



DICOM Conformance Statement

Cedara I-Store™

Version 4.2

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1 Introduction

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1 Scope and field of application

This document specifies the compliance to the DICOM standard. It contains a short description of the applications involved and provides technical information about the communications capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Classes, Roles, Information Object Definitions, Data Elements and Transfer Syntaxes.

This Conformance Statement should be read in conjunction with the DICOM standard.

1.2 Intended audience

This Conformance Statement is intended for:

- Potential clients,
- System integrators of medical equipment,
- Marketing persons interested in system functionality (i.e. the Service Classes supported),
- Software designers implementing DICOM interfaces.

It is assumed that the reader is familiar with the DICOM standard.

1.3 Contents and structure

The DICOM Conformance Statement is contained in chapter 2 through 16 and follows the contents and structuring requirements of DICOM PS 3.2-2003.

1.4 Used definitions, terms and abbreviations

DICOM definitions, terms and abbreviations are used throughout this Conformance Statement. For a description of these, see NEMA PS 3.3-2003 and PS 3.4-2003.

1.5 References

The DICOM standard is available under the document name:

NEMA PS 3.X (X refers to the part 1 - 16) and Supplements

Digital Imaging and Communications in Medicine (DICOM)

Published by:

National Electrical Manufacturers Association

1300 N. 17th Street, Rosslyn, Virginia 22209 USA

1.6 Important note to the reader

This Conformance Statement by itself does not guarantee successful interoperability. Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into a networked environment may require application functions that are not specified within the scope of DICOM. Consequently, the information provided by this Conformance Statement does not guarantee interoperability.

It is the user's responsibility to analyze thoroughly the application requirements and the environment of the applications.

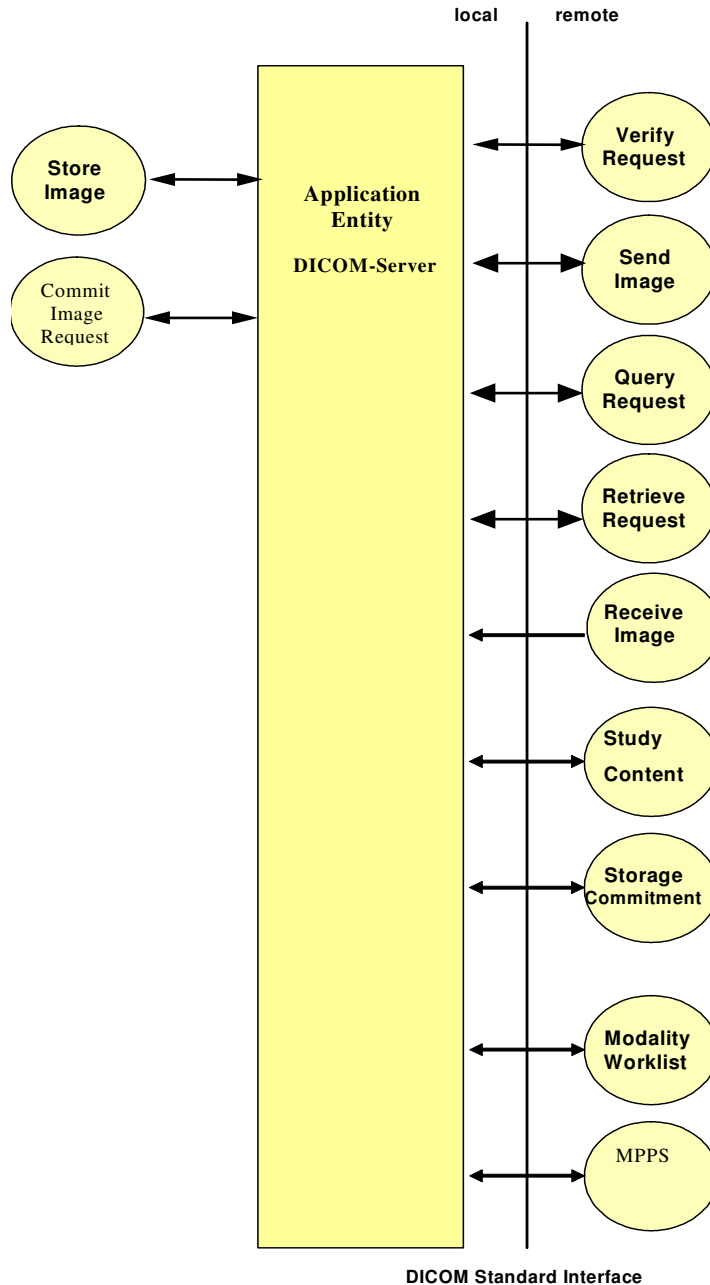
2 Implementation model

The system entitled Cedara I-Store™ is a medical image storage system. Cedara I-Store receives medical images from modalities of different types and stores these images on some storage facility. Cedara I-Store may also actively retrieve images from modalities.

