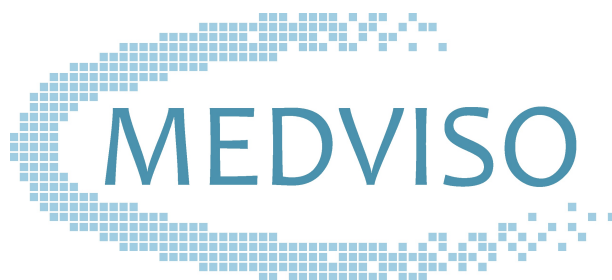


Patient Database, Segment Server and PACS Communication Manual



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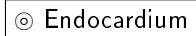

Contents

1	Conventions and Trademarks	1
1.1	Typographic conventions	1
2	Background	2
2.1	Conditions for use	2
3	Conventions	3
3.1	Typographic conventions	3
4	Patient Database	4
4.1	Installation and technical details	4
4.1.1	Maintenance of the patient database	4
4.1.2	Sharing patient database with other users	4
4.1.3	Backup of patient database	5
4.2	Overview and usage	5
4.3	Search a study	6
4.3.1	Sort studies	6
4.3.2	Load a study	6
4.3.3	Graphical image series selection	7
4.4	Import studies	7
4.5	Export studies	8
5	Segment Server Module	9
5.1	Configuring Segment Server	9
5.2	Starting Segment Server	10
5.2.1	Automatic setup	11
5.2.2	Manual setup	11
5.3	Diagnosing the Segment Server	13
5.4	Troubleshooting	14
6	PACS Connection	16
6.1	PACS Connection Set up	16
6.2	DICOM Query Configurations	16
6.3	DICOM Retrieve Configurations	19
6.4	Sending files back to PACS	20

6.5	Troubleshooting	20
6.6	Using the PACS connection	21
6.6.1	Searching for studies	21
6.6.2	Retrieving files	22
7	Sending DICOM data back to PACS	23
8	External PACS Module	24

1 Conventions and Trademarks

1.1 Typographic conventions

A	Key A at the keyboard.
Ctrl-A	Control key. Hold down <code>Ctrl</code> key and <code>A</code> simultaneously.
	Icon in toolbar.
*.mat	Filename extension.
C:/Program	Folder.
File	Menu, e.g. File menu.
File→Save As	Sub menu, e.g. under the File menu the item <code>Save As</code> is found.
	Push/Toggle button in the graphical user interface.
	Radiobutton in the graphical user interface.
	Checkbox in the graphical user interface.

2 Background

The Patient Database functionality and the Segment Server module is an addition to the software Segment, Segment CMR, Segment CT, or Segment 3DPrint that allows to send and store images. In this manual the software Segment, Segment CMR, Segment CT or Segment 3DPrint are used interchangeably since they work similarly with the Sectra PACS Plugin. At all places this manual specifies Segment this can also be read as any of the software packages. Please note that the availability of the functionality described in this manual is subject to your system configuration.

Patient Database allows you to keep track of studies that are stored on a workstation.

Segment Server allows you to send images from a PACS or directly from a scanner to Segment for storage in the Patient Database. This is a server software that listens for incoming images from PACS or DICOM compliant workstations and store them into the patient database. This is the preferred method to get images into Segmentsolutions.

PACS connection allows you to query and retrieve images from a PACS. It also allows you to send images back to the PACS system for storage.

To install the tools and modules described in this manual you need to have administrator privileges on the computer. If you need assistance with installation, please do not hesitate to contact support@medviso.com.




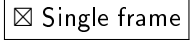
2.1 Conditions for use

Caution: Federal law restricts this device to sale by or on the order of professionals trained in medical image analysis.

3 Conventions

The following typographic conventions are used in this manual.

3.1 Typographic conventions

A	Key A at the keyboard.
Ctrl-A	Control key. Hold down Ctrl key and A simultaneously.
	Icon in toolbar.
*.mat	Filename extension.
C:/Program	Folder.
File	Menu, e.g. File menu.
File→Save As	Sub menu, e.g. under the File menu the item Save As is found.
	Push/Toggle button in the graphical user interface.
	Radiobutton in the graphical user interface.
	Checkbox in the graphical user interface.

4 Patient Database

The Patient Database allows you to easily keep track of your patients and efficient and simple loading of image data into Segment.

The aim of the patient database is to give the user an overview of available patient studies that are stored on the workstation and to facilitate loading of data. It is not designed to replace a hospital PACS for long time image storage. If so desired you should complement Segment by purchasing a commercially available PACS or freely available such as Conquest PACS.

For further help with designing an appropriate system for managing large patient image archives, please contact Medviso AB.

4.1 Installation and technical details

The patient database resides on a simple directory structure and an index file to keep track of the files. In the folder **DICOM**, raw unprocessed DICOM images are stored. In the folder **Analyzed**, processed files with contours, measurements and annotations are stored. The location where the patient database is stored can be adjusted in Segment preferences.

If importing database from version prior R5123, then you need to rebuild the patient database to fit the new format. If the index has become corrupted or you have manually modified the folder structure, then index file can be regenerated by using maintenance functionality in **Maintenance** menu and the option **Rebuild database**, see Figure 1. This option will scan the patient database folder for studies and rebuild the database from scratch. Do not attempt to manually insert DICOM files into this file structure. Instead use the importing tools provided under the **Tool** menu.

4.1.1 Maintenance of the patient database

Old studies can be deleted by enter date and run database maintenance as shown in Figure 1.

It is possible to select to remove either only DICOMs, or only Analysed files, or both from the specific date. For analysed files, the date used is the date when the analysis is performed, not when the study is acquired.

4.1.2 Sharing patient database with other users

For a multi users system it is possible to share the patient database with other users. This makes it possible to start the analysis of one study one computer and then a few hours later continue with the analysis on another computer. This is done by sharing the folder (or place it on a network disc) where the patient database resides (the folder where the file

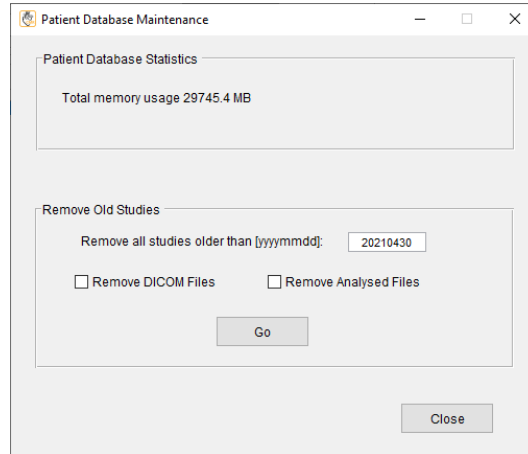


Figure 1: Maintenance graphical user interface.

patientdatabase.mat resides). On the other computers, select this shared folder.

