

# *Vision Applications Rel. 6.1*

## *DICOM Conformance Statement*



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**Abstract** This document provides information about the DICOM Conformance of Vision Applications Rel. 6.1.

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# 1. Introduction

## 1.1 Purpose

This conformance statement specifies how the Vision applications conform to the DICOM V 3.0 standard. Vision applications use DICOM to receive and transmit objects that are used in the radiation therapy process. Further more images and image related data can be printed on a hard copy medium using the DICOM Print Management Service Class.

## 1.2 Scope

The scope and format of this document from chapter 2 on are defined by the part 2 of the DICOM V3.0 standard. Some sections defined in the standard that are not applicable to the software described herein are left out for clarity.

## 1.3 Intended Audience

The intended audience is:

- Customers, who want to use DICOM with Vision Applications
- Marketing and Sales persons
- System Integrators of medical equipment
- Other vendors offering interfacing via DICOM

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

## 1.4 Definitions

This section provides the definitions of terms, acronyms, and abbreviations, which are used throughout the document.

AE	Application Entity
DICOM	Digital Imaging and Communications in Medicine, a standard on image communications in medical applications
DIMSE	DICOM Message Service element
IE	Information Entity
IOD	Information Object Definition
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object-Pair, a definition of an information object (like an image) and of a service (like storage) that can be performed for the object

TCP/IP	Transmission Control Protocol / Internet Protocol, a widely used computer networking protocol
VR	Value Representation, a data encoding method in DICOM
Multi-frame Image	Image that contains multiple two-dimensional pixel planes
UID	Unique Identifier

## 1.5 Related Documents

- [1] Digital Imaging and Communications in Medicine (DICOM), Parts 1-14 (1999), National Electrical Manufacturers Association (NEMA)  
Rosslyn, VA  
United States of America

## 2. Implementation Model

### 2.1 Application Data Flow Diagram

A diagram illustrating the application model is shown in Figure 1: Application Data Flow Diagram below.

