Pukka-j Limited

Technical documentation:

DICOM Conformance statement

For

Dicom Explorer System Software

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Contents

1 Introduction

This chapter provides general information about the purpose, scope and content of this Conformance Statement.

1.1 Intended Purpose

This document is the conformance statement of the DICOM services in the Pukka-J application “Dicom Explorer”.

1.2 Standards

Digital Imaging and Communications in Medicine (DICOM). NEMA Standard Publications PS 3.1-16 and Supplements.

1.3 Intended Audience

The reader of this document is concerned with implementing an Enterprise wide DICOM network or Integration issues or software design.

1.4 Important Remarks

DICOM does not guarantee interoperability and this conformance statement is only the first stage of validating a connection between Dicom Explorer and another DICOM device.

1.5 Definitions

Definitions, terms and abbreviations used in this document are defined within the different parts of the DICOM standard and the IHE framework.

ACR	American College of Radiology
AE	Application Entity
AET	Application Entity Title
ASCII	American Standard Code for Information Interchange
DB	Database
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element-Composite
DIMSE-N	DICOM Message Service Element-Normative
ECG	Electrocardiogram

GUI	Graphical User Interface
HIS	Hospital Information System
IOD	Information Object Definition
ISO	International Standard Organization
NEMA	National Electrical Manufacturers Association
RIS	Radiology Information System
OSI	Open Systems Interconnection
PACS	Picture Archive & Communication System
PDU	Protocol Data Unit
RGB	Reg Green Blue
ROI	Region of Interest
SCU	Service Class User (DICOM client)
SCP	Service Class Provider (DICOM server)
SOP	Service-Object Pair
Tag	A 32 bit integer consisting of a group/element pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier Attribute
VR	Value Representation
VM	Value Multiplicity

2 Implementation Model

Dicom Explorer is a collection of Java Applets, Java Applications and supporting classes. The package is presented as a collection of Java Archive (jar) files. The 'top level' jar contains all the entry points for web access, application access or standalone servers and client applications. The entry point jar is, by default, called dt.jar and is approximately 40KB in size. This is normally a protected 'served only' jar that initiates each user connection. It is digitally signed and finger printed using a fully authenticated Certificate Chain (CA=Thawte).

2.1 Use as a Java applet

The following HTML code is used to start Dicom Explorer in a web page (this web page starts a DICOM Server Instance on port 104).

```
<html>
  <!--
    Copyright Pukka-J Ltd 2003
  -->
  <head>
    <title>Dicom Explorer</title>
    <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
  </head>
  <BODY bgcolor=#666699 leftmargin=0 topmargin=1>
    <OBJECT classid="clsid:8AD9C840-044E-11D1-B3E9-00805F499D93"
      width=100% height=100% vspace=0 hspace=0>
      <PARAM NAME=type= VALUE="application/x-java-applet">
      <PARAM NAME=CODE VALUE="Desktop.class">
      <PARAM NAME=AllowDemo VALUE=false>
      <PARAM NAME=CODEBASE VALUE="..">
      <PARAM NAME=DicomService.port VALUE="104">
      <PARAM NAME=ARCHIVE VALUE="dt.jar">
      <PARAM NAME=Desktop.background VALUE="0x666699">
      <COMMENT>
        <EMBED
          type="application/x-java-applet"
          java CODEBASE=".." java ARCHIVE="dt.jar" java CODE="Desktop.class"
          pluginspage="http://pukka-j.net/plugin.html" width=100%
          height=100% Desktop.background=0x666699 AllowDemo=true>
        <NOEMBED>
      </COMMENT>
      </NOEMBED>
      </EMBED>
    </OBJECT>
  </BODY>
</html>
```

2.2 Use as a Java application

Although normally served the application container dt.jar can be installed on any computer with a Java Virtual Machine installed (Java 1.2 or better). It then provides command line options for starting a DICOM server as a non-graphical background server process:

```
java -classpath dt.jar DicomServer -port 104
```

As a background server process this class of usage is used for 'blackbox' rack mounted servers that have no monitors or keyboards. Use of this process can range from small scale DICOM caches for individual modalities or scanners to Enterprise wide PACS indexing up to 5TB of image data.

Dicom Verification as a command line utility:

```
java -classpath dt.jar DicomPing -host 192.9.200.1 -port 104 -call AE -calling [myAE]
```

2.3 Application Data Flow

One or more instances of Dicom Explorer running on a single computer provide Telemedicine, PACS, Legacy Image Interfaces and client Image Review and Reporting. It can act as a Proxy gateway to other DICOM servers and other instances of Dicom Explorer. A schematic flow diagram can be seen in Figure 1.

2.4 Application Access

As a single Java Class Dicom Explorer can be instantiated in a number of ways and in many different environments.

