

# DICOM Tool: Advanced

The DICOM Tool expands DICOM support in Analyze, enabling the indexing of collections of DICOM images through a local database file. With the DICOM Tool, databases can be created, updated, and shared with other users with file system access to the images and the database file. This exercise will demonstrate how to create a database, configure a DICOM receiver and Database sender and then how to import DICOM data into the database. *Note: If you are a previous BirPacs user please contact support@analyzedirect.com for instructions on migrating your database to the DICOM Tool.*

1. Open the **DICOM Tool (File > DICOM Tool)**.
2. If you have already completed Exercise 1, choose **File > Create Database**. If the DICOM Tool detects that no database is present, a dialog box will be returned asking you if you would like to create a new database or browse for an existing database, click **Create a new local database**.

## Specification of the Database Name and Directory

3. In the **Create New Image Database** window you can specify the database name and file system directory, specify a DICOM receiver for the database (optional), specify database server (optional), and specify the source of initial DICOM images (optional).
4. The **Local Database Name** will default to 'SystemName\_PortNumber'; change the Local Database Name to **TEST2\_5679**.

*note* Any name can be chosen for the local database, however when creating multiple databases, following a coherent naming convention will simplify database management.

5. The **Local Database Directory** option enables you to specify the directory on your system in which the database and all of the DICOM images will be stored.
  - i. On your system's local disk create a folder called '**AnalyzeDB**' (\$:/AnalyzeDB). Note that if you have completed exercise 1, **DICOM Tool - Quick Configuration**, this folder should already exist.
  - ii. Once the directory has been created, click Local Database Directory in the Create New Image Database window, and navigate to the location of the new 'AnalyzeDB' folder (\$:/AnalyzeDB).
  - iii. Select the folder and click OK. You have now specified the location of your database.

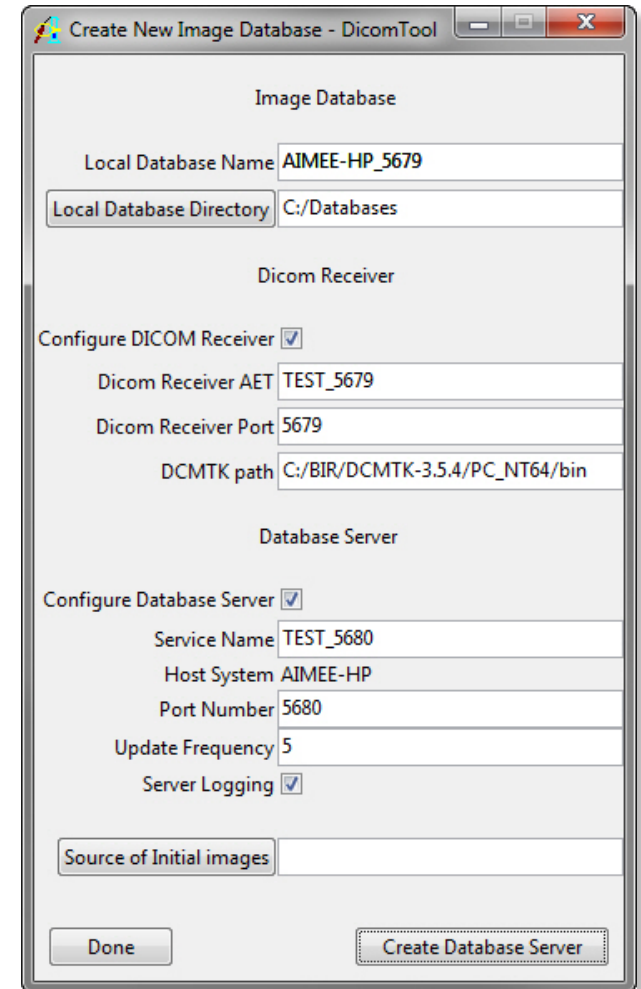
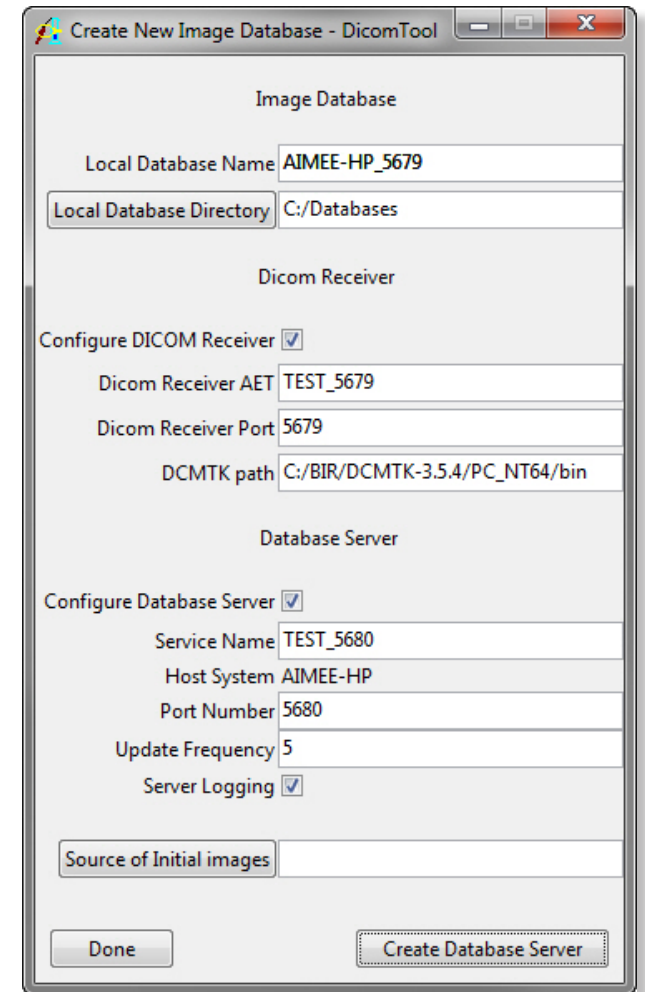