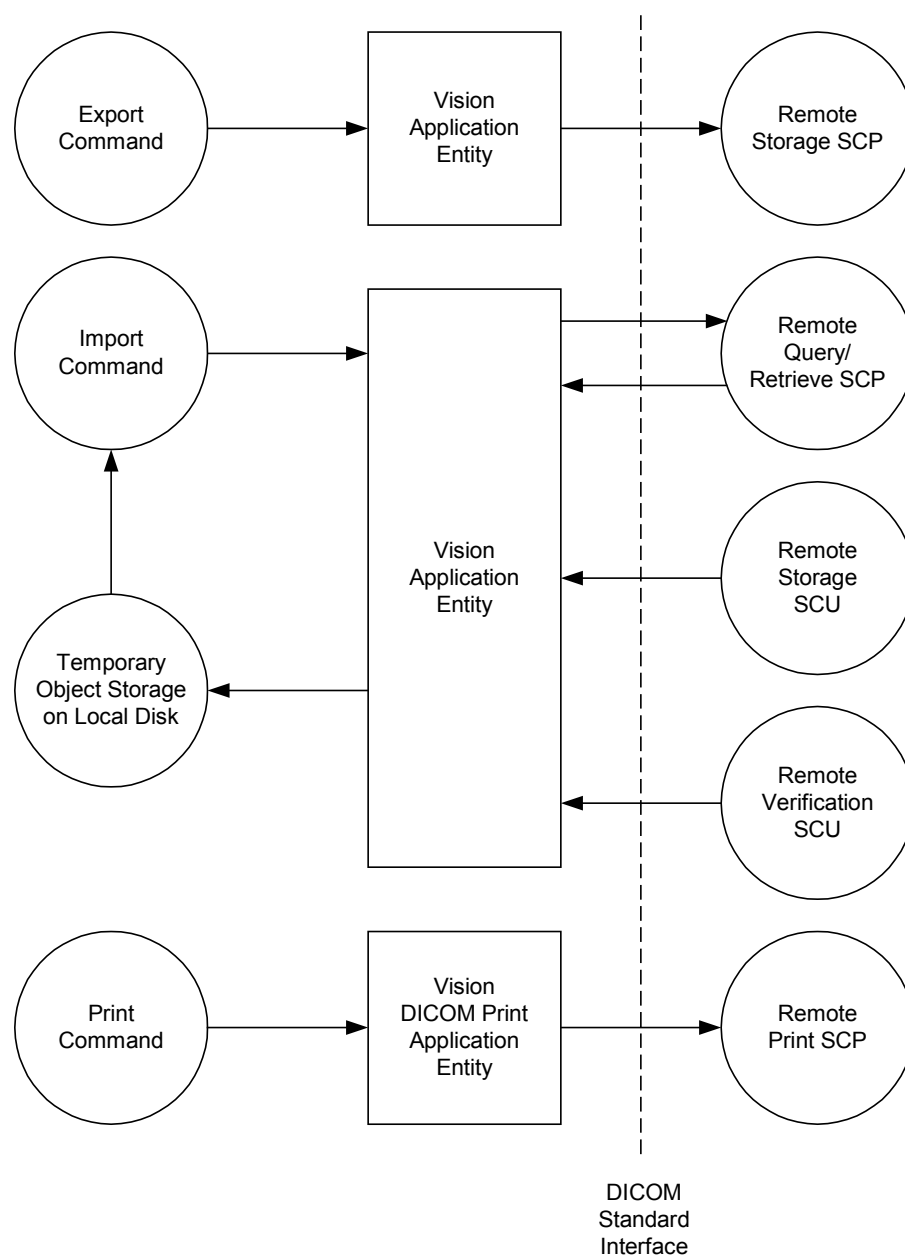


Figure 1: Application Data Flow Diagram

## 2.2 Functional Definition of AE's

The Vision Application Entity is responsible for the DICOM file import, file export, transfer of DICOM objects to other systems and Query/Retrieve of DICOM objects from other systems. Those functions must be activated by the user in a Vision Application.

The Vision Application Entity acting as a DICOM Daemon is responsible for all DICOM communications from other DICOM Applications. Depending on the specific installation this application is running either all the time, or only when started by the user. It accepts storage requests of the service classes specified below. The objects are stored in separate intermediate files, from which they are read in and converted by a Vision Application when the user issues an appropriate command. The C-ECHO messages to the Verification SCP are automatically responded to with a C-ECHO response.

The Vision DICOM Print Application Entity contains the DICOM Print Management. It is responsible for acquiring all the information which is required to print a film session. The film session contains one or more films related in a user defined way (e.g. belonging to the same patient or to the same folder). Each film consists of one or more images.

## 2.3 Sequencing of Real-World Activities

Not applicable.

## 3. AE Specifications

### 3.1 Vision Application Entity Specification

The Vision Application Entity provides Standard Conformance to the following DICOM V3.0 SOP classes:

SOP Class Name	SCU/SCP Role	SOP Class UID
Verification (Echo)	SCP only	1.2.840.10008.1.1
CR Image Storage	Both	1.2.840.10008.5.1.4.1.1.1
CT Image Storage	Both	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	Both	1.2.840.10008.5.1.4.1.1.4
Ultrasound Image Storage (*)	Both	1.2.840.10008.5.1.4.1.1.6 (retired) 1.2.840.10008.5.1.4.1.1.6.1
Secondary Capture Image Storage (*)	Both	1.2.840.10008.5.1.4.1.1.7
X-Ray Angiographic Image Storage (*)	Both	1.2.840.10008.5.1.4.1.1.12.1
RT Image Storage	Both	1.2.840.10008.5.1.4.1.1.481.1
RT Structure Set Storage	Both	1.2.840.10008.5.1.4.1.1.481.3
RT Plan Storage	Both	1.2.840.10008.5.1.4.1.1.481.5
Study Root Query/Retrieve information model- FIND	SCU	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve information model- MOVE	SCU	1.2.840.10008.5.1.4.1.2.2.2

**Table 1: Supported SCU/SCP SOP Classes for Vision Application Entity**

**Note:** For (\*) see section 3.1.3.3.2 SOP specific conformance for all image storage SOP classes on page 9.

#### 3.1.1 Association Establishment Policies

##### 3.1.1.1 General

The maximum PDU length of the AE is 32768 bytes.

