



The Nuclear Medicine Company



Vision POWERstation DICOM Conformance Statement

Document PN 92-080210

SMVInternational 105 rue Morane-Saulnier ZI BP 112 78534 BUC Cedex – France
Tel: 33.1.30.84.91.00 Fax: 33.1.30.84.91.05
SMVAmerica 8380 Darrow Road Twinsburg, Ohio 44087 USA
Tel: 800.664.0844.1340 Fax: 216.405.7680

Document history

REV. #	Changes	Author	Date
0	Creation	Etienne VALLEE	3-nov-94
1	First release of DICOM in Vision environment	Etienne VALLEE	28-mar-96
2	Update print SCU and PDU size	EV/Frédéric LOUCANO	29-may-96
3	Add Query/Retrieve and HIS interface	EV/Frédéric LOUCANO	10-jun-96
4	Update for DICOM P3	FL / EV	9-dec-96
5	Add Imation specificity, query/retrieve, echo scu, and multimodality support.	FL / EV	19-feb-97
5.1	Add modifications as per final release of supplement 7	FL / EV	27-mar-97
6.0	Added/modified Query & Retrieve (SCU & SCP). Updated/corrected section 3.2.2.1.3 Corresponds to VISION Software Version 5.1.0	LL	10-feb-2000
6.1	Start paragraph numbering at 1.0 instead of 0.0. Update document format per comments from E. Vallee. Correct SMVI address.	KMM	9-Mar-2000
7.0	Added Worklist and multiple SCPs. Added Vision ↔ DICOM Conversion Specifications Section. Corresponds to VISION Software Version 5.2.0	LL KMM	9-Jun-2000 16-Oct-2000

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1. Introduction

1.1 Purpose of this document

This document is the conformance statement of the DICOM implementation by SMV on the Vision POWERstations.

1.2 Sources for this document

The American College of Radiology-National Electrical Manufacturers Association (ACR-NEMA) Digital Imaging and Communications in Medicine (DICOM) Standard, Version 3.0. © Copyright 1998 by the National Electrical Manufacturers Association (NEMA).

2. Implementation model

2.1 Application data flow diagram

2.1.1 « dicom-echo » (Certification SCU)

The module *dicom-echo* is a UNIX application that sends a verification request to a remote Certification SCP, and is invoked by entering the following command:

```
dicom-echo -r option [-scu option] [-scp option] -h
  with: -r option      where : option is the remote SCP AE Title.
        -scu option      option is the local SCU AE Title.
        -scp option      option is the local SCP AE Title.
        -h                displays the help menu, and exit the program.
```

2.1.2 « vision-to-dicom » (Storage SCU)

The module *vision-to-dicom* is a UNIX application that exports DICOM images to a remote Storage SCP, and is invoked from the Vision User Interface («Patient Database» *copy* or *move* services), or by entering the following command:

```
vision-to-dicom -r option [-scu option] [-scp option] -f filename -s number -h
  with: -r option      where : option is the remote SCP AE Title.
        -scu option      option is the local SCU AE Title.
        -scp option      option is the local SCP AE Title.
        -f filename      filename is the vision formatted file to convert into a DICOM
                           object and send to the remote Storage SCP (can not be used
                           with the -s option).
        -s number        number is the sequence number (vision format) of a dataset to
                           convert into a DICOM object and send to the remote Storage
                           SCP (can not be used with the « -f » option).
        -h                displays the help menu, and exit the program.
```

Note : this module uses the */home/vision/database* directory to temporarily store the DICOM file. It is removed after its transfer to its destination. The identification of the directory can however be modified by setting the environment variable **DICOM_OUT** (its content being the path), and all outgoing DICOM files are then kept in this directory.

2.1.3 « dicom-query » (Query/Retrieve SCU)

The module *dicom-query* is a UNIX application that initiates the Query/Retrieve service by requesting a list of data entries of a remote Query/Retrieve SCP (this list of data entries represents the content of a browser from which the user selects the desired items to transfer). This process is invoked by the Vision User Interface («Patient Database» *retrieve* or *archive* services, «Update Browser» option), or by entering the following command :

```
dicom-query -r option [-scu option] [-scp option] [-u|-c] [-l number] [-e number] [-q] -h
  with: -r option      where : option is the remote SCP AE Title.
        -scu option    option is the local SCU AE Title.
        -scp option    option is the local SCP AE Title.
        -u              initiates a new query request.
        -c              returns the response of the previous query request.
        -l number     number specifies the level of the query (0 :patient, 1 :study :
                        2 :series , 3 :image).
        -e number     number specifies the ith entry (from the query response) for
                        which a query at the next level is to be requested.
        -q              (quiet mode) indicates « no print statements ».
        -h              displays the help menu, and exit the program.
```

2.1.4 « dicom-retrieve » (Query/Retrieve SCU)

The module *dicom-retrieve* is a UNIX application that completes the Query/Retrieve service by importing the user selected data (from a previous query request) of a remote Query/Retrieve SCP. This process is invoked by the Vision User Interface («Patient Database» *retrieve* or *archive* services, «browser menu»), or by entering the following command :

```
dicom-retrieve -r option [-scu option] [-scp option] -e number [-q] -h
  with: -r option      where : option is the remote SCP AE Title.
        -scu option    option is the local SCU AE Title.
        -scp option    option is the local SCP AE Title.
        -e number     number specifies the ith entry (from the query response) to
                        retrieve.
        -q              (quiet mode) indicates « no print statements ».
        -h              displays the help menu, and exit the program.
```

2.1.5 « dicom-worklist » (Basic Worklist Management SCU)

The module *dicom-worklist* is a UNIX application that initiates the Worklist Query service by requesting a list of data entries of a remote Worklist SCP. This process is invoked by the Vision User Interface («Worklist», via the «Update» option), or by entering the following command :

```
dicom-worklist -r option [-scu option] [-scp option] [-u|-c] -a|-m|-e [-q] -h
  with: -r option      where : option is the remote SCP AE Title.
        -scu option    option is the local SCU AE Title.
        -scp option    option is the local SCP AE Title.
        -u              initiates a new query request.
        -c              returns the response of the previous query request.
        -a              « automatic mode » (this mode is enabled by the automatic
                        scheduler).
        -m              « manual mode » (interactive mode, ie. : via the program
                        « worklist »).
        -e              « external mode » (used by the worklist daemon « worklistd »).
        -q              (quiet mode) indicates « no print statements ».
        -h              displays the help menu, and exit the program.
```

2.1.6 « dicom-print » (Print Management SCU)

The module *dicom-print* is a UNIX application identified as the backend program of an AIX queue. It is automatically invoked by Vision's hardcopy utility.

2.1.7 « dicom-scp » (Certification, Storage and Query/Retrieve SCPs)

The module *dicom-scp* is a UNIX daemon that checks the input of one association and processes the corresponding DICOM service request.

The module *dicom-scp* is automatically invoked when login in as « vision » on a POWERstation, or by entering the following command :

Note : this module uses the */home/vision/database* directory to temporarily store and process the DICOM file. This file is then removed after its conversion to its vision equivalent. The identification of the directory can however be modified by setting the environment variable **DICOM_IN** (its content being the path), and all incoming DICOM files are then kept in this directory.

