

Inobitec DICOM Server (PACS) version 2.11

USER'S MANUAL

The screenshot displays the Inobitec DICOM Server (PACS) interface, version 2.11. The interface is divided into several sections:

- Settings:** A sidebar on the left contains navigation links: Admin, Devices (AS), Studies, Modality Worklist, Storages, Tasks, Log, Settings, and About. The main content area shows the 'Settings' page with tabs for Database, DICOM, Email notification, and HL7 connection settings. The 'HL7 connection settings' tab is active, displaying fields for Host description, Connection type (TCP/IP Client), IP (127.0.0.1), Port (2575), HL7 version (2.5.1), Encoding (UTF-8), Start block (1 byte), and Timeout for sending completion status (60). A 'Create new connection' dialog box is open over the settings, with a large arrow pointing to it from the 'SETTINGS IMPORT & EXPORT' label.
- MESSAGE EXCHANGE:** A red box with the text 'HL7 MESSAGE EXCHANGE' is overlaid on the settings section.
- TASK STATISTICS:** A red box with the text 'TASK STATISTICS' is overlaid on the bottom left. It contains a 'Schedule' table with columns for Day, Time, and Status. The table shows a grid of blue squares representing scheduled tasks. Below the table, a summary box indicates: 'Total hours in a week: 93', 'Series scheduled for uploading: 12', and 'Failed: 0'.
- HIS (Hospital Information System) Interface:** A separate window shows the HIS interface with a top navigation bar (Patients, Studies, Schedule, Tasks, Reports, Management) and a user profile (Dr. Johnson W., Logout). The 'Studies' section displays a table of studies with columns: Name, Modality, ACC, Study status, Description status, Series, and Completion time. The table lists three studies: Smith J. (CT, 00001, Completed, Ready, 3, 12:00:31), Williams A. (MR, 00002, In progress, Processed by Johnson W., 5, 11:30:14), and Williams A. (MR, 00003, Completed, Processed by Anderson R., 3, 11:30:14). A 'Report' section for Williams A. shows patient details (Williams A., Male, Jan 25, 1970), diagnosis (Dorsal extrusion of L4-5 disc), and description (The lateral recesses are significantly narrowed on both sides; the vertebral canal at the level of disc prolapse is narrowed to 9.4 mm (absolute)). A large arrow points from the 'TASK STATISTICS' section to the 'Report' section. A 'New series' button is visible at the bottom right of the studies table.

SETTINGS IMPORT & EXPORT



The information contained in this User Manual belongs to Inobitec Software FZ-LLC, Dubai Media City, Building 05, Dubai, UAE, P.O. Box 73030. The Manual is delivered to the users of the Inobitec DICOM Server (PACS) software product exclusively for the purpose of working with this product. Inobitec Software FZ-LLC reserves the right to alter this Manual without prior notice.

Contents

About this Manual	6
Accepted Conventions	6
Technical Support	7
About the Product	8
DICOM Server Functionality	8
Installing, Uninstalling and Launching the Program	11
System Requirements	11
Minimum System Requirements	11
Recommended System Requirements	12
Installing the Program	13
Installing the Program on Windows	13
Installing the Program on Linux	14
Database Deployment	15
Launching the Program	17
Launching on Windows	17
Launching on Linux	17
Command Line Parameters	18
Updating the Program	18
How to update a database from any version	19
Updating the Database	19
Updating the Program on Windows	20
Updating the Program on Linux	20
Uninstalling the Program	21
Uninstalling the Program on Windows	21
Uninstalling the program up to and including version 2.10.2, installed using the deploy_pacs.bat script	21
Uninstalling the program version 2.11.0 and later	22
Uninstalling the Program on Linux	23
Uninstalling the program up to and including version 2.10.2, installed using the deploy_pacs.sh script	23
Uninstalling the program installed from a deb package	24
Getting Started	24

1	DICOM Server Management Web Console	25
1.1	Logging into the DICOM Server Administration Web Console	26
1.2	Devices	27
1.2.1	Adding a Client DICOM Device	28
1.2.2	Setting up a Secure DICOM Connection via the TLS protocol	30
1.2.3	Adding WADO Devices	32
1.2.4	Connecting the Workstation as a Client for Inobitec DICOM Viewer Pro- gram	33
1.2.5	Setting up a Secure Connection with Inobitec DICOM Viewer as the Client	34
1.2.6	Setting up a connection using the WADO service for Inobitec DICOM Viewer Program	36
1.3	Studies	36
1.3.1	Study Panel	37
1.3.2	Series Panel	38
1.3.3	Opening a Series	39
1.3.4	Study Search	40
1.3.5	Import of Studies	42
1.4	Modality Worklist	45
1.4.1	Searching for Scheduled Studies	45
1.4.2	Scheduled Studies Panel	45
1.4.3	Clearing the Modality Worklist	46
1.4.4	List of the Scheduled Procedure Steps	47
1.4.5	Deleting Scheduled Studies	47
1.4.6	Resetting the Step Status	48
1.5	Storages	48
1.5.1	Storage Settings	49
1.5.2	Data Storage Transfer	51
1.6	Storage Maintenance Schedule	52
1.6.1	Setting the Transfer of Studies to the Regional DICOM Server	54
1.6.2	Regional DICOM Server	57
1.6.3	Studies Archiving Settings	57
1.6.4	Data Deletion Settings	60
1.6.5	Automatic series deletion if running out of storage space	62
1.7	Log Viewing	63
2	Settings	65
2.1	Database connection settings	66
2.1.1	Changing database connection settings	67
2.2	Configuring DICOM Server services	67
2.2.1	DICOM Server access settings	67
2.2.2	Store service settings	68
2.2.3	MWL service settings	70
2.3	Email Notification Settings	71
2.4	Messaging with the RabbitMQ server	72
2.4.1	Setting up a messaging service with the RabbitMQ server	72
2.4.2	Configuration of the RabbitMQ server	74
2.5	Configuring an HL7 connection	78
2.5.1	Creating a new connection	79

2.5.2	Actions with connections	83
2.6	Web services to access the DICOM Server	83
2.7	System logging settings	84
2.8	DICOM Server Certificates	86
2.9	Integration of the DICOM Server with other Services via the HTTP Protocol	88
2.10	Changing the administrator username and password	89
2.11	DICOM Server system settings	91
2.11.1	Storage maintenance task processing settings	91
2.11.2	Event handling settings	93
2.11.3	Configuring study import to DICOM Server	93
2.11.4	Resetting DICOM Server settings	94
2.12	Uploading and downloading DICOM Server settings	94
2.13	Tables	95
2.13.1	Customizing Parameters Display Options	95
2.13.2	Sorting by Values	96
3	Licensing	97
3.1	General Information	97
3.2	DICOM Server Licensing	97
4	DICOM Files Import Utility inobitec-dicom-server-import-util	100
4.1	Using inobitec-dicom-server-import-util in the Interactive Mode	100
4.2	Using inobitec-dicom-server-import-util with Command Line Parameters	101
5	Features and limitations	102
5.1	Peculiarities of DICOM Server operation in Windows OS	102
5.2	Peculiarities of Message Display When Deploying or Updating a PostgreSQL Database	102

About this Manual

This User Manual describes the functionality of Inobitec DICOM Server (PACS) (version 2.11.2) 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 Inobitec Software FZ-LLC team. If you apply for technical support, please include the following information in your message:

- name, version, and bitness of the operating system of the computer or computers on which the program and the DBMS are installed;
- program version (for example, 2.11.0.029). To find out the program version, select **About** in the main menu of the web console;
- DBMS version used;
- product code and license key, if a license has been purchased. For information on how to find out the product code, see section 3.1;
- 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/about/serverLic/.

The 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;
- message exchanging with RabbitMQ service;
- interaction with external systems via the HL7 protocol;
- 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;
 - viewing and editing program settings;
 - import and export of program settings;
 - view the product code and upload the license;
 - log file viewing;
 - downloading a log files archive;
 - searching for studies in the storage;
 - viewing studies in the storage;
 - manage the collection of tasks associated with studies transfer, compression, and deletion;
 - 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.

In the current version of the DICOM Server, interaction with the regional server via Web-services (WADO, QIDO) is not available.

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 by the storage period is not available.
6. Automatic disposal of studies if there is lack of storage space is not available.
7. The import of studies to the DICOM Server through the administration web console is unavailable.

Installing, Uninstalling and Launching the Program

It is not recommended to install the 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.

The amount of free space for system log files is configured by the user on the **Logging** tab of the **Settings** page. By default, 20 files of 100 MB each are specified.

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

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

Minimum System Requirements

- **Operating System:**
 - Windows 10 x64;
 - Ubuntu 24.04.
- **One of DBMS:**
 - MySQL 5.6;
 - PostgreSQL 10. The MD5 authorization method must be enabled in the PostgreSQL DBMS settings;

- **RAM:** 16 GB;
- **Free space on the disk:** 100 MB (excluding data storage and system log files);
- **Processor:** clock frequency 2.5 GHz;
- **Network card** (1 Gbit/s);
- **Web browser for the web console:**
 - Microsoft Edge;
 - Google Chrome;
 - Mozilla Firefox.

Other browsers may not display the web console correctly.

Recommended System Requirements

- **Operating System:**
 - Windows 10 x64;
 - Ubuntu 24.04.
- **One of DBMS:**
 - MySQL 8;
 - PostgreSQL 16. The MD5 authorization method must be enabled in the PostgreSQL DBMS settings;
- **RAM:** 32 GB;
- **Free space on the disk:** 100 MB (excluding data storage and system log files);
- **Processor:** clock frequency 3 GHz (4 cores);
- **Network card** (1 Gbit/s);
- **Hard drive with quick data access;**
- **Web browser for the web console:**
 - Microsoft Edge;
 - Google Chrome;
 - Mozilla Firefox.

Other browsers may not display the web console correctly.

Installing the Program

Installing the Program on Windows

The DICOM Server supports **MySQL** and **PostgreSQL** DBMS.

The DICOM Server distribution package for Windows is supplied as an archive. The distribution package name has the following format:

InobitecDicomServer-<server version>-<suffix>-<operating system>-<supported DBMS>.zip.

Examples of archived DICOM Server distribution package names for installation on Windows are given below:

InobitecDicomServer-2.11.0-rw-Windows-x64-MySQL.zip

InobitecDicomServer-2.11.0-rw-Windows-x64-PostgreSQL.zip

Attention! Start the DICOM Server service only after successful database deployment (see Section **Database Deployment**).

To install the DICOM Server in a Windows operating system, perform the following steps:

1. Extract the distribution package files from the archive into a separate directory.
2. Run the command prompt as administrator.
3. Go to the **scripts** directory of the unpacked DICOM Server distribution package by running the following command:
cd <path to the scripts directory>

4. Run **deploy_server.bat**.

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

5. Select the DBMS type. The DBMS type is selected to add the database connection parameters to the settings file. Enter 1 for MySQL, enter 2 for PostgreSQL, and press **Enter**.

Select database type:

1 - MySQL

2 - PostgreSQL

Enter database type [1-2]:

6. Enter the IP address of the server with the DBMS installed (the default value is **127.0.0.1**) and press **Enter**:

Enter database host ip [127.0.0.1]:

7. Enter the DBMS port. The default value for the selected DBMS will be shown in square brackets:

Enter database port [3306]:

or

Enter database port [5432]:

8. Enter the database name (default value: **pacs_db**) and press **Enter**:

Enter database name [pacs_db]:

9. Enter the user name to access the database (default value: **pacs_user**) and press **Enter**:
Enter database username [pacs_user]:

10. Enter the user password to access the database (default value absent) and press **Enter**:
Enter database user password:

A file with the database connection settings is created. The default file path is:
C:\ProgramData\Inobitec\Inobitec DICOM Server (PACS).ini

11. Enter the path to the directory where the DICOM Server will be installed (default value: **C:\InobitecDicomServer**) and press **Enter**:
Enter the path to the folder to install the Inobitec DICOM Server (PACS) [C:\InobitecDicomServer]:

12. Enter the name under which the service will be registered in the operating system (default value: **InobitecDicomServer**) and press **Enter**:
Enter the Inobitec DICOM Server (PACS) service name [InobitecDicomServer]:

13. Indicate if dependency on DBMS service should be added:
Add dependency from DBMS service?

14. If you have chosen to add the dependency in the previous step, enter the DBMS service name and press **Enter**:
Enter DBMS service name (e.g., MySQL):
or
Enter DBMS service name (e.g., postgresql-x64-15):

After successful installation, the following message is displayed:

Installing Inobitec DICOM Server (PACS) completed.

After the Program installation, deploy the database according to Section **Database Deployment**, and then start the DICOM Server service.

Installing the Program on Linux

The DICOM Server supports **PostgreSQL** and **MySQL** DBMS.

Attention! The DBMS must be running before installing the DICOM Server.

The DICOM Server for Linux is supplied as an installation deb package. The package contains the Program and all libraries required for its operation.

The package name has the following format: **InobitecDicomServer-<server version>-<suffix>-<operating system>-<supported DBMS>.deb**.

Examples of DICOM Server deb package names for installation on Linux are given below:

InobitecDicomServer-2.11.0-rw-ubuntu-24.04-mysql.deb

InobitecDicomServer-2.11.0-rw-ubuntu-24.04-postgresql.deb

To install the deb package:

1. Update the local list of available software packages from the repositories. To do this, run the following command in the terminal (example for Ubuntu):
sudo apt update

2. Go to the directory with the downloaded file and start installation:

```
cd /path/to/deb-package
```

```
sudo apt install ./<deb-package_name>
```

Attention! Be sure to use the `./` prefix before the file name. In this case **apt** will search for the package locally, not in remote repositories.

3. Deploy the database schema. For details see Section [Database Deployment](#).
4. After installing the deb package, update system services. To do this, run the following command in the terminal (example for Ubuntu):

```
sudo systemctl daemon-reload
```

File structure after installation:

- files with environment variables — `/etc/inobitec-dicom-server/env.conf`;
- directory for log files — `/var/log/inobitec-dicom-server` (write permissions are granted to the **pacs** user).

