

Inobitec DICOM Server (PACS) version 2.5

USER'S MANUAL

INOBITEC DICOM SERVER

Logout ⊖

DEVICES (AE)

STUDIES

STORAGES

TASKS

WEB VIEWER

LOG

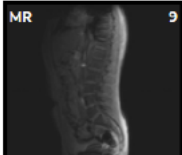
SETTINGS

ABOUT

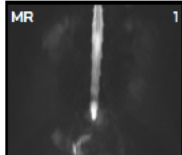
Studies

Name	PID	Birth date	Sex	ACC#	Modality	Date	Description
Testov Ivan Ivanovich	TI10000000000002	1976-01-13	M	xxx	MR	2014-09-25	Abdomen^Lumbosacral spine
Testov Ivan Ivanovich	TI10000000000002	1973-04-19	M	xxx	MR	2014-09-24	Head^Brain
Testov Ivan Ivanovich	TI10000000000002	1982-09-16	F	xxx	MR	2014-09-25	Abdomen^Kidneys & adrenal gla
Testov Ivan Ivanovich	TI10000000000002	1964-09-20	M	xxx	US	2014-09-23	Abdomen^Kidneys & adrenal gla
Testov Ivan Ivanovich	TI10000000000002	1991-12-27	M	xxx	US	2014-09-22	Neck^Thyroid
Testov Ivan Ivanovich	TI10000000000002	1985-07-05	M	xxx	US	2014-09-23	Neck^Thyroid
Testov Ivan Ivanovich	TI10000000000002	1964-09-20	M	xxx	US	2014-09-23	Abdomen^Abdomen (liver, gallb
Testov Ivan Ivanovich	TI10000000000002	1979-06-02	M	xxx	US	2014-09-15	Neck^Thyroid
Testov Ivan Ivanovich	TI10000000000002	1957-05-15	F	xxx	US	2014-09-15	Neck^Thyroid
Testov Ivan Ivanovich	TI10000000000002	1956-04-12	M	xxx	SR\US	2014-12-12	Abdomen^Kidneys & adrenal gla

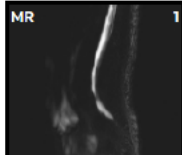
<< < 1 - 10 of 12 > >>



MR 9



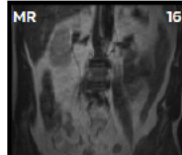
MR 1



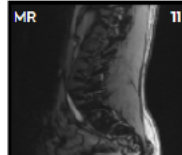
MR 1



MR 11



MR 16



MR 11



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About this Manual

This User Manual describes the functionality of Inobitec DICOM Server (PACS) (version 2.5) and provides instructions on how to use this software product.

Accepted Conventions

Names of program interface elements, key names and important notes are printed in **bold**.
Image captions are printed in *italics*.

Technical Support

Technical support of Inobitec DICOM Server (PACS) users is provided by the INOBITEC, LLC team. If you apply for technical support, please include the following information in your message:

- your computer OS name, version and bitness (you can get this information from your system administrator);
- version (e.g. 2.3.0.904);
- product code. How to find out the product code, see the section [2.1](#);
- information about the client.

To apply for technical support, or if you have any further questions or comments, please email us at support@inobitec.com

About the Product

The Inobitec DICOM Server (PACS) software product and installer does not:

- collect and transfer confidential user information;
- intercept network traffic;
- show ads;
- send spam;
- show messages not related to work;
- automatically update itself without notifying the user.

After uninstalling you do not need to restore your operating system and browser settings. Uninstalling is free of charge. Uninstalling does not adversely affect the operation of the computer and installed software. Files not related to the Inobitec DICOM Server (PACS) are not removed and changed after uninstalling. The Inobitec DICOM Server (PACS) functionality, installing, uninstalling, licensing are fully described in this User Manual on the website inobitec.com. License Agreement is available from the link inobitec.com/eng/about/serverLic/.

DICOM Server the program is officially released in two editions (for MySQL and for PostgreSQL) and for 64-bit operating systems.

The following builds are available to be custom-built:

- for operating systems of the Linux family that are not specified in the system requirements;
- for DBMS that are not specified in the system requirements.

To order a custom build, please email market@inobitec.com.

DICOM Server Functionality

- Storing studies in DICOM format;
- connecting clients (modalities and software) via the DICOM protocol;
- control of clients' access to data;
- connecting network drives as storages;
- automatic compression of the downloaded data after a certain period of time;
- automatic disposal of the uploaded data after a certain period of time;

- modality worklist storage;
- connection to the regional DICOM server with the following capabilities:
 - saving studies at the regional DICOM server;
 - searching for studies at the regional DICOM server;
 - transferring files in the preferred format (Transfer Syntax);
 - checking the delivery of studies to the regional DICOM Server;
- a web console providing the following opportunities:
 - client connection settings;
 - choosing the preferred file transfer format;
 - an opportunity to add a description;
 - storage settings;
 - regional DICOM server connection settings;
 - program settings viewing;
 - log file viewing;
 - downloading a log files archive;
 - searching for studies in the storage;
 - viewing studies in the storage;
 - disposing of studies and series;
 - viewing and editing the list of the scheduled studies (modality worklist);
 - deleting the scheduled studies and their steps;
 - resetting the step status for the scheduled studies;
 - studies downloading;
 - logging level settings;
- secure clients' connection to the regional DICOM server;
- web viewer.

Trial mode restrictions:

1. Maximum number of clients connected: 2.
2. Maximum number of studies stored: 100.
3. Connection to the regional DICOM server is not available.
4. Automatic data compression is not available.
5. Automatic disposal of studies is not available.
6. Automatic disposal of studies by the storage period is not available.
7. Automatic disposal of studies if there is lack of storage space is not available.
8. Maximum number of simultaneous web viewer sessions 0.

Installing, Uninstalling and Launching the Program

It is not recommended to install DICOM Server and the DBMS on the same computer.

System Requirements

The amount of free space needed for storage is to be calculated by the users themselves on the basis of the following parameters:

- average volume of data obtained from the modality, as calculated for the specific study type;
- number of studies;
- period of data storage at the server;
- data archiving.

If the DICOM Server is being installed on a virtual machine, it is recommended:

- set static MAC address on network adapters;
- allocate static RAM, not dynamic.

Minimum System Requirements

- **Operating System:**
 - Windows 7 x64;
 - CentOS 7 x64;
- **One of DBMS:**
 - MySQL 5.5-5.6;
 - PostgreSQL 9.4 or higher. The MD5 authorization method must be enabled in the PostgreSQL DBMS settings;
- **RAM:** 16 GB;
- **Free space on the disk:** 105 MB (excluding the space for data storage);
- **Processor:** clock frequency 2.5 GHz;
- **Network card** (1 Gbit/s).

Recommended System Requirements

- **Operating System:**
 - Windows 7 x64 or higher;
 - CentOS 7 x64;
- **One of DBMS:**
 - MySQL 5.5-5.6;
 - PostgreSQL 9.4 or higher. The MD5 authorization method must be enabled in the PostgreSQL DBMS settings;
- **RAM:** 32 GB;
- **Free space on the disk:** 105 MB (excluding the space for data storage);
- **Processor:** clock frequency 3 GHz (4 cores);
- **Network card** (1 Gbit/s);
- **Hard drive with quick data access.**

Installing the Program

MySQL Database deployment on Windows (for MySQL builds)

To deploy database on Windows, launch the command prompt and run as username **load_database.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value absent):
Enter database port:
The port must contains only the numbers and must be not empty
3. Enter the administrator user name to access the database (default value: **root**) and press **Enter**:
Enter mysql administrator user name (existing user) [root]:
4. Enter the administrator password to access the database (default value absent) and press **Enter**:
Enter mysql administrator user password:
Attention! The password will be displayed when entered!
5. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter database username [PACS_USER]:

6. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:
Attention! The password will be displayed when entered!

Press any button to complete.

PostgreSQL Database deployment on Windows (for PostgreSQL builds)

To deploy database on Windows, launch the command prompt and run as username **load_database.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value: 5432):
Enter database port [5432]:
The port must contains only the numbers and must be not empty
3. Enter the administrator user name to access the database (default value: **postgres**) and press **Enter**:
Enter postgres administrator user name (existing user) [postgres]:
4. Enter the administrator password to access the database (default value absent) and press **Enter**:
Enter postgres administrator user password:
Attention! The password will be displayed when entered!
5. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter postgres user name for PACS db scheme (will be created) [PACS_USER]:
6. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:
Attention! The password will be displayed when entered!

Press any button to complete.

Installing the RenderNode on Windows

To install the RenderNode on Windows, launch the command prompt as administrator and run **deploy_rendernode.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Select where you want to install the RenderNode (by default the server will be installed in C:\RenderNode) and press **Enter**:
Enter the path to the folder to install the RenderNode for Inobitec DICOM Server (PACS) [C:\RenderNode]:

2. Enter the RenderNode port (default value: **8080**) and press **Enter**:
Enter RenderNode port [8080]:
3. Enter the name under which the service will be registered in the operating system (default value: RenderNode) and press **Enter**:
Enter the RenderNode service name [RenderNode]:

After that the files will be copied in the designated folder. After the files have been copied, a service with the designated name is created. If a service with such a name already exists, the installation will result in an error message.

Press any button to complete.

Installing the Program on Windows

To install DICOM Server on Windows:

1. Launch the command prompt as administrator.
2. At the command prompt, run the command:
cd <path to the Scripts folder>
and go to the *Scripts* directory of the unpacked DICOM Server distribution.
3. Run **deploy_pacs.bat**.

The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Select where you want to install the DICOM Server (by default the server will be installed in C:\PACSServer).

Press Enter:

Enter the path to the folder to install the Inobitec DICOM Server (PACS) [C:\PACSServer]:

If the folder chosen already exists, the installation will result in an error message:

*The directory <the folder chosen> already exists.
Delete the folder or use update_pacs.bat script to upgrade
an existing version of Inobitec DICOM Server (PACS).
Installing Inobitec DICOM Server (PACS) failed.*

2. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
3. Enter the DBMS port (default value absent):
Enter database port:
The port must contain only the numbers and must be not empty
The IP address and the DBMS port are recorded in the **conn_string** parameter of the configuration file.
4. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter database username [PACS_USER]:
The value is recorded in the **user** parameter of the configuration file.

5. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:
Attention! The password will be displayed when entered!
The value is recorded in the **pass** parameter of the configuration file.
6. Enter the AE Title for the DICOM Server (default value: **PACS_Inobitec**) and press **Enter**:
Enter the Inobitec DICOM server AETitle [PACS_Inobitec]:
The value is recorded in the **pacs_server_ae_title** of the configuration file.
7. Indicate if incoming connections via DICOM protocol should be accepted from any clients (press **Y** if they should be accepted and **N** if not):
Accept associations from any AETitles? [Y,N]?
The value is recorded in the **accept_association_from_any** of the configuration file.
8. Indicate if insecure connection with DICOM requests processing service should be used when working with the studies storage (press **Y** if it should be used and **N** if not):
Activate unsecured DICOM store service? [Y,N]?
The value is recorded in the **activate_unsecure_dicom_store_service** of the configuration file.
9. If you have chosen the use of insecure connection, enter the port for insecure connection (default value: 3000) and press **Enter**:
Enter the unsecured DICOM store service port [3000]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **unsecure_dicom_store_service_port** of the configuration file.
10. Indicate if insecure connection with the DICOM requests processing service should be used when working with the study worklist (press **Y** if it should be used and **N** if not):
Activate unsecured DICOM MWL service? [Y,N]?
The value is recorded in the **activate_unsecure_dicom_mwl_service** of the configuration file.
11. If you have chosen the use of insecure connection, enter the port for insecure connection (default value: 3001) and press **Enter**:
Enter the unsecured DICOM MWL service port [3001]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **unsecure_dicom_mwl_service_port** of the configuration file.
12. Indicate if secure connection with the DICOM requests processing service should be used when working with the studies storage (press **Y** if it should be used and **N** if not):
Activate secured DICOM store service? [Y,N]?
The value is recorded in the **activate_secure_dicom_store_service** of the configuration file.
13. If you have chosen the use of secure connection, enter the port for secure connection (default value: 3100) and press **Enter**:
Enter the secured DICOM store service port [3100]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **secure_dicom_store_service_port** of the configuration file.
14. Indicate if secure connection with the DICOM requests processing service should be used when working with the modality worklist (press **Y** if it should be used and **N** if not):
Activate secured DICOM MWL service? [Y,N]?
The value is recorded in the **activate_secure_dicom_mwl_service** of the configuration file.

15. If you have chosen the use of secure connection, enter the port for secure connection (default value: 3101) and press **Enter**:
Enter the secured DICOM MWL service port [3101]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **secure_dicom_mwl_service_port** of the configuration file.
16. Enter the limit of free disk space in megabytes (default value: 2048) and press **Enter**:
Enter free space storage limit [2048]:
The value is recorded in the **free_disk_space_limit** of the configuration file.
17. Enter the port for the HTTP service (default value: 8000) and press **Enter**:
Enter the HTTP service port [8000]:
The value is recorded in the **unsecure_http_service_port** of the configuration file.
18. Enter the user name to access the web console (default value: **Admin**) and press **Enter**:
Enter the WebAdmin user name [Admin]:
The value is recorded in the **web_admin_login** of the configuration file.
19. Enter the user password to access the web console (default value absent) and press **Enter**:
Enter the WebAdmin user password:
Attention! The password will be displayed when entered!
The value is recorded in the **web_admin_password** of the configuration file.
20. Enter the path to the Web Viewer render node, including the port (default value: **http://localhost:8080**) and press **Enter**:
Enter the WebViewer render node URL [http://localhost:8080]:
The value is recorded in the **web_viewer_render_node_url** of the configuration file.
21. Enter the Web Viewer port (default value: 8090) and press **Enter**:
Enter the WebViewer port [8090]:
The value is recorded in the **web_viewer_tcp_port** of the configuration file.
22. Enter the name under which the service will be registered in the operating system (default value: PACSServer) and press **Enter**:
Enter the Inobitec DICOM Server (PACS) service name [PACSServer]:

After that the files will be copied in the designated folder. After the files have been copied, a service with the designated name is created. If a service with such a name already exists, the installation will result in an error message.

23. Indicate if dependency on DBMS service should be added (press **Y** if it should be added and **N** if not):
Add dependency from DBMS service? [Y,N]?
24. If you have chosen to add the dependency, enter the DBMS service name (default value absent) and press **Enter**:
Enter DBMS service name:
25. Indicate if dependency on the Render Node should be added (press **Y** if it should be added and **N** if not):
Add dependency from Render Node service? [Y,N]?

26. If you have chosen to add the dependency, enter the Render Node service name (default value absent) and press **Enter**:

Enter Render Node for Inobitec DICOM Server (PACS) service name:

Press any button to complete the installation.

If at the time of installation the service launch dependence has not been established, use the following command:

```
sc config PACSServer depend=MySQL
```

where **PACSServer** is the name of the Inobitec DICOM Server (PACS) service and **MySQL** is the name of MySQL DBMS service.

MySQL Database deployment on Linux (for MySQL builds)

To deploy database on Linux, launch the command prompt and run as user **load_database.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value absent):
Enter database port:
The port must contains only the numbers and must be not empty
3. Enter the administrator user name to access the database (default value: **root**) and press **Enter**:
Enter mysql administrator user name (existing user) [root]:
4. Enter the administrator password to access the database (default value absent) and press **Enter**:
Enter mysql administrator user password:
5. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter database username [PACS_USER]:
6. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:

PostgreSQL Database deployment on Linux (for PostgreSQL builds)

To deploy database on Linux, launch the command prompt and run as user **load_database.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:

2. Enter the DBMS port (default value: 5432):
Enter database port [5432]:
The port must contains only the numbers and must be not empty
3. Enter the administrator user name to access the database (default value: **postgres**) and press **Enter**:
Enter postgres administrator user name (existing user) [postgres]:
4. Enter the administrator password to access the database (default value absent) and press **Enter**:
Enter postgres administrator user password:
5. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter postgres user name for PACS db scheme (will be created) [PACS_USER]:
6. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:

Installing the RenderNode on Linux

To install the RenderNode on Linux, launch the command prompt as superuser and run **deploy_rendernode.bat**. The interactive installator runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Select where you want to install the RenderNode (by default the server will be installed in C:\RenderNode) and press **Enter**:
Enter the path to the folder to install the RenderNode for Inobitec DICOM Server (PACS) [C:\RenderNode]:
2. Enter the RenderNode port (default value: **8080**) and press **Enter**:
Enter RenderNode port [8080]:
3. Enter the name under which the service will be registered in the operating system (default value: RenderNode) and press **Enter**:
Enter the RenderNode service name [RenderNode]:

After that the files will be copied in the designated folder. After the files have been copied, a service with the designated name is created. If a service with such a name already exists, the installation will result in an error message.

Installing the Program on Linux

To install DICOM Server on Linux:

1. Launch the terminal.

2. Run the command:
cd <path to the Scripts folder>
and go to the *Scripts* directory of the unpacked DICOM Server distribution.
3. Run **deploy_pacs.sh** as superuser.

After starting, the installator will check for installed dependencies. If the dependencies are not installed, the installation will result in an error message:

Dependency check...

Follow components are required for Inobitec DICOM Server (PACS) and absent:

libgd.so.2 => not found

libminizip.so.1 => not found

Install the dependencies and try to install Inobitec DICOM Server (PACS) again. Install the

dependencies and run the script again. If all the dependencies are installed, then the *All dependencies are satisfied.* message will be displayed.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value absent):
Enter database port:
The IP address and the DBMS port are recorded in the **conn_string** parameter of the configuration file.
3. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter database username [PACS_USER]:
The value is recorded in the **user** parameter of the configuration file.
4. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:
The value is recorded in the **pass** parameter of the configuration file.
5. Enter the AE Title for the DICOM Server (default value: **PACS_Inobitec**) and press **Enter**:
Enter the Inobitec DICOM server AETitle [PACS_Inobitec]:
The value is recorded in the **pacs_server_ae_title** of the configuration file.
6. Indicate if incoming connections via DICOM protocol should be accepted from any clients (press **Y** if they should be accepted and **N** if not):
Accept associations from any AETitles? [Y,N]?
The value is recorded in the **accept_association_from_any** of the configuration file.
7. Indicate if insecure connection with DICOM requests processing service should be used when working with the studies storage (press **Y** if it should be used and **N** if not):
Activate unsecured DICOM store service? [Y,N]?
The value is recorded in the **activate_unsecure_dicom_store_service** of the configuration file.
8. If you have chosen the use of insecure connection, enter the port for insecure connection (default value: 3000) and press **Enter**:
Enter the unsecured DICOM store service port [3000]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **unsecure_dicom_store_service_port** of the configuration file.

9. Indicate if insecure connection with the DICOM requests processing service should be used when working with the study worklist (press **Y** if it should be used and **N** if not):
Activate unsecured DICOM MWL service? [Y,N]?
The value is recorded in the **activate_unsecure_dicom_mwl_service** of the configuration file.
10. If you have chosen the use of insecure connection, enter the port for insecure connection (default value: 3001) and press **Enter**:
Enter the unsecured DICOM MWL service port [3001]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **unsecure_dicom_mwl_service_port** of the configuration file.
11. Indicate if secure connection with the DICOM requests processing service should be used when working with the studies storage (press **Y** if it should be used and **N** if not):
Activate secured DICOM store service? [Y,N]?
The value is recorded in the **activate_secure_dicom_store_service** of the configuration file.
12. If you have chosen the use of secure connection, enter the port for secure connection (default value: 3100) and press **Enter**:
Enter the secured DICOM store service port [3100]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **secure_dicom_store_service_port** of the configuration file.
13. Indicate if secure connection with the DICOM requests processing service should be used when working with the modality worklist (press **Y** if it should be used and **N** if not):
Activate secured DICOM MWL service? [Y,N]?
The value is recorded in the **activate_secure_dicom_mwl_service** of the configuration file.
14. If you have chosen the use of secure connection, enter the port for secure connection (default value: 3101) and press **Enter**:
Enter the secured DICOM MWL service port [3101]:
If you have chosen not to use insecure connection, the default value will be used. The value is recorded in the **secure_dicom_mwl_service_port** of the configuration file.
15. Enter the limit of free disk space in megabytes (default value: 2048) and press **Enter**:
Enter free space storage limit [2048]:
The value is recorded in the **free_disk_space_limit** of the configuration file.
16. Enter the port for the HTTP service (default value: 8000) and press **Enter**:
Enter the HTTP service port [8000]:
The value is recorded in the **unsecure_http_service_port** of the configuration file.
17. Enter the user name to access the web console (default value: **Admin**) and press **Enter**:
Enter the WebAdmin user name [Admin]:
The value is recorded in the **web_admin_login** of the configuration file.
18. Enter the user password to access the web console (default value absent) and press **Enter**:
Enter the WebAdmin user password:
The value is recorded in the **web_admin_password** of the configuration file.
19. Enter the path to the Web Viewer render node, including the port (default value: **http://localhost:8080**) and press **Enter**:
Enter the WebViewer render node URL [http://localhost:8080]:
The value is recorded in the **web_viewer_render_node_url** of the configuration file.

