

IntelHeart

9.4 and later | DICOM Conformance Statement



intelerad

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INTENDED USE

The InteHeart is intended for use in the communication and storage of medical images. The InteHeart is also intended for use as a comprehensive solution to view, optimize, and post-process diagnostic medical images as an aid to physicians and other healthcare professionals in the evaluation of digital imaging examinations.

Due to special customer requirements based on the imaging modality and clinical focus, the InteHeart can be configured with different combinations of clinical applications which are intended to assist the physician in diagnosis or treatment planning. This includes commercially available post-processing techniques such as multi-planar reconstruction (MPR).

Lossy compressed mammographic images and digitized film screen images must not be reviewed for primary image interpretations. Mammographic images may only be interpreted using cleared monitors intended for mammography display. MPR is not intended for mammography use.

Not intended for diagnostic use on mobile devices.

EXPECTED LIFE

InteHeart is software. The lifetime of the product is approximately 3 to 4 years. Software is fully supported during its defined lifetime. InteHeart may require that clients' systems be upgraded to the latest configuration available past the end of life of software.

CONTRAINDICATIONS—None.

Caution: Federal law restricts this device to sale by or on the order of a physician.

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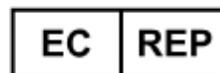


Intelrad Holdings USA Ltd.

305 Church at N Hills St, 6th Floor

Raleigh, North Carolina 27609 USA

Phone: +1 919-323-3001 extension 2



Emergo Europe
Westvoortsedijk 60
6827 AT Arnhem
The Netherlands



UK RESPONSIBLE PERSON

Emergo Consulting (UK) Limited
c/o Cr360 - UL International
Compass House, Vision Park Histon
Cambridge CB24 9BZ
United Kingdom



Device name: InteHeart
Medical Image Management System
Multiple Patient Multiple Use



InteHeart UDI is: **+B228INTELEHEART0/\$\$79R**

AUSTRALIAN SPONSOR

Emergo Australia
Level 20, Tower II, Darling Park, 201 Sussex Street
Sydney, NSW 2000, Australia
Australia

NAME AND ADDRESS OF IMPORTER IN BRAZIL:

Emergo Brazil Import Importação e Distribuição de Produtos Médicos Hospitalares Ltda
LdaSão

Avenida Francisco Matarazzo, 1752, salas 502/503, Água Branca,
São Paulo/SP, Brasil – CEP: 05001-200.
CNPJ: 04.967.408/0001-98
Resp. Técnico: Luiz Levy Cruz Martins – CRF-SP: 42415
Registro ANVISA no: 80117580706

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INTRODUCTION

The material presented in this publication is copyright-protected © 2007-2016 by Heart Imaging Technologies, LLC and may not be reproduced in any form, by any method, for any purpose, without the written consent of Heart Imaging Technologies, LLC. Information in this document is subject to change without notice.

The contents of this document describe the basic functionality provided by the IntelHeart Image Management System to communicate with devices using the DICOM standard.

The IntelHeart system is capable of receiving, storing, and sending DICOM information. Non-image DICOM information can be received and archived. Valid DICOM images can be received, archived, and converted to web-accessible formats that are then viewable online tIntelHeart URL. Remote systems can query and retrieve DICOM files and request transmission of DICOM files. The IntelHeart can query and retrieve DICOM files from remote DICOM compatible devices.

INTENDED AUDIENCE

This document is written for the people that need to understand how IntelHeart 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.

STATEMENT SCOPE

The scope of this DICOM Conformance Statement is to facilitate integration between IntelHeart and other DICOM compliant 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.

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 – generally equivalent to an Information Object Definition (IOD), the specification used to define the information to exchange in a message; does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. Examples: MR image object definition, CT image object definition, image query information model.

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.

– 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 – smallest unit of information in an object definition; a data element identified by a tag. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004).

Information Object Definition (IOD) – the specified set of Attributes that comprise a type of data object (see Abstract Syntax). 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).

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.

Transfer Syntax – the encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.

Unique Identifier (UID) – a globally unique “dotted decimal” string that identifies a specific object; 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.