Please ensure that all users have read and write access to the common folder.

4.1.3 Backup of patient database

We strongly advice all users to have adequate backup strategy of the patient database as it is typically placed on a local computer. Typically an incremental backup strategy is enough as it is generally not necessary to go back to a certain date. We suggest the usage of the software Syncback.

4.2 Overview and usage

The graphical user interface of the patient database is shown in Figure 2.

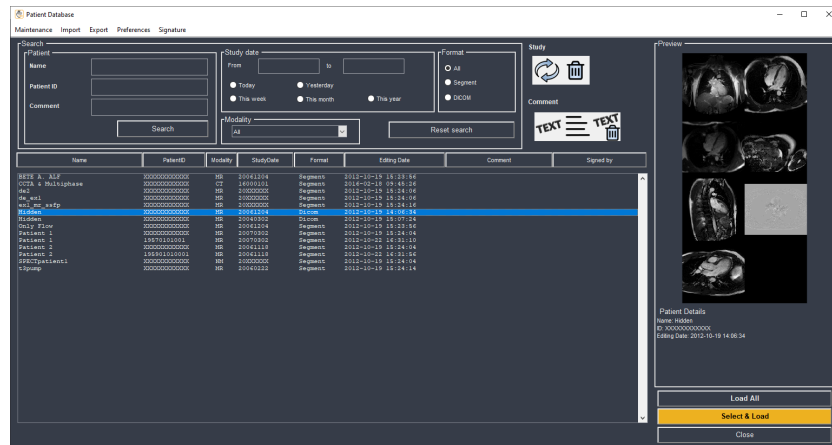


Figure 2: Graphical user interface of the patient database.

In the listbox all available studies which fullfills the searchcriteria are shown. In the listbox information on patient name and ID, imaging modality, study date and file format, either DICOM or Segment is given.

4.3 Search a study

Studies can be search for by using the different criteria, patient name, patient id, comment, imaging modality and study date.

To search for a study by patient name typing the letters in the edit box **Name** and then start the search. The letters typed in the edit box will be searched for at any place in the patient name, that is to say if you type in an 'a' it will match with both 'anne' and 'julia'. Wildcards such as '*' should never be inserted since the algorithm automatically uses such an approach.

The search for patient ID and comments works in the same way as the search for patient name.

To only find studies of a certain imaging modality change in the pop up menu **Modality** from **All** to the imaging modality of your choice.

Searching for a study by the date can be done in two ways, by searching for studies within a week, month or year by using the radiobuttons **This week**, **This month** or **This year** or by editing **Study date** in the edit boxes **From:** and **to**. To start typing in either of the edit boxes first click in the box. When starting to type the search will immediately start. When typing '2' in the from box all studies after '20000101' which fullfills the other searchcriteria such as name and patient id will be shown in the listbox. When the whole date has been typed in both the from and to boxes the search will result in only those studies performed between those two dates. To be able to change in the patient id or name edit boxes again a mouse click in the edit box must be performed first.

The studies can also be searched for by matching the **Format** of the file, either Dicom or Segment. This is done by changing the format radiobutton from **All** to either **Segment** or **Dicom**.

All search criteria can be deleted by using the button

4.3.1 Sort studies

The studies in the list box can be sorted by the different criterias by pushing the buttons , , , or .

4.3.2 Load a study

To load a study select it in the list box and push either the button or . The button is only available if the format of the study is Dicom and it allows you to choose which series to load in the graphical Dicom selector, described in 4.3.3.

4.3.3 Graphical image series selection

The graphical series selector tool is shown in Figure 3. While moving the mouse pointer over the image series more information on each image series is shown in the top of the graphical interface. Select which image series to load with left mouse button. Image series outlined in yellow are selected. It is also possible to group image series to one image stack. Image series that are to be grouped are selected by holding down the **Shift** key while mouse clicking, or by using the middle mouse button. Thereafter, press the pushbutton **Group Selected**. Grouped image series are shown with a green outline. Multiple image stacks can be selected for loading or grouping by clicking and dragging over the selection. When finished selecting image series, press **Load selected**.

Note that if multiple directions is detected in the dicom folder all the different directions are loaded as separate image stacks.

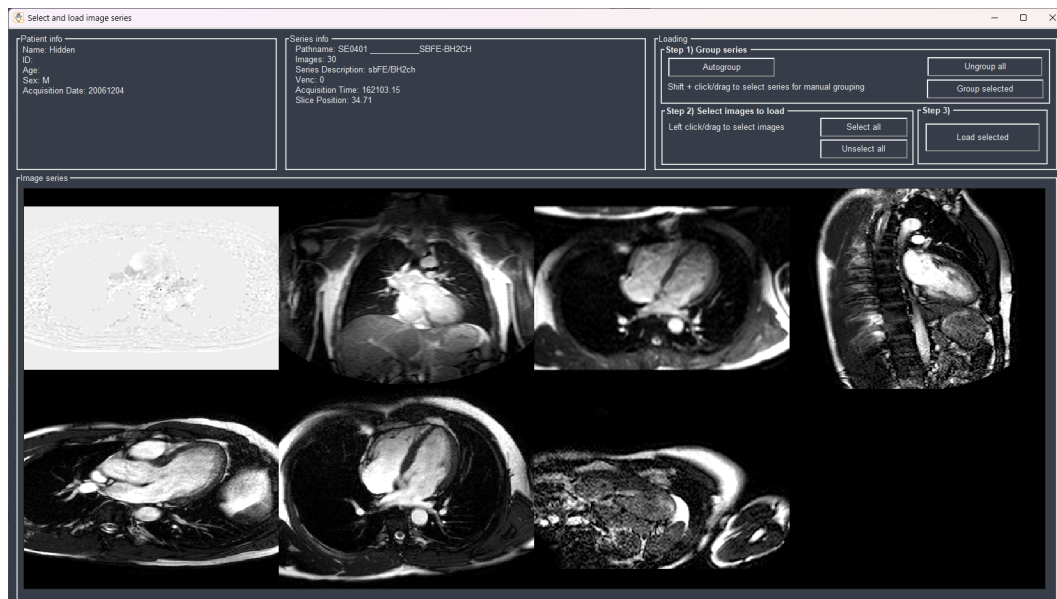


Figure 3: Graphical image series selector.

