

1. Introduction

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

1.1 Purpose

This document contains the DICOM Conformance Statement for DICOM Server for DataView Series®, the medical image viewing and processing system of DataView Imaging International, Inc. The server is intended to receive patient and image data over the network and store it on the disk in proprietary database format. This document enumerates the compliance to the DICOM 3.0 standard (formally called the NEMA PS 3.X-1993 standards). The compliance has been specified through the Service Classes, Information Objects and Communication Protocols supported by the implementation.

1.2 Target Audience

This document is intended for potential clients, system integrators and software designers interested in acquiring and working with DataView Series. The document assumes familiarity with DICOM Standard as defined by ACR-NEMA. It should be interpreted in conjunction with the published standard.

1.3 General

The DataView Series is a product of DataView Imaging International, Inc., USA. This document is a preliminary DICOM Conformance Statement and is based on the specification of a medical system under development.

The DICOM application will evolve in future to meet the user's requirements and to incorporate new features and technologies. DataView Imaging International, Inc. plans to adapt its software to future versions of the DICOM standard. This may result in changes to the support of communications features listed in this Conformance Statement. The user should ensure that other devices conform to the evolving standard. Failure to do so will likely result in the loss of function and/or connectivity.

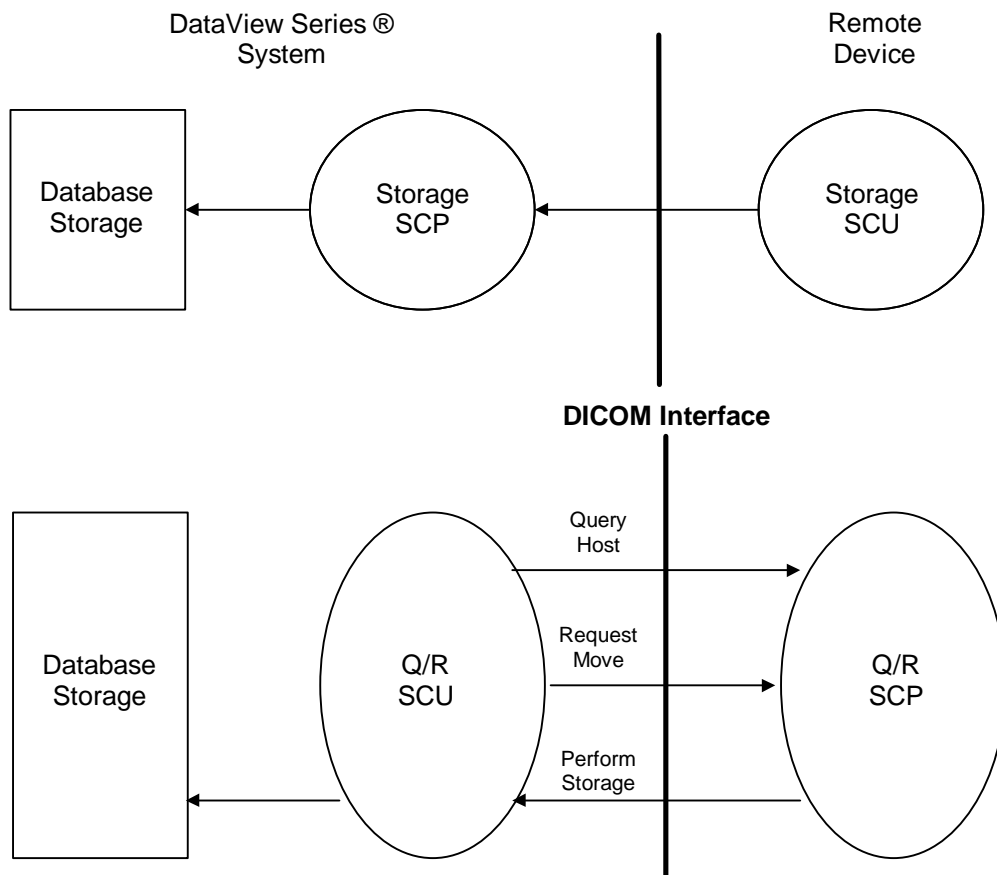
DataView Imaging International, Inc. reserves the right to make changes to its products or to discontinue its delivery. This Conformance Statement by itself does not guarantee successful