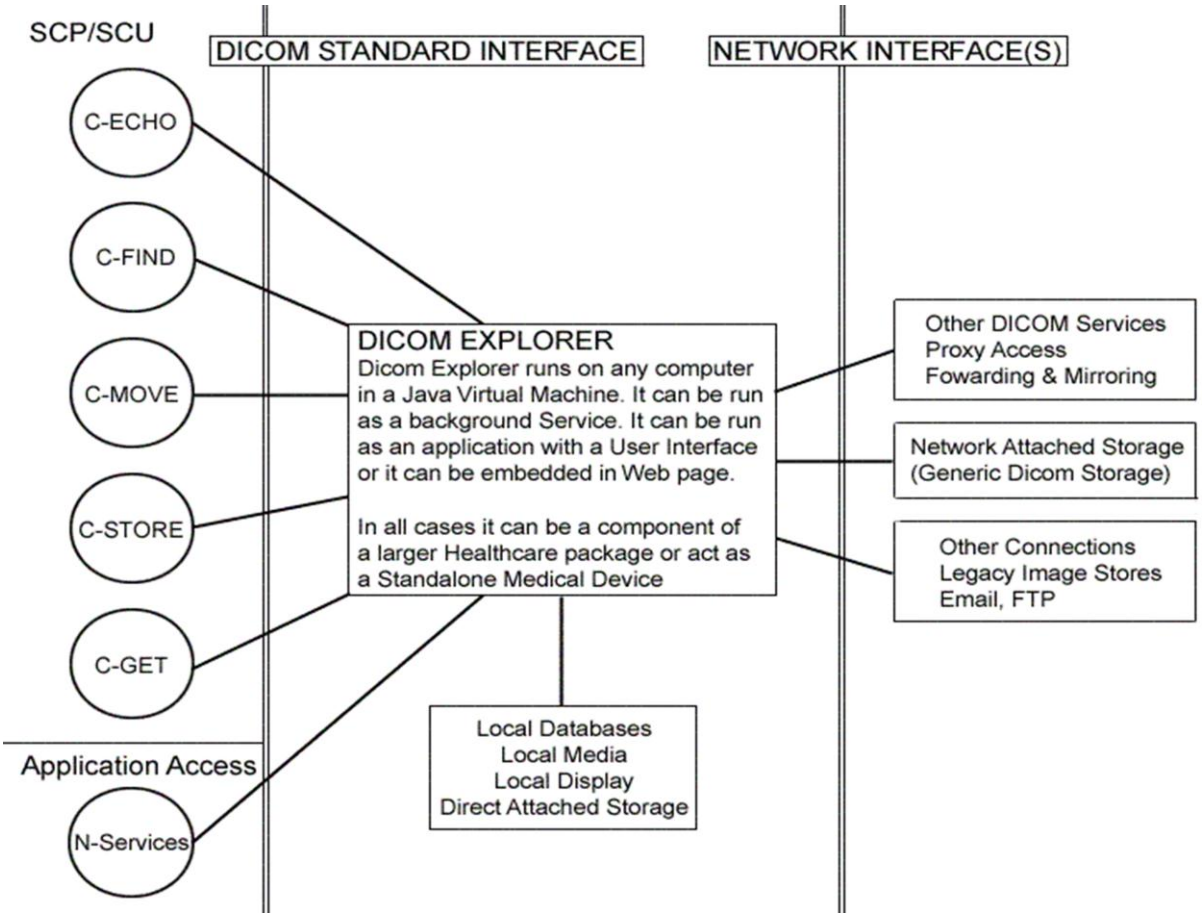

Figure 1 Schematic diagram of application data flow

2.5 Application Entity Titles

Each Image Database managed by Dicom Explorer has a unique name. The scope of the Database name depends on the Enterprise wide topology of the DICOM Storage Area Network and whether the name has any intrinsic meaning within Dicom Explorer.

1. Multiple servers acting as storage class providers may use a single database instance to index stored DICOM objects.
2. A single named Database Entity can be a virtual PACS of joined Data sources.
3. A Database maybe a simple one to one mapping either directly with another DICOM source or an interface to a non DICOM source.
4. Certain Database names such as the "Local Database" and the "In Box" have predefined definitions.

Application Entities Titles work within the scope of a connection to a Single Dicom Server instance. In general when you are talking to a server you are connecting to its "Local Database". The AETs involved are used for primitive validation of the connection; are they known and is this a request from an IP address associated with the callers AET and then the possible association of a specific local database view associated with the callers AET and/or the called AET. In most servers the database is independent of the AETs involved.

Dicom Explorer maps each source database directly onto its local file system at a single point called the Study Root. Under the Root, Dicom Explorer maintains a hierarchy of AETs, their UIDS and DICOM objects.

2.6 Acceptance Policy

Dicom Explorer supports two basic level connection models; OPEN or CLOSED.

With an open acceptance policy the Server will respond to any AE title as any AE title. With a closed policy only known AE titles are allowed to connect.

Regardless of how the basic DICOM connection is validated any other credentials required for using the connection are determined over this connection before access to the main DICOM services is granted. At this level we are determining whether any communication is sanctioned based on the AET regardless of the service requested and any mapping or application level rules for that AET.

2.7 Number of Associations

The Number of concurrent associations is controlled by the Dicom Explorer property **DicomCache.maxConnections**. The default value for the standalone DICOM server is 25 connections. This property is determined and limited by system specification and use of the server instance. The limiting factor is normally memory. This factor may also be limited by License.

2.8 Asynchronous Nature

Dicom Explorer does not support asynchronous communication (multiple outstanding transactions over a single association).

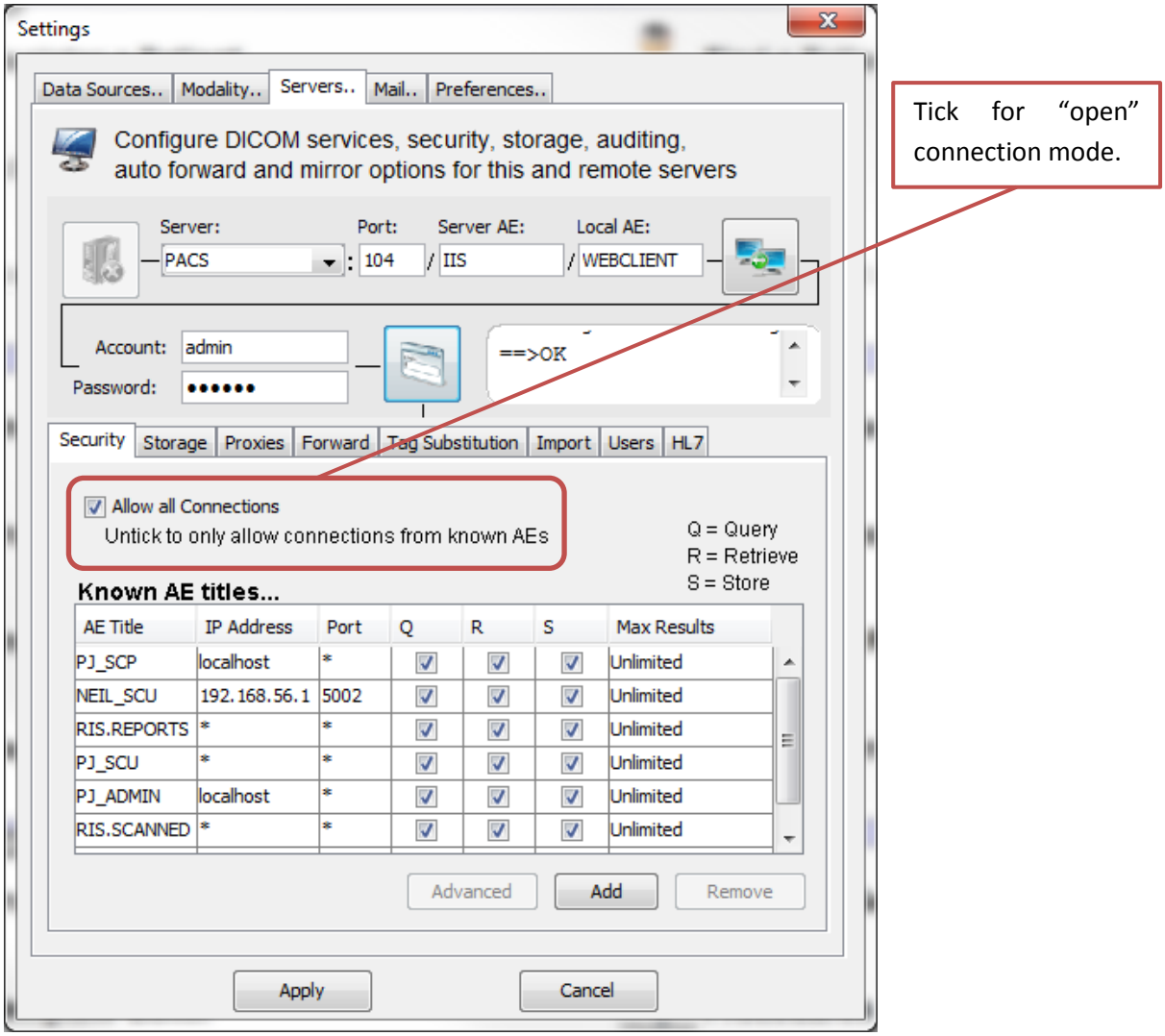

Figure 2 Settings window shows connection models

2.9 Mapping to real world activities

Dicom Explorer uses AETs (Application Entity Titles) as the key to data separation, and a direct lookup of a Real World Activity such as forwarding or emailing a DICOM IOD to another AET or a Real person.

