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**DICOM Conformance Statement for
Cedara CR Console Manager™**

Product Version 1.1

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Overview

This document describes the DICOM v3.0 implementation supported by Cedara CR Console Manager™ 1.1. It documents conformance aspects required to interoperate with other DICOM v3.0 conformant devices.

The Cedara CR Console Manager implements the necessary DICOM services to download work lists from an information system and save acquired CR images to a network storage device and/or local Cedara I-View storage device.

Table 1 lists the Supported Networking DICOM Service (SOP) Classes.

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Transfer		
Computed Radiography Image Storage 1.2.840.10008.5.1.4.1.1.1	Yes	No
Workflow Management		
Storage Commitment Push Model 1.2.840.10008.1.20.1	Yes	No
Modality Worklist Information Model - FIND 1.2.840.10008.5.1.4.31	Yes	No

Table 1. Network Services

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1. Introduction

The Cedara CR Console Manager integrates with the Kodak Point-of-Care CR Reader version 3.0 (Kodak LightQC) to acquire CR images. The console should be connected to the CR Reader for acquisition. The console should be connected to the information network for Modality Worklist, CR Image Storage and/or Storage Commitment.

The use of this conformance statement by itself does not guarantee successful interoperability of the product with equipment from other vendors. The user or integrator of Cedara CR Console Manager should keep the following issues in mind:

- Successful interoperability of the Cedara CR Console Manager with other devices may require functions which are not specified within the scope of DICOM. It is the user's or integrator's responsibility to ensure that the proper analysis and validation is performed to verify the connection.
- Test procedures should be used to verify that data transferred into/from the software is correct. This is often done with the aid of phantom scans using a variety of clinical protocols.
- Test procedures should be used to verify connectivity. Issues such as power failure and broken connections should be verified.

1.1 Revision History

Version	Type	Date	Description
1.0	major	Sept. 11, 2008	Initial version
2.0	minor	March 12 th , 2009	Changed logo and product # to 1.1.

1.2 Audience

This document is written for the people that need to understand how Cedara CR Console Manager will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

1.3 Remarks

The scope of this DICOM Conformance Statement is to facilitate integration between Cedara CR Console Manager and other DICOM products. The Conformance Statement should be read and understood in conjunction with the DICOM Standard. DICOM by itself does not guarantee

interoperability. The Conformance Statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality.

This Conformance Statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different Conformance Statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.
- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

1.4 Terms And Definitions

Informal definitions are provided for the following terms used in this Conformance Statement. The DICOM Standard is the authoritative source for formal definitions of these terms.

Abstract Syntax – the information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples : Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.

Application Entity (AE) – an end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.

Application Entity Title – the externally known name of an *Application Entity*, used to identify a DICOM application to other DICOM applications on the network.

Application Context – the specification of the type of communication used between *Application Entities*. Example: DICOM network protocol.

Association – a network communication channel set up between *Application Entities*.

Attribute – a unit of information in an object definition; a data element identified by a *tag*. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Object Definition (IOD) – the specified set of *Attributes* that comprise a type of data object; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The *Attributes* may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.

Joint Photographic Experts Group (JPEG) – a set of standardized image compression techniques, available for use by DICOM applications.

Media Application Profile – the specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs)

Module – a set of *Attributes* within an *Information Object Definition* that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.

Negotiation – first phase of *Association* establishment that allows *Application Entities* to agree on the types of data to be exchanged and how that data will be encoded.

Presentation Context – the set of DICOM network services used over an *Association*, as negotiated between *Application Entities*; includes *Abstract Syntaxes* and *Transfer Syntaxes*.

Protocol Data Unit (PDU) – a packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.

Security Profile – a set of mechanisms, such as encryption, user authentication, or digital signatures, used by an *Application Entity* to ensure confidentiality, integrity, and/or availability of exchanged DICOM data

Service Class Provider (SCP) – role of an *Application Entity* that provides a DICOM network service; typically, a server that performs operations requested by another *Application Entity* (*Service Class User*). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP).

Service Class User (SCU) – role of an *Application Entity* that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU)

Service/Object Pair (SOP) Class – the specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.

Service/Object Pair (SOP) Instance – an information object; a specific occurrence of information exchanged in a *SOP Class*. Examples: a specific x-ray image.

Tag – a 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the “group” and the “element”. If the “group” number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]

Transfer Syntax – A set of encoding rules that allow Application Entities to unambiguously negotiate the encoding techniques (e.g., Data Element structure, byte ordering, compression) they are able to support, thereby allowing these Application Entities to communicate. Examples: JPEG Baseline, Explicit VR Little Endian.

Unique Identifier (UID) – a globally unique “dotted decimal” string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.

