



Numa[®]

Products and Services for
Nuclear Medicine

NumaStore[™]

Image Management Solution

*Receives, Stores, Organizes, and Distributes
Nuclear Medicine Data*

10 Northern Blvd. Unit 12, Amherst, NH 03031

Phone: (603) 883-1909, Fax: (603) 883-0839

NUMASTORE™

NUCLEAR MEDICINE IMAGE MANAGER

1.0 SUMMARY

NumaStore Image Management System is a medical image management system tailored to the needs of nuclear medicine and nuclear cardiology. It provides safe, long-term, expandable storage while managing the flow of images throughout the Nuclear Medicine Department and beyond. NumaStore is the cornerstone for connectivity within the Nuclear Medicine Department.

While NumaStore takes advantage of new technology such as DICOM, it also connects with older systems that do not have DICOM capabilities. NumaStore easily integrates into a Nuclear Medicine Department. By using your existing computers to view or reprocess the archived images, the need for retraining is eliminated.

NumaStore replaces magneto optical disk (MOD), floppy disk, tape, or film as the long term storage medium. The time and costs associated with media, film, supplies, and storage have caused many departments to look for alternatives. Safe and secure archiving of patient images with NumaStore reduces the dependence on obsolete hardware or film. Nuclear Medicine Departments can rely on NumaStore's ability to recall images in a format that will be compatible with future review and processing systems.

NumaStore features improve efficiency and workflow of the Nuclear Medicine Department by:

- Automating the mundane task of archiving images. See Section 2.4, *Auto-Pull (DICOM)*, page 6, and Section 2.5, *Auto-Import (non-DICOM)*, page 6.
- Simplifying and speeding image data retrieval for reprocessing or display in a way that facilitates and encourages comparative analysis. See Section 5.1, *Query and Retrieve*, page 18.
- Delivering nuclear medicine and nuclear cardiology images to different manufactures workstations, departments, imaging modalities, PACS hospitals, clinics, referring physicians, and patients. See Section 5.5, *Auto-Forward*, page 19, and Section 5.4, *Filter*, page 19.
- Reducing the cost of archive media and film. See Section 3.8, *Online RAID*, page 10.
- Eliminating lost images due to bad or lost films, floppies, tapes, and optical disks. See Section 3.1, *Reliability*, page 8.
- Directing the right type of images to the correct location for processing, archiving, reading, reporting, or sharing. See Section 5.0, *Distribute*, page 18.
- Working with your current acquisition, processing, and review workstations. See Section 5.7, *Nuclear Medicine Workstation Compatibility*, page 21.
- Integrating nuclear medicine into a PACS environment. See Section 5.8, *PACS Compatibility*, page 21.

1.1 NUMASTORE RECEIVES, STORES, ORGANIZES AND DISTRIBUTES NUCLEAR MEDICINE IMAGE DATA

RECEIVES

NumaStore communicates via DICOM C-Store functions as well as native formats and network protocols. (See Section 2.0, *Receive*, page 4.)

STORES

NumaStore provides on-line storage of both raw and processed images. NumaStore is expandable, reliable, and secure while maintaining the integrity of the original images. (See Section 3.0, *Store*, page 8.)

ORGANIZES

NumaStore enables you to sort and query images by 46 different attributes and create your own custom attributes or groups for research and teaching. (See Section 4.0, *Organize*, page 13.)

DISTRIBUTES

NumaStore communicates via DICOM, offering Query and Retrieve capabilities, filters, and connectivity with non-DICOM and remote systems. (See Section 5.0, *Distribute*, page 18.)

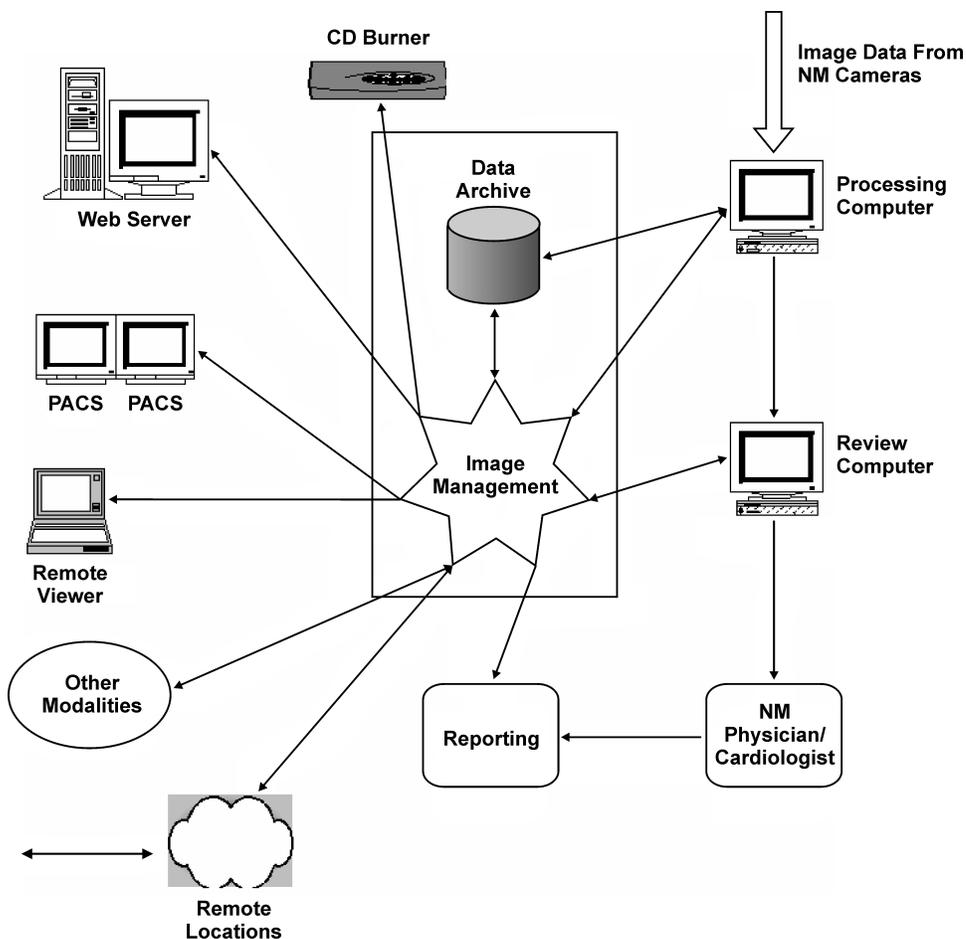


FIGURE 1: NUMASTORE IMAGE MANAGER OVERVIEW

2.0 **RECEIVE**

The flexibility of the Microsoft Windows operating system combined with Numa's knowledge of industry standards and proprietary formats gives NumaStore extensive connectivity options. It receives images from a variety of different formats, media types, and network protocols.

NumaStore is compatible with NumaLink and NumaStation connectivity products and has several of its own unique connectivity offerings. Some of these features are described in this section.

2.1 **DICOM**

Relationships with other vendors and Numa's validation process keep Numa updated and informed of any variation in the standard. NumaStore employs the MergeCom-3™ Toolkit developed by Merge Technologies Inc. (<http://www.merge.com>). This toolkit and the Numa software development strategy give Numa flexibility, ensure compatibility, and enable NumaStore to remain compliant.

Numa is constantly validating new vendors and platforms. Contact Numa for the latest compatibility list—visit <http://www.NumaStore.com/> or call 1-800-733-6862.

NumaStore is fully compatible with the DICOM store, query, and retrieve capabilities of nuclear medicine processing systems and DICOM viewers. NumaStore conforms to the DICOM 3.0 standard and supports the DICOM 3.0 image file standard. The *NumaStore 1.0 DICOM 3.0 Conformance Statement* is available from Numa (1-800-733-6862) or the NumaStore Web site at: http://www.NumaStore.com/Products/NUMAST_1/numast_1.HTM.

NumaStore uses the DICOM-conformant nuclear medicine workstations and viewers of other vendors to provide a store/query/retrieve client interface. It stores images sent to it by Service Class Users, executes queries based on several standard DICOM query models, and retrieves requested images.