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 stored images, transfer of image objects or files, and sending images to other devices.

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.

ABBREVIATIONS

AE	Application Entity
AET	Application Entity Title
CR	Computed Radiography
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
DX	Digital X-ray
HIS	Hospital Information System
HL7	Health Level 7 Standard
IOD	Information Object Definition
IO	Intra-oral X-ray
JPEG	Joint Photographic Experts Group
MPEG	Moving Picture Experts Group
MG	Mammography (X-ray)
MR	Magnetic Resonance Imaging
NM	Nuclear Medicine
OP	Ophthalmic Photography
PACS	Picture Archiving and Communication System
PDU	Packet Data Unit
PET	Positron Emission Tomography
RF	Radiofluoroscopy
RIS	Radiology Information System

RT	Radiotherapy
SC	Secondary Capture
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
SR	Structured Reporting
US	Ultrasound
XA	X-ray Angiography

REFERENCES

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

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INTELEHEART AE TITLE REQUIREMENTS

This section contains more detail surrounding DICOM communication with IntelHeart.

IntelHeart AE Title

The application Entity Title is “IntelHeart”.

Ports required for Communication

A standard IntelHeart installation will require the DICOM Receiver (StoreSCU) process to listen on port 104. DICOM files will arrive at the IntelHeart through this port. Other ports may be used in a customer implementation but will be specific to the requirements of the customer.

The standard IntelHeart installation will require the Query/Retrieve process to listen on port 7000. When third party DICOM compliant devices need to retrieve DICOM file information from IntelHeart

, this port is used. Other ports may be configured to support the Query/Retrieve function, but the custom port will be specific to the requirements of the customer.

IntelHeart AE Title Example

Configure a scanner, workstation or other DICOM compliant device using the following information. Specific information will be dependent on customer requirements.

Sending DICOM Images to IntelHeart

AE Title	To Be Determined (TBD) by customer (IntelHeart by default)
IP Address	To Be Determined (TBD) by customer
Port	104
Services	Storage Commitment

Send DICOM Queries to IntelHeart

AE Title	To Be Determined (TBD) by customer (IntelHeart by default)
IP Address	To Be Determined (TBD) by customer
Port	7000
Services	Query/Retrieve

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COMMUNICATION PROFILES

Supported Communication Stacks

DICOM Upper Layer over TCP/IP is supported.

OSI Stack

Not supported.

TCP/IP Stack

The TCP/IP stack is inherited from the underlying operating system

API

The application makes use of the Berkeley Sockets interface on Unix and of the WinSock interface on Win32 platforms.

Physical Media Support

DICOM is indifferent to the physical medium over which TCP/IP executes.

Point-to-Point Stack

Not supported

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STORE SCP

This application entity provides standard conformance to the following DICOM SOP classes as an SCP:

SOP Class Name	SOP Class UID
Verification	1.2.840.10008.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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 Present.	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

Hardcopy Color Image Storage	1.2.840.10008.5.1.1.1.30
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.1.29
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128
Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
X-ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8

Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
Stored Print Storage	1.2.840.10008.5.1.1.27
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Visible Light Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform	1.2.840.10008.5.1.4.1.1.9.2.1

Storage	
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Grayscale Byte Secondary Capture Image St.	1.2.840.10008.5.1.4.1.1.7.2
Multiframe Grayscale Word Secondary Capture Image St.	1.2.840.10008.5.1.4.1.1.7.3
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Draft Visible Light Image Storage (sup15_fz 1997)	1.2.840.10008.5.1.4.1.1.77.1
Draft Visible Light Multi Frame Image Storage (sup15_fz 97)	1.2.840.10008.5.1.4.1.1.77.2
Structured Reporting Text Storage (sup23_fz 1997)	1.2.840.10008.5.1.4.1.1.88.1
Structured Reporting Audio Storage (sup23_fz 1997)	1.2.840.10008.5.1.4.1.1.88.2
Structured Reporting Detail Storage (sup23_fz 1997)	1.2.840.10008.5.1.4.1.1.88.3
Structured Reporting Comprehensive Storage (sup23_fz 97)	1.2.840.10008.5.1.4.1.1.88.4
Draft Waveform Storage (sup30_fz 1997)	1.2.840.10008.5.1.4.1.1.9.1

OFFIS Private Presentation State IPC	1.2.276.0.7230010.3.4.1915765545.18030.917282194.0
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This application entity does not provide standard conformance to any SOP class as SCU.