4.4 Import studies

Studies can be imported to the patientdatabase in three different ways, from CD, from PACS and from network/disc. The import function can be found under the menu **Import**. When choosing to import from CD it is possible to restrict the import to be only dicom format otherwise both dicom and segment format files will be imported. When importing from PACS the PACS connection will be started and how to search for and retrieve files from the PACS is further described in Chapter 6. Importing from network or disc is done by choosing from which location to import files and then choosing which format to import.

4.5 Export studies

It is also possible to export files in dicom format from the patientdatabase. This can be done by either selecting multiple files, exporting the one file selected in the listbox or by exporting all dicom files. If you want to select multiple files to export you add files to an exportlist by selecting the file in the listbox and then going to the menu **Export** and selecting **Add DICOM files to exportlist**. This procedure can be repeated until you have added all the files that you want to export. The files selected can be shown by selecting **Show exportlist** in the **Export** menu. When satisfied with the export list select **Export DICOM files to PACS** in the **Export** menu. This pops up an GUI in which you choose either to export selected files. To export the files the correct PACS system must be selected from the drop down menu.

5 Segment Server Module

The Segment Server is a separate program and by having this running on a computer it is possible to send DICOM files directly from a Scanner, DICOM compliant workstation or PACS to Segment Patient Database.

In a typical clinical workflow situation both the PACS connection and the Segment Server are used to import images into Patient Database for analysis and storage. The Segment Server allows to receive images that are pushed onto from an imaging device such an MRI Scanner, DICOM workstation or PACS. The PACS Connection Module allows to query and retrieve images from a PACS system, or a DICOM workstation. Segment Server is the recommended main source of input data to a Segment installation.

5.1 Configuring Segment Server

In order to make it possible to retrieve images from imaging devices and other DICOM workstations a two server processes are required to run on the computer. Both these processes are run as services. Please note that the Segment Server solution was radically changed from version R5123, and when upgrading the software you need to manually install it again.

If you require help with setting up Segment DICOM Server, please contact Medviso AB support, support@medviso.com.

Start with setting up the Patient Database manual, see Chapter 4 for details.

Configuration of the Segment Server is done in preferences and under Segment **Advanced System and DICOM Settings**. The relevant part of this user interface is shown in Figure 4.

- **Database folder** sets the location of the Patient Database folder, this is the patient database where all images are stored. See details in Chapter 4.
- **Temporary folder** is a temporary folder where images from the Segment Server temporary are stored. Normally this is subfolder called **TEMP** under the patientdatabase but can if so desired be moved to a separate location. It could for performance reasons make sense to have this temporary folder located on a SSD disk in case the patient database is not located on a SSD disk.
- **Port** sets the port used for incoming associations.
- **AE Title** it is the AE title for the Segment DICOM Server, and is set to the hostname of the computer by default.
- **Options (storescp)** sets options used for negotiating used network transfer syntax. Options can be combined (some but not all). Recommended is to not fill this and thus use default settings. For particular systems, useful options are:

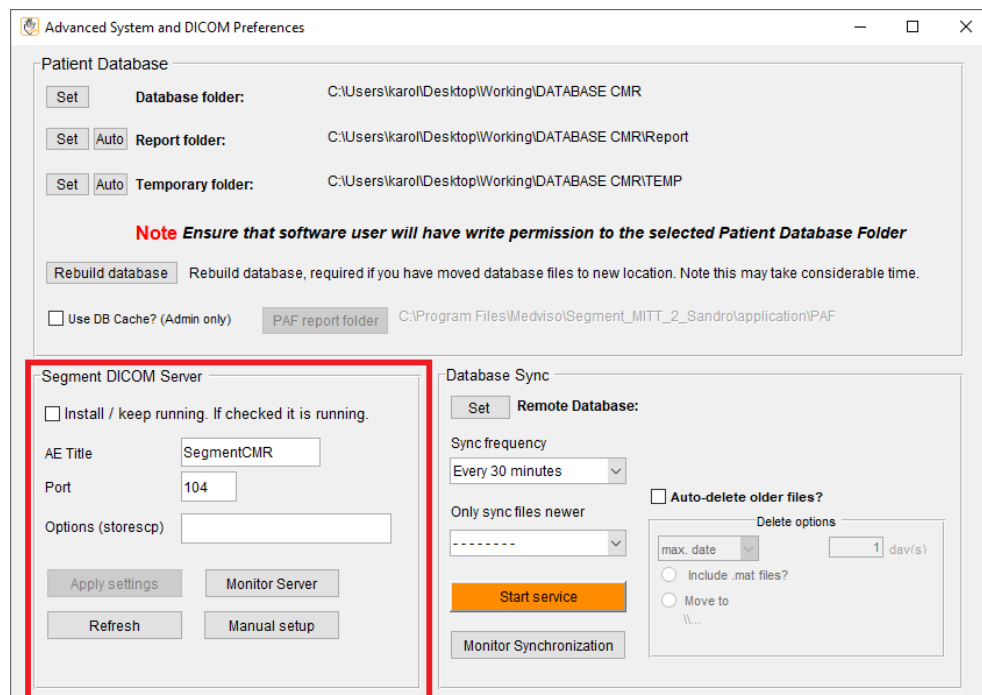


Figure 4: User interface for adjusting Segment DICOM Server settings.

1. `-prefer-uncompr` prefer explicit VR local byte order (default)
2. `-prefer-little` prefer explicit VR little endian TS
3. `-prefer-deflated` prefer deflated expl. VR little endian TS
4. `-implicit` accept implicit VR little endian TS only
5. `-normal` allow implicit format conversions (default)
6. `-bit-preserving` write data exactly as read (less error checking...)

Output transfer syntax (not with `-bit-preserving` or compressed transmission):

1. `-write-xfer-same` write with same TS as input (default)
2. `-write-xfer-little` write with explicit VR little endian TS
3. `-write-xfer-implicit` write with implicit VR little endian TS
4. `-write-xfer-deflated` write with deflated expl. VR little endian TS

Please note that if you make any changes then the services running needs to be stopped, deleted, installed, and restarted, please see below for details.

