

Vidar Dicom Viewer

Dicom Conformance Statement

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Product Name(s): Vidar Dicom Viewer

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1. COMFORMANCE STATEMENT OVERVIEW

The application supports long term storage of images, waveforms, reports, and measurements.

**Table 1-1
NETWORK SERVICES**

SOP Classes	User of Service (SCU)	Provider of Service (SCP)
Image Transfer		
ComputedRadiographyImageStorage	Yes	Yes
DigitalXRayImageStorageForPresentation	Yes	Yes
DigitalXRayImageStorageForProcessing	Yes	Yes
DigitalMammographyXRayImageStorageForPresentation	Yes	Yes
DigitalMammographyXRayImageStorageForProcessing	Yes	Yes
DigitalIntraOralXRayImageStorageForPresentation	Yes	Yes
DigitalIntraOralXRayImageStorageForProcessing	Yes	Yes
CTImageStorage	Yes	Yes
EnhancedCTImageStorage	Yes	Yes
LegacyConvertedEnhancedCTImageStorage	Yes	Yes
UltrasoundMultiFrameImageStorage_retired	Yes	Yes
UltrasoundMultiFrameImageStorage	Yes	Yes
MRImageStorage	Yes	Yes
EnhancedMRImageStorage	Yes	Yes
EnhancedMRColorImageStorage	Yes	Yes
LegacyConvertedEnhancedMRImageStorage	Yes	Yes
NuclearMedicineImageStorage_retired	Yes	Yes
UltrasoundImageStorage_retired	Yes	Yes
UltrasoundImageStorage	Yes	Yes
EnhancedUSVolumeStorage	Yes	Yes
SecondaryCaptureImageStorage	Yes	Yes
MultiFrameSingleBitSecondaryCaptureImageStorage	Yes	Yes
MultiFrameGrayscaleByteSecondaryCaptureImageStorage	Yes	Yes
MultiFrameGrayscaleWordSecondaryCaptureImageStorage	Yes	Yes
MultiFrameTrueColorSecondaryCaptureImageStorage	Yes	Yes
XRayAngiographicImageStorage	Yes	Yes
EnhancedXAImageStorage	Yes	Yes
XRayRadiofluoroscopicImageStorage	Yes	Yes
EnhancedXRFImageStorage	Yes	Yes
XRayAngiographicBiPlaneImageStorage_retired	Yes	Yes
XRay3DAngiographicImageStorage	Yes	Yes
XRay3DCraniofacialImageStorage	Yes	Yes

BreastTomosynthesisImageStorage	Yes	Yes
BreastProjectionXRyImageStorageForPresentation	Yes	Yes
BreastProjectionXRyImageStorageForProcessing	Yes	Yes
IntravascularOpticalCoherenceTomographyImageStorageForPres	Yes	Yes
IntravascularOpticalCoherenceTomographyImageStorageForProc	Yes	Yes
NuclearMedicineImageStorage	Yes	Yes
VLEndoscopicImageStorage	Yes	Yes
VideoEndoscopicImageStorage	Yes	Yes
VLMicroscopicImageStorage	Yes	Yes
VideoMicroscopicImageStorageVLSlideCoordinatesMicroscopicI	Yes	Yes
VLPhotographicImageStorage	Yes	Yes
VideoPhotographicImageStorage	Yes	Yes
OphthalmicPhotography8BitImageStorage	Yes	Yes
OphthalmicPhotography16BitImageStorage	Yes	Yes
OphthalmicTomographyImageStorage	Yes	Yes
WideFieldOphthalmicPhotographyStereographicProjectionImage	Yes	Yes
WideFieldOphthalmicPhotography3DCoordinatesImageStorage	Yes	Yes
OphthalmicOpticalCoherenceTomographyEnFacelImageStorage	Yes	Yes
OphthalmicOpticalCoherenceTomographyBScanVolumeAnalysisS	Yes	Yes
VLWholeSlideMicroscopyImageStorage	Yes	Yes
PositronEmissionTomographyImageStorage	Yes	Yes
LegacyConvertedEnhancedPETImageStorage	Yes	Yes
EnhancedPETImageStorage	Yes	Yes
RTImageStorage	Yes	Yes
DICOSCTImageStorage	Yes	Yes
DICOSDigitalXRyImageStorageForPresentation	Yes	Yes
DICOSDigitalXRyImageStorageForProcessing	Yes	Yes
EddyCurrentImageStorage	Yes	Yes
EddyCurrentMultiFrameImageStorage	Yes	Yes
Waveforms, Notes, Reports, Measurements Transfer		
ParametricMapStorage	Yes	Yes
RawDataStorage	Yes	Yes
SpatialRegistrationStorage	Yes	Yes
SpatialFiducialsStorage	Yes	Yes
DeformableSpatialRegistrationStorage	Yes	Yes
SegmentationStorage	Yes	Yes
SurfaceSegmentationStorage	Yes	Yes
TractographyResultsStorage	Yes	Yes
RealWorldValueMappingStorage	Yes	Yes
SurfaceScanMeshStorage	Yes	Yes