Association Establishment Policies

General

The DICOM standard application context name, which is always proposed, is:

Application context name	1.2.840.10008.3.1.1.1
--------------------------	-----------------------

The maximum PDU length can be configured at installation time in the range 4096 - 131072 bytes.

The default is 16384 bytes.

SOP Class extended negotiation is not supported.

Store SCP can be configured to use secure DICOM communication conforming to the Basic TLS Secure Transport Connection Profile.

Asynchronous Nature

Asynchronous mode of operation is not supported.

Implementation Identifying Information

The implementation UID of this application is:

OFFIS DCMTK 3.5.0 Implementation Class UID	1.2.276.0.7230010.3.0.3.5.0
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Association Initiation by Real-World Activity

This application entity initiates associations when querying/retrieving from third party DICOM compliant devices.

Association Acceptance Policy

Real-World Activity “Image receipt”

The Store SCP application entity accepts an association when it receives an association request from a remote DICOM Storage or Verification SCU. The application entity accepts incoming association requests on a single port number defined in the configuration file. It accepts any association for which at least one presentation context is accepted. The calling and called application entity titles are ignored. The responding application entity name can be configured in the configuration file, the default is STORESCP. Association requests can be rejected with the following status codes and reasons:

Result	Source	Reason	Description
rejected permanent	provider, present. Related	temporary congestion	Resource limitation: process creation Failed
rejected transient	user	app. context name not supported	Incorrect application context name
rejected permanent	user	no reason	Private shutdown mechanism initiated

Associated Real-World Activity

The application entity waits for incoming associations. No operator action is required to receive DICOM data.

Presentation Context Table

The default behavior of the Store SCP is to accept as SCP for each of the supported SOP classes.

All presentation contexts containing one or more of the following transfer syntaxes:

Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2

The default behavior can be changed in the configuration file such that only presentation contexts for supported SOP classes containing the Implicit VR Little Endian transfer syntax are accepted.

SOP Specific Conformance for all Storage SOP Classes

The Store SCP will receive any DICOM objects (images and non-image objects) transmitted on the open association provided that the correct presentation context is used. If the objects are received successfully, they are stored and registered in the local database, from where they can be loaded and viewed through IntelexHeart. For all storage SOP classes except Grayscale Softcopy Presentation State Storage, no integrity checks of the received objects are performed beyond tests of a very basic structural integrity. In particular, the sending system is not prevented from transmitting incomplete or incorrect IODs or objects that are correct but cannot be displayed in the viewer (i. e. color images, unsupported non-image objects). Such objects will be retained in a study folder, and can be further transmitted with the Store SCU component, but they cannot be viewed. Objects are stored in the local database as files in DICOM part 10 format with Explicit VR Little Endian Transfer Syntax. When objects received in Implicit VR contain attributes unknown to this application, they are stored as “Unknown VR” (UN) elements. Certain element values may be changed during storage, i. e. group length values and sequence lengths are re-computed. This behavior can be changed in two ways in the configuration file:

- The support for unknown VR can be disabled. In this case, unknown elements are stored as “OB”.
- The Store SCP can be switched to “bit preserving mode”. In this case, objects are stored without any modification in the transfer syntax in which they are received.

For Grayscale Softcopy Presentation State Storage, transmitted objects are checked thoroughly. If a required element is absent or has an incorrect value, or if a feature of the Grayscale Softcopy Presentation State that is not supported by this implementation is used, the storage is rejected with the error code 0xC000: “Error, cannot understand”. Presentation State features not supported by this application are: Mask module.