The Storage Association by an SCU can use an arbitrary but unique AET that results in either simple storage or storage followed by some action such as forwarding to a PACS, an individual or selection of locations/individuals.

The Query Association by an SCU can uses an arbitrary AET that results in either a simple query of the local database or a composite query to multiple locations or a simple proxy query to another location such as a PACS.

3 Verification C-ECHO

The Verification C-ECHO SOP is supported in both the SCP and SCU roles. It is treated as a Standalone function for verifying DICOM node viability. It is not used in conjunction with other SOP classes as a precursor before use of the other DIMSE-C commands.

Table 1 Service object pair 1

SOP Class	SOP name
1.2.840.10008.1.1	Verification

Association acceptance policies are identical for all SOP Classes – see 2.3 AE Titles and 2.4 Acceptance Policy.

3.1 Presentation Context

As a Service Class User, Dicom Explorer proposes only the default transfer syntax. As A Service Class Provider it can accept any proposed DICOM compliant transfer syntax – it will always accept the default transfer syntax if proposed. There is no support for extended negotiation or asynchronous connections. As the verification SOP class carries no data there is no advantage in varying the default transfer syntax. Although Dicom Explorer will accept most proposed transfer syntaxes even for a ping – they are specifically listed in the Storage SOP section where they have more relevance. The support of any transfer syntax is a generic function within Dicom Explorer and therefore supported by all SOP classes in both SCP and SCU roles.

Table 2 Presentation context - syntax

Proposed Syntax UID	Syntax name
1.2.840.10008.1.2	Implicit VR Little Endian

The identifying information for Dicom Explorer carried in the Association PDUs in both SCP and SCU roles is the same. It is also identical regardless of the method of instantiating a Dicom Explorer SOP – command line, web page, application or embedded component.

Table 3 Presentation context - implementation

Association Identifying Information	
Implementation Class UID	1.2.826.0.1.3680043.2.526
Implementation Version Name	"DEX433"

The Implementation Class UID which is unique to Dicom Explorer is used as the Root UID for all internally generated UIDS.

The default proposed PDU size is 16KB. This can be modified by a server property for all connections MaxPDUSize. If this property is set it will become the proposed PDU size for all subsequent connections

and will be the 'override' value in the acceptance PDU if the proposers size is greater than MaxPDUSize. Properties can also be set for specific AE titles to override the global default.

```
MaxPDUSize.aet = Value_in_Bytes
```

Where ***aet*** is replaced with the real Application Entity Title of the SCP or SCU. *Value_in_Bytes* could be 16384, for example.

3.2 Implementation Model

The DICOM Ping functionality is available as a method of the abstract DicomService class. It is packaged as a main class in DicomPing for use as command line function and is made available as a user function on the "Servers Tab" of the Properties popup.

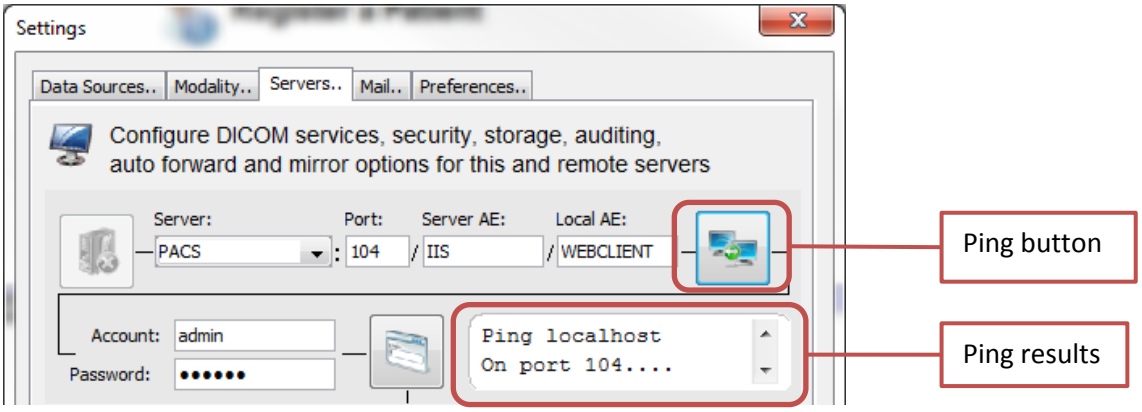

Figure 3 The servers tab on the settings menu - ping and ping results

4 Query, C-FIND

Dicom Explorer supports both the Patient Query Model and Study Query Model as both SCP and SCU.

Table 4 Service object pair 2

SOP Class	SOP name
1.2.840.10008.5.1.4.1.2.1.1	Patient Root Find
1.2.840.10008.5.1.4.1.2.2.1	Study Root Find

4.1 Presentation Context

Dicom Explorer supports all valid transfer syntaxes (see section 3.1 Presentation Context).