To view information about the installed package, run:

```
apt show inobitec-dicom-server
```

During deb package installation, a Linux system user **pacs** is created. The `inobitec-dicom-server` service runs as this user.

The database user is specified separately in the **DB_USER** parameter of the `/etc/inobitec-dicom-server/env.conf` file. If the database is deployed manually, the database user must be created separately in the DBMS or using the schema deployment utility.

Database Deployment

Attention! Before database deployment, make sure that you have the DBMS administrator password and the database user password. The password field cannot be left empty.

Attention! The MD5 authorization method must be enabled in the PostgreSQL DBMS settings.

To deploy the database, use the utility corresponding to your operating system and DBMS type:

OS	DBMS	Utility	DBMS client	DBMS port	Default DBMS administrator name
Windows	MySQL	inobitec-dicom-server-mysql-util.exe	mysql	3306	root
Windows	PostgreSQL	inobitec-dicom-server-postgres-util.exe	psql	5432	postgres
Linux	MySQL	inobitec-dicom-server-mysql-util	mysql	3306	root
Linux	PostgreSQL	inobitec-dicom-server-postgres-util	psql	5432	postgres

In a Windows operating system, go to the **bin** directory and run the selected utility from the command line as a regular user. Do not run the utility as an administrator.

In a Linux operating system, run the selected utility as a regular user. Do not run the utility as a superuser.

You need to install the DBMS client specified in the table to ensure the utility operation. The path to the DBMS client executable file must be provided in the **PATH** environmental variable.

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

1. When prompted, enter the figure corresponding to the action you want to perform. To deploy the database schema, print 1 and press **Enter**.
What do you want to do?
1 – Deploy database
2 – Update database
Please enter number of the action
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 [127.0.0.1]:
3. Enter the DBMS port. The default port for the selected DBMS is specified in the table:
Enter database port [3306]:
or
Enter database port [5432]:
4. Enter the database name (default value: **pacs_db**) and press **Enter**:
Enter database name [pacs_db]:
5. Enter the user name to access the database (default value: **pacs_user**) and press **Enter**:
Enter user name for DICOM Server database schema [pacs_user]:
6. Enter the user password to access the database (default value absent) and press **Enter**:
Enter password for user pacs_user:
7. Enter the DBMS administrator name. The default administrator name for the selected DBMS is specified in the table:
Enter database admin username [root]:
or
Enter database admin username [postgres]:
8. Enter the DBMS administrator password and press **Enter**:
Enter database admin password:

After successful database deployment, the following message is displayed:

Deploying database schema complete

Database deployed successfully.

Attention! Make sure that the MySQL DBMS buffer is suitable for operations related to large amounts of information. To work with bulk data, e.g. to delete a storage containing more than 100000 studies, it is recommended to increase the **innodb** buffer size to 64 MB by changing the **innodb_buffer_pool_size=64MB** parameter in the **mysql.ini** configuration file.

Attention! The maximum logging level is set in the PostgreSQL DBMS settings by default. This may result in quick reduction of free disk space and interruption of the DICOM Server operation by the system. We recommend that you regularly check free disk space or change the DBMS logging settings.

Launching the Program

Launching on Windows

You can launch the DICOM Server as service in two ways:

1. Using the **Services** window. Use your operating system manual.
2. Using the

`sc start <service name>`

command. For the default service name (**InobitecDicomServer**) the command looks like `sc start InobitecDicomServer`.

Run it as administrator.

Launching on Linux

The DICOM Server can be started in two ways:

1. Starting DICOM Server as a service

1. Install the deb package according to the information provided in section [«Installing the program in Linux-family OS»](#);
2. Configure the database connection. To do this, go to the `/etc/inobitec-dicom-server` directory and edit the parameters in the environment variables file **env.conf**, specifying:

DB_ADDRESS: IP address for connecting to the DBMS. The default value is **127.0.0.1**;

DB_PORT: DBMS port. For PostgreSQL, the default value is **5432**; for MySQL — **3306**;

DB_DRIVER_NAME: database driver name. For PostgreSQL, the default value is **QPSQL**; for MySQL — **QMYSQL**;

DB_NAME: database name. The default value is **pacs_db**;

DB_USER: database username. The default value is **pacs_user**;

DB_PASSWORD: database user password. There is no default value;

DB_MAX_CONNECTION: maximum number of simultaneous database connections. The default value is **20**.

3. Start the server by running the command, for example for Ubuntu OS:
`sudo systemctl start inobitec-dicom-server`

4. To enable automatic server startup when the OS starts, run:
`sudo systemctl enable inobitec-dicom-server`
5. To stop the server, run:
`sudo systemctl stop inobitec-dicom-server`

2. Starting DICOM Server from the command line with database connection parameters

The DICOM Server can be connected to the database and started from the command line without editing the **env.conf** file. To do this:

1. Install the deb package according to the information provided in section [«Installing the program in Linux-family OS»](#);
2. Start the DICOM Server, passing the variable values separated by spaces in the command line. The description of the variables and allowed values is provided in the previous subsection.

Example of connecting to a PostgreSQL database and starting the DICOM Server with default parameters:

```
DB_ADDRESS=127.0.0.1 DB_PORT=5432 DB_DRIVER_NAME=QPSQL DB_NAME=pacs_db  
DB_USER=pacs_user DB_PASSWORD=password DB_MAX_CONNECTION=20 inobitec-dicom-server
```

Attention! The maximum logging level is set by default in the PostgreSQL DBMS settings. This may lead to a rapid decrease in free disk space and interruption of the DICOM Server operation by the system. We recommend regularly checking the available disk space or changing the DBMS logging settings.

Attention! Make sure that the MySQL DBMS buffer is suitable for work with large amounts of data. To work with bulk data, e.g. to delete a storage containing more than 100,000 studies, the **innodb** buffer size must be increased to 64 MB by changing the **innodb_buffer_pool_size=64MB** parameter in the **mysql.ini** configuration file.

Command Line Parameters

The following startup keys are supported for the **inobitec-dicom-server** executable:

- v, --version:** displays the DICOM Server version and the program terminates;
- p:** displays the product key and the program terminates.

Updating the Program

Attention! Updating the database may take a long time!



Before updating the program, stop the DICOM Server. Do not start the DICOM Server until the program and database updates are fully complete



Create backups before updating the database



During the update, the physical size of the database may increase significantly. Before updating, make sure that there is enough free space on the storage device where the database files are stored. The additional space used during the update will subsequently be used to store new data, so the database size will not increase for some time after the update

How to update a database from any version

To update the database to the current version, 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:

- for Windows — in the «**scripts\previous_versions**» folder;
- for Linux — in the «**/usr/share/inobitec-dicom-server/previous_versions**» directory.

For example, if version 1.4.3 is installed, then to update to version 2.11.2 you need to run the database update scripts for versions 1.5.2, 2.0.0, 2.1.0, 2.4.0, 2.5.0 from the «**previous_versions**» folder, and then update to version 2.11.2 according to the database update section for the required DBMS and operating system.

Updating the Database

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 the database, use the utility that matches your operating system and DBMS type:

OS	DBMS	Utility	DBMS client	DBMS port
Windows	MySQL	inobitec-dicom-server-mysql-util.exe	mysql	3306
Windows	PostgreSQL	inobitec-dicom-server-postgres-util.exe	psql	5432
Linux	MySQL	inobitec-dicom-server-mysql-util	mysql	3306
Linux	PostgreSQL	inobitec-dicom-server-postgres-util	psql	5432

In Windows operating systems, go to the «**bin**» directory and run the selected utility from the command line as a regular user. Do not run the utility as an administrator.

In Linux operating systems, run the selected utility as a regular user. Do not run the utility as a superuser.

For the utility to work, the DBMS client specified in the table must be installed in the system. In Linux operating systems, if the DBMS client is not installed, the installation ends with an error. The path to the DBMS client executable file must be specified in the **PATH** environment variable.

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

1. When prompted by the installer, enter the number of the action you want to perform. To update the database, enter 2 and press **Enter**.

What do you want to do?

1 – Deploy database

2 – Update database

Please enter number of the action

2. Enter the IP address of the computer where the DBMS is installed (default value: **127.0.0.1**) and press **Enter**:
Enter database host [127.0.0.1]:
3. Enter the DBMS port. The default value is specified in the table:
Enter database port [3306]:
or
Enter database port [5432]:
4. Enter the database name (default value: **pacs_db**):
Enter database name [pacs_db]:
5. Enter the user name for connecting to the database (default value: **pacs_user**) and press **Enter**:
Enter user name for DICOM Server database schema [pacs_user]:
6. Enter the password of the user whose name was entered in step 5 and press **Enter**:
Enter password for user pacs_user:

After the database is successfully updated to version 2.11.2, the following message is displayed:

New version is 2.11.2

Updating database schema...

Updating database schema complete

Updating the Program on Windows

To update the program to version 2.11.2, do the following:

1. Uninstall the DICOM Server without deleting the database (see Section [Uninstalling the Program on Windows](#)).
2. Install the DICOM Server version 2.11.2 (see Section [Installing the Program on Windows](#)).
3. After installing the program, update the database (see Section [Updating the Database](#)).

Updating the Program on Linux

To update the program from version 2.10.2 or later to version 2.11.2, do the following:

1. Uninstall the DICOM Server without deleting the database (see Section [Uninstalling the Program on Linux](#)).

2. Install the DICOM Server version 2.11.2 (see Section [Installing the Program on Linux](#)).
3. After installing the program, update the database (see Section [Updating the Database](#)).

To update the program installed from a deb package, follow these steps:

1. Run the command (example for Ubuntu OS):
`sudo apt install ./<deb_package_name>`

Attention! Make sure to use the «./» prefix before the file name. In this case, **apt** will search for the package locally, not in remote repositories.

2. After updating the program, update the database (see Section [Updating the Database](#)).

Uninstalling the Program

Uninstalling the Program on Windows

Uninstalling the program up to and including version 2.10.2, installed using the `deploy_pacs.bat` script

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 program version 2.11.0 and later

To uninstall the DICOM Server version 2.11.0 and later in Windows OS, follow these steps:

1. Stop the server in one of the following ways:
 - using the **Services** snap-in;
 - using the command: `sc stop <service_name>`.
For the default service name (**InobitecDicomServer**), the command is as follows:
`sc stop InobitecDicomServer`
Run the command in Command Prompt as an administrator.
2. Open the **Start -> Windows Settings -> Apps** menu.
3. In the list of installed programs, select **Inobitec DICOM Server** and click **Uninstall**.

During uninstallation, the following will be removed:

- directories with the installed program;
- services;
- entries in the list of installed programs.

The database is not deleted during program uninstallation.

Uninstalling the Program on Linux

Uninstalling the program up to and including version 2.10.2, installed using the `deploy_pacs.sh` script

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 program installed from a deb package

If the DICOM Server was installed from a deb package, follow these steps to uninstall it:

1. Stop the server by running the command. Example for Ubuntu OS:
`sudo systemctl stop inobitec-dicom-server`
2. Uninstall the server by running the command:
`sudo apt remove inobitec-dicom-server`

The database is not deleted during program uninstallation.

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.

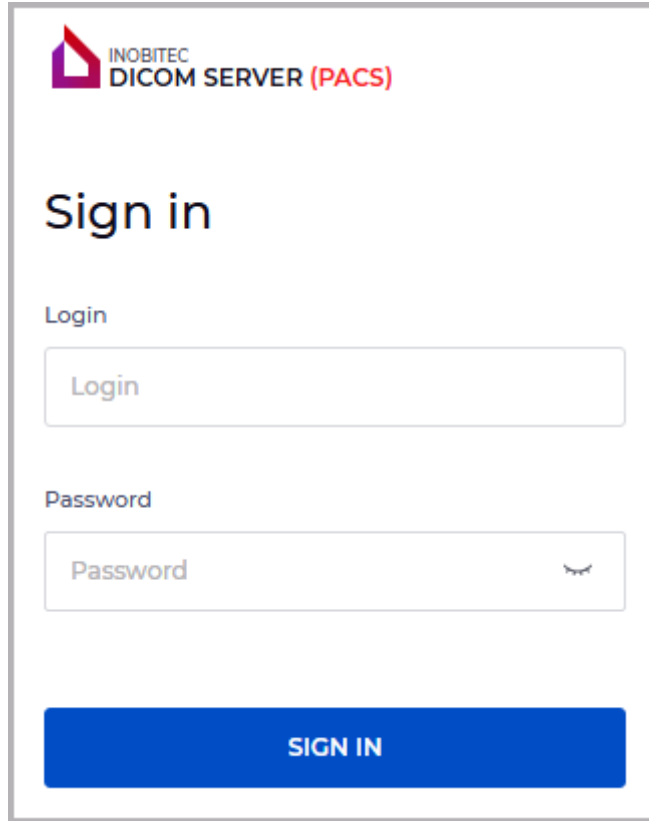
Chapter 1

DICOM Server Management Web Console

The web console allows you to:

- connect clients and manage access rights;
- search for and disposing of studies and certain series;
- view studies;
- manage scheduled studies and their stages;
- customize and manage storages;
- manage the collection of tasks associated with studies transfer, compression, and deletion;
- set up Web Viewer connection;
- view and download log files;
- set up an email notification;
- set up a messaging service with the RabbitMQ message broker;
- view and edit the settings;
- view the product code and upload the license.

1.1 Logging into the DICOM Server Administration Web Console



INOBITEC
DICOM SERVER (PACS)

Sign in

Login

Password

SIGN IN

Figure 1.1: Logging into 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`. In the pop-up box (Fig. 1.1), print the user name (login) and password, and then click the **SIGN IN** button.

The entered password is hidden and displayed as dots. To display the password in the input field, click the closed-eye icon. The following credentials are used by default:

Username: **admin**

Password: **Admin123!**

For security purposes, we recommend changing the default username and password (see section 2.10).