The following error/warning status codes can be sent by the Store SCP in the context of a CSTORE-

RSP message:

Code	Name	Severity	Description
a700	refused: out of resources	failure	Application out of memory, file system or database write error (e. g. full)
a800	refused: SOP class not supported	failure	Received C-STORE-RQ for non-storage SOP class

a900	error: data set does not match SOP class	failure	SOP class or instance UID in C-STORE-RQ does not match UIDs in the received dataset
c000	error: cannot understand	failure	Received dataset without SOP class or instance UID; received Presentation State that failed syntax check; internal application error

Store SCP never removes, coerces or changes attribute values, except for the special case of group length attributes mentioned above. The Lossy Image Compression (0028,2110) attribute is ignored both during reception of an object and in the IntelHeart.

Store SCP implements Level 2 (Full) conformance to the Storage Service Class. Store SCP implements Signature Level 3 conformance since the integrity of incoming Digital Signatures is preserved even if “bit preserving mode” is not activated. However, extended negotiation is not supported.

SOP Specific Conformance for SR SOP Classes

SR content is not viewable in IntelHeart. All SR content items specified in PS.3-2000 can be stored within IntelHeart and can be accessed through DICOM standard communication.

Presentation Context Acceptance Criterion

The application entity will accept all presentation contexts which contain one of the supported SOP classes and one of the supported transfer syntaxes.

Transfer Syntax Selection Policies

The default behavior of the Store SCP is to select for each presentation context containing a supported SOP class, the explicit VR transfer syntax with the byte order matching the local machine byte order (i. e. little endian on PC, big endian on SPARC). If this transfer syntax is not available, the explicit VR transfer syntax with opposite byte order is selected. If this is also unavailable, Implicit VR little endian is selected, if available, otherwise the presentation context is rejected.

The default behavior can be changed in the configuration file such that presentation contexts are only accepted with the default Implicit VR Little Endian transfer syntax.

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STORE SCU

This application entity provides standard conformance to the following DICOM SOP classes as an SCU:

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
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 Present.	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
Hardcopy Color Image Storage	1.2.840.10008.5.1.1.30
Hardcopy Grayscale Image Storage	1.2.840.10008.5.1.1.29
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20
Standalone PET Curve Storage	1.2.840.10008.5.1.4.1.1.129
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128

Nuclear Medicine Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3
X-ray Angiographic Bi-Plane Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3
RT Beams Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.4
RT Brachy Treatment Record Storage	1.2.840.10008.5.1.4.1.1.481.6
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3
RT Treatment Summary Record Storage	1.2.840.10008.5.1.4.1.1.481.7
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7
Standalone Overlay Storage	1.2.840.10008.5.1.4.1.1.8
Standalone Curve Storage	1.2.840.10008.5.1.4.1.1.9
Standalone Modality LUT Storage	1.2.840.10008.5.1.4.1.1.10
Standalone VOI LUT Storage	1.2.840.10008.5.1.4.1.1.11
Stored Print Storage	1.2.840.10008.5.1.1.27
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1
Visible Light Endoscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.1
Visible Light Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.2
Visible Light Slide Coordinates Microscopic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.3
Visible Light Photographic Image Storage	1.2.840.10008.5.1.4.1.1.77.1.4
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1
X-ray Radiofluoroscopic Image Storage	1.2.840.10008.5.1.4.1.1.12.2
Grayscale Softcopy Presentation State Storage	1.2.840.10008.5.1.4.1.1.11.1
Basic Text SR Storage	1.2.840.10008.5.1.4.1.1.88.11
Enhanced SR Storage	1.2.840.10008.5.1.4.1.1.88.22
Comprehensive SR Storage	1.2.840.10008.5.1.4.1.1.88.33
Twelve Lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1

General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1
Mammography CAD SR	1.2.840.10008.5.1.4.1.1.88.50
Multiframe Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1
Multiframe Grayscale Byte Secondary Capture Image St.	1.2.840.10008.5.1.4.1.1.7.2
Multiframe Grayscale Word Secondary Capture Image St.	1.2.840.10008.5.1.4.1.1.7.3
Multiframe True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4
Key Object Selection Document	1.2.840.10008.5.1.4.1.1.88.59
Draft Visible Light Image Storage (sup15_fz 1997)	1.2.840.10008.5.1.4.1.1.77.1
Draft Visible Light Multi Frame Image Storage (sup15_fz 97)	1.2.840.10008.5.1.4.1.1.77.2
Structured Reporting Text Storage (sup23_fz 1997)	1.2.840.10008.5.1.4.1.1.88.1
Structured Reporting Audio Storage (sup23_fz 1997)	1.2.840.10008.5.1.4.1.1.88.2
Structured Reporting Detail Storage (sup23_fz 1997)	1.2.840.10008.5.1.4.1.1.88.3
Structured Reporting Comprehensive Storage (sup23_fz 97)	1.2.840.10008.5.1.4.1.1.88.4
Draft Waveform Storage (sup30_fz 1997)	1.2.840.10008.5.1.4.1.1.9.1

