Patient Database, Segment Server and PACS Communication Manual

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1.1 Typographic conventions

Caution used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or material damage.

Information intended to help the user achieve optimal use of the software. Includes usage considerations, limitations, or recommendations that do not relate to safety.

A reminder to the user of their responsibilities under applicable regulatory requirements.

`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.
Close	Push/Toggle button in the graphical user interface.

2 Background

The **Patient Database** functionality and the **Segment Server** module are additions to the software packages Segment, Segment CMR, Segment CT, or Segment 3DPrint that enable sending and storing images.

In this manual, the software packages Segment, Segment CMR, Segment CT, and Segment 3DPrint are used interchangeably, as they operate similarly with the Sectra PACS Plugin. Wherever this manual refers to Segment, it should be understood to mean any of the software packages listed above.

Please note that the availability of the functionality described in this manual depends on 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. It is a server application that listens for incoming images from PACS or other DICOM-compliant workstations and stores them in the patient database. This is the preferred method for importing images into Segment solutions.

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 priviligies 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.

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4 Patient Database

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

The aim of the **Patient Database** is to provide the user with an overview of available patient studies stored on the workstation and to facilitate loading of data. It is not intended to replace a hospital PACS for long-term image storage. If long-term storage is required, Segment should be complemented by a commercially available PACS or a freely available solution 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, with an index file to keep track of the files. Raw, unprocessed DICOM images are stored in the folder `DICOM`. In the folder `Analysed`, 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 a version prior to R5123, then you need to rebuild the patient database to fit the new format. If the index file has become corrupted, or you have manually modified the folder structure, then the index file can be regenerated by using the 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 entering the date and running the database maintenance as shown in Figure 1.

It is possible to remove either only DICOM files, only analysed files, or both, from a specified date. For analysed files, the relevant date is the date on which the analysis was performed, not the date the study was acquired.

4.1.2 Sharing patient database with other users

In a multi-user system, the patient database can be shared among users. This allows analysis of a study to be started on one computer and continued later on another computer. Sharing is achieved by placing the patient database folder (the folder containing the file `patientdatabase.mat`) on a network drive or shared location. Other computers must then

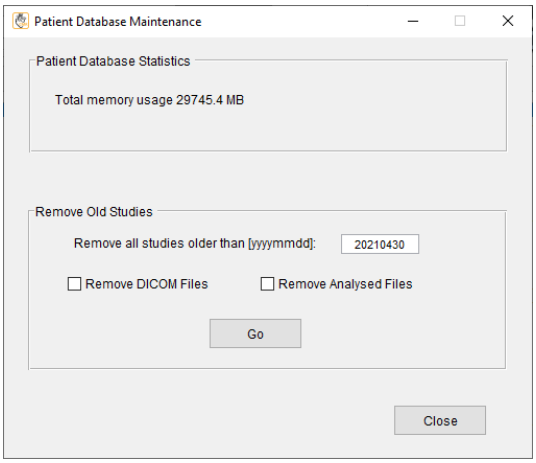

Figure 1: Maintenance graphical user interface.

select this shared folder to access the database.

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

4.1.3 Backup of patient database

It is strongly advised that all users implement an adequate backup strategy for the patient database, as it is typically stored on a local computer. An incremental backup strategy is generally sufficient, since it is usually not necessary to restore data to a specific date. The use of backup software such as Syncback is recommended.

4.2 Overview and usage

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

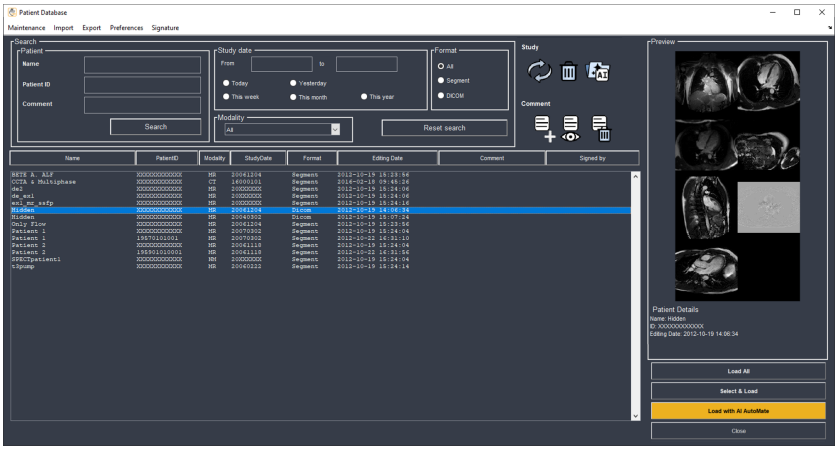

Figure 2: Graphical user interface of the patient database.

The listbox displays all available studies that fulfill the search criteria. For each study, the listbox provides information including patient name and ID, imaging modality, study date, and file format (either DICOM or Segment).

4.3 Search for a study

Studies can be searched for using various criteria: patient name, patient ID, comment, imaging modality, and study date.

To search for a study by patient name, enter letters in the edit box `Name` and then start the search. The entered letters will be matched against any part of the patient name; for example, typing the letter 'a' will match both 'anne' and 'julia'. Wildcards such as '*' should not be used, as the search algorithm automatically applies this functionality.

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 the imaging modality in the pop up menu `Modality` from `All`.

Searching for a study by date can be performed in two ways: using the radio buttons `This week`, `This month`, or `This year` to search for studies within the specified time frame, or by entering dates manually in the `Study date` fields `From:` and `To:`.
To enter a date, first click inside the corresponding edit box. The search will start automatically as soon as typing begins. For example, typing '2' in the `From` box will display all studies performed after '2000-01-01' that also fulfill other search criteria such as patient name or ID. When both `From` and `To` dates are fully entered, the search results will include only those studies performed between the specified dates.

