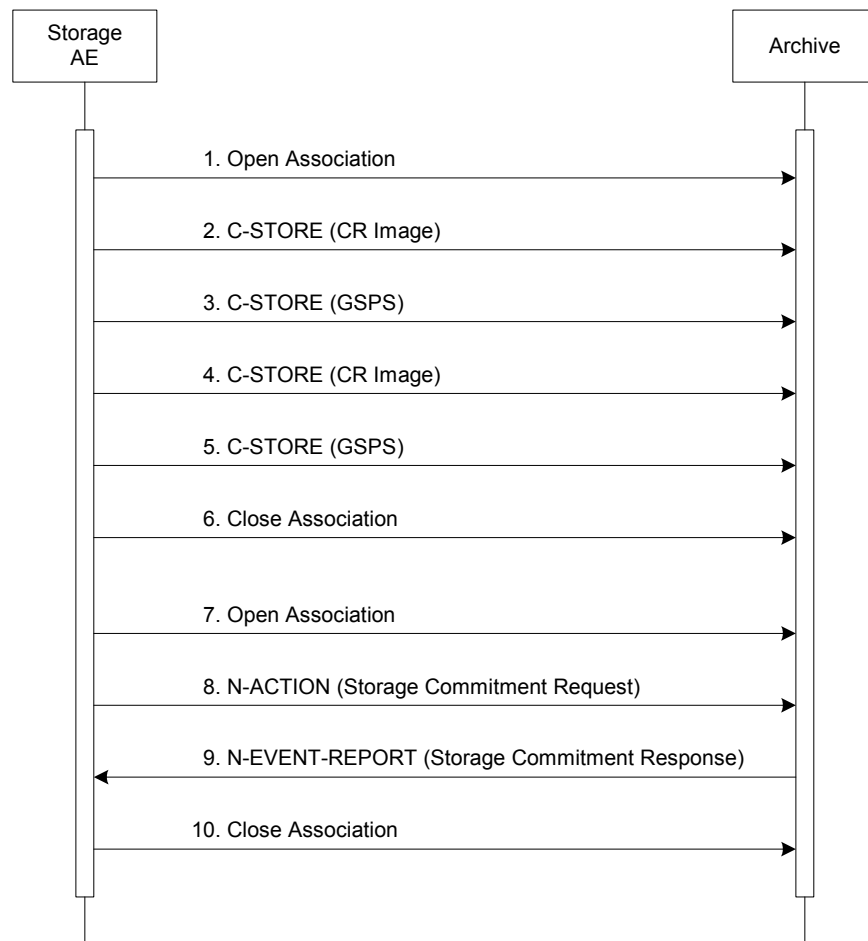
4.2.3.1. Description and Sequencing of Activities

4.2.3.1.1. Activity – Send Images

A user can select images and request them to be sent to multiple destinations. When the “Auto-send” option is active, each image is automatically sent when the patient study is closed.

The Storage AE attempts to initiate a new Association with the Archive (remote AE) in order to issue a C-STORE request. If the job contains multiple images then multiple C-STORE requests will be issued over the association. If the user configurable presentation state feature is enabled, then a C-STORE request will be issued for each GSPS instance.

If the user configurable storage commitment feature is enabled, the Storage AE will, after all images and presentation states have been sent, transmit a single Storage Commitment request (N-ACTION) over a new Association. Upon receiving the N-ACTION response, the Storage AE will delay releasing the Association for configurable amount of time. If no N-EVENT-REPORT is received within this time period the Association will be released.