Value Representation (VR) – the format type of an individual DICOM data element, such as text, an integer, a person’s name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

1.5 Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network “handshake”. One of the two devices must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an *Abstract Syntax* for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called *Presentation Contexts*. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on *Roles* – which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information). The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no Association Negotiation possible, they both use a *Media Application Profile* that specifies “pre-negotiated” exchange media format, Abstract Syntax, and Transfer Syntax.

1.6 Abbreviations

AE	Application Entity
AET	Application Entity Title
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DNS	Domain Name System
FSC	File-Set Creator
HIS	Hospital Information System
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
JPEG	Joint Photographic Experts Group
MPPS	Modality Performed Procedure Step
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NTP	Network Time Protocol
O	Optional (Key Attribute)
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
R	Required (Key Attribute)
RIS	Radiology Information System.
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SPS	Scheduled Procedure Step
SR	Structured Reporting
TCP/IP	Transmission Control Protocol/Internet Protocol
U	Unique (Key Attribute)
UL	Upper Layer
VR	Value Representation

1.7 References

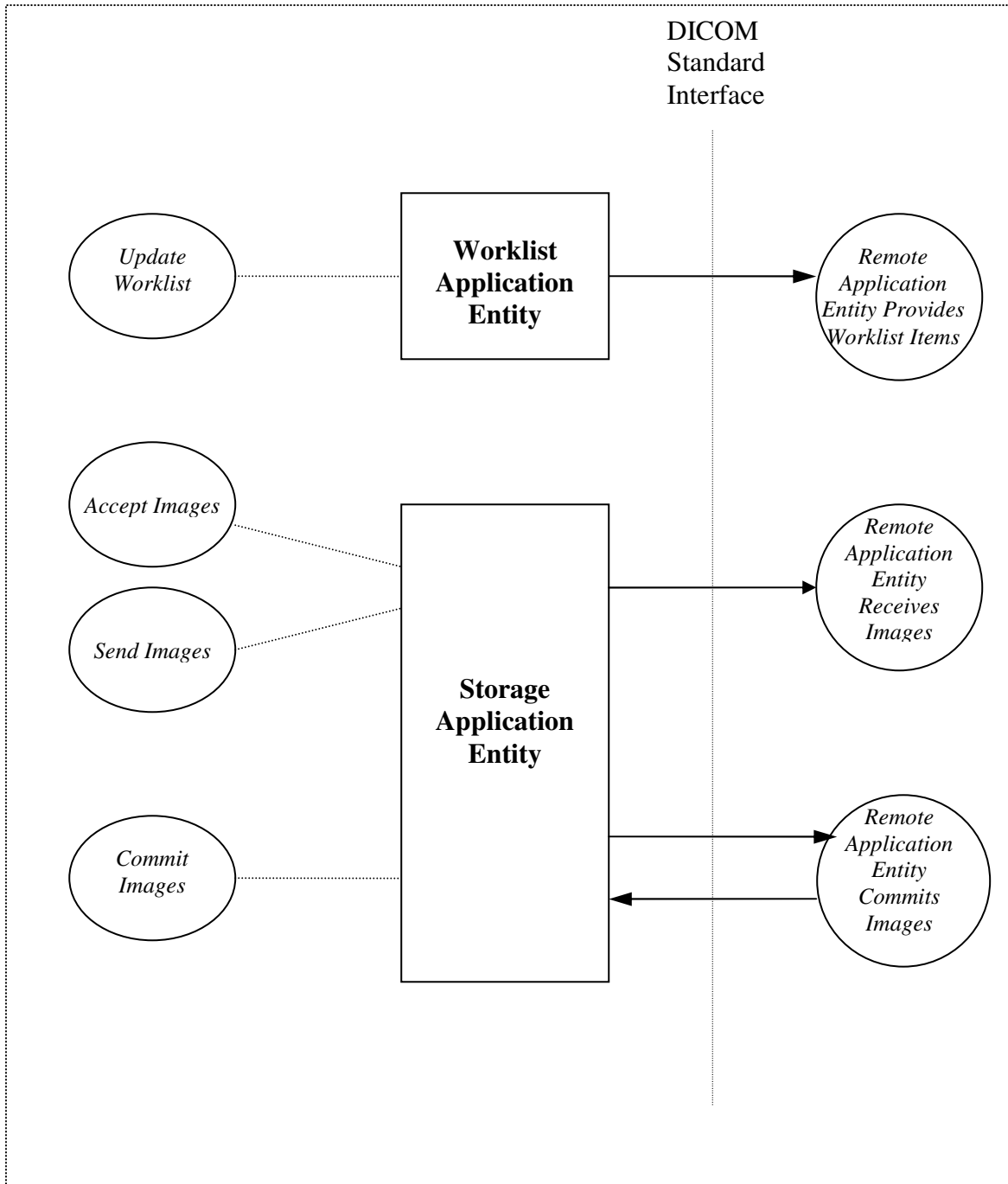
NEMA PS3 2008 - Digital Imaging and Communications in Medicine (DICOM) Standard, available free at <http://medical.nema.org/>

2. Networking

This section describes the networking related services of the Cedara CR Console Manager.