To modify the patient ID or name fields after a date search, a mouse click inside the respective edit box is required before typing.

Studies can also be searched by matching the file `Format`, either DICOM or Segment. This is done by changing the format radio button from `All` to either `Segment` or `DICOM`.

All search criteria can be deleted by using the button Reset Search

4.3.1 Sort studies

The studies in the list box can be sorted by the different criteria by pushing the buttons Name, Patient ID, Modality, Study Date, or Comment.

4.3.2 Load a study

To load a study, select it in the list box and press either the button Load all or Select & Load. The button Select & Load is available only if the format of the study is DICOM. It allows selection of specific series to load using the graphical DICOM selector, described in Section 4.3.3.

4.3.3 Graphical image series selection

The graphical series selector tool is shown in Figure 3. When moving the mouse pointer over an image series, additional information about the series is displayed at the top of the graphical interface. Select image series to load by clicking with the left mouse button. Selected series are outlined in yellow.

It is also possible to group image series into a single image stack. To select series for grouping, hold down the `Shift` key while clicking with the mouse, or use the middle mouse button. Then, press the Group Selected button. Grouped image series are outlined in green.

Multiple image stacks can be selected for loading or grouping by clicking and dragging over the desired selections. When the selection is complete, press Load selected.

Note that if multiple directions are detected in the DICOM folder, each direction is loaded as a separate image stack.

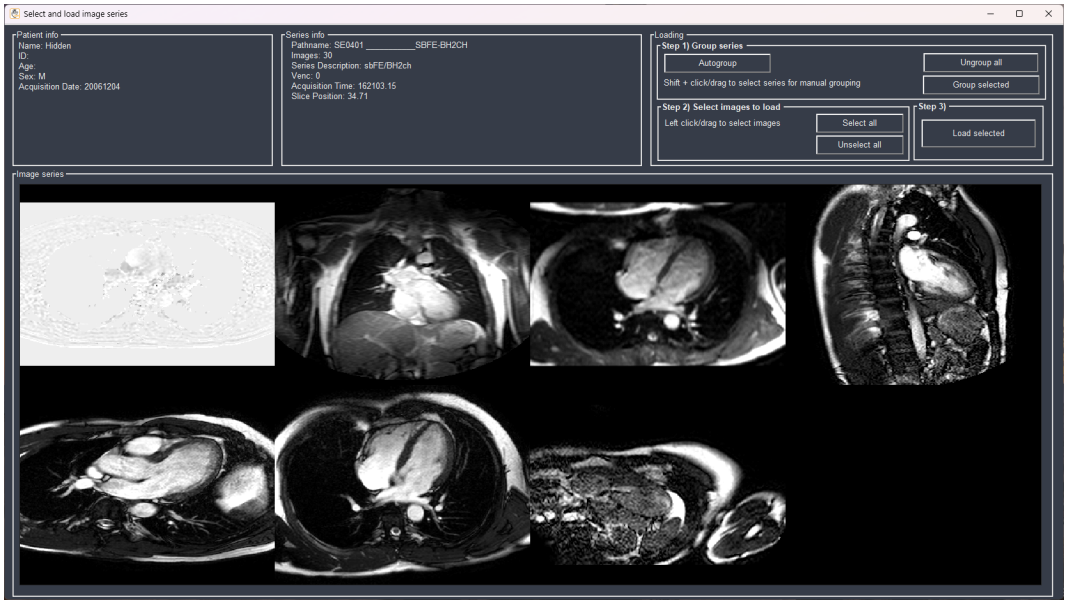

Figure 3: Graphical image series selector.

4.4 Import studies

Studies can be imported into the patient database in three ways: from CD, from PACS, and from network or disk. The import function is accessible under the menu Import.

When importing from CD, it is possible to restrict the import to DICOM files only; otherwise, both DICOM and Segment format files will be imported. When importing from PACS, the PACS connection will be initiated. Instructions on searching for and retrieving files from PACS are provided in Chapter 6. Importing from network or disk is performed by selecting the source location and then choosing the file format to import.

4.5 Export studies

It is also possible to export files in DICOM format from the patient database. Exporting can be performed by selecting multiple files, exporting a single file selected in the listbox, or exporting all DICOM files.

To select multiple files for export, add files to an export list by selecting each file in the listbox, then navigating to the menu Export and selecting `Add DICOM files to exportlist`. This procedure can be repeated until all desired files are added to the export list.

The files in the export list can be viewed by selecting `Show exportlist` in the Export menu. When the export list is finalised, select `Export DICOM files to PACS` in the Export menu. This action opens a graphical user interface allowing selection of files to export. To perform the export, the appropriate PACS system must be selected from the drop-down menu.

5 Segment Server Module

The Segment Server is a separate program that enables DICOM files to be sent directly from a scanner, DICOM-compliant workstation, or PACS to the Segment Patient Database.

In a typical clinical workflow, both the PACS Connection and the Segment Server are used to import images into the Patient Database for analysis and storage. The Segment Server allows reception of images pushed from imaging devices such as MRI scanners, DICOM workstations, or PACS. The PACS Connection Module, on the other hand, enables querying and retrieving images from a PACS system or DICOM workstation. The Segment Server is the recommended primary source of input data for a Segment installation.

5.1 Configuring Segment Server

To enable retrieval of images from imaging devices and other DICOM workstations, two server processes must be running on the computer. Both processes are run as services. Please note that the Segment Server architecture was significantly changed starting from version R5123. When upgrading the software, you need to manually reinstall the server.

If you need assistance setting up the Segment DICOM Server, please contact Medviso AB support at `support@medviso.com`.

Begin by setting up the Patient Database manually; see Chapter 4 for details.