2.1.8 Implementation model

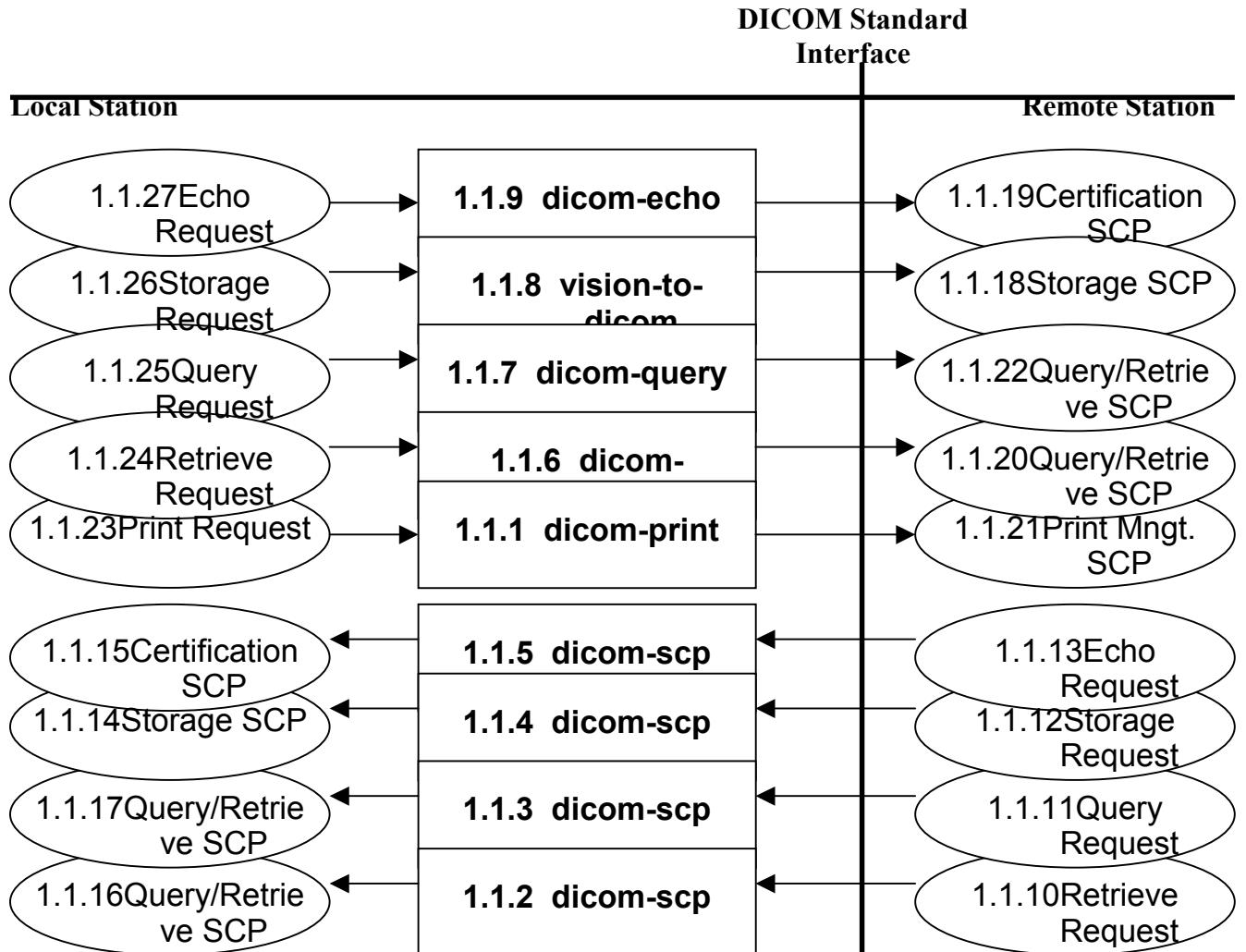


Fig 1 Implementation model of applications

2.2 Functional definition of the application entities

2.2.1 « dicom-echo »

This Certification SCU sends a verification request, to a remote Certification SCP, and acknowledges its proper execution by displaying a message of success or failure.

2.2.2 « vision-to-dicom »

This Storage SCU converts a SMV Nuclear Medicine dataset to its DICOM 3.0 equivalent, and sends the DICOM formatted object to the remote Storage SCP.

2.2.3 « dicom-query »

This process is the first of two modules that composes the Query/Retrieve SCU. It sends a query request to a remote Query/Retrieve SCP, which responds to the SCU by transferring back a list of DICOM objects that identifies each appropriate entries (patients, studies, or series).

The form of the query request contains the desired information for all entries (if available and supported by the remote Query/Retrieve SCP). These request specifics are contained in the `/home/vision/data/dicom-query.cfg` ascii file (which can be modified manually, or via Vision's User Interface).

2.2.4 « dicom-retrieve »

This process is the second of two modules that composes the Query/Retrieve SCU. It sends a set of entry# (ascertained within the object listing created by a previous query request) to the remote Query/Retrieve SCP. The remote station then acknowledges the request by sending the corresponding DICOM object to the local Storage SCP. The module *dicom-retrieve* terminates when the object transfer has been completed. If more than one entry is specified when initiating the retrieve process: a series of *dicom-retrieve* calls is successively executed for each corresponding entry.

2.2.5 « dicom-worklist »

This Basic Worklist Management SCU sends a query request to the remote Worklist SCP, which responds to the SCU by transferring back a list of DICOM objects. Each objects correspond to a patient entry for which dataset(s) is to be acquired.

2.2.6 « dicom-print »

This Print Management SCU converts a Vision formatted block of hardcopy data into its appropriate DICOM 3.0 object, and sends the latter to the remote Print Management SCP.

2.2.7 « dicom-scp »

This module responds to DICOM associations for Certification, Storage, and Query/Retrieve requests :

2.2.7.1 Certification SCP

Aknowledges the remote Certification SCU of a verification request.

2.2.7.2 Storage SCP

Receives a DICOM object of a remote Storage SCU, converts it into a «Vision» dataset, and stores it in the Vision Database.

2.2.7.3 Query/Retrieve SCP (Query section)

Parses the Vision database, converts the matching dataset identification entries into a series of DICOM objects (each object containing the user selected information ascertained by the SCU), and sends them to the remote Query/Retrieve SCU.

2.2.7.4 Query/Retrieve SCP (Retrieve section)

Receives and identifies an entry number to a specific set of Vision dataset(s). The set of Vision dataset(s) is then converted into a DICOM object(s), and sent to the remote Storage SCP.

2.3 Sequencing of real-world activities

Not applicable.

3. AE specifications

SMV, and different manufacturers, can support multiple databases on the same platform, hence the requirement of accessing multiple set of SCU/SCPs of any DICOM station.

ALL AE Titles, on the network, must be unique. The only exception resides in the case where a SCU's AE Title is the same as its corresponding SCP's.

3.1 *dicom-echo* AE specifications

dicom-echo provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCU:

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1

dicom-echo: SOP classes

3.1.1 Association establishment policy

3.1.1.1 General

dicom-echo shall attempt to establish an association whenever it is invoked with valid parameters.

The SOP Class Extended Negotiation is not supported.

The SCU/SCP Role Selection Negotiation is not supported for all Association establishment requests.

3.1.1.2 Number of associations

dicom-echo is not required to initiate multiple simultaneous transactions.

3.1.1.3 Asynchronous nature

Not applicable.

3.1.1.4 Implementation identifying information

dicom-echo provides a single implementation Class UID which is "1.2.250.1.31.1.1".

dicom-echo provides an implementation version name of "SMV_ECHO_X.Y" where X.Y represents the software version number.

The default **dicom-echo** application title name is "SMV_ECHO", but can be modified within the DICOM configuration procedures (see section 6).

3.1.2 Association initiation policy

There is one Real-world activity that causes association establishment:

- Sending a verification request to a remote DICOM Verification SCP.