The interface between Cedara I-Store and remote applications connected to Cedara I-Store is conformant to DICOM i.e. remote application may send images to Cedara I-Store using the C-STORE DIMSE-C Service from one of the SOP Classes in the Storage Service Class. Cedara I-Store queries the contents of remote database providers using the C-FIND DIMSE-C Service. Also Cedara I-Store retrieves images from a service provider using the C-MOVE DIMSE C-Service.

2.1 Application Data Flow Diagram

The Cedara I-Store system behaves as a single application entity.



2.2 Functional definition of Application Entities

The Cedara I-Store application entity acts as a service class user of store, verification and query retrieve service classes. The application entity acts as a service class provider of verification and storage service classes. It supports as a service class provider and service class user for the storage commitment classes and as a service class user for the study content notification

classes and the modality worklist classes.

2.3 Sequencing of Real World Activities

Not applicable.

3 AE Specifications

3.1 AE Specification

The Cedara I-Store Application Entity provides Standard Conformance to the following DICOM SOP classes as an SCU:

Table 1: Supported SOP classes by the Cedara I-Store AE as SCU

SOP Class Name	UID
Verification	1.2.840.10008.1.1
Basic Study Content Notification	1.2.840.10008.1.9
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1
XRA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
Patient Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2
Ultrasound Multiframe Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage - For	1.2.840.10008.5.1.4.1.1.1.2

SOP Class Name	UID
Presentation	
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
VL Endoscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.4
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3
Mammography CAD SR SOP Class	1.2.840.10008.5.1.4.1.1.88.50
Modality Worklist Information Model - Find SOP Class	1.2.840.10008.5.1.4.31
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.3
RT Plan Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.5

The Cedara I-Store Application Entity provides Standard Conformance to the following DICOM SOP classes as an SCP:

Table 2: Supported SOP classes by the Cedara I-Store AE as SCP

SOP class Name	UID
Verification	1.2.840.10008.1.1
Basic Study Content Notification	1.2.840.10008.1.9
CR Image Storage	1.2.840.10008.5.1.4.1.1.1
Grayscale Softcopy Presentation State	1.2.840.10008.5.1.4.1.1.11.1
XRA Image Storage	1.2.840.10008.5.1.4.1.1.12.1
RF Image Storage	1.2.840.10008.5.1.4.1.1.12.2
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
NM Image Storage	1.2.840.10008.5.1.4.1.1.20
US Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1

SOP class Name	UID
SC Image Storage	1.2.840.10008.5.1.4.1.1.7
PET Image Storage	1.2.840.10008.5.1.4.1.1.128
Patient Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2
Patient/Study Only Query/Retrieve Info Model – FIND	1.2.840.10008.5.1.4.1.2.3.1
Patient/Study Only Query/Retrieve Info Model – MOVE	1.2.840.10008.5.1.4.1.2.3.2
Ultrasound Multiframe Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
VL Endoscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.1
VL Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.2
VL Slide-Coordinates Microscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.3
VL Photographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.77.1.4
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3
Mammography CAD SR SOP Class	1.2.840.10008.5.1.4.1.1.88.50
Modality Worklist Information Model - Find SOP Class	1.2.840.10008.5.1.4.31
RT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.1
RT Dose Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.2
RT Structure Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.3
RT Plan Storage SOP Class	1.2.840.10008.5.1.4.1.1.481.5

3.1.1 Association Establishment Policies

3.1.1.1 General

Cedara I-Store will offer a configurable PDU size on associations initiated by Cedara I-Store itself. Cedara I-Store will accept any PDU size offered on associations initiated by remote applications, if it is smaller or equal to its own PDU-size.

The PDU-Size of Cedara I-Store can be configured in the windows registry. Its default value is 60000.

3.1.1.2 Number of Associations

The number of simultaneous associations supported by Cedara I-Store as a service class provider and service class user is in principle not limited. The practical maximum number of supported associations is determined by the amount of resources (CPU, memory, hard disk size).

The number of simultaneous store associations is in principle not limited.

3.1.1.3 Asynchronous Nature

Cedara I-Store does support asynchronous operations and performs asynchronous window negotiation.

3.1.1.4 Implementation Identifying Information

Implementation Class UID of Cedara I-Store for Windows is: 1.2.276.0.30.2

A Version name is not supplied.

3.1.2 Association Initiation Policy

Cedara I-Store initiates associations as a result of the following events:

- Cedara I-Store initiates an image storage.
 - If I-Store is setup as an online cache, upon receiving images, I-Store should forward these images to an archive.
- Cedara I-Store initiates a query or move request.
 - Application wants to query what's available in another DICOM contact and initiates a move request to move images over to I-Store
- Cedara I-Store initiates a modality performed procedure step notification
 - MPPS should be initiated when the system receives an MPPS notification from a client which it needs to propagate to one or more other interested parties. It receives one then sends/echo that to one or more other nodes.
- Cedara I-Store initiates Storage Commitment Request
 - If I-Store is setup as an online cache, upon receiving images, I-Store should forward these images to an archive and issue Storage Commitment Request to confirm images have been arrived to the archive so that it can remove the copy locally.