2.1 Implementation Model

2.1.1 Application Data Flow



The Worklist AE receives Worklist information from a remote AE. It is associated with the “Update Worklist” local real-world activity. When the “Update Worklist” local real-world activity is performed, the Worklist AE queries a remote AE for worklist items and provides the set of worklist items matching the query request. “Update Worklist” is performed as a result of an operator request or can be performed automatically at specific time intervals

The Storage AE sends images to a remote AE. The remote AE could be an archive device, PACS or a local installation of Cedara I-View. The Storage AE is associated with the local real-world activities “Accept Images” and “Send Images”. On the “Accept Images” real-world activity, the Storage AE sends images immediately to Cedara I-View (if installed). “Send Images” is activated by user settings (auto-send) and when performed, the Storage AE sends images to all remote AEs. The Storage AE requests Storage Commitment if a remote AE is configured as a storage commitment device. Only one storage commitment device may be active at a time. The Storage AE is associated with the local real-world activity “Commit Images” which is activated by user settings (auto-commit).

2.1.2 Functional definition of AEs

2.1.2.1 Functional Definition of Worklist AE

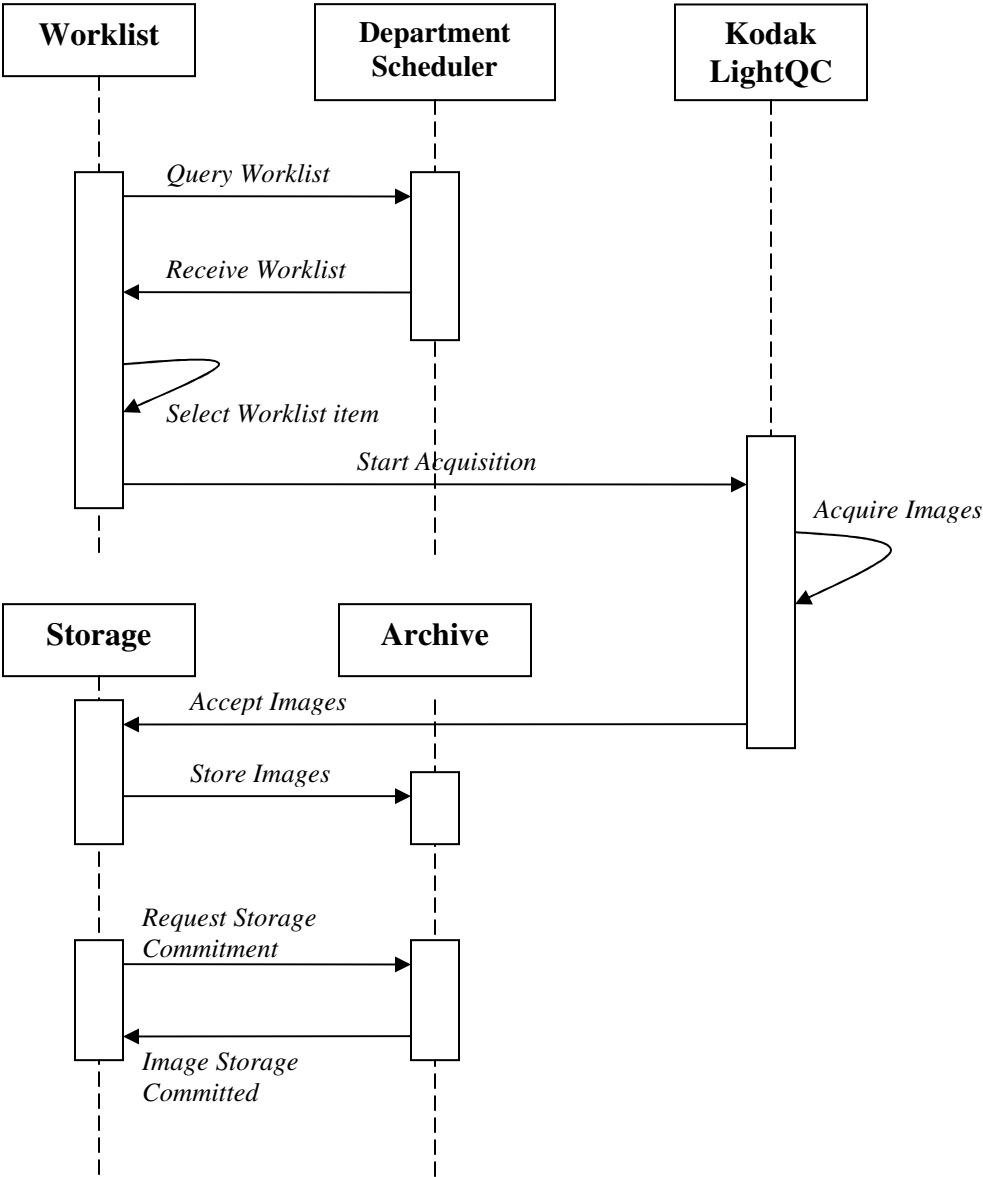
Worklist Update attempts to download a Worklist from a remote node. If the Worklist AE establishes an Association to a remote AE, it will transfer all worklist items via the open Association. The results will be displayed in a list to the user.