SurfaceScanPointCloudStorage	Yes	Yes
MRSpectroscopyStorage	Yes	Yes
StandaloneOverlayStorage_retired	Yes	Yes
StandaloneCurveStorage_retired	Yes	Yes
TwelveLeadECGWaveformStorage	Yes	Yes
GeneralECGWaveformStorage	Yes	Yes
AmbulatoryECGWaveformStorage	Yes	Yes
HemodynamicWaveformStorage	Yes	Yes
CardiacElectrophysiologyWaveformStorage	Yes	Yes
BasicVoiceAudioWaveformStorage	Yes	Yes
GeneralAudioWaveformStorage	Yes	Yes
ArterialPulseWaveformStorage	Yes	Yes
RespiratoryWaveformStorage	Yes	Yes
StandaloneModalityLUTStorage_retired	Yes	Yes
StandaloneVOILUTStorage_retired	Yes	Yes
GrayscaleSoftcopyPresentationStateStorage	Yes	Yes
ColorSoftcopyPresentationStateStorage	Yes	Yes
PseudoColorSoftcopyPresentationStateStorage	Yes	Yes
BlendingSoftcopyPresentationStateStorage	Yes	Yes
XAXRFGayscaleSoftcopyPresentationStateStorage	Yes	Yes
GrayscalePlanarMPRVolumetricPresentationStateStorage	Yes	Yes
CompositingPlanarMPRVolumetricPresentationStateStorage	Yes	Yes
AdvancedBlendingPresentationStateStorage	Yes	Yes
VolumeRenderingVolumetricPresentationStateStorage	Yes	Yes
SegmentedVolumeRenderingVolumetricPresentationStateStorage	Yes	Yes
MultipleVolumeRenderingVolumetricPresentationStateStorage	Yes	Yes
LensometryMeasurementsStorage	Yes	Yes
AutorefractometryMeasurementsStorage	Yes	Yes
KeratometryMeasurementsStorage	Yes	Yes
SubjectiveRefractionMeasurementsStorage	Yes	Yes
VisualAcuityMeasurementsStorage	Yes	Yes
SpectaclePrescriptionReportStorage	Yes	Yes
OphthalmicAxialMeasurementsStorage	Yes	Yes
IntraocularLensCalculationsStorage	Yes	Yes
MacularGridThicknessAndVolumeReportStorage	Yes	Yes
OphthalmicVisualFieldStaticPerimetryMeasurementsStorage	Yes	Yes
OphthalmicThicknessMapStorage	Yes	Yes
CornealTopographyMapStorage	Yes	Yes
BasicTextSRStorage	Yes	Yes
EnhancedSRStorage	Yes	Yes
ComprehensiveSRStorage	Yes	Yes

Comprehensive3DSRStorage	Yes	Yes
ExtensibleSRStorage	Yes	Yes
ProcedureLogStorage	Yes	Yes
MammographyCADSRStorage	Yes	Yes
KeyObjectSelectionDocumentStorage	Yes	Yes
ChestCADSRStorage	Yes	Yes
XRayRadiationDoseSRStorage	Yes	Yes
RadiopharmaceuticalRadiationDoseSRStorage	Yes	Yes
ColonCADSRStorage	Yes	Yes
ImplantationPlanSRStorage	Yes	Yes
AcquisitionContextSRStorage	Yes	Yes
SimplifiedAdultEchoSRStorage	Yes	Yes
PatientRadiationDoseSRStorage	Yes	Yes
ContentAssessmentResultsStorage	Yes	Yes
EncapsulatedPDFStorage	Yes	Yes
EncapsulatedCDASStorage	Yes	Yes
BasicStructuredDisplayStorage	Yes	Yes
CTDefinedProcedureProtocolStorage	Yes	Yes
CTPerformedProcedureProtocolStorage	Yes	Yes
StandalonePETCurveStorage_retired	Yes	Yes
StereometricRelationshipStorage	Yes	Yes
RTDoseStorage	Yes	Yes
RTStructureSetStorage	Yes	Yes
RTBeamsTreatmentRecordStorage	Yes	Yes
RTPlanStorage	Yes	Yes
RTBrachyTreatmentRecordStorage	Yes	Yes
RTTreatmentSummaryRecordStorage	Yes	Yes
RTIonPlanStorage	Yes	Yes
RTIonBeamsTreatmentRecordStorage	Yes	Yes
DICOSThreatDetectionReportStorage	Yes	Yes
DICOS2DAITStorage	Yes	Yes
DICOS3DAITStorage	Yes	Yes
DICOSQuadrupoleResonanceQRStorage	Yes	Yes