I-Store can propose any of the presentation contexts shown in the table below:

Table 3: Proposed Presentation Contexts

Presentation Context table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Query / Retrieve	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
	1.2.840.10008.5.1.4.1.2.3.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian			
	1.2.840.10008.5.1.4.1.2.2.2				
	1.2.840.10008.5.1.4.1.2.3.2				
Images	Any of the Image Storage SOP classes listed in Table 1	1.2.840.10008.3.1.2.3.3	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCU	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCU	None
		JPEG Lossless (Process 14)	1.2.840.10008.1.2.4.70	SCU	None

		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCU	None
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91	SCU	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
Storage Commitment Push Model SOP Class	1.2.840.10008.1.2.0.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None

3.1.2.1 Query/Reterive

3.1.2.1.1 Associated Real-World Activity

Application wants to query what's available in another DICOM contact and initiates a move request to move images over to I-Store

3.1.2.1.2 Presentation Context Table

Each time an association is initiated, Cedara I-Store proposes a number of Presentation Contexts to be used on that association. They are listed in Table 3, “Proposed Presentation Contexts” - Query / Reterive section.

3.1.2.2 Export Images

3.1.2.2.1 Associated Real-World Activity

If I-Store is setup as an online cache, upon receiving images, I-Store should forward these images to an archive.

I-Store can also move images to different configured DICOM partner upon receiving a move request from users or other DICOM partners.

3.1.2.2.2 Presentation Context Table

Each time an association is initiated, Cedara I-Store proposes a number of Presentation Contexts to be used on that association. They are listed in Table 3, “Proposed Presentation Contexts” – Images section.

3.1.2.2.3 SOP Specific Conformance for SOP Class(es)

Cedara I-Store might change invalid data elements of an image on export.

Cedara I-Store will recalculate and insert the Group Length elements in the image header.

3.1.2.3 Modality Performed Procedure Step

3.1.2.3.1 Associated Real-World Activity

MPPS should be initiated when the system receives an MPPS notification from a client which it needs to propagate to one or more other interested parties. It receives one then sends/echo that to one or more other nodes.

3.1.2.3.2 Presentation Context Table

Each time an association is initiated, Cedara I-Store proposes a number of Presentation Contexts to be used on that association. They are listed in Table 3, “Proposed Presentation Contexts” – Modality Performed Procedure Step SOP Class.

3.1.2.4 Storage Commitment with Cedara I-Store (SCU)

3.1.2.4.1 Associated Real-World Activity

If I-Store is setup as an online cache, upon receiving images, I-Store should forward these images to an Merge OEM

archive and issue Storage Commitment Request to confirm images have been arrived to the archive so that it can remove the copy locally.

3.1.2.4.2 Presentation Context Table

I-Store can propose any of the presentation contexts listed in Table 3, “Proposed Presentation Contexts”- Storage Commitment Push Model SOP Class section

3.1.2.4.3 SCU Conformance

Cedara I-Store can request storage commitment N-Action for any SOP Instance that has been transferred to a remote DICOM AE. It does not support the optional Storage Media File-Set ID and UID attributes in the storage commitment request. Cedara I-Store will check each instance status inside the report accordingly. Cedara I-Store can be configured to re-send the data if the storage commitment request couldn't be processed.

The following attributes are supported in Storage Commitment N-Action request; this table is a subset of Table J.3-1 in PS 3.4-2003 of the DICOM Standard:

Attribute	Tag	Req. Type (SCU)
Transaction UID	(0008,1195)	1
Referenced SOP Sequence	(0008,1199)	1
>Referenced SOP Class UID	(0008,1150)	1
>Referenced SOP Instance UID	(0008,1155)	1

3.1.3 Association Acceptance Policy

The Cedara I-Store Application Entity accepts association requests from all applications independent of the called or calling AE title; reference also 6.1.

The AE title of Cedara I-Store is defined by the user and is fully configurable per individual DICOM-Partner. The configuration is made in the GUI of Cedara I-Store.