NumaStore is:

- Service Class Provider and Service Class User for the DICOM Query/Retrieve Service Class
- Service Class Provider and Service Class User for the DICOM Storage Service Class

NumaStore also supports communications testing using the DICOM Verification Service Class (“Echo Test”) as both a Service Class Provider and Service Class User.

NumaStore is multi-threaded to support multiple simultaneous DICOM associations. There is no inherent limit to the number of associations other than limits imposed by the computer operating system.

2.2 **NATIVE FILE FORMATS**

NumaStore supports the DICOM 3.0 image file standard as well as nuclear medicine manufacturers' native file formats. With manufacturers' proprietary formats, there is no translation or data loss. All image types are archived in their original format so there are no issues when these images are retrieved for processing or display.

NumaStore is compatible with Numa's image file translation products. When required, the archived images can be translated into another manufacturer's format or DICOM. NumaStore can be configured to automatically or manually translate images. The translation works with *Auto-Forward*, page 19, or *Filter*, page 19.

Contact Numa for the latest compatibility list—visit <http://www.NumaStore.com/> or call 1-800-733-6862.

2.3 IMPORT FROM LOCAL AND REMOTE DIRECTORIES

File import is the inclusion of non-DICOM files into the NumaStore database. Files are imported by placing them in a specified import directory (a local or mapped directory) accessible by NumaStore.

As shown below, you can configure more than one import directory. Each directory is associated with a specific OEM file format. Import directories are configured with the NumaStore Import/Export configuration utility.

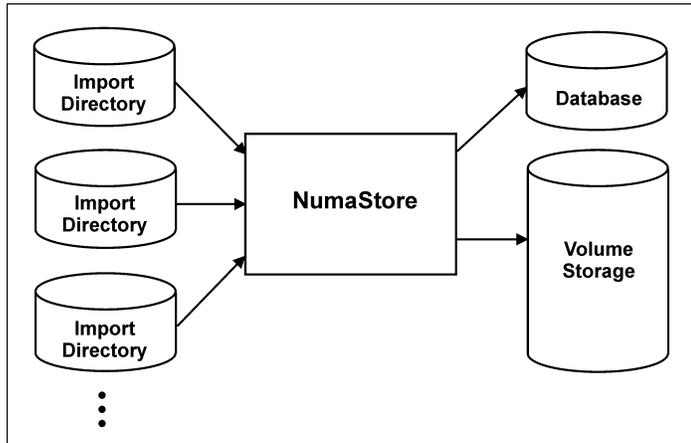


FIGURE 2: IMPORT FLOW

NumaStore periodically checks import directories for importable files. When a file is detected, NumaStore:

1. Scans the file for information stored in the database (e.g., patient name and ID, study name, etc.).
2. Updates the database accordingly.
3. Stores the file in a storage volume (see Section 3.11, *Secondary Backup*, page 11).

Imported files are always stored in their original format. For selected OEMs, the import targets also can be directories on remote machines accessed via FTP. In this case, the configuration of the import target includes remote node and (if necessary) login information.

For some OEMs for which remote import targets are supported, the ability to use the remote database to drive automatic imports also is available.

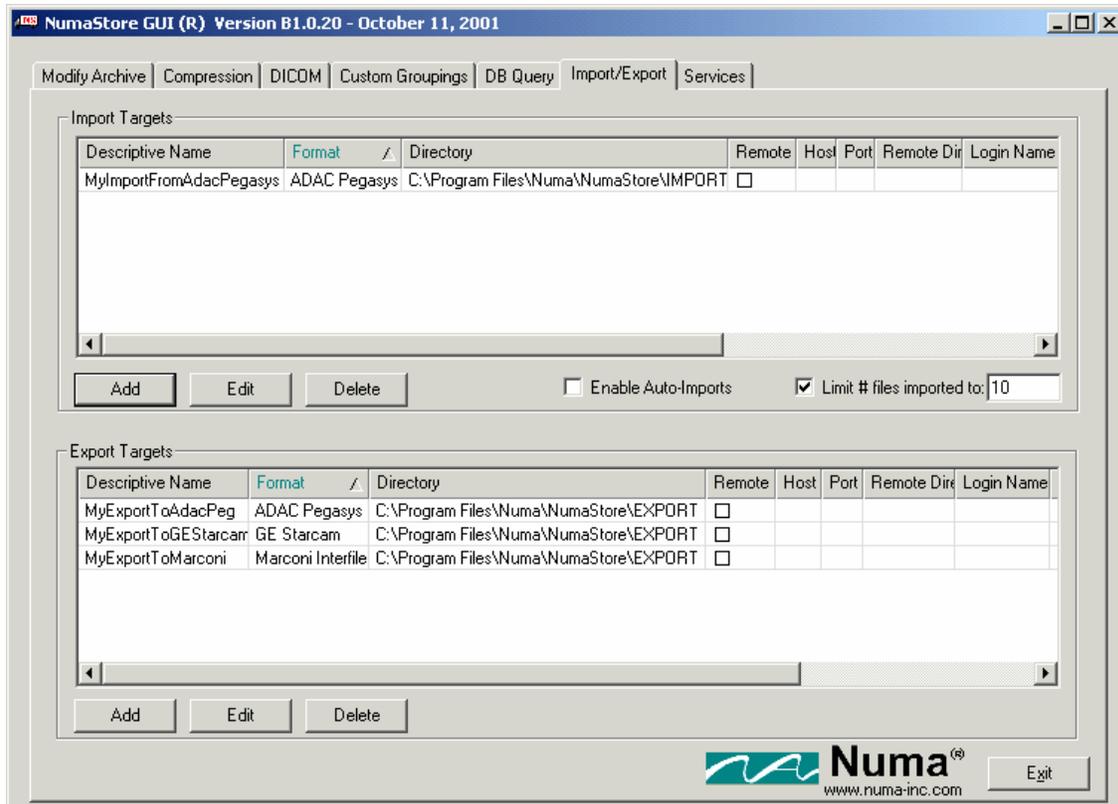


FIGURE 3: IMPORT

2.4 AUTO-PULL (DICOM)

You can configure NumaStore to automatically retrieve (pull) and store new image data from other DICOM application entities. The system can compare a list of image files on NumaStore with images that are not, and then pull those that are not onto NumaStore.

To accomplish Auto-Pulling, NumaStore:

1. Periodically queries the remote workstation to determine what image data it currently holds.
2. Compares that image to images already stored in NumaStore.
3. Performs a DICOM retrieve request for any images on the remote application that are not already stored in NumaStore.

NumaStore can perform Auto-Pull and Filter (see Section 5.4, page 19) for all images or selected image types. Selected image types include raw, processed, screen saves, and all. There is a configurable interface to control the frequency of Auto-Pull. Once an Auto-Pull is configured and enabled, no further user intervention is required to archive or move images from the source computer.

2.5 AUTO-IMPORT (NON-DICOM)

Auto-Import works similar to Auto-Pull except it is configured to work with supported non-DICOM nuclear medicine workstations.

You can configure NumaStore to automatically import and store new images from supported non-DICOM nuclear medicine workstations. The system can compare a list of image files on NumaStore with images that are not, and then pull those that are not onto NumaStore.

To accomplish auto-importing, NumaStore:

1. Periodically queries the remote workstation to determine what image data it currently holds.
2. Compares that image to images already stored in NumaStore.
3. Performs a retrieve request for any image on the remote application that is not already stored in NumaStore.

NumaStore Auto-Import works for all image types. A programmable interface controls the frequency of Auto-Import. Once an Auto-Import is configured and enabled, no further user intervention is required to archive or move images from the source computer.

2.6 OPTICAL DISK

Numa is developing utilities that will facilitate migration of images from supported optical disk into NumaStore. Contact Numa for more information—visit <http://www.NumaStore.com/> or call 1-800-733-6862.

2.7 NETWORK PROTOCOLS

In addition to DICOM, NumaStore works with Numa's other connectivity products to support proprietary and industry standard network protocols: Using the DICOM standard, NumaStore provides immediate network connectivity using a well known standard and user interface.