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

- **Database folder:** Sets the location of the Patient Database folder, which stores all patient images. See Chapter 4 for details.
- **Temporary folder:** This folder temporarily stores images from the Segment Server. By default, it is a subfolder called `TEMP` under the Patient Database folder, but it can be moved to a separate location if desired. For performance reasons, it may be beneficial to place this folder on an SSD, especially if the Patient Database itself is not located on an SSD.
- `Port`: Specifies the port used for incoming DICOM associations.
- `AE Title`: Sets the AE title for the Segment DICOM Server. By default, this is set to the hostname of the computer.
- `Options (storescp)`: Sets options used to negotiate network transfer syntaxes. Options can be combined (some, but not all). It is recommended to leave this empty to use the default settings. Useful options for specific systems include:

    1. `-prefer-uncompr` — prefer explicit VR local byte order (default)

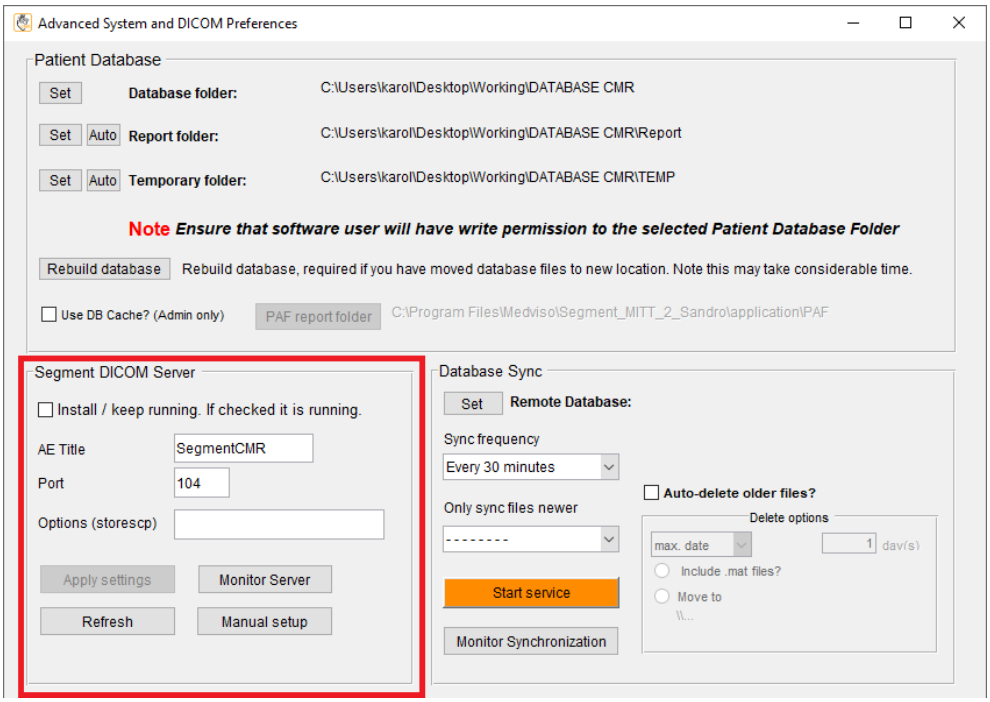

Figure 4: User interface for adjusting Segment DICOM Server settings.

2. `-prefer-little` — prefer explicit VR little endian TS
3. `-prefer-deflated` — prefer deflated explicit 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 compatible with `-bit-preserving` or compressed transmission):

1. `-write-xfer-same` — write with the 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 explicit 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 running the software **as Administrator**, not just being logged in as an Administrator. To do this, right-click the software icon and select

Run as administrator.

There are two processes that must be running for the Segment Server to function correctly:

1. **Storage Server:** Listens on the designated port and stores images to the temporary folder.
2. **Sorter Server:** Sorts the files in the temporary folder and stores them into the Patient Database.

5.2.1 Automatic setup

- Select Install/keep running. This function generates two `.bat` files in the Segment folder. These files are used to start the services and automatically install and run them. If the services are running correctly, the checkbox is marked with x.
- Click Apply changes whenever you change the Port number, AE Title, or Patient Database paths. This function will automatically stop running services, delete old `.bat` files, recreate them, and restart the services. Once the services are running correctly, the checkbox Install/keep running will be marked with x.
- To stop and delete the services, simply uncheck the checkbox for Install/keep running.
- To monitor whether the services are running correctly, see Section 5.3.

5.2.2 Manual setup

Click Manual setup to manually configure the services. This button opens a dedicated window (see Figure 5), where you can manually install, delete, and start/stop services. The Status panel provides additional information about the current status of the services. Possible statuses are: *'Not running'*, *'Running'*, *'Not installed'*.

If the services are running, follow steps 1 to 5.

If the services are not installed, follow steps 3 to 5.

1. **Stop services:** Click Stop to stop the services. The status in the Status panel changes from 'Running' to 'Not running'.
   If the services do not stop automatically, open the Windows Services editor using Open Service Window. Locate `SegmentStorageServer` and `SegmentSorterService`, and click the red "Stop" icon (or the "Stop the service" text) to stop them manually, as illustrated in Figure 6.
2. **Delete services:** Click Delete to remove the services.
   When upgrading the software, it is recommended to fully delete the services before reinstalling, otherwise locked files may prevent installation. Ensure the services are stopped first (see step 1). You may also need to manually terminate the `nssm.exe` process used by Segment by pressing `Ctrl-Alt-Delete`, opening Task Manager, locating `nssm.exe`, and ending the process.