The AE does not support any SOP class extended negotiations. The user information item sent by this AE only contains the maximum PDU length and the Implementation UID.

### 3.1.1.2 Number of Associations

The Vision Application Entity accepts any number of simultaneous associations. Note however, that multiple associations at a time affect the response time of the system, and may thus cause time-outs on the association initiator side.

### 3.1.1.3 Asynchronous Nature

Asynchronous operation is not supported.

### 3.1.1.4 Implementation Identifying information

The Implementation Class UID of the application entity is:

1.2.246.352.43077212.2

No implementation version information is given.

## 3.1.2 Association Initiation Policy

The Vision Application Entity initiates associations in two different cases:

- The operator selects a DICOM Export Filter in a Vision application.
- The operator selects the DICOM Query/Retrieve Import Filter in a Vision application.

### 3.1.2.1 Export to Remote Storage SCP

#### 3.1.2.1.1 Associated Real-World Activity

The operator selects the Export command and then selects an export destination that is configured to use a DICOM Export Filter. The service class used depends on the type of the object that the user has selected before the Export command.

#### 3.1.2.1.2 Proposed Presentation Contexts

Vision Application Entity will propose the following presentation contexts:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**Table 2: Proposed Presentation Contexts for Export to Remote Storage SCP**

### 3.1.2.2 Import from Remote Query/Retrieve SCP

#### 3.1.2.2.1 Associated Real-World Activity

The operator selects the Import command and an import source that has been configured to use the DICOM Query/Retrieve service class.

#### 3.1.2.2.2 Proposed Presentation Contexts

Vision Application Entity will propose the following presentation contexts:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Root Query/Retrieve information model- FIND	1.2.840.10008.5.1.4.1.2.2.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Study Root Query/Retrieve information model- MOVE	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**Table 3: Proposed Presentation Contexts for Import from Remote Query/Retrieve SCP**

### 3.1.2.3 SOP Specific Conformance (SCU Role)

#### 3.1.2.3.1 SOP specific conformance for all storage SOP classes

In a case of successful C-STORE operation, the program does not display the user any information but returns to its normal state. All C-STORE-responses with a warning or unsuccessful status cause the program to display warning messages to the user.

#### 3.1.2.3.2 SOP specific conformance for the Query/Retrieve SOP classes

Priority processing is not used.

Mainly unique and required keys are supported. On study level the two optional keys Patient Name and Patient Id can be specified. Wild card matching (\*) is used.

No relational queries are allowed.

For the C-STORE sub-operations generated in the C-MOVE all SOP classes as listed in Table 1: Supported SCU/SCP SOP Classes for Vision Application Entity are supported.

### 3.1.3 Association Acceptance Policy

The Vision Application Entity accepts all association requests that request one of the supported service classes. It does not place any limits on the number of concurrent associations or on who may connect to it.

#### 3.1.3.1 Associated Real-World Activity

When objects are sent to the Vision Application Entity, the DICOM Daemon stores them to temporary files. The user may then activate the Import command to read the objects into the database.

In case of Query/Retrieve, the objects that are received by the Vision Application Entity are stored by the DICOM Daemon to temporary files. When the retrieval of all objects is complete, the objects are automatically read by the application and they can be stored directly in the database in the context of the patient.