20. Enter the Web Viewer port (default value: 8090) and press **Enter**:
Enter the WebViewer port [8090]:
The value is recorded in the **web_viewer_tcp_port** of the configuration file.
21. Enter the name under which the service will be registered in the operating system (default value: pacsserver) and press **Enter**:
Enter the Inobitec DICOM Server (PACS) service name [pacsserver]:
22. Enter the user starting the DICOM Server (default value: **pacs**) and press **Enter**:
Enter the user name for starting Inobitec DICOM Server (PACS) service [pacs]:
23. Indicate if dependency on DBMS service should be added (press **Y** if it should be added and **N** if not):
Add dependency from DBMS service? [Y,N]?
24. If you have chosen to add the dependency, enter the DBMS service name (default value absent) and press **Enter**:
Enter DBMS service name:
25. Indicate if dependency on the Render Node should be added (press **Y** if it should be added and **N** if not):
Add dependency from Render Node service? [Y,N]?
26. If you have chosen to add the dependency, enter the Render Node service name (default value absent) and press **Enter**:
Enter Render Node for Inobitec DICOM Server (PACS) service name:

After that the files will be copied in the designated folder. After the files have been copied, a service with the designated name is created. If a service with such a name already exists, the installation will result in an error message.

Updating the Program

Attention! Database updating may take a long time!

Attention! If after updating the DICOM Server cannot be launched as the configuration file does not have the required parameters, add the missing parameters manually. The configuration file is described in Section 1.



Make backups before updating the database



When updating, the physical size of the database can grow dramatically. Before updating, make sure that there is enough free space on the hard disk where the database files are stored. The additional space taken during the update will subsequently be used to store new data, so for some time after the update, the size of the database will not increase

How to update a database from any version

To update the database to the current version, you should apply all the listed database schema updates in the specified order: 1.4.0, 1.4.1, 1.4.2, 1.4.3, 1.5.2, 2.0.0, 2.1.0, 2.4.0, 2.5.0. Update scripts for previous versions are located in the **Scripts\previous_versions** folder.

For example, if you have version 1.4.3 installed, then to update to version 2.5.0 you need to run database update scripts for versions 1.5.2, 2.0.0, 2.1.0, 2.4.0 from the **previous_versions** folder, and then upgrade to version 2.5.0 according to the section on updating the database for the desired DBMS and operating system.

Update MySQL Database on Windows (for MySQL builds)

Attention! If the version of the DICOM Server installed is earlier than 2.4.0 then read the procedure for updating the database (see Section [How to update a database from any version](#))

To update database on Windows, launch the command prompt and run as username **update_database.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

If the DBMS client is not installed, the installation fails.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value: 3306):
Enter database port [3306]:
The port must contains only the numbers and must be not empty
3. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter mysql user name for PACS db scheme (existing user) [PACS_USER]:
4. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:
Attention! The password will be displayed when entered!

Press any button to complete.

Update PostgreSQL Database on Windows (for PostgreSQL builds)

Attention! If the version of the DICOM Server installed is earlier than 2.4.0 then read the procedure for updating the database (see Section [How to update a database from any version](#))

To update database on Windows, launch the command prompt and run as username **update_database.bat**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

If the DBMS client is not installed, the installation fails.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:

2. Enter the DBMS port (default value: 5432):
Enter database port [5432]:
The port must contains only the numbers and must be not empty
3. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter postgres user name for PACS db scheme (existing user) [PACS_USER]:
4. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:
Attention! The password will be displayed when entered!

Press any button to complete.

Update Program on Windows (for MySQL builds)

To update DICOM Server on Windows, launch the command prompt as administrator and run «**update_pacs**». The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Enter the path to the installed DICOM Server (by default the server is installed in C:\PACSServer) and press **Enter**: *Enter the path to Inobitec DICOM Server [C:\PACSServer]:*
2. Enter the URL for the RenderNode (default value: **http://localhost:8080**) and press **Enter**:
Enter the WebViewer render node URL [http://localhost:8080]:
3. Enter the RenderNode port (default value: 8080) and press **Enter**:
Enter the WebViewer port [8080]:

Press any button to complete.

Update MySQL Database on Linux (for MySQL builds)

Attention! If the version of the DICOM Server installed is earlier than 2.4.0 then read the procedure for updating the database (see Section [How to update a database from any version](#))

To update database on Linux, launch the command prompt and run as user **update_database.sh**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

If the DBMS client is not installed, the installation fails.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value: 3306):
Enter database port [3306]:
The port must contains only the numbers and must be not empty

3. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter mysql user name for PACS db scheme (existing user) [PACS_USER]:
4. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:

Update PostgreSQL Database on Linux (for PostgreSQL builds)

Attention! If the version of the DICOM Server installed is earlier than 2.4.0 then read the procedure for updating the database (see Section [How to update a database from any version](#))

To update database on Linux, launch the command prompt and run as user **update_database.sh**. The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

If the DBMS client is not installed, the installation fails.

1. Enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
2. Enter the DBMS port (default value: 5432):
Enter database port [5432]:
The port must contains only the numbers and must be not empty
3. Enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter postgres user name for PACS db scheme (existing user) [PACS_USER]:
4. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:

Update Program on Linux (for MySQL builds)

To update DICOM Server on Linux, launch the command prompt as superuser and run «**update_pacs.sh**». The interactive installer runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Enter the path to the installed DICOM Server (by default the server is installed in C:\PACSServer) and press **Enter**: *Enter the path to Inobitec DICOM Server [C:\PACSServer]:*
2. Enter the URL for the RenderNode (default value: **http://localhost:8080**) and press **Enter**:
Enter the WebViewer render node URL [http://localhost:8080]:
3. Enter the RenderNode port (default value: 8080) and press **Enter**:
Enter the WebViewer port [8080]:

Uninstalling the Program

Uninstalling the Program on Windows

To uninstall the DICOM Server on Windows, launch the command prompt as administrator and run **uninstall_pacs.bat**. The interactive script runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

If the **PATH** environment variable does not contain a path to the DBMS client, the script will prompt you to enter it. Enter a path without quotes; there are even spaces in the path.

1. Confirm or cancel uninstallation (press **Y** to confirm and **N** to cancel):
Do you really want to uninstall Inobitec DICOM Server (PACS)? This action can not be aborted.
2. Enter the name under which the service is registered in the operating system (default value: PACSServer) and press **Enter**:
Enter the Inobitec DICOM Server (PACS) service name [PACSServer]:
3. Enter the path to the installed DICOM Server (by default the server is installed in C:\PACSServer) and press **Enter**:
Enter the path to the folder where Inobitec DICOM Server (PACS) is installed [C:\PACSServer]:
4. Confirm or cancel database deletion (press **Y** to confirm and **N** to cancel):
Do you want to delete database schema?
5. If you have chosen to delete database, enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:
6. Enter the DBMS port (default value for PostgreSQL: 5432, for MySQL: 3306):
Enter database port [5432]:
Enter database port [3306]:
7. Enter the administrator user name to access the database (default value: **root**) and press **Enter**:
Enter postgres administrator user name (existing user) [postgres]:
Enter mysql administrator user name (existing user) [root]:
8. Enter the administrator password to access the database (default value absent) and press **Enter**:
Enter postgres administrator user password:
Enter mysql administrator user password:
9. Confirm or cancel database user deletion (press **Y** to confirm and **N** to cancel):
Do you want to delete database schema user?

10. If you have chosen to delete the database user, enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:

Enter postgres user name for Inobitec DICOM Server (PACS) db scheme [PACS_USER]:

Press any button to complete.

Uninstalling the RenderNode on Windows

To uninstall the RenderNode on Windows, launch the command prompt as administrator and run **uninstall_rendernode.bat**. The interactive script runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Confirm or cancel uninstallation (press **Y** to confirm and **N** to cancel):
Do you really want to uninstall Render Node for Inobitec DICOM Server (PACS)? This action can not be aborted.
2. Enter the name under which the service is registered in the operating system (default value: RenderNode) and press **Enter**:
Enter the Render Node for Inobitec DICOM Server (PACS) service name [RenderNode]:
3. Enter the path to the installed RenderNode (by default the server is installed in C:\RenderNode) and press **Enter**:
Enter the path to the folder where Render Node for Inobitec DICOM Server (PACS) is installed [C:\RenderNode]:

Press any button to complete.

Uninstalling the Program on Linux

To uninstall the DICOM Server on Linux, launch the command prompt as administrator and run **uninstall_pacs.bat**. The interactive script runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

If the **PATH** environment variable does not contain a path to the DBMS client, the script will prompt you to enter it. Enter a path without quotes; there are even spaces in the path.

1. Confirm or cancel uninstallation (press **Y** to confirm and **N** to cancel):
Do you really want to uninstall Inobitec DICOM Server (PACS)? This action can not be aborted. [y/n]
2. Enter the name under which the service is registered in the operating system (default value: pacsserver) and press **Enter**:
Enter the Inobitec DICOM Server (PACS) service name [pacsserver]:
3. Confirm or cancel database deletion (press **Y** to confirm and **N** to cancel):
Do you want to delete database schema? [y/n]
4. If you have chosen to delete database, enter the IP address of the computer with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:
Enter database host ip [127.0.0.1]:

5. Enter the DBMS port (default value for PostgreSQL: 5432, for MySQL: 3306):
Enter database port [5432]:
Enter database port [3306]:
6. Enter the administrator user name to access the database (default value: **root**) and press **Enter**:
Enter postgres administrator user name [postgres]:
Enter mysql administrator user name [root]:
7. Enter the administrator password to access the database (default value absent) and press **Enter**:
Enter postgres administrator user password:
Enter mysql administrator user password:
8. Confirm or cancel database user deletion (press **Y** to confirm and **N** to cancel):
Do you want to delete database user? [y/n]
9. If you have chosen to delete the database user, enter the user name to access the database (default value: **PACS_USER**) and press **Enter**:
Enter postgres user name for PACS db scheme [PACS_USER]:

Uninstalling the RenderNode on Linux

To uninstall the RenderNode on Linux, launch the command prompt as administrator and run **uninstall_rendernode.bat**. The interactive script runs. Follow the prompts. To keep the default value shown in square brackets, press **Enter** without entering the value.

1. Confirm or cancel uninstallation (press **Y** to confirm and **N** to cancel):
Do you really want to uninstall Render Node for Inobitec DICOM Server (PACS)? This action can not be aborted. [y/n]
2. Enter the name under which the service is registered in the operating system (default value: RenderNode) and press **Enter**:
Enter the Render Node service name [RenderNode]:

Press any button to complete.

Launching the Program

Dependency on other services

If the DBMS is not available when the DICOM Server starts, then DICOM Server exits with the error. If the DBMS become unavailable during DICOM Server working, then DICOM Server logs the **ERROR** level message but does not exit.

Launching on Windows

You can launch DICOM Server as service in two ways:

1. using the **Services** window. Use you operating system manual.
2. using the

```
> sc start <service name>
```

command. For the default service name («PACSServer») the command looks like

```
> sc start PACSServer.
```

Run it as administrator.