3.1.2.1 Proposed presentation context

Transfer Syntax Name	Transfer Syntax UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2

3.2 *vision-to-dicom* AE specifications

vision-to-dicom provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCU:

SOP Class Name	SOP Class UID
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7

vision-to-dicom: SOP classes

3.2.1 Association establishment policy

3.2.1.1 General

vision-to-dicom shall attempt to establish an association whenever it is invoked with valid parameters. It shall only attempt to establish associations if it determines that the Abstract Syntax and Transfer Syntax specified in the file header are valid. **vision-to-dicom** can perform multiple C-STORE operations over a single association. The association is maintained until all data files to be exported have been processed. The SOP Class Extended Negotiation is not supported.

The SCU/SCP Role Selection Negotiation is not supported for all Association establishment requests.

The SCU/SCP Role Selection Negotiation is not supported for all Association establishment requests.

The maximum PDU size which can be transmitted by **vision-to-dicom** is fixed at 100 Kbytes.

3.2.1.2 Number of associations

vision-to-dicom is not required to initiate multiple simultaneous transactions.

3.2.1.3 Asynchronous nature

Not applicable.

3.2.1.4 Implementation identifying information

vision-to-dicom provides a single implementation Class UID which is "1.2.250.1.31.1.3".

vision-to-dicom provides an implementation version name of "SMV_STORE_SCU_X.Y" where X.Y represents the software version number.

The default **vision-to-dicom** application title name is "SMV_STORE", but can be modified within the DICOM configuration procedures (see section 6).

3.2.2 Association initiation policy

There is one Real-world activity that causes association establishment:

- Sending a Vision image dataset to a remote AE.

3.2.2.1 Real-world activity - Transfer of image with implicit VR

3.2.2.1.1 Associated real-world activity

The associated Real-world activity is the attempt to transfer an image file through the Vision application database browser, or manually (though this last procedure requires a more thorough knowledge of the Vision database).

The user chooses a destination in a list of hosts (or AE titles) then selects one or more patients or images in the local browser and validates the list to start the Vision format to DICOM format conversion and then the transfer.

3.2.2.1.2 Proposed presentation context

3.2.3 Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name list	UID list		
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	none
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	DICOM Implicit VR Little Endian	1.2.840.10008.1.2	SCU	none

vision-to-dicom: Proposed Presentation context for Transfer

3.2.3.1.1 SOP specific conformance statement for Storage Service class

When transferring data from Vision’s User Interface, the list of images to be transferred is displayed to the user. Each file successfully transferred is removed from the list.

Note that the images previously imported that do not match the NM SOP class (1.2.840.10008.5.1.4.1.1.20) will be converted and then exported as SC SOP class (1.2.840.10008.5.1.4.1.1.7)

Statuses of warning shall be treated as successful.

The following attributes for the Nuclear Medicine Images are the supported attributes (from module 1 to module 24):

1 - Patient Module

NAME	TAG ID	TYPE	VR
Patient's Name	(0010,0010)	2	PN
Patient ID	(0010,0020)	2	LO

NAME	TAG ID	TYPE	VR
Patient's Birth Date	(0010,0030)	2	DA
Patient's Sex	(0010,0040)	2	CS
Other Patient IDs	(0010,1000)	3	LO
Patient Comments	(0010,4000)	3	LT

2 - General Study Module

NAME	TAG ID	TYPE	VR
Study Instance UID	(0020,000D)	1	UI
Study Date	(0008,0020)	2	DA
Study Time	(0008,0030)	2	TM
Referring Physician's Name	(0008,0090)	2	PN
Study ID	(0020,0010)	2	SH
Accession Number	(0008,0050)	2	SH
Study Description	(0008,1030)	3	LO
Name of Physician(s) Reading Study	(0008,1060)	3	PN

3 - Patient Study

NAME	TAG ID	TYPE	VR
Admitting Diagnoses Description	(0008,1080)	3	LO
Patient's Age	(0010,1010)	3	AS
Patient's Size	(0010,1020)	3	DS
Patient's Weight	(0010,1030)	3	DS

4 - General Series Module

NAME	TAG ID	TYPE	VR
Modality	(0008,0060)	1	CS
Series Instance UID	(0020,000E)	1	UI
Series Number (see note * below)	(0020,0011)	2	IS
Series Date	(0008,0021)	3	DA
Series Time	(0008,0031)	3	TM
Performing Physician's Name	(0008,1050)	3	PN
Series Description	(0008,103E)	3	LO
Operators' Name	(0008,1070)	3	PN
Smallest Pixel Value in Series	(0028,0108)	3	US/SS
Largest Pixel Value in Series	(0028,0109)	3	US/SS

* The « Series number » is set to 1 for all exports (Vision to DICOM), and is ignored for all imports (DICOM to Vision).

5 - NM /PET Patient Orientation Module

NAME	TAG ID	TYPE	VR
Patient Orientation Code Sequence	(0054,0410)	2	SQ
Patient Gantry Relationship Code Sequence	(0054,0414)	2	SQ
> Code Value	(0008,0100)	1C	SH
> Coding Scheme Designator	(0008,0102)	1C	SH
> Code Meaning	(0008,0104)	3	LO

6 - Frame of Reference Module : Not supported

7 - General Equipment Module

NAME	TAG ID	TYPE	VR
Manufacturer	(0008,0070)	2	LO
Institution Name	(0008,0080)	3	LO
Station Name (see note * below)	(0008,1010)	3	SH
Institutional Department Name	(0008,1040)	3	LO
Device Serial Number	(0018,1000)	3	LO
Software Versions	(0018,1020)	3	LO
Spatial Resolution	(0018,1050)	3	DS
Date of Last Calibration	(0018,1200)	3	DA

* the « **Station Name** » field is set to the POWERstation hostname for outgoing DICOM objects only. This field is ignored for incoming DICOM objects.

8 - General Image Module

NAME	TAG ID	TYPE	VR
Image Number (see note * below)	(0020,0013)	2	IS
Image Date (see note ** below)	(0008,0023)	2C	DA
Image Time (see note ** below)	(0008,0033)	2C	TM
Image Type	(0008,0008)	3	CS
Acquisition Date	(0008,0022)	3	DA
Acquisition Time (see note ** below)	(0008,0032)	3	TM
Images in Acquisition	(0020,1002)	3	IS
Image Comments	(0020,4000)	3	LT

* the « **Image Number** » field is set to 1 for outgoing DICOM objects, and is ignored for all incoming DICOM objects.

** the « **Image Date** », « **Image Time** » & « **Images In Acquisitions** » fields are ignored for all incoming DICOM objects.

9 - Image Pixel Module

NAME	TAG ID	TYPE	VR
Samples per Pixel	(0028,0002)	1	US
Photometric Interpretation	(0028,0004)	1	CS
Rows	(0028,0010)	1	US
Columns	(0028,0011)	1	US
Bits Allocated	(0028,0100)	1	US
Bits Stored	(0028,0101)	1	US
High Bit	(0028,0102)	1	US
Pixel Representation	(0028,0103)	1	US
Pixel Data	(7FE0,0010)	1	OB/OW
Smallest Image Pixel Value	(0028,0106)	3	US/SS
Largest Image Pixel Value	(0028,0107)	3	US/SS

10 - NM Image Pixel Module

NAME	TAG ID	TYPE	VR
Samples per pixel	(0028,0002)	1	US
Photometric interpretation	(0028,0004)	1	CS
Bits Allocated	(0028,0100)	1	US
Bits Stored	(0028,0101)	1	US
High Bit	(0028,0102)	1	US
Pixel Spacing	(0028,0030)	2	DS

11 - Multi Frame Module

NAME	TAG ID	TYPE	VR
Number of Frames	(0028,0008)	1	IS
Frame Increment Pointer	(0028,0009)	1	AT