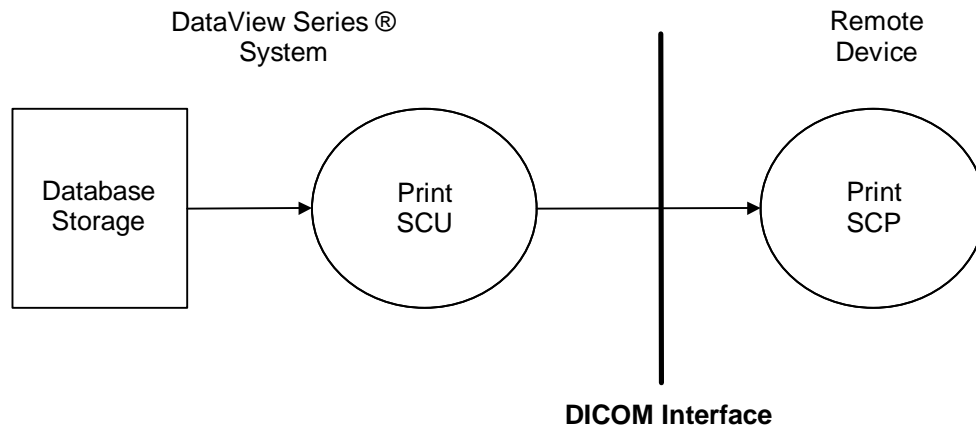
interconnection. It is the responsibility of the user to carry out additional validation tests to ensure the functionality, performance, accuracy and stability of the transmitted image and patient data.

2. Implementation Model

The DataView Series DICOM Server is a Windows NT based application running on DataView Series Workstation. The Server can be running as either a normal process during log in or as an NT server at startup of the machine. The Server process is terminated by logging out or system shutdown. In either case there is no user interaction. The progress and errors are directed to a log file.

2.1 Application Data Flow Diagram





The DataView Series Server comprises four Application Entities (AE).

1. Verification Service Class Provider (SCP),
2. Storage Service Class Provider (SCP),
3. Query / Retrieve Service Class User (SCU),
4. Print Service Class User (SCU).

The SCP AEs await DICOM Association from a remote device. The Server grants access to the device if all Association parameters are acceptable. The Association is created between remote device and Storage SCP.

The Verification SCP is embedded into Storage SCP. It provides standard DICOM Echo service.

The Storage SCP receives the images and patient data transferred by the remote device. The data is checked for validity. It is then converted to internal database format and stored on disk. A success response is sent to remote device upon successful data conversion and storage, else an appropriate failure response is sent. One image is received, processed and responded to at a time. Therefore, the asynchronous transfer is not supported.

The Query / Retrieve SCU initiates query requests to a remote device. If the user selects images to move, then SCU sends a MOVE request and receives images over another association.

The Printer SCU opens an Association with a remote Printer SCP and sends the images selected by the operator from a Graphical User Interface.

2.2 Functional Definition of Application Entities

The DataView Series Server acts as a Echo, CT and MR Storage Service Class Provider, Q/R Service Class User and Print Service Class User.

2.3 Sequencing of Real World Activities

All SCP activity is performed in the background with no user interaction. The Print SCU function is initiated by user from operator console.

3. AE Specifications

3.1 Server AE Specification

The DataView Series Server provides support for standard conformance to the following DICOM 3.0 Service Object Pair (SOP) Classes as a Service Class Provider (SCP).

SOP Class Name (SCP)	SOP Class UID
Verification (Echo)	1.2.840.10008.1.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
SC Image Storage	1.2.840.10008.5.1.4.1.1.7

3.2 Client AE Specification

The DataView Series Server provides support for standard conformance to the following DICOM 3.0 Service Object Pair (SOP) Classes as a Service Class Provider (SCU).