Launching on Linux

The command depends on operating system. E.g., use

```
# systemctl start <service name>
```

in CentOS 7. For the default service name («pacsserver») the command looks like

```
# systemctl start pacsserver
```

Command Line Parameters

Command line syntax:

```
[<program_path>]\pacs_server < --cfg <serverconfig_path> --log <logconfig_path> [-selftest | --test-mail | --reset-uploaded-flag] | --help | --version | --product-key >
```

-h, --help: information about command line parameters is displayed; the program shuts down;

-s, --selftest: configuration file correctness and database structure are checked; the program shuts down;

-m, --test-mail: a test message is sent by e-mail to check the current settings; the program shuts down;

--reset-uploaded-flag: the Upload flag is unchecked for all the series that were to be sent to the regional DICOM server; the program shuts down;

--reset-compressed-flag: the Compressed flag is unchecked for all the series that were to be compressed; the program shuts down;

-v, --version: DICOM Server version is displayed; the program shuts down;

-p, --product-key: product code is displayed; the program shuts down;

-c, --cfg <serverconfig_path>: the path to the main configuration file (serverconfig_path) is specified;

-l, --log <logconfig_path>: the path to the configuration file for setting up logging (logconfig_path) is specified.

Example:

```
C:\PACSServer\PACSServer.exe --cfg C:\PACSServer\srv_settings.ini
--log C:\PACSServer\log4cpp.ini.
```

Getting Started

To avoid problems with the DICOM Server, do the following before you start working with the program:

1. Limit the access to the computers with the program installed in order to protect the patients' personal data.
2. If you need to receive data from the modality, check the modality connection settings by downloading test data.

Before starting a procedure that requires flawless operation of the DICOM Server, do the following:

1. If there is an uninterruptible power supply unit, make sure it is in working order.
2. Check the connected DICOM servers availability; depending on the tasks to be performed, check the ability to upload, download and search for data.

Chapter 1

DICOM Server Settings

Primary DICOM Server settings are setup when the server is installed. All the parameters are saved in the configuration file and can be changed.

1.1 Configuration File *srv_settings.ini*

Attention! Create a backup copy of the *srv_settings.ini* configuration file before changing the values of its parameters.

The examples of settings are provided for the case when DBMS is installed on the same computer as the DICOM Server. If the parameter is optional, the default value is set. If the parameter has not been provided, the default value is used.

The structure of *srv_settings.ini* file:

- DBMS settings:
 - **conn_string**: DBMS connection settings:
Example for MySQL: `Server="127.0.0.1";Port="3306";Database="pacs;
"unix_socket=NULL;client_flag="0;"`
Example for PostgreSQL: `Server="127.0.0.1";Port="5432";Database="pacs;
"unix_socket=NULL;client_flag="0;"`
 - **user**: DBMS user name;
 - **pass**: DBMS password;
 - **min_connections_number**: minimum number of simultaneous connections to the database. Allowed value: a whole number greater than zero;
 - **max_connections_number**: maximum number of simultaneous connections to the database. Allowed value: a whole number greater than zero. It must not be smaller than the `min_connections_number` parameter;
- HTTP server settings:
 - **activate_unsecure_http_service**: (optional, true by default) activation of HTTP request receipt service. The service is required for correct operation of the web console. Allowed values: **true**, **false**. If the parameter value is **false**, the web console will be inaccessible;

- **unsecure_http_service_port**: port for incoming HTTP requests. Allowed value: a whole number greater than zero;
- **enable_wado** (optional, the default setting is **true**): disables unauthorized access to snapshots via HTTP. Allowed value: **true**, **false**. If the parameter value is **false**, you will not be able to view images in the web console;
- web console settings:
 - **web_admin_login**: login for entering the web console;
 - **web_admin_password**: password for entering the web console, case sensitive;
 - **web_admin_session_life_time**: web console session timeout (in seconds);
- DICOM Server access settings:
 - **accept_association_from_any**: (optional, true by default) accepting connections from any device. Allowed value: **true**, **false**. If the number of connections is limited by the license (for details see Section 2), this parameter should be ignored;
 - **pacs_server_ae_title**: DICOM Server AE title. 16 characters max., case sensitive. The allowed symbols: all symbols from the default character set except «\» and control characters;
- DICOM requests processing service (storage) settings:
 - **activate_unsecure_dicom_store_service**: (optional, true by default) activation of the processing service for DICOM requests received via insecure connection (work with the studies storage). Allowed values: **true**, **false**;
 - **unsecure_dicom_store_service_port**: port for incoming DICOM requests received via insecure connection (work with the studies storage). Allowed value: a whole number greater than zero. You need to assign a value to this parameter even if the respective service is not used;
 - **activate_secure_dicom_store_service**: (optional, true by default) activation of the processing service for DICOM requests received via secure connection (work with the studies storage). Allowed values: **true**, **false**;
 - **secure_dicom_store_service_port**: port for incoming DICOM requests received via secure connection (work with the studies storage). Allowed value: a whole number greater than zero. You need to assign a value to this parameter even if the respective service is not used;
- storage Settings:
 - **free_disk_space_limit**: minimum amount of free storage space in megabytes. After reaching the limit writing to this storage is terminated;
 - **disk_free_space_check_frequency** (optional, 30 by default): the frequency of checking the storage for space availability (in seconds);
 - **dcm_temporary_folder** (optional, the temporary system folder is used by default): path to the temporary folder relative to the storage;
- DICOM requests processing service (worklist) settings:
 - **activate_unsecure_dicom_mwl_service**: (optional, true by default) activation of the processing service for DICOM requests received via insecure connection (work with the studies worklist). Allowed values: **true**, **false**;

- **unsecure_dicom_mwl_service_port**: port for incoming DICOM requests received via insecure connection (work with the studies storage). Allowed value: a whole number greater than zero. You need to assign a value to this parameter even if the respective service is not used;
 - **activate_secure_dicom_mwl_service**: (optional, true by default) activation of the processing service for DICOM requests received via secure connection (work with the studies worklist). Allowed values: **true**, **false**;
 - **secure_dicom_mwl_service_port**: port for incoming DICOM requests received via secure connection (work with the studies storage). Allowed value: a whole number greater than zero. You need to assign a value to this parameter even if the respective service is not used;
- certificates settings:
 - **cert_client_private_path**: path to the client's private key;
 - **cert_client_public_path**: path to the client's public key;
 - **cert_server_private_path**: path to the server private key;
 - **cert_server_public_path**: path to the server public key;
 - **cert_trusted_dir_path**: path to the directory with client's certificates;
 - web viewer settings:
 - **web_viewer_render_node_url**: url of the RenderNode service with the port. Example: *http://192.168.1.10:8080* ;
 - **web_viewer_tcp_port**: port for connection with the web viewer. Allowed value: a whole number greater than zero;
 - **web_viewer_session_timeout**: web viewer session timeout (in seconds);
 - **vt_config_file_path**: path to the web viewer color palettes file;
 - studies Storage Settings (for details see Section 3.2):
 - **compression_level**: compression level numeric code. Allowed value: a whole number from 0 to 9. If the parameter value is 0 (without compression), then the value of **uncompressing_store_days** parameter is to be ignored;
 - **uncompressing_store_days**: number of days elapsed before compression. Allowed value: a whole number greater or equal to 0. If the parameter value is 0, the data are compressed immediately after they are uploaded to the server;
 - **storage_worker_collect_compression_task_count** (optional, 30 by default): the number of series selected for compression per one storage maintenance service iteration;
 - **store_days**: file storage period (number of days). Allowed value: a whole number greater or equal to 0. If the parameter value is 0, the files are stored for indefinite time;
 - **storage_worker_collect_remove_task_count** (optional, 30 by default): the number of series selected for deletion per one storage maintenance service iteration;
 - **storage_worker_tasks_delay** (optional, 5000 by default): the delay between tasks associated with the storage maintenance (in milliseconds);
 - **enable_remove_old_series_by_storage** (optional, false by default): auto deletion of the oldest series (by the date of downloading) in case there is lack of space in the storage;

- **confirm_remove_old_series_by_storage** (optional, false by default): confirmation of auto deletion of the oldest series (by the date of downloading) in case there is lack of space in the storage. To enable auto deletion of the oldest series when there is lack of space in the storage, both `enable_remove_old_series_by_storage` and `confirm_remove_old_series_by_storage` must equal true;
 - **remove_old_series_by_storage_threshold** (optional, by default, the same as `free_disk_space_limit`): the limit of space in the storage (in MB), after reaching which the system starts collecting series for deletion;
 - **remove_old_series_by_storage_collect_task_count** (optional, 100 by default): the number of series to be deleted in case there is lack of space in the storage;
 - **remove_by_storage_not_uploaded** (optional, false by default): deletion of the series that have not yet been sent to the regional DICOM server. The value of this parameter is to be ignored if the function of automatic series uploading to the regional DICOM server is disabled;
- regional DICOM server settings (for details see Section 3.3):
 - **regional_pacs_enabled**: (optional, false by default) enabling files upload to the regional DICOM server. Allowed values: **true, false**;
 - **regional_pacs_ae_title**: AETitle of the regional DICOM server. 16 characters max., case sensitive. Allowed symbols: all symbols from the default character set except «\» and control characters;
 - **regional_pacs_address**: IP address of the regional DICOM server;
 - **regional_pacs_port**: DICOM port of the regional DICOM server. Allowed value: a whole number greater than zero;
 - **regional_pacs_secured_connection**: (optional, false by default) use of secure connection to the regional DICOM server. Allowed values: **true, false**;
 - **regional_pacs_extended_search**: (optional, false by default) enabling search at the regional DICOM Server. Allowed values: **true, false**;
 - **storage_worker_collect_upload_task_count** (optional, 30 by default): the number of series selected for uploading to the regional DICOM server per one storage maintenance service iteration;
 - **regional_pacs_storage_commitment_enabled** (optional, false by default): confirmation of the files delivery to the regional DICOM Server. The permitted values are: **true, false**. For details see Section 3.3.
 - **regional_pacs_preferred_transfer_syntax** (optional, UID value is missing by default, which corresponds to **As it is**): setting the preferred file TS for sending files to the regional DICOM Server.
The permitted UID values are:
 - * 1.2.840.10008.1.2
 - * 1.2.840.10008.1.2.1
 - * 1.2.840.10008.1.2.2
 - * 1.2.840.10008.1.2.1.99
 - * 1.2.840.10008.1.2.4.50
 - * 1.2.840.10008.1.2.4.70
 - * 1.2.840.10008.1.2.4.80
 - * 1.2.840.10008.1.2.4.81
 - * 1.2.840.10008.1.2.4.91

* 1.2.840.10008.1.2.5

For details to change preferred TS see Section 3.3.

- log settings (for details see Section 1.2):
 - **enableTraceLoggerLevel** (optional, the default setting is **false**): extended logger output. Allowed values: **true**, **false**;
- email notification settings (for details see Section 5):
 - **email_command**: email sending command for a third-party service;
 - **enable_email_storage_devices_notifying**: (optional, the default setting is **false**) activation of notification in case of problems with storage availability. Allowed values: **true**, **false**;
 - **free_disk_space_warning_notify_limit**: (optional, 4096 by default) limit of free space for storage (in megabytes) upon reaching which a notification is sent;
 - **enable_email_save_file_failure_notifying**: (optional, the default setting is **false**) activation of notification in case of file saving errors. Allowed values: **true**, **false**.