#### 3.1.3.2 Presentation Context Table

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
CR Image Storage	1.2.840.10008.5.1.4.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None
RT Image Storage	1.2.840.10008.5.1.4.1.1.481.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

**Table 4: Acceptable Presentation Contexts**

### 3.1.3.3 SOP Specific Conformance (SCP Role)

#### 3.1.3.3.1 SOP specific conformance for the verification SOP class

Vision Application Entity provides standard conformance to the DICOM Verification Service Class.

#### 3.1.3.3.2 SOP specific conformance for all image storage SOP classes

Vision Application Entity conforms to the image storage service classes at level 0 (local) for CT, CR and MR modalities. This means that only the attributes of the images that can be saved in the Vision database are stored by Vision Application Entity and all others are discarded. However, it is guaranteed that at least all type 1 attributes are stored. For other image modalities even type 1 attributes may be discarded.

A successful C-STORE operation means that the image has been received, and saved to a temporary file, which can then be read in to the Vision database by the user. The successful termination of the association does not imply that the image data is either syntactically or semantically correct.

#### 3.1.3.3.3 SOP specific conformance for the RT Structure Set storage SOP class

Vision Application Entity conforms to the RT Structure Set storage service classes at level 0 (local). This means that only the attributes of the structure sets that can be converted to meaningful information for Vision Applications are utilized.

A successful C-STORE operation means that the structure set has been received, and saved to a temporary file. The successful termination does not imply that the data is either syntactically or semantically correct.

The system can only use ROI contours which lie on the slice planes of the CT or MR image set that is referenced by the structure set module.

Before the structure set can be imported in Vision Applications, the corresponding CT or MR image set has to be sent to the system and it has to be read in to the program. A volume image shall be constructed in advance by the user. The structure set can be imported and added to

the appropriate volume image. A ROI contour is discarded if it's referencing an image which can not be found in the system.

#### **3.1.3.3.4 SOP specific conformance for the RT Plan storage SOP class**

Vision Application Entity conforms to the RT Plan storage service classes at level 0 (local). This means that only the attributes of the plan that can be converted to meaningful information for Vision Applications are utilized.

A successful C-STORE operation means that the plan has been received, and saved to a temporary file. The successful termination does not imply that the data is either syntactically or semantically correct.

All information in the RT Prescription, RT Tolerance Tables, RT Patient Setup and RT Fraction Scheme modules is discarded. Compensator and Bolus are not supported, because they are not handled by Vision Applications yet. BeamLimitingDevice data will be only stored in case of successful verification of the imported treatment machine together with the BeamLimitingDevice (verification criteria see Appendix). The same applies for the imported Wedge, Block and Applicator data. The Data is discarded if verification fails.

Treatment beams can be read in to Vision Applications only if they represent static or arc fields, and therefore may only contain 2 control points.

#### **3.1.3.3.5 SOP specific conformance for the RT Image storage SOP class**

Vision Application Entity conforms to the RT Image storage service classes at level 0 (local). This means that only the attributes of the RT image that can be converted to meaningful information for Vision Applications are utilized.

A successful C-STORE operation means that the RT image has been received, and saved to a temporary file. The successful termination does not imply that the data is either syntactically or semantically correct.

If the RT image references the RT Plan and RT Beam, the referenced RT Plan has to be imported before the image to be able to preserve the association. On import of the RT Image no plans and fields are created.

#### **3.1.3.4 Presentation Context Acceptance Criterion**

Vision Application Entity will accept the presentation contexts mentioned in the Presentation Context Table above.

#### **3.1.3.5 Transfer Syntax Selection Policies**

Vision Application Entity will only accept the DICOM default transfer syntax.

## 3.2 Vision DICOM Print Application Entity Specification

Vision DICOM Print Application Entity provides standard conformance as a Print Management SCU to the following SOP classes:

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4
>Printer SOP Class	1.2.840.10008.5.1.1.16

**Table 5: Supported SCU SOP Classes for Vision DICOM Print Application Entity**

### 3.2.1 Association Establishment Policies

#### 3.2.1.1 General

The maximum PDU length of the AE is 32768 bytes. The user information item sent by this AE only contains the maximum PDU length and the Implementation UID.