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3. INTRODUCTION

3.1 REVISION HISTORY

Document Version	Date of Issue	Author	Description
1.0	January 23, 2018	Alex Gavrilov	Version for Final Review

3.2 AUDIENCE

This document is written for the people that need to understand how Vidar Dicom Viewer 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.

3.3 REMARKS

The scope of this DICOM Conformance Statement is to facilitate integration between the Vidar Dicom Viewer 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.

3.4 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 – 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 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.

3.5 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.

3.6 ABBREVIATIONS

Abbreviations should be listed here. These may be taken from the following list, deleting terms that are not used within the Conformance Statement, and adding any additional terms that are used:

AE	Application Entity
AET	Application Entity Title

CAD	Computer Aided Detection
CDA	Clinical Document Architecture
CD-R	Compact Disk Recordable
CSE	Customer Service Engineer
CR	Computed Radiography
CT	Computed Tomography
DHCP	Dynamic Host Configuration Protocol
DICOM	Digital Imaging and Communications in Medicine
DNS	Domain Name System
DX	Digital X-ray
GSPS	Grayscale Softcopy Presentation State
HIS	Hospital Information System
HL7	Health Level 7 Standard
IHE	Integrating the Healthcare Enterprise
IOD	Information Object Definition
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISO	International Organization for Standards
IO	Intra-oral X-ray
JPEG	Joint Photographic Experts Group
LUT	Look-up Table
MPEG	Moving Picture Experts Group
MG	Mammography (X-ray)
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance Imaging
MSPS	Modality Scheduled Procedure Step
MTU	Maximum Transmission Unit (IP)
MWL	Modality Worklist
NM	Nuclear Medicine
NTP	Network Time Protocol
O	Optional (Key Attribute)
OP	Ophthalmic Photography
OSI	Open Systems Interconnection
PACS	Picture Archiving and Communication System
PET	Positron Emission Tomography
PDU	Protocol Data Unit
R	Required (Key Attribute)
RF	Radiofluoroscopy
RIS	Radiology Information System.
RT	Radiotherapy
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
US	Ultrasound
VL	Visible Light
VR	Value Representation
XA	X-ray Angiography