SEQUENCING OF ACTIVITY – SEND IMAGES

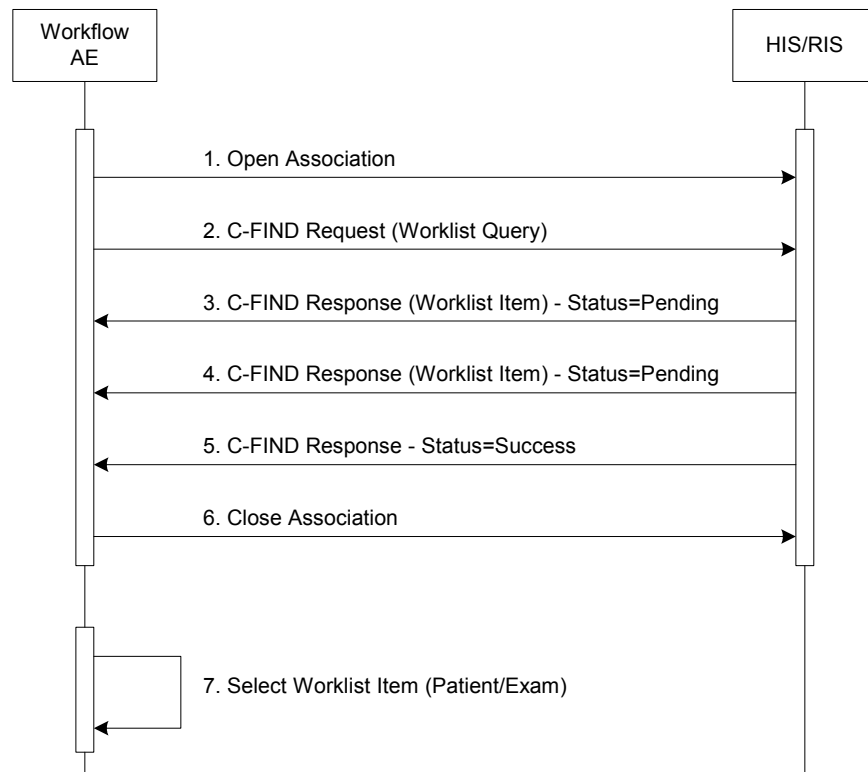
A possible sequence of interactions between the Storage AE and an Archive, which supports Storage and Storage Commitment SOP classes as an SCP is illustrated in the figure above:

1. The Storage AE opens an association with the Archive.
2. A CR image is transmitted to the Archive using a C-STORE request and the Archive replies with a C-STORE response (successful status).
3. A GSPS instance is transmitted to the Archive using a C-STORE request and the Archive replies with a C-STORE response (successful status).
4. A second CR image is transmitted to the Archive using a C-STORE request and the Archive replies with a C-STORE response (successful status).

5. A second GSPS instance is transmitted to the Archive using a C-STORE request and the Archive replies with a C-STORE response (successful status).
6. The Storage AE closes the association with the Archive.
7. The Storage AE opens an association with the Archive.
8. An N-ACTION request is transmitted to the Archive to obtain storage commitment of previously transmitted CR images and GSPS instances. The Archive replies with an N-ACTION response indicating the request has been received and is being processed.
9. The Archive transmits an N-EVENT-REPORT request notifying the Storage AE of the status of the Storage Commitment Request. The Storage AE replies with an N-EVENT-REPORT response confirming receipt.
10. The Storage AE closes the association with the Archive.

4.2.3.1.2. Activity – Update Worklist

A user requests a Worklist Update to receive all items for a Scheduled Procedure Step.