12 - NM Multi Frame Module

NAME	TAG ID	TYPE	VR
Frame increment Pointer	(0028,0009)	1	AT
Energy Window Vector	(0054,0010)	1C	US
Number of Energy Windows	(0054,0011)	1	US
Detector Vector	(0054,0020)	1C	US
Number of Detectors	(0054,0021)	1	US
Phase Vector	(0054,0030)	1C	US

NAME	TAG ID	TYPE	VR
Number of Phases	(0054,0031)	1C	US
Rotation Vector	(0054,0050)	1C	US
Number of Rotations	(0054,0051)	1C	US
R-R Interval Vector	(0054,0060)	1C	US
Number of R-R Intervals	(0054,0061)	1C	US
Time Slot Vector	(0054,0070)	1C	US
Number of Time Slots	(0054,0071)	1C	US
Slice Vector	(0054,0080)	1C	US
Number of Slices	(0054,0081)	1C	US
Angular View Vector	(0054,0090)	1C	US
Time Slice Vector	(0054,0100)	1C	US

13 - NM Isotope Module

NAME	TAG ID	TYPE	VR
Energy Window Information Sequence	(0054,0012)	2	SQ
> Energy Window Name	(0054,0018)	3	SH
> Energy Window Range Sequence	(0054,0013)	3	SQ
>> Energy Window Lower Limit	(0054,0014)	3	DS
>> Energy Window Upper Limit	(0054,0015)	3	DS
Radiopharmaceutical Information Sequence	(0054,0016)	2	SQ
> Radionuclide Code Sequence	(0054,0300)	2C	SQ
>> Code Value	(0008,0100)	1C	SH
>> Coding Scheme Designator	(0008,0102)	1C	SH
>> Code Meaning	(0008,0104)	3	LO
> Radiopharmaceutical Route	(0018,1070)	3	LO
> Radiopharmaceutical Volume	(0018,1071)	3	DS
> Radionuclide Total Dose	(0018,1074)	3	DS

14 - NM Detector Module

NAME	TAG ID	TYPE	VR
Detector Information Sequence	(0054,0022)	2	SQ
> Collimator/Grid Name	(0018,1180)	3	SH
> Collimator Type (see note * below)	(0018,1181)	2C	CS
> Focal Distance (see note * below)	(0018,1182)	2C	IS
> Zoom Factor	(0028,0031)	3	DS
> Image Orientation (patient) (see note * below)	(0020,0037)	2C	DS
> Image Position (patient)	(0020,0032)	2C	DS

* these fields are always set to NIL (numerical value 0, or an empty string) .

15 - NM Tomo Acquisition Module

NAME	TAG ID	TYPE	VR
Rotation Information Sequence	(0054,0052)	2	SQ
> Start Angle	(0054,0200)	1C	DS
> Angular Step	(0018,1144)	1C	DS
> Rotation Direction	(0018,1140)	1C	CS
> Scan Arc	(0018,1143)	1C	DS
> Actual frame duration	(0018,1242)	1C	IS
> Number of Frames in Rotation	(0054,0053)	1C	US

16 - NM Multi Gated Acquisition Conditional Module

NAME	TAG ID	TYPE	VR
Gated Information Sequence	(0054,0062)	2C	SQ
> Data Information Sequence	(0054,0063)	2C	SQ
>> Frame Time	(0018,1063)	1C	DS

17 - NM Phase Conditional Module

NAME	TAG ID	TYPE	VR
Phase Information Sequence	(0054,0032)	2C	SQ
> Phase Delay (see note * below)	(0054,0036)	1C	IS
> Actual Frame Duration	(0018,1242)	1C	IS
> Pause Between Frames	(0054,0038)	1C	IS
> Number of Frames in Phase	(0054,0033)	1C	US

* this field is always set to NIL (numerical value 0, or an empty string) .

18 - NM Reconstruction Conditional Module

NAME	TAG ID	TYPE	VR
Spacing Between Slices	(0018,0088)	2	DS
Reconstruction Diameter	(0018,1100)	3	DS
Convolution Kernel	(0018,1210)	3	SH
Slice Thickness	(0018,0050)	2	DS

19 - Overlay Plane Module : Not supported

20 - Multi Frame Overlay Module : Not supported

21 - Curve Module : Not supported

22 - VOI LUT Module : Not Supported

23 - SOP Common Module

NAME	TAG ID	TYPE	VR
SOP Class UID	(0008,0016)	1	UI
SOP Instance UID	(0008,0018)	1	UI

3.2.4 Association acceptance policy

vision-to-dicom AE is not required to accept associations.

3.3 dicom-query Specifications

dicom-query provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCU:

SOP Class Name	SOP Class UID
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.2
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.3

dicom-query: SOP classes

3.3.1 Association establishment policy

3.3.1.1 General

dicom-query shall attempt to establish an association whenever it is invoked with valid parameters.

The SCU/SCP Role Selection Negotiation shall not be supported for all Association establishment requests.

The maximum PDU size which can be transmitted by **dicom-query** is fixed at 100 Kbytes.

3.3.1.2 Asynchronous nature

Not applicable.

3.3.1.3 Number of associations

dicom-query is not required to initiate multiple simultaneous transactions.

3.3.1.4 Implementation identifying information

dicom-query provides a single implementation Class UID which is 1.2.250.1.31.1.8.

dicom-query provides an implementation version name of "SMV_QUERY_X.Y" where X.Y refers to the software version number.

The default **dicom-query** application entity title is "SMV_QUERY", but can be modified within the DICOM configuration procedures (see section 6).

3.3.2 Association initiation policy

3.3.2.1 Real-world activity - Find

3.3.2.1.1 Associated real-world activity

dicom-query issues a FIND request when the user wishes to view patient and/or study information of a remote DICOM C-FIND SCP.

3.3.2.1.2 Proposed presentation context

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name list	UID List		
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	See note
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.2	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	See note
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.3	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	See note

dicom-query: Proposed Presentation context for Find

Note: Find Extension Negotiation will be supported. DICOM-Query will negotiate the following information:

Field name	Value	Description of field
Relational-queries	1	relational queries supported

Find Extension Negotiation

3.3.2.1.3 SOP specific conformance statement for Find

dicom-query can query for the following search keys :

Description	Tag	Level
Patient Name	(0010,0010)	Patient
Patient ID	(0010,0020)	Patient
Patient Birth Date	(000F,B210)	Patient
Patient Sex	(0010,0040)	Patient
Other Patient Name	(0010,1001)	Patient
Other Patient ID.	(0010,1000)	Patient
Study UID	(0020,000D)	Study
Study ID	(0020,0010)	Study
Study Date	(0008,0020)	Study
Study Time	(0008,0030)	Study
Accession Number	(0008,0050)	Study
Referring Physician	(0008,0090)	Study
Study Description	(0008,1030)	Study
Station Name	(0008,1010)	Study
Physician Reading Study	(0008,1060)	Study
Admitting Diagnostic Description	(0008,1080)	Study
Series UID	(0020,000E)	Series
Series Number	(0020,0011)	Series
Modality	(0008,0060)	Series

Description	Tag	Level
Image UID	(0008,0018)	Image
Image Type	(0008,0008)	Image

dicom-query: search keys

3.4 dicom-retrieve Specifications

dicom-retrieve provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCU:

SOP Class Name	SOP Class UID
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2

dicom-retrieve: SOP classes

3.4.1 Association establishment policy

3.4.1.1 General

dicom-retrieve shall attempt to establish an association whenever it is invoked with valid parameters. The SCU/SCP Role Selection Negotiation shall not be supported for all Association establishment requests. The maximum PDU size which can be transmitted by **dicom-retrieve** is fixed at 100 Kbytes.

3.4.1.2 Asynchronous nature

Not applicable.