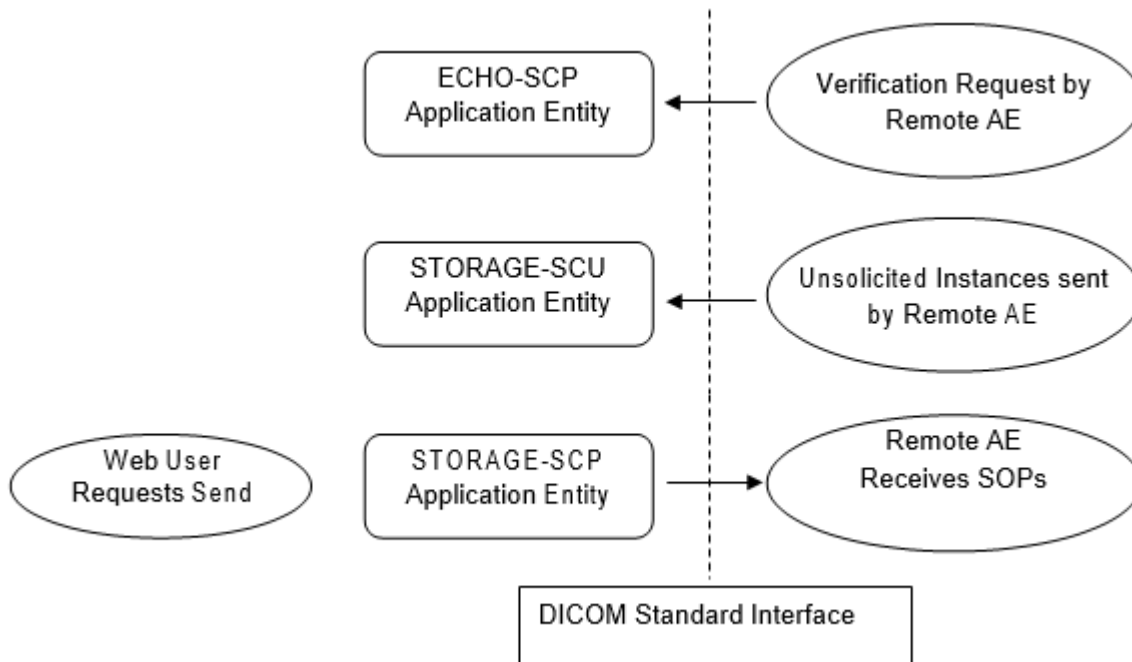
3.7 REFERENCES

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

4. NETWORKING

4.1 IMPLEMENTATION MODEL

4.1.1 Application Data Flow



**Figure 4.1-1
IMPLEMENTATION MODEL**

The application is a native application that provides a native gui user interface, local database (SQLite) and network listener that spawns additional threads as necessary to handle incoming connections.

Conceptually, the network services may be modeled as the following separate AEs, though in fact all the AEs share a single (configurable) AE Title (AE_VDVIEWER by default):

- ECHO-SCP, which responds to verification requests
- STORAGE-SCP, which receives incoming composite instances
- STORAGE-SCU, which sends outbound composite instances

4.1.2 Functional Definitions of AE's

4.1.2.1 ECHO-SCP

ECHO-SCP waits in the background for connections, will accept associations with Presentation Contexts for the SOP Class of the Verification Service Class, and will respond successfully to echo requests.

4.1.2.2 STORAGE-SCP

STORAGE-SCP waits in the background for connections, will accept associations with Presentation Contexts for SOP Classes of the Storage Service Class, and will store the received instances to the local database where they may subsequently be listed and viewed through the user interface.

4.1.2.3 STORAGE-SCU

STORAGE-SCU is activated through the user interface when a user selects studies from the local database and requests that they be sent to a remote AE (selected from a pre-configured list).

4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background and are not dependent on any sequencing.

All SCU activities are initiated through the user interface.

4.2 AE SPECIFICATIONS

4.2.1 ECHO-SCP

4.2.1.1 SOP Classes

ECHO-SCP provides Standard Conformance to the following SOP Class(es):

**Table 4.2-1
SOP CLASSES SUPPORTED BY ECHO-SCP**

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

4.2.1.2 Association Policies

4.2.1.2.1 *General*

ECHO-SCP accepts but never initiates associations.

**Table 4.2-2
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR ECHO SCP**

Maximum PDU size received	65kB (approximate)
---------------------------	--------------------

4.2.1.2.2 *Number of Associations*

**Table 4.2-3
NUMBER OF ASSOCIATIONS AS A SCP FOR ECHO-SCP**

Maximum number of simultaneous associations	1
---	---

4.2.1.2.3 *Asynchronous Nature*

ECHO-SCP will only allow a single outstanding operation on an Association. Therefore, ECHO-SCP will not perform asynchronous operations window negotiation.

4.2.1.2.4 *Implementation Identifying Information*

**Table 4.2-4
DICOM IMPLEMENTATION CLASS AND VERSION FOR ECHO-SCP**

Implementation Class UID	2.16.643.1.2.3
Implementation Version Name	VIDAR_03

4.2.1.3 Association Initiation Policy

ECHO-SCP does not initiate associations.

4.2.1.4 Association Acceptance Policy

When ECHO-SCP accepts an association, it will respond to echo requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will NOT be rejected. All request are accepted.

4.2.1.4.1 Activity – Receive Echo Request

4.2.1.4.1.1 Description and Sequencing of Activities

As requests are received, they are responded to immediately.

4.2.1.4.1.2 Accepted Presentation Contexts

**Table 4.2-5
ACCEPTABLE PRESENTATION CONTEXTS FOR ECHO-SCP AND RECEIVE ECHO REQUEST**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	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

4.2.1.4.1.2.1 Extended Negotiation

No extended negotiation is performed.