5.2 Starting Segment Server

Please note that these operations may require that you run the software as Administrator (not only being logged in as Administrator). This is done by right clicking on the icon of

the software and then select "Run as administrator".

There are two processes running that needs to run for Segment Server can work; 1) storage server that listens on the designated port and stores images to the temporary folder location, 2) sorter server that sorts the files on the folder and stores them into the patientdatabase.

5.2.1 Automatic setup

- Select ☒ Install\keep running. This function generates two .bat files stored in the Segment folder that are used to start the services and automatically install and start services.

If the services are running correctly, the checkbox is marked ☒.

- Click everytime you change Port number, AETitle or PatientDatabase pathways. This function automatically stops services if running, deleting .bat-files, recreate .bat-files and start the services again.

If the services are running correctly, the checkbox ☒ Install\keep running is marked.

- To stop and delete services just unselect checkbox ☒ Install\keep running.

- To monitor if services are running correctly see in Section 5.3

5.2.2 Manual setup

Click to manually setup services. This button opens a dedicated window (see Figure 5) where you can manually install, delete and start/stop services. In the Status panel you find additional information that indicates status for services. There are following status for services: 'Not running', 'Running', 'Not installed'.

If the services are running go through steps 1 to 5.

If the services are not installed go through steps 3 to 5.

1. Click . This stops the services. The status in the Status panel changes from 'Running' to 'Not running'.

If the status for services is 'Running' that means that the services needed to be stopped manually. In order to stop them now, use this option and scroll down to the services named `SegmentStorageServer` and `SegmentSorterService`. This is done in Windows standard service editor as illustrated in Figure 6. To open this Services Window click on . Click on the red "Stop" icon (or the text Stop the service) to stop the service

2. Click to delete services. When upgrading the software it is recommended to completely delete the services and reinstall them as otherwise the files that are used by the services are locked and prevents installation. When you want to delete the services, first make sure that they are stopped, please see the section above for details. Thereafter click on , to delete the two services. You may also need to manually delete the process `nssm.exe` that is used by Segment to install/delete the services. This

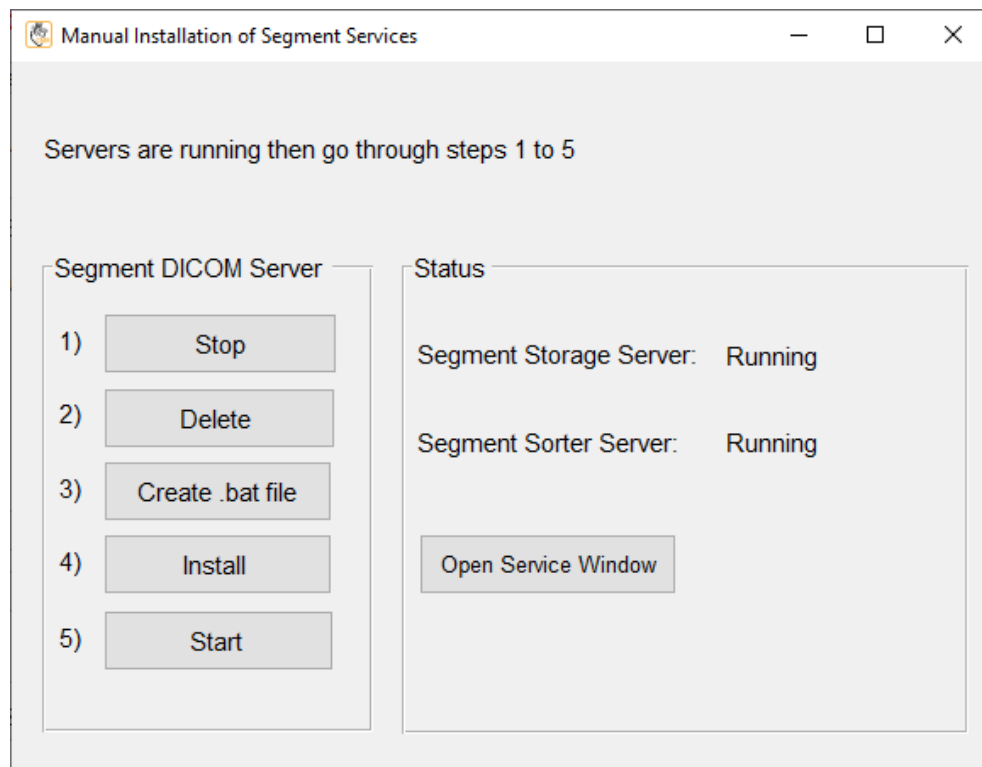


Figure 5: User interface for manual adjusting Segment DICOM Server settings.

is done by pressing **Ctrl-Alt-Delete** and select **Task manager** and find the process named **nssm.exe** and manually delete it.

3. Select checkbox **Create .bat files**. This generates two .bat files stored in the Segment folder that are used to start the services.
4. Click **Install**. This registers the services to automatically start when the computer starts. Note that no user needs to be logged in on the computer in order for the services starts. After installation the status in the Status panel changes from 'not installed' to 'Not running'.
5. Click **Start**. Although the services are set to start automatically on system start they are not yet started unless you log-out. Click on this button to start Services. After starting the status in the Status panel changes from 'Not running' to 'Running'.

If the status for services is 'Not running' that means that the services needed to be started manually. In order to start them now, use this option and scroll down to the services named **SegmentStorageServer** and **SegmentSorterService**. This is done in Windows standard service editor as illustrated in Figure 6. To open this Services Window click on **Open Service Window**. Click on the green "Play" icon (or the text Start the service) to start the service, and the status of the Service should turn to **Running**.