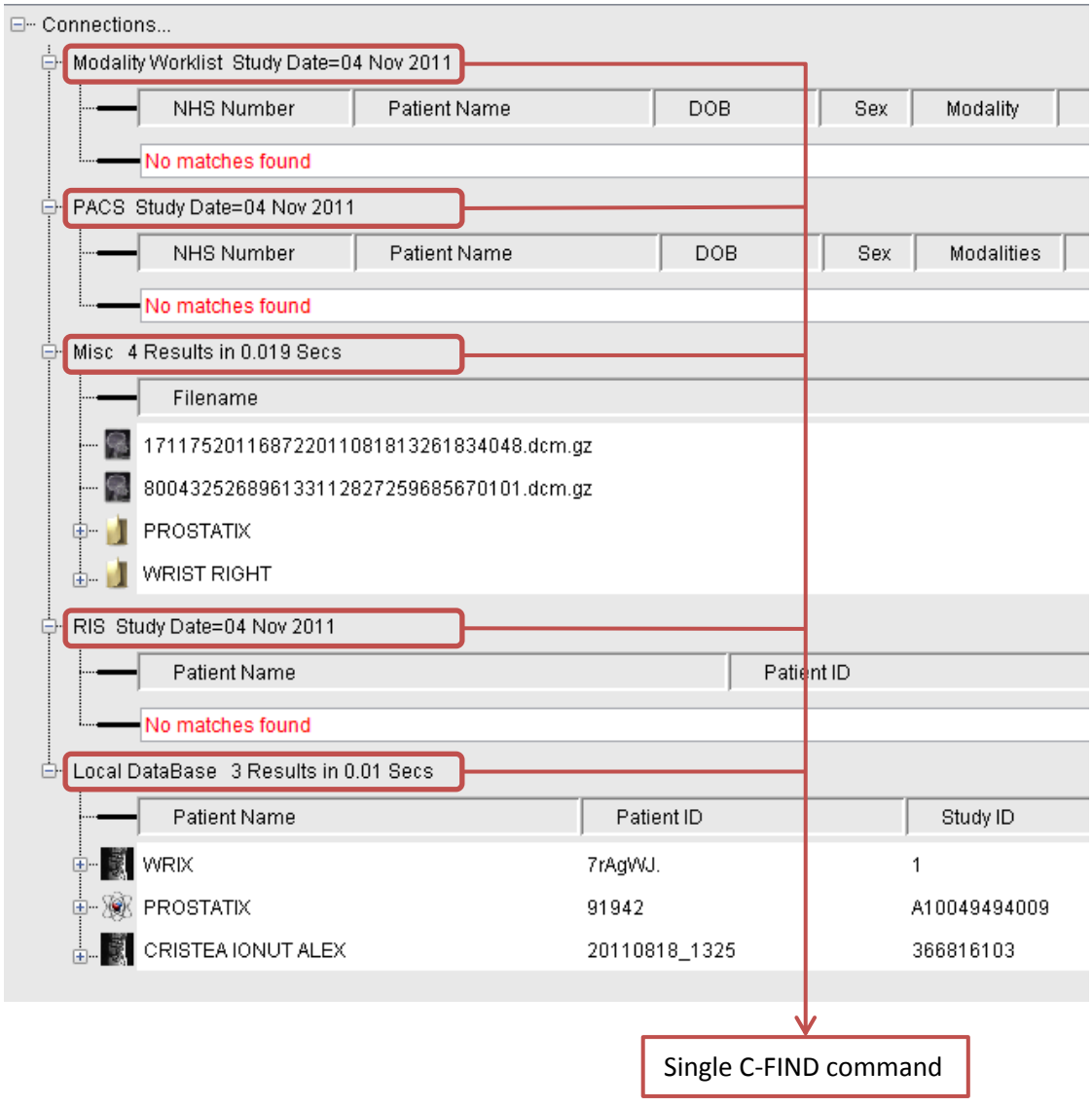

Figure 4 Multiple results from single query

4.2 Implementation Model

Dicom Explorer can do multiple simultaneous queries using the search parameters of a single C-FIND directive. This is a very distributed DICOM model more akin to an Internet Search engine paradigm rather than single point Hospital wide archive.

The Dicom Explorer user interface allows the User to tick on or off specific places to query. Any query node can itself be a composite node that in turn queries multiple locations (and maintains an optimized database view of those locations).

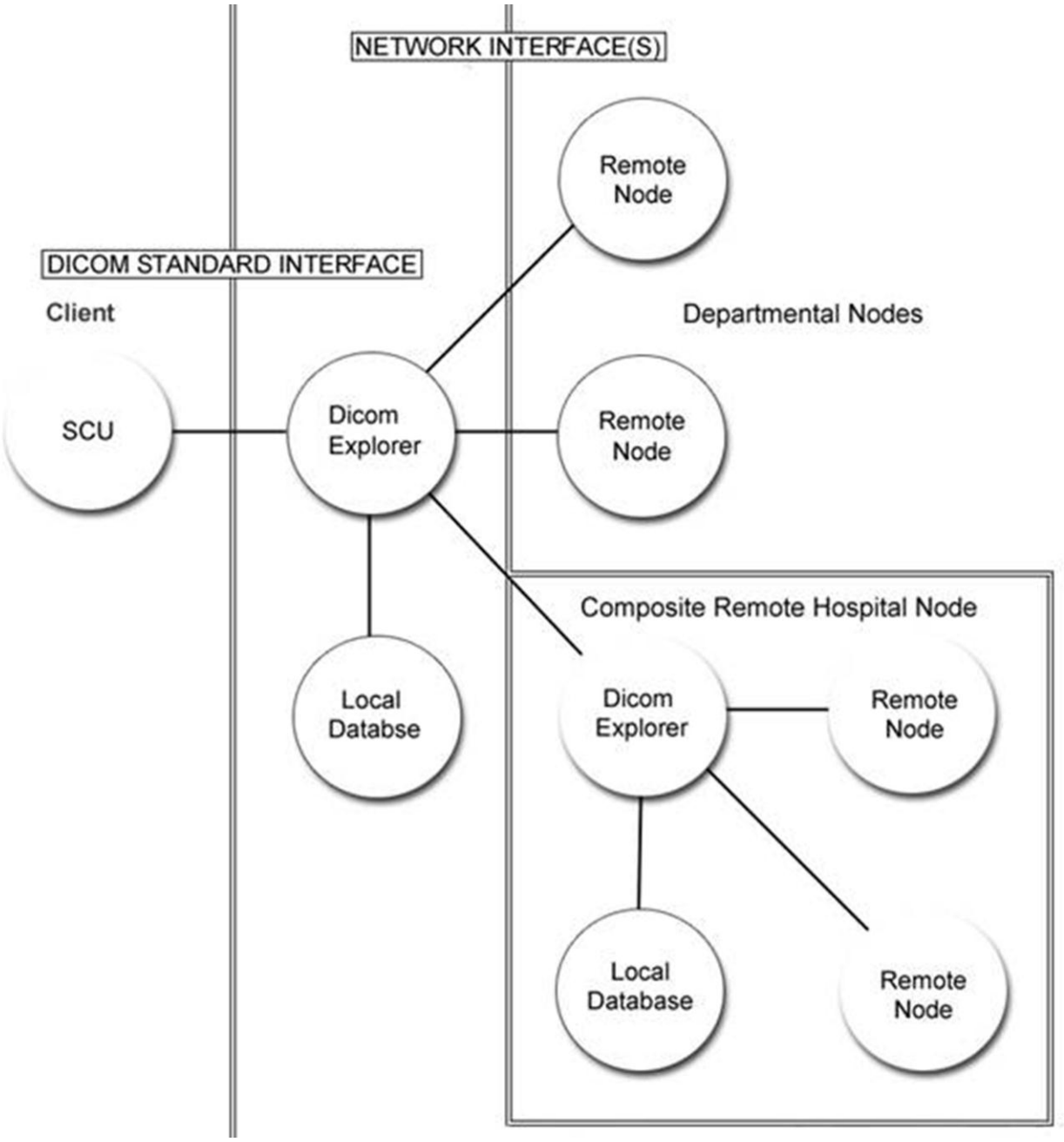

Figure 5 The search engine model

4.3 The Search Engine Model

The nodal chart shown in Figure 5 describes the search engine model.