3.4.1.3 Number of associations

dicom-retrieve is not required to initiate multiple simultaneous transactions.

3.4.1.4 Implementation identifying information

dicom-retrieve provides a single implementation Class UID which is 1.2.250.1.31.1.9.

dicom-retrieve provides an implementation version name of "SMV_RTRV_X.Y" where X.Y refers to the software version.

The default entity application title name for **dicom-retrieve** "SMV_RTRV", but can be modified with the DICOM configuration tools (see section 6).

3.4.2 Association initiation policy

3.4.2.1 Real-world activity for Move

3.4.2.1.1 Associated real-world activity

dicom-retrieve issues a MOVE request when the user wishes to move one or more studies from a remote DICOM station to the local Storage SCP .

3.4.2.1.2 Proposed presentation context

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name list	UID List		
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	none

dicom-retrieve: Proposed Presentation context for Move

3.5 dicom-worklist Specifications

dicom-worklist provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCU:

SOP Class Name	SOP Class UID
Modality Worklist IM	1.2.840.10008.5.1.4.31

dicom-worklist: SOP class

3.5.1 3.5.1 Association establishment policy

3.5.1.1 3.5.1.1 General

dicom-worklist shall attempt to establish an association whenever it is invoked with valid parameters. The SCU/SCP Role Selection Negotiation shall not be supported for all Association establishment requests. The maximum PDU size which can be transmitted by **dicom-query** is fixed at 100 Kbytes.

3.5.1.2 3.5.1.2 Asynchronous nature

Not applicable.

3.5.1.3 3.5.1.3 Number of associations

dicom-worklist is not required to initiate multiple simultaneous transactions.

3.5.1.4 3.5.1.4 Implementation identifying information

dicom-worklist provides a single implementation Class UID which is 1.2.250.1.31.1.8.

dicom-worklist provides an implementation version name of "SMV_QUERY_X.Y" where X.Y refers to the software version number.

The default **dicom-query** application entity title is "SMV_QUERY", but can be modified within the DICOM configuration procedures (see section 6).

3.5.2 3.5.2 Association initiation policy

3.5.2.1 3.5.2.1 Real-world activity - Find

3.5.2.1.1 3.5.2.1.1 Associated real-world activity

dicom-worklist issues a FIND request when the user wishes to view patient information of a remote DICOM C-FIND SCP.

3.5.2.1.2 3.5.2.1.2 Proposed presentation context

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name list	UID List		
Basic Worklist Management IM	1.2.840.10008.5.1.4.31	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None

dicom-worklist: Proposed Presentation context for Find

3.5.2.1.3 3.5.2.1.3 SOP specific conformance statement for Find

dicom-worklist can query for the following search keys :

Description	Tag
Patient Name	(0010,0010)
Patient ID	(0010,0020)
Other Patient ID.	(0010,1000)
Patient's Birth Name	(0010,1005)
Patient's Age	(0010,1010)
Patient's Birth Date	(000F,B210)
Patient Sex	(0010,0040)
Patient's Size	(0010,1020)
Patient's Height	(0010,1030)
Patient's address	(0010,1040)

Description	Tag
Patient Comments.	(0010,4000)
Institution Name	(0008,0080)
Admitting Diagnostic Description	(0008,1080)
Referring Physician	(0008,0090)
Accession Number	(0008,0050)
Study UID	(0020,000D)
Scheduled Station AE Title	(0040,0001)
Scheduled Station Name	(0040,0010)
Scheduled Procedure Step Location	(0040,0011)
Scheduled Procedure Step Start Date	(0040,0002)
Scheduled Procedure Step Start Time	(0040,0003)
Scheduled Procedure Step End Date	(0040,0004)
Scheduled Procedure Step End Time	(0040,0005)
Scheduled Performing Phycisian's Name	(0040,0006)
Scheduled Procedure Step Description	(0040,0007)
Scheduled Procedure Step ID.	(0040,0009)
Scheduled Procedure Step Status	(0040,0020)
Comments on Scheduled Procedure Step	(0040,0400)
Modality	(0008,0060)

dicom-worklist: search keys

3.6 dicom-print Specifications

dicom-print provides Standard Conformance to the following DICOM V3.0 Meta SOP classes and DICOM V3.0 SOP classes as an SCU:

SOP Class Name	SOP Class UID
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9
Basic color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18

dicom-print: Meta SOP classes & SOP classes

SOP Class Name	SOP Class UID
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

dicom-print: Greyscale Print Management SOP classes

SOP Class Name	SOP Class UID
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 Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1
Printer SOP Class	1.2.840.10008.5.1.1.16

dicom-print: Color Print Management SOP classes

3.6.1 Association establishment policy

3.6.1.1 General

dicom-print AE shall attempt to establish an association whenever it is invoked.

The SOP Class Extended Negotiation is not supported.

The SCU/SCP Role Selection Negotiation shall not be supported for all Association establishment requests.

The maximum PDU size which can be transmitted by **dicom-print** is fixed at 100 Kbytes.

3.6.1.2 Number of associations

dicom-print is not required to initiate multiple simultaneous transactions.

3.6.1.3 Asynchronous nature

Not applicable.

3.6.1.4 Implementation identifying information

dicom-print provides a single implementation Class UID which is "1.2.250.1.31.1.2".

dicom-print provides an implementation version name of "SMV_PRINT_X.Y" where X.Y is the software version number.

dicom-print provides an application entity title of SMV_PRINT.

3.6.2 Association initiation policy

3.6.2.1 Real-world Activity - Print Session

3.6.2.1.1 Associated real-world activity

dicom-print is to be invoked by the UNIX print spooler with valid parameters, and allows the establishment of an association in order to transmit an image for hard-copy purpose only.

3.6.2.1.2 Proposed presentation context

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name list	UID List		
Basic Grayscale Print management Meta SOP Class	1.2.840.10008.5.1.1.9	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	none
Basic Color Print management Meta SOP Class	1.2.840.10008.5.1.1.18	DICOM implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	none

dicom-print: Proposed Presentation context for Print

3.6.2.1.3 SOP specific conformance statement for Print Service class

3.6.2.1.3.1 Basic Film Session SOP class

When **dicom-print** creates an association, a N-CREATE is sent to the SCP AE to create a Basic Film Session SOP instance.

Attribute name	tag	Range	Comments
Number of copies	2000,0010	1 to 10	
Print priority	2000,0020	HIGH, MED, LOW	

Medium type	2000,0030	PAPER, CLEAR FILM, BLUE FILM	
Film destination	2000,0040	MAGAZINE, PROCESSOR	

Range of attributes of N-CREATE for the Basic Film Session SOP class

3.6.2.1.3.2 Basic film box SOP class

Attribute name	tag	Range	Comments
Film orientation	2010,0040	PORTRAIT, LANDSCAPE	
Film size ID	2010,0050	8INx10IN, 14INx17IN, 10INx12IN, 10INx14IN, 12INx14IN, 14INx14IN, 11INx14IN, 24CMx24CM, 24CMx30CM	
Magnification type	2010,0060	REPLICATE, BILINEAR, CUBIC, NONE	
Border density	2010,0100	WHITE, BLACK	
Empty image density	2010,0110	WHITE, BLACK	
Minimum density	2010,0120	0.0 - 1.0	
Maximum density	2010,0130	1.0 - 3.0	
Trim	2010,0140	YES, NO	
Image display format	2010,0010	STANDARD\C,R	C, R between 1-3