To apply the new settings, restart the DICOM Server.

1.2 Logging Setting

Logging is executed on the basis of log4cpp library. The details can be found at the manufacturer's website log4cpp.sourceforge.net.

Logging settings are changed in the configuration file **log4cpp.ini**. The configuration file is created during installation and contains recommended logging settings.

The logging level can also be set on the web console (see Section 4.4).

The file is comprised of sections of the following type:

```
log4cpp.rootCategory=INFO, A1
log4cpp.appender.A1=RollingFileAppender
log4cpp.appender.A1.fileName=C:/PACSServer/logs/pacs_srv.log
log4cpp.appender.A1.maxFileSize=10485760
log4cpp.appender.A1.maxBackupIndex=10
log4cpp.appender.A1.layout=PatternLayout
log4cpp.appender.A1.layout.ConversionPattern=%d [%5p %c] %m%n
```

By default, there is one section A1 in the file (shown above).

Logging is performed with appenders, i.e. program message receivers. In the example, the appender name is shown in the first line (A1). The appender performs the following functions:

- message filtering by logging level. The example shows the level «**INFO**». You can change the logging level only for the first appender using the web console;
- message formatting. The example shows the pattern `%d [%5p %c] %m%n`;
- message output. The appender used in the example is **RollingFileAppender**, intended for message output. The parameters for this type of appender are:
 - file path (`C:/PACSServer/logs/pacs_srv.log`);
 - maximum file size in bytes. After reaching the limit, no more data are saved in that file (`10485760`);

- maximum number of files. After reaching the limit, the oldest file is deleted (10).

Use the following logging levels:

- **TRACE:** DICOM data dumps, method execution time, input parameters, and intermediate function performance results are recorded. DEBUG, INFO, WARN, ERROR, and FATAL level messages are also recorded;
- **DEBUG:** the details of the diagnostic data are recorded. Example: method invocation order during command processing. INFO, WARN, ERROR, and FATAL level messages are also recorded;
- **INFO** (by default): the main work stages are recorded. Examples: incoming connections, command processing results. WARN, ERROR, and FATAL level messages are also recorded;
- **WARN** any abnormal program behavior that does not lead to malfunctioning is recorded. ERROR and FATAL level messages are also recorded;
- **ERROR:** the errors having impact on the program functioning but not resulting in termination are recorded. Examples: failure to establish a DBMS connection at start, denied access to resource files and other services. FATAL level messages are also recorded;
- **FATAL:** errors resulting in a failure to execute the program are recorded.

At DEBUG level an extended logging mode (TRACE) can be activated. To do that, add the line **enableTraceLoggerLevel=true** in the configuration file **srv_settings.ini**. By default, the mentioned parameter is not provided in the configuration file. The default value is **false**. To deactivate the logging mode, set the **enableTraceLogger** parameter equal to false or delete it from the configuration file.

Attention! The higher is the logging level, the shorter is the data storage period for protocol files. If you set a high logging level (it may be especially important for the extended logging mode), you may need to expand the maximum log file size (maxFileSize parameter) and increase the number of files stored at the same time (maxBackupIndex parameter).

Protocol files are downloaded from the web console, and the text of the last file related to the A1 appender is shown.

If there isn't such an appender, it will be impossible to download protocol files and to display the protocol in the web console.

To apply the new settings, restart the DICOM Server.

When the logging level is changed through the web console, restart is not required.

Chapter 2

Licensing

2.1 General Information

A unique product code is generated for each DICOM Server. Then a license file containing the following information is created for each product code:

- end of support date;
- maximum number of clients connected (AETitle number);
- Inobitec Web DICOM Viewer license and its validity term;
- maximum number of simultaneous connections to the Inobitec Web DICOM Viewer.

You may need a product code to obtain technical support and to purchase a license. The product code can be obtained in two ways:

- In the **ABOUT** tab. The product code is shown on the right panel **ABOUT** tab.
- At the command prompt using the `-p` key. On the command prompt run:
`«program_path>\pacs_server -p.`
For more details, see Section [Command Line Parameters](#).

The license key is the unique product identifier at the manufacturer's license server and, since version 2.0.0, is no longer a means of providing a license.

Each license has a support term. A DICOM Server can be updated to the new version created during the support term. To get a license for the updates issued after the expiration of the support term, you need to subscribe to updates, which is cheaper than buying a new license. The minimum support term for each license is one year.

If you have a license for an early DICOM Server version (earlier than 2.0.0) and it is still valid, then you need to get a free license file for 2.0.0 or a later version (issued during the support term). To do that, contact the help desk.

There are two licensing schemes available:

1. With a limited number of all client's connections (AETitle). The cost of the license depends on the number of connections.
2. With an unlimited number of connections. The licensing terms and conditions are determined case by case.

2.2 Licensing

To complete the licensing procedure for 2.3.0 or later version open the **ABOUT** tab and click the **UPDATE LICENSE** button. In the dialog that opens click on the white space to choose the license file or drag and drop the license file from the file manager to the white space. Click the **SAVE** button to save license or **CANCEL** to cancel. If the license is installed successfully, its parameters are shown on the right panel (Fig. 2.1) and the license file will be renamed to «pacs.lic» and moved to the «conf» folder in the folder with the installed DICOM Server. Default path for Windows: `C:\PACSServer\conf\pacs.lic`.

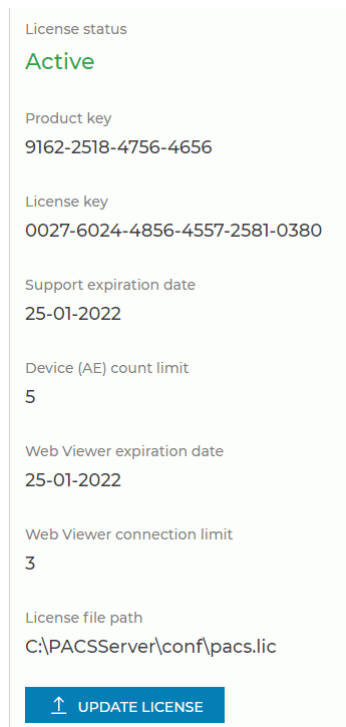


Figure 2.1: License parameters

If you don't have a license, the DICOM Server works in trial mode and its functions are limited (for details see Section **DICOM Server Functionality**). If the DICOM Server used to be licensed but then the license was deleted for some reason (e.g. the operating system was reinstalled), all the connections and studies that have already been added will still be available, though it will be impossible to establish new connections and add new studies in excess of the limit provided for the trial mode.

Chapter 3

Working with Studies

3.1 Uploading Studies to the DICOM Server

The studies are uploaded to the DICOM Server from clients via the DICOM protocol.

3.1.1 Connecting a Modality as a Client

To connect a client, proceed as follows:

1. Add the client to the table **Clients (AE)** (for details see Section 4.2.1). Tick the **UPLOAD** check box for the client to allow for data upload to the DICOM Server.
2. Customize the client by providing the following data regarding the DICOM Server:
 - (a) the **DICOM port**;
 - (b) the **AE Title** (case sensitive);
 - (c) the **IP address** or the **network name** for the computer with the DICOM Server.

The DICOM port and the AE title of the DICOM Server can be found in the configuration file or the management web console (see section 4.2.6).

3. To check the connection to the DICOM Server, send a C-Echo command from the client to the server. Normally, the modality does not accept C-Echo commands. Thus, if an error occurs after the command is sent from the web console to the modality, it may not be related to problems with the settings.

If an error occurs after a C-Echo command is sent from the modality to the DICOM Server, check the connection settings of the DICOM Server and the client. If a mistake is made in the DICOM Server AE title provided to the client while the port and the server address is correct, the DICOM Server log will have a file with the following entry:

```
2018-04-17 12:47:16,067 [ INFO DICOMCore Module]
DicomConnectionHandler: can not find called or calling AETitle.
Association will be rejected.
```

The logging level must be **INFO** or above (see section 1.2). Analyze the log files on the client.

If all the parameters are correct, check the firewall settings of the computer with the DICOM Server.

3.1.2 Connecting a Workstation as a Client

To connect a workstation, proceed as follows:

1. Add the client to the table **Clients (AE)** (for details see Section 4.2.1). Tick the **UPLOAD** check box for the client to allow for data upload to the DICOM Server.
2. Customize the client by providing the following data regarding the DICOM Server:
 - (a) the **DICOM port**;
 - (b) the **AE Title** (case sensitive);
 - (c) the **IP address** or the **network name** for the computer with the DICOM Server;
 - (d) if you need to choose a **character set**, enter “UTF-8”;
 - (e) if you need to choose the **server type**, enter “DICOM”;
 - (f) if you need to choose the image upload method, set c-get or c-move.

The DICOM port and the AE title of the DICOM Server can be found in the configuration file or the management web console (see section 4.2.6).

3. To check the connection to the DICOM Server, send a C-Echo command from the client to the server and from the server to the client. If the command is executed correctly, it means that the connection settings are correct.

If an error occurs after a C-Echo command is sent from the modality to the DICOM Server or from the DICOM Server to the workstation, check the connection settings of the DICOM Server and the client. If a mistake is made in the DICOM Server AE Title provided to the client while the port and the server address is correct, the DICOM Server log will have a file with the following entry:

```
2018-04-17 12:47:16,067 [ INFO DICOMCore Module]
DicomConnectionHandler: can not find called or calling AETitle.
Association will be rejected.
```

The logging level must be **INFO** or above (see section 1.2). Analyze the software log files on the workstation.

If all the parameters are correct, check the firewall settings of the computer with the DICOM Server and on the workstation.

3.1.3 Secure Connection Setup

The DICOM Server uses the TLS protocol for coding the data transferred via the network. For this purpose, a copy of the client’s root certificate is made on the computer with the DICOM Server, and a copy of the DICOM Server root certificate is made on the computer with the client.

To setup a secure connection, proceed as follows:

1. If there isn’t a folder named **trusted**, create such a folder and provide the user in whose name the DICOM Server is launched with reading rights.
2. Make a copy of the client’s root certificate in the **trusted** folder. This certificate must have a **cer** or **crt** extension.
3. Make a copy of the DICOM Server root certificate on the computer with the client. Follow the directions concerning the client’s settings. You will find the demo DICOM Server root certificate (CA.crt) in the following folder: « <path to the folder with the server>/serts/CA».

4. Check the **USE TLS** box on the web console for the client (see Section 4.2.1).
5. Restart the DICOM Server.

By default, the «trusted» folder is at « <path to the folder with the server>/serts/trusted». The path is determined by the value of the **cert_trusted_dir_path** parameter in the configuration file.

For inbound connections, the DICOM Server uses **PACS_Server_private.key** and **PACS_Server_public.crt** certificates, for outbound connections — **PACS_Client_private.key** and **PACS_Client_public.crt**. All the keys must be signed with the DICOM Server root certificate.

The table shows the correspondence between roots and configuration file parameters.