4.4 The Real World Activity of The Search Engine Model

To reduce the complexity and cost of implementation of a Regional or Hospital Wide DICOM network by using a distributed model. The Infrastructure is provided by Dicom Explorer Nodes. Each Node is any DICOM compliant SCP from Modality acquisition console to Hospital PACS.

4.5 The proxy model

In the simple proxy service Dicom Explorer acts as an intermediary between a Single DICOM server and multiple clients (see Figure 6).

4.6 The Real World Activity of the Proxy model

1. Providing a Query/Retrieve service to DHCP clients using C-FIND and C-GET to a central store that does not support C-GET. On a DHCP network (Dynamic Host Control Protocol) each client's IP address is allocated when they initially connect to the network. This variable IP address is at odds with the DICOM C-MOVE protocol which requires a fixed IP address for association with any destination AET.

2. Provide a load balancing mechanism by caching DICOM IODs in a local store. Clients requesting images from the central store are served from the Proxy cache when there is a cache hit; otherwise the Proxy fetches the IOD from the central store for the client and then caches it for a predetermined number of days for other clients. This can considerably reduce network traffic off the central store backbone onto local VLANs.

4.7 The C-FIND IOD

In order to maximize the distributed potential of Dicom Explorer to servers of all capabilities from all manufacturers the default query is the minimum set defined by the DICOM standard.

Table 5 Query parameters in the C-FIND IOD

Element	Name	Level	Optional
(0010,0010)	Patient Name	Patient/Study	NO
(0010,0020)	Patient ID	Patient/Study	NO
(0010,0030)	Patient DOB	Patient/Study	NO
(0010,0040)	Patient Sex	Patient/Study	NO
(0020,000D)	Study UID	Study	NO
(0020,0010)	Study ID	Study	NO
(0008,0020)	Study Date	Study	YES
(0008,0050)	Accession Number	Study	NO
(0008,0060)	Modality	Study	YES
(0008,0080)	Institution	Study	YES
(0032,1060)	Requested Procedure	Study	YES

Element	Name	Level	Optional
(0020,000E)	Series UID	Series	NO
(0008,0103E)	Series Description	Series	NO
(0008,0060)	Modality	Series	NO
(0032,1060)	Requested Procedure	Series	YES
(0018,0015)	Body Part Examined	Series	YES
(0008,0021)	Series Date	Series	YES
(0008,0031)	Series Time	Series	YES
(0008,0018)	Instance UID	Image	NO
(0028,0011)	Image Width	Image	NO
(0028,0010)	Image Height	Image	NO
(0028,0008)	Image Frames	Image	NO

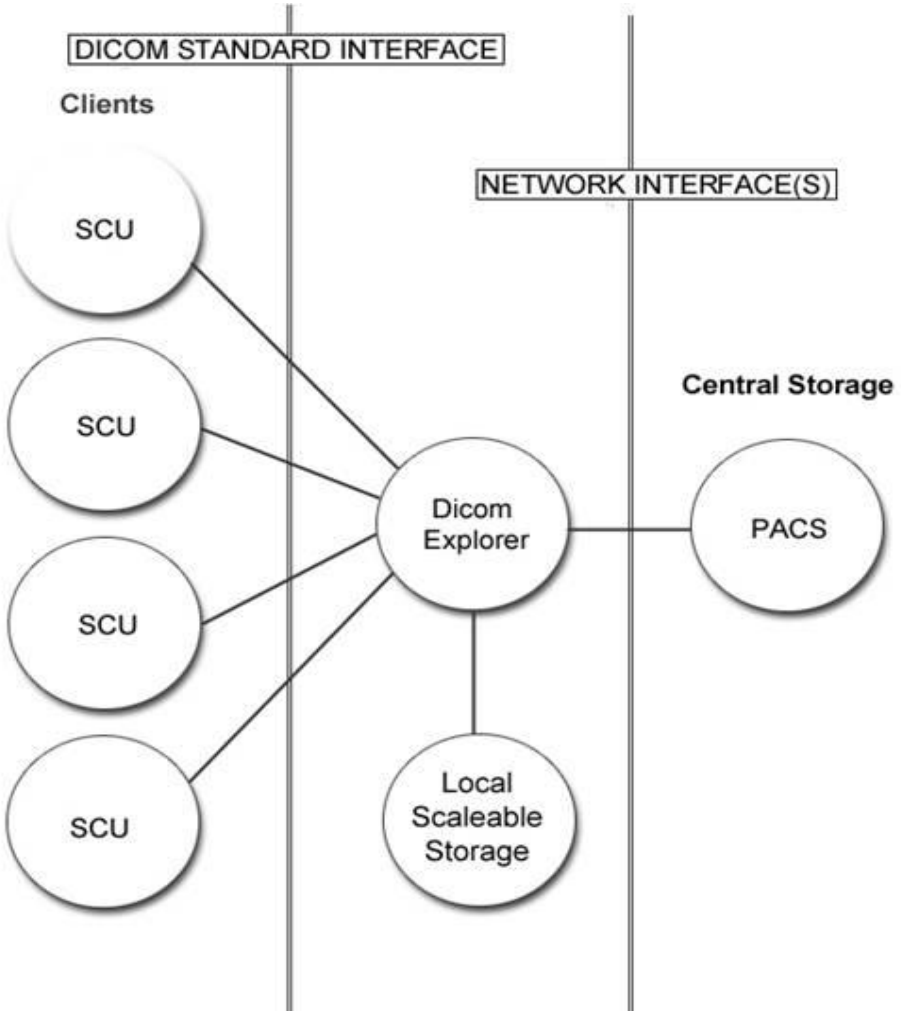

Figure 6 The proxy model

5 Query/Retrieve Composite C-FIND, C-MOVE & C-GET

Query and Retrieve is a Composite function that makes use of C-FIND at either Patient or Study Root Level and the corresponding C-MOVE or C-GET SOPS to retrieve a selection to a client. Dicom Explorer as an SCP provides a Mix and Match service for clients - they can choose a Study or Patient Root query and C-MOVE or C-GET services to retrieve one or more DICOM IODs. Dicom Explorer as an SCU has a configurable query/retrieve interface for any given remote DICOM service.

Table 6 Service object pair 3

SOP Class	SOP name
1.2.840.10008.5.1.4.1.2.1.1	Patient Root Find
1.2.840.10008.5.1.4.1.2.2.1	Study Root Find
1.2.840.10008.5.1.4.1.2.1.2	Patient Root Move
1.2.840.10008.5.1.4.1.2.2.2	Study Root Move
1.2.840.10008.5.1.4.1.2.1.3	Patient Root Get
1.2.840.10008.5.1.4.1.2.2.3	Study Root Get
Storage Classes	See Section 5.1 (page 16)

5.1 Presentation Context

Dicom Explorer supports all valid transfer syntaxes – (see section 3.1).