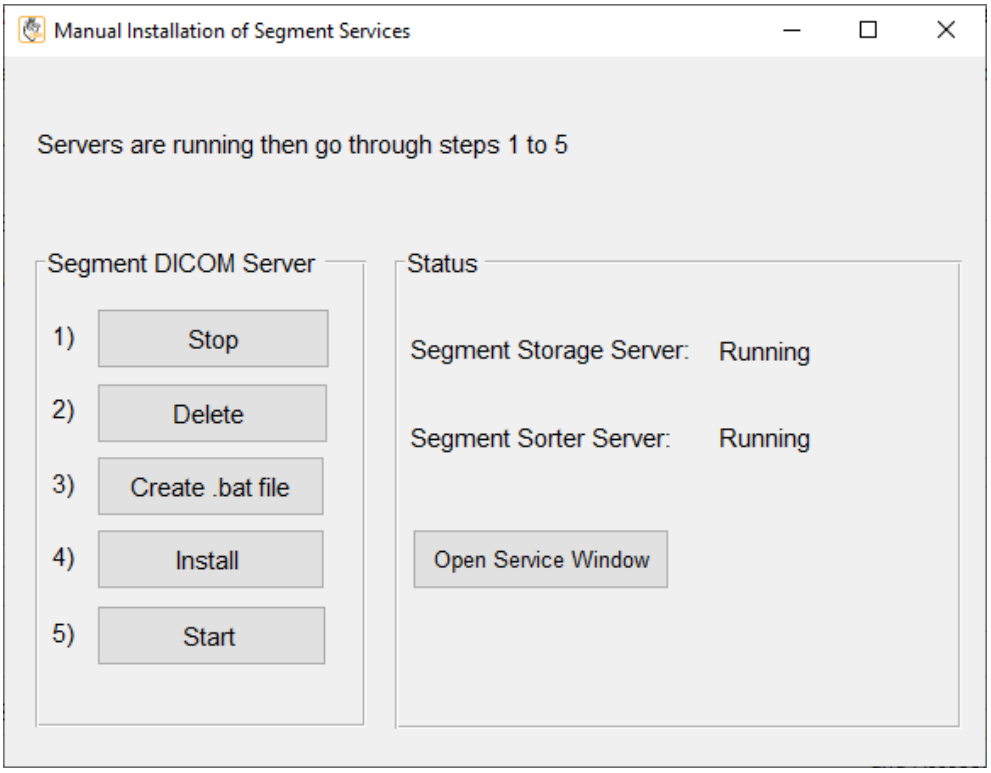

Figure 5: User interface for manually adjusting Segment DICOM Server settings.

3. **Create .bat files:** Select the checkbox Create .bat files. This generates two `.bat` files in the Segment folder that are used to start the services.

4. **Install services:** Click Install to register the services so they start automatically when the computer starts. No user login is required for automatic startup. After installation, the Status panel changes from 'Not installed' to 'Not running'.

5. **Start services:** Click Start to begin running the services immediately. After starting, the Status panel changes from 'Not running' to 'Running'.
   If the services do not start automatically, open the Windows Services editor using Open Service Window. Locate `SegmentStorageServer` and `SegmentSorterService`, and click the green "Play" icon (or the "Start the service" text) to start them manually. The status should then change to 'Running'.

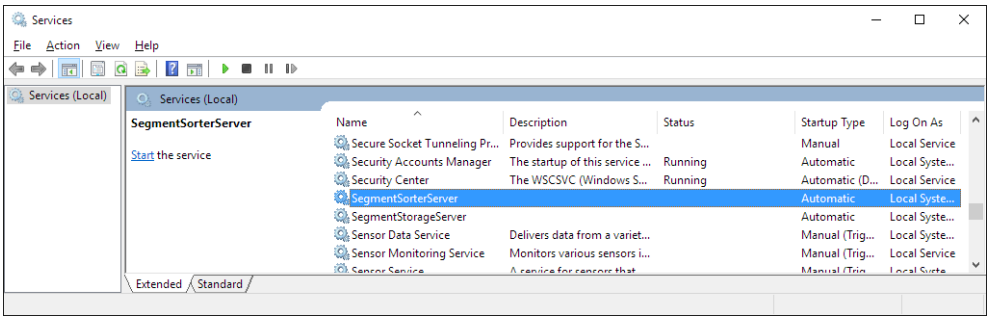

Figure 6: User interface Starting / Stopping services.

5.3 Diagnosing the Segment Server

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

The user interface features three status indicators ("lamps"). All of them should generally be green, indicating that both services (storage and sorter) are running and idle. The last lamp is green if the Segment Server can access the folder where the patient database is located. Note that this only verifies reachability, not write permissions.

The monitor also shows the time of the last check and the time of the last status response from the sorter service. Status updates occur every 1–2 seconds. The time of the last file transfer is also displayed.

If files are currently being sorted or are queued for the sorter service, the corresponding indicator will turn yellow. If no response is received from the sorter for 15 minutes, it is assumed to be non-functional and requires manual inspection.

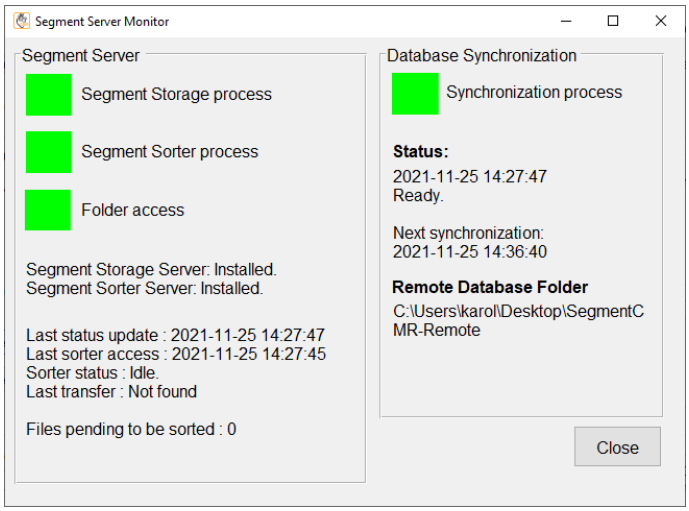

Figure 7: User interface to monitor the Segment Server.