Cedara I-Store accepts associations for the following purposes:

- To allow remote applications to verify application level communication with Cedara I-Store.
- To allow remote applications to store images in the Cedara I-Store database.
- To allow remote applications to query the local Cedara I-Store database.
- To allow remote applications to move images from the local storage of Cedara I-Store to a destination defined by an AE title which have to be configured in the Cedara I-Store software (GUI).
- To allow remote applications to check the storage commitment of an image
- To allow remote applications to check the contents of a study.
- To allow remote applications to notify about a modality performed procedure step

Any of the presentation contexts shown in the table below are acceptable:

Table 4: Acceptable Presentation Contexts

Presentation Context table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification / Query / Move	SOP classes listed in Table 2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
Any of the Image Storage SOP classes listed in Table 2		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	SCP	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCP	None
		JPEG Lossless (Process 14)	1.2.840.10008.1.2.4.70	SCP	None
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90	SCP	None
		JPEG 2000 Image Compression	1.2.840.10008.1.2.4.91	SCP	None
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None

Storage Commitment Push Model SOP Class	1.2.840.100 08.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	SCU/SCP Role selection
		Explicit VR Little Endian	1.2.840.10008.1.2.1	SCU	SCU/SCP Role selection
		Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	SCU/SCP Role selection

3.1.3.1 Verify Application Level Communication

3.1.3.1.1 Associated Real-World Activity

Cedara I-Store accepts associations from nodes that wish to verify application level communication using the C-ECHO command.

3.1.3.1.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” on page 17 are acceptable.

3.1.3.1.3 C-ECHO SCP Conformance

Cedara I-Store provides standard conformance.

3.1.3.1.4 Presentation Context Acceptance Criterion

Cedara I-Store accepts all contexts in the intersection of the proposed and acceptable presentation contexts. There is no check for duplicate contexts. Duplicate contexts are accepted.

3.1.3.1.5 Transfer Syntax Selection Policies

Cedara I-Store prefers Explicit VR Little Endian above Implicit VR Little Endian transfer syntax and explicit Big Endian transfer syntax. If only explicit Big Endian and Implicit Little Endian are supposed it will prefer explicit Big Endian.

3.1.3.2 Store Images in the Cedara I-Store Database

3.1.3.2.1 Associated Real-World Activity

Cedara I-Store accepts associations from nodes that wish to store images in the Cedara I-Store database using the C-STORE command.

3.1.3.2.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” on page 17 are acceptable.

3.1.3.2.3 C-STORE SCP Conformance

Cedara I-Store provides level 2 (Full) conformance for the Storage Service Class. In the event of a successful C-STORE operation, the image has been stored in the Cedara I-Store database. The duration of the storage of the image is determined by the user of Cedara I-Store.

Attributes are checked for DICOM-Conformance and attributes with invalid entries are changed to become valid.

No attribute values are changed by the Application Entity.

The C-STORE is unsuccessful if Cedara I-Store returns one of the following status codes:

- A700 - Indicates the database, or hard disk space is full.

3.1.3.2.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.2.5 Transfer Syntax Selection Policies

Cedara I-Store prefers Explicit VR Little Endian over Implicit VR Little Endian transfer syntax and explicit Big Endian transfer syntax. If only explicit Big Endian and Implicit Little Endian are supposed it will prefer explicit Big Endian.

3.1.3.3 Query database of Cedara I-Store

3.1.3.3.1 Associated Real-World Activity

Cedara I-Store accepts associations from nodes that wish to query information about the images in the Cedara I-Store database using the C-FIND command, if these nodes are configured as DICOM partners in the Cedara I-Store software which are allowed to use this service.

3.1.3.3.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” on page 17 are acceptable.

3.1.3.3.3 C-FIND SCP Conformance

Cedara I-Store provides baseline and extended behavior as defined in Part 4 C.4.1.3.1 of the DICOM standard. So the SCU can perform a hierarchical or a relational query.

In the event of a successful C-FIND operation, Cedara I-Store returns a response with state success.

The C-FIND is unsuccessful if Cedara I-Store returns a response with the state failed or refused

The following attributes can be queried:

Patient Level:

0010,0010	PatientsName
0010,0020	PatientsID
0010,0030	PatientsBirthDate
0010,0040	PatientsSex
0010,1000	OtherPatientID
0010,1001	OtherPatientNames
0010,2160	EthnicGroup
0010,4000	PatientsComments
0010,0032	PatientsBirthTime
0020,1200	PatientRelatedStudies
0020,1202	PatientRelatedSeries
0020,1204	PatientRelatedInstances

Study Level:

0020,0010	StudyID
0020,000D	StudyInstanceUID
0008,0050	AccessionNumber
0008,0020	StudyDate
0008,0030	StudyTime
0008,0090	ReferringsPhysiciansName
0008,1030	StudyDescription
0008,1060	NameOfPhysicianReadingTheStudy
0020,1070	OtherStudyNumbers
0032,4000	StudyComments
0008,0061	ModalitiesInStudy
0020,1206	StudyRelatedSeries
0020,1208	StudyRelatedInstances

Series Level:

0008,0060	Modality
0020,000E	SeriesInstanceUID
0020,0011	SeriesNumber
0018,0015	BodyPartExamined
0008,103E	SeriesDescription
0008,0021	SeriesDate
0008,0031	Series Time
0008,1050	PerformingPhysiciansName
0008,1070	Operators Name
0020,1209	SeriesRelatedInstances
0040,0244	PerformedProcedureStepStartDate
0040,0245	PerformedProcedureStepStartTime
0040,0254	PerformedProcedureStepDescription
0040,0253	PerformedProcedureStepID
0040,0275	RequestAttributesSequence
0040,A370	ReferencedRequestSequence