NumaStore can be configured to work with the following industry standard network protocols:

- TCP/IP
- FTP
- OSI
- TFTP
- DICOM

NumaStore also can be configured to work with the following manufacturer proprietary protocols:

- Elscint OSI
- GE Starlink
- Siemens ICON Ethertalk
- Sophy Net

2.8 REMOTE TELECOMMUNICATIONS

NumaStore can be connected to telecommunications devices and networks that expand its usefulness beyond the department walls. Using current technology and the internet, image data can be moved between workstations down the hall or thousands of miles away. Small remote clinics or hospitals may not have the resources to provide the diagnosis required for today's complex and specialized procedures. NumaStore can be configured as a remote server to pull in images for over reading or as a central hub to archive and manage several locations. As today's departments expand and consolidate, this becomes an important feature.

In addition to using the DICOM standard, NumaStore provides connectivity via all supporting TCP/IP standards (modem, ISDN, DSL, cable modem, T1, etc.). NumaStore also uses the above network protocols.

3.0 STORE

Nuclear medicine processing systems typically are not designed to store large numbers of studies. It is often necessary to remove studies from these machines within a matter of weeks or even days in order to free up resources to process additional studies. NumaStore provides safe, long-term expandable storage and cataloging as well as efficient retrieval of nuclear medicine images.

The NumaStore database catalogs stored medical images based on patient and study data obtained from those images. It supports the query and retrieval of images stored on NumaStore storage volumes with cross-references to the database. When NumaStore receives a store request, it saves the corresponding images to its internal disk store and updates its internal database with appropriate patient, study, series, and image attributes. Studies (raw and/or processed images) are stored on expandable, easily accessed online disks.

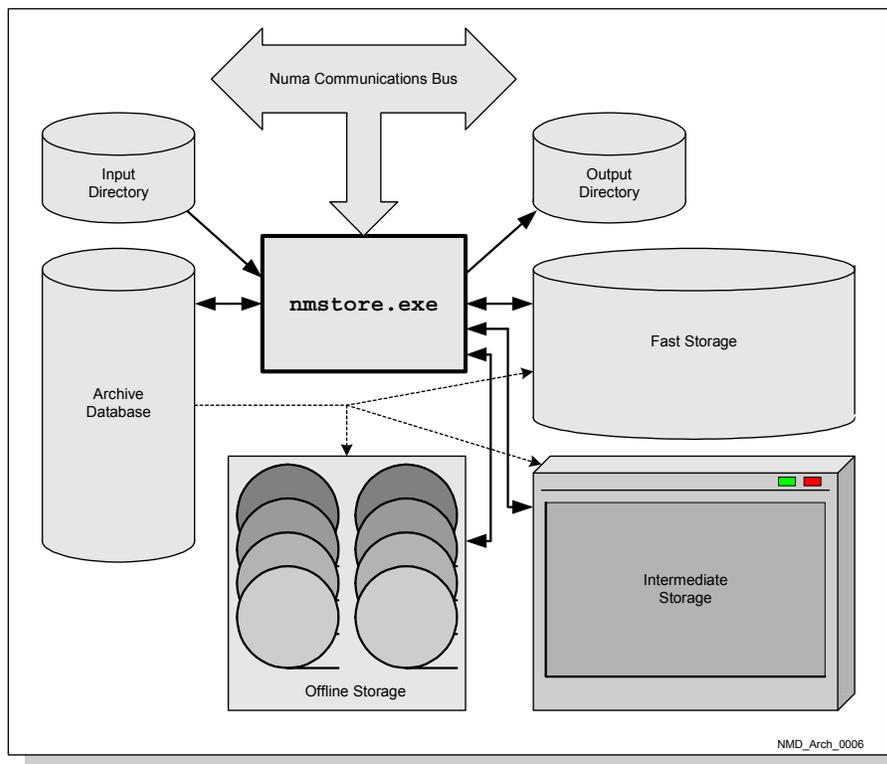


FIGURE 4: STORAGE

3.1 RELIABILITY

NumaStore is a safe, reliable way to archive nuclear medicine images. It employs the same RAID technology (Section 3.8, page 10) used in other critical data management applications such as banking, web servers, and hospital information systems. NumaStore includes diagnostic and rebuild tools to maintain the database at optimum levels. There are tools to migrate the images to new expanded media as your needs change and technology advances. Unlike optical disk or MOD, NumaStore is not subject to failure, obsolescence, or misplacement.

3.2 SECURITY

Using the security features within Microsoft Windows 2000 server, access to the NumaStore user or administrative interface requires a secure log on and password.

3.3 EXPANDABLE AND SCALABLE

Not every hospital has the same storage needs. NumaStore offers a solution for one-camera departments as well as multi-camera, multi-vendor departments.

NumaStore systems are designed with “room to grow.” As a department’s needs increase, hardware can be added to meet those needs. NumaStore loss-less data compression methods (Section 3.16, page 12) maximize available storage space.

3.4 SUPPORT OF NATIVE FORMATS

NumaStore supports native file formats while maintaining data integrity. Images are stored in their native format (without translation) whenever possible. Adding the capability to translate images into a universal format such as DICOM ensures the images will be compatible in the future.

Numa understands the sensitivity of patient studies and ensures this mission-critical data is not lost. Industry-standard hardware and software tools such as redundant hardware and RAID (Section 3.8, page 10) are used to ensure the safety and reliability of data stored on the system.

Contact Numa for the latest compatibility list—visit <http://www.NumaStore.com/> or call 1-800-733-6862.

3.5 DICOM

NumaStore is fully compatible with the DICOM store capabilities of nuclear medicine processing systems. NumaStore also works with DICOM devices of other modalities or PACS systems. The *NumaStore 1.0 DICOM 3.0 Conformance Statement* is available from Numa (1-800-733-6862) or at: http://www.NumaStore.com/Products/NUMAST_1/numast_1.HTM.

3.6 SUPPORT OF ALL IMAGE TYPES

NumaStore supports all types of images in native or DICOM formats:

- All new images
- Secondary captures (screen saves, snapshots, light box images, etc.)
- Raw images (statics, dynamics, GSPECT projections, etc.)
- Processed images (reconstructed slices, etc.)

A filter (Section 5.4, page 19) can be configured to support only some of the image types.

3.7 STORAGE VOLUMES

NumaStore uses volumes to locate and store images. A volume is any storage device. Volumes are easily defined as different media types and can be located anywhere on the network. Volume sizes can be expanded to include larger volumes of online, near line, or offline storage. Examples are RAID (Section 3.8, page 10) and Near-Line CD/DVD Jukeboxes (Section 3.10, page 10).

When storing image data in NumaStore, the entire incoming data stream (DICOM) or original image file (native mode) is stored as an image file on a configured NumaStore storage volume.

The NumaStore graphical user interface provides a visual display of free space available and used space. Refer to the example in Figure 5.

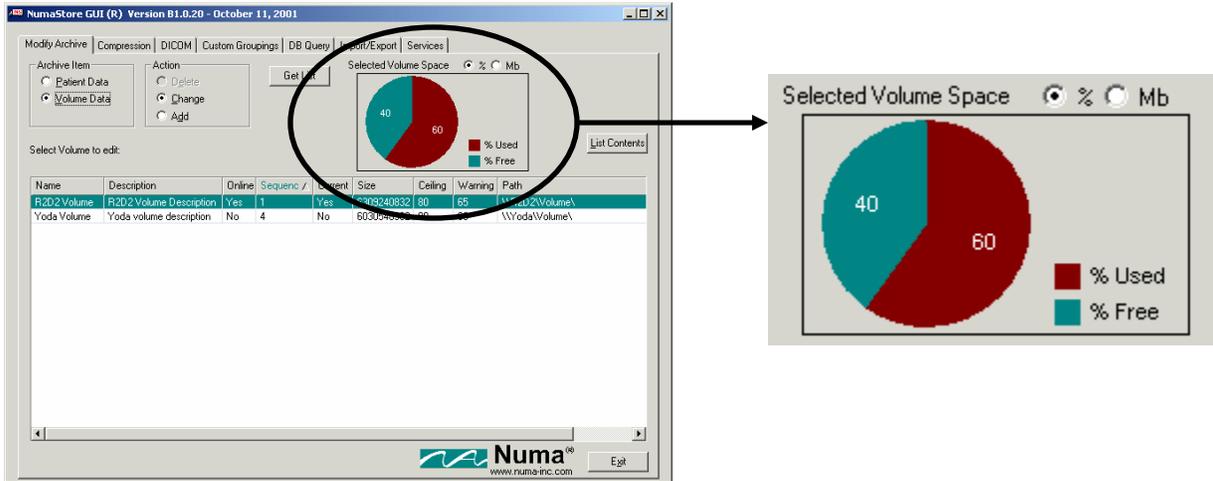


FIGURE 5: VISUAL DISPLAY OF VOLUME SPACE

3.8 ONLINE RAID

The online Redundant Array of Inexpensive Disks (RAID) is a configuration consisting of a number of inexpensive disk drives, a parity drive, and a specialized controller. The redundant drive(s) provide secure single-error detection and redundant information to recover the original information if a disk fails. In addition, RAID provides:

- High transfer rates
- Increased disk capacity
- High I/O rates
- Faster data access speeds

RAID provides high performance for immediate access to patient imaging studies. Organizations archiving information on optical disk often find it expensive and inefficient. For example, the retrieval of an image stored on an optical platter can take many minutes if the platter is on the shelf rather than in a jukebox.

3.9 DICOM PART 10

Soon NumaStore will have the ability to write images in DICOM Part 10 format to a CD. All NumaStore systems include a CD burner. NumaStore will log when the files were written and on which CD.

3.10 NEAR-LINE CD/DVD JUKEBOX OPTIONS

In addition to online storage (RAID), near-line storage (CD/DVD jukebox) is available and configurable according to your needs. Contact Numa for an options list—visit <http://www.NumaStore.com/> or call 1-800-733-6862.

3.11 SECONDARY BACKUP

DICOM removable media is supported as an offline storage option (see Section 3.9, *DICOM Part 10*, page 10). In addition, NumaStore supports:

- Tape
- CD-R
- PACS or other systems

NumaStore can Auto-Forward and Filter supported images to an archive; yet, data that is pertinent to nuclear medicine is maintained in the department with NumaStore.

- Offsite storage

NumaStore can be configured to move data offsite via a WAN or the internet to another NumaStore or archive.

3.12 INDUSTRY STANDARD OPERATING SYSTEM

NumaStore runs on the industry-standard Microsoft Windows 2000 operating system. It uses Microsoft Back Office including SQL 2000 For more information, visit <http://www.microsoft.com>.

3.13 QUALITY STATE-OF-THE-ART HARDWARE

NumaStore is built on commercial quality, brand name, off-the-shelf hardware. NumaStore comes in standard configuration with options to suit user needs. Contact Numa for the latest hardware configurations and options—visit <http://www.NumaStore.com> or call 1-800-733-6862.

3.14 UNINTERRUPTIBLE POWER SUPPLY (OPTIONAL)

NumaStore includes an Uninterruptible Power Supply (UPS), which designed to prevent blackouts, brownouts, sags, and surges from reaching your computer and other valuable electronic equipment. The UPS filters out small utility line fluctuations and isolates your equipment from large disturbances by internally disconnecting from the utility line. The UPS provides continuous power from its internal battery until the utility line returns to safe levels. NumaStore can be configured with an optional American Power Conversion Corporation (APC) UPS.

APC is the leading national and international manufacturer of state-of-the-art uninterruptible power supplies, redundant switches, power management software, and related equipment. APC products protect hardware, software, and data from the threat of power disturbances in businesses throughout the world.

For more information about the APC UPS visit <http://www.apc.com>.

3.15 DIAGNOSTIC AND MAINTENANCE TOOLS

NumaStore supports diagnostic tools.

Each release of NumaStore includes a database upgrade utility that brings an older existing NumaStore database into compatibility with the latest NumaStore software. This upgrade is typically performed automatically as part of the new software installation.

3.16 COMPRESSION/DECOMPRESSION

Image files may be stored either compressed or uncompressed. You can manually initiate the compression or decompression procedure. Or, you can configure NumaStore to compress image files automatically during storage and decompress them automatically during retrieval. You can modify the compression status of already stored image files.

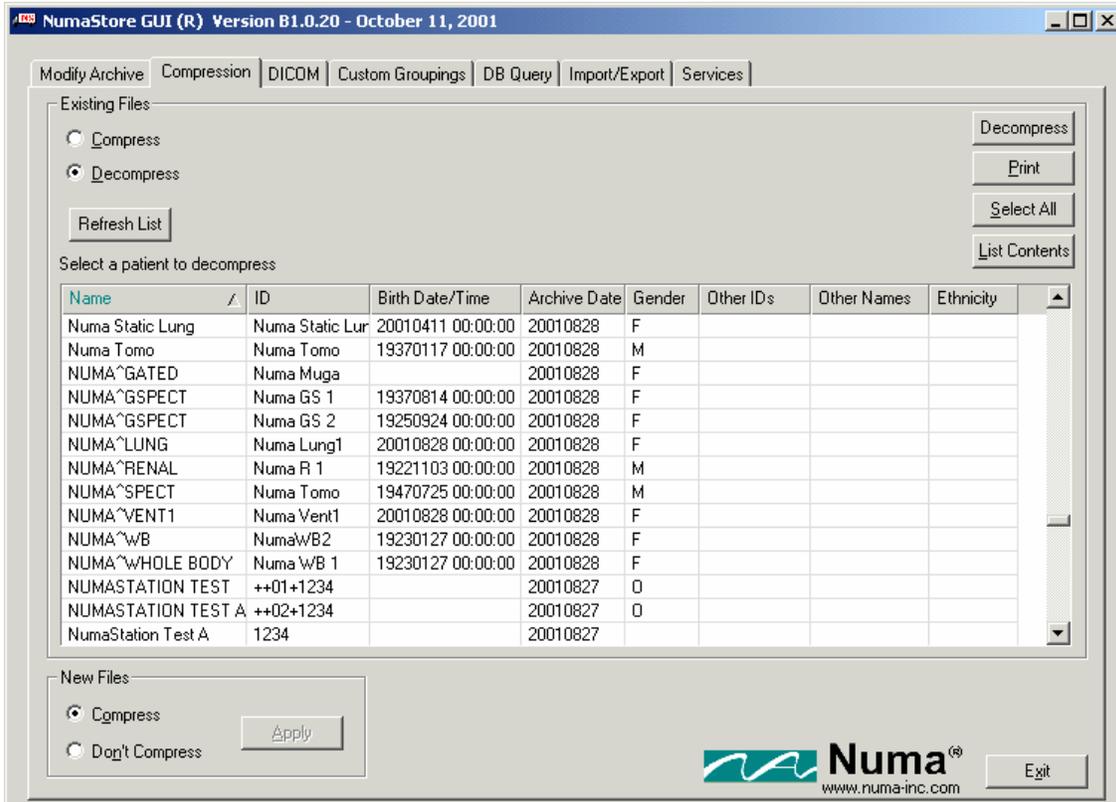


FIGURE 6: COMPRESSION

The DynaZIP compression process is used. For more information about DynaZIP, visit: <http://www.innermedia.com/Products/Zip-compression/zip-compression.htm>.

This compression is loss-less (using the Huffman encoding algorithm).

A compression factor of 4 to 5 is typical for nuclear medicine images; that is, the size of the compressed image is 20% to 25% the size of the original image. The compression factor achieved is dependent on the actual images being compressed.

The cost of this compression, in terms of processing throughput, depends on the processing power of the system. Numa measured the processing cost at about 2 seconds per megabyte of original (uncompressed) images, on a 400 MHz Pentium II processor.