The Segment Server monitor can also be accessed from the Maintenance menu in the Patient Database module.

5.4 Troubleshooting

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

The most common problems are:

- **Read/write access to the Patient Database folders.**
  Solution: Ensure that all software users have read and write permissions to the Patient Database folder.
- **Local non-admin users cannot run Segment Storage and Sorter services.**
  Solution: Run the services under administrative credentials. The admin account should have read/write permissions to the Patient Database folder.

  Open the Services window, locate the services named `SegmentStorageServer` and `SegmentSorterService`, right-click and select `Properties`. Go to the `Log on` tab and choose `This account`, then enter admin credentials (see Figure 8). Click Apply to save changes.

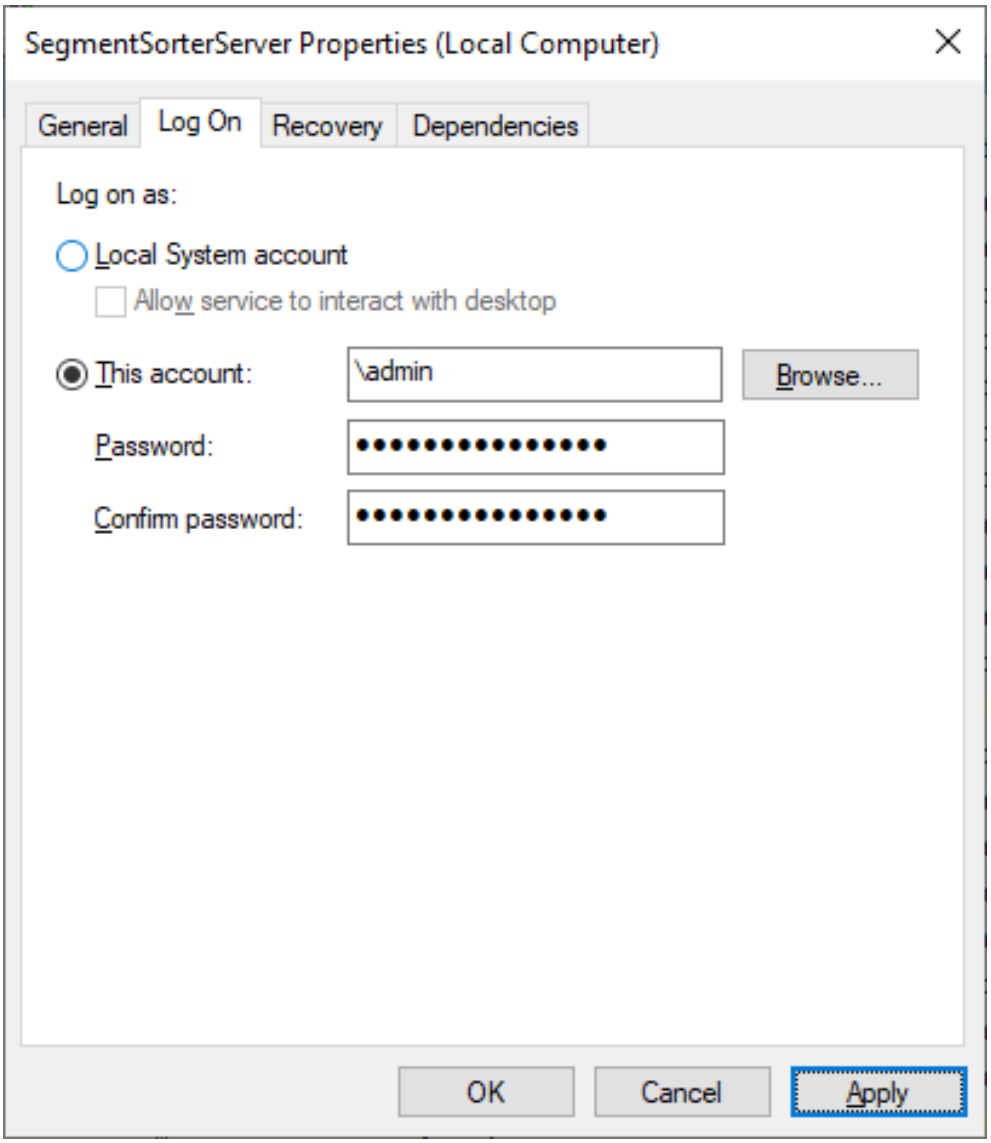

Figure 8: Service Properties window.

6 PACS Connection

The PACS connection allows you to query and retrieve images directly from a hospital PACS system into the Patient Database.

6.1 PACS Connection Setup

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 the *PACS Preferences* settings in Segment, under *Define PACS Connections*, where you can add a new connection (see Figure 9; the Add button is marked with a red box). Note that, in order to generate the `.con` file 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* for the PACS. This is for your own reference.

b) You are then asked for information pertaining to your PACS, as well as a Segment port. This port must **not** be the same as the one selected for *DICOM Port for Segment Server* under *Advanced System and DICOM Preferences* (see Figure 10).

c) The three *AE_title* fields define what your station is named for different calls to PACS. In a standard setup, they should all be set to the same value. On the PACS side, you must also adjust privileges so that the workstation can access and utilise PACS.

d) The *Connection type* field defines the type of connection. Select either "Send to PACS" or "Retrieve from PACS," depending on the intended communication.

e) Finally, click OK to add and save the `.con` file to the Program folder.

f) Save all preferences in *Advanced System and DICOM Preferences* by clicking Save to All.

6.2 DICOM Query Configurations

DICOM Query refers to when Segment queries the PACS (or another DICOM workstation) for patient data. DICOM Query configurations allow you to customise search queries for communicating with PACS.