Image Level:

0008,0018	ImageInstanceUID
0020,0013	ImageNumber
0020,4000	ImageComments
0008,0023	ImageDate
0008,0033	ImageTime
0008,0008	ImageType
0020,0012	AcquisitionNumber
0008,0022	AcquisitionDate
0008,0032	AcquisitionTime
0020,4000	ImageComments
0020,0052	FrameOfReferenceUID
0008,0016	SOPClassUID
0028,0008	NumberOfFrames
0028,0010	ImageHeight
0028,0011	ImageWidth
0028,0100	BitsAllocated
0028,0101	BitsStored
0028,0103	PixelRepresentation
0028,0002	SamplesPerPixel
0028,0004	PhotometricInterpretation
0040,A032	ObservationDateTime
0040A043	ConceptNameCodeSequence
0070,0082	PresentationCreationDate
0070,0083	PresentationCreationTime
0070,0081	ContentDescription
0070,0080	PresentationLabel
0070,0084	PresentationCreatorsName

3.1.3.3.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.3.5 Transfer Syntax Selection Policies

Reference: Section 3.1.3.1.5.

3.1.3.4 Move images from the Cedara I-Store database

3.1.3.4.1 Associated Real-World Activity

Cedara I-Store accepts associations from nodes that wish to move images from the local Cedara I-Store for Windows database using the C-MOVE command, if these nodes are configured as DICOM partners in the Cedara I-Store software which are allowed to use this service. Furthermore the move destination must be known to the Cedara I-Store software, this means the destination has to be a configured DICOM partner.

3.1.3.4.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” are acceptable.

3.1.3.4.3 C-MOVE SCP Conformance

Cedara I-Store provides baseline and extended behavior as defined in Part 4 C.4.2.3.1 of the DICOM standard. So the SCU can issue a hierarchical or a relational move request.

In the event of a successful C-MOVE operation, Cedara I-Store returns a response with state success.

In the event of a partly successful C-MOVE operation, Cedara I-Store returns a response with state warning.

The C-MOVE is unsuccessful if Cedara I-Store returns a response with the state failed or refused

The attributes which can be used to specify the moved images is the same as the set of attributes supported for C-FIND see 3.1.3.3.3.

3.1.3.4.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.4.5 Transfer Syntax Selection Policies

Reference: Section 3.1.3.1.5.

3.1.3.5 Notification of Study Contents with Cedara I-Store (SCP)

3.1.3.5.1 Associated Real-World Activity

Cedara I-Store accepts associations from nodes that wish to get a notification for a study contents in the Cedara I-Store database using the C-STORE command.

3.1.3.5.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” are acceptable.

3.1.3.5.3 SCP Conformance

Cedara I-Store provides conformance for the Storage Service Class. In the event of a successful C-STORE operation, the returned status has the following meaning:

- 0000 – Study is completely available in the Cedara I-Store database
- 0001 – Study is partially available in the Cedara I-Store database
- 0002 – Study is not available in the Cedara I-Store database
- 0003 – Cedara I-Store was not able to determine if study is available or not

Attributes are checked for DICOM-Conformance and attributes with invalid entries are changed to become valid.

The notification is unsuccessful if Cedara I-Store returns one of the following status codes:

- C000 – the service could not be performed.

3.1.3.5.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.5.5 Transfer Syntax Selection Policies

Reference: Section 3.1.3.1.5.

3.1.3.6 Storage Commitment with Cedara I-Store (SCP)

3.1.3.6.1 Associated Real-World Activity

Cedara I-Store accepts associations from nodes that wish to query Cedara I-Store for confirmation to store images for a longer time period.

3.1.3.6.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” are acceptable.

3.1.3.6.3 SCP Conformance

Cedara I-Store provides conformance for the Storage Commitment Push Service Class. In the event of a successful N-Action operation, the returned status has the following meaning:

- 0000 – the storage commitment request was successfully received
- 0110 – the storage commitment request could not be processed

Attributes are checked for DICOM-Conformance and attributes with invalid entries are changed to become valid.

In result to the N-Action command Cedara I-Store will initiate a new association back to the SCU and will send an N-EVENT-REPORT with the status of the requested SOP Instance UIDs back to the SCU. Therefore Cedara I-Store will include an SCP/SCU rule negotiation user item

in the association request, where Cedara I-Store will request the SCP role.

The stored SOP instances are listed in the 0008,1199 success sequence and the SOP instances for which the storage state could not be found will be listed in the 0008,1198 failed sequence.

3.1.3.6.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.6.5 Transfer Syntax Selection Policies

Reference: Section 3.1.3.1.5.