File	Configuration file parameter
The folder path for the DICOM Server client's root certificates	cert_trusted_dir_path=<path to the folder with the server>/serts/trusted
The path to the private key file for outbound DICOM Server connections	cert_server_private_path=<path to the folder with the server>/serts/PACS_Server_private.key
The path to the public key file for outbound DICOM Server connections	cert_server_public_path=<path to the folder with the server>/serts/PACS_Server_public.crt
The path to the private key file for inbound DICOM Server connections	cert_client_private_path=<path to the folder with the server>/serts/PACS_Client_private.key
The path to the public key file for inbound DICOM Server connections	cert_client_public_path=<path to the folder with the server>/serts/PACS_Client_public.crt

After the DICOM Server installation, you will find the demo keys signed with the demo root certificate using the paths provided in the table.

3.1.4 Connecting the Workstation as a Client for Inobitec DICOM Viewer Program

Let us assume that the DICOM Server has the following parameters:

- **IP address:** 192.168.1.10;
- **DICOM port:** 3000;
- **AE Title:** PACS_Inobitec.

Inobitec DICOM Viewer Program has the following parameters:

- **IP address:** 192.168.1.20;
- **IP address:** 11112;
- **AE Title:** Viewer_Inobitec.

To set the connection, proceed as follows:

1. Add a client with the following parameters to the **Clients (AE)** table on the DICOM Server web console (for the settings see Section 4.2.1):
 - (a) **AE TITLE:** Viewer_Inobitec;
 - (b) **IP or FQDN:** 192.168.1.20;
 - (c) **PORT:** 11112;
 - (d) Tick the **UPLOAD** check box.
2. In Inobitec DICOM Viewer, add a connection to DICOM Server with the following parameters:
 - (a) **Server type:** DICOM;
 - (b) **Server mode:** C-MOVE or C-GET;
 - (c) **Character set:** UTF-8;
 - (d) **Client name (SCU):** Viewer_Inobitec;
 - (e) **Service name (SCP):** PACS_Inobitec;
 - (f) **Host server name or IP:** 192.168.1.10;
 - (g) **Server port:** 3000;
3. Add the required permissions to the firewall on both computers.
4. To check the settings, send a C-Echo command from the DICOM Server management web console to Inobitec DICOM Viewer and back.

Upload the studies to the DICOM Server in compliance with the provisions of the client's user manual. If the uploading process results in an error, analyze the DICOM Server log file (section 4.4). Explanation of some log file entries:

1. [INFO] All devices have no free space
The storage is either inactive or full. Check the storage settings.
2. [INFO] Disk <storage path> is enabled but unavailable
The specified storage does not exist.

3.2 Studies Storage

Depending on the settings, data may be stored on the DICOM Server for an indefinite or limited period of time. It may be stored either in compressed or uncompressed form.

3.2.1 Automatic Data Compression

The function is unavailable in trial mode

Compression is the process of data conversion associated with reduction of data size and potential loss of quality. The quality of images depends on the coder/decoder used for compression.



The Compression is associated with vanishing of losing details, which can have negative effect on diagnostics quality.

If server works as a client (see Section 3.3), the series will not be compressed until they are sent to the regional DICOM server.

Compression is disabled by default. To enable compression proceed as follows:

1. Open the **TASKS** tab.
2. Choose one of the options from the **Compression Level** drop-down menu:
 - **No compression** (by default);
 - **Save initial codec**;
 - **Prefer RLE compression**;
 - **Prefer Deflated Little Indian Explicit**;
 - **Prefer JPEG Lossless**;
 - **Prefer JPEG Lossy**;
 - **Prefer JPEG-LS Lossless**;
 - **Prefer JPEG-LS Lossy**;
 - **Prefer JPEG2000 (Lossless only)**;
 - **Prefer JPEG2000 (Lossless or Lossy)**.
3. Make an entry in the box **Compress Studies after**. If you have chosen the **No compression** option, this box will be inactive and the entries made in it will be ignored.
4. To save changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

The table shows the correspondence between the web console settings and the configuration file parameters.

Web console parameter	Configuration file parameter
Compression Level	compression_level
No compression	0
Save initial codec	1
Prefer RLE compression	2
Prefer Deflated Little Indian Explicit	3

Web console parameter	Configuration file parameter
Prefer JPEG Lossless	4
Prefer JPEG Lossy	5
Prefer JPEG-LS Lossless	6
Prefer JPEG-LS Lossy	7
Prefer JPEG2000 (Lossless only)	8
Prefer JPEG2000 (Lossless or Lossy)	9
Compress Studies after	uncompressing_store_days

Compression does not apply to files containing video. Depending on the compression level selected, some files may not be processed.

The series storage period in its initial state is calculated from the date it was uploaded to the Inobitec DICOM Server (PACS). If new images are added to an already compressed series, the series will be re-processed.

If the compression level changes, already compressed series will not be processed again. You can start the series compression procedure anew by running Inobitec DICOM Server (PACS) with the appropriate parameter (for more details, see Section [Command Line Parameters](#) or by clicking the **RESTART** button (see Section [4.2.4](#)).

3.2.2 Data Storage Period

The function is unavailable in trial mode

For series, it is possible to set the storage period. After this time, the series will be deleted from the storage.



Data deleted when this feature is turned on cannot be restored

The series storage period is calculated from the date the series was uploaded to the server. Series for removal are collected from all storages. If server works as a client (see Section [3.3](#)), the series will not be deleted until they are sent to the regional DICOM server.

To enable automatic study disposal after a specified storage period:

1. Open the **TASKS** tab.
2. Enter the storage period (a whole number of days greater than zero). If you enter zero (the default value), the data will not be disposed of.
3. To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

This setting corresponds to the **store_days** parameter in the configuration file.

If the function of automatic uploading studies to the regional DICOM server has been enabled, the series will not be deleted until they are sent to the regional DICOM server.

Note that the data storage period is determined for particular series, not for a complete study. If files in a study were uploaded on different days (e.g. several images were added to the existing series), only a part of this study will be disposed of.

3.2.3 Automatic series deletion if running out of storage space

The function is unavailable in trial mode

This functionality allows you to free up space by deleting old series in those storage folders in which free space ends.



Data deleted when this feature is turned on cannot be restored

To enable automatic study disposal if running out of storage space:

1. The **enable_remove_old_series_by_storage** and **confirm_remove_old_series_by_storage** settings must be set to «**true**». If the specified parameters are not in the settings file, they should be added.
2. Specify the amount of remaining free space (in megabytes) in the storage folder upon reaching which collection of series for deletion will begin (the **remove_old_series_by_storage_threshold** parameter).
3. The **remove_by_storage_not_uploaded** parameter must be set to «**true**» to remove data that has not been uploaded or «**false**» otherwise.
4. Restart Inobitec DICOM Server (PACS).

The value of the **remove_by_storage_not_uploaded** parameter is used only if this server works as a client server. In this case, if the parameter is set to «**true**», the series will be deleted even if they have not yet been sent to the regional DICOM server.

3.2.4 Storage Transfer

To transfer a storage without disabling the DICOM Server or a long time and causing sufficient inconvenience to the users, and to avoid the risk of losing access to the data available, proceed as follows:

1. Create a backup copy of the database, a system snapshot etc.
2. Disable data upload to the DICOM Server and wait for the current uploads to be completed. The opportunity to download data will still be available.
3. Disable the functions of the regional DICOM Server, as well as the functions of archiving and disposing of old images.
4. Uncheck the **ENABLED** box for the storage.
5. Copy the whole storage folder to the new location.
6. Change the folder path for the existing storage. **Attention! Do not delete the old storage or create a new one. It will result in problems with file access!** If data are being downloaded when the path is changed, the process is not interrupted.

7. Enable the regional DICOM Server functions, as well as the functions of archiving and disposing of old images.
8. Check the **ENABLED** box for the storage.

If you delete the old storage and create a new one while transferring the storage, you will not be able to access the storage files.

3.3 Regional DICOM Server

The function is unavailable in trial mode

A regional DICOM server is a DICOM server to which other (client) servers are connected. The studies from client servers are uploaded to the regional server, and such client servers may search the regional server for data. You don't have to change the settings of your Inobitec DICOM Server (PACS) in order to use it as a regional DICOM server. To use your Inobitec DICOM Server (PACS) as a client server, proceed as follows:

1. Open the **TASKS** tab.
2. To enable/disable the connection to the regional DICOM server, tick/untick the check box **Enable connection**.
3. Enter the AE Title of the regional DICOM server (16 latin characters max., case sensitive) in the **AE Title** box.
4. Enter the DICOM port of the regional DICOM server (a whole number greater than zero) in the **Port** box.
5. Enter the IP address of the regional DICOM server in the **IP-address** box.
6. To enable/disable the secure connection, tick/untick the check box **Use TLS**.
7. To enable/disable search at the regional DICOM Server, tick/untick the check box **Enable extended search**.
8. From the **Preferred TS** (Transfer Syntax) drop-down list, choose the format in which files will be uploaded to the device by C-GET and C-MOVE methods. When choosing the preferred TS, consider the device capabilities, the acceptable image compression level, and the current archiving settings at the server.

The available transfer syntax options are:

- **As it is;**
- **Little Endian Implicit** (UID 1.2.840.10008.1.2);
- **Little Endian Explicit** (UID 1.2.840.10008.1.2.1);
- **Big Endian Explicit** (UID 1.2.840.10008.1.2.2);
- **Deflated Explicit VR Little Endian** (UID 1.2.840.10008.1.2.1.99);
- **JPEG Baseline** (UID 1.2.840.10008.1.2.4.50);
- **JPEG Lossless, Non-hierarchical, 1st Order Prediction** (UID 1.2.840.10008.1.2.4.70);

- **JPEG-LS Lossless** (UID 1.2.840.10008.1.2.4.80);
 - **JPEG-LS Lossy (Near-lossless)** (UID 1.2.840.10008.1.2.4.81);
 - **JPEG 2000 (Lossless or Lossy)** (UID 1.2.840.10008.1.2.4.91);
 - **RLE Lossless** (UID 1.2.840.10008.1.2.5).
9. To enable/disable the confirmation of the files delivery to the regional DICOM Server, check/uncheck the **Delivery check (Storage Commitment)** box. As a result, you will get a list of UIDs that have been successfully saved/have not been saved on the regional DICOM Server.
10. To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

The table shows the correspondence between the web console settings and the configuration file parameters.

Web console parameter	Configuration file parameter
Enable connection	regional_pacs_enabled
Box ticked	true
Box unticked	false
AETitle	regional_pacs_ae_title
Port	regional_pacs_port
Address	regional_pacs_address
Use TLS	regional_pacs_secured_connection
Box ticked	true
Box unticked	false
Enable extended search	regional_pacs_extended_search
Box ticked	true
Box unticked	false
Delivery check	regional_pacs_storage_commitment_enabled
Box ticked	true
Box unticked	false

If you have enabled search at the regional DICOM Server, the client server searches both, its own storage and the regional DICOM server, upon the request from the client application.