For patient-, study-, and series-level queries, you can select the information model and specify which DICOM tags to include in the query. Please consult your PACS DICOM conformance statement to determine which DICOM queries are supported by your PACS.

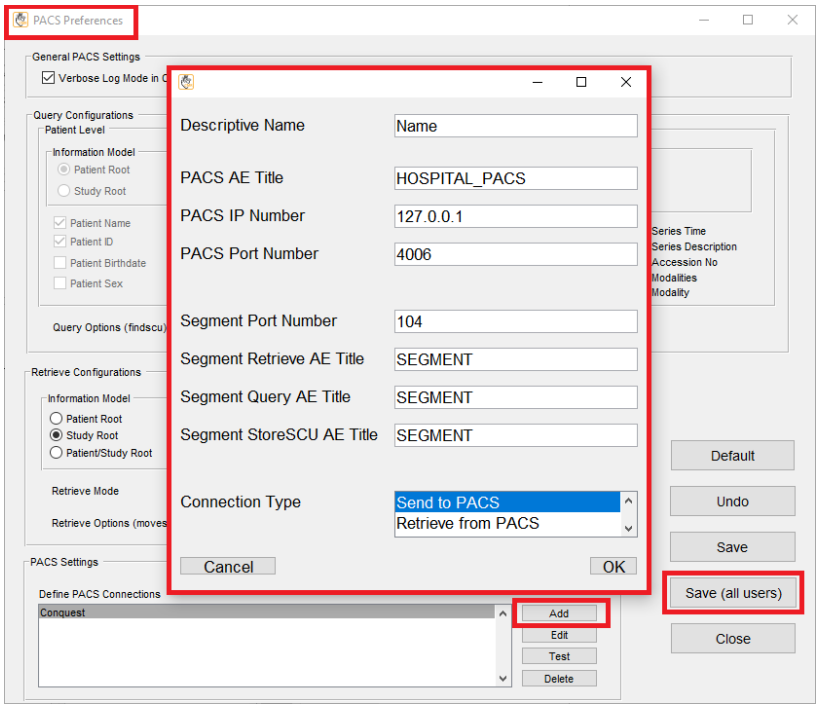

Figure 9: PACS Preferences window.

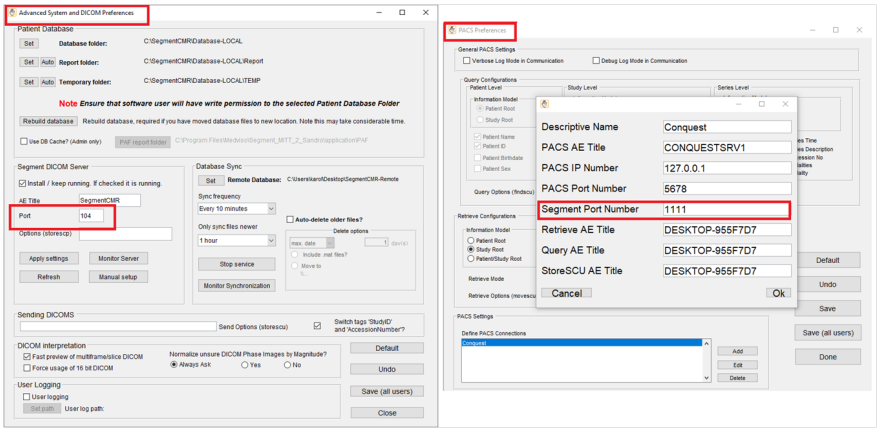

Figure 10: DICOM Port for Segment Server.