SOP Class Name (SCU)	SOP Class UID
Basic Greyscale Print Management	1.2.840.10008.5.1.1.9

SOP Class Name (SCU)	SOP Class UID
Basic Film Session	1.2.840.10008.5.1.1.1
Basic Film Box	1.2.840.10008.5.1.1.2
Basic Greyscale Image Box	1.2.840.10008.5.1.1.4
Study Root Query/Retrieve - FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve - MOVE	1.2.840.10008.5.1.4.1.2.2.2

3.2.1 Association Establishment Policies

3.2.1.1 General

All configurable parameters are read from a disk file titled "dataView.cfg". This configuration file resides in the same directory as executable binary file. The name and location of configuration file may be overridden by an environment variable called MSI_SCP_CFG_PATH. The environment variable lists complete path including file name. If any parameter is missing or incorrect, then the default value is used. The list of configurable parameters and corresponding default values are listed below.

Parameter	Default	Description
MSI_SCP_PORT	104	DICOM TCP/IP port number
MSI_SCP_SCP_TITLE	DataView SCP	DICOM Application Entity Title
MSI_SCP_MAX_PDU_LEN	16	Maximum PDU length in Kbyte
MSI_SCP_ARTIM_TIMEOUT	60	ARTIM timeout in seconds
MSI_SCP_READ_TIMEOUT	45	Read timeout in seconds
MSI_SCP_WRITE_TIMEOUT	15	Write timeout in seconds
MSI_SCP_LOG_PATH	dataView.log	Full path for error log file
MSI_SCP_SCU_ACCEPT		One or more acceptable SCU AE Titles

3.2.1.2 Number of Associations

The SCP accepts one association at a time and SCU initiates one association at a time.

3.2.1.3 Asynchronous Nature

Asynchronous communication is not supported.

3.2.1.4 Implementation Identifying Information

3.2.2 Association Initiation by Real-World Activity

The DataView Series Server SCP does not initiate associations. SCU association is initiated by the operator.

3.2.3 Association Acceptance Policy

The Server SCP accepts association from a remote machine that is listed in configuration file. The Association request is rejected if either the Called AE Title is incorrect or the Calling AE Title is not among the list of acceptable clients.

3.2.3.1 DICOM Verification Service Class Provider

The DataView Series Server accepts Association for DICOM C-ECHO Service Class. Success or Failure is sent back automatically depending upon whether the remote device is authorized to connect and a valid C-ECHO-RQ is made.

SOP Class Name	SOP Class UID	Role
Verification	1.2.840.10008.1.1	SCP

3.2.3.1.1 Associated Real-World Activity

There is no real world activity associated with this Service. Only a success or failure is notified to the operator.

3.2.3.1.2 Presentation Context Table

The acceptable Presentation Context are listed below.

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
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		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.3.1.3 Presentation Context Acceptance Criterion

The DataView Series Server accepts all the proposed and supported Presentation Contexts. No check is performed for duplicate contexts. Duplicate contexts are accepted with the transfer syntax acceptance policy listed below.

3.2.3.1.4 Transfer Syntax Selection Policies

On machines with littleendian host architecture like Intel based PC, preference is given to Implicit VR Little Endian, followed by Explicit VR Little Endian and then Explicit VR Big Endian.

3.2.3.2 DICOM Storage Service Class Provider

Implementation Class UID is “1.2.840.1015.5.1.1.0”

Implementation Version name is “DataView SSCP 1.0”.

The DataView Series Server provides standard conformance as CT, MR and SC Storage Service Class Provider. No level of conformance is enforced for incoming data. All images and patient data is received. If key fields necessary for storing in internal database are missing or invalid then the data is discarded and appropriate response is sent to the remote device.

SOP Class Name	SOP Class UID	Role
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	SCP
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	SCP
SC Image Storage	1.2.840.10008.5.1.4.1.1.7	SCP

3.2.3.2.1 Associated Real-World Activity

There is no user interaction for this Service. The data is received over a successful association. The data is verified for content and integrity. It is then converted to internal database format and stored on disk. Depending upon the result of data verification, conversion and storage, a status of success or failure is returned in C-STORE-RSP message.