Main menu of the web console of the DICOM Server is shown in Fig. 1.2.

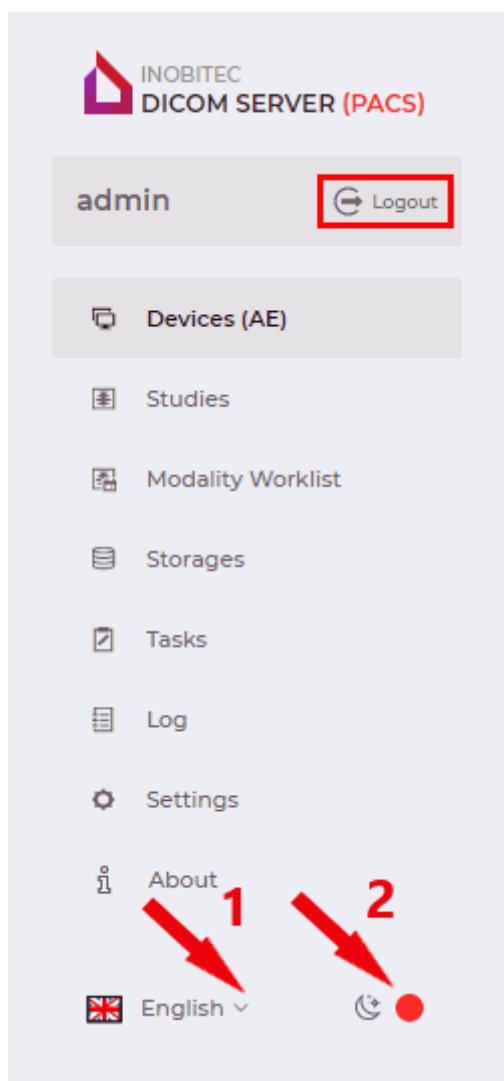


Figure 1.2: Web Console interface settings

To change the interface language, click the language selection button in the lower left corner (marked with number «1» in Fig. 1.2). To change the page background click the switch marked with number «2» in Fig. 1.2.

To log out from the web console, click the **Logout** button on the main menu (see the red box in Fig. 1.2).

1.2 Devices

After you have entered the web console, you will see the **Devices (AE)** tab (see Fig. 1.3).

You can connect various DICOM devices to the DICOM Server to provide for downloading, transfer, and quick access to the studies stored.

On the **Devices (AE)** tab, the clients' access to the data is restricted.

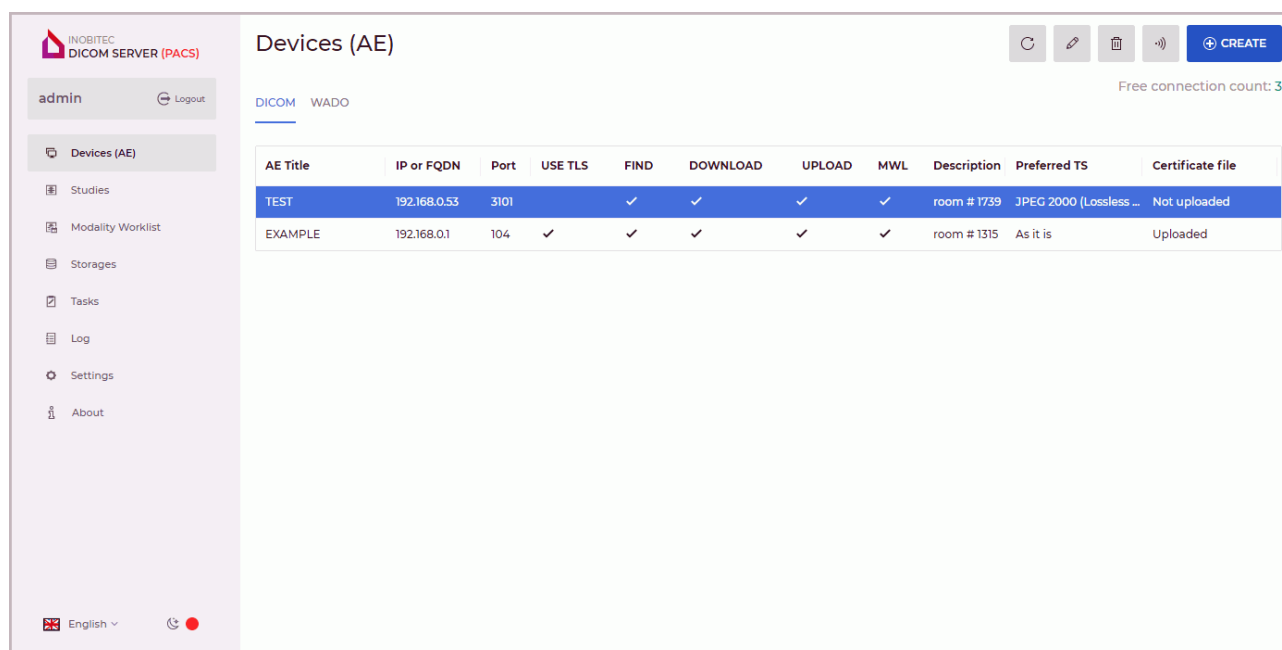


Figure 1.3: Devices (AE) Tab

In the table representing the connected client devices, the connection parameters are displayed. For details on the parameters display options, see Section 2.13.1. Client devices may be sorted by the values provided in one of the columns (see Section 2.13.2).

1.2.1 Adding a Client DICOM Device

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

1. Open the **Devices (AE)** page and go to the **DICOM** tab.
2. Click the **CREATE** button.
3. In the dialog box that pops up (Fig. 1.4), provide the following information on the client (device or program):
 - (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**. The maximum FQDN size is 255 characters, 63 characters for each domain name. The admissible characters are: uppercase and lowercase Latin letters, dot «.», and hyphen «-»;
 - (c) enter the client's DICOM port in the box named **Port**;
 - (d) tick the check box named **UPLOAD** to enable the client to upload data to the DICOM Server;
 - (e) 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.**

- (f) tick the check box named **DOWNLOAD** to enable the client to download data from the DICOM Server;
- (g) tick the check box named **FIND** to enable the client to search for data at the DICOM Server;
- (h) tick the check box named **USE TLS** to use secure connection. In the **Certificate file** field, the certificate status is displayed. If there is no certificate, the «Not selected» status will be shown in this field. If required, upload the certificate file (for details see Section 1.2.2).
When a new certificate is uploaded, the previous certificate is deleted. If you delete a device from the list of clients, the respective certificate file will be deleted. After uploading a new certificate, restart the server to apply the changes.
- (i) add a brief description of the device or software to the **Description** field. The description must not exceed 128 characters. This field can be left blank;
- (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 only)** (UID 1.2.840.10008.1.2.4.90);
 - **JPEG 2000 (Lossless or Lossy)** (UID 1.2.840.10008.1.2.4.91);
 - **RLE Lossless** (UID 1.2.840.10008.1.2.5).
4. 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.

If the **USE TLS** box is checked but the certificate has not been uploaded, the **SAVE** button will be disabled.

Figure 1.4: Adding a new client

If needed, you can add one more client.

If the maximum number of clients and WADO devices provided for by the license has been reached, the **CREATE** button becomes inactive. The total number of client connections available is displayed in the right-hand upper corner and determined by the type of the license (see Section 3).

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 you have failed to send a **C-ECHO** command to the DICOM Server, check the connection settings for DICOM Server and the client. Analyze the log files for the DICOM Server and the client. If all the parameters are correct, check the firewall settings for the computer with the DICOM Server.

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 change the settings of the existing client, click the  **Edit** button.

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

1.2.2 Setting up a Secure DICOM Connection via the TLS protocol

A Secure DICOM Connection provides for secure data transfer across the network via the TLS protocol. The DICOM Server interface provides for an opportunity to manage the server and clients' certificates.

To encode the data transferred across the network, the DICOM Server uses the TLS protocol. For that purpose, a copy of the client root certificate is saved on the computer with the

DICOM Server, and a copy of the DICOM Server root certificate is saved on the computer with the client. For details see Section 2.8.

In the dialog box for setting up and editing the clients' connections, follow the steps listed below to set up a secure DICOM connection:

1. Tick the check box named **USE TLS** to use secure connection (Fig. 1.5). In the **Certificate file** field, the certificate status is displayed. If there is no certificate, the «Not selected» status will be shown in this field.
2. To upload a certificate file, click the  **Upload** button. In the dialog box, select the file and click **Open**. After the certificate has been uploaded, you will see the «Uploaded» status in the **Certificate file** field.
3. Click the **SAVE** button under the settings section. The changes will be applied after restarting the server. If the **USE TLS** box is checked but the certificate has not been uploaded, the **SAVE** button will be disabled.
4. To delete a certificate, click the  **Delete** button.

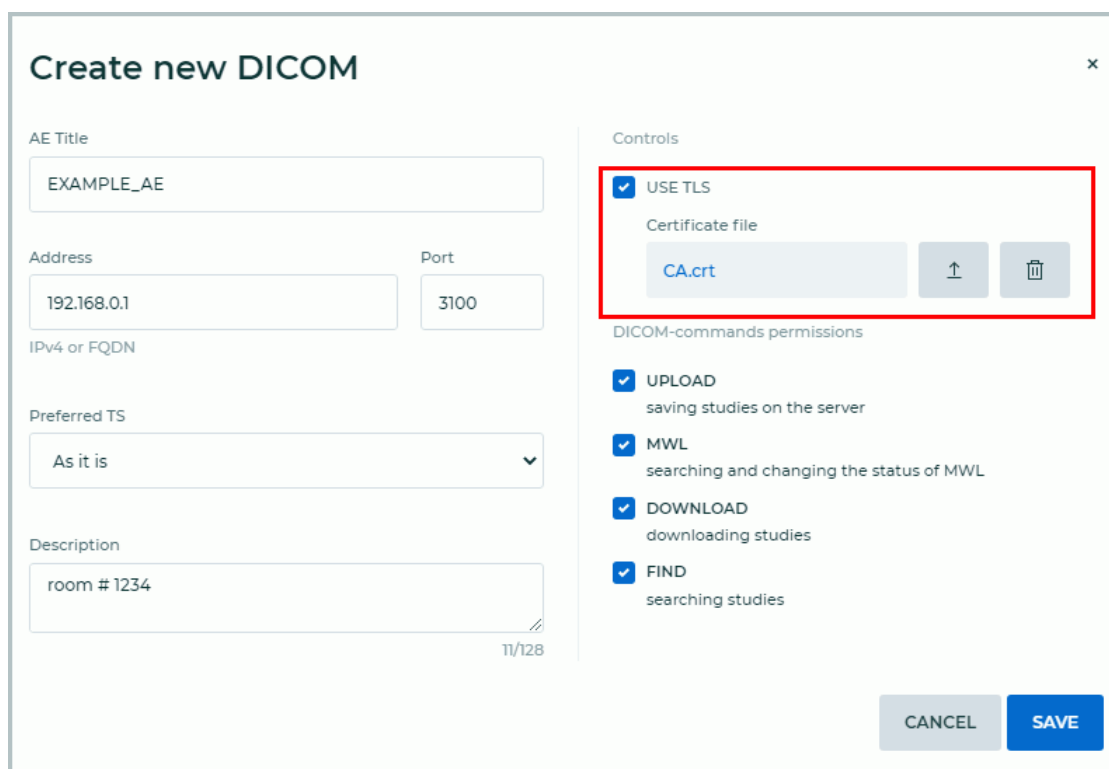


Figure 1.5: Setting a secure DICOM connection

After changing the parameters of the **USE TLS** box or the certificate, restart the DICOM Server to apply the changes.

1.2.3 Adding WADO Devices

To add a WADO device to the list, proceed as follows:

1. Open the **Devices (AE)** page and go to the **WADO** tab.
2. Click the **CREATE** button.
3. In the dialog box that pops up (Fig. 1.6), provide the following information on the WADO device:
 - (a) enter the device's IP address or domain name in the box named **Address**. The maximum FQDN size is 255 characters, 63 characters for each domain name. The admissible characters are: uppercase and lowercase Latin letters, dot «.», and hyphen «-»;
 - (b) tick the check box named **UPLOAD** to enable the device to upload data to the DICOM Server. Enabled by default;
 - (c) tick the check box named **DOWNLOAD** to enable the device to download data to the DICOM Server. Enabled by default;
 - (d) tick the check box named **FIND** to enable the device to search data to the DICOM Server. Enabled by default.
4. To save the changes, click the **SAVE** button, to cancel, click **CANCEL**. If an invalid value is entered, a warning is displayed below the input field, the input field frame becomes red.

Create new WADO ×

Address

192.168.1.1

IPv4 or FQDN

Description

room # 4321

11/128

DICOM-commands permissions

- ☒ **UPLOAD**
saving studies on the server
- ☒ **DOWNLOAD**
downloading studies
- ☒ **FIND**
searching studies

CANCEL **SAVE**

Figure 1.6: Create new WADO

If needed, you can add one more client.

If the maximum number of clients and WADO devices provided for by the license has been reached, the **CREATE** button becomes inactive. The total number of client connections available is displayed in the right-hand upper corner and determined by the type of the license (see Section 3).

To check the device'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 you have failed to send a **C-ECHO** command to the DICOM Server, check the connection settings for DICOM Server and the client. Analyze the log files for the DICOM Server and the client. If all the parameters are correct, check the firewall settings for the computer with the DICOM Server.

To delete a WADO device, 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 change the settings of the existing WADO device, click the  **Edit** button.

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

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

For example, a device with the DICOM Server has the following parameters:

- **Host IP address:** 192.168.1.10;
- **Port:** 3000;
- **AE Title:** PACS_Inobitec.

For example, a device with the Inobitec DICOM Viewer Program has the following parameters:

- **Host IP address:** 192.168.1.20;
- **DICOM Listener port:** 11112;
- **AE Title:** Viewer_Inobitec.