2.1.2.2 Functional Definition of Storage AE

When an image is acquired and accepted by the user, the application stores the image in its local database and then initiates an archive-queue entry in the local database with the associated network destination. The existence of the archive-queue entry activates the Storage AE. An association request is sent to the destination AE and upon successful negotiation, the image transfer is started. If the association cannot be opened, the related archive-queue entry will be scheduled for the next retry (automatic).

If the destination AE is configured as a storage commitment device, and the Storage AE has transferred the image to the destination, a commitment confirmation is requested. If a commitment is successfully confirmed, the Commitment AE will record this information in the local database.

2.1.3 Sequencing of Real World Activities



2.2 AE Specification

2.2.1 Worklist AE Specification

2.2.1.1 SOP Classes

The Worklist AE provides Standard Conformance to the following SOP Classes:

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

2.2.1.2 Association Establishment Policies

2.2.1.2.1 General

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

Application Context Name	1.2.840.10008.3.1.1.1
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2.2.1.2.2 Number of Associations

The maximum number of simultaneous Associations is 1.

2.2.1.2.3 Asynchronous Nature

The Worklist AE does not support asynchronous operations and will not perform asynchronous window negotiation.

2.2.1.2.4 Implementation Identifying Information

The application uses the following implementation identifying information:

- Implementation Class UID: **2.16.124.113531.9**
- Implementation Version Name: **OE ver 1.0**

2.2.1.3 Association Initiation Policy

This section describes the conditions under which the Worklist AE will initiate an association.

2.2.1.3.1 Activity – Worklist Update

A Worklist Update occurs on user interaction (pressing the “Search” button on the Worklist control) or automatically at specific time intervals configurable by the user. To specify query parameters, the user types search criteria in the column headers of the worklist.

2.2.1.3.1.1 Description and Sequencing of Activities

Upon initiation of the request, the Worklist AE will build an Identifier for the C-FIND request, will initiate an Association to send the request and will wait for Worklist responses. After retrieval of all responses, the Worklist AE will update the Worklist control with the list of responses.

2.2.1.3.1.2 Proposed Presentation Contexts

The Worklist AE will propose Presentation Contexts as shown in the following table.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit Little Endian	1.2.840.10008.1.2	SCU	None

2.2.1.3.1.3 SOP Specific Conformance for Modality Worklist

The behavior of Worklist AE when encountering status codes in a Modality Worklist C-FIND response is summarized in the table below. If any other SCP response status that “Success” or “Pending” is received by Worklist AE, a message will appear on the user interface and the user interface will fall back to locally saved worklist items for display.

Modality Worklist C-FIND Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Matching is complete	0000	The SCP has completed the matches. Worklist items are available for display.
Refused	Out of resources	A700	The Association is aborted using A-ABORT and the worklist query is marked as failed. Error information is logged.
Failed	Identifier does not match SOP Class	A900	The Association is aborted using A-ABORT and the worklist query is marked as failed. Error information is logged.
Failed	Unable to Process	C000 – CFFF	The Association is aborted using A-ABORT and the worklist query is marked as failed. Error information is logged.

Cancel	Matching terminated due to Cancel request	FE00	If the query was cancelled due to too many worklist items then the SCP has completed the matches. Worklist items are available for display. Otherwise, the Association is aborted using A-ABORT and the worklist query is marked as failed. Error information is logged.
Pending	Matches are continuing	FF00	The worklist item contained in the Identifier is collected for later display.
Pending	Matches are continuing – Warning that one or more Optional Keys were not supported	FF01	The worklist item contained in the Identifier is collected for later display. Errors are logged only once for each C-FIND operation
*	*	Any other status code.	The Association is aborted using A-ABORT and the worklist is marked as failed. Error information is logged.

The behavior of Worklist AE during communication failure is summarized in the table below.