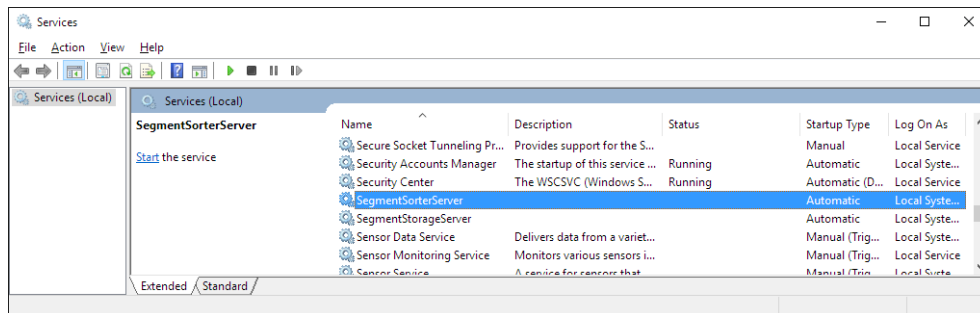


Figure 6: User interface Starting / Stopping services.

5.3 Diagnosing the Segment Server

To start the Segment Server monitor click on **Monitor Segment Server**. This opens up a user interface illustrated in Figure 7.

The user interface has three "lamps" indicating the status. All of them should generally be green, then the two services (storage and sorting) are up and running and idle. The last lamp is green if the Segment Server can access the folder where the patient database is located. Note, it does only check if it is reachable, not if it is write enabled. The monitor also indicated the time of last check and the time of last status response from the sorter service. The status is updated every 1-2 seconds. Furthermore, time of last transfer is also indicated. If there are files that currently are being sorted or there is a queue of files waiting

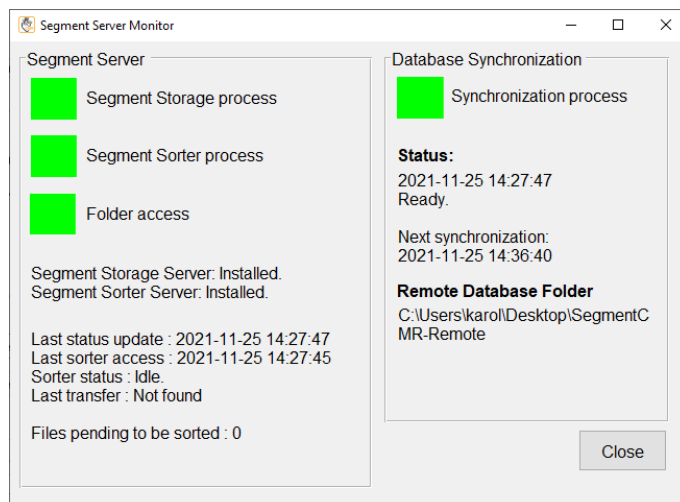


Figure 7: User interface to monitor the Segment Server.

the the sorter service is indicated with yellow. If there are no signs of life from the sorter for 15 minutes, then the sorter is assumed to be non working and needs to be manually inspected.

The Segment Server monitor is also available under **Maintenance** menu in the Patient Database Module.

5.4 Troubleshooting

Segment DICOM Server uses routines from DCMTK to receive images, and also Medviso AB code to sort and store the received images in the Patient Database. The sorter service creates a log file that is stored in the **Temporary Folder** under a subfolder called **logfiles**. Inspect this log file carefully for debug information. When contacting support@medviso.com, please ensure to include this logfile.

The most common problems are:

- Read / write access to the Patient Database folders.
Solution: Ensure that software users will have read and write permissions to the Patient Database folder.

- Local non-admin users do not have the power to run Segment Storage and Sorter services

Solution: Run the services under admin credentials. The admin should have read/write permissions to the Patient Database folder.

Open the Services Window, select services named **SegmentStorageServer** and **SegmentSorterService**, right-click to open **Properties**, then go to **Log on** tab and then use admin credentials to log on on **This account** (see Figure 8. Click on **Apply** to save changes.

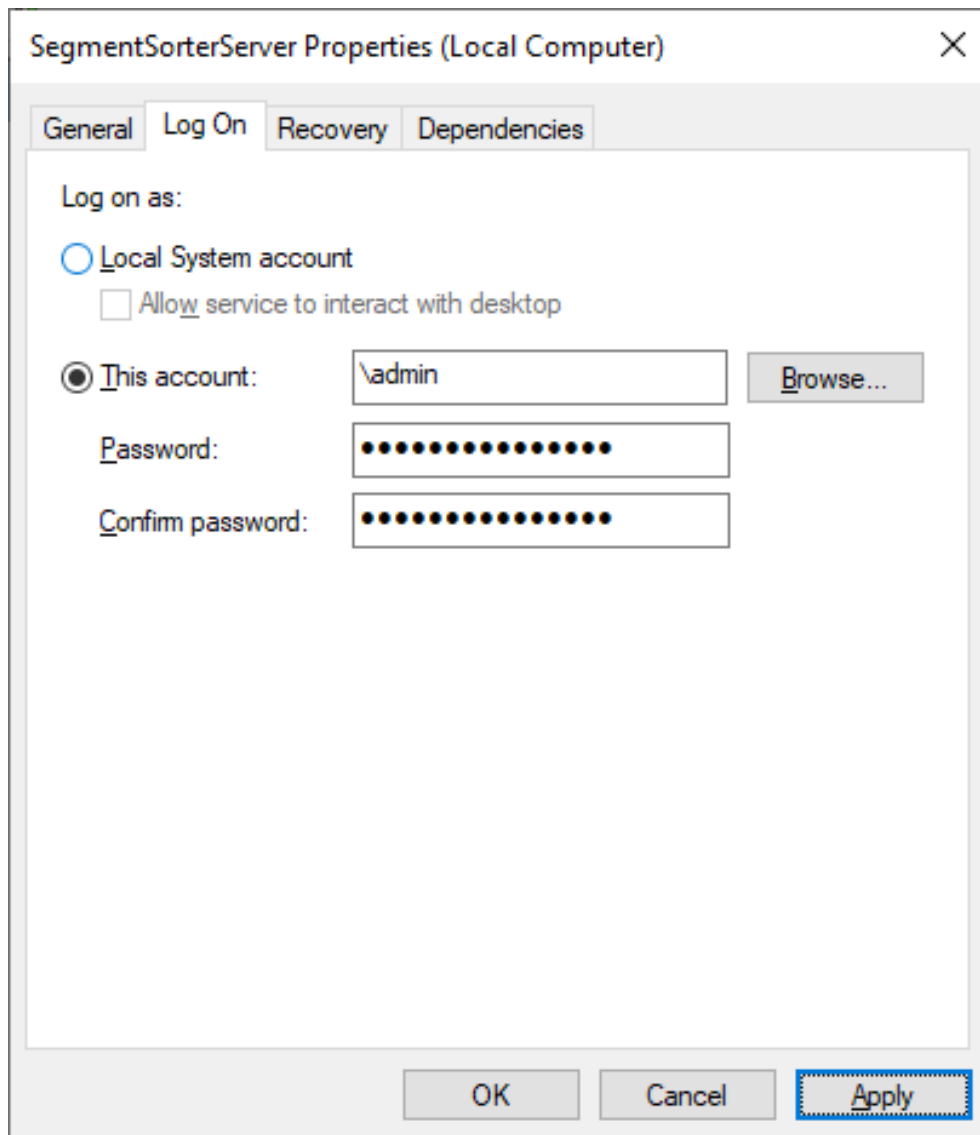


Figure 8: Service Properties window.