5.2 Implementation Model

The Query/Retrieve functionality is available as command line functions for server based automation processes and within the Graphical User Interface of Dicom Explorer. Move, Find, Get and Store are abstract methods of the DicomService Class. They are implemented by real sub-classes such as DicomProxyService, DicomArchiveService and DicomInterfileService which provide specific interpretations of the SOP classes. A C-Store transaction to an Interfile Service will result in the conversion of a DICOM image IOD to an Interfile whereas a C-Store transaction to a Proxy Service will result in the DICOM IOD being forwarded to another DICOM storage device.

When retrieving images, curves, ROIs and text from non DICOM sources, Dicom Explorer will convert them to DICOM and optionally cache them in the local DICOM storage.

When acting as a Proxy, Dicom Explorer may convert C-MOVE transactions to C-GET and Vice-Versa if configuration dictates that the Client request is not directly compatible with the destination service being accessed through the Proxy.

When acting as a client, Dicom Explorer chooses an appropriate renderer for any retrieved IOD. It has inbuilt support for Images of all types, RGB, Monochrome, Jpeg with all sorts of planar configurations and dimensions, it also supports the standalone Curve IOD and Waveform IODs such as ECG traces.

6 Storage, C-STORE

Dicom Explorer supports the Storage Classes shown in Table 7 as both SCP and SCU.

Table 7 Supported storage classes

SOP Class UID	Storage Class
1.2.840.10008.3.1.1.1	DICOM Application Context Name
1.2.840.10008.3.1.2.3.3	Modality Performed Procedure Step
1.2.840.10008.5.1.1.27	Stored' Print Image Storage. (Retired)
1.2.840.10008.5.1.1.29	Hardcopy Gray Scale Storage. (Retired)
1.2.840.10008.5.1.1.30	Hardcopy Colour Storage. (Retired)
1.2.840.10008.5.1.4.1.1.1	Computed Radiography Image Store
1.2.840.10008.5.1.4.1.1.1.1	Digital X-Ray - for presentation
1.2.840.10008.5.1.4.1.1.1.1.1	Digital X-Ray - for processing
1.2.840.10008.5.1.4.1.1.1.2	Digital Mammography Image Storage - for presentation
1.2.840.10008.5.1.4.1.1.1.2.1	Digital Mammography Image Storage - for processing
1.2.840.10008.5.1.4.1.1.1.3	Digital Intra-oral X-Ray Image Storage - present
1.2.840.10008.5.1.4.1.1.1.3.1	Digital Intra-oral X-Ray Image Storage - process
1.2.840.10008.5.1.4.1.1.10	Modality LUT Storage. (Retired)
1.2.840.10008.5.1.4.1.1.10	Standalone Modality LUT
1.2.840.10008.5.1.4.1.1.104.1	Encapsulated pdf
1.2.840.10008.5.1.4.1.1.11	Standalone VOI LUT
1.2.840.10008.5.1.4.1.1.11	Volume Of Interest (VOI) Storage. (Retired)
1.2.840.10008.5.1.4.1.1.11.1	Gray Scale Softcopy Presentation State Storage - PR modality
1.2.840.10008.5.1.4.1.1.11.2	Colour Softcopy Presentation State Storage - PR modality
1.2.840.10008.5.1.4.1.1.11.3	Pseudocolor Softcopy Presentation State Storage - PR modality
1.2.840.10008.5.1.4.1.1.11.4	Blending Softcopy Presentation State Storage - PR modality
1.2.840.10008.5.1.4.1.1.12.1	X-Ray Angiographic Image Storage
1.2.840.10008.5.1.4.1.1.12.1.1	Enhanced X-Ray Angiographic image storage
1.2.840.10008.5.1.4.1.1.12.2	X-Ray Radiofluoroscopic Image Storage
1.2.840.10008.5.1.4.1.1.12.2.1	Enhanced X-Ray Radiofluoroscopic image storage
1.2.840.10008.5.1.4.1.1.12.3	X-Ray Angiographic Bi-plane image (Retired)
1.2.840.10008.5.1.4.1.1.128	PET – Positron Emission Tomograpy
1.2.840.10008.5.1.4.1.1.129	Pet Curve Storage. (Retired)
1.2.840.10008.5.1.4.1.1.129	Standalone PET Curve
1.2.840.10008.5.1.4.1.1.2	Computed Tomography Image Storage
1.2.840.10008.5.1.4.1.1.2.1	Enhanced Computed Tomography Image Storage(With Contrast)
1.2.840.10008.5.1.4.1.1.20	Nuclear Medicine Image Storage
1.2.840.10008.5.1.4.1.1.5	Nuclear Medicine Image Storage (retired)
1.2.840.10008.5.1.4.1.1.3	MultiFrame Ultrasound Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.3.1	MultiFrame Ultrasound Image Storage