4.2.1.4.1.3 SOP Specific Conformance

4.2.1.4.1.3.1 SOP Specific Conformance to Verification SOP Class

ECHO-SCP provides standard conformance to the Verification Service Class.

4.2.1.4.1.3.2 Presentation Context Acceptance Criterion

ECHO-SCP will only accept a Presentation Context compatible with the one listed in Table 4.2-5.

4.2.1.4.1.3.3 Transfer Syntax Selection Policies

If proposed, ECHO-SCP prefers the Explicit VR Little Endian Transfer Syntax.

ECHO-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts,

applying the same method for selecting a Transfer Syntax for each.

4.2.2 STORAGE-SCP

4.2.2.1 SOP Classes

STORAGE-SCP provides Standard Conformance to the SOP Classes given in table 1-1.

4.2.2.2 Association Policies

4.2.2.2.1 *General*

STORAGE-SCP accepts but never initiates associations.

**Table 4.2-6
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR STORAGE SCP**

Maximum PDU size received	65kB (approximate)
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4.2.2.2.2 *Number of Associations*

**Table 4.2-7
NUMBER OF ASSOCIATIONS AS A SCP FOR STORAGE-SCP**

Maximum number of simultaneous associations	1
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4.2.2.2.3 *Asynchronous Nature*

STORAGE-SCP will only allow a single outstanding operation on an Association. Therefore, STORAGE- SCP will not perform asynchronous operations window negotiation.

4.2.2.2.4 *Implementation Identifying Information*

**Table 4.2-8
DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCP**

Implementation Class UID	2.16.643.1.2.3
Implementation Version Name	VIDAR_03

4.2.2.3 Association Initiation Policy

STORAGE-SCP does not initiate associations.

4.2.2.4 Association Acceptance Policy

When STORAGE-SCP accepts an association, it will respond to storage requests. If the Called AE Title does not match the pre-configured AE Title shared by all the SCPs of the application, the association will not be rejected.

4.2.2.4.1 *Activity – Receive Storage Request*

4.2.2.4.2 *Description and Sequencing of Activities*

As instances are received, they are copied to the local file system and a record inserted into the local database.

4.2.2.4.2.1 *Accepted Presentation Contexts*

Table 4.2-9 contains the transfer syntaxes supported for Image SOP Classes and Table 4.2-10 contains the transfer syntaxes supported for Non-Image SOP Classes.

**Table 4.2-9
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE-SCP AND RECEIVE STORAGE REQUEST FOR IMAGE SOP CLASSES**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 1-1	See Table 1-1	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
		RLE Lossless	1.2.840.10008.1.2.5	SCP	None
		JPEG Lossless, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	SCP	None
		JPEG Extended (Process 2 & 4)	1.2.840.10008.1.2.4.51	SCP	None
		JPEG Baseline (Process 1)	1.2.840.10008.1.2.4.50	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
		MPEG2	1.2.840.10008.1.2.4.100	SCP	None
		MPEG4AVCH264HighProfileLevel41	1.2.840.10008.1.2.4.102	SCP	None

**Table 4.2-10
ACCEPTABLE PRESENTATION CONTEXTS FOR
STORAGE-SCP AND RECEIVE STORAGE REQUEST FOR NON-IMAGE SOP CLASSES**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 1-1	See Table 1-1	Explicit VR Little Endian	1.2.840.10008.1.2.1	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

4.2.2.4.2.1.1 Extended Negotiation

No extended negotiation is performed, though STORAGE-SCP:

- is a Level 2 Storage SCP (Full – does not discard any data elements)
- does not support digital signatures.

4.2.2.4.2.2 SOP Specific Conformance

4.2.2.4.2.2.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCP provides standard conformance to the Storage Service Class.

4.2.2.4.2.2.2 Presentation Context Acceptance Criterion

STORAGE-SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.2.4.2.2.3 Transfer Syntax Selection Policies

The STORAGE-SCP will prefer Explicit Transfer Syntaxes over Implicit Transfer Syntaxes and it prefers lossless compressed Transfer Syntaxes over lossy compressed Transfer Syntaxes..

STORAGE-SCP will accept duplicate Presentation Contexts; that is, if it is offered multiple Presentation Contexts, each of which offers acceptable Transfer Syntaxes, it will accept all Presentation Contexts, applying the same method for selecting a Transfer Syntax for each.