6 PACS Connection

The PACS connection allows to Query/Retrieve images directly from a hospital PACS system to the Patient Database.

6.1 PACS Connection Set up

When setting up PACS it is almost always necessary to have assistance from your local PACS administrator.

For Segment packages to communicate with PACS you need to generate a .con file. This is done under *PACS preferences* setting in the software, *Define PACS Connections*, where you can add a new connection (see Figure 9, button marked in red box). Recall that in order to generate the .con from Segment packages you may need to run the software as an administrator.

- a) When adding a new PACS connection you are asked to supply a *Descriptive Name* of the PACS. This is for your own usage.
- b) Then you are asked for information pertaining to your PACS. You are also asked for a Segment port. This cannot be the same as the port selected for *Dicom Port for Segment Server* under *Advanced System and DICOM Preferences* settings (see Figure 10).
- c) The last three *AE_title* fields define what your station is named for different calls to PACS. On a standard setup they should all be set to the same. Note that on the PACS side, you need to adjust privileges so that the workstations can access and utilize PACS.
- d) Finally click to add and save the .con file to the Program folder.
- e) Save all the preferences in *Advanced System and DICOM Preferences* by clicking .

6.2 DICOM Query Configurations

DICOM Query is when query the PACS (or another DICOM workstation) for patients. Configurations for DICOM Query allows to customize search queries for communicating with PACS. For patient, study and series level queries, the user can select information model and decide which tags to include in the query. Please consult your PACS DICOM conformance state next to see which DICOM queries are supported by your PACS.

It is also possible to specify more DICOM and network options. These are options used in the DCMTK FINDSCU operation. The possible proposed transmission transfer syntaxes are:

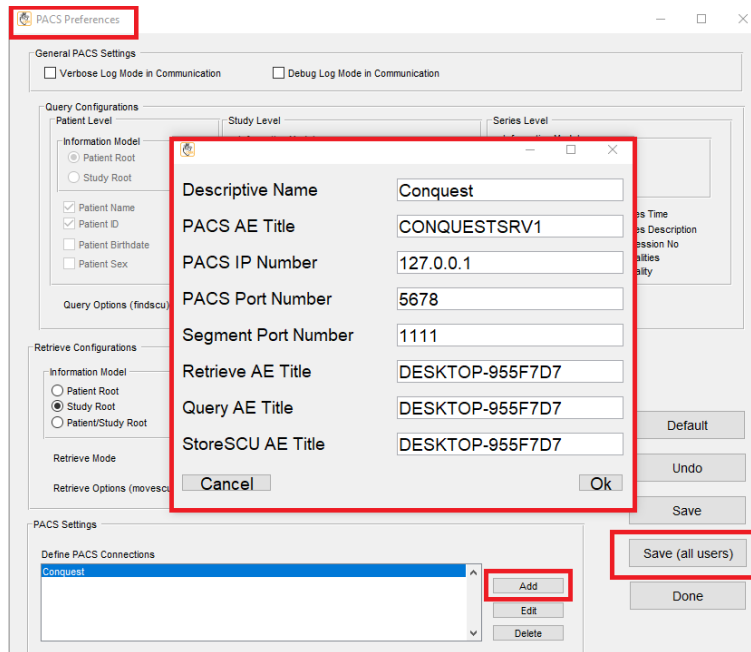


Figure 9: Pacs preferences window.

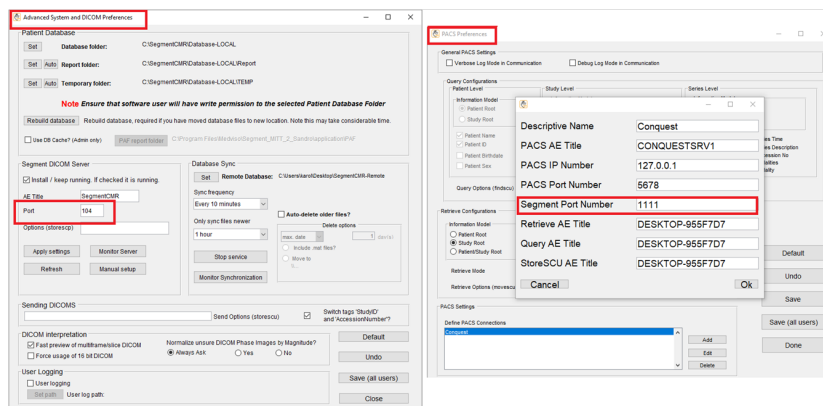


Figure 10: DICOM Port for Segment Server.

The image shows a 'PACS Preferences' window with the following sections:

- General PACS Settings**
 - ☐ Verbose Log Mode in Communication
 - ☐ Debug Log Mode in Communication
- Query Configurations**
 - Patient Level**
 - Information Model: ☒ Patient Root, ☐ Study Root
 - ☒ Patient Name, ☒ Patient ID, ☐ Patient Birthdate, ☐ Patient Sex
 - Study Level**
 - Information Model: ☐ Patient Root, ☒ Study Root, ☐ Patient/Study Root
 - ☒ Patient Name, ☒ Patient ID, ☐ Patient Sex, ☒ Study UID, ☒ Study Date, ☒ Study Time, ☒ Study Description, ☐ Accession No, ☐ Modalities, ☐ Modality
 - Series Level**
 - Information Model: ☐ Patient Root, ☒ Study Root, ☐ Patient/Study Root
 - ☐ Patient Name, ☐ Patient ID, ☐ Study Date, ☒ Study UID, ☒ Series UID, ☒ Series Time, ☒ Series Description, ☐ Accession No, ☐ Modalities, ☐ Modality
 - Query Options (findscu):
- Retrieve Configurations**
 - Information Model: ☐ Patient Root, ☒ Study Root, ☐ Patient/Study Root
 - Retrieve Mode: Patient ID, Study UID, Series UID (level series)
 - Retrieve Options (movescu):
- PACS Settings**
 - Define PACS Connections: List with 'Conquest' selected
 - Buttons: Add, Edit, Delete

On the right side of the window are buttons: Default, Undo, Save, Save (all users), and Done.