3.1.3.7 Modality Performed Procedure Step SOP Class

3.1.3.7.1 Associated Real-World Activity

Cedara I-Store stores information about Modality Performed Procedure Steps (MPPS) in its database. It accepts associations from nodes that wish to create or update information about MPPS.

Cedara I-Store acts as SCP for the N-Create and N-Set messages related to the Modality Performed Procedure Step SOP Class identified through the UID: 1.2.840.10008.3.1.2.3.3.

The following attributes are supported; this table is identical to the Table F.7.2-1 in PS 3.4-2003 of the DICOM standard:

Table 1: Attributes for MPPS

Attribute Name	Tag	Req. Type N-CREATE	Req. Type N-SET	Requirement Type Final State
		(SCU/SCP)	(SCU/SCP)	
Specific Character Set	(0008,0005)	1C/1C	Not allowed	
Scheduled Step Attribute Sequence	(0040,0270)	1/1	Not allowed	
>Study Instance UID	(0020,000D)	1/1	Not allowed	
>Referenced Study Sequence	(0008,1110)	2/2	Not allowed	
>>Referenced SOP Class UID	(0008,1150)	1C/1 Sequence Item is present) (Required if	Not allowed	
>>Referenced SOP Instance UID	(0008,1155)	1C/1 Sequence Item is (Required if present)	Not allowed	
>Accession Number	(0008,0050)	2/2	Not allowed	
>Placer Order Number/Imaging Service Request	(0040,2016)	3/3	Not allowed	
>Filler Order Number/Imaging Service Request	(0040,2017)	3/3	Not allowed	
>Requested Procedure ID	(0040,1001)	2/2	Not allowed	
>Requested Procedure Description	(0032,1060)	2/2	Not allowed	
>Scheduled Procedure Step ID	(0040,0009)	2/2	Not allowed	
>Scheduled Procedure Step Description	(0040,0007)	2/2	Not allowed	
>Scheduled Protocol Code Sequence	(0040,0008)	2/2	Not allowed	
>>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Coding Scheme designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Coding Scheme Version	(0008,0103)	3/3	Not allowed	
>>Code Meaning	(0008,0104)	3/3	Not allowed	
Patient's Name	(0010,0010)	2/2	Not allowed	
Patient ID	(0010,0020)	2/2	Not allowed	
Patient's Birth Date	(0010,0030)	2/2	Not allowed	
Patient's Sex	(0010,0040)	2/2	Not allowed	
Referenced Patient Sequence	(0008,1120)	2/2	Not allowed	
>Referenced SOP Class UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	Not allowed	
>Referenced Instance UID	(0008,1155)	1C/1 (Required if Sequence Item is present)	Not allowed	
Performed Procedure Step ID	(0040,0253)	1/1	Not allowed	
Performed Station AE Title	(0040,0241)	1/1	Not allowed	
Performed Station Name	(0040,0242)	2/2	Not allowed	
Performed Location	(0040,0243)	2/2	Not allowed	
Performed Procedure Date Step Start	(0040,0244)	1/1	Not allowed	
Performed Procedure Step Start Time	(0040,0245)	1/1	Not allowed	
Performed Procedure Step Status	(0040,0252)	1/1	3/1	
Performed Procedure Step Description	(0040,0254)	2/2	3/2	
Performed Procedure Type Description	(0040,0255)	2/2	3/2	
Procedure Code Sequence	(0008,1032)	2/2	3/2	

Attribute Name	Tag	Req. Type N-CREATE	Req. Type N-SET	Requirement Type Final State
>>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Coding Scheme designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	Not allowed	
>>Coding Scheme Version	(0008,0103)	3/3	Not allowed	
>>Code Meaning	(0008,0104)	3/3	Not allowed	
Patient's Name	(0010,0010)	2/2	Not allowed	
Patient ID	(0010,0020)	2/2	Not allowed	
Patient's Birth Date	(0010,0030)	2/2	Not allowed	
Patient's Sex	(0010,0040)	2/2	Not allowed	
Referenced Patient Sequence	(0008,1120)	2/2	Not allowed	
>Referenced SOP Class UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	Not allowed	
>Referenced Instance UID	(0008,1155)	1C/1 (Required if Sequence Item is present)	Not allowed	
Performed Procedure Step ID	(0040,0253)	1/1	Not allowed	
Performed Station AE Title	(0040,0241)	1/1	Not allowed	
Performed Station Name	(0040,0242)	2/2	Not allowed	
Performed Location	(0040,0243)	2/2	Not allowed	
Performed Procedure Date Step Start	(0040,0244)	1/1	Not allowed	
Performed Procedure Step Start Time	(0040,0245)	1/1	Not allowed	
Performed Procedure Step Status	(0040,0252)	1/1	3/1	
Performed Procedure Step Description	(0040,0254)	2/2	3/2	
Performed Procedure Type Description	(0040,0255)	2/2	3/2	
Procedure Code Sequence	(0008,1032)	2/2	3/2	
>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	1C/1	
>Coding Scheme Designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Coding Scheme Version	(0008,0103)	3/3	3/3	
>Code Meaning	(0008,0104)	3/3	3/3	
Performed Procedure Step End Date	(0040,0250)	2/2	3/1	1
Performed Procedure Step End Time	(0040,0251)	2/2	3/1	1
Comments on the Performed Procedure Step	(0040,0280)	3/3	3/3	
Performed Procedure Step Discontinuation Reason Code	(0040,0281)	3/3	3/3	
Sequence				
>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	1C/1	
>Coding Scheme Designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>Coding Scheme Version	(0008,0103)	3/3	3/3	
>Code Meaning	(0008,0104)	3/3	3/3	
Modality	(0008,0060)	1/1	Not allowed	