#### 3.2.1.2 Number of associations

The Vision DICOM Print Application Entity acts as an Association-requester i.e. the AE establishes one single association to any remote AE at any time.

#### 3.2.1.3 Asynchronous nature

Asynchronous operation is not supported.

#### 3.2.1.4 Implementation Identifying information

The Implementation Class UID of the Print Management application entity is:

1.2.246.352.43077212.3

No implementation version information is given.

### 3.2.2 Association Initiation Policy

The Vision DICOM Print Application Entity initiates associations when the user selects the DICOM Print command in a Vision application.

### 3.2.2.1 Associated Real-World Activity

The Vision DICOM Print Application Entity initiates associations when the user selects the DICOM Print command and then selects a configured printer which is capable to use DICOM. The AE allows the user to set print parameters and to transmit images for printing.

### 3.2.2.2 Proposed Presentation Contexts

The Vision DICOM Print Application Entity supports the listed Abstract Syntaxes and Transfer Syntaxes as a Print Management SCU:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Printer SOP Class	1.2.840.10008.5.1.1.16	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

**Table 6: Proposed Presentation Contexts for Print to Remote Print SCP**

### 3.2.2.3 SOP Specific Conformance for Meta SOP Class: Basic Grayscale Print Management

The Meta SOP Class is defined by the following set of supported SOP Classes.

- Basic Film Session SOP Class
- Basic Film Box SOP Class
- Basic Grayscale Image Box SOP Class
- Printer SOP Class

### 3.2.2.3.1 SOP Specific conformance for SOP Class: Basic Film Session

Vision DICOM Print Application Entity supports the following Attributes of the N-CREATE DIMSE Service:

Attribute Name	Tag
Number of Copies	(2000,0010)
Medium Type	(2000,0030)
Film Session Label	(2000,0050)

### 3.2.2.3.2 SOP Specific conformance for SOP Class: Basic Film Box

Vision DICOM Print Application Entity supports the following Attributes of the N-CREATE DIMSE Service:

Attribute Name	Tag
Image Display Format	(2010,0010)
Referenced Film Session Sequence	(2010,0500)
Film Orientation	(2010,0040)
Film Size ID	(2010,0050)
Magnification Type	(2010,0060)

### 3.2.2.3.3 SOP Specific conformance for SOP Class: Basic Grayscale Image Box

Vision DICOM Print Application Entity supports the following Attributes of the N-SET DIMSE Service:

Attribute Name	Tag	Range
Image Position	(2020,0010)	
Preformatted Grayscale Image Sequence	(2020,0110)	
>Samples Per Pixel	(0028,0002)	1
>Photometric Interpretation	(0028,0004)	MONOCHROME1 or 2
>Rows	(0028,0010)	Depending on image
>Columns	(0028,0011)	Depending on image
>Pixel Aspect Ratio	(0028,0034)	Depending on image
>Bits Allocated	(0028,0100)	16 / 8
>Bits Stored	(0028,0101)	12 / 8
>High Bit	(0028,0102)	11 / 7
>Pixel Representation	(0028,0103)	unsigned integer
>Pixel Data	(7FE0,0010)	
Magnification Type	(2010,0060)	

### 3.2.2.3.4 SOP Specific conformance for SOP Class: Printer

Vision DICOM Print Application Entity supports the mandatory service element N-EVENT-REPORT.

The N-GET DIMSE Service Attributes supported are:

Attribute name	Tag
Printer Status	(2110,0010)
Printer Status Info	(2110,0020)

### 3.2.3 Association Acceptance Policy

The Vision DICOM Print Application Entity does not accept any association from a remote AE.

## **4. Communication profiles**

### **4.1 Supported communications stacks**

Vision Application Entity and Vision DICOM Print Application Entity provide DICOM V3.0 TCP/IP Network Communication Support as defined in PS 3.8 (part 8 of the DICOM V3.0 standard).