Figure 1

## Specification of a DICOM Receiver (optional)

6. The Configure DICOM Receiver option allows you to configure a DICOM receiver for the database. This step is optional, if you do not want to configure the receiver please move on to step 8, otherwise check the Configure DICOM Receiver option.
7. DICOM Receiver configuration requires three key pieces of information:
  - i. **DICOM Receiver AET:** By default is set to 'SystemName\_PortNumber'. To reflect the receiver's connection to the database defined in step 4, change the DICOM Receiver AET to **TEST2\_5679**.
  - ii. **DICOM Receiver Port:** Specifies the TCP/IP port number on which the DICOM Receiver listens for connections to receive messages. For this exercise, the DICOM Receiver Port can remain **5679**.
  - iii. **DCMTK Path:** The DCMTK executable files are automatically installed with Analyze in the **\$.BIR\DCMTK-3.5.4\System\_Type\$\bin** directory (where \$System\_Type\$ is your system platform, e.g. PC\_NT) and the DCMTK Path will point to this directory by default. However, if Analyze is being run from a network rather than local installation, the DCMTK files should be installed locally and this path should point there.

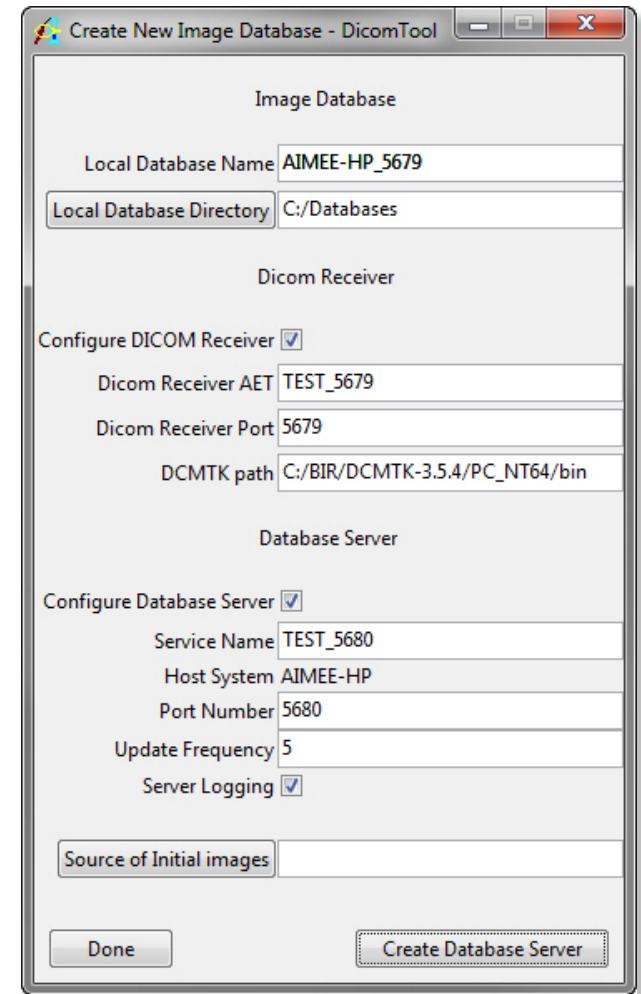


## Specification of a Database Server (optional)

8. The Configure Database Server option allows you to configure an optional database server to manage automatic updates and multiple client access to the database over a network. The database server is a dedicated process attached to one database and accessible by system name and port number. It responds to connection requests, SQL statements, and requests for images, and polls the image storage area for newly received images to register. Configuring and installing a database server is very similar to configuring the DICOM receiver. This step is optional, if you do not want to configure the database server please move on to step 10, otherwise check the Configure Database Server option.
9. The Database Server fields are used to configure the database server process that controls access to the database.
  - i. **Service Name:** The name by which the server is identified, for this exercise use **TEST2\_5679**.

*note* On Windows systems this becomes the name of the Windows Service; on UNIX systems it is used to name the daemon script which starts, stops and checks server status.

- ii. **Host System:** Identifies the system name this program is running on. You can create servers to run on your system, and any server should be attached to a database local file system.
- iii. **Port Number:** Specifies the port number client systems will use to connect to server. It cannot be the same port as the one used by the DICOM receiver (STORESCP). For this exercise set the port to **5680**.
- iv. **Update Frequency:** Specifies the interval in minutes at which the server will poll the image storage directory to see if the DICOM receiver has deposited images to be in the database. For this exercise, you can leave this set to **5**.
- v. **Server Logging:** Creates a log file of the database server for diagnostics.



*tip* It is recommend using a closely related port number so they can be easily remembered; e.g., if the receiver is running at port n, run that database server at port n+1.

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## Specification of the Source of Initial Images (optional)

10. The **Source of Initial Images** option allows you to specify a directory containing DICOM images; click **Source of Initial Images**.
11. In the Browse for Folder window returned, navigate to the **\$:\BIR\images\TutorialData** directory, select the **ImportExportTutorial** folder, and click **OK**.

## Creating the Database Server

12. To create the local database, click **Create Database Server**. Note, creating a Database Server requires administrative privileges; a dialog box will automatically be returned stating that you will receive a prompt from your operating system, click **OK**. You will then need to enter the administrator password.
13. The DICOM Tool will now copy the DICOM images from the initial source to the location (if selected) specified in step 5. The data will automatically be sorted and indexed by patient, study, series, and volume.
14. Once the process is complete, the Create New Image Database window will automatically be dismissed and the data will now be available in the DICOM Tool (figure 2).

## Viewing and Loading Data

15. Data can be selected from the Patient information panel in the DICOM Tool.
16. Select the data set with the 'Patient Name' **MR SIGNA LX 1.0T** and 'Patient ID' **337**. The data set will be highlighted, note the other information panels will automatically update with relevant Study, Series, and Volume information (when available).
17. Note there are two data sets available for selection in the Series information panel below. Select **Series 102**.