Figure 11: PACS Settings GUI.

1. **-propose-uncompr** propose all uncompressed TS, explicit VR with local byte ordering first (default)
2. **-propose-little** propose all uncompressed TS, explicit VR little endian first
3. **-propose-implicit** propose implicit VR little endian TS only.

Please note that all PACS systems do not allow explicit or implicit DICOM conversions on the fly. These options may therefore not work. Please consult the DICOM conformance statement of your PACS system.

6.3 DICOM Retrieve Configurations

DICOM Retrieve is when retrieves images from the PACS. These settings are found in the **Retrieve Configurations** section. The retrieve mode setting found in this section sets different modes that are used when retrieving images from the PACS. Essentially this setting adjusts which DICOM elements that are included in the performed retrieve queries. Please consult your PACS DICOM conformance state next to see which DICOM retrieve queries are supported by your PACS.

It is also possible to configure retrieve options that are used when retrieving images. These options configure the DCMTK MOVESCU operation. Useful options are:

Preferred network transfer syntaxes:

- **-prefer-uncompr** prefer explicit VR local byte order (default)
- **-prefer-little** prefer explicit VR little endian TS
- **-implicit** accept implicit VR little endian TS only

Proposed transmission transfer (outgoing associations):

- **-propose-uncompr** propose all uncompressed TS, explicit VR with local byte ordering first (default).
- **-propose-little** propose all uncompressed TS, explicit VR little endian first.
- **-propose-implicit** propose implicit VR little endian TS only.
- **-normal** allow implicit format conversions (default)
- **-bit-preserving** write data exactly as read (cannot be used with **-normal**)
- **-write-xfer-same** write with same TS as input (default)
- **-write-xfer-little** write with explicit VR little endian TS
- **-write-xfer-implicit** write with implicit VR little endian TS
- **-enable-new-vr** enable support for new VRs (UN/UT) (default)
- **-disable-new-vr** disable support for new VRs, convert to OB
- **-group-length-recalc** recalculate group lengths if present (default)

- `-group-length-create` always write with group length elements
- `-group-length-remove` always write without group length elements
- `-length-explicit` write with explicit lengths (default)
- `-length-undefined` write with undefined lengths

6.4 Sending files back to PACS

Sending files back to PACS can be done from the patient database or the File menu. Configuration of this can be done from Advanced System and DICOM Preferences. It is possible to adjust settings that are passed to the underlying DCMTK libraries. Some of the most common configurations settings are:

- `-propose-uncompr` propose all uncompressed TS, explicit VR with local byte ordering first (default)
- `-propose-little` propose all uncompressed TS, explicit VR little endian first
- `-propose-implicit` propose implicit VR little endian TS only
- `-required` propose only required presentation contexts (default: propose all supported)
- `-combine` combine proposed transfer syntaxes (default: separate pres. context for each TS)
- `-enable-new-vr` enable support for new VRs (UN/UT) (default)
- `-disable-new-vr` disable support for new VRs, convert to OB
- `-uid-padding` silently correct space-padded UIDs

6.5 Troubleshooting

The two most common problems are the firewall on the computer where `dicom` is run and denial from the PACS server.

Another common problem is that when it works to search patients and when the image retrieval does not work. The most probable cause is then security settings. Many PACS systems are setup so that all clients may search images, but only selected clients are allowed to retrieve images. Another cause may also be that `dicom` performs DICOM retrieve operations not supported by the PACS. Please see log files and your PACS DICOM conformance statement next.

The list of the common problems is presented below:

- Firewall (usually Windows) prevents port activities.
Solution: Add Segment Port to the Windows firewall (and network firewall, if needed).


- Incorrect AE title / port that causes PACS not to respond.
Solution: Check if PACS settings are setup correctly (see Figure 11)
- PACS requires whitelist for Query / Retrieve.
Solution: Check if the AETitle and Port for Segment are on the whitelist for Query/Retrieve.
- The computer's IP address can be changed and then no longer on the PACS whitelist.
Solution: Check the IP address in the PACS system.
- DICOM retrieve operations are not supported by the PACS.
Solution: Change **Retrieve Configurations** in the PACS settings window (see Figure 9)

To facilitate debugging a set of debug tools are provided with . The debug tools are located in the top right corner of the PACS connection user interface.

When contacting Medviso AB support with problems in the PACS Connection it is imperative to send the PACS logs. To find this log file go to **Help** menu and select **Open Folder with Log Files**, then in a newly opened window select the file *pacs.log*. This is almost necessary in order to be able to solve any connection problems.

If it is not possible to solve the problems after email correspondence including log files with Medviso, we recommend to perform a telephone conference (or video conference) that allows the support team at Medviso to see and study directly what happens when settings are adjusted.

6.6 Using the PACS connection

The PACS connection GUI is started by the clicking on  icon. The graphical user interface for the PACS connection functionality is shown in Figure 12. In the upper left corner of the GUI you can select what PACS to connect to.

6.6.1 Searching for studies

The most common approach is to search for a desired patient. You can enter either patient-name or patient ID. The wildcard `*` is allowed. The wildcard `*` may represent zero, one or more letters. The patient first name is followed by a `^` and the surname. For instance the search string `bo*` will find `Bond^James`. Note that there is no difference made on versal or capital letters. The search string `*Ja` will also find `Bond^James` since once at least one wildcard is entered, then an implicit wildcard is added on the end.