Basic film box presentation attribute range

3.6.2.1.3.3 Greyscale image box SOP class

Attribute name	tag	Range	Comments
Photometric interpretation	0028,0004	MONOCHROME1, MONOCHROME2	
Rows	0028,0010	1 to 3	
Columns	0028,0011	1 to 3	
Polarity	2020,0020	NORMAL, REVERSE	
Image position	2020,0010	1 to 9	
Sample per pixel	0028,0002	1	
Bits allocated	0028,0100	8	
Bits stored	0028,0101	8	
High bit	0028,0102	7	
Pixel representation	0028,0103	0	
Pixel data	7FE0,0010		

Basic Greyscale image box attribute range

3.6.2.1.3.4 Color image box SOP class

Attribute name	tag	Range	Comments
Photometric interpretation	0028,0004	RGB	
Planar configuration	0028,0006	1	
Rows	0028,0010	1 to 3	
Columns	0028,0011	1 to 3	
Polarity	2020,0020	NORMAL, REVERSE	
Image position	2020,0010	1 to 9	
Sample per pixel	0028,0002	3	

Bits allocated	0028,0100	8	
Bits stored	0028,0101	8	
High bit	0028,0102	7	
Pixel representation	0028,0103	0	
Pixel data	7FE0,0010		

Basic Color image box attribute range

3.6.2.1.3.5 Printer SOP class

Attribute name	tag	Comments
Printer status	2110,0010	
Printer Status Info	2110,0020	
Printer Name	2110,0030	
Manufacturer	0008,0070	
Manufacturer Model Name	0008,1090	
Device Serial Number	0018,1000	
Software Version	0018,1020	

Printer SOP Class attributes read

3.6.3 Association acceptance policy

The **dicom-print** AE is not required to accept Associations.

3.7 *dicom-scp specifications*

dicom-scp AE provides Standard Conformance to the following DICOM V3.0 SOP classes as an SCP:

SOP Class Name	SOP Class UID
C-ECHO SOP Class	1.2.840.10008.1.1
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
Ultrasound Multi frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
Nuclear Medicine Image Storage SOP Class (former description of nuclear medicine images, not fully supported by dicom-scp)	1.2.840.10008.5.1.4.1.1.5
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
X-ray Angiographic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1
X-ray RadioFluoroscopic Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2
X-ray Angiographic Bi-Plane Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.3
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.2
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.3
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2

dicom-scp: SOP classes

3.7.1 Association establishment policy

3.7.1.1 General

dicom-scp does not attempt to initiate any association.

The default PDU size which can be received by **dicom-scp** is fixed at 100 Kbytes.

3.7.1.2 Number of associations

The number of simultaneous associations which shall be accepted by **dicom-scp** is only limited by the kernel parameters of the underlying TCP/IP implementation. **dicom-scp** will spawn a new process for each connection request it receives. Therefore, **dicom-scp** can have multiple simultaneous connections, and there are no inherent limitations on the total number of simultaneous associations it can maintain.

3.7.1.3 Asynchronous nature

Not applicable.

3.7.1.4 Implementation identifying information

dicom-scp provides a single implementation Class UID which is "1.2.250.1.31.1.4"

dicom-scp provides an implementation version name of "SMV_SCP_X.Y" where X.Y is the software version number.

The default application entity title for **dicom-scp** is of "SMV_SCP", but can be modified with the DICOM configuration tools (see section 6).

The port number used by **dicom-scp** is 4104.

3.7.2 Association acceptance policy

dicom-scp shall accept associations for the purpose of certification, query/retrieve operations, and for the purpose of storing images.

dicom-scp shall accept Storage and Query/Retrieve associations from nodes already defined in the local DICOM configuration.

3.7.2.1 Transfer Syntaxes

Unless otherwise mentioned, all proposed transfer syntaxes are as follow :

Transfer Syntax Name	Transfer Syntax UID
DICOM Implicit VR Little Endian	1.2.840.10008.1.2
DICOM Explicit VR Little Endian	1.2.840.10008.1.2.1
DICOM Explicit VR Big Endian	1.2.840.10008.1.2.2

dicom-scp: Proposed transfer syntaxes

3.7.2.2 Real-world activity - Verification SOP class

The associated Real-World activity is a C-ECHO request received by **dicom-scp**.

3.7.2.2.1 Presentation context table

Presentation Context Table				
Abstract Syntax (*)		Transfer Syntax (*)	Role	Extended Negotiation
Name	UID	Name list		
Verification	1.2.840.10008.1.1	DICOM implicit VR Little Endian Transfer Syntax : 1.2.840.10008.1.2	SCP	None

3.7.2.3 Real-world activity - Storage SOP class

When **dicom-scp** accepts an association for a C-STORE request, it receives any image transmitted on that association and stores the complete DICOM image on disk in the UNIX file system in the format specified by PS3.10.

3.7.2.3.1 Associated real-world activity

The associated real-world activity associated with the C-STORE operation is the storage of the complete file on disk. Conversion into Vision format and update of the patient database is performed by another process. **dicom-scp** will issue a failure if it is unable to store the image on disk.

3.7.2.3.2 Presentation context table

Presentation Context Table				
Abstract Syntax (*)		Transfer Syntax (*)	Role	Extended Negotiation
Name	UID	Name list		
Computed Radiography Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.1	See section 3.6.2.1	SCP	None
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	See section 3.6.2.1	SCP	None
US multi frame Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.3	See section 3.6.2.1	SCP	None
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	See section 3.6.2.1	SCP	None
Retired NM Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.5	See section 3.6.2.1	SCP	None
Ultrasound Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.6	See section 3.6.2.1	SCP	None
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	See section 3.6.2.1	SCP	None
XA Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.1	See section 3.6.2.1	SCP	None
XRF Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.2	See section 3.6.2.1	SCP	None
XA-BP Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.12.3	See section 3.6.2.1	SCP	None
Nuclear Medicine Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.20	See section 3.6.2.1	SCP	None

dicom-scp: Proposed Presentation context

3.7.2.3.3 SOP specific conformance

dicom-scp conforms to the SOP's of the Storage Service Class at level 2 (full). No elements are discarded or coerced by **dicom-scp**. The DICOM image is always temporarily stored in a file. Then, the dataset is included in the Vision patient database by an other process and is available for viewing and processing. The processing of the received DICOM objects may be restricted upon the original object specificity.

Nuclear Medicine images (1.2.840.10008.5.1.4.1.1.20) are integrated into the Vision database with a leading caret character (^) at the beginning of patient id (for easier sorting of received DICOM images).

Secondary Capture images (1.2.840.10008.5.1.4.1.1.7) are integrated into the Vision database with a leading caret character (^) at the beginning of patient id with subtype 'screensave'.

Images from other modalities are integrated into the Vision database with a leading string "^XX^" at the beginning of patient id, where XX is the modality (US, CR, MR, CT, XA,...).

In the event of a successful C-STORE operation, the image file is successfully stored on disk.

dicom-scp does not delete image files. The duration of the image storage is determined by the operator.

If the C-STORE operation is unsuccessful, **dicom-scp** shall return one of the error codes:

Protocol Codes	Description
C000	The operation was not successful
0122	Indicates that the SOP Class is not supported
0211	Indicates that the operation is unrecognized
0000	Operation performed properly

dicom-scp: returned codes

3.7.2.4 Real-world activity – Query Request Response

When **dicom-scp** accepts an association for a C-FIND request, it receives the DICOM object that defines the form of the query response and parses the appropriate Vision database for all possible match (a match is a Vision entry that correspond to the query's attributes search). All corresponding entries are then sent back on the same association to the remote SCU.