This application entity does not provide standard conformance to any SOP class as SCP

Association Establishment Policies

General

The DICOM standard application context name, which is always proposed, is:

Application context name	1.2.840.10008.3.1.1.1
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The maximum PDU length can be configured at installation time in the range 4096..131072 bytes.

The default is 16384 bytes.

SOP Class extended negotiation is not supported.

Store SCU can be configured to use secure DICOM communication conforming to the Basic TLS Secure Transport Connection Profile.

Number of Associations

Store SCU will only propose a single association. However, multiple instances of Store SCU may be running at the same time. The number of parallel instances is only limited by the resources of the underlying operating system.

Asynchronous Nature

Asynchronous mode of operation is not supported.

Implementation Identifying Information

The implementation UID of this application is:

OFFIS DCMTK 3.5.0 Implementation Class UID	1.2.276.0.7230010.3.0.3.5.0
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Association Initiation by Real-World Activity

Real-World Activity “Image transmission”

An instance of the Store SCU application entity is sparked in order to execute a transmission request. The application entity initiates an association with the selected remote Storage SCP. The calling application entity name can be configured, the default is STORESCU. The called application entity name must be configured together with the presentation address to be used in the configuration file.

Associated Real-World Activity

The user selects an object, series or study in the database browser. He selects the “send” function, chooses a send target and selects “OK”.

Proposed Presentation Contexts

The default behavior of the Store SCP is to propose as SCU for each of the supported SOP classes a single presentation context containing the following transfer syntaxes:

Implicit VR Little Endian	1.2.840.10008.1.2
Explicit VR Little Endian	1.2.840.10008.1.2.1
Explicit VR Big Endian	1.2.840.10008.1.2.2

The explicit VR transfer syntax with local byte order (i. e. little endian on PC, big endian on SPARC) will always be the first in the list of the proposed transfer syntaxes, followed by the explicit VR transfer syntax with opposite byte order, followed by the DICOM default transfer syntax.

The default behavior can be changed for each send target in the configuration file such that only the Implicit VR Little Endian transfer syntax is proposed instead.

SOP Specific Conformance for all Storage SOP Classes

Store SCU transmits the selected objects from the local IntelHeart database and creates a log entry for each C-STORE operation. The log entry shows whether or not the transmission was successful. If the SCP returns a DIMSE error or warning status code for one C-STORE operation, this information is logged, and transmission continues with the next object. Store SCU never attempts to automatically repeat failed transmissions. If transmission of one selected object fails because no appropriate presentation context could be negotiated, Store SCU aborts the association and creates a log entry indicating the unsuccessful termination. Store SCU always transmits all elements contained in an object, independent from their type within the IOD of the corresponding SOP Class.

Association Acceptance Policy

This application entity never accepts associations.

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POST-PROCESSING

Some image types may be analyzed using post-processing software tools. For each tool listed below, required standard tags and unsupported tags are listed. These lists are a general guideline and may not be exhaustive.

- Volumes/Mass
 - Slice thickness, mm (0018, 0050)
 - Image position, mm (0020, 0032)
 - Nominal Interval, ms (0018, 1062)
- VENC
 - VENC Values (0018, 9197)
 - Common Unsupported Tags
 - Any third-party scaling or VENC values stored in private tags are not supported. In such cases as we are aware, we will disable analysis on these images.
- T1
 - Inversion time, ms (0018, 0082) (multiple values required)
- T2/T2*
 - Echo time, ms (0008, 0081) (multiple values required)