Modality Worklist Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the worklist query marked as failed. The reason is logged.
Association aborted by the SCP or network layers	The worklist query is marked as failed. The reason is logged.

Acquired images will always use the Study Instance UID specified for the Scheduled Procedure Step (if available). If an acquisition is unscheduled, a Study Instance UID will be generated locally.

The table below provides a description of the Worklist AE Worklist Request Identifier and specifies the attributes that are copied into the images. Unexpected attributes returned in a C-FIND response are ignored.

Requested return attributes not supported by the SCP are set to have no value. Non-matching responses returned by the SCP due to unsupported optional matching keys are ignored. No attempt is made to filter out possible duplicate entries.

Worklist Request Identifier

Module Name	Tag	VR	M	R	Q	D	IOD
Attribute Name							
SOP Common							
Specific Character Set	(0008,0005)	CS		X			
Scheduled Procedure Step							
Scheduled Procedure Step Sequence	(0040,0100)	SQ		X			
> Scheduled Station AET	(0040,0001)	AE	S				
> Scheduled Procedure Step Start Date	(0040,0002)	DA	S				
> Scheduled Procedure Step Start Time	(0040,0003)	TM		X			
> Modality	(0008,0060)	CS	S	X			
> Scheduled Performing Physician's Name	(0040,0006)	PN		X	X		
> Scheduled Procedure Step Description	(0040,0007)	LO		X			
> Scheduled Station Name	(0040,0010)	SH	(S)	X			
> Scheduled Procedure Step ID	(0040,0009)	SH		X			
Requested Procedure							
Requested Procedure Description	(0032,1060)	LO		X			
Study Instance UID	(0020,000D)	UI		X			X
Requested Procedure Priority	(0040,1003)	SH		X			
Imaging Service Request							
Accession Number	(0008,0050)	SH		X	X	X	X
Referring Physician's Name	(0008,0090)	PN		X	X		
Patient Identification							
Patient Name	(0010,0010)	PN		X	X	X	X
Patient ID	(0010,0020)	LO		X	X	X	X
Patient Demographic							
Patient's Birth Date	(0010,0030)	DA		X	X	X	X
Patient's Sex	(0010,0040)	CS		X	X	X	X
Patient's Weight	(0010,1030)	DS		X			

The above table should be read as follows:

Module Name: The name of the associated module for supported worklist attributes.

Attribute Name: Attributes supported to build a Worklist AE Worklist Request Identifier

Tag:	DICOM tag for this attribute
VR:	DICOM VR for this attribute
M:	Matching keys for Worklist update. A “S” will indicate that Worklist AE will supply an attribute value for Single Value Matching.
R:	Return keys. An “X” will indicate that Worklist AE will supply this attribute as Return Key with zero length for Universal Matching.
Q:	Interactive Query Key. An “X” will indicate that Worklist AE will supply this attribute as matching key, if entered in the Worklist user interface.
D:	Displayed keys. An “X” indicates that this worklist attribute is displayed to the user during patient registration dialog.
IOD:	An “X” indicates that this Worklist attribute is included into all Object Instances created during performance of the related Procedure Step.

2.2.1.4 Association Acceptance Policy

The Worklist AE does not accept Associations.

2.2.2 Storage AE Specification

2.2.2.1 SOP Classes

The Storage AE provides Standard Conformance to the following SOP Classes:

SOP Class Name	SOP Class UID	SCU	SCP
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Yes	No
Storage Commitment Push Model	1.2.840.10008.1.20.1	Yes	No

2.2.2.2 Association Establishment Policies

2.2.2.2.1 General

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

Application Context Name	1.2.840.10008.3.1.1.1
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2.2.2.2.2 Number of Associations

The number of simultaneous associations is not limited by the application. As an association initiator the AE creates at most one association per destination at a given time.

2.2.2.2.3 Asynchronous Nature

The Storage AE does not support asynchronous operations and will not perform asynchronous window negotiation.

2.2.2.2.4 Implementation Identifying Information

The application uses the following implementation identifying information:

- Implementation Class UID: **2.16.124.113531.9**
- Implementation Version Name: **OE ver 1.0**

2.2.2.3 Association Initiation Policy

This section describes the conditions under which the Storage AE will initiate an association.

2.2.2.3.1 Activities – Accept Images and Send Images (Auto-Send)

Accept Images occurs on user interaction (pressing the “Exit” button on the Kodak LightQC application). When Accept Images is performed, the Storage AE immediately initiates an Association to the I-View Storage SCP and transfers the images to I-View upon successful Association. The transfer to Cedara I-View occurs only if Cedara I-View is installed on the local system and the I-View Storage SCP is configured as a destination AE for the Cedara CR Console Manager Storage AE.