To set the connection, proceed as follows:

1. Add a client with the following parameters to the **Devices (AE)** table on the DICOM Server web console (for the settings see Section 1.2.1):
 - (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 1.7). 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.

1.2.5 Setting up a Secure Connection with Inobitec DICOM Viewer as the Client

For example, a device with the DICOM Server has the following parameters:

- **Host IP address:** 192.168.1.10;
- **Port of secure storage:** 3100;
- **AE Title:** PACS_Inobitec.

For example, a device with the Inobitec DICOM Viewer Program has the following parameters:

- **Host IP address:** 192.168.1.20;
- **Secure DICOM Listener port:** 11212;
- **AE Title:** Viewer_Inobitec.

To set the secure connection, proceed as follows:

1. Add a client with the following parameters to the **Devices (AE)** table on the DICOM Server web console (for the settings see Section 1.2.1):
 - (a) **AE Title:** Viewer_Inobitec;
 - (b) **IP or FQDN:** 192.168.1.20;
 - (c) **Port:** 11212;
 - (d) tick the check box **USE TLS**, upload the root certificate file of the Inobitec DICOM Viewer Program (for details see Section 1.2.2).
2. Activate secure DICOM listener service in the Inobitec DICOM Viewer Program with the following parameters:

- (a) in the dialog box **Network->Services->Secure DICOM Listener...** to enable the secure DICOM listener service, check the **Enable** box;
 - (b) **AE Title:** Viewer_Inobitec;
 - (c) **Port:** 11212;
 - (d) in the **Trusted peer certificates** add to the list the root certificate of the DICOM Server;
 - (e) in the **Certificate** box set the paths to the public key certificate files and private key of the Inobitec DICOM Viewer Program;
 - (f) to save the current settings for all the users of this PC, check the **Shared settings (for all users)** box. It can only be done if the Inobitec DICOM Viewer Program was launched by a user with administrator privileges. The users who do not have administrator privileges cannot check or uncheck this box.
3. In the **Server list** of the Inobitec DICOM Viewer Program add a new PACS server with the following parameters:
 - (a) **Server nickname:** enter the server name e.g., DICOM Server;
 - (b) **Server type:** DICOM;
 - (c) **Server mode:** C-MOVE or C-GET;
 - (d) **Character set:** UTF-8;
 - (e) **Client name (SCU):** Viewer_Inobitec;
 - (f) **Service name (SCP):** PACS_Inobitec;
 - (g) **Server host name or IP:** 192.168.1.10;
 - (h) **Server port:** 3100;
 - (i) to enable the secure connection mode, check the **Use secure mode (TLS)** box in the server parameters dialog box. By doing this, you will activate the **TLS Settings** button for secure mode setup;
 - (j) In the **TLS Settings** dialog box:
 - add a root certificate of the DICOM Server as a trusted partner certificate;
 - to enable verification of the trusted (root) certificate at the time of establishing a connection with the DICOM Server, check the **Verify peer certificate** box;
 - to authenticate the client when connecting, check the **Authentication of the client** box and click **Choose**;
 - in the **Certificate and private key** dialog box set the paths to the public key certificate file and private key file of the Inobitec DICOM Viewer Program;
4. Add the required permissions to the firewall on both computers.
5. To check the settings, send a C-ECHO command from the DICOM Server management web console to Inobitec DICOM Viewer and back.

1.2.6 Setting up a connection using the WADO service for Inobitec DICOM Viewer Program

For example, a device with the DICOM Server has the following parameters:

- **Host IP address:** 192.168.1.10;
- **DICOM Study Web-service port:** 8010;
- **AE Title:** PACS_Inobitec.

For example, a device with the Inobitec DICOM Viewer Program has the following parameters:

- **Host IP address:** 192.168.1.20

1. To set up a connection via the WADO service, go to the **Settings** tab in the DICOM Server web console. In the **Web-services** settings block, activate **DICOM Study Web-service** (see Section 2.6). Add a client with the following parameters to the **WADO** table on the DICOM Server web console (for the settings see Section 1.2.3):

- (a) **IP or FQDN:** 192.168.1.20;
- (b) If necessary, add a device **Description**;
- (c) tick the check boxes **UPLOAD**, **DOWNLOAD** and **FIND**.

2. In Inobitec DICOM Viewer, add a connection to DICOM Server with the following parameters:

- (a) **Host server name or IP:** 192.168.1.10;
- (b) **Server type:** DICOM;
- (c) **Server mode:** WADO-RS;
- (d) in the **WADO settings** dialog box, fill in the **Port** field: 8010. Leave the **Service root path**, **Login** and **Password** fields blank.

The other parameters are used for DICOM connection and do not affect the connection via the WADO service.

1.3 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 import and delete studies or series of studies. To open the page for viewing studies, click the **Studies** button.

In the **Studies** table, you will find the information on the studies saved on the DICOM Server. For details on the data display settings, see Section 2.13.1. The studies may be sorted by the values provided in one of the columns (see Section 2.13.2).

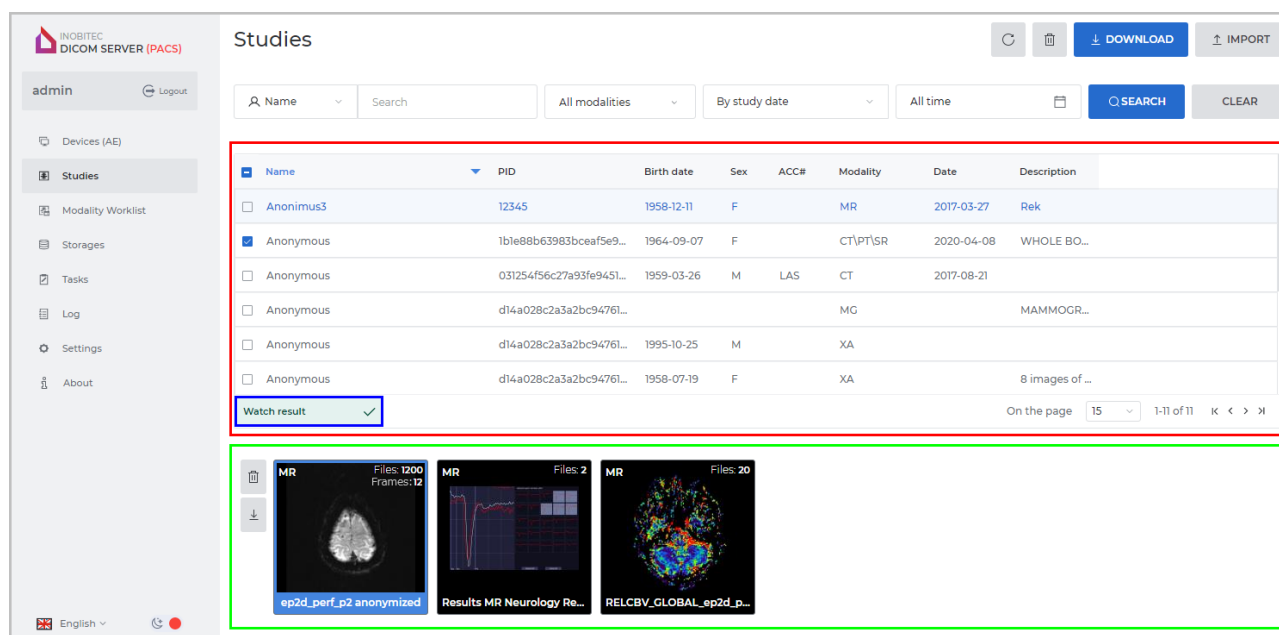


Figure 1.7: Study search and viewing page

1.3.1 Study Panel

The study panel is highlighted in the Fig. 1.7 in red. The panel shows the studies in the storage. 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

The number of studies shown on a page may be selected from the **On the page** dropdown list. By default, 15 studies are shown on a page.

To update the studies list, click on the  **Refresh** button.

To download a study, check the respective box on the study list and click the **DOWNLOAD** button. The study is packed. The **DOWNLOAD** button is activated if only one study has been selected.

To delete a study, proceed as follows:

1. Check the box for the study on the study panel. To select all the studies on the page, check the box in the table header.
2. Click the  **Remove** button above the study list. If none of the studies has been selected, the **Remove** button is inactive.

3. In the dialog box that pops up, click **REMOVE** to delete or **CANCEL** to cancel the action.



A study that has been deleted cannot be restored!

1.3.2 Series Panel

The series panel is highlighted in the Fig. 1.7 in green. To see thumbnails of a study series, select this series on the series panel. The following information is displayed for thumbnail of each series:

- **modality;**
- **number of files.** A single file may contain multiple images (frames);
- **number of frames.** If the thumbnail does not show the number of frames, then each file contains a single image;
- **description.**

If the series description is too long, the complete description will be shown as a tooltip when you mouse over the respective thumbnail.

To download a study series, proceed as follows:

1. Select the study on the study panel.
2. Select the series on the series panel.
3. Click the  **Download** button on the series panel, to the left of the thumbnails. The series will be zipped. If none of the series has been selected, the **Download** button will be inactive.

To delete a study series, proceed as follows:

1. Select the study on the study panel.
2. Select the series on the series panel.
3. Click the  **Remove** button on the series panel, to the left of the thumbnails. If none of the series has been selected, the **Remove** button will be inactive.
4. In the dialog box that pops up, click **REMOVE** to delete the selected series or **CANCEL** to cancel the action.



A study series that has been deleted cannot be restored!

1.3.3 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. The image of the series opens in a new tab (Fig. 1.8). If there are any other images open in the **DICOM Viewer** tab, they will be closed.

To open a series from the **DICOM Viewer** tab, select the series you need and double-click the left mouse button.

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. If a series contains a file that contains multiple frames, the DICOM Server displays the first frame.



Figure 1.8: The **DICOM Viewer** tab

The window width and level (W/L) values for the series are taken by the DICOM Server from the following tags: *0x0028, 0x1050 WindowCenter* and *0x0028, 0x1051 WindowWidth*. If no values have been provided for these tags, the window width and level (W/L) values will be calculated by the DICOM Server on the basis of the data provided by the series image. In some cases, this may lead to inaccurate display of the series thumbnails and the images opened from the administrator web console.

1.3.4 Study Search

The search panel is shown in Fig. 1.9.

Figure 1.9: Search panel

One of the following search criteria should be selected from the dropdown list (number 1 in Fig. 1.9):

- **Name.** To search for a name that does not start with the entered characters, put an asterisk at the beginning: «*John»;
- **Patient ID** (similar to search by name);
- **Accession number** (similar to search by name).

The search query must be entered in the **Search** field (number 2 in Fig. 1.9). The maximum size of the text in the **Search** field is 128 characters. Special symbols and national scripts may be used. The field may be empty. If the search query is too long for the field, it is cropped and the omission points are shown at the end of the line. The complete text of the search query will be shown in a balloon tip.

To search for studies by modality, select the relevant modalities on the **All modalities** dropdown list (number 3 in Fig. 1.9). All the modalities are selected by default (the **Select all** button is active, see Fig. 1.10 «a»). The user may select any combination of modalities (see Fig. 1.10 «b»). To cancel the chosen modality, click the button once again.

Click **OK** to confirm or **CANCEL** to cancel.

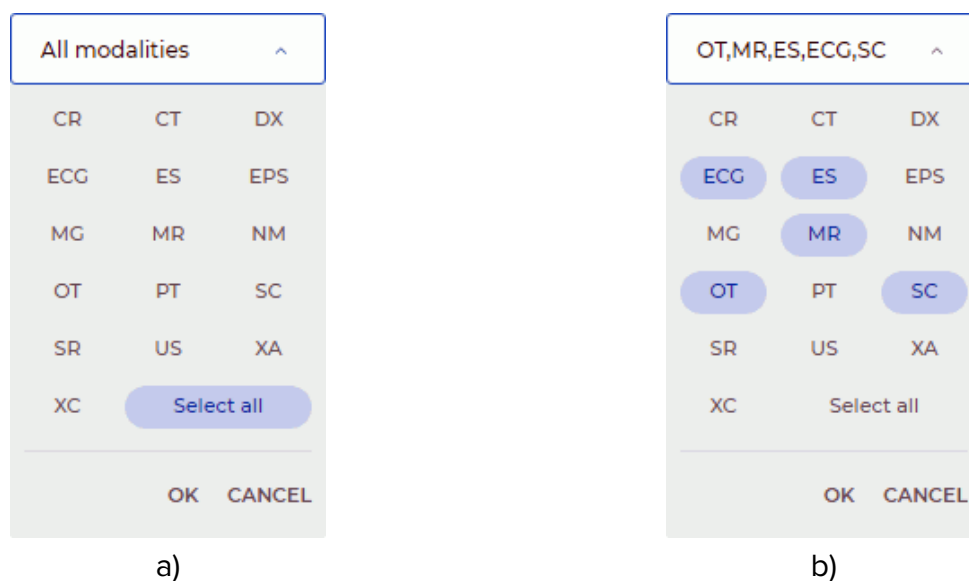


Figure 1.10: Search by modality

The user may search for studies by the study date or by the patient's date of birth. This criterion should be chosen on the drop-down list (number 4 in Fig. 1.9), and the search period depends on it.

If you choose the **By study date** criterion, the following options will be available on the drop-down list (number 5 in Fig. 1.9) for selecting the search period:

- **All time** (by default);
- **Today**;
- **Yesterday**;
- **Last week**;
- **Last month**;
- **Last year**;
- **Exact date**. Fill in the field in YYYY-MM-DD format;
- **Interval**. Fill in the field in YYYY-MM-DD — YYYY-MM-DD format.

The date can also be selected using the calendar.

	Su	Mo	Tu	We	Th	Fr	Sa
							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31					

Figure 1.11: The options available for the **By study date** criterion

Click **OK** to enter the date or **CANCEL** to cancel.

If the date entered is incomplete or if the user chooses another option on the list, the field is cleared.