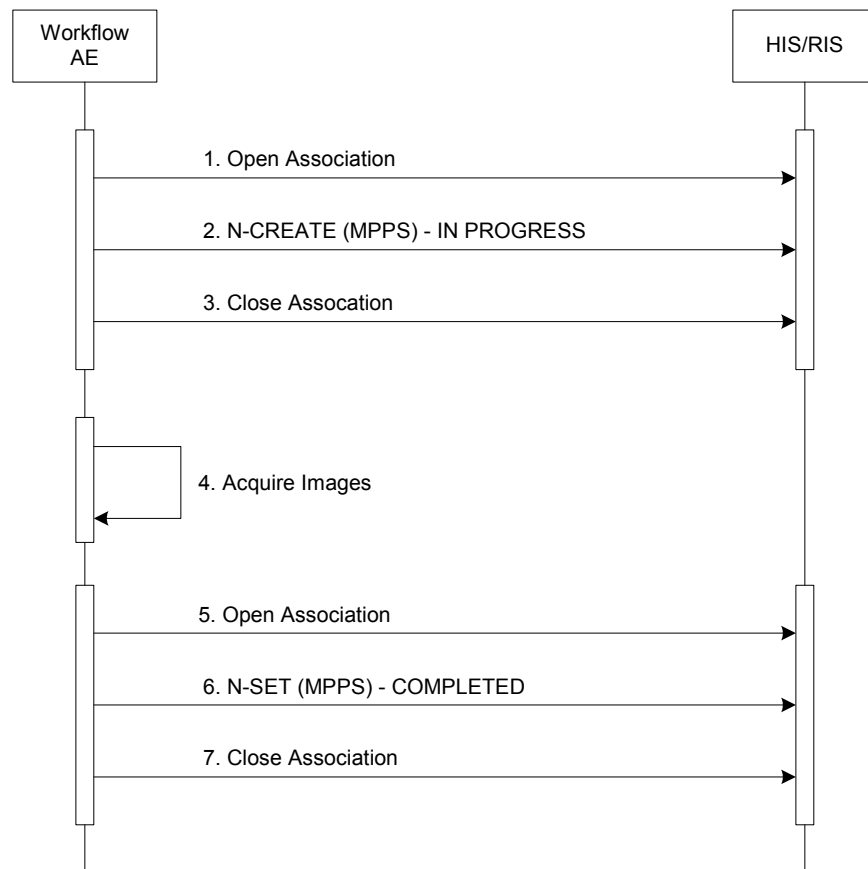
SEQUENCING OF ACTIVITY - WORKLIST UPDATE

A possible sequence of interactions between the Workflow AE and the HIS/RIS is illustrated in the figure above:

1. The Workflow AE opens an association with the HIS/RIS.
2. The Workflow AE sends a C-FIND request to the HIS/RIS containing the Worklist query attributes.
3. The HIS/RIS returns a C-FIND response containing the requested attributes of the first matching Worklist item.
4. The HIS/RIS returns another C-FIND response containing the requested attributes of the second matching Worklist item.
5. The HIS/RIS returns another C-FIND response with status “Success” indicating that no further matching Worklist items exist. (Note: This example assumes only 2 Worklist items match the Worklist query.)
6. The Workflow AE closes the association with the HIS/RIS.
7. The user selects a Worklist item from the Worklist and prepares to acquire new images.

4.2.3.1.3. Activity – Acquire Images

After patient registration, the CRystalView CR Workstation is awaiting acquisition of the CR image. The trigger to create an MPPS SOP instance is derived from this event. An association to the MPPS SCP is established and the related MPPS SOP instance will be created.