SOP Class UID	Storage Class
1.2.840.10008.5.1.4.1.1.4	Magnetic Resonance Image Storage
1.2.840.10008.5.1.4.1.1.4.1	Enhanced Magnetic Resonance Image Storage (With Contrast)
1.2.840.10008.5.1.4.1.1.4.2	Enhanced Magnetic Resonance Spectroscopy Storage
1.2.840.10008.5.1.4.1.1.481.1	Radiotherapy Image Storage
1.2.840.10008.5.1.4.1.1.481.2	Radiotherapy Dose Storage
1.2.840.10008.5.1.4.1.1.481.3	Radiotherapy Structure Set Storage
1.2.840.10008.5.1.4.1.1.481.4	Radiotherapy Beams Treatment Record Storage
1.2.840.10008.5.1.4.1.1.481.5	Radiotherapy Plan Storage
1.2.840.10008.5.1.4.1.1.481.6	Radiotherapy Brachy Treatment Record Storage
1.2.840.10008.5.1.4.1.1.481.7	Radiotherapy Treatment Summary Record Storage
1.2.840.10008.5.1.4.1.1.481.8	Radiotherapy ION Plan Storage
1.2.840.10008.5.1.4.1.1.481.9	Radiotherapy ION Bean Treatment Record Storage
1.2.840.10008.5.1.4.1.1.6	Ultrasound Image Storage (Retired)
1.2.840.10008.5.1.4.1.1.6.1	Ultrasound Image Storage
1.2.840.10008.5.1.4.1.1.66	Raw data Storage.
1.2.840.10008.5.1.4.1.1.66.1	Spatial Registration Storage
1.2.840.10008.5.1.4.1.1.66.2	Spatial Feducials Storage
1.2.840.10008.5.1.4.1.1.66.3	Deformable Spatial Reg Storage
1.2.840.10008.5.1.4.1.1.66.4	Segmentation Storage
1.2.840.10008.5.1.4.1.1.67	Real World Mapping Storage
1.2.840.10008.5.1.4.1.1.7	SC - Secondary Capture Storage
1.2.840.10008.5.1.4.1.1.7.1	Single Bit Multi-Frame Secondary Capture Storage
1.2.840.10008.5.1.4.1.1.7.2	Gray Scale Byte Multi-Frame Secondary Capture Storage
1.2.840.10008.5.1.4.1.1.7.3	Gray Scale Word Multi-Frame Secondary Capture Storage
1.2.840.10008.5.1.4.1.1.7.4	True Colour Multi-Frame Secondary Capture Storage
1.2.840.10008.5.1.4.1.1.77.1	Visible Light Storage Single Frame (Retired)
1.2.840.10008.5.1.4.1.1.77.1.1	Visible Light Storage - Endoscopic
1.2.840.10008.5.1.4.1.1.77.1.1.1	Visible Light Storage - Endoscopic Video
1.2.840.10008.5.1.4.1.1.77.1.2	Visible Light Storage - Microscopic
1.2.840.10008.5.1.4.1.1.77.1.2.1	Visible Light Storage - Microscopic Video
1.2.840.10008.5.1.4.1.1.77.1.3	Visible Light Storage Slide-Coordinates Microscopic
1.2.840.10008.5.1.4.1.1.77.1.4	Visible Light Storage - Photographic
1.2.840.10008.5.1.4.1.1.77.1.4.1	Visible Light Storage - Video
1.2.840.10008.5.1.4.1.1.77.1.5.1	Visible Light Storage - Opthalmic Photo 8BIT
1.2.840.10008.5.1.4.1.1.77.1.5.2	Visible Light Storage - Opthalmic Photo 16BIT
1.2.840.10008.5.1.4.1.1.77.1.5.3	Visible Light Storage - Opthalmic Stereometric Relationship
1.2.840.10008.5.1.4.1.1.77.2	Visible Light Storage Multiframe (Retired)
1.2.840.10008.5.1.4.1.1.8	Standalone Overlay
1.2.840.10008.5.1.4.1.1.8	Standalone Overlay Storage. (Retired)
1.2.840.10008.5.1.4.1.1.88	Structured Report Storage
1.2.840.10008.5.1.4.1.1.88.11	Basic Text Structured Report

SOP Class UID	Storage Class
1.2.840.10008.5.1.4.1.1.88.22	Enhanced Structured Report
1.2.840.10008.5.1.4.1.1.88.33	Comprehensive Structured Report
1.2.840.10008.5.1.4.1.1.88.40	Procedure Log
1.2.840.10008.5.1.4.1.1.88.50	Mammography CAD Structured Report
1.2.840.10008.5.1.4.1.1.88.59	Key Object Selection Doc
1.2.840.10008.5.1.4.1.1.88.65	Chest CAD Structured Report
1.2.840.10008.5.1.4.1.1.88.67	X-Ray Dose Structured Report
1.2.840.10008.5.1.4.1.1.9	Standalone Curve
1.2.840.10008.5.1.4.1.1.9.1.1	Waveform: 12-lead ECG Storage
1.2.840.10008.5.1.4.1.1.9.1.2	Waveform: General ECG Storage
1.2.840.10008.5.1.4.1.1.9.1.3	Waveform: Ambulatory ECG Storage
1.2.840.10008.5.1.4.1.1.9.2.1	Waveform: Hemodynamic Storage
1.2.840.10008.5.1.4.1.1.9.4.1	Waveform: Basic Voice Storage
1.2.840.10008.5.1.4.1.1.9.3.1	Cardio Electrophysiology (Modality=EPS)
1.2.840.10008.5.1.4.1.2.3.1	Patient/Study only Query/Retrieve Information Model - FIND
1.2.840.10008.5.1.4.1.2.3.2	Patient/Study only Query/Retrieve Information Model - MOVE
1.2.840.10008.5.1.4.31	Modality Work List FIND
1.2.840.10008.5.1.4.33	Instance Availability Notification SOP Class

6.1 Presentation Context

Dicom Explorer supports the Abstract Syntaxes shown in Table 8 as both SCP and SCU.

Table 8 Presentation context - abstract syntax

Abstract Syntax UID	Syntax Name
1.2.840.10008.1.2	Implicit Value Representation (VR) little Endian byte order – aka the Default Transfer Syntax
1.2.840.10008.1.2.1	Explicit Value Representation (VR) little Endian byte order
1.2.840.10008.1.2.2	Explicit Value Representation (VR) big Endian byte order
1.2.840.10008.1.2.5	RLE compression See Dicom 3.5 Annex G
1.2.840.10008.1.2.4.50	JPEG Base line compression encoding The Default transfer syntax for lossy jpeg
1.2.840.10008.1.2.4.51*	JPEG Extended JPEG Coding Type 2 = 8-bit JPEG Coding Type 4 = 12-bit
1.2.840.10008.1.2.4.57*	JPEG lossless, Non-Hierarchical
1.2.840.10008.1.2.4.70*	JPEG Lossless, Non-Hierachical, First Order Prediction The Default transfer syntax for losslessjpeg

* The JPEG CODECS are optimized with more options if JAI is installed on a client computer as a Java extension.

Abstract Syntax UID	Syntax Name
1.2.840.10008.1.2.4.90[†]	Lossless (reversible) mode of JPEG 2000 Part 1 (ISO/IS 15444-1) (i.e.The use of a reversible wavelet transformation and a reversible color component transformation, if applicable, and no quantization).
1.2.840.10008.1.2.4.91[†]	a. the lossless (reversible) mode of JPEG 2000 Part 1 (ISO/IS 15444-1) (i.e. the use of a reversible wavelet transformation and a reversible color component transformation, if applicable, and no quantization), or b. the lossy (irreversible) mode of JPEG 2000 Part 1 (ISO/IS 15444-1) (i.e. the use of an irreversible wavelet transformation and an irreversible color component transformation, if applicable, and optionally quantization).

6.2 Implementation Model

The Storage method of the Dicom Service Class is made available as a command line utility for server based automation functions. Within the Dicom Explorer user interface a *drag and drop* model is supported. An indicated Collection of Series and or images is *dragged* from a DICOM or NON-DICOM store and *dropped* onto a DICOM store. This ultimately results in one or more C-Store commands to a DICOM server.

[†] JPEG2000 Wavelet compression is only available if JAI (Java Advanced Imaging) is installed as a Java Extension – the availability is automatically detected and requires no user configuration.

7 Storage Commitment

Dicom Explorer supports the storage commitment SOPs shown in Table 9 as a Service Class Provider only. All DICOM abstract syntaxes are supported.