If the settings for connecting to the regional DICOM server are changed, already sent series will not be processed again. You can start the series sending procedure again by running Inobitec DICOM Server (PACS) with the appropriate parameter (for more details, see [Command](#)

[Line Parameters](#) or by clicking the **RESTART** button (see Section 4.2.3).

3.4 Data storage

Study data accepted by Inobitec DICOM Server (PACS) is stored in the storage. The storage is in a folder (folders) on a local or network drive.

Attention! To map a network drive on Windows, launch the DICOM Server as application mode from the command prompt as administrator. For details see the [Command Line Parameters](#) section.

You need to create a storage folder yourself. The folder must have a write permission for the user starting the DICOM Server. On Linux you need to enter the name of this user during installation.

Storage folders can be enabled or disabled. Enabled folders do not save new files; they do not check for free space. In this case, the search and downloading of studies is carried out even from enabled storage folders. The steps required to enable the storage folder are described in Section 4.2.2.



The data kept in the storage and in the database may be lost through the hard drive damage, improper users' activities, or third-party software impact. To avoid data loss, back up the data.



Periodically check the amount of free space on the hard disk drive where storage is placed

If the **Storages** table displays a zero in the **Free space (MB)** column for any path, you need to check the path, access rights and the amount of free space.

If there are several storage folders, the data are saved in the first active folder available on the disk with enough free space. You need to set the limit of free space on each disk (2048 MB by default). This setting can be adjusted in the configuration file. The column **FREE SPACE (MB)** in the web console shows the total amount of free space on the disk, regardless of the limit. If there isn't enough free space for saving the data (with allowance for the limit), such data will be saved in a folder on another disk. If such a folder is unavailable, the saving procedure will result in an error.

The frequency of checking the amount of free space in folders can be changed in the settings file in the **disk_free_space_check_frequency** parameter (30 seconds by default). After changing the value of the **free_disk_space_limit** and **disk_free_space_check_frequency** parameters, restart DICOM Server to apply the new values.



Do not create storage folders on the same hard disk partition

When receiving files, they are placed in a temporary folder before saving to the storage folder. The current path to the temporary folder is displayed in the web console in the line **Temporary folder**. By default, the system temporary folder is used. To change the location of the temporary folder:

1. Change the **dcm_temporary_folder** parameter. If this parameter is missing, add it.
2. Restart DICOM Server.

If for some reason access to the temporary folder is not possible (for example, the access rights are manually changed), then loading the studies to DICOM Server will fail.



Make sure that the hard disk partition on which the temporary folder is located has enough free space. Otherwise, DICOM Server will not be able to accept files, perform automatic data compression, and allow downloading archives with studies and program protocols in the web console

The table shows the correspondence between the web console settings (read only) and the configuration file parameters.

Web console parameter	Configuration file parameter
Free space (MB) (the Storages tab)	free_disk_space_limit
Temp folder (the Settings tab)	dcm_temporary_folder

3.4.1 Data Storage Transfer

The storage contains study data only. The information required for the files content display is stored in the database, so if a part of the information is lost, the study search, loading and display become impossible.

To transfer a storage without the risk of losing access to the data available, significant inconvenience for the users, or disabling the DICOM Server for a long time, proceed as follows:

1. Make a backup copy of the database, a system snapshot etc.
2. Disable data upload to the DICOM Server (uncheck the **UPLOAD** box for all the clients, see Section 3.1) and wait until the current uploads are completed. The opportunity to download data will still be available.
3. Disable data upload to the regional DICOM Server, as well as the functions of archiving and disposing of old images.
4. Uncheck the **Enabled** box for the storage.
5. Copy the whole storage folder to a new location.
6. Change the folder path for the existing storage. **Attention! Do not delete the old storage or create a new one. It will result in problems with file access!** If data are being downloaded at the time when the path is changed, the process is not interrupted.
7. Enable data upload to the regional DICOM Server, as well as the functions of archiving and disposing of old images.
8. Check the **Enabled** box for the storage.

If access to storage folders is denied as a result of deletion of entries from the **Storages** table, restore the database using the backup copy. Note that the studies uploaded after the backup copy creation are inaccessible.

Chapter 4

DICOM Server Management Web Console

The web console allows you to:

- view and edit the settings;
- set up integrated Web Viewer connection;
- view and download log files;
- search for and disposing of studies and certain series;
- view studies.

4.1 Opening the Web Console

To use the web console, you need to start the DICOM Server and to set the web console access in the system. To enable access from other devices, you need to open the DICOM Server HTTP port in the firewall.

To open the web console, type `http://<computer address or name>:<HTTP DICOM Server port>` in the browser's address bar, e.g.: `http://192.168.1.2:8000`. Type the user name and the password in the login window, and press **Enter**.

To change the interface language, click the language selection button in the lower left corner (marked with number «1» in Fig. 4.1). To change the page background click the switch marked with number «2» in Fig. 4.1.

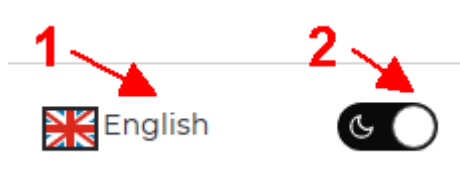


Figure 4.1: Web Console interface settings

4.2 DICOM Server settings

4.2.1 Client Connection Settings

After you have entered the web console, the browser will display the **Devices (AE)** tab.

#	AE Title	IP or FQDN	Port	USE TLS	FIND	DOWNLOAD	UPLOAD	MWL	Description	Preferred TS
2	EXAMPLE	192.168.0.1	104	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	room # 1315	As it is
3	TEST	192.168.0.53	3101	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	room # 1739	JPEG 2000 (Lossless only)

Figure 4.2: Devices (AE) Tab


To add a client to the list, proceed as follows:

1. Click the **CREATE** button.
2. Enter the following information about the client (device or program) in the data entry line:
 - (a) enter the client's AE title in the box named **Ae Title**;
 - (b) enter the client's IP address or domain name in the box named **IP or FQDN**;
 - (c) enter the client's DICOM port in the box named **Port**;
 - (d) tick the check box named **USE TLS** to use secure connection;
 - (e) tick the check box named **FIND** to enable the client to search for data at the DICOM Server;
 - (f) tick the check box named **DOWNLOAD** to enable the client to download data from the DICOM Server;
 - (g) tick the check box named **UPLOAD** to enable the client to upload data to the DICOM Server;
 - (h) tick the check box named **MWL** (Modality Worklist) to enable the client to access MWL at the DICOM Server. **Attention: To enable MWL search you also need to tick the FIND check box.**
 - (i) add a brief description of the device or software to the **Description** field. The description must not exceed 120 characters;
 - (j) from the **Preferred TS** (Transfer Syntax) drop-down list, choose the format in which images will be uploaded to the device by C-GET and C-MOVE methods. When choosing the preferred TS, consider the device capabilities, the acceptable image compression level, and the current archiving settings at the server.

The available transfer syntax options are:

- **As it is;**
- **Little Endian Implicit** (UID 1.2.840.10008.1.2);
- **Little Endian Explicit** (UID 1.2.840.10008.1.2.1);
- **Big Endian Explicit** (UID 1.2.840.10008.1.2.2);
- **Deflated Explicit VR Little Endian** (UID 1.2.840.10008.1.2.1.99);
- **JPEG Baseline** (UID 1.2.840.10008.1.2.4.50);
- **JPEG Lossless, Non-hierarchical, 1st Order Prediction** (UID 1.2.840.10008.1.2.4.70);
- **JPEG-LS Lossless** (UID 1.2.840.10008.1.2.4.80);
- **JPEG-LS Lossy (Near-lossless)** (UID 1.2.840.10008.1.2.4.81);
- **JPEG 2000 (Lossless or Lossy)** (UID 1.2.840.10008.1.2.4.91);
- **RLE Lossless** (UID 1.2.840.10008.1.2.5).


3. To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**. If an invalid value is entered, a warning appears below the corresponding field.


To check the client's availability with a C-Echo command, click the **ECHO**  button in the column. In the lower right corner, the result of the operation pops up.

If needed, you can add one more client.

If the maximum number of clients provided for by the license has been reached, the **CREATE** button becomes inactive.

To change the settings of the existing client, click the **EDIT**  button.

To delete a client, select it in the table, click the **REMOVE**  button and choose **REMOVE** or **CANCEL** in the dialog box to confirm or cancel the deletion.

To update the data in the table, click the **UPDATE**  button.

4.2.2 Storage Settings

You need to create a folder for data storage and give the required permissions to the user who starts the DICOM Server.

To add the path to a storage folder to the list, proceed as follow:

1. Click the **CREATE** button.
2. Make the following entries in the data entry line:
 - (a) enter the path to the storage folder in the **Storage Path** box;
 - (b) tick the **Enabled** check box to make this folder active.
3. To save the changes, click the **SAVE** button, to cancel click the **CANCEL** button.
4. If needed, add another folder path.

To change the parameters of the existing paths to the storage folders, select it in the table, click the **EDIT** button. After having changed the parameters, click **Save** at the top of the Storage table.

To delete the path to a storage folder, select it in the table, click the **REMOVE** button. To delete the data saved in the folder, check the **Remove all storage files** box. Click **REMOVE** or **CANCEL** in the dialog box to confirm or cancel the deletion.

To update the data in the table, click the **UPDATE** button.

The value of the **Free space (MB)** column is updated with the frequency specified in the **disk_free_space_check_frequency** parameter in the settings file (by default every 30 seconds). To see the latest updates, click the **UPDATE** button at the top of the **Storages** table.

4.2.3 Regional DICOM Server Settings

The web console provides the following connection settings for the regional DICOM server:

- **Regional DICOM server AETitle;**
- **Regional DICOM server IP address;**
- **Regional DICOM server port;**
- **Enable the connection to the regional DICOM server;**
- **Use secure connection (TLS);**
- **Enable advanced search.**

To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

To restart sending data click the **RESTART** button.

4.2.4 Studies Archiving Settings

The web console provides the following studies storage settings:

- **Compression level;**
- **Time after which data are to be compressed (days);**
- **Data storage period (days).**

To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

To restart archiving click the **RESTART** button.

4.2.5 Removing from the storage settings

The web console provides the following studies removing settings (if there is not enough free space):

- **Threshold (MB);**
- **Remove not uploaded to the Regional DICOM Server data;**
- **Enable removing.**

To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

4.2.6 Viewing the Read Only Settings

Some settings in the web console are read only. You can edit the settings in the configuration file.

- **Database settings:**
 - Database user name;
 - Database password;
 - Minimum number of connections;
 - Maximum number of connections;
 - Database connection string;
- **HTTP service settings:**
 - HTTP Service activation;
 - **WADO Service activation.** The option disables unauthorized access to snapshots via HTTP. If the check box is unchecked, then viewing the series in the DICOM Server administrator web console will be impossible;
 - HTTP port;
- **Notifications settings:**
 - Email command;
 - Save error notifications activation;
 - Storage notifications activation;
 - Notification threshold (MB);
- **DICOM service settings:**
 - MWL service activation;
 - Secure MWL service activation;
 - Secure storage activation;
 - Storage activation;
 - Server AE title;
 - Path to the temporary folder;
 - Limit of free disk space;
 - MWL service port;
 - Secure MWL service port;
 - Secure storage port;
 - Storage port.