3.7.2.4.1 Presentation context table

Presentation Context Table				
Abstract Syntax (*)		Transfer Syntax (*)	Role	Extended Negotiation
Name	UID	Name list		
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1	All from table 3.5.3.2.2	SCP	None
Study Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.2	All from table 3.5.3.2.2	SCP	None
Patient/Study Only Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.3	All from table 3.5.3.2.2	SCP	None

dicom-scp: Proposed Presentation context

3.7.2.4.2 SOP specific conformance

3.7.2.4.2.1 Key Attributes

Description	Tag	Level
Patient Name	(0010,0010)	Patient
Patient ID	(0010,0020)	Patient
Patient Birth Date	(000F,B210)	Patient
Patient Sex	(0010,0040)	Patient
Other Patient Name	(0010,1001)	Patient
Other Patient ID.	(0010,1000)	Patient
Study UID	(0020,000D)	Study
Study Date	(0008,0020)	Study
Study Time	(0008,0030)	Study
Accession Number	(0008,0050)	Study
Referring Physician	(0008,0090)	Study
Study Description	(0008,1030)	Study
Station Name	(0008,1010)	Study
Physician Reading Study	(0008,1060)	Study
Admitting Diagnostic Description	(0008,1080)	Study
Series UID	(0020,000E)	Series
Modality	(0008,0060)	Series
Image Type	(0008,0008)	Image

dicom-query: search keys

3.7.2.4.2.2 String Matching

All string matching operations are NOT CASE SENSITIVE.

A zero length string value for a specific key attributes is recognized as a « Universal Matching » condition, ie. : all entries are a match.

A non zero length string value (without any wild card) for a specific key is recognized as a sub-string, ie. : an entry is a match if its corresponding value contains this string.

A non zero length string value (with wild card(s) *) for a specific key is recognized as a set of sub-strings, ie. : an entry is a match if its corresponding value contains all these sub-strings, in the order they are specified in the string value.

3.7.2.4.2.3 Date Matching

A zero length date string value for a specific key attributes is recognized as a « Universal Matching » condition, ie. : all entries are a match.

A date string <date> has the following forms :

« *yyyy**mm**dd* » where *yyyy* is the year, *mm* is the month, and *dd* is the day. This condition implies that an occurrence is a match if the year, month and day arguments are included in the corresponding entity.

Note that a special character (such as '/', '.', etc) can separate the year, month and days values.

Also, all entries are a match if :

- A string of the form « <date1> - <date2> » matches all occurrences of dates which fall between <date1> and <date2> inclusive.
- A string of the form « - <date> » matches all occurrences of dates prior to and including <date>.
- A string of the form « <date> - « matches all occurrences of <date> and subsequent dates.

3.7.2.4.2.4 Time Matching

A zero length time string value for a specific key attributes is recognized as a « Universal Matching » condition, ie. : all entries are a match.

A time string <time> can have the following forms :

- « hhmmss.frac » where **hh** is in hours, **mm** is in minutes, **ss** is in seconds, and **frac** is a fractional part (with an effective range of 00 to 99) of a second.
- « hhmmss » where **hh** is in hours, **mm** is in minutes and **ss** is in seconds.
- « hhmm » where **hh** is in hours and **mm** is in minutes.
- « hh » where **hh** is in hours.

Note that a special character (such as ‘ : ’) can separate the hour , minutes and seconds values.

Also, all entries are a match if :

- A string of the form « <time1> - <time2> » matches all occurrences of time which fall between <time1> and <time2> inclusive.
- A string of the form « - <time> » matches all occurrences of time prior to and including <time>.
- A string of the form « <time> - « matches all occurrences of <time> and subsequent times.

If the C-FIND operation is unsuccessful, **dicom-scp** shall return one of the error codes:

Protocol Codes	Description
C000	The operation was not successful
0122	Indicates that the SOP Class is not supported
0211	Indicates that the operation is unrecognized
0000	Operation performed properly

dicom-scp: returned codes

3.7.2.5 Real-world activity – « Retrieve Request Response »

When **dicom-scp** accepts an association for a C-MOVE request, it receives the DICOM object that identifies the set of Vision dataset(s) to transfer. The images are then transmitted to the corresponding Storage SCP.

Note: **dicom-scp** does not support data retrieval at the image level. If such a request is performed by the remote Query/Retrieve SCU : the returned data then corresponds to the request’s series UID (hence a series level retrieval).

3.7.2.5.1 Presentation context table

Presentation Context Table					
Abstract Syntax (*)		Transfer Syntax (*)		Role	Extended Negotiation
Name	UID	Name list			
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2	All from table 3.5.3.2.2		SCP	None

dicom-scp: Proposed Presentation context

(*) Configuration for other transfer syntaxes is possible (see chap 6).

If the C-MOVE operation is unsuccessful, **dicom-scp** shall return one of the error codes:

Protocol Codes	Description
C000	The operation was not successful
0122	Indicates that the SOP Class is not supported
0211	Indicates that the operation is unrecognized
0000	Operation performed properly

dicom-scp: returned codes

3.7.2.6 Presentation context acceptance criterion

dicom-scp shall always accept a Presentation context for the Verification SOP Class with the DICOM Default Transfer Syntax.

dicom-scp shall only accept a Presentation context for the Storage and Query/Retrieve SOP classes from nodes known to **dicom-scp** with enabled authorizations.

4. Communication profiles

4.1 Supported communication stacks

All the applications provide DICOM V3.0 TCP/IP Network Communication Support as defined in PS3.8.

4.2 TCP/IP stack

All the applications inherit their TCP/IP stack from the UNIX system upon which they execute. The current implementation runs on AIX V3.2.

4.2.1 Physical media support

All the applications are indifferent to the physical medium upon over which TCP/IP executes; they inherit this from the UNIX system upon which they execute.

5. Extensions/specializations/Privatizations

Not applicable.

6. Configuration

The DICOM configuration for all supported services is done with Vision's « Configure » application, under the « DICOM Services » and « Archive Devices » options.

Note : the DICOM applications are licensed, hence a software key is therefore required to enable the services.

6.1 AE title/presentation address mapping

The address mapping is automatically stored in file "ae.data.sql" by the Vision's DICOM configuration service.

6.2 Configurable parameters

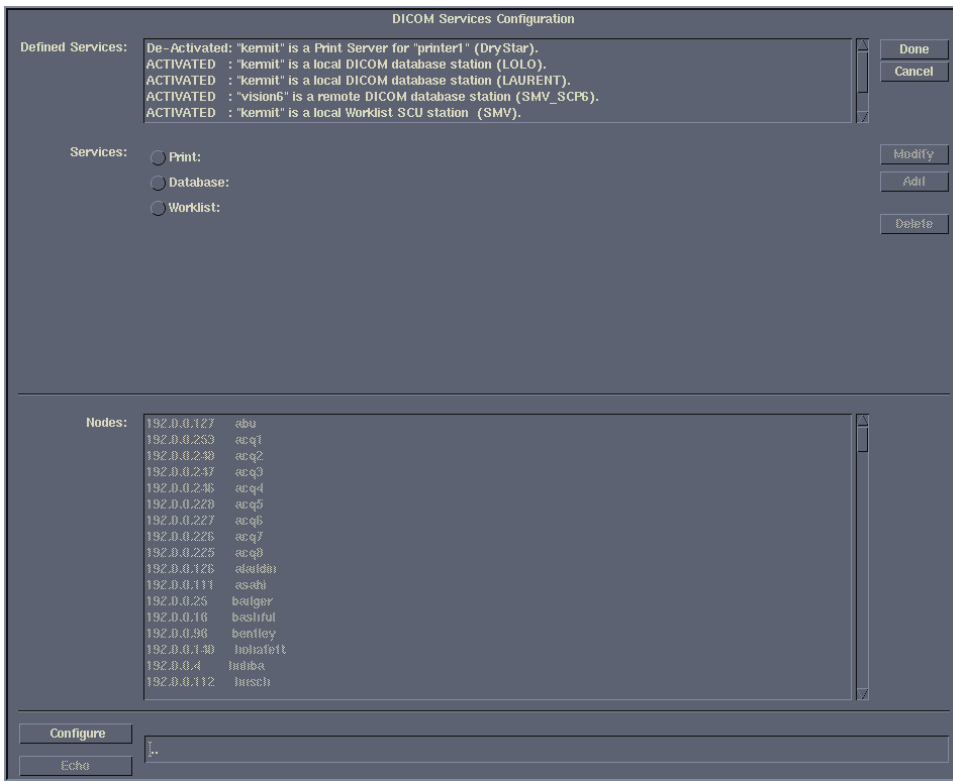
The following information must be ascertained for each DICOM station on the network :

SCP AE Title : this is the Service Class Provider Application Entity Title. It identifies a DICOM station from another. SMV's default is **SMV_SCP**.