SEQUENCING OF ACTIVITY – ACQUIRE IMAGES

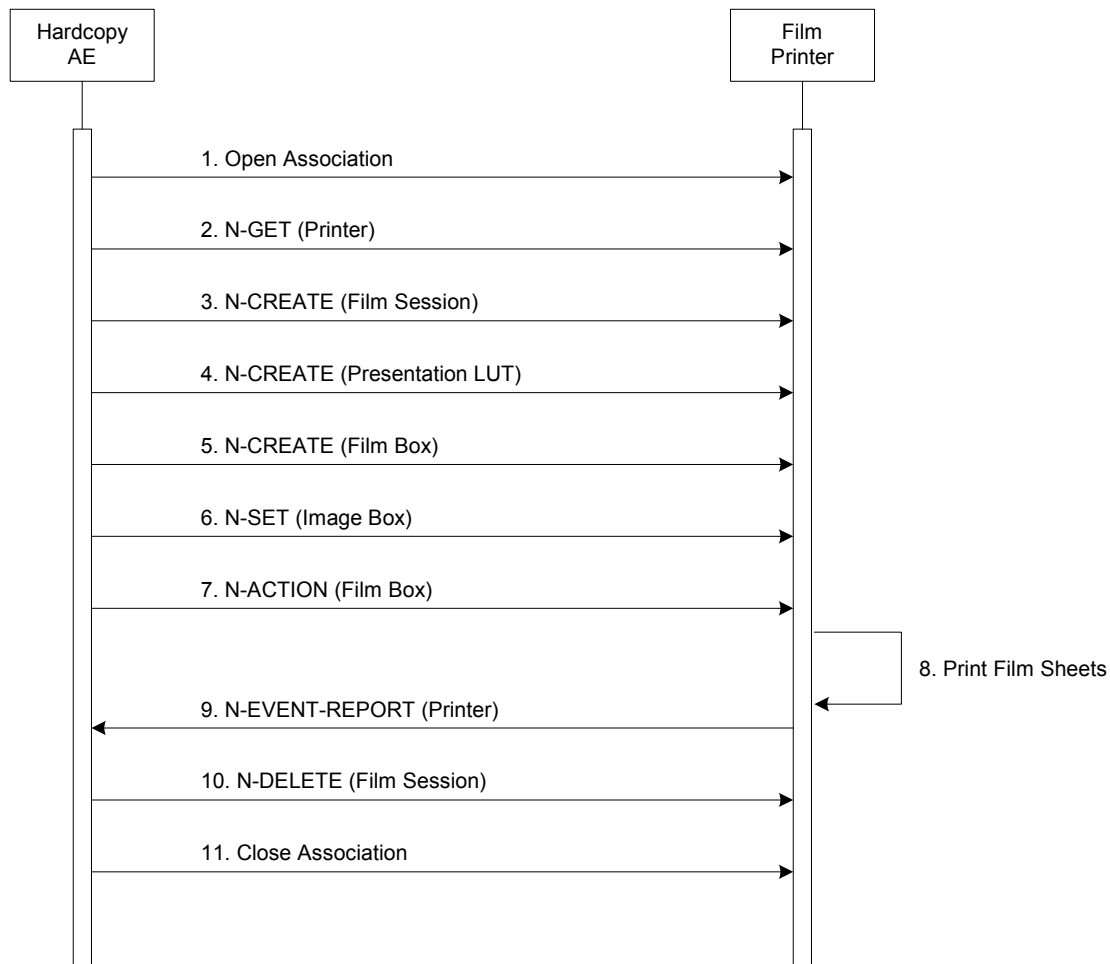
A possible sequence of interactions between the Worklist AE and the HIS/RIS is illustrated in the figure above:

1. The Worklist AE opens an association with the HIS/RIS.
2. The Worklist AE sends an N-CREATE request to the HIS/RIS to create an MPPS instance with status of “In Progress” and creates all necessary attributes. The HIS/RIS acknowledges the MPPS creation with an N-CREATE response.
3. The Worklist AE closes the association with the HIS/RIS.
4. All images are acquired and stored in the local database.
5. The Worklist AE opens an association with the HIS/RIS.
6. The Worklist AE sends an N-SET request to the HIS/RIS to update the MPPS instance with a status of “Completed”. The HIS/RIS acknowledges the MPPS update with an N-SET response (status success).

7. The Worklist AE closes the association with the HIS/RIS.

4.2.3.1.4. Activity – Film Images

A user composes images onto film sheets and requests them to be sent to a specific hardcopy device. The user can select the desired film format and number of copies.



SEQUENCING OF ACTIVITY – PRINT IMAGES

A typical sequence of interactions between the Hardcopy AE and a Film Printer is illustrated in the figure above:

1. The Hardcopy AE opens an association with the Film Printer.

2. The Hardcopy AE sends an N-GET to obtain the status of the Film Printer. If the Film Printer reports a “Failure” status, the print-job is switched to a failed state and the user is informed.
3. The Hardcopy AE sends an N-CREATE to create a Film Session.
4. The Hardcopy AE sends an N-CREATE to create a Presentation LUT (if supported by the Film Printer).
5. The Hardcopy AE sends an N-CREATE to create a Film Box linked to the Film Session. A single Image Box will be created as a result of this operation.
6. The Hardcopy AE sends an N-SET on the Image Box to transfer the contents of the film sheet to the Film Printer.
7. The Hardcopy AE sends an N-ACTION on the Film Box to instruct the Film Printer to print the Film Box.
8. The Film Printer prints the requested number of film sheets.
9. The Film Printer asynchronously reports its status via N-EVENT-REPORT notification. The Film Printer can send this message at any time during the association. If the Film Printer reports a “Failure” status, the print-job is switched to a failed state and the user is informed.
10. The Hardcopy AE sends an N-DELETE on the Film Session to delete the complete Film Session hierarchy.
11. The Hardcopy AE closes the association with the Film Printer.