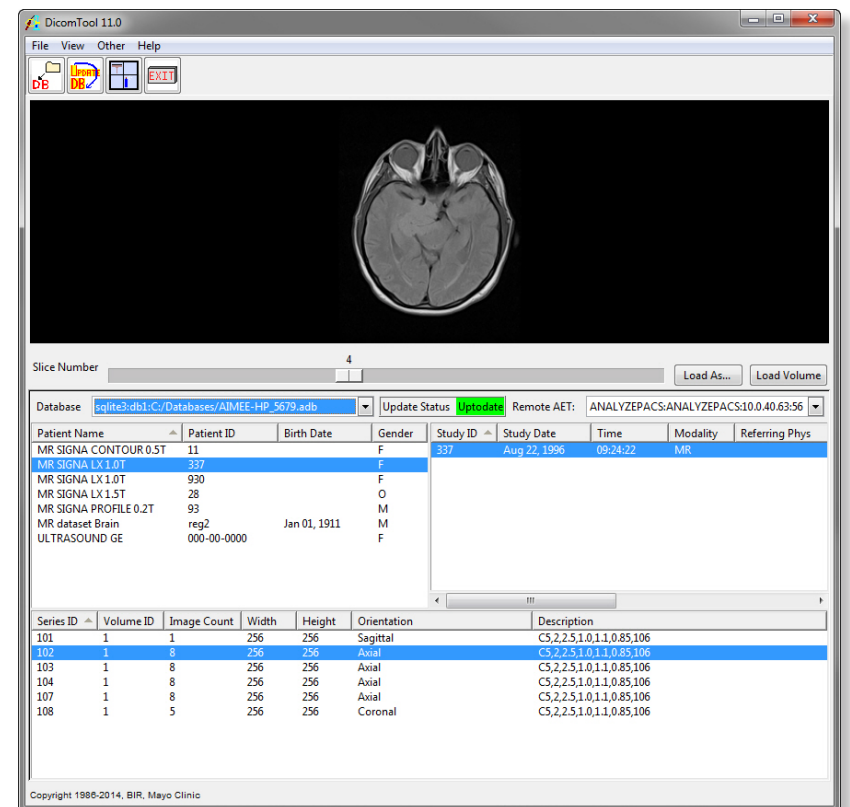
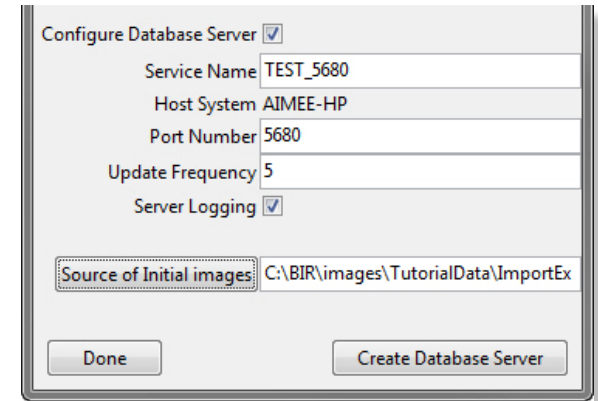


Figure 2

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18. Review the data slice-by-slice by using the Slice Number slider bar under the image display.
19. Right-click on the image display to open the Intensity window (figure 3). Here you can change the intensity display of the image; use the slider bar to take the Maximum intensity level down to 500. The image display will interactively update. Click Done to dismiss the Intensity window.
20. To load this data set into the Analyze workspace, click Load Volume. The data set will automatically load into the Analyze workspace.

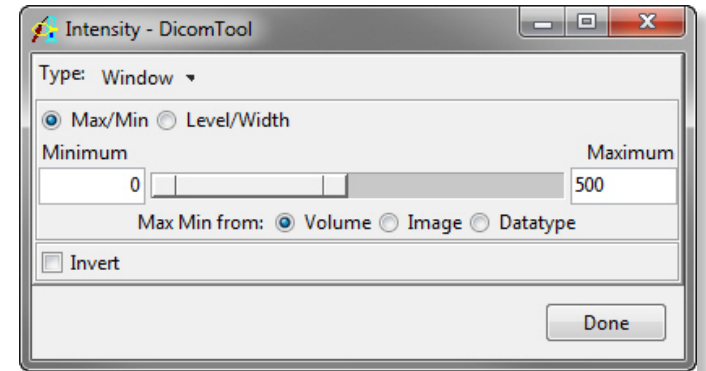


Figure 3

## Other DICOM Tool Options

21. Move the cursor over any of the information panels and right-click. The menu returned provides most of the options available for management of the images in the DICOM database, these options include:
  - Refresh:** Deselects any selected data and refreshes the data
  - Configure Columns:** Configure the column properties for the data display
  - Configure Search:** Focus the scope of the displayed data with an information search
  - Show Server Info:** Enable/disable display of recent databases and remote AETs
  - Update DB:** Register any recently received unregistered images in the database
  - Query Current AET:** Perform query retrieve on remote AET to retrieve images
  - DB Update Status:** Enable/disable display of Database Update Status
  - Import DICOM Images:** Copy and register images from the file system to the database
  - Load Patient:** Load patient data from files
  - Export Patient:** Export patient data to files
  - Delete Patient:** Delete the patient data from the database
  - Send Patient:** Send patient data to listening server
  - Anonymize Patient:** Anonymize the patient information (only available from the patient pane)

*note* If you wish to resize or resample the data use the Load As button option, this will load the selected data into the Load As module (see exercise 4 for instructions on how to use the Load As module).