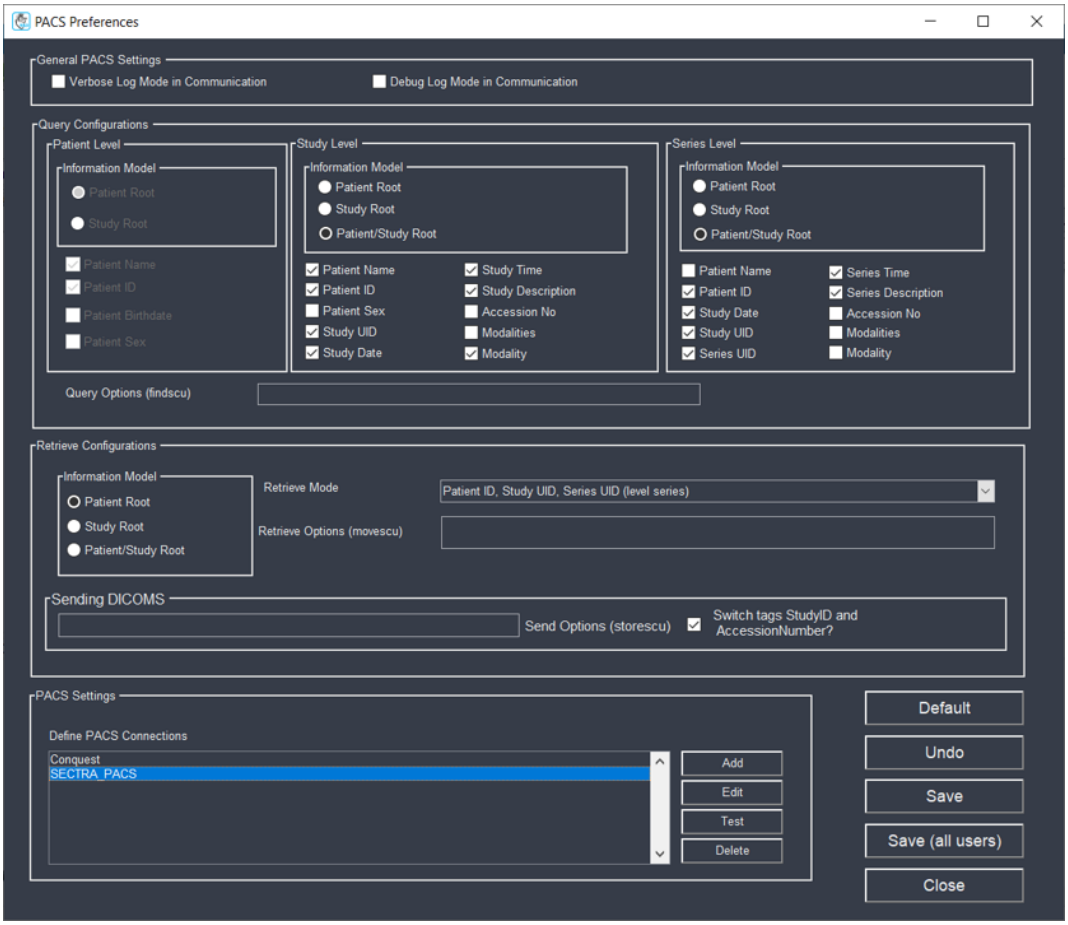

Figure 11: PACS Settings GUI.

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

1. `-propose-uncompr` — propose all uncompressed transfer syntaxes, with explicit VR and local byte ordering first (default).
2. `-propose-little` — propose all uncompressed transfer syntaxes, with explicit VR little endian first.
3. `-propose-implicit` — propose implicit VR little endian transfer syntax only.

Please note that not all PACS systems allow explicit or implicit DICOM conversions on the fly. These options may therefore not work in all environments. Consult the DICOM conformance statement of your PACS system for details.

6.3 DICOM Retrieve Configurations

DICOM Retrieve refers to when Segment retrieves images from the PACS. These settings are found in the `Retrieve Configurations` section.

The *Retrieve mode* setting defines the mode used when retrieving images from the PACS. Essentially, this setting determines which DICOM elements are included in the retrieve queries. Consult your PACS DICOM conformance statement to determine which retrieve queries are supported by your PACS.

It is also possible to configure advanced retrieve options used when retrieving images. These options control the DCMTK `movescu` operation. Commonly used options include:

Preferred network transfer syntaxes

- `-prefer-uncompr` — prefer explicit VR with local byte order (default).
- `-prefer-little` — prefer explicit VR little endian transfer syntax.
- `-implicit` — accept implicit VR little endian transfer syntax only.

Proposed transmission transfer syntaxes (outgoing associations)

- `-propose-uncompr` — propose all uncompressed transfer syntaxes, explicit VR with local byte ordering first (default).
- `-propose-little` — propose all uncompressed transfer syntaxes, explicit VR little endian first.
- `-propose-implicit` — propose implicit VR little endian transfer syntax only.
- `-normal` — allow implicit format conversions (default).
- `-bit-preserving` — write data exactly as read (cannot be used with `-normal`).

- `-write-xfer-same` — write with the same transfer syntax as the input (default).
- `-write-xfer-little` — write with explicit VR little endian transfer syntax.
- `-write-xfer-implicit` — write with implicit VR little endian transfer syntax.
- `-enable-new-vr` — enable support for new VRs (UN/UT) (default).
- `-disable-new-vr` — disable support for new VRs, converting them 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

Files can be sent back to the PACS either from the Patient Database or via the File menu. Configuration for this functionality is available under *Advanced System and DICOM Preferences*. From there, you can adjust settings that are passed to the underlying DCMTK libraries. Some of the most common configuration settings include:

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

6.5 Troubleshooting

The two most common problems are:

1. Firewall restrictions on the computer where Segment is running.
2. Denial of access from the PACS server.

Another common situation is when patient searches work, but image retrieval does not. The most probable cause in such cases is related to security settings. Many PACS systems are configured so that all clients may search for images, but only select clients are allowed to retrieve them. Another possible cause is that Segment performs DICOM retrieve operations that are not supported by the PACS. In such cases, review the log files and consult your PACS DICOM conformance statement. Common problems and solutions include:

- **Firewall (usually Windows) prevents port activity.** *Solution:* Add the Segment port to the Windows firewall (and network firewall, if applicable).
- **Incorrect AE Title or port prevents PACS from responding.** *Solution:* Verify that the PACS settings are configured correctly (see Figure 11).
- **PACS requires a whitelist for Query/Retrieve operations.** *Solution:* Ensure the AE Title and port for Segment are included in the PACS whitelist.
- **The computer's IP address has changed and is no longer on the PACS whitelist.** *Solution:* Check and update the IP address in the PACS system.
- **DICOM retrieve operations are not supported by the PACS.** *Solution:* Adjust the `Retrieve Configurations` in the PACS settings window (see Figure 9).

To assist with debugging, a set of diagnostic tools is provided with Segment. These tools are located in the top-right corner of the PACS connection user interface.

When contacting Medviso AB support regarding problems with the PACS connection, it is essential to include the PACS log file. To locate this file, go to the `Help` menu and select `Open Folder with Log Files`. In the newly opened window, select the file *pacs.log*. Providing this file is often necessary to diagnose and resolve connection issues.

If the problem cannot be resolved after email correspondence (including the log file) with Medviso, we recommend arranging a telephone or video conference. This allows the Medviso support team to observe directly what happens when settings are adjusted.

6.6 Using the PACS connection

The PACS connection GUI is started by clicking on the  icon. The GUI for the PACS connection functionality is shown in Figure 12. In the upper left corner of the GUI, you can select which 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 the patient name or the patient ID. The wildcard `*` is allowed and may represent zero, one, or more characters.