Uncompressed Data		Compressed Data	
7,474	Patients	7,474	Patients
20,586	Studies	20,586	Studies
157,137	Series	157,137	Series
164,986	Images	164,986	Images
150 Gb	Total Space Used	35 Gb	Total Space Used

3.17 STORAGE REQUIREMENT CHART

On average, a nuclear medicine camera processes five to ten patients a day, or 1250 to 2500 patient per year. A typical gated SPECT study contains 2-4 Mb of raw images or 10-20 Mb of processed images. Given these assumptions, the table below shows a range of storage requirements to keep nuclear medicine studies available over various periods of time:

Time/Number of Studies	Raw Gated SPECT	Processed Gated SPECT
1 month (100-200)	200-800 Mb	1-4 Gb
1 year (1250-2500)	2.5-10 Gb	12.5-50 Gb
5 years (6250-12,500)	12.5-50 Gb	62.5-250 Gb
20 years (25K-50K)	50-200 Gb	250 Gb – 1 Tb

Mb = Megabytes (10**6), Gb = Gigabytes (10**9), Tb = Terabytes (10**12)

4.0 ORGANIZE

NumaStore enables you to interact easily with the DICOM query and retrieve user interface. It provides a list of archived images as well as customized owners with groups of images. You can sort or query on a number of attributes at the patient, study, series, and image levels. NumaStore also provides pre-fetch for comparative analysis and customizable list and column displays.

4.1 EASY-TO-USE WINDOWS INTERFACE

NumaStore interacts with the DICOM query and retrieve user interface. Patient image file sets are easily moved from NumaStore to the destination system’s database where they can be selected for display and processing. A Windows graphical user interface (GUI) is provided on the system for local query and retrieve as well as administrative functions.

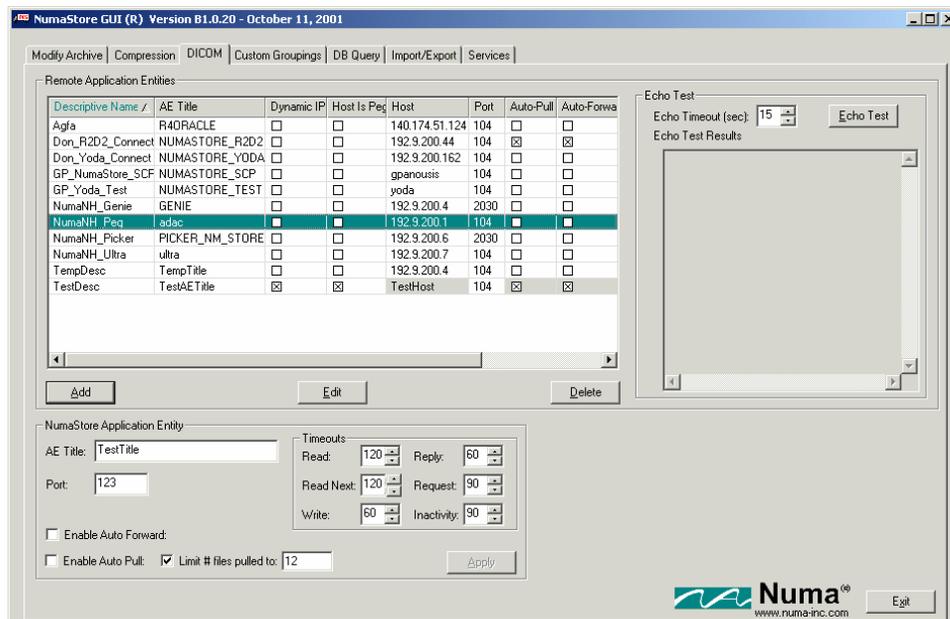


FIGURE 7: SAMPLE OF THE NUMASTORE GRAPHICAL USER INTERFACE

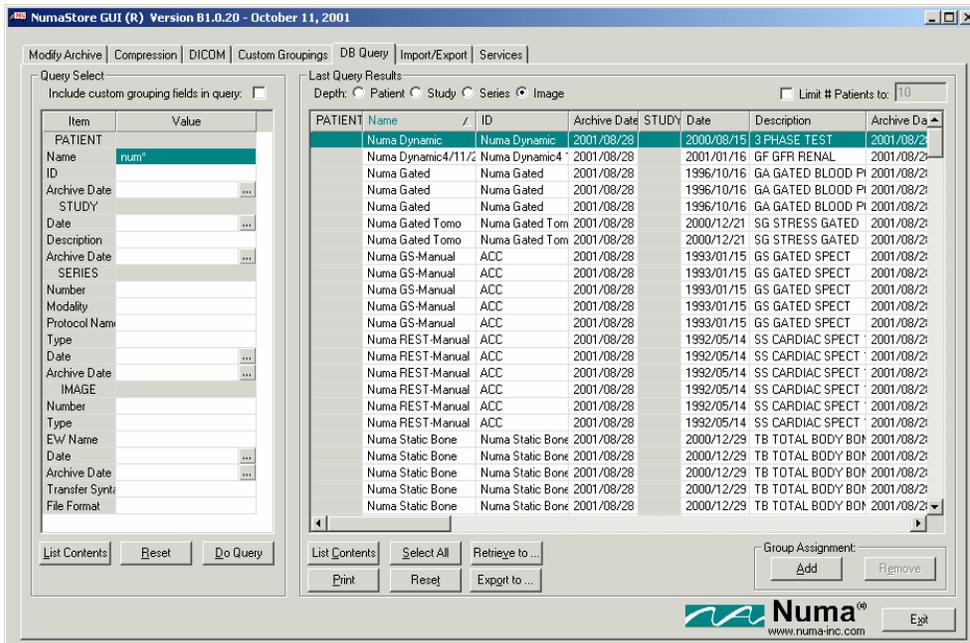


FIGURE 8: ANOTHER SAMPLE OF THE NUMASTORE GRAPHICAL USER INTERFACE

The Remote User Interface (Section 5.10, page 21) allows the NumaStore GUI to run on any Windows system on the network.

4.2 PRINT LIST OF ARCHIVED IMAGES

By simply pressing the “Print” button, you can print the results of a query—a list of archived images.