4.2.3 STORAGE-SCU

4.2.3.1 SOP Classes

STORAGE-SCU provide Standard Conformance to the following SOP Classes given in table 1-1

4.2.3.2 Association Policies

4.2.3.2.1 General

STORAGE-SCU initiates but never accepts associations.

**Table 4.2-11
MAXIMUM PDU SIZE RECEIVED AS A SCP FOR STORAGE-SCU**

Maximum PDU size received	65kB (approximate)
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4.2.3.2.2 Number of Associations

**Table 4.2-12
NUMBER OF ASSOCIATIONS AS A SCP FOR STORAGE-SCU**

Maximum number of simultaneous associations	7 (default config)
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4.2.3.2.3 Asynchronous Nature

STORAGE-SCU will only allow a single outstanding operation on an Association. Therefore, STORAGE-SCU will not perform asynchronous operations window negotiation.

4.2.3.2.4 Implementation Identifying Information

**Table 4.2-13
DICOM IMPLEMENTATION CLASS AND VERSION FOR STORAGE-SCU**

Implementation Class UID	2.16.643.1.2.3
Implementation Version Name	VIDAR_03

4.2.3.3 Association Initiation Policy

STORAGE-SCU attempts to initiate a new association for each instance.

4.2.3.3.1 Activity – Send Storage Request

4.2.3.3.1.1 Description and Sequencing of Activities

For each instance selected from the user interface to be transferred, a single attempt will be made to transmit it to the selected remote AE. If the send fails, for whatever reason, no retry will be performed, and an attempt will be made to send the next instance.

4.2.3.3.1.2 Proposed Presentation Contexts

**Table 4.2-35
PROPOSED PRESENTATION CONTEXTS FOR STORAGE-SCU**

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
See Table 4.2-30 (Image SOP Classes)	See Table 4.2-30 (Image SOP Classes)	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
		RLE Lossless	1.2.840.10008.1.2.5	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, Non-Hierarchical (Process 14)	1.2.840.10008.1.2.4.57	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
		MPEG2	1.2.840.10008.1.2.4.100	SCP	None
		MPEG4AVCH264HighProfileLevel41	1.2.840.10008.1.2.4.102	SCP	None
See Table 4.2-31 (Non-Image SOP Classes)	See Table 4.2-31 (Non-Image SOP Classes)	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

STORAGE-SCU will propose Presentation Contexts only for the SOP Class(es) of the instances that are to be transferred.

For each SOP Class being transferred, STORAGE-SCU will propose two Presentation Contexts. One containing the transfer syntax that the SOP class is encoded on for the server, and a second Presentation Context using the uncompressed transfer syntaxes. When the server cannot decompress an image because it does not have the appropriate codec(s), the second Presentation Context (uncompressed syntaxes) is not proposed.

4.2.3.3.1.2.1 Extended Negotiation

No extended negotiation is performed.

4.2.3.3.1.3 SOP Specific Conformance

4.2.3.3.1.3.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCU provides standard conformance to the Storage Service Class.

4.2.3.3.1.3.2 Presentation Context Acceptance Criterion

STORAGE-SCU does not accept associations.

4.2.3.3.1.3.3 Transfer Syntax Selection Policies

STORAGE-SCU prefers to send each instance using its current Transfer Syntax, and will find the first Presentation Context where the Transfer Syntax was accepted. In the case where the Transfer Syntax was not accepted by the remote STORAGE-SCP, STORAGE-SCU will check for the acceptance of Explicit VR Little Endian and Implicit VR Little Endian, in that order. If STORAGE-SCU cannot change the Transfer Syntax, the sub-operation will fail and it will not store the instance.

4.2.3.4 Association Acceptance Policy

STORAGE-SCU does not accept associations.

4.3 NETWORK INTERFACES

4.3.1 Physical Network Interface

The application is indifferent to the physical medium over which TCP/IP executes; which is dependent on the underlying operating system and hardware.

4.3.2 Additional Protocols

When host names rather than IP addresses are used in the configuration properties to specify presentation addresses for remote AEs, the application is dependent on the name resolution mechanism of the underlying operating system.

4.3.3 IPv4 and IPv6 Support

By default, this product supports IPv4. When configured, it will also support IPv6. It does not utilize any of the optional configuration identification or security features of IPv6.