3.2.3.2.2 Presentation Context Table

The following Abstract and Transfer Syntax combinations are supported by the Server.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
CT Image Storage	1.2.840.1000 8.5.1.4.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
MR Image Storage	1.2.840.1000 8.5.1.4.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
SC Image Storage	1.2.840.1000 8.5.1.4.1.1.7	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

3.2.3.2.3 Presentation Context Acceptance Criterion

Same as section 3.2.3.1.3.

3.2.3.2.4 Transfer Syntax Selection Policies

Same as section 3.2.3.1.4.

3.2.3.3 DICOM Query / Retrieve Service Class User

Implementation Class UID is "1.2.840.1015.5.2.1.0"

Implementation Version name is "DataView QSCU 1.0".

The DataView Series Server provides standard conformance as CT, MR and SC Storage Service Class Provider. No level of conformance is enforced for incoming data. All images and patient data is received. If key fields necessary for storing in internal database are missing or invalid then the data is discarded and appropriate response is sent to the remote device.

SOP Class Name	SOP Class UID	Role
Patient Root Q/R FIND	1.2.840.10008.5.1.4.1.2.1.1	SCU
Patient Root Q/R MOVE	1.2.840.10008.5.1.4.1.2.1.2	SCU
Study Root Q/R FIND	1.2.840.10008.5.1.4.1.2.2.1	SCU
Study Root Q/R MOVE	1.2.840.10008.5.1.4.1.2.2.2	SCU

3.2.3.3.1 Associated Real-World Activity

The DataView Series Server will submit queries to remote hosts through DIMSE C-FIND-RQ command. Upon receipt of a valid set of images, a Storage SCP will be spawned. It will be followed by C-MOVE-RQ to remote host. The awaiting Storage SCP will receive images sent by remote host.

3.2.3.3.2 Presentation Context Table

The following Abstract and Transfer Syntax combinations are proposed by the SCU.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Patient Root Q/R FIND	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Patient Root Q/R MOVE	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
Study	1.2.840.10008	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Root Q/R FIND	.5.1.4.1.2.2.1	Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2.1 1.2.840.10008.1.2.2		
Study Root Q/R MOVE	1.2.840.10008 .5.1.4.1.2.2.2	Implicit VR Little Endian Explicit VR Little Endian Explicit VR Big Endian	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

All Required (R) and Unique (U) patient, study, series and image level keys are accepted. Some optional (O) keys are also supported as described in the following tables.

3.2.3.3.2.1 Patient Level Attributes for Patient Root Q/R Information Model

Description	Tag	Type
Patient Name	(0010,0010)	R
Patient ID	(0010,0020)	U
Patient Birth Date	(0010,0030)	O
Patient Sex	(0010,0040)	O

3.2.3.3.2.2 Study Level Attributes for Patient Root Q/R Information Model

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician Name	(0008,0090)	O
Study Description	(0008,1030)	O
Patient Age	(0010,0010)	O

3.2.3.3.2.3 Series Level Attributes for Patient Root Q/R Information Model

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U

3.2.3.3.2.4 Image Level Attributes for Patient Root Q/R Information Model

Description	Tag	Type
Image Number	(0020,0013)	R
SOP Instance UID	(0008,0018)	U

3.2.3.3.2.5 Study Level Attributes for Study Root Q/R Information Model

Description	Tag	Type
Study Date	(0008,0020)	R
Study Time	(0008,0030)	R
Accession Number	(0008,0050)	R
Patient Name	(0010,0010)	R
Patient ID	(0010,0020)	R
Study ID	(0020,0010)	R
Study Instance UID	(0020,000D)	U
Referring Physician Name	(0008,0090)	O
Study Description	(0008,1030)	O
Patient Birth Date	(0010,0030)	O

Description	Tag	Type
Patient Sex	(0010,0040)	O
Patient Age	(0010,1010)	O

3.2.3.3.2.6 Series Level Attributes for Study Root Q/R Information Model

Description	Tag	Type
Modality	(0008,0060)	R
Series Number	(0020,0011)	R
Series Instance UID	(0020,000E)	U

3.2.3.3.2.7 Image Level Attributes for Study Root Q/R Information Model

Description	Tag	Type
Image Number	(0020,0013)	R
SOP Instance UID	(0008,0018)	U

3.2.3.3.3 Presentation Context Acceptance Criterion

Not applicable.