4.2.3.1.5. Activity – Verification

A user can manually initiate verification to verify a connection to a remote AE.

If the C-ECHO request was successfully received, a success status code will be returned in the C-ECHO response. Otherwise an error status code will be returned in the C-ECHO response.

4.2.3.2. Proposed Presentation Contexts

Presentation Context Table					
SOP Class		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Computed	1.2.840.10008.5.1.4.1.1.1	Implicit VR	1.2.840.10008.1.2	SCU	None

Radiography Image Storage		Little Endian			
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Storage Commit Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Modality Worklist Information Model	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Modality Performed Procedure Step	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Print Manage Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Presentation LUT	1.2.840.10008.5.1.1.23	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

4.3. NETWORK INTERFACES

4.3.1. Physical network interface

The CRystalView CR Workstation requires two network connections. One network connection is used for the CR Reader device and the second network connection is used for the workstation computer.

The CRystalView CR Workstation uses a proprietary protocol to communicate with the CR Reader.

If connection to a local area network is not required, then a network cross-over cable may be used between the CR Reader device and the workstation computer.

SUPPORTED NETWORK INTERFACES

Ethernet 100baseT
Ethernet 10baseT

4.4. CONFIGURATION

4.4.1. Local AE Titles/Address Mapping

The local AE title and TCP/IP port for the CRystalView CR Workstation is configured via a dedicated configuration panel in the application. The default AE title is "CRYSTALVIEW". The default port is 5150. Special privileges are required to access this configuration panel.

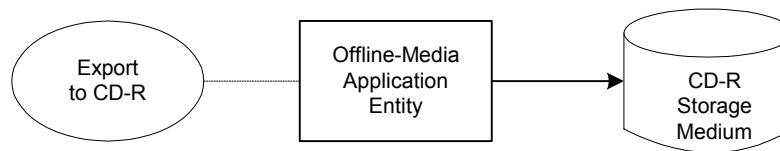
4.4.2. Remote AE Titles/Address Mapping

All remote AE titles and TCP/IP ports are configured via dedicated configuration panels in the application. Special privileges are required to access these configuration panels.

5. MEDIA INTERCHANGE

5.1. IMPLEMENTATION MODEL

5.1.1. Application Data Flow



APPLICATION DATA FLOW DIAGRAM FOR MEDIA STORAGE

5.1.2. Functional Definition of AEs

5.1.2.1. Functional Definition of Offline-Media Application Entity

The CRystalView QS Workstation Offline-Media AE exports selected patient studies (images and presentation states) to a local directory, which may then be copied to a CD-R using an off-the-shelf utility. It is associated with the local real-world activity “Export”.

5.1.3. Sequencing of Real-World Activities

One or more images are selected and the Offline-Media AE is invoked. The images and presentation states are written to a local directory. An off-the shelf CD-R utility is used to burn the information to CD-R.

5.2. AE SPECIFICATIONS

5.2.1. Offline-Media Application Entity Specification

5.2.1.1. Real-Word Activities

5.2.1.1.1. Activity – Export to CD-R

The Offline-Media Application Entity acts as an FSC using the interchange option when requested to export SOP Instances from the local database to a local directory.

The user selects “Export” and browses to a local directory where the files will be created. A dialog is displayed which lists all patient studies stored in the local database. The user selects one or more patient studies, which are written together with a corresponding DICOMDIR to the local directory. The user inserts a CD-R into the CD writer and an off-the-shelf utility is used to copy the local directory to CD-R.

5.2.1.1.2. Activity – Import from CD

The user selects “Import” and then selects “DICOMDIR”. The user browses to the directory containing the DICOMDIR. A dialog is displayed which lists all patient studies. The user selects one or more patient studies, which are imported into the local database.