If you choose the **By patient birthdate** criterion, there will be only two options available on the drop-down list for selecting the search period (number 5 in Fig. 1.9): **Exact date** and **All time** (Fig. 1.12). Fill in the field in YYYY-MM-DD format. The date can also be selected using the calendar.

The image shows a date selection interface. At the top, there is a text input field containing '2022-05-09' and a calendar icon. Below this is a modal window with a list of options on the left and a calendar on the right. The options are: 'All time', 'Today', 'Yesterday', 'Last week', 'Last month', 'Last year', 'Exact date' (highlighted in blue), and 'Interval'. The calendar shows 'May 2022' with days of the week (Su, Mo, Tu, We, Th, Fr, Sa) and dates. The date '9' is highlighted in blue. At the bottom right of the modal are 'OK' and 'CANCEL' buttons.

Figure 1.12: The options available for **By patient birthdate**

Click **OK** to enter the date or **CANCEL** to cancel.

If the date entered is incomplete or if the user chooses another option on the list, the field is cleared.

After the relevant fields have been filled, click the **SEARCH** button. To reset the search criteria, click **CLEAR**.

1.3.5 Import of Studies

The function is unavailable in trial mode

There are two ways to import studies to the DICOM Server through the administration web console:

1. Click the **IMPORT** button in the **Studies** tab. In the dialog box that pops up, select the folder with the studies and click **Open**.



Attention! It may take time to calculate the number of the files imported. Wait until a dialog box for confirming files import appears.

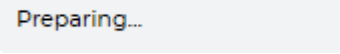
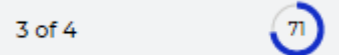
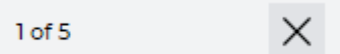
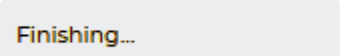
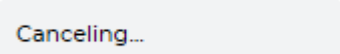
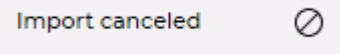
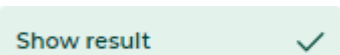
In the dialog box that pops up, click the **Upload** button. To cancel the action, click **Cancel**.

2. While holding the left mouse button, drag the folder with the studies from the explorer window to the study panel in the **Studies** tab. . When the user is dragging a folder to the study panel, the study panel is converted into a receive window where a **DROP YOUR FOLDER HERE** message is displayed. Release the mouse button inside the selected area.

Only a folder with subfolders may be dragged. Separate files or text fragments will not be accepted. If a file cannot be dragged, the cursor is displayed as .

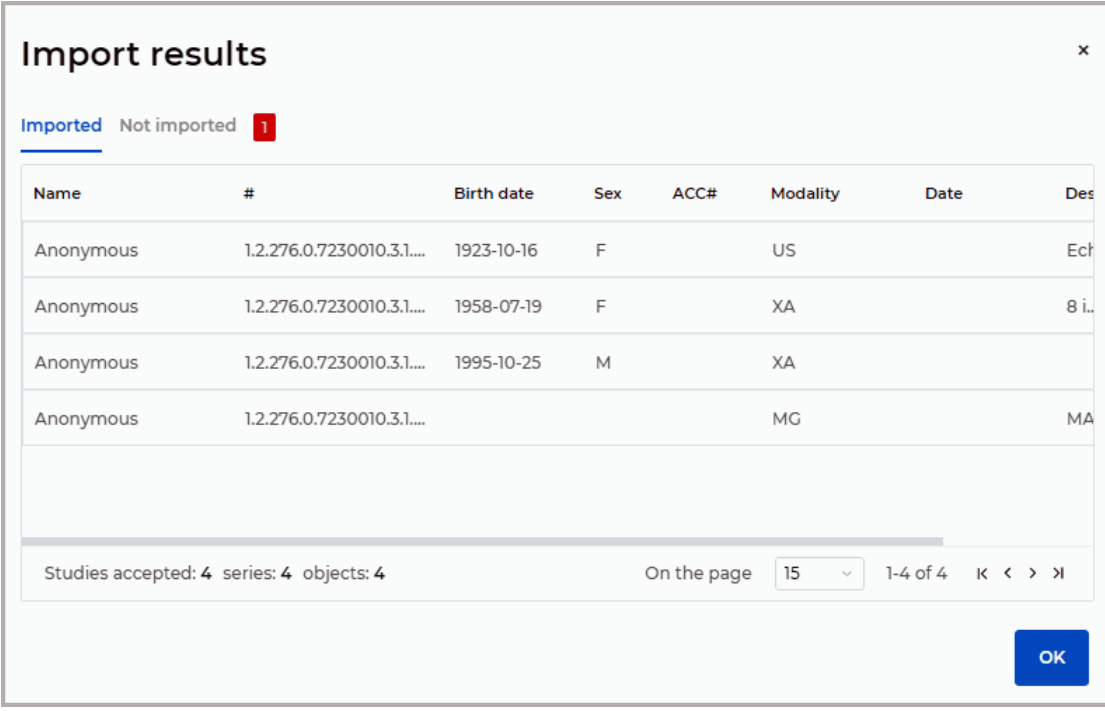
When files are imported, an import status panel (see the blue box in Fig. 1.7) is displayed on the **Studies** page. On other DICOM Server pages, the import status panel is shown on the main menu of the administration web console. The import status panel will be displayed until the page is updated or the DICOM Server is relaunched.

The statuses shown on the import status panel are:

	The number of files to be imported is calculated
	The files are imported. The panel shows the number of files imported, the total number of files and the progress animation
	The cursor is placed over the progress animation, and a button for cancelling import is shown on top of the progress wheel. To cancel the files import, click the  button. Import may be cancelled while the files are being calculated or imported
	The process of files import is being completed
	The import of files is being canceled
	The import of files has been canceled by the user
	The import has resulted in an error. Click the mouse on the status panel to view the report. In the Import results dialog box that pops up, (see the Fig. 1.13) Not imported tab for the files that have not been imported
	The import has been completed successfully. To view the import results, click the mouse on the status panel. In the Import results dialog box that pops up, (see the Fig. 1.13) Imported and Not imported tabs for the results

No files can be added to the current import session. To import more files, wait until the import procedure is completed or cancel the files import.

The import results will be shown as a table in the **Imported** and **Not imported** tabs of the **Import results** dialog box (see Fig. 1.13). The number of lines on the page may be selected from the **On the page** drop-down list. 15 lines are shown on the page by default.



Import results ×

Imported Not imported 1

Name	#	Birth date	Sex	ACC#	Modality	Date	Des
Anonymous	1.2.276.0.7230010.3.1....	1923-10-16	F		US		Ect
Anonymous	1.2.276.0.7230010.3.1....	1958-07-19	F		XA		8 i..
Anonymous	1.2.276.0.7230010.3.1....	1995-10-25	M		XA		
Anonymous	1.2.276.0.7230010.3.1....				MG		MA

Studies accepted: 4 series: 4 objects: 4

On the page 15 1-4 of 4 < > >>

OK

Figure 1.13: The **Import results** dialog box

Files import may result in an error in the following cases:

- if there are no files in the folder chosen by the user. In this case, a warning **The chosen folder does not contain any files** will appear in the right-hand bottom corner and the status shown on the import status panel will not be changed;
- if the size of the folder with the files exceeds 1GB. A warning **Transferred folder size exceeds 1 GB** will appear in the right-hand bottom corner. In this case, the files to be imported should be divided into several groups;
- if the files cannot be saved on the server. In this case, a warning **Failed to save the files on the server** will appear in the right-hand bottom corner and the status shown on the import status panel will be changed to **Error report**.

1.4 Modality Worklist

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

Modality Worklist

Search: All modalities: By study date: All time:

☐	PID	Name	Sex	Birth date	Weight	Pregnancy	ACC#	Admission id	Description
☐	50lul8qJUsLc1ptZDZBOItse6e3YXtb...	Ivanova AA	F	2019-12-19	32	1	ZP7GLE72g...	541110115	sr43xghl...
☒	Bk8pph0R0nMaAxihJtNxoPHystIFv...	Petrova PP	F	1999-03-11	84	0	cKpkWDgx...	857490000	sl118YNO...
☒	Bk8pph0R0nMaAxihJtNxoPHystIFv...	Patient#1	F	1999-05-15	84	0	cKpkWDgx...	857490000	sl118YNO...
☒	OZdFO03ULEM9XO3u2tgMDHhnm...	Example	M	1997-01-23	57	0	uzZ35pB6W...	251836754	h59i57S...
☐	pkDHTxmMR18N2l9k88EmLgN7cCC...	Pushkin AS	F	1998-08-16	67	0	lHw3UVRsQ...	1409959708	P6lqTUn...
☐	pkDHTxmMR18N2l9k88EmLgN7cCC...	Example#2	F	1998-10-20	67	0	lHw3UVRsQ...	1409959708	P6lqTUn...
☐	U14C8gLt6D8MWv0mEWD33C4xEm...	Test	F	2020-08-08	85	1	xNVcgfDL5iq...	1402961682	qXFoEzy...
☐	U14C8gLt6D8MWv0mEWD33C4xEm...	hDDKlgrQ6buEAzR...	F	2020-06-04	85	1	xNVcgfDL5iq...	1402961682	qXFoEzy...

On the page: 15 1-9 of 9 < > >>

Moda...	AE title	Date	Time	Description	Physician name	Status
US	ECG_SCU	2023-04-02	02:56:54	ECG	Doctor	COMPLETED

Figure 1.14: «Modality Worklist» page

In the **Modality Worklist** table, you will find the information on the studies saved on the DICOM Server. For details on the data display settings, see Section 2.13.1. The studies may be sorted by the values provided in one of the columns (see Section 2.13.2).

1.4.1 Searching for Scheduled Studies

You can search for scheduled studies using the search panel. The search criteria are chosen as described in Paragraph 1.3.4.

1.4.2 Scheduled Studies Panel

The scheduled studies panel is highlighted in the Fig. 1.14 in red. On this panel, you can see the scheduled studies that have been found. The studies are marked with labels of different colors. The color of the label depends on the status of the study stage (see Fig. 1.15).

Modality Worklist					
 Search		All modalities			
☐	PID		Name	Sex	Birth date
	☐ 79081442698		Patient	F	2019-12-19
	☐ 79515526900		Test	F	1999-03-11
	☐ 079582115272		Example	F	1999-05-15
	☐ 79102120296		Spamer	M	1997-01-23

Figure 1.15: Example of a marked study

The scheduled studies for which all the stages have been completed (have the **COMPLETED** status), are marked with green  . If the stages of a scheduled study have the **MISSED**, **DISCONTINUED**, or **CANCELED**, but not **SCHEDULED** or **IN_PROGRESS** status, the study is marked with orange  .

The studies having stages with the **SCHEDULED** or **IN_PROGRESS** status are not marked.

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.

The number of studies shown on a page may be selected from the **On the page** dropdown list. By default, 15 studies are shown on a 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

To update the scheduled studies list, click on the  **Refresh** button.

1.4.3 Clearing the Modality Worklist

To delete all the completed or deleted studies from the modality worklist, click the **Delete the completed studies**  button on the **Modality Worklist** page.



The deletion of studies and their steps cannot be cancelled

In the **Clear the MWL** dialog box (Fig. 1.16) that pops up, click **REMOVE** to delete or **CANCEL** to cancel.

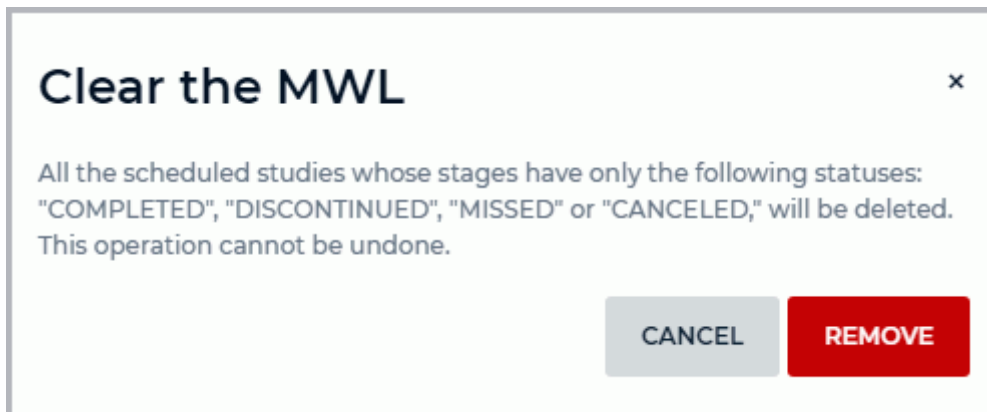


Figure 1.16: **Clear the MWL** dialog box

After deletion has been confirmed, all the scheduled studies having stages with the **COMPLETED**, **DISCONTINUED**, **MISSED**, or **CANCELED** status will be deleted. The deleted data cannot be restored.

1.4.4 List of the Scheduled Procedure Steps

The list of the steps of the scheduled study is highlighted in the Fig. 1.14 in green. 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.

1.4.5 Deleting Scheduled Studies



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



Attention! Deleting a scheduled study or its stages before receiving information about its completion from external systems connected via the HL7 protocol and through the RabbitMQ message broker may result in the loss of information without the possibility of recovery.

To delete a scheduled study, proceed as follows:

1. Check the box for the study on the study panel. To select all the studies on the page, check the box in the table header.
2. Click the **Remove**  button above the list. If none of the studies has been selected, the **Remove** button is inactive.
3. In the dialog box that pops up, click **REMOVE** to delete the selected studies or **CANCEL** to cancel the action.

To delete a steps of a scheduled study, 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.

1.4.6 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.

1.5 Storages

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.

Depending on the settings provided, data may be kept on the DICOM Server or an unlimited or a limited period of time. It may be compressed or stored as is. The DICOM Server storages can be managed from the **Storages** tab (see Fig. 1.17) on the web console.

The table shows the storage parameters. For details on the parameters display options, see Section 2.13.1. The storages may be sorted by the values provided in one of the columns (see Section 2.13.2).