3.2.3.3.4 Transfer Syntax Selection Policies

Not applicable.

3.2.3.4 DICOM Print Service Class User

Implementation Class UID is "1.2.840.1015.5.3.1.0"

Implementation Version name is "DataView PSCU 1.0".

The DataView Series Server provides standard conformance to Basic Grayscale Print Management Meta SOP Class as Service Class User.

SOP Class Name	SOP Class UID	Role
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	SCU

Corresponding set of supported SOP classes are

SOP Class Name	SOP Class UID	Role
Basic Film Session	1.2.840.10008.5.1.1.1	SCU
Basic Film Box	1.2.840.10008.5.1.1.2	SCU
Basic Grayscale Image Box	1.2.840.10008.5.1.1.4	SCU
Printer	1.2.840.10008.5.1.1.16	SCU

3.2.3.4.1 Associated Real-World Activity

The user selects one a set patients, studies or images and initiates a print request.

3.2.3.4.2 Presentation Context Table

The following Abstract and Transfer Syntax combinations are supported by the Server.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Ext. Neg.
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta	1.2.840.10008.5.1.1.9	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

All mandatory attributes are provided by the SCU. In addition following SCU optional attributes are supported through interactive graphical user interface dialog or disk based configuration file.

3.2.3.4.2.1 Optional Basic Film Session Attributes

Attribute Name	Tag	Default	Options
Number of Copies	(2000,0010)	1	Any positive integer
Print Priority	(2000,0020)	MEDIUM	HIGH, MEDIUM, LOW
Medium Type	(2000,0030)	Printer Dependent	PAPER, CLEAR FILM, BLUE FILM
Film Destination	(2000,0040)	Printer Dependent	MAGAZINE, PROCESSOR

3.2.3.4.2.2 Optional Basic Film Box Attributes

Attribute Name	Tag	Default	Options
Image Display Format	(2010,0010)	STANDARD\3,4	STANDARD\row,col
Film Orientation	(2010,0040)	PORTRAIT	PORTRAIT, LANDSCAPE
Film Size ID	(2010,0050)	Printer Dependent	8INX10IN, 10INX12IN, 10INX14IN 11INX14IN, 14INX14IN, 14INX17IN 24CMX24CM, 24CMX30CM
Magnification Type	(2010,0060)	Cubic, if available	REPLICATE, BILINEAR, CUBIC, NONE
Border Density	(2010,0100)	BLACK	BLACK, WHITE
Empty Image Density	(2010,0110)	BLACK	BLACK, WHITE

3.2.3.4.2.3 Optional Basic Grayscale Image Box Attributes

Attribute Name	Tag	Default	Options
Polarity	(2020,0020)	NORMAL	NORMAL, REVERSE
Magnification Type	(2010,0060)	None	Specified in Film Box

3.2.3.4.3 Presentation Context Acceptance Criterion

Not applicable.

3.2.3.4.4 Transfer Syntax Selection Policies

Not applicable.

4. Communication Profiles

The DataView Series Server provides DICOM TCP/IP network communications support as defined in PS 3.8 Network Communication Support for Message Exchange.

4.1 OSI Stack

OSI stack is not supported.

4.2 TCP/IP Stack

TCP/IP stack is inherited from the operating system.

4.3 Point-to-Point Stack

Point-to-Point stack is not supported.

5. Extensions / Specializations / Privatizations

None.

6. Configuration

All configurable parameters are listed in file 'dataView.cfg' residing in same directory as the executable.

6.1 AE Title / Presentation Address Mapping

The default AE Title and port are "DataView SCP" and 104, respectively.

7. Support for Extended Character Sets

No extended character set is supported.