Attribute Name	Tag	Req. Type N-CREATE	Req. Type N-SET	Requirement Type Final State
Study ID	(0020,0010)	2/2	Not allowed	
Performed Protocol Code Sequence	(0040,0260)	2/2	3/2	
>Code Value	(0008,0100)	1C/1 (Required if Sequence Item is present)	1C/1	
>Coding Scheme Designator	(0008,0102)	1C/1 (Required if Sequence Item is present)	Sequence Item is present) 1C/1 (Required if	
>Coding Scheme Version	(0008,0103)	3/3	3/3	
>Code Meaning	(0008,0104)	3/3	3/3	
Performed Series Sequence	(0040,0340)	2/2	3/1	1 (See note 2)
>Performing Physician's Name	(0008,1050)	(Required if Sequence Item is present) 2C/2	(Required if Sequence Item is present) 2C/2	2
>Protocol Name	(0018,1030)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	1
>Operator's Name	(0008,1070)	2C/2 (Required if Sequence Item is present)	2C/2 (Required if Sequence Item is present)	2
>Series Instance UID	20,000E)(00	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	1
>Series Description)(0008,103E	2C/2 present) (Required if Sequence Item is	2C/2 present) (Required if Sequence Item is	2
>Retrieve AE Title	(0008,0054)	(Required if Sequence Item is 2C/2 present)	(Required if Sequence Item is 2C/2 present)	2
>Referenced Sequence Image	(0008,1140)	(Required if 2C/2 Sequence Item is present)	(Required if 2C/2 Sequence Item is present)	See F.7.2.2.2.
>>Referenced SOP Class UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>>Referenced Instance SOP UID	(0008,1155)	(Required if 1C/1 Sequence Item is present)	(Required if 1C/1 Sequence Item is present)	
>Referenced Image Instance Non-Composite SOP Sequence	(0040,0220)	(Required if 2C/2 Sequence Item is present)	(Required if 2C/2 Sequence Item is present)	See F.7.2.2.2.
>>Ref Class referenced SOP UID	(0008,1150)	1C/1 (Required if Sequence Item is present)	if sent) 1C/1 (Required Sequence Item is pre	
>>Referenced SOP Instance UID	(0008,1155)	1C/1 (Required if Sequence Item is present)	1C/1 (Required if Sequence Item is present)	
>All other attributes from Performed Series Sequence		3/3	3/3	
All other attributes from Radiation Dose Module and Billing Material Code Module		3/3	3/3	

3.1.3.7.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, "Acceptable Presentation Contexts," are acceptable.

3.1.3.7.3 SCP Conformance

Cedara I-Store provides conformance for the Modality Performed Procedure Step SOP Class. When Cedara I-Store receives an N-Create message for an instance UID, which is unknown a new MPPS object is created.

The attribute "Performed Procedure Step Status" can only be updated, if the current status of the object is IN PROGRESS. Messages of type N-Create and N-Set which are received for instances which have a state of COMPLETED or DISCONTINUED are refused. The status code 0110H (Performed Procedure Step object may no longer be updated) is returned.

No attributes are changed by the SCP by default (nevertheless an existing configuration can lead to site specific changes).

The default behaviour of Cedara I-Store is to delete MPPS objects which have not been updated for at least 8 hours. The amount of hours can be configured by the user.

3.1.3.7.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.7.5 Transfer Syntax Selection Policies

Reference: Section 3.1.3.1.5.

3.1.3.8 Modality Worklist SOP Class

3.1.3.8.1 Associated Real-World Activity

Cedara I-Store stores information about Modality Worklist Entries, which it receives from a RIS System through HL7 Order Messages, in its database. It accepts associations from nodes that wish to query the Modality Worklist.

Cedara I-Store acts as SCP for the C-Find messages related to the Modality Worklist SOP Class identified through the UID: 1.2.840.10008.5.1.4.31.

In the event of a successful C-FIND operation, Cedara I-Store returns a response with state success.