For Swedish users the PatientID system allows to search on patients born a specific year. Entering `*Bert` as patientname and `1934*` as Patient ID will find patients who are born in 1934 and with names such as `Bert` or `Berta`. Note that it will also find `Bertilsson^Arne`

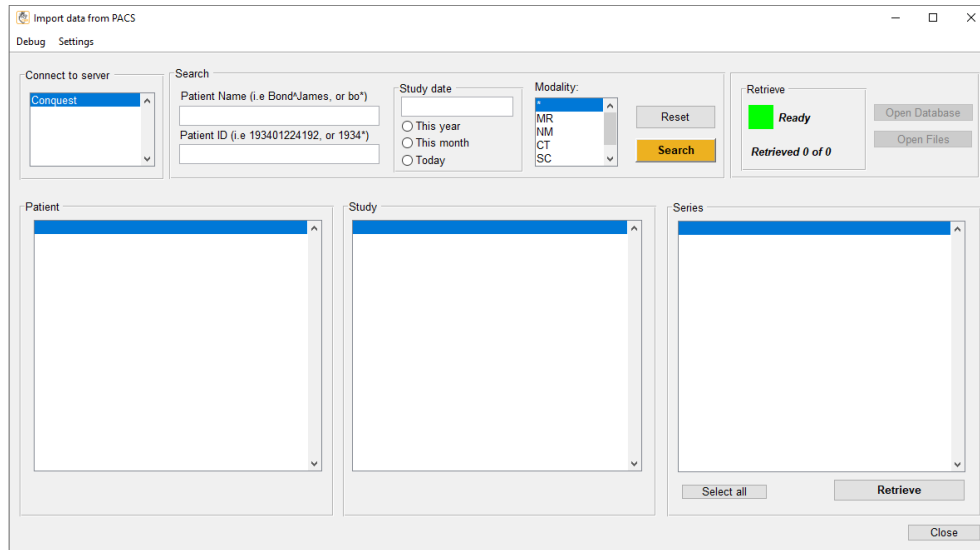


Figure 12: Screen-shot of the PACS search and retrieval GUI.

since the wildcard `*` may represent no or more letters.

Studies can also be searched for by editing the criterias study date and imaging modality. Study date can be entered either as a particular date or by using the radiobuttons `This year`, `This month` or `Today`.

When you have found correct study, double click on the desired study and the available image series will be shown. Select the desired image series with the shift or control keys. There is also a `Select all` pushbutton to select all image series.

6.6.2 Retrieving files

When you have selected your desired image series it is time to retrieve the data. This is done by the pushbutton `Retrieve`. The retrieved images are stored to the Segment's Patient Database.

The the images are stored in sorted subfolders. The first folder level is the patient name, i.e `Bond\ James`. The second folder level is the study data, i.e `20060821`. The next folder level is the the series and are named as `Seriexxxx` where `xxxx` are a serial series number.

After retriving the files you can directly open Patient Database with `Open Database`.

7 Sending DICOM data back to PACS

Segment can send DICOM information back to PACS systems in the following four contexts:

- Complete analysed studies for final storage in PACS. Essentially the stores a DICOM camouflaged `.mat` file back. On the PACS system this is indicated as a file with Medviso logo.
- Reports in form of DICOM screen captures from the Report Module.
- From the Patient database it is possible to send a study containing DICOM files.

In order to send images back the PACS connection needs to be configured and the needs to be a defined `.con` file. Please note that the most common problem with sending images back is that the PACS system needs to be configured to receive images from the computer. Settings for sending back is done under the Advanced Systems and DICOM Preferences and illustrated in Figure 13.

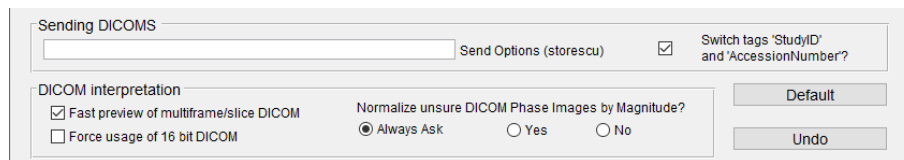


Figure 13: Settings to send images back to PACS.

For Sectra users:

If StudyID and AccessionNumber are switched with each other in Sectra PACS, you should select the checkbox ☒ Switch StudyID and AccessionNumber to switch back during the import of data from PACS to Segment.

8 External PACS Module

The purpose of the External PACS Module is to be able to invoke Segment from an external PACS. This description is only intended for setting up and we strongly suggest to configure the external PACS coupling in close collaboration with personal from Medviso AB.

The External PACS Module consists of two parts. The first is contained in the separate file `SegmentAPI.exe`. This file is called by an external PACS system and upon this call starts Segment (if it is not already running) and outputs a text file `studies2load.txt` containing instructions on which file or patient is to be opened. It is therefore necessary that the file is placed in a catalog where the user has write permission.

The call to the API has the form

```
SegmentAPI.exe /x "argument/s x" /y "argument/s y" ...
```

It takes the following types of arguments:

- `/p "PatientID"` ID of patient.
- `/d "StudyDate"` Date of study.
- `/f "Filename"` Name of file.
- `/s STUID` Study UID.
- `/n "Windowname"` Beginning of window title in which to do the loading, if such window exists. Default is "Segment CMR v".
- `/c "Callfile"` Name of file to call for launching loading application, if no window with suitable title exists. Default is "SegmentCMR.exe".
- `/m "StudyPath"` Set data path of Segment.
- `/l "PathList"` Load DICOM files from folders separated by semicolon. Currently not in use.
- `/g "GraphicalSelector"` Including this opens the graphical series selector for the specified study. Takes no arguments.
- `/a "DynamicPACS"` Three input arguments for dynamically setting AE title, IP and port of a PACS.

The second part of the module is contained in Segment. It continuously looks for the file `studies2load.txt` and parses it for instructions. Once instructions are found, one of the following actions is taken depending on the instructions contained.

1. **Name of one or several mat-files.** The files are loaded.
2. **Name of folder of DICOM files.** The graphical Series Selector is opened for this path.

3. **Patient ID uniquely identified in the Patient Database.**

- (a) **DICOM files associated with the patient.** The Series Selector is opened for this patient.
- (b) **Mat-file associated with the patient.** The file is loaded.
- (c) **Both DICOM and mat-file associated with the patient.** The user is asked whether to open the Series Selector for the DICOMs or to load the mat-file.

4. **Patient ID found in several database instances containing DICOMs or mat-files.** An error message appears.

5. **Patient ID not found in database.** An error message appears.

There is also an optional parameter that can be specified by the external PACS:

Dynamic PACS definition (optional). AE title, IP and port are specified for the PACS connection. Then instructions for loading files are parsed.