#### **4.1.1 TCP/IP stack**

Vision Application Entity and Vision DICOM Print Application Entity use the TCP/IP stack of Windows NT (Winsock) which is the operating system of the Vision application system.

##### **4.1.1.1 Physical media support**

Vision Application Entity and Vision DICOM Print Application Entity can run on any physical network media that is supported by the underlying hardware and operating system (i.e. standard PCs and Windows NT). These include, but are not limited to: thin, thick, and twisted-pair Ethernet, token ring network and FDDI.

## 5. Configuration

Vision Application Entity obtains the configuration information from the import/export filter configurations and the DICOM Storage SCP configuration of Vision Applications.

Vision DICOM Print Application Entity obtains the configuration information from the DICOM Print configuration of Vision Applications.

### 5.1 AE Title/Presentation Address Mapping

Each import/export or print filter provides a mapping of an Application Entity Title to a Presentation Address. A Presentation Address consists of a filter name, a calling (local) and called (destination) AE title, a destination IP address or hostname, and a port number.

### 5.2 Configurable Parameters

#### 5.2.1 Vision Application Entity

The configurable parameters of Vision Application Entity are:

- For the Storage service class SCU the TCP/IP address, called AE title and port number of the destination are configurable. The calling AE title of the local application is configurable too. Multiple configurations can exist in the system at the same time.
- For the Query/Retrieve service class SCU the TCP/IP address, called AE title and port number of the provider are configurable. The calling AE title of the local application and the Move Destination AE title are configurable too. The configurable Received File Directory Path is the directory where the objects are stored in. It must point to the same directory as configured for the Storage service class SCP. Multiple configurations can exist in the system at the same time.
- For the Storage service class SCP the port number and the location of the temporary object storage are configurable. Calling and called AE title are not verified. The Vision Application Entity will respond to any calling AE with the AE title that it is called with. The TCP/IP address of the host computer is used. Only one configuration can exist in the system at the same time.
- TCP/IP port number  
The port number of our Storage service class SCP defaults to 104 (decimal), but it can be configured to be any number that is acceptable for TCP/IP.
- Whether or not a log is produced  
By default no debug log is produced by the Vision Application Entity. It can be configured to produce an ASCII log of its actions in a file called 'dicom.log'.

## 5.2.2 Vision DICOM Print Application Entity

The configurable parameters of Vision DICOM Print Application Entity are:

- For the print service class SCU the TCP/IP address, calling and called AE title and port number of the destination are configurable. Multiple configurations can exist in the system at the same time.
- Whether or not a log is produced  
By default no debug log is produced by the Vision DICOM Print Application Entity. It can be configured to produce an ASCII log of its actions in a file called 'dicom.log'

## **6. Support of Extended Character Sets**

Extended character sets are not supported.

# Appendix A: RT Information Objects Implementation

## General

The following sub-modules of the module RT Beams are currently not supported:

- RT Compensator
- RT Bolus
- References to RT Dose module and RT Dose

Modules of the RT Plan IOD which are currently not supported:

- RT Tolerance Table
- RT Patient Setup (only used for verification)
- RT Prescription
- RT Fraction Scheme

RT Image Module:

- Multiframe images are not supported. The RT Image Module must contain only a single item in the Exposure sequence.

## RT Beams Module

Dynamic Treatment is currently not supported i.e. only static fields or standard arc therapy with 2 control points can be imported/exported.

The following list contains information about restrictions in the value range of certain attributes.

Attribute Name	Tag	Supported
Beam Type	(300A,00C3)	STATIC = all beam parameters remain unchanged during delivery  DYNAMIC = two Control Points allowed where only the Gantry Angle (300A,011E) may change
Radiation Type	(300A,00C6)	PHOTON, ELECTRON
Number of Wedges	(300A,00D0)	Only one wedge per beam is supported
Number of Compensators	(300A,00E0)	Only value 0 is supported i.e. data sent in the compensator sequence will be discarded on import.
Number of Boli	(300A,00ED)	Only value 0 is supported i.e. references sent in the Referenced Bolus Sequence will be discarded on import.