The Storage AE may be configured to send output images from Kodak LightQC to destination Storage SCPs at regular intervals. When the Send Images (auto-send) activity is performed, the Storage AE initiates an Association to the archive and transfers the images to the archive upon success. If the association or transfer is not successful, the images are scheduled for transfer at the next auto-send time interval.

2.2.2.3.1.1 Description and Sequencing of Activities

The Storage AE will initiate an association to an archive as a Storage SCU and send the images using C-STORE operation. The association is released after all images have been transferred.

2.2.2.3.1.2 Proposed Presentation Contexts

The Storage AE will propose Presentation Contexts as shown in the following table.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CR Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1	Implicit Little Endian	1.2.840.10008.1.2	SCU	None

2.2.2.3.1.3 SOP Specific Conformance for CR Image Storage

If CR Image Storage SOP Instances are included in the Send Job and a corresponding Presentation Context is not accepted then the Association is aborted using A-ABORT and the send job is marked as failed. The job failure is logged and reported to the user via the Archive Status dialog.

The behavior of Storage AE when encountering status codes in a C-STORE response is summarized in the Table below:

Storage C-STORE Response Status Handling Behavior

Service Status	Further Meaning	Error Code	Behavior
Success	Success	0000	The SCP has successfully stored the SOP Instance. If all SOP Instances in a send job have status success then the job is marked as complete.
Refused	Out of Resources	A700 – A7FF	The Association is aborted using A-ABORT and the send job is marked as failed. Error information is logged and the error is reported to the user via the Archive Status UI.
Error	Data Set does not match SOP Class	A900 – A9FF	The Association is aborted using A-ABORT and the send job is marked as failed. Error information is logged and the error is reported to the user via the Archive Status UI.
Error	Cannot Understand	C000 – CFFF	The Association is aborted using A-ABORT and the send job is marked as failed. Error information is logged and the error is reported to the user via the Archive Status UI.
Warning	Coercion of Data Elements	B000	Image transmission is considered successful.
Warning	Data Set does not match SOP Class	B007	Image transmission is considered successful.
Warning	Elements Discarded	B006	Image transmission is considered successful.
*	*	Any other status code	The Association is aborted using A-ABORT and the send job is marked as failed. Error information is logged and the error is reported to the user via the Archive Status UI.

The behavior of Storage AE during communication failure is summarized in the table below.

Storage Communication Failure Behavior

Exception	Behavior
Timeout	The Association is aborted using A-ABORT and the send job is marked as failed. Error information is logged and the error is reported to the user via the Archive Status UI.
Association aborted by the SCP or network layers	The send job is marked as failed. The reason is logged and the job failure is reported to the user via the job control application

A failed send job is automatically re-started. The delay between resending failed jobs is configurable.

2.2.2.3.2 Activity - Storage Commitment

2.2.2.3.2.1 Description And Sequencing of Activities

Whenever a CR image is successfully sent to the archive the Storage AE automatically initiates a new association with the archive as a Storage Commitment SCU and sends an N-ACTION command to request storage commitment for the CR image. Upon receiving the N-ACTION response, the Storage AE releases the association. The Storage AE always listens for connections from the archive on a pre-configured port for storage commitment response. When the archive completes the storage commitment of one or more images it will connect to the Storage AE, request an association and send the appropriate storage commitment result notifications. The Storage AE will store the result of the storage commitment operation for each image.

The storage commitment functionality of the Storage AE can be turned off through configuration.

2.2.2.3.2.2 Proposed Presentation Contexts

The Storage AE will propose Presentation Contexts as shown in the following table.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit Little Endian	1.2.840.10008.1.2	SCU	None

2.2.2.3.2.3 SOP Specific Conformance for Storage Commitment Push SOP Class

If the association with the archive fails the Storage AE logs an error message describing the error and will not retry.

If an N-ACTION response has a status that is not Success the Storage AE will log an error message, close the association and will not attempt to commit the image again. The Storage AE will continue to send storage commitment requests for subsequent CR images.

The Storage AE supports an “Association Timer” for each association request. This timer starts when the association request is sent and stops when the association response is received or an error occurs. If a timeout occurs the connection is closed and the association is marked as failed. The Association Timer value is not configurable and it has a default value of 30 seconds.

2.2.2.4 Association Acceptance Policy

The Storage AE will accept associations in order to receive responses to a Storage Commitment Request.