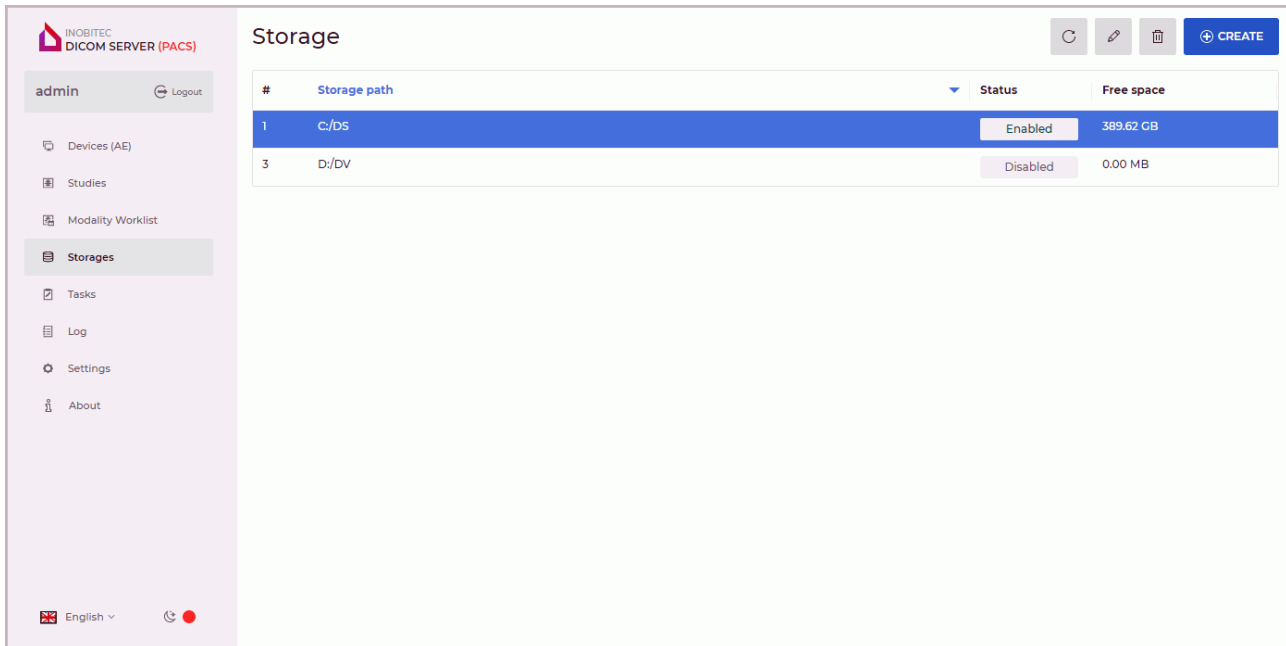


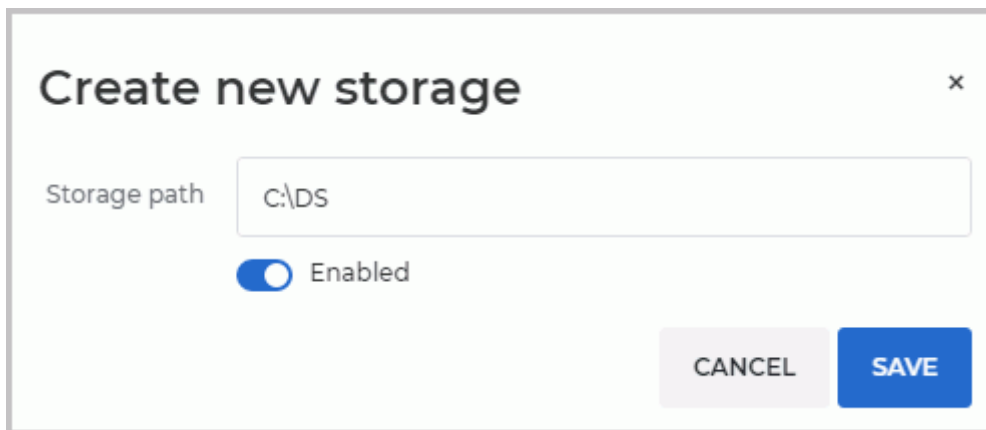
Figure 1.17: Storage management page

1.5.1 Storage Settings

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.

To create a new storage, proceed as follows:

1. Click the **CREATE** button.
2. In the **Create new storage** dialog box (Fig. 1.18) make the following entries in the data entry line:
 - enter the path to the storage folder in the **Storage Path** box. It is not recommended to provide the path to a folder containing files.
 - 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.



The dialog box is titled "Create new storage" with a close button (x) in the top right corner. It contains a text input field labeled "Storage path" with the value "C:\DS". Below the input field is a toggle switch labeled "Enabled", which is currently turned on. At the bottom right, there are two buttons: "CANCEL" and "SAVE".

Figure 1.18: The **Create new storage** dialog box



On Windows, the path to the network storage must be provided in UNC format.

Below, you can see some examples of UNC paths.

```
\\192.168.0.8\storage
\\nas-storage\pacs
\\nas.organization.com\storage
```

If needed, add another folder path.

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.

To change the parameters of the existing paths to the storage folders, select it in the table, click the  **Edit** button.



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

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.

If you delete a storage without deleting the data, the links to the study files will be deleted from the database. The study files will remain in the file system, but they will become inaccessible. If you add the storage folder once again, the links to the study files will not be restored.

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

If the **Storages** table displays a zero in the **Free space** 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). The column **FREE SPACE** in the web console shows the total amount of free

space on the disk, regardless of the limit. If the folder remains less space such data will be saved in another folder. If there isn't enough free space for saving the data (with allowance for the limit), if such a folder is unavailable, the saving procedure will result in an error.



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 **Temp folder** in the page **Settings** in the block **Store service settings**. By default, the system temporary folder is used.

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, the 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

To change the location of the temporary folder:

1. In the **configuration file** change the temporary folder parameter. If this parameter is missing, add it.
2. Restart the DICOM Server.

The DICOM Server can send emails in case of problems with storage availability, reaching the limit of free space or file saving errors. For details see Section 2.3.

1.5.2 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 1.2.1) 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.

1.6 Storage Maintenance Schedule

The DICOM Server storage maintenance schedule provides the user an opportunity to manage the process of collecting the tasks associated with study files transfer, compression, and deletion. The schedule may be used to manage the hardware and network load.

You can manage the tasks collection process on the **Tasks** page of the weekly schedule (see Fig. 1.19). The schedule provides for the time of task collection rather than task performance. If the time provided for task performance is up but there are some tasks left in the queue, the process of task performance will go on until the queue is empty. The tasks on the schedule are performed on a weekly basis. The schedule is not deleted when there are no tasks to be performed.

Figure 1.19: Storage maintenance schedule page

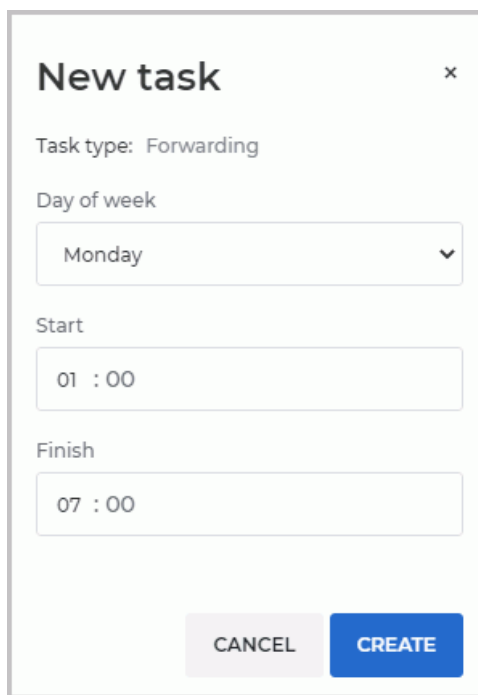
You can provide the settings for tasks transfer, archiving, and deletion in **Forwarding**, **Archiving** and **Deletion** tabs. The schedule is provided separately for each type of tasks.

There are three ways to add new tasks to the schedule:

- click the **+** **Create** button on the page with the schedule;
- left-click on the selected cell of the table with the schedule;

- with the cursor, select the cells you need while holding the left mouse button.

In the **New task** dialog box (see Fig. 1.20), select or change the day of week, as well as the time provided for the beginning and the end of the task performance. The time provided for the performance of a task must be divisible by 1 hour.



The image shows a 'New task' dialog box. It has a title bar with the text 'New task' and a close button (X). The main content area contains the following fields: 'Task type' with the value 'Forwarding'; 'Day of week' with a dropdown menu showing 'Monday'; 'Start' time with a text input showing '01 : 00'; and 'Finish' time with a text input showing '07 : 00'. At the bottom of the dialog are two buttons: 'CANCEL' and 'CREATE'.

Figure 1.20: «New task» dialog box

To create a new task, click the **CREATE** button. To cancel, click **CANCEL**.

Create tasks for other days of week and time intervals in the same way.

The blocks of tasks on the schedule are inactive and shown in grey. The tasks may be activated from the respective tabs on the **Tasks** page:

- to enable transfer of tasks, check the **Enable connection** box in the **Forwarding** tab (for details see Section 1.6.1);
- to enable study compression, in the **Archiving** tab, select the suitable option from the **Compression level** drop-down list (for details see Section 1.6.3);
- to enable series collection and deletion upon expiration of a certain period of time, go to the **Deletion** tab and enter a positive value in the **Store days** field (for details see Section 1.6.4).

To delete a task, left-click on the task selected. In the pop-up box with the task description (see Fig. 1.21) click the **DELETE** button.

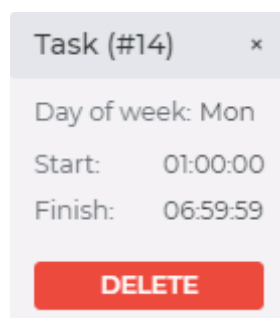


Figure 1.21: Pop-up box with the task description

Confirm the deletion by choosing **DELETE** in the confirmation dialog box. To cancel the deletion, choose **CANCEL**.

1.6.1 Setting the Transfer of Studies to the Regional DICOM Server

The function is unavailable in trial mode

To provide the settings required to enable Inobitec DICOM Server (PACS) to send studies to the regional DICOM Server, proceed as follows:

1. Open the **Tasks** page and go to the **Forwarding** tab.
2. Create a schedule for studies forwarding (see Section 1.6).

Attention! When you add or delete a studies forwarding schedule, you do not activate/deactivate the forwarding function. To activate/deactivate this function, check/uncheck the respective box.

3. To enable/disable the forwarding studies to the regional DICOM server, check/uncheck the **Enable connection** box (is highlighted in the Fig. 1.22 in red). The box is unchecked by default.
If the **Enable connection** box is unchecked, all the fields, buttons and checkboxes in the **Forwarding** tab will be inactive. The blocks of forwarding tasks on the schedule will be shown in grey.
4. Enter the AE Title of the regional DICOM server (16 latin characters max., case sensitive) in the **AE Title** box.
5. Enter the IP address of the regional DICOM server or domain name in the **IP-address** box. The maximum FQDN size is 255 characters, 63 characters for each domain name. The admissible characters are: uppercase and lowercase Latin letters, dot «.», and hyphen «-».
6. Enter the DICOM port of the regional DICOM server (a whole number greater than zero) in the **Port** box.

7. 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 only)** (UID 1.2.840.10008.1.2.4.90);
 - **JPEG 2000 (Lossless or Lossy)** (UID 1.2.840.10008.1.2.4.91);
 - **RLE Lossless** (UID 1.2.840.10008.1.2.5).
8. To enable/disable the secure connection, tick/untick the check box **Use TLS**. In the **Certificate file** field, the certificate status is displayed. If there is no certificate, the «Not selected» status will be shown in this field. If required, upload the certificate file (for details see Section 1.2.2).
- When a new certificate is uploaded, the previous certificate is deleted. If you delete a device from the list of clients, the respective certificate file will be deleted. After uploading a new certificate, restart the server to apply the changes.
9. To enable/disable search at the regional DICOM Server, tick/untick the check box **Use extended search**.
- To perform search for the client DICOM Server and then for the regional DICOM Server, tick the **Use extended search** box. The results of local and distant search will be combined.
 - No search will be performed on the regional DICOM server if **Use extended search** is not checked, regardless of search results on the client DICOM server.
10. To enable/disable the confirmation of the files delivery to the regional DICOM Server, check/uncheck the **Delivery check (Storage Commitment)** box. If necessary, in the **Delivery confirmation waiting time** field, specify the waiting time for file delivery confirmation in milliseconds. The field is available only when the **Delivery check (Storage Commitment)** checkbox is selected. The default value is **60000**. As a result, you will get a list of UIDs that have been successfully saved/have not been saved on the regional DICOM Server.

Settings

☒ Enabled connection

AE Title
PACS_TEST ✓

IP-address
127.0.0.1 ✓

Port
3000 ✓

Preferred TS
As it is ▼

☐ Use TLS

Certificate file
Not selected [upload icon] [trash icon]

☒ Use extended search

☒ Delivery check (Storage Commitment)

Delivery confirmation waiting time
60000 ms

TCP connection timeout
10000 ms

DICOM connection timeout
30000 ms

Data transfer timeout
15000 ms

If the parameters of connection to the regional DICOM server are changed, the series already sent will not be processed again. You can start the batch sending procedure again by restarting the DICOM server

RESTART

SAVE CANCEL

Figure 1.22: Forwarding tab settings panel

11. Set the connection timeout if required.

- in the **TCP connection timeout** field, provide the TCP connection timeout value in milliseconds. The permitted values for this field are natural numbers up to 120000. The default value is 10000 milliseconds;
- in the **DICOM connection timeout** field, provide the DICOM connection timeout value in milliseconds. The connection is established after the TCP connection. The default value is 30000 milliseconds;
- if the server sends data during the connection, provide the data transfer timeout value in the **Data transfer timeout** field. The default value is 15000 milliseconds.