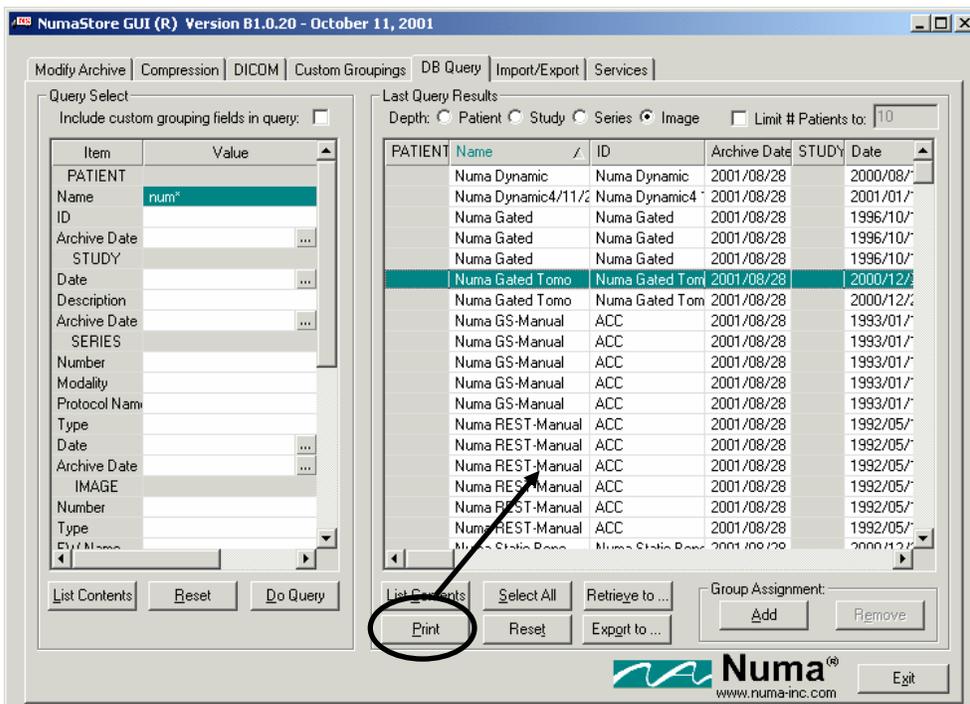


FIGURE 9: PRINT A LIST OF ARCHIVED IMAGES

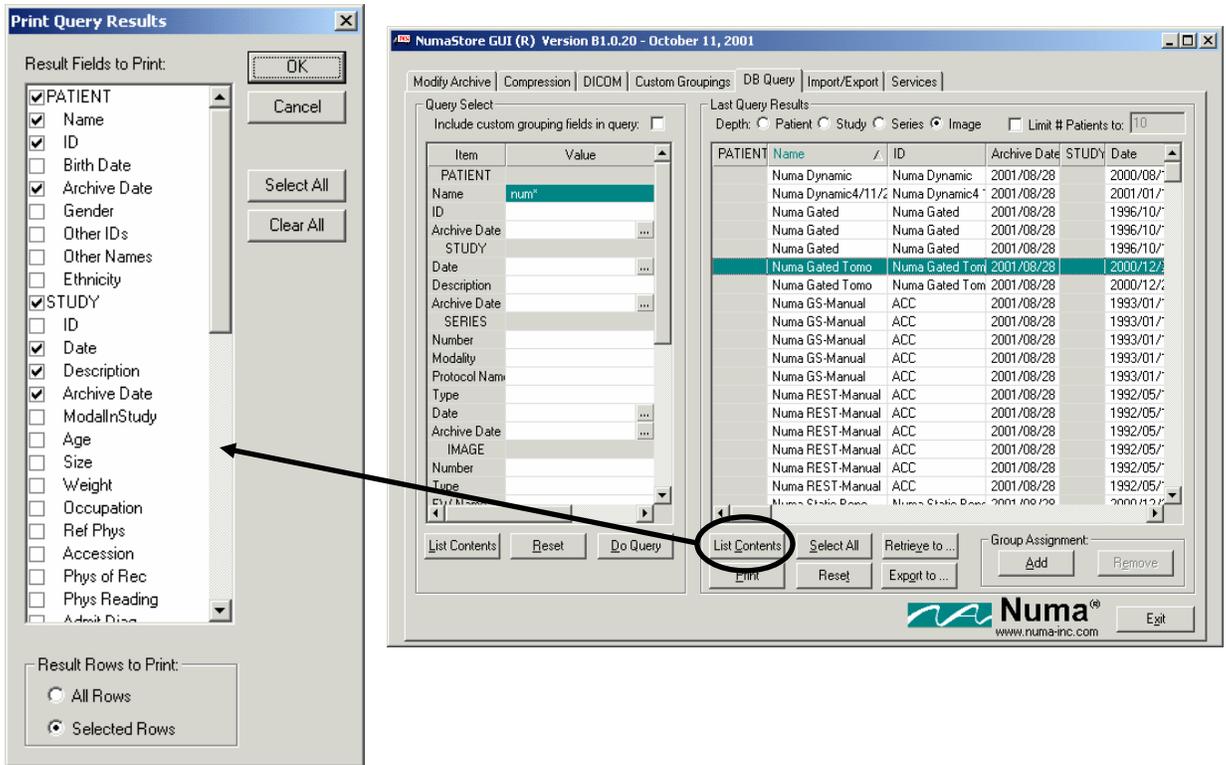


FIGURE 10: LIST OF FIELDS TO PRINT

4.3 SORT OR QUERY ON A NUMBER OF ATTRIBUTES WITH SUPPORT OF PATIENT, STUDY, SERIES, AND IMAGE LEVELS

For both DICOM and non-DICOM systems, NumaStore extracts patient, study, series, and image data from a stored image and updates its internal database with this information to support subsequent queries. As such, query responses are based on patient, study, series, and image information maintained in NumaStore's internal database as a result of previous store operations.

NumaStore images can be sorted or queried on by 46 different attributes plus three user-defined custom attributes. The attributes are divided into Patient, Study, Series and Image levels. The image attributes are populated by information in the image headers and follow the DICOM header format.

The user can select the image attributes to display and select images from. The interface supports wild card selections. The "List Contents" button controls the display of columns in the list.

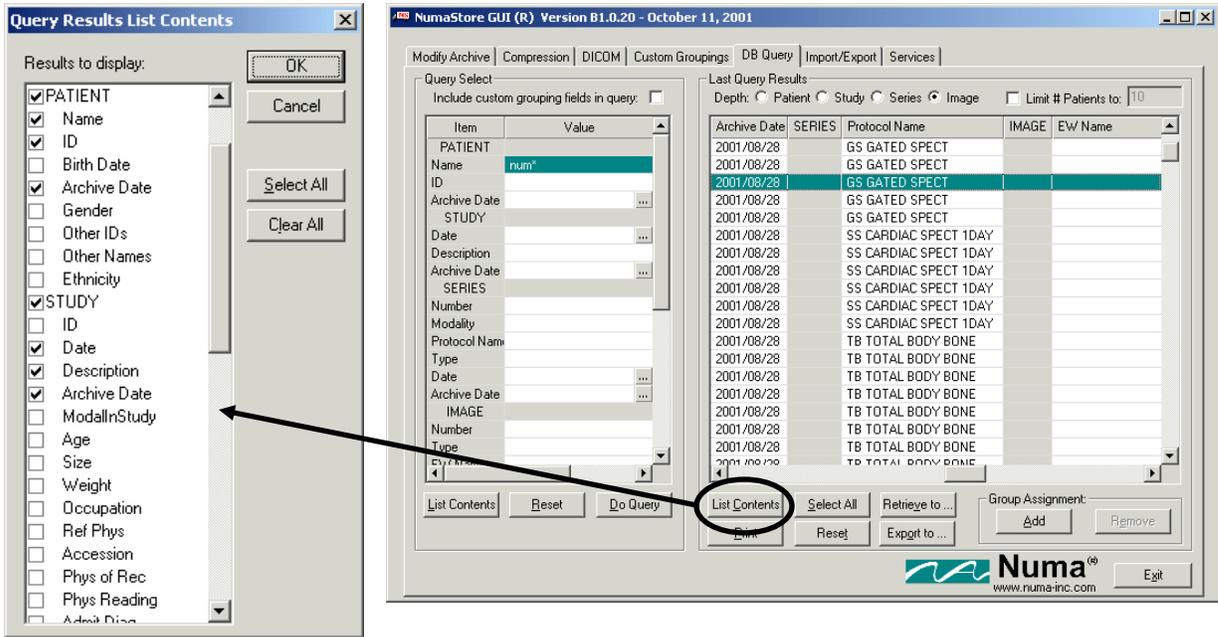


FIGURE 11: QUERY ATTRIBUTES LIST

The results list can be sorted by Name, ID, Birth Date Time, Archive Date, Gender, Other IDs, Other Names, or Ethnicity.

Arrows in a column heading enable you to sort the list in ascending or descending order.