The user selects “Import” and then selects “DICOM File”. The user browses to the directory containing the DICOM File, selects the file, which is then imported into the local database.

6. SUPPORT OF CHARACTER SETS

The CRystalView CR Workstation DICOM application supports the following character set:

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

7. SECURITY

The CRystalView CR Workstation does not support any specific security measures.

It is assumed the CRystalView CR Workstation is used within a secured environment. It is assumed that a secured environment includes at a minimum:

- a) Firewall or router protections to ensure that only approved external hosts have network access to CRystalView CR Workstation.
- b) Firewall or router protections to ensure the CRystalView CR Workstation only has network access to approved external hosts and services.
- c) Any communication with external hosts and services outside the locally secured environment uses appropriate secure network channels (e.g. such as Virtual Private Network (VPN)).

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.

8. ANNEXES

8.1. IOD CONTENTS

8.1.1. Created SOP Instances

Table 8.1.1 specifies the attributes of a CR Image transmitted by CRystalView QC Workstation application.

Table 8.1.2 specifies the attributes of a Grayscale Softcopy Presentation State transmitted by the CRystalView QC Workstation application.

The following tables use a number of abbreviations. The abbreviations used are as follows:

VNAP	Value not always present
ANAP	Attribute not always present
ALWAYS	Always Present
EMPTY	Attribute is sent without a value
MWL	Attribute value source is from Modality Worklist
USER	Attribute value source is from the user
AUTO	Attribute value is generated auto-magically

8.1.1.1. CR Image IOD

Table 8.1.1
IOD OF CREATED CR SOP INSTANCES

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1.3	ALWAYS
Study	General Study	Table 8.1.4	ALWAYS
Series	General Series	Table 8.1.6	ALWAYS
	CR Series	Table 8.1.7	ALWAYS
Equipment	General Equipment	Table 8.1.9	ALWAYS
Image	General Image	Table 8.1.10	ALWAYS
	Image Pixel	Table 8.1.11	ALWAYS
	CR Image	Table 8.1.12	ALWAYS
	Modality LUT	Table 8.1.13	ALWAYS
	SOP Common	Table 8.1.20	ALWAYS

8.1.1.2. Grayscale Softcopy Presentation State IOD

Table 8.1.2
GRAYSCALE SOFTCOPY PRESENTATION STATE IOD

IE	Module	Reference	Presence of Module
Patient	Patient	Table 8.1.3	ALWAYS
Study	General Study	Table 8.1.4	ALWAYS
	Clinical Trial Study	Table 8.1.5	ALWAYS

Series	General Series	Table 8.1.6	ALWAYS
	Presentation Series	Table 8.1.8	ALWAYS
Equipment	General Equipment	Table 8.1.9	ALWAYS
Presentation State	Presentation State	Table 8.1.14	ALWAYS
	Display Area	Table 8.1.15	ALWAYS
	Graphic Annotation	Table 8.1.16	ALWAYS
	Spatial Transformation	Table 8.1.18	ALWAYS
	Graphic Layer	Table 8.1.19	ALWAYS
	Softcopy VOI LUT	Table 8.1.20	ALWAYS
	Softcopy Presentation LUT	Table 8.1.21	ALWAYS
	SOP Common	Table 8.1.22	ALWAYS

8.1.1.3. Common Modules

Table 8.1.3
PATIENT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN		VNAP	MWL/USER
Patient ID	(0010,0020)	LO		ALWAYS	MWL/USER
Patient's Birth Date	(0010,0030)	DA		VNAP	MWL/USER
Patient's Sex	(0010,0040)	CS		VNAP	MWL/USER

Table 8.1.4
GENERAL STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Date	(0008,0020)	DA		ALWAYS	AUTO
Study Time	(0008,0030)	TM		ALWAYS	AUTO
Accession Number	(0008,0050)	SH		ALWAYS	MWL/USER
Referring Physician Name	(0008,0090)	PN		VNAP	MWL/USER
Study Description	(0008,1030)	CS		VNAP	MWL/USER
Study Instance UID	(0020,000D)	UI		ALWAYS	AUTO
Study ID	(0020,0010)	SH		ALWAYS	MWL/USER /AUTO