The patient's first name is followed by a `^` and the surname. For instance, the search string `bo*` will find `Bond^James`. Searches are case-insensitive. The string `*Ja` will also find

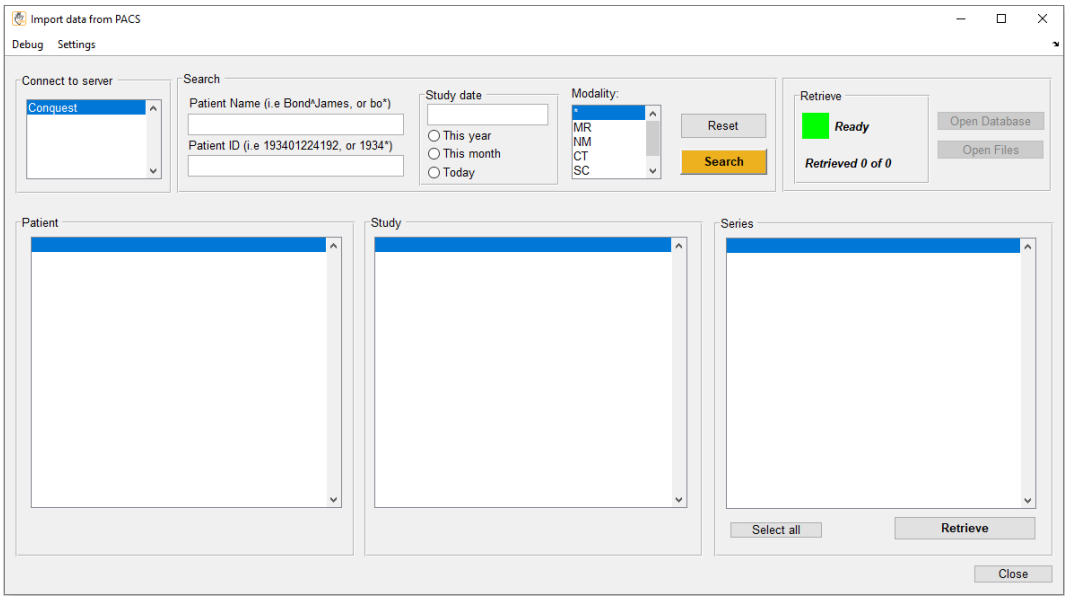

Figure 12: Screenshot of the PACS search and retrieval GUI.

`Bond^James` since, once at least one wildcard is entered, an implicit wildcard is added at the end.

For Swedish users, the PatientID system allows searching for patients born in a specific year. Entering `*Bert` as the patient name and `1934*` as the Patient ID will find patients born in 1934 with names such as `Bert` or `Berta`. It will also find `Bertilsson^Arne` since the wildcard `*` may represent one or more letters.

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

When you have found the correct study, double-click on it to display the available image series. Select the desired image series using the `Shift` or `Ctrl` keys, or click the Select all button to select all series.

6.6.2 Retrieving files

When you have selected your desired image series, click the Retrieve button to start the retrieval. The retrieved images are stored in the Segment Patient Database.
The images are stored in sorted subfolders:

- First folder level: the patient name, e.g., `Bond^James`.
- Second folder level: the study date, e.g., `20060821`.
- Third folder level: the series, named `Seriexxxx`, where `xxxx` is the series number.

After retrieving the files, you can directly open the Patient Database using Open Database.

7 Sending DICOM data back to PACS

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

- Complete analysed studies for final storage in PACS. In this case, Segment stores a DICOM-camouflaged `.mat` file back to the PACS. On the PACS system, this appears as a file with the Medviso logo.
- Reports in the 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 there must be a defined `.con` file. The most common problem when sending images back is that the PACS system must be configured to receive images from the sending computer. Settings for sending images back are found under Advanced Systems and DICOM Preferences and are illustrated in Figure 13.

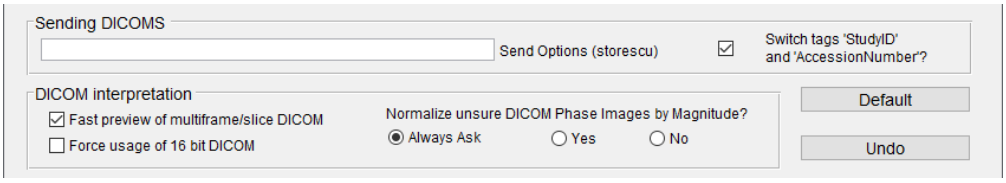

Figure 13: Settings for sending images back to PACS.

For Sectra users: If the StudyID and AccessionNumber are swapped in Sectra PACS, select the checkbox ☒ Switch StudyID and AccessionNumber to restore the correct order during import from PACS to Segment.

8 External PACS Module

8.1 External PACS Module

The purpose of the External PACS Module is to enable invoking Segment from an external PACS. This description is intended only for setup purposes, and we strongly recommend configuring the external PACS integration in close collaboration with personnel from Medviso AB.

The External PACS Module consists of two parts. The first part is contained in the separate file `SegmentAPI.exe`. This file is called by an external PACS system and, upon execution, 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 this file is placed in a directory where the user has write permission.

The API is called in the following form:
`SegmentAPI.exe /x "argument/s x" /y "argument/s y" ...`

The following types of arguments are supported:

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

The second part of the module is integrated in Segment. It continuously monitors the file `studies2load.txt` and parses it for instructions. Depending on the contents, one of the following actions is performed:

1. **Name of one or several mat-files:** The files are loaded.
2. **Name of a folder containing DICOM files:** The graphical Series Selector is opened for this folder.
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 prompted to choose between opening the Series Selector for the DICOM files or loading the mat-file.
4. **Patient ID found in multiple database instances containing DICOMs or mat-files:** An error message is displayed.
5. **Patient ID not found in the database:** An error message is displayed.

An optional parameter can also be specified by the external PACS:
Dynamic PACS definition (optional): AE title, IP, and port can be defined for the PACS connection before instructions for loading files are parsed.