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

If the **Use TLS** box is checked but the certificate has not been uploaded, the **SAVE** button will be disabled.

Restart the DICOM Server for applying changes.

Attention! If the user refreshes the browser page or re-opens the Forwarding tab after changing the state of the Enable connection and Use TLS check boxes and/or of the certificate, the current state of the check boxes will be displayed in the Settings section. To apply the new parameters, relaunch the DICOM Server.

If you change the parameters of connection to the regional DICOM Server, the series that have already been forwarded will not be processed for a second time. To start the series forwarding procedure once again, click the **RESTART** button under the settings section of the web console.

Below the schedule grid, there is an information block that displays:

- the total number of hours per week allocated for collecting tasks related to series forwarding;
- the number of series scheduled for forwarding;
- the number of series with failed forwarding attempts.

Click **Retry forwarding**  to requeue the series that failed to be forwarded.

1.6.2 Regional DICOM Server

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. To use Inobitec DICOM Server (PACS) as a regional DICOM server, add clients' DICOM servers to the table on the **Devices (AE)** page (see Section 1.2).

In the current version of the DICOM Server, interaction with the regional server via Web-services (WADO, QIDO) is not available.

1.6.3 Studies Archiving Settings

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 the DICOM Server works as a client, the series will not be compressed until they are sent to the regional DICOM server (for details see Section 1.6.1).

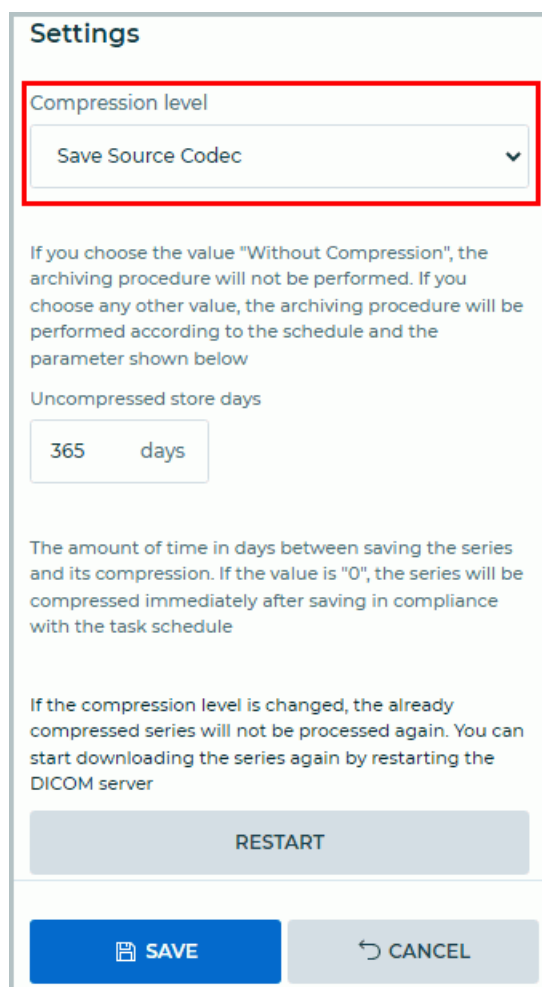
Compression is disabled by default. To enable compression proceed as follows:

1. Open the **Tasks** page and go to the **Archiving** tab.

2. Create data archiving tasks schedule (see Section 1.6).

Attention! When you add an archiving schedule, you do not activate the archiving function. To activate this function, select an archiving option from the «Compression Level» drop-down list. To deactivate the archiving function, choose «Without compression».

3. Choose one of the options from the **Compression Level** drop-down menu (is highlighted in the Fig. 1.23 in red):



Settings

Compression level

Save Source Codec ▼

If you choose the value "Without Compression", the archiving procedure will not be performed. If you choose any other value, the archiving procedure will be performed according to the schedule and the parameter shown below

Uncompressed store days

365 days

The amount of time in days between saving the series and its compression. If the value is "0", the series will be compressed immediately after saving in compliance with the task schedule

If the compression level is changed, the already compressed series will not be processed again. You can start downloading the series again by restarting the DICOM server

RESTART

SAVE CANCEL

Figure 1.23: The **Archiving** tab settings panel

- **Without compression** (by default);
- **Save Source 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).**
4. In **Uncompressed store days** field, provide the number of days after which the data will be compressed. If you have chosen **Without compression**, this field should be ignored.
 5. To save changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

If you choose any option except **Without compression** from the **Compression Level** drop-down list, a warning message (Fig. 1.24) will pop up when you click the **SAVE** button.

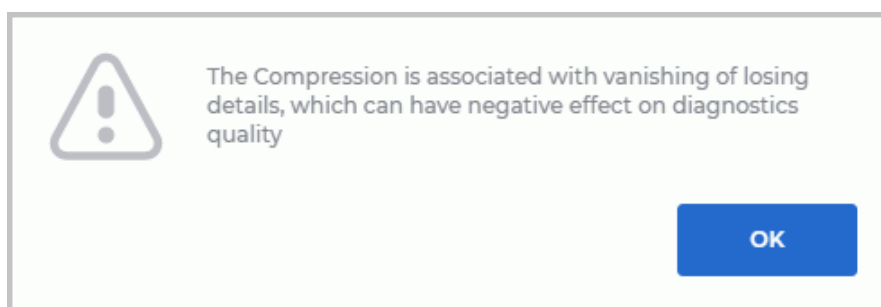


Figure 1.24: A warning message notifying the user of the possible image quality loss after compression

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 clicking the **RESTART** button.

If the same series complies with the requirements for compression and for deletion, it will be deleted.

Below the schedule grid, there is an information block that displays:

- the total number of hours per week allocated for collecting tasks related to series archiving;
- the number of series scheduled for archiving;
- the number of unsuccessfully processed series.

Click **Retry archiving**  to requeue the series that failed to be archived.

1.6.4 Data Deletion Settings

In DICOM Server web console, you can provide the settings for data deletion from a 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 the DICOM Server works as a client, the series will not be deleted until they are sent to the regional DICOM server. (for details see Section 1.6.1).

To enable automatic study disposal after a specified storage period:

1. Open the **Tasks** page and go to the **Deletion** tab.
2. Create a schedule for deleting data tasks (see Section 1.6).

Attention! When you add a data deletion schedule, you do not activate the deletion function. To activate this function, set the storage period in the «Store days» field. To deactivate the deletion function, enter zero in the «Store days» field.

3. Enter the storage period (a whole number of days greater than zero) in the **Store days** field (is highlighted in the Fig. 1.25 in red). If you enter zero (the default value), the data will not be disposed of.
4. To save the changes, click the **SAVE** button under the settings section, to cancel, click **CANCEL**.

Settings

Store days

180 days

If the value is "0", old studies will not be deleted. If the value is greater than "0", studies will be deleted in compliance with the schedule

☒ **Enabled removing**

If the box is checked, the oldest series will be deleted automatically when you run out of storage space. This process does not depend on the schedule

Threshold (Mb)

2048 mb

The minimum amount of storage space available. After reaching this value, old series will be deleted

☒ **Remove not uploaded**

If this box is checked and the task of sending studies to the regional PACS is active, even the series that have not been sent to the regional PACS yet will be deleted

SAVE **CANCEL**

Figure 1.25: The **Deletion** tab settings panel

If you change the value provided in the **Store days** field from 0 to any other number, a warning message (Fig. 1.26) will pop up when you click the **SAVE** button.

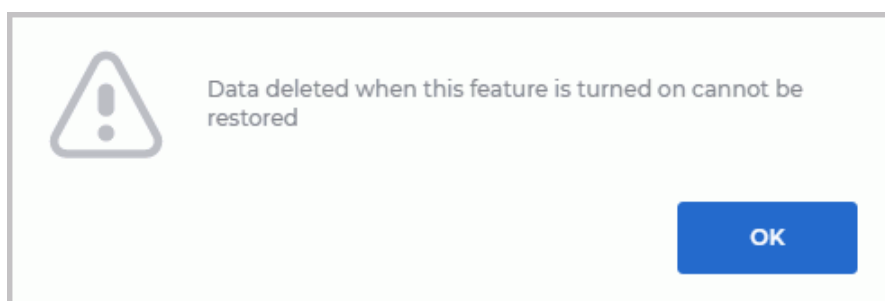


Figure 1.26: A warning message notifying the user that the deleted data cannot be restored

If the same series complies with the requirements for compression and for deletion, it will be deleted.

Below the schedule grid, there is an information block that displays:

- the total number of hours per week allocated for collecting tasks related to series deletion;
- the number of series scheduled for deletion.

1.6.5 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

Attention! Automatic data deletion does not depend on the schedule. To enable/disable automatic data deletion when running out of storage space, check/uncheck the Enabled removing box.

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

1. Open the **Tasks** page and go to the **Deletion** tab.
2. To enable automatic deletion of series from the storage, check the **Enabled removing** box.
3. In the **Threshold (Mb)** field, provide the amount of space available in the storage folder (in Mb). After reaching this limit, series will be collected for deletion. The default value is 2048.
4. If you have provided for automatic forwarding of series to the regional DICOM server and checked the **Remove not uploaded** box, series will be deleted even if they have not been sent to the regional DICOM server

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

If you check the **Enabled removing** box, a warning message (Fig. 1.27) will pop up notifying you that the deleted data cannot be restored when you click the **SAVE** button.

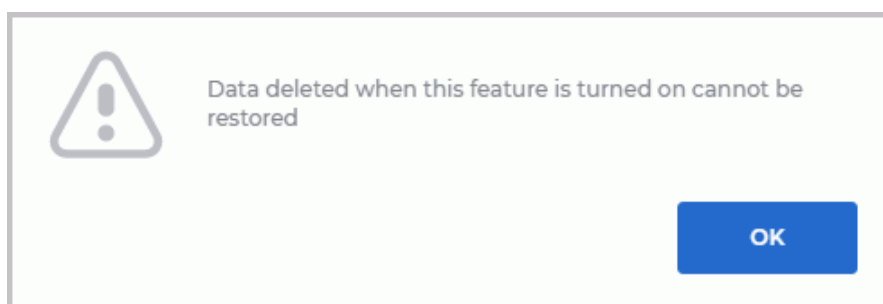


Figure 1.27: A warning message notifying the user that the deleted data cannot be restored

The DICOM Server can send emails in case of problems with storage availability, reaching the limit of free space or file saving errors. For details see Section 2.3.

1.7 Log Viewing

To view the system log, select the **Log** page (Fig. 1.28). The page displays the contents of the most recent log file. Entries are ordered by time from top to bottom, with the newest entries appearing at the bottom of the page. To scroll through the log, move the bar on the right-hand side of the window, scroll the wheel or use the arrow keys.

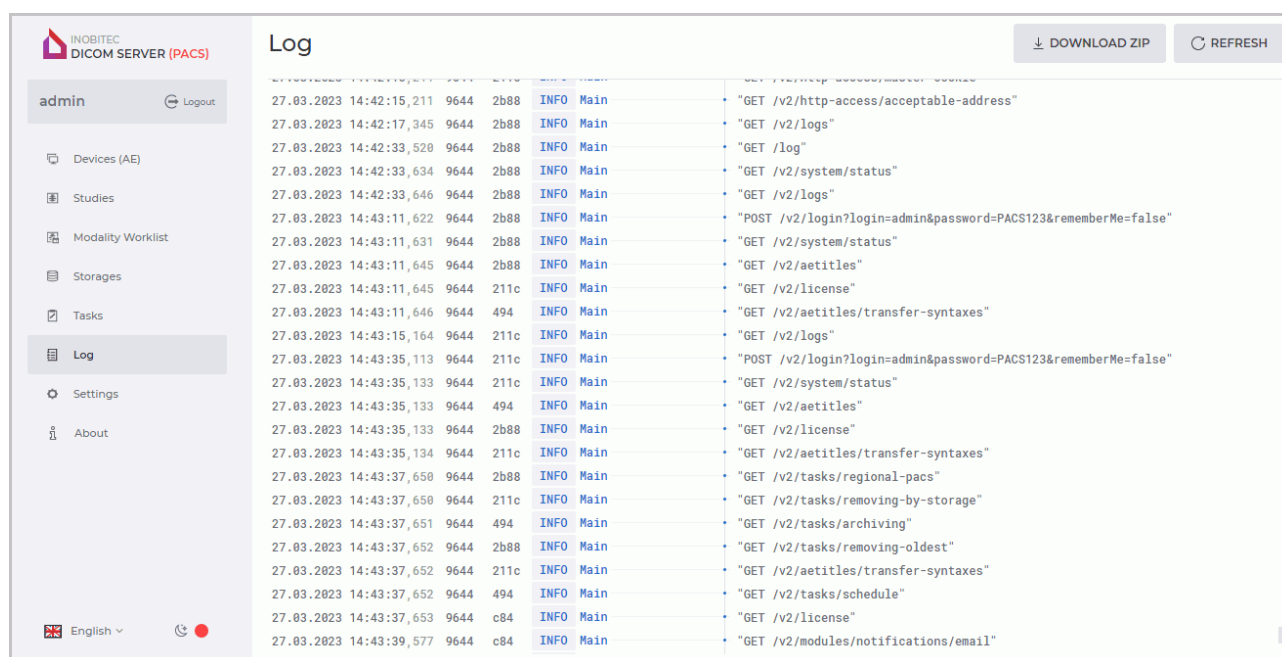


Figure 1.28: Log page

To update the window, click the **REFRESH** button at the top of the window.

To download the archive with all the log files, click the **DOWNLOAD ZIP** button. The name of an archive is written as *logs.zip*.

System logging settings can be changed by the DICOM Server administrator. For more information on changing the settings, see section [2.7](#).

Chapter 2

Settings

On the **Settings** page, the administrator configures the DICOM Server parameters. The settings are divided into groups, with each group of settings placed on a separate tab. In fig. 2.1, the settings group tabs are highlighted with a red frame.