The C-FIND is unsuccessful if Cedara I-Store returns a response with the state failed or refused

The following attributes can be queried (see Table K.6-1 in PS 3.4-2003 of the DICOM standard):

Inside Sequence 0040,0100:

Scheduled Station AE Title	0040,0001
Scheduled Procedure Step Start Date	0040,0002
Scheduled Procedure Step Start Time	0040,0002
Scheduled Performing Physicians Name	0040,0006
Scheduled Procedure Step Description	0040,0007
Scheduled Procedure Step ID	0040,0009
Modality	0008,0060

On top-level:

Patients Name	0010,0010
Patients ID	0010,0020
Patients Birth Date	0010,0030
Patients Sex	0010,0040
Other Patient ID	0010,1000
Admission ID	0038,0010
Current Patient Location	0038,0300
Referring Physicians Name	0008,0090
Pregnancy Status	0010,21c0
Patients State	0038,0500
Confidentiality	0040,3001
Contrast Allergies	0010,2110
Placer Order Number	0040,2016
Filler Order Number	0040,2017
Medical Alerts	0010,2000
Requested Procedure Description	0032,1060
Accession Number	0008,0050
Requested Procedure ID	0040,1001

Patient Transport Arrangements	0040,1004
Requested Procedure Code Value	0032,1064
Scheduled Protocol Code Sequence	0040,0008
Patients Weight	0010,1030
Study Instance UID	0020,000D

All of the above attributes can also be used for matching according to their value type.

If the Scheduled Station AE Title is omitted from the query it will be set by default, with the Calling AE Title used during association establishment. This default behavior can be switched off through a configuration setting.

Attributes not mentioned above will be returned unchanged.

3.1.3.8.2 Presentation Context Table

Any of the presentation contexts shown in Table 4, “Acceptable Presentation Contexts,” are acceptable.

3.1.3.8.3 SCP Conformance

Cedara I-Store provides conformance for the Modality Worklist SOP Class.

Cedara I-Store supports case-insensitive matching for all text attributes, like PN VR attributes or CS VR attributes.

The usage of the Specific Character Set (0008,0005) for queries or matching is not supported.

3.1.3.8.4 Presentation Context Acceptance Criterion

Reference: Section 3.1.3.1.4.

3.1.3.8.5 Transfer Syntax Selection Policies

Reference: Section 3.1.3.1.5.

4 Communication Profiles

4.1 Supported Communication Stacks

The Cedara I-Store application provides DICOM TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.2 TCP/IP Stack

Cedara I-Store inherits its TCP/IP stack from the operating system upon which it executes.

4.2.1 Physical Media Support

Depends on the computer and its operating systems on which Cedara I-Store is used.

5 Extensions/Specializations/Privatizations

Not applicable.

6 Configuration

Cedara I-Store is highly configurable not only concerning the DICOM communication. So in this document only the options of common interest for the DICOM communication are mentioned. For a more detailed description of the configurable options refer to the "Service Handbook for Cedara I-Store for Windows".

The Cedara I-Store system is configured by editing key/value pairs in the registry. This editing is intended to be used by service engineers only. For some configurable options a user interface for the normal users exists.

6.1 AE Title/Presentation Address mapping

6.1.1 Local AE Titles and Presentation Addresses

The local AE-titles are configurable per destination. Cedara I-Store may have more than one AE-title. Cedara I-Store may also have more than one AE-title per destination.

Cedara I-Store listens for the C-STORE service on port **104** and for the C-MOVE, C-FIND and all other services which it supports on port **105**. These port numbers are configurable in the windows registry; see the "Service Handbook for Cedara I-Store " for details.

6.1.2 Remote AE Titles and Presentation Addresses

AE-titles and the mapping to IP-addresses and port-numbers is fully configurable. AE-Titles are not mapped to hostnames. Default behavior is that any pair of AE-titles is accepted. The user must provide the following information for each remote application, with which he wants to communicate:

- The application entity title.
- The local application entity title
- The foreign IP-address.
- The foreign DICOM-port.

This is configured using the GUI interface.

6.1.3 Usage of Called AE-Titles when storing images to Cedara I-Store.

Cedara I-Store can be configured to sort received images into different databases (called groups in Cedara I-Store) according to the called AE title used by the sender. This is done in the file aptitles.def (e.g.: set gCalled(Interest) { dummy "Interesting Cases" }). All images send to a non configured called AE title are placed in the local database.

6.1.3.1 Sending Images directly to a folder of Cedara I-Store

Cedara I-Store can sort received images directly into a folder with the patients names as the title. To use this feature the called AE title must have a trailing dash. For example: Interest-

Now the received image is stored in the database "Interesting Cases" (see. 6.1.3) and a folder in this database is created with the name of the patient to which the images belong.

6.2 Other configurable items

- Maximum PDU size
- Supported abstract syntaxes
- Usage of Value Representation UN
- Making images anonymous before storing them to a DICOM-node

7 Support of Extended Character Sets

Cedara I-Store does not support Extended Character Sets.