Table 9 Service object pair 4

SOP Class	SOP name
1.2.840.10008.1.20.1	Storage Commitment Push Model

The Dicom Explorer interpretation of commitment with regard to storing any IOD is user definable either through direct manipulation of the properties file or through the "Settings→Servers→Storage" pop-up (see Figure 7 Storage commitment).

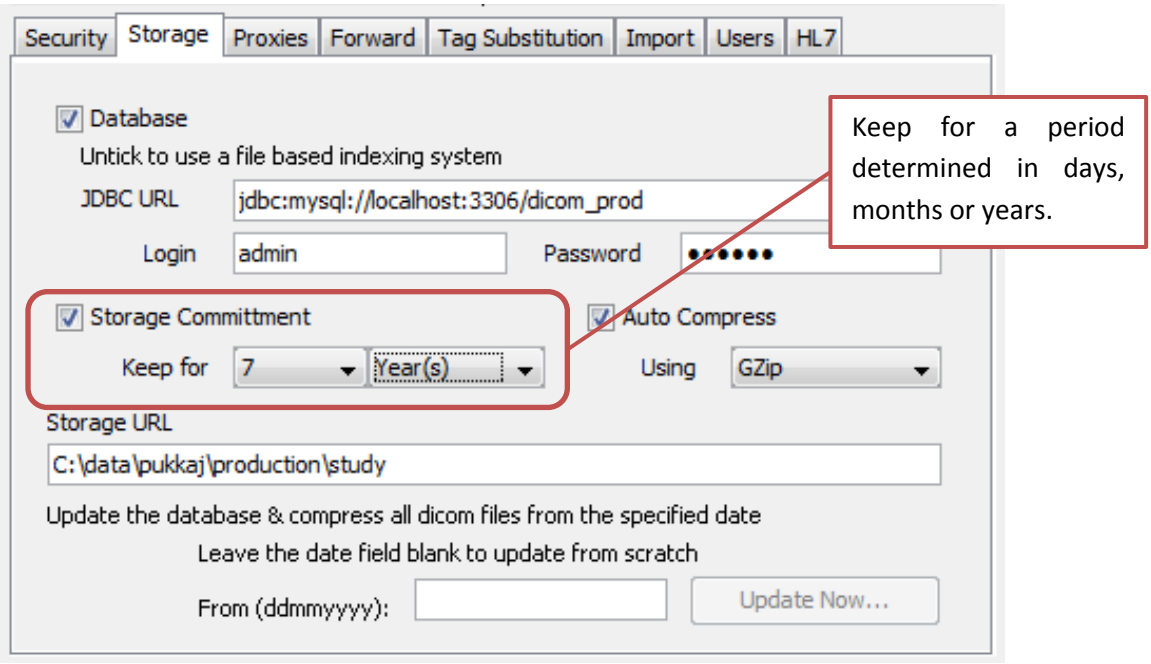

Figure 7 Storage commitment

8 Media

Dicom Explorer supports the “Saving” of DICOM part 10 files directly through the user interface (see Figure 8).

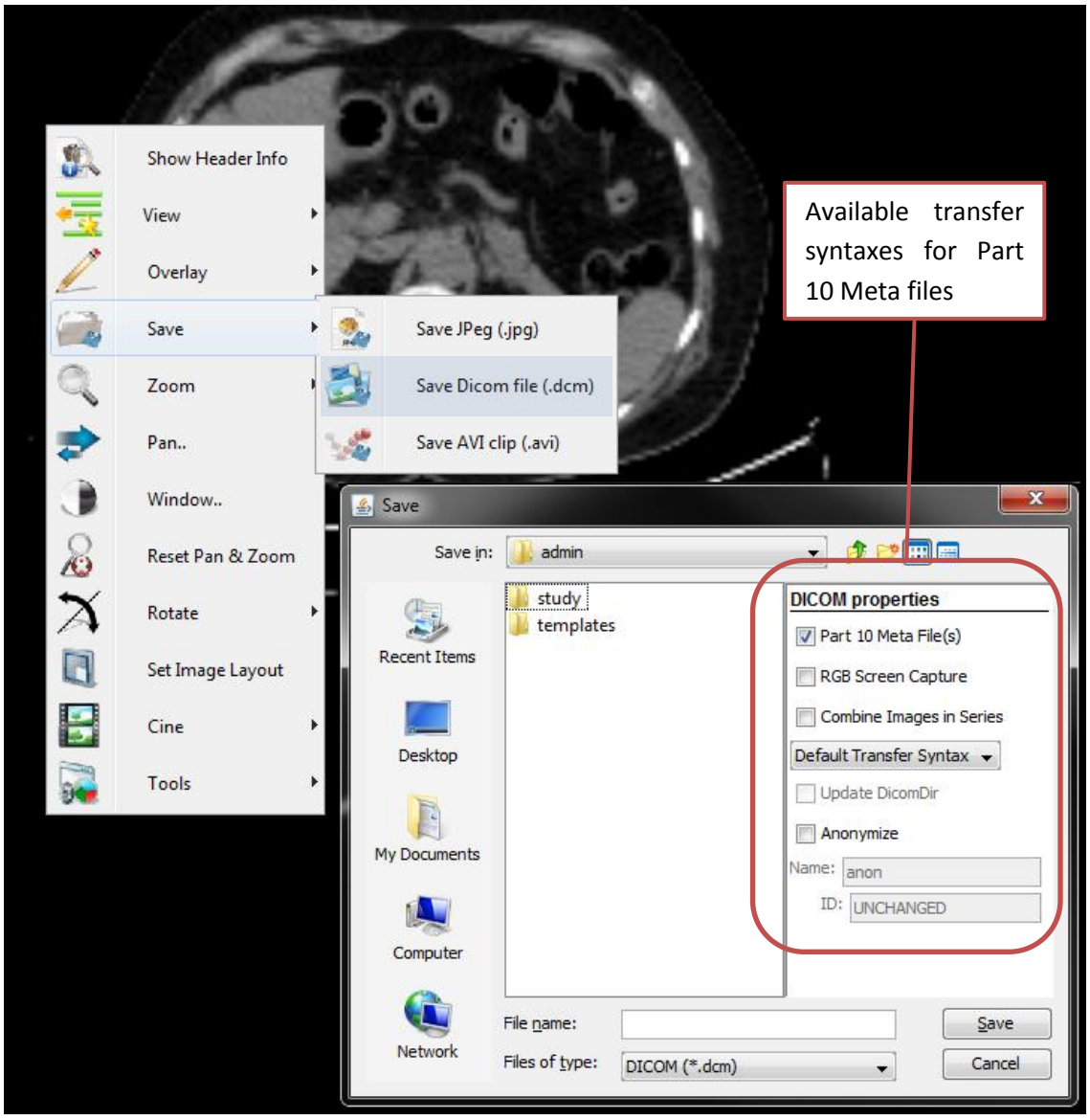

Figure 8 Saving DICOM part 10 media files