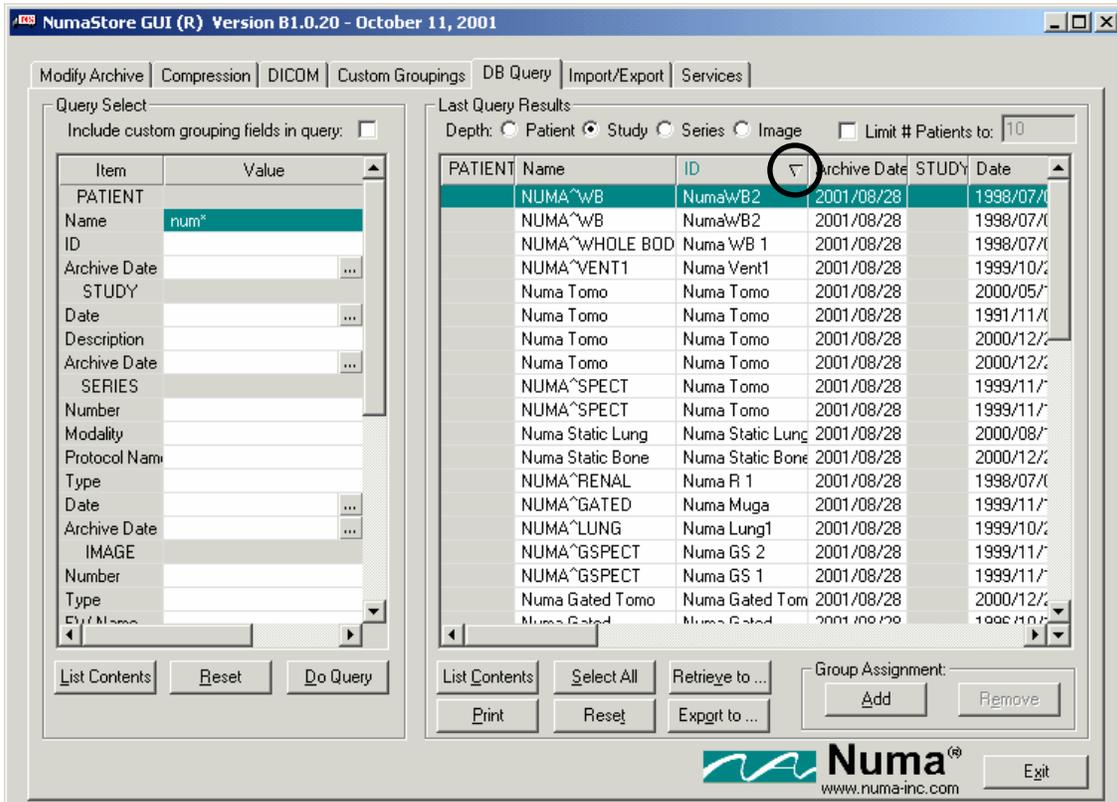


FIGURE 12: COLUMN SORT IN ASCENDING OR DESCENDING ORDER

Date attributes allow for images to be searched by the date:

- Equal to
- On or before
- On or after
- Between (inclusive)

A calendar is displayed to assist in the proper date selection.

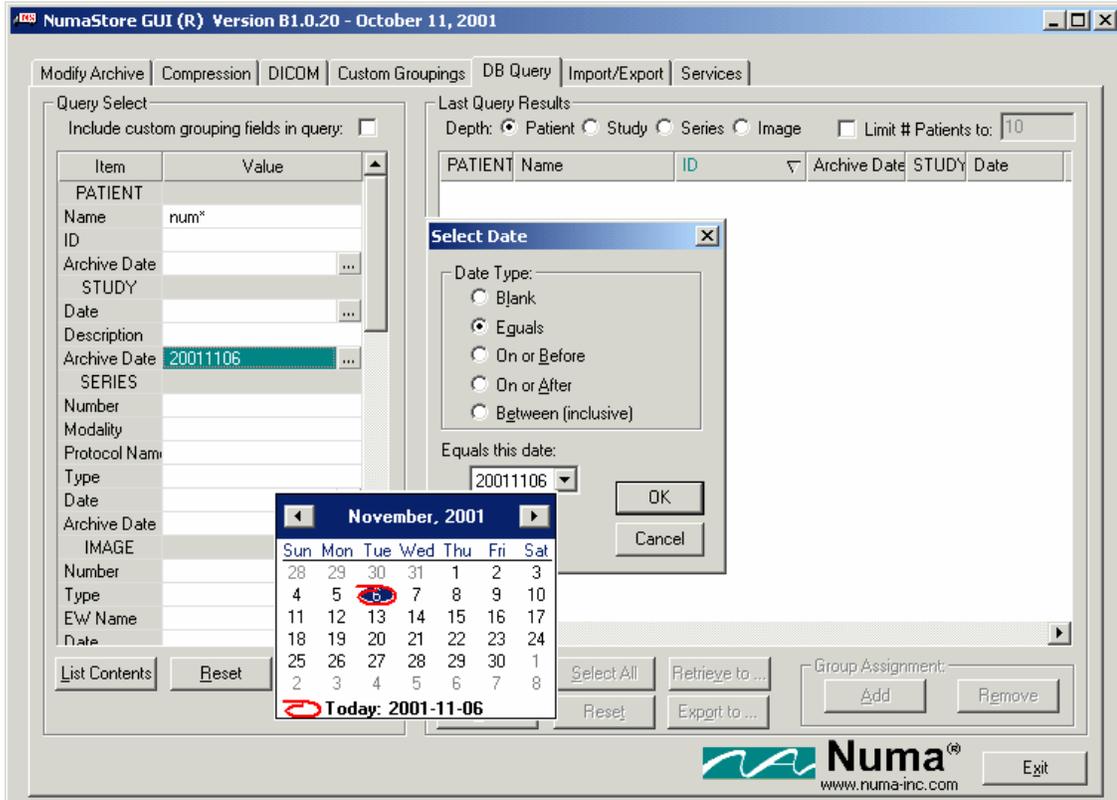


FIGURE 13: DATE SELECTION WITH CALENDAR

4.4 PRE-FETCH FOR COMPARATIVE ANALYSIS

Currently, many nuclear medicine physicians must rely on static reports, film, or optical disks when comparing current patient images with those from a previous study. These methods are often slow and problematic. With NumaStore, the physician can quickly compare previous studies with the most recent one on any DICOM-compatible display system. And, previous raw data studies can be reprocessed using the latest techniques for further comparison.

4.5 CUSTOMIZABLE LIST AND COLUMN DISPLAYS

The user can use the "list contents" button on the interface to select the attributes that will be displayed in the list. This feature helps the user limit the number of attributes displayed on the screen.

5.0 DISTRIBUTE

NumaStore can be configured to act like a traffic cop for images. NumaStore can direct the “traffic” or images to different areas of the department or locations as required. NumaStore has the unique ability to see into the images to determine where it should be sent according to where the image came from, who needs access, what format the image is in, and the type of image (raw, processed, or secondary capture). These powerful features allow NumaStore to become a true image manager.

5.1 QUERY AND RETRIEVE

NumaStore is fully compatible with the DICOM query and retrieve capabilities of nuclear medicine processing systems and DICOM viewers (Section 2.1, page 4, and Section 5.1, page 18). Queries are performed with a large number of parameters. Studies are retrieved for viewing and processing by DICOM systems.

Local query and retrieve functions allow studies to be selected and pushed back to non-DICOM systems for processing and viewing.

When NumaStore receives a find request, it searches its internal database for images with the requested attributes and returns a list of found attributes.

When NumaStore receives a move request, it identifies the set of images and transfers them to the remote application entity.

NumaStore supports wild card key values as well as date and time ranges for query/retrieve requests.

NumaStore responds to a retrieve request by obtaining from its database a reference to a requested image, retrieving the image from its internal volume storage, and performing a store of the requested image to the requesting application entity.

5.2 DICOM

NumaStore supports the DICOM Storage Class as a Service Class User, allowing the NumaStore user to initiate the transfer of images from NumaStore to a remote DICOM Application Entity. This is useful in cases where the remote application entity does not support query and retrieval as a Service Class User, or where it is logistically easier to push images from the NumaStore side than to pull images from the remote application entity side.

A NumaStore user performs a store to a remote application entity by:

1. Querying the NumaStore database.
2. Selecting the appropriate query results.
3. Retrieving the information to a specified location.

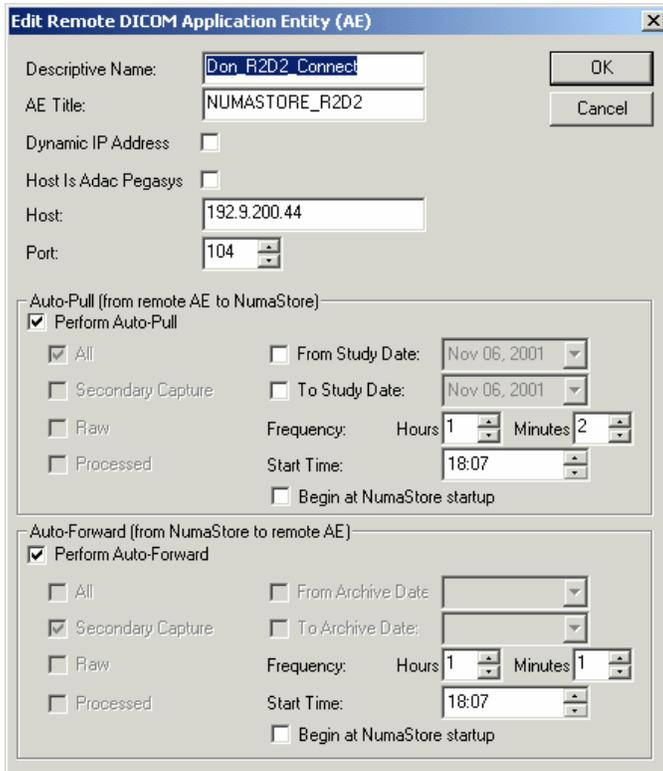


FIGURE 14: REMOTE DICOM APPLICATION ENTITY

5.3 IMAGE TRANSLATION

NumaStore translates images on the fly, manually, or in response to a DICOM query. NumaStore also shares code with the popular NumaLink product to ensure future compatibility. Contact Numa for details—visit <http://www.NumaLink.com/> or call 1-800-733-6862.