Beam Limiting Device Position Sequence	(300A,011A)	Sequence is only supported for the first Control Point, i.e. dynamic treatments besides arc therapy are not supported.
Beam Limiting Device Rotation Direction	(300A,0121)	Only type NONE is supported
Patient Support Rotation Direction	(300A,0123)	Only type NONE is supported
Table Top Eccentric Rotation Direction	(300A,0126)	Only type NONE is supported

## RT Image Module

Attribute Name	Tag	Supported
RT Image Plane	(3002,0000C)	NORMAL = image plane normal to beam axis
Image Type	(0028,0008)	BLANK are not supported

## ROI Contour Module

The system can only use ROI contours of the type mentioned in the table and the contours have to be on the slice planes of the CT or MR images which are referenced by one of the frames of reference in the Referenced Frame of Reference Sequence.

Attribute Name	Tag	Supported
Contour Geometric Type	(3006,0042)	POINT, OPEN_PLANAR, CLOSED_PLANAR

## Structure Set Module

Tag (3006,0016) referenced images must be present, i.e. a structure set which was created without referencing images will not be imported by Vision Applications.

## Appendix B: RT Data Mapping Requirements

For a successful exchange of RT data certain DICOM tags must map with attributes of the corresponding data in Vision Applications. Data may be discarded or rejected otherwise.

In case of the RT Plan for example the beam can be imported even though the treatment device can not be verified. Wedges, Applicators or MLCs on the other hand will be discarded.

### Treatment Machine

The mapping will be successful

- if the DICOM Treatment Machine Name (tag (300A,00B2)) is the same as the Radiation Device ID in Vision
- or if the DICOM Treatment Machine Name is the same as the Radiation Device Name in Vision
- or if the DICOM Device Serial Number (tag (0018,1000)) is the same as the Radiation Device Manufacturer Serial No. in Vision

Further more the Source Axis Distance (tag (300A,00B4)), if present, must be equal to the SAD of the Radiation Device in Vision and the Table Top Eccentric Axis Distance (tag (300A,0124)), if present, must be equal to the Table Top Eccentric of the Vision Machine.

### Wedge

A wedge is successfully verified if wedge angle (tag (300A,00D5)), wedge orientation (tag (3000A,00D8)) and wedge type (tag (300A,00D3)) are equal to a wedge of the specific treatment machine in the Vision Application. If multiple wedges are fulfilling the criteria the wedge ID in Vision must be the same as the wedge number (tag (300A,00D2)).

### Applicator

The applicator Id (tag (300A,0108)) must be the same as the Applicator ID in Vision.

### MLC

Number of Leaf/Jaw pairs (tag (300A,00BC)) must be the same as the number of leaves in the Vision Application MLC.

### Block

In Vision Applications one single Block may contain multiple block edges (closed polygons). DICOM blocks which have the same thickness (tag (300A,0100)) and block type (tag (300A,00F8)) are combined into one block on import.

### Field (Beam)

For the static beam the second control point shall not contain any values besides the Control Point Index (tag (300A,0112)) and Cumulative Meterset Weight (tag (300A,0134)).

In case of a dynamic beam the Gantry Angle (tag (300A,011E)) and only that shall be present in the second control point.

## Patient Setup

Although Vision applications do not support the patient setup module certain verifications have to be done on import of a RT Plan. If the plan is referencing a Structure Set which has been imported before, the patient position of the connected 3D image is checked. If no Structure Set is referenced by the Plan, the user may choose a 3D image. The same check is performed. A warning is given if the Patient position of any referenced patient setup (tag (0018,5100)) is not equal to the patient position of the 3D image.