Table 8.1.5
CLINICAL TRIAL STUDY MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Clinical Trial Time Point ID	(0012,0050)	LO		ALWAYS	AUTO
Clinical Trial Time Point Description	(0012,0051)	ST		ALWAYS	AUTO

**Table 8.1.6
GENERAL SERIES MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Series Date	(0008,0021)	DA		ALWAYS	AUTO
Series Time	(0008,0031)	TM		ALWAYS	AUTO
Modality	(0008,0060)	CS	CR	ALWAYS	AUTO
Body Part Examined	(0018,0015)	CS		VNAP	MWL/USER
Protocol Name	(0018,1030)	LO		ALWAYS	MWL/USER
Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Series Number	(0020,0011)	IS		VNAP	AUTO

**Table 8.1.7
CR SERIES MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Body Part Examined	(0018,0015)	CS		ALWAYS	MWL/USER
View Position	(0018,5101)	CS		VNAP	MWL/USER

**Table 8.1.8
PRESENTATION SERIES MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	CR	ALWAYS	AUTO

**Table 8.1.9
GENERAL EQUIPMENT MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	Alara Inc.	ALWAYS	AUTO
Manufacturer's Model Name	(0008,1090)	LO	R200	ALWAYS	AUTO

**Table 8.1.10
GENERAL IMAGE MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Type	(0008,0008)	CS	ORIGINAL PRIMARY	ALWAYS	AUTO
Content Date	(0008,0023)	DA		ALWAYS	AUTO
Content Time	(0008,0033)	TM		ALWAYS	AUTO
Instance Number	(0020,0013)	IS		ALWAYS	AUTO

**Table 8.1.11
IMAGE PIXEL MODULE OF CREATED SOP INSTANCES**

Attribute Name	Tag	VR	Value	Presence of Value	Source
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				Value	
Samples per Pixel	(0028,0002)	US		ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS		ALWAYS	AUTO
Rows	(0028,0010)	US		ALWAYS	MWL/USER
Columns	(0028,0011)	US		ALWAYS	MWL/USER
Bits Allocated	(0028,0100)	US		ALWAYS	AUTO
Bits Stored	(0028,0101)	US		ALWAYS	AUTO
High Bit	(0028,0102)	US		ALWAYS	AUTO
Pixel Representation	(0028,0103)	US		ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW		ALWAYS	AUTO
Smallest Pixel Value	(0028,0106)	US		ALWAYS	AUTO
Largest Pixel Value	(0028,0107)	US		ALWAYS	AUTO

Table 8.1.12
CR IMAGE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Plate ID	(0018,1004)	LO		ALWAYS	AUTO
Imager Pixel Spacing	(0018,1164)	DS		ALWAYS	AUTO
Cassette Size	(0018,1403)	CS		ALWAYS	AUTO
Relative X-ray Exposure	(0018,1405)	IS		ALWAYS	AUTO
Film Speed Class	(0018,6000)	DS		ALWAYS	AUTO

Table 8.1.13
MODALITY LUT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Rescale Intercept	(0028,1052)			ALWAYS	AUTO
Rescale Slope	(0028,1053)			ALWAYS	AUTO
Rescale Type	(0028,1054)			ALWAYS	AUTO

Table 8.1.14
PRESENTATION STATE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referenced Series Sequence	(0008,1115)	SQ		ALWAYS	AUTO
Referenced Image Sequence	(0008,1140)	SQ		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI		ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
>Series Instance UID	(0020,000E)	UI		ALWAYS	AUTO
Instance Number	(0020,0013)	IS		ALWAYS	AUTO
Presentation Label	(0070,0080)	CS		ALWAYS	AUTO

Presentation Description	(0070,0081)	LO		ALWAYS	AUTO
Presentation Creation Date	(0070,0082)	DA		ALWAYS	AUTO
Presentation Creation Time	(0070,0083)	TM		ALWAYS	AUTO
Presentation Creator's Name	(0070,0084)	PN		ALWAYS	AUTO