5.4 FILTER

NumaStore can be programmed to recognize certain image types and allow only those image types to be moved.

5.5 AUTO-FORWARD

Once image data is stored in NumaStore, NumaStore can automatically send the image to a remote application entity. This feature is referred to as Auto-Forward.

To accomplish Auto-Forward, NumaStore:

1. Periodically queries the remote application entity to determine what image data it currently holds.
2. Compares that image to images already stored in NumaStore.
3. Performs a store request for any image stored in NumaStore that is not already on the remote application.

NumaStore can perform Auto-Forward for all images or selected image types. Once an Auto-Forward is configured and enabled, no further user intervention is required.

Auto-Forward works with the filter (Section 5.4, above) and image translation (Section 5.3, page 19) features.

5.6 EXPORT TO LOCAL AND REMOTE DIRECTORIES

When a file previously stored in the NumaStore database is exported, it is available outside NumaStore. To export a file, NumaStore makes it available in a directory accessible by NumaStore.

As shown in Figure 15, you can configure more than one export directory. Each directory is associated with a specific OEM file format. Export directories are configured with the NumaStore Import/Export configuration utility.

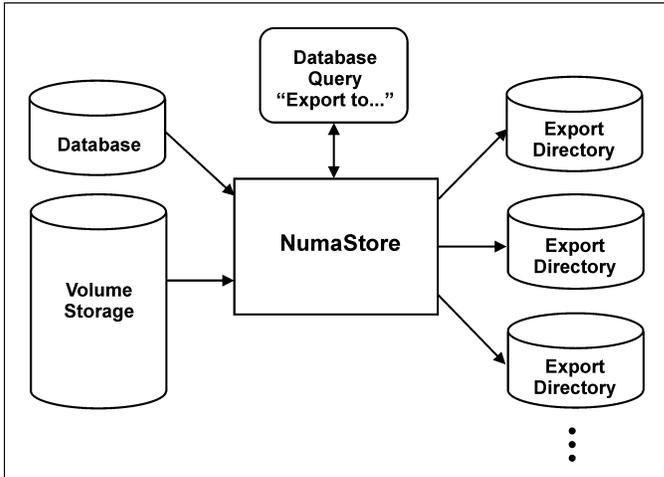


FIGURE 15: EXPORT FLOW

File export is driven by the user.

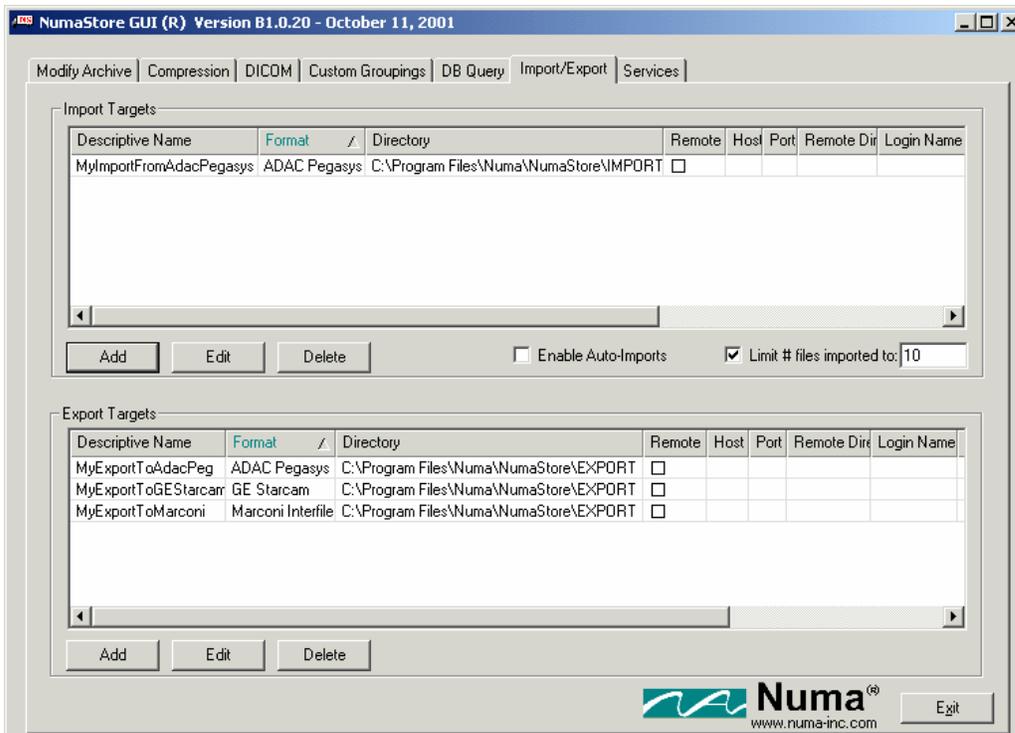


FIGURE 16: EXPORT

Imported files are always stored and, subsequently, exported in their original format. For selected OEMs, the export targets also can be directories on remote machines accessed via FTP. In this case, the configuration of the export target includes remote node and (if necessary) login information.

For some OEMs for which remote export targets are supported, the ability to update the remote database with exported images also is available.

5.7 NUCLEAR MEDICINE WORKSTATION COMPATIBILITY

NumaStore works with your current workstation for acquisition, display, and processing. For this reason, there is no need to learn new procedures. NumaStore is a seamless extension of your current workstation. Data is always available to be retrieved to the originating system for reprocessing or display.

5.8 PACS COMPATIBILITY

Using DICOM image translation (Section 5.3, page 19), filter (Section 5.4, page 19), and auto-forwarding (Section 5.5, page 19), NumaStore will pass compatible images to the PACS network for display throughout your facility. NumaStore has been validated with several PACS vendors and products. Contact Numa for details—visit <http://www.NumaStore.com> or call 1-800-733-6862.

NumaStore is the solution for successfully integrating nuclear medicine with PACS.

5.9 REMOTE VIEWER COMPATIBILITY

NumaStore works with SeeMor and other DICOM viewers to allow images to be reviewed on personal computers. For more information, visit <http://www.areeda.com>.

5.10 REMOTE USER INTERFACE

NumaStore's GUI can be configured to run on any Windows PC connected to the network. This enables users to access NumaStore image management features from several locations throughout the department. Image data can be grouped, reported, queried, and moved throughout the department with ease.

5.11 OTHER MODALITIES

With DICOM conformance nuclear medicine images can be shared with workstations for other modalities:

- PET
- CT
- MRI
- Ultrasound
- Cath Lab

5.12 TELECOMMUNICATIONS

You can distribute images remotely using most remote telecommunication options (Section 2.8, page 7) including the Internet.

5.13 NUMASTORE CD-R

CD DICOM write mode:

NumaStore CDR in DICOM Write mode is a DICOM CD creator. The user selects files from the NumaStore Database. The files are then, if necessary, converted to DICOM and then written to a CD-R. A DICOM Directory file is also written to the CD-R. The GUI will compute the size of file selected and determine if the selected files will fit on the current CD-R.

DICOM CDs are created to export patient data – not to archive it within NumaStore-CDR. The user will be prompted that this action does not mark the files as being archived. This mode is used to share patient image files in DICOM format with other compatible DICOM devices.