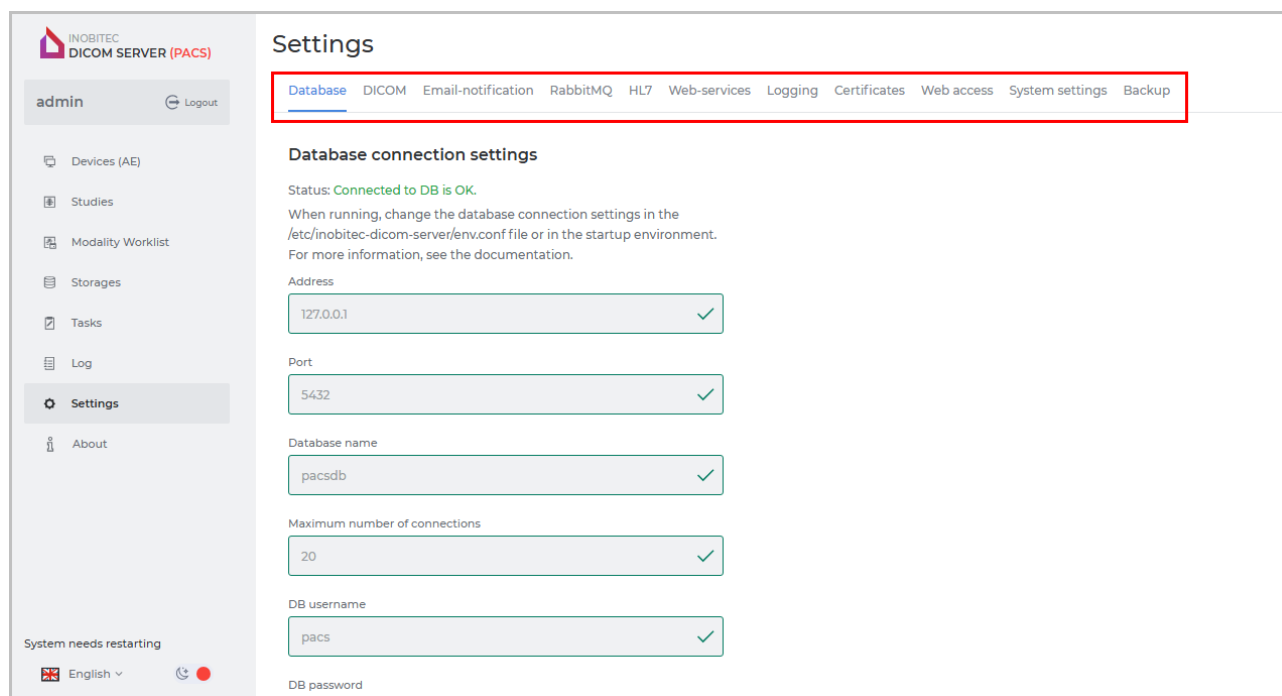


Figure 2.1: The DICOM Server settings page

Attention! Changing some settings may require restarting the DICOM Server. In this case, an informational message is displayed in the main menu of the web console, reminding you to restart the server after you finish editing the settings. The changes will take effect only after the DICOM Server is restarted.

2.1 Database connection settings

The connection parameters of DICOM Server to the database can be viewed on the **Database** tab of the **Settings** page (fig. 2.2).

Database connection settings

Status: **Database connection established.**

When running, change the database connection settings in the `/etc/inobitec-dicom-server/env.conf` file or in the startup environment. For more information, see the documentation.

Address

127.0.0.1 ✓

Port

5432 ✓

Database name

pacsdbs ✓

Maximum number of connections

20 ✓

DB username

pacs ✓

DB password

.... ✓

Database driver

QPSQL ▾

CANCEL

SAVE

Figure 2.2: Database connection settings

The **Database connection settings** block displays the current connection status. Possible messages:

- **Database connection established.** The database is connected and ready for use;
- **Connected. Database update required.** A database update is required;
- **Failed to connect to the database.** The error may be caused by incorrect database configuration parameters or incorrect DICOM Server connection settings;
- **No information.** No connection status information is available.

2.1.1 Changing database connection settings

To change the database connection parameters in Windows, edit the **Inobitec DICOM Server (PACS).ini** file in the *C:/ProgramData/Inobitec* folder.

Database connection parameters in Linux can be changed in two ways:

- edit the parameters in the **env.conf** environment variables file in the */etc/inobitec-dicom-server* directory;
- run the DICOM Server from the command line, specifying the required connection parameters.

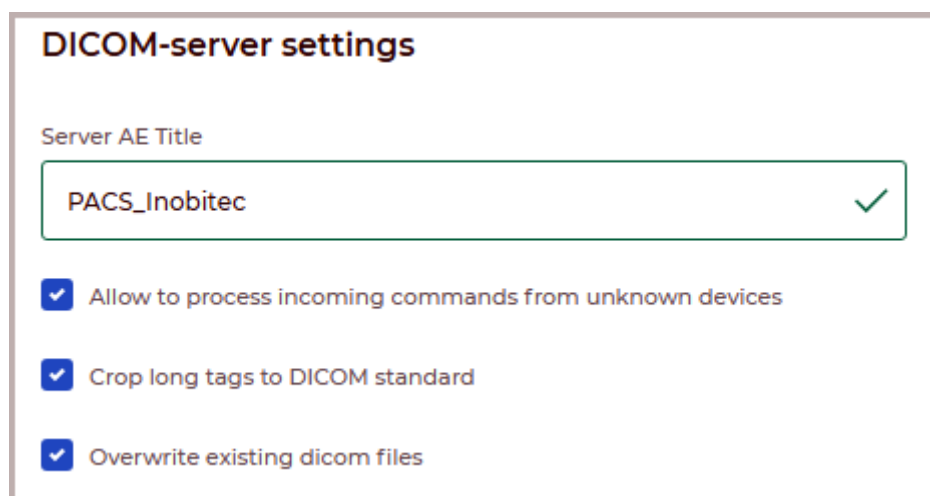
Detailed information is provided in section [Running on Linux family operating systems](#).

2.2 Configuring DICOM Server services

DICOM Server services are configured on the **DICOM** tab of the **Settings** page.

2.2.1 DICOM Server access settings

The **DICOM Server settings** block (fig. 2.3) displays the access settings for DICOM Server.



DICOM-server settings

Server AE Title

PACS_Inobitec ✓

☒ Allow to process incoming commands from unknown devices

☒ Crop long tags to DICOM standard

☒ Overwrite existing dicom files

Figure 2.3: DICOM Server access settings

In the **Server AE Title** field, enter the name of DICOM Server. Maximum length: 16 case-sensitive characters. Allowed characters: all characters from the default character set except «\» and control characters. Default value: **PACS_Inobitec**.

To enable receiving commands from any devices, select the **Allow to process incoming commands from unknown devices** checkbox. If the number of connections is limited by the license, the checkbox is ignored.

If the **Crop long tags to DICOM standard** checkbox is selected, the values of the **AccessionNumber** (0008,0050), **RequestedProcedureID** (0040,1001), and **StudyID** (0020,0010) tags are cropped to 16 characters, and the value of the **AdmissionID** (0038,0010) tag is cropped to 64 characters before the study record is added to the database.

To enable overwriting existing files, select the **Overwrite existing dicom files** checkbox. Overwriting existing files is disabled by default.

Click **SAVE** at the bottom of the page to apply the changes, or **CANCEL** to restore the previous values.

2.2.2 Store service settings

The **Store service settings** block (fig. 2.4) displays the following fields:

- field for activating the service for working with the study storage over an unsecured connection: **Storage service**.
The port value is displayed in the **Port** field. The default value is **3000**. To change the port, enter a value from 1 to 65535 in the **Port** field. The **Port** field must be filled in, even if the service is not used;
- field for activating the service for working with the study storage over a secure connection: **Secure storage service**.
The port value is displayed in the **Port** field. The default value is **3100**. To change the port, enter a value from 1 to 65535 in the **Port** field. The **Port** field must be filled in, even if the service is not used.

Store service settings

☒ Storage service

Port

☒ Secure storage service

Port

The "Port" field must be set to a value, even if the corresponding service is not used

Temp folder

Free disk space limit (MB)

Timeout for run garbage collector for DICOM files without ref (h)

Timeout for check disk free space scan (s)

Number of series removed in one iteration

Figure 2.4: Store service settings

In the **Temp folder** field, specify the absolute path to the temporary folder. By default, the system temporary folder is used.

In the **Free disk space limit (Mb)** field, specify the minimum amount of free space in the storage, in megabytes, at which writing to this storage will stop. The default value is **2048**.

In the **Timeout for run garbage collector for dicom files without ref (h)** field, specify the time period, in hours, after which temporary files will be deleted. The default value is **24**.

The value in the **Timeout for check disk free space scan (s)** field is the frequency of checking free space in the storage, in seconds. The default value is **30**.

In the **Number of series removed in one iteration** field, specify the number of series selected for deletion during one iteration of the storage maintenance service. The default value is **100**.

Click **SAVE** at the bottom of the page to apply the changes, or **CANCEL** to restore the previous values.

2.2.3 MWL service settings

The **MWL service settings** block (fig. 2.5) displays the following fields:

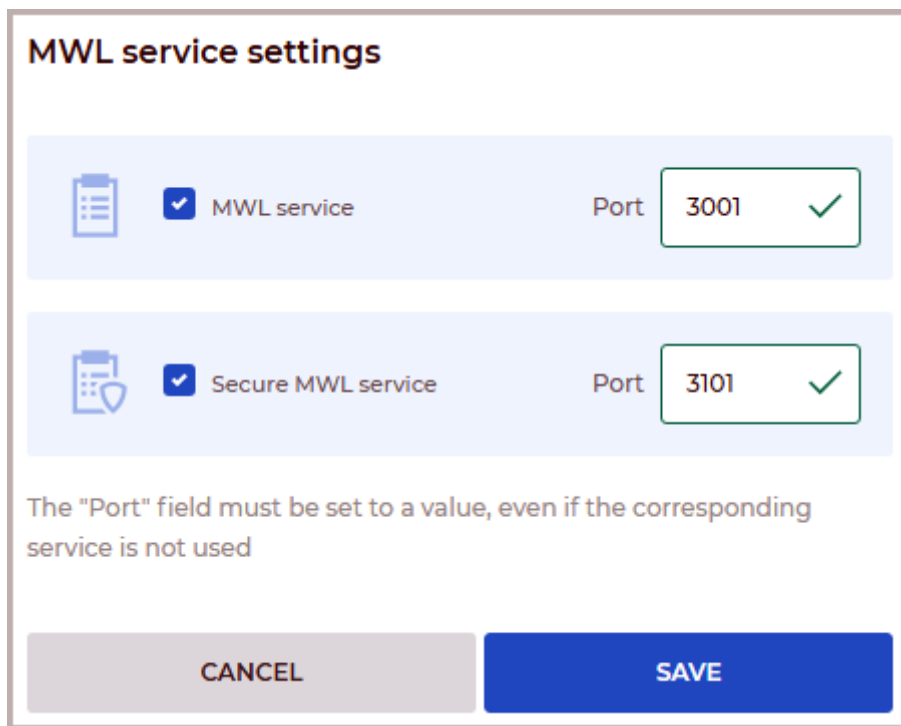
The image shows a screenshot of the 'MWL service settings' form. At the top, the title 'MWL service settings' is displayed in a bold, dark font. Below the title, there are two service configuration sections. The first section is for the 'MWL service', indicated by a document icon and a checked checkbox. To its right, the 'Port' field is set to '3001' with a green checkmark. The second section is for the 'Secure MWL service', indicated by a document icon with a shield and a checked checkbox. Its 'Port' field is set to '3101' with a green checkmark. Below these sections, a note states: 'The "Port" field must be set to a value, even if the corresponding service is not used'. At the bottom of the form, there are two buttons: a grey 'CANCEL' button and a blue 'SAVE' button.

Figure 2.5: MWL service settings

- field for activating the service for working with the worklist over an unsecured connection: **MWL service**.
The port value is displayed in the **Port** field. The default value is **3001**. To change the port, enter a value from 1 to 65535 in the **Port** field. The **Port** field must be filled in, even if the service is not used;
- field for activating the service for working with the worklist over a secure connection: **Secure MWL service**.
The port value is displayed in the **Port** field. The default value is **3101**. To change the port, enter a value from 1 to 65535 in the **Port** field. The **Port** field must be filled in, even if the service is not used.

Click **SAVE** to apply the changes, or **CANCEL** to restore the previous values.

2.3 Email Notification Settings

The DICOM Server may notify clients by email about problems with the storage availability, lack of storage space, and errors that occurred while trying to save files.



When updating the DICOM Server from a version lower than 2.9.0 to the current one, email notifications must be enabled once again.

Notification settings are configured on the **Email notification** tab of the **Settings** page. The **Email notification settings** section (Fig. 2.6) contains the following fields:

Email notification settings

SMTP server address: 192.168.1.1 ✓

Port: 8888 ✓

Connection type: TCP

User: example ✓

Password: ✓

Email address: example@inobitec.com ✓

E-mail notifications will not be sent until all connection data has been entered

☒ Activate save error notifications

☒ Storage notifications

☒ Activate storage space run out notifications

Notification threshold (MB): 4096 ✓

CANCEL SAVE

Figure 2.6: Email notification settings section

- the **SMTP server address** field. Values may be entered in IPv4, IPv6, or URL (without specifying the protocol);
- the **Port** field for entering the service port. The field is empty by default;

- the **Connection type** drop-down list providing for **TCP** and **SSL** options. **TCP** is chosen by default;
- the **User** field where any characters may be entered. The field is empty by default;
- the **Password** field where any characters may be entered. The combination entered is hidden, asterisk characters are displayed instead. The field is empty by default;
- the **Email address** field where the user is to provide the address for notifications.

When values are entered in the settings fields, they are checked for conformity. If an invalid value is entered, the respective box turns red.

If at least one of the required fields is