Table 8.1.15
DISPLAY AREA MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Displayed Area Selection Sequence	(0070,005A)	SQ		ALWAYS	AUTO
>Displayed Area Top Left Hand Corner	(0070,0052)	SL		ALWAYS	AUTO
>Displayed Area Bottom Right Hand Corner	(0070,0053)	SL		ALWAYS	AUTO
>Presentation Size Mode	(0070,0100)	CS	SCALE TO FIT or MAGNIFY	ALWAYS	AUTO
>Presentation Pixel Spacing	(0070,0101)	DS		ALWAYS	AUTO
>Presentation Pixel Aspect Ratio	(0070,0102)	IS		ALWAYS	AUTO
>Presentation Pixel Magnification Ratio	(0070,0103)	FL		ALWAYS	AUTO

Table 8.1.16
GRAPHIC ANNOTATION MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Graphic Annotation Sequence	(0070,0001)	SQ		VNAP	AUTO
>Referenced Image Sequence	(0008,1140)	SQ		ALWAYS	AUTO
>>Referenced SOP Class UID	(0008,1150)	UI	1.2.840.10008.5.1.4.1.1.1 (CR Image Storage SOP Class)	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI		ALWAYS	AUTO
>>Referenced Frame Number	(0008,1160)	IS		VNAP	AUTO
>Graphic Layer	(0070,0002)	CS	ALARA IMAGE MARKER LAYER	ALWAYS	AUTO
>Text Object Sequence	(0070,0008)	SQ		VNAP	AUTO
>>Bounding Box Annotation Units	(0070,0003)	CS	PIXEL	VNAP	AUTO
>>Anchor Point Annotation Units	(0070,0004)	CS	PIXEL	VNAP	AUTO

>>Unformatted Text Value	(0070,0006)	ST	From user input	VNAP	AUTO
>>Bounding Box Top Left Hand Corner	(0070,0010)	FL	From user input	VNAP	AUTO
>>Bounding Box Bottom Right Hand Corner	(0070,0011)	FL	From user input	VNAP	AUTO
>>Bounding Box Text Horizontal Justification	(0070 0012)	CS	From user input	VNAP	AUTO

Table 8.1.17
SPATIAL TRANSFORMATION MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Image Horizontal Flip	(0070,0041)	CS		VNAP	AUTO
Image Rotation	(0070,0042)	US		VNAP	AUTO

Table 8.1.18
GRAPHIC LAYER MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Graphic Layer Sequence	(0070,0060)	SQ		VNAP	AUTO
>Graphic Layer	(0070,0002)	CS	ALARA IMAGE MARKER LAYER	VNAP	AUTO
>Graphic Layer Order	(0070,0062)	IS	1	VNAP	AUTO
>Graphic Layer Recommended Display Grayscale Value	(0070,0066)		65535	VNAP	AUTO
>Graphic Layer Description	(0070,0068)	CS	Layer for Image LEFT/RIGHT Marker	VNAP	AUTO

Table 8.1.19
SOFTCOPY VOI LUT MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Softcopy VOI LUT Sequence	(0028,3110)	SQ		ALWAYS	AUTO
Window Center	(0028,1050)	DS	From display setting	ALWAYS	AUTO
Window Width	(0028,1051)	DS	From display setting	ALWAYS	AUTO

Table 8.1.20
SOFTCOPY PRESENTATION STATE MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Presentation LUT Shape	(2050,0020)	CS	IDENTITY	ALWAYS	AUTO

Table 8.1.21
SOP COMMON MODULE OF CREATED SOP INSTANCES

Attribute Name	Tag	VR	Value	Presence of Value	Source
Specific Character Set	(0008,0005)	CS	ISO_IR 100	ALWAYS	MWL/USER
Instance Creation Date	(0008,0012)	DA		ALWAYS	
Instance Creation Time	(0008,0013)	TM		ALWAYS	
SOP Class UID	(0008,0016)	UI	1.2.840.10008.5.1.4.1.1.11.1 (GSPS SOP Class)	ALWAYS	
SOP Instance UID	(0008,0018)	UI		ALWAYS	
Instance Number	(0020,0013)			ALWAYS	