4.3 Web Viewer Settings

To set up connection to the View Viewer, open the **WEB-VIEWER** tab.

4.3.1 Current configuration

The web console provides the following View Viewer settings:

- **URL:** Render Node URL (*http://<host>:<port>*, where the host is the IP address or hostname of the computer the Render Node is installed on; port is the RenderNode port);
- **Session timeout;**
- **TCP port:** local Web Viewer port.

To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

4.3.2 Web Viewer Users Settings

To add a user to the list, proceed as follows:

1. Click the **CREATE** button.
2. Enter the following information in the dialog that opens:
 - (a) enter the user's login to the box named **Login**;
 - (b) enter the user's password to the box named **Password**;
 - (c) enter the user's password again to the box named **Password confirm**.
3. To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**. If an invalid value is entered, a warning appears below the corresponding field.
4. If needed, you can add one more user.

The value of the **Online** column displays the user status.

To change the parameters of the existing user, select it in the table, click the **EDIT** button.

To delete the user, select it in the table, click the **REMOVE** button and choose **REMOVE** or **CANCEL** in the dialog box to confirm or cancel the deletion.

To update the data in the table, click the **UPDATE** button.

To close the user's session, press the **KICK** button.

4.4 Log Viewing

To view the log, choose the **LOG** tab by pressing the respective button. The contents of the latest log file for A1 appender will be shown. **Attention: If there isn't such an appender, no data will be displayed.** The entries are sorted by the time of their creation; the latest entries are shown at the top. To scroll through the log, move the bar on the right-hand side of the window, scroll the wheel or use the arrow keys.

To update the window, press the **UPDATE** button at the top of the window.

To download the archive with all the log files, press **DOWNLOAD ZIP**. The name of an archive is written as *pacs_logs_<hhmmsszzz>.zip*, where hh stands for hours, mm — for minutes, ss — for seconds, zzz — for microseconds reflecting the time of the archive creation.

To change the logging level, go to the **SETTINGS** tab and choose the level required from the dropdown list. You don't have to relaunch the DICOM Server. **Attention! The logging level for the first appender is changed in the configuration file. For details see Section 1.2.**

4.5 Modality Worklist

The administrator web console provides an opportunity to manage the list of scheduled studies. To open the scheduled studies tab, click the **MWL** (Modality Worklist) button.

4.5.1 Searching for Scheduled Studies

To search for scheduled studies, click the **SEARCH** button.


To find all the scheduled studies, perform the search with empty filter fields. To reset the filter, click the **RESET** button.

You can filter studies by the following parameters:

- **Patient's name;**
- **Patient's PID;**
- **Patient's date of birth;**
- **Patient's sex;**
- **Admission id;**
- **Status;**
- **AE title;**
- **Study modality;**
- **Study date.**

To filter by the step status, choose one of the following options from the drop-down list:

- **SCHEDULED;**
- **IN_PROGRESS;**
- **COMPLETED;**
- **DISCONTINUED;**
- **MISSED;**
- **CANCELED.**

To filter by modality, click the button corresponding to the desired modality. The button is highlighted. To cancel the action, click the button again. Any set of modalities can be selected at the same time. To cancel filtering by modality, click the  button.





To filter by date, choose one of the two options:

- **Exact date;**
- **Date range:** you need to enter the start and/or the end date. The buttons below are available for quick setting of the following ranges:
 - the last week;
 - the last month;
 - the last year.

You can also search by the description of the procedure step or by the doctor's name.

4.5.2 Scheduled Studies Panel

On this panel, you can see the scheduled studies that have been found. At the bottom of the panel, you see the navigation buttons, the number of pages, and the numbers of the studies on the current page.

	Button that brings you back to the first page of the study list
	Button that brings you back to the previous page of the study list
	Button that brings you to the next page of the study list
	Button that brings you to the last page of the study list


4.5.3 List of the Scheduled Procedure Steps

To view the list of the steps of the scheduled study, select the study on the study panel. You will see the list of the steps of the selected study at the bottom of the panel, under the navigation buttons.

4.5.4 Deleting Scheduled Studies

Attention! The deletion of scheduled studies and their steps cannot be cancelled!

To delete a scheduled study or its steps, proceed as follows:


1. Select a scheduled study on the study panel.
2. In the list of steps, select a step of the scheduled study.
3. Click the **Remove**  button. If the study comprises several steps, only the selected step will be deleted. When you delete the last step of the scheduled study, the study is deleted from the study panel.
4. If required, repeat steps 2 and 3.

If you attempt to delete a scheduled study or one of its steps with «IN_PROGRESS» status, a dialog box will pop up, in which you will have to confirm the deletion.

4.5.5 Resetting the Step Status

If a hardware or software failure occurs at some step of the study, the step status may be reset to **SCHEDULED**.

To reset the status to **SCHEDULED**, proceed as follows:

1. Select a scheduled study on the study panel.
2. In the list of steps, select a step of the scheduled study. The status of this step must be different from **SCHEDULED**.
3. Click the **Reset**  button.

4.6 Viewing Studies



This function cannot be used for establishing a diagnosis

The web console allows you to search for and view study images, as well as to delete studies or series of studies. To open the tab for viewing studies, press the **STUDIES** button.


4.6.1 Study Search

To search for studies, press the **SEARCH** button.

To find all the studies kept in the DICOM Server storage, perform the search with empty filter fields. By default, the filter is empty. To clear the filter, click the **RESET** button.

You can filter the data by the following criteria:

- **Patient's name;**
- **Patient's PID;**
- **Patient's date of birth;**
- **Patient's sex;**
- **Study modality;**
- **Study date.**





To filter by modality, click the button corresponding to the desired modality. The button is highlighted. To cancel the action, click the button again. Any set of modalities can be selected at the same time. To cancel filtering by modality, click the  button.

To filter by date, choose one of the two options:

- **Exact date;**
- **Date range:** you need to enter the start and/or the end date. The buttons below are available for quick setting of the following ranges:
 - the last week;
 - the last month;
 - the last year.

4.6.2 Study Panel

The panel shows the studies in the storage by 10 items. At the bottom of the panel, you can see the navigation buttons, the number of pages and the numbers of current studies:

	Button that brings you back to the first page of the study list
	Button that brings you back to the previous page of the study list
	Button that brings you to the next page of the study list
	Button that brings you to the last page of the study list

To download a search, select it in the list and press **DOWNLOAD**. The study is packed.

4.6.3 Series Panel

You can see the series panel in the picture.

To see a study series, select this series on the series panel. The following information is displayed for each series:

- **Name;**
- **Modality;**
- **Number of images.**

4.6.4 Data Deletion

Attention: If a study or a series of studies is deleted, it cannot be restored.

To delete a single study, proceed as follows:

1. Select a study on the study panel.
2. Click the **REMOVE** button.
3. Click the **REMOVE** or **CANCEL** button to confirm or cancel the deletion.

To delete a single study series, proceed as follows:

1. Select a study on the study panel.
2. Select a series on the series panel.
3. Click the **REMOVE** button on the series panel.
4. Click the **REMOVE** or **CANCEL** button to confirm or cancel the deletion.

4.7 Image Viewing

4.7.1 Opening a Series

To view the series images, proceed as follows:

To open a series from the tab for viewing studies, select the series you need on the series panel and double-click the left mouse button. To view the series images, use the **Image Viewing** tab. If there are any other images open in the **Image Viewing** tab, they will be closed.

To open a series from the **Image Viewing** tab, select the series you need and double-click the left mouse button

4.7.2 Image Scroll

To go from one image of the series to another, scroll the mouse wheel or move the bar on the right-hand side of the image viewing window.

Chapter 5

Email Notification

DICOM Server can send emails in case of problems with storage availability, reaching the limit of free space or file saving errors. To activate Email Notification, set the corresponding parameter value to **true** and set the **email command** (see Section 1.1).

Configuration file parameter	Action
email_command	email command
enable_email_storage_devices_notifying	activation of notification in case of problems with storage availability
free_disk_space_warning_notify_limit	limit of free space for storage upon reaching which a notification is sent
enable_email_save_file_failure_notifying	activation of notification in case of file saving errors

If at least one of the parameters **enable_email_storage_devices_notifying**, **free_disk_space_warning_notify_limit** or **enable_email_save_file_failure_notifying** is **true** then you must set the **email_command** parameter.

Messages are sent using a third-party service, such as Postfix. An example of a send message command for a Postfix server:

```
email_command="echo %1 | sendmail <email_address>"
```

where `email_address` is the email to send a message, `%1` is a parameter, instead of which a message from the server is written. Do not delete this parameter.

Chapter 6

DCM_IMPORT Utility

We use the `dcm_import` command-line utility for automated data uploading to the DICOM server. If the utility is started with no parameters, it works interactively.

The studies from the given folder are imported regardless of their nesting level. Thus, it is enough to provide the path to the top-level folder. All the files that have been found are interpreted as DICOM files.

When the program exits, reports with a list of files when reading which an error occurred and with a list of files when sending which an error occurred are generated.

The language is defined by the system locale of the operating system.

6.1 Using `dcm_import` in the Interactive Mode

To import data to the DICOM server interactively, proceed as follows:

1. Run the utility with no command line parameters.
2. Enter the IP address of the DICOM server. The default value is **127.0.0.1**. To keep the default value, do not make any entries. Press **Enter**.
3. Enter the port of the DICOM server. The default value is 3000. Press "Enter".
4. Enter the path to the folder with the studies to be imported to the DICOM server. The default value is: **the folder one level above the `dcm_import` utility executable file**. Press **Enter**.
5. Enter the AE Title of the DICOM server. The default value is: **PACS_Inobitec**. Press **Enter**.

The command line shows the process of files import and the errors occurring.

The import parameters can be passed via the command line when the `dcm_import` utility is run (see Section 6.2).

6.2 Using `dcm_import` with Command Line Parameters

To import data to the DICOM server, run the `dcm_import` utility with the following parameters:
`[<program_path>]<dcm_import> [<host> <port> <path> <aetitlescp>]`

<**host**> — DICOM server IP address for studies import;

<**port**> — DICOM server port for studies import;

<**path**> — path to the folder with the studies to be imported;

<**aetitlescp**> — AE Title of the DICOM server where the studies are to be imported.

Example:

```
D:\Inobitec\PACSServer\2.0.0\Dcm_import\dcm_import.exe 192.168.1.10  
3000 D:\dicom_data PACS_Inobitec.
```

If the `dcm_import` utility is started with no parameters, it works interactively (see Section 6.1).

Thanks for selecting our product! The INOBITEC, LLC team is constantly working to improve it. We will be grateful for any feedback, comments and suggestions how to enhance the product functionality, user-friendliness and visualization quality.

We wish you success in your work!