- Hostname : represents the network address of a DICOM device.
- Port : this is the SCP's port number through which network communication is to be established when the SCP is accessed (the SCP listens to the world through this port, and ONLY this port). SMV's only valid value is **4104**.
- The following information may be also required for the Certification, Storage and Query/Retrieve services :
- Echo SCU AE Title : this is the Certification Service Class User Application Entity Title. It identifies the verification service that is being requested to the SCP. SMV's default is **SMV_ECHO**.
- Storage SCU AE Title : this is the Storage Service Class User Application Entity Title. It identifies the storage service that is being requested to the SCP. SMV's default is **SMV_STORE**.
- Query SCU AE Title : this is the C-FIND Service Application Entity Title. It identifies the query (FIND) service that is being requested to the SCP. SMV's default is **SMV_QUERY**.
- Retrieve SCU AE Title : this is the C-MOVE Service Application Entity Title. It identifies the retrieve (MOVE) service that is being requested to the SCP. SMV's default is **SMV_RTRV**.
- Notes : All AE titles, on the network, must be unique.
 ALL DICOM stations must configure ALL of these parameters in order to be compliant to one another.
 The Echo, Storage, Query and Retrieve SCU AE titles that are not specified are assumed to be the same as the station's SCP AE title.
 The Database SCP & SCU AE Title strings are arbitrary (but must still be known by all other DICOM database devices).

6.2.1 « Configure's DICOM Services »

The DICOM variables are set via the application « Configure ». The option « DICOM Services » is used to configure the DICOM parameters associated to each DICOM device that reside on the network. The menu is as follow :



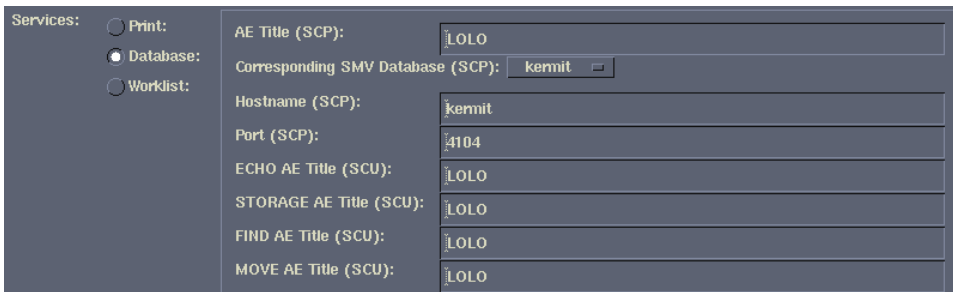
The configuration of a « Print Management SCU » (ie. : print server) is done by selecting the « Print » toggle button and entering the appropriate values :



Notes : A result of the configuration of a DICOM printer is the creation of an AIX queue, identified hereby as the « Local Queue Name ». This queue will subsequently be used by Vision’s hardcopy setup menu in order to complete the configuration of the DICOM print device.

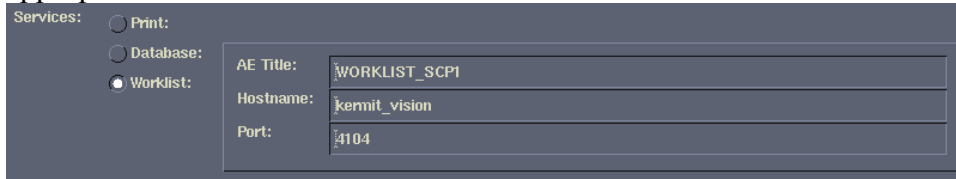
The default value « lp » should be used if no « Remote Queue Name » is specified by the DICOM device manufacturer.

The configuration of « Database » SCUs is done by selecting the « Database » toggle button and entering the appropriate values :



A DICOM database configuration requires a set of entries for the local station, ie. : the POWERstation onto which the DICOM license has been installed, and a set of entries for each remote DICOM database devices that will be accessed (for which all parameters are to be provided by the DICOM device manufacturer). Also, a Vision Database must be assigned to the set of entries in order to to allow the access of multiple Vision Databases to remote DICOM devices.

The configuration of « Worklist » is done by selecting the « Worklist » toggle button and entering the appropriate values :



No port number is assigned to the SCU.

6.2.2 Other Configurable Parameters

The presentation contexts (SOP Classes and Transfer syntaxes) are configurable in file "dtk.data.sql". Note that encapsulated transfer syntaxes (like JPEG) are not supported.

Log files are available in \$DCM_LOG_PATH directory. Maximum information is given when \$DCM_LOG_LEVEL is set to value 4 (default is 3).

7. Support of extended character sets

All the applications supported by SMV shall not support extended character sets.

8. Vision ↔ DICOM Conversion Specifications

8.1 Vision → DICOM Conversion Specifications

Vision Type	Vision Sub-type	→	DICOM Type
Wholebody	--		WHOLE BODY
Report	--		--
--	Annotation	→	--
--	Contiguous	→	TOMO
--	Coronal	→	RECON TOMO - RECON GATED TOMO
--	CoronalFA	→	RECON TOMO - RECON GATED TOMO
--	Dynamic	→	DYNAMIC
--	Gated	→	GATED – GATED TOMO
--	General	→	STATIC – DYNAMIC
--	HorzLong	→	RECON TOMO - RECON GATED TOMO
--	ListMode	→	--
--	MultiDim	→	--
--	Planar	→	STATIC
--	Plots	→	--
--	Projection	→	TOMO
--	Reprojection	→	TOMO
--	Rest	→	TOMO
--	ROI	→	--

--	Sagittal	→	RECON TOMO - RECON GATED TOMO
--	SagittalFA	→	RECON TOMO - RECON GATED TOMO
--	ScreenSave	→	SECONDARY CAPTURE
--	Short	→	RECON TOMO - RECON GATED TOMO
--	Sinogram	→	--
--	Spot	→	WHOLE BODY
--	Stress	→	TOMO
--	Target	→	--
--	TIFF	→	SECONDARY CAPTURE
--	Transverse	→	RECON TOMO - RECON GATED TOMO
--	TransverseFA	→	RECON TOMO - RECON GATED TOMO
--	VCR_Acq	→	--
--	VCR_Proj	→	TOMO
--	VertLong	→	RECON TOMO - RECON GATED TOMO
--	3D	→	DYNAMIC

8.2 DICOM → Vision Conversion Specifications

DICOM Type	→	Vision Type	Vision Sub-type
STATIC	→	General	Planar
WHOLE BODY	→	Wholebody	General
DYNAMIC	→	General	Dynamic
GATED	→	Cardiac	Gated
TOMO	→	General	Procjection
GATED TOMO	→	Cardiac	Gated
RECON TOMO	→	General	Transverse
RECON GATED TOMO	→	Cardiac	HorzLong
SECONDARY CAPTURE	→	General	Pixmap – TIFF