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22. On your system's local disk create a folder called '**test\_export**' (\$:/test\_export).
23. Select the 'Patient Name' **MR dataset Brain** and then right-click and select the **Export Patient** option (figure 4).
24. In the (Browse for Folder) window returned, navigate to the new '**test\_export**' directory, then click **OK**. The DICOM images will be exported out to this directory.
25. Now navigate to the '**test\_export**' directory on your system's local disk; note the file names have changed to new DICOM UIDs.
26. In the DICOM Tool, with **MR data set Brain** still selected, right-click and select the Delete Patient option.
27. A dialog box will be returned asking you to confirm that this is what you want to do, click **Yes**. A delete confirmation window will be returned, click **OK** to dismiss it.
28. To import this data back into the DICOM Tool right-click in any of the information panels and select the **Import DICOM Images** option. In the window returned navigate to and select the 'test\_export' directory on your system disk, then click **OK**.
29. You will be asked if you would like to 'Import all DICOM files found below <\$:/test\_export >', click **Yes** to import these images back into the database. The data will be automatically sorted and imported into the DICOM Tool database, and the data set will appear in the Patient information panel.
30. Close the DICOM module before proceeding to the next exercise.

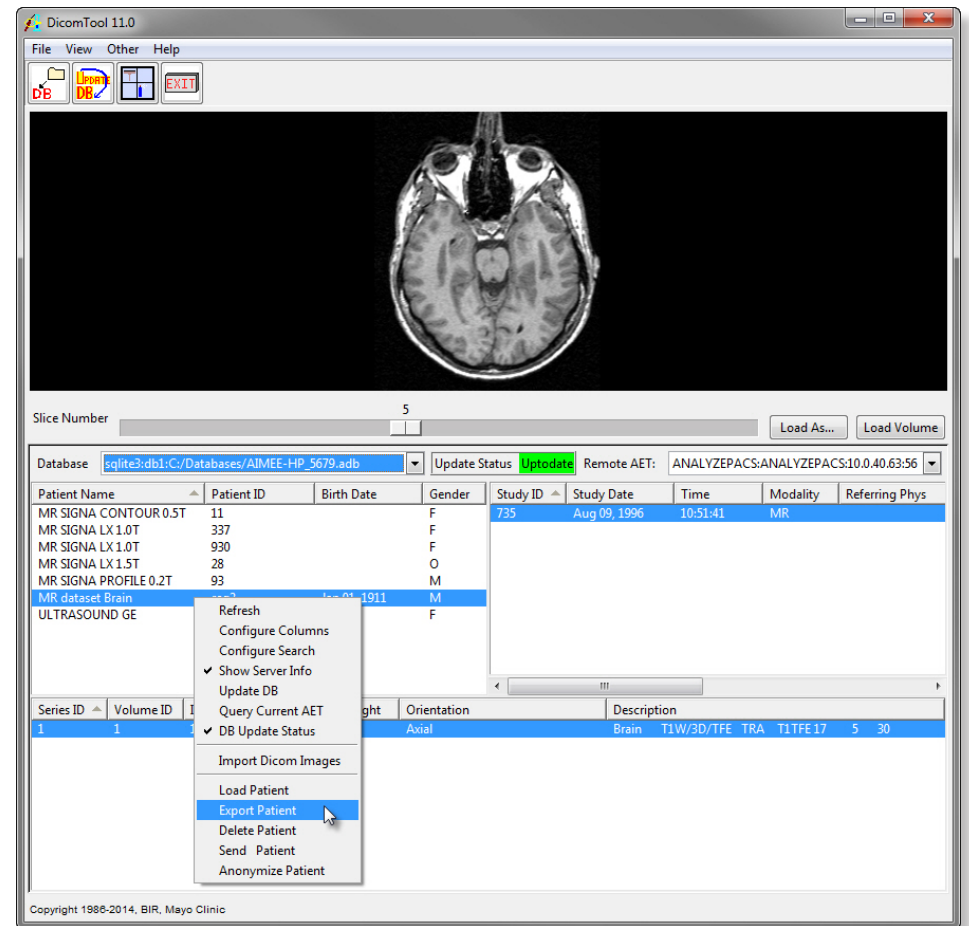


Figure 4

*tip* Multiple databases can be created for the DICOM Tool, so multiple DICOM receivers can be configured for the tool; you can select different databases from the Local Databases drop-down menu option.