2.3 Network Interfaces

2.3.1 Physical Network Interface

The Cedara CR Console Manager supports a single network interface. One of the following physical network interfaces will be available depending on installed hardware options:

- Ethernet 100baseT
- Gigabit Ethernet

2.3.2 Additional Protocols

The Cedara CR Console Manager conforms to the System Management Profiles listed in the Table below. All requested transactions for the listed profiles and actors are supported. Support for optional transactions are listed in the following table:

Profile Name	Actor	Protocols Used	Optional Transactions	Security Support
Network Address Management	DHCP Client	DHCP	N/A	
	DNS Client	DNS	N/A	

2.3.2.1 DHCP

DHCP can be used to obtain TCP/IP network configuration information. The network parameters obtainable via DHCP are shown in the Table below. The Default Value column of the table shows the default used if the DHCP server does not provide a value. Values for network parameters set in the Service/Installation tool take precedence over values obtained from the DHCP server. Support for DHCP is pre-configured on the system. If DHCP is not in use, TCP/IP network configuration information must be manually configured via the service interface.

DHCP Parameter	Default Value
IP Address	None
Host Name	Requested machine name

List of NTP servers	Empty list
List of DNS servers	Empty list
Routers	Empty list
Static Routes	None
Domain name	None
Subnet Mask	Derived from IP Address (see service manual)
Broadcast address	Derived from IP Address (see service manual)
Default Router	None
Time Offset	Site configurable (from Time Zone)
MTU	Network Hardware Dependent
Auto-IP permission	No permission

If the DHCP server refuses to renew a lease on the assigned IP address all active DICOM Associations will be aborted.

2.3.2.2 DNS

DNS can be used for address resolution. If DHCP is not in use or the DHCP server does not return any DNS server addresses, the identity of a DNS server can be configured in the system via the service interface. If a DNS server is not in use, local mapping between hostname and IP address can be manually configured via the service interface.

2.3.3 IPv4 and IPv6 Support

This product only supports IPv4 connections.

2.4 Configuration

2.4.1 AE Title/Presentation Address Mapping

2.4.1.1 Local AE Titles

The Cedara CR Console Manager uses the Worklist AE Title/ Storage AE Title and their TCP/IP Ports configured via the service page interface. The Field Service Personnel can configure the TCP Ports via the service page interface. No Default AE Title is provided. The AE Titles must be configured during installation.

2.4.1.2 Remote AE Title/Presentation Address Mapping

The AE Title, host names and port numbers of remote applications are configured using the service page interface.

2.4.2 Parameters

A number of parameters related to DICOM communication can be configured using preference and config files. The following table shows those configuration parameters relevant to DICOM

communication. See the Cedara CR Console Manager Service Manual for details on configuration capabilities.

Parameter	Configurable (Yes/No)	Default Value
Max. Send and Receive PDU Size (larger PDUs will never be sent, even if the receiver supports a larger Max PDU Receive Size. If the receiver supports a smaller Max PDU Receive Size then the Max PDU Send Size will be reduced accordingly for the duration of the Association. Max PDU Receive Size information is exchanged during DICOM Association Negotiation in the Maximum Length Sub-Item of the A-ASSOCIATION-RQ and A-ASSOCIATE-AC)	No	65536
Association Timeout and Inactivity Timeout (Time-out waiting for a response to an Association Request or to a release request, Time-out waiting for completion of a TCP/IP connect request, Time-out for waiting for data between TCP/IP-packets)	No	30 seconds
Supported Transfer Syntaxes (separately set for each service)	No	Implicit VR Little Endian
Worklist Auto Update Interval (Automatic worklist update request)	Yes	5 minutes
Storage Retry Time (How long before resending a failed storage job)	Yes	1 minute
Storage Commitment Enabled (Request storage commitment after successful C-STORE response)	Yes	Off

3 Media Interchange

Cedara CR Console Manager does not support Media Storage.

4 Support of Extended Character Sets

Cedara CR Console Manager only supports the default DICOM character repertoire.

5 Security

5.1 Security Profiles

Cedara CR Console Manager does not support any specific security measures.

It is user's responsibility to use the system within a secured environment and to maintain a secured environment that includes at a minimum:

- Firewall or router protections to ensure that only approved external hosts have network access to the system
- Firewall or router protections to ensure that the system 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))

5.2 Association Level Security

None supported.

5.3 Application Level Security

The service page user interface, that is used to configure the DICOM service, is password controlled.

6 Annexes

6.1 IOD Contents

Cedara CR Console Manager supports sending of CR images generated by Kodak LightQC.