4.4 CONFIGURATION

All configuration is performed through the use of configuration file stored in pre-defined locations that are specific to the underlying operating system.

4.4.1 AE Title/Presentation Address Mapping

The Calling AE Title of the local application is configurable in the configuration file. The mapping of the logical name by which remote AEs are described in the user interface to Called AE Titles as well as presentation address (hostname or IP address and port number) is configurable via web interface or in the configuration file.

4.4.2 Parameters

Table 4.4-1
CONFIGURATION PARAMETERS TABLE

Parameter	Configurable	Default Value
STORAGE-SCU Specific Parameters		
Port number of the destination PACS	Yes	104
AEtitle of the destination PACS	Yes	VIDAR
AEtitle self	Yes	IMPORT
IP-address of the destination PACS	Yes	localhost
STORAGE-SCP Specific Parameters		
Port number	Yes	104
AEtitle	Yes	AE_VDVIEWER
Time-out for waiting for data between TCP/IP packets. (Low-level timeout)	Yes	30 seconds

5. MEDIA INTERCHANGE

The Dicom Viewer does not support any form of Media Interchange.

6. SUPPORT OF CHARACTER SETS

6.1 OVERVIEW

The application supports all extended character sets defined in the DICOM 2017 standard, including single-byte and multi-byte character sets as well as code extension techniques using ISO 2022 escapes.

Support extends to correctly decoding and displaying the correct symbol for all names and strings received over the network, and in the local database.

No specific support for sorting of strings other than in the default character set is provided in the GUI. All strings are converted to Unicode before display.

6.2 CHARACTER SETS

In addition to the default character repertoire, the Defined Terms for Specific Character Set in Table 6.2-1 are supported:

Table 6.2-1
SUPPORTED SPECIFIC CHARACTER SET DEFINED TERMS

Character Set Description	Defined Term
Latin alphabet No. 1	ISO_IR 100
Latin alphabet No. 2	ISO_IR 101
Latin alphabet No. 3	ISO_IR 109
Latin alphabet No. 4	ISO_IR 110
Cyrillic	ISO_IR 144
Arabic	ISO_IR 127
Greek	ISO_IR 126
Hebrew	ISO_IR 138
Latin alphabet No. 5	ISO_IR 148
Japanese	ISO_IR 13
Thai	ISO_IR 166
Unicode in UTF-8	ISO-IR 192
Default repertoire	ISO 2022 IR 6
Latin alphabet No. 1	ISO 2022 IR 100
Latin alphabet No. 2	ISO 2022 IR 101
Latin alphabet No. 3	ISO 2022 IR 109
Latin alphabet No. 4	ISO 2022 IR 110
Cyrillic	ISO 2022 IR 144
Arabic	ISO 2022 IR 127
Greek	ISO 2022 IR 126
Hebrew	ISO 2022 IR 138
Latin alphabet No. 5	ISO 2022 IR 148
Thai	ISO 2022 IR 166
Japanese	ISO 2022 IR 13

Japanese	ISO 2022 IR 87
Japanese	ISO 2022 IR 159
Korean	ISO 2022 IR 149
Chinese (Simplified) Extended	GB18030

6.3 CHARACTER SET CONFIGURATION

Whether or not characters are displayed correctly depends on the presence of font support in the underlying operating system. Typically it may be necessary for the user to add one of the “all Unicode” fonts to their system configuration in order to correctly display characters that would not typically be used in the default locale.

7. SECURITY

7.1 SECURITY PROFILES

None supported.

7.2 ASSOCIATION LEVEL SECURITY

None supported.

The system can be configured to only allow configured AEs to open an association.

7.3 APPLICATION LEVEL SECURITY

The Dicom Viewer does not support Audit Trail logging according to DICOM Supplement 95. No Audit messages are generated.

8. ANNEXES

8.1 IOD CONTENTS

8.1.1 Coerced/Modified fields

No fields may be coerced. SOP Instances are saved "as is".

8.2 DATA DICTIONARY OF PRIVATE ATTRIBUTES

No private attributes are defined.

8.3 CODED TERMINOLOGY AND TEMPLATES

Not applicable.

8.4 GRAYSCALE IMAGE CONSISTENCY

Not applicable.

8.5 STANDARD EXTENDED/SPECIALIZED/PRIVATE SOP CLASSES

None

8.6 PRIVATE TRANSFER SYNTAXES

None.