6.1.1 Created CR SOP Instances

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

VNAP	Value Not Always Present (attribute sent zero length if no value is present)
ANAP	Attribute Not Always Present
ALWAYS	Always Present
EMPTY	Attribute is sent without a value

The abbreviations used in the “Source” column:

USER	the attribute value source is from User input
AUTO	the attribute value is generated automatically by Kodak LightQC
MWL	the attribute value is from MWL
CONSOLE	the attribute value is from Cedara CR Console Manager
CONFIG	the attribute value source is a configurable parameter

Attributes of the CR Image SOP Instances:

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	0008,0016	UI	“1.2.840.10008.5.1.4.1.1.1”	ALWAYS	AUTO
SOP Instance UID	0008,0018	UI	A unique UID for every new instance of image	ALWAYS	AUTO
Study Date	0008,0020	DA		ALWAYS	AUTO
Study Time	0008,0030	TM		ALWAYS	AUTO
Accession Number	0008,0050	SH		VNAP	USER or MWL
Modality	0008,0060	CS	“CR”	ALWAYS	AUTO
Manufacturer	0008,0070	LO		ALWAYS	AUTO
Institution Name	0008,0080	LO		ALWAYS	AUTO
Referring Physician's Name	0008,0090	PN		VNAP	AUTO
Station Name	0008,1010	SH		ALWAYS	AUTO
Study Description	0008,1030	LO		ANAP	AUTO
Performing Physician's Name	0008,1050	PN		ANAP	AUTO
Operator's Name	0008,1070	PN		ALWAYS	AUTO
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO
Patient's Name	0010,0010	PN		VNAP	USER or

					MWL
Patient ID	0010,0020	LO		VNAP	USER or MWL
Patient's Birth Date	0010,0030	DA		VNAP	USER or MWL
Patient's Sex	0010,0040	CS		VNAP	USER or MWL
Body Part Examined	0018,0015	CS		ALWAYS	AUTO
Plate ID	0018,1004	LO		ALWAYS	AUTO
Imager Pixel Spacing	0018,1164	DS		ALWAYS	AUTO
Relative X-Ray Exposure	0018,1405	IS		ALWAYS	AUTO
Patient Position	0018,5100	CS	Length = 0	ALWAYS	AUTO
View Position	0018,5101	CS		ALWAYS	AUTO
Sensitivity	0018,6000	DS		ALWAYS	AUTO
Study Instance UID	0020,00D	UI	A UID is automatically generated for every instance	ALWAYS	CONSOLE or MWL
Series Instance UID	0020,000E	UI	A UID is automatically generated for every instance	ALWAYS	AUTO
Study ID	0020,0010	SH	Length = 0	ALWAYS	AUTO
Series Number	0020,0011	IS		ALWAYS	AUTO
Instance Number	0020,0013	IS		ALWAYS	AUTO
Patient Orientation	0020,0020	CS	Length = 0	ALWAYS	AUTO
Laterality	0020,0060	CS	Length = 0	ALWAYS	AUTO
Samples Per Pixel	0028,0002	US	1	ALWAYS	AUTO
Photometric Interpretation	0028,0004	CS	"MONOCHROME2"	ALWAYS	AUTO
Rows	0028,0010	US		ALWAYS	AUTO
Columns	0028,0011	US		ALWAYS	AUTO
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO
Pixel Aspect Ratio	0028,0034	IS	"1\1"	ALWAYS	AUTO
Bits Allocated	0028,0100	US	16	ALWAYS	AUTO
Bits Stored	0028,0101	US	12	ALWAYS	AUTO
High Bit	0028,0102	US	11	ALWAYS	AUTO
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO
Smallest Image Pixel Value	0028,0106	US		ALWAYS	AUTO
Largest Image Pixel Value	0028,0107	US		ALWAYS	AUTO
Window Center	0028,1050	DS		ALWAYS	AUTO
Window Width	0028,1051	DS		ALWAYS	AUTO
Rescale Intercept	0028,1052	DS	0	ALWAYS	AUTO
Rescale Slope	0028,1053	DS	1	ALWAYS	AUTO
Rescale Type	0028,1054	LO	"US"	ALWAYS	AUTO

Pixel Data	7FE0,0010	OW		ALWAYS	AUTO
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6.1.2 Usage of Attributes From Received IOD's

The Cedara CR Console Manager maintains a list of study, that contains patient and study level attributes, in the database for image viewing.

6.1.3 Attribute Mapping

The Cedara CR Console Manager does not perform any attribute mapping.

6.1.4 Coerced/Modified Fields

The Cedara CR Console Manager sends IOD generated by Kodak LightQC and does not modify fields.

6.2 Data Dictionary of Private Attributes

No private attributes are defined.

6.3 Coded terminology and Templates

Code Meaning values are not interpreted or displayed by the application.

6.4 Grayscale Image Consistency

The Cedara CR Console Manager does not support the Grayscale Standard Display Function.

6.5 Standard Extended/Specialized/Private SOP Classes

The Cedara CR Console Manager does not claim conformance to any Extended, Specialized or Private SOP Classes.

6.6 Private Transfer Syntaxes

The Cedara CR Console Manager does not employ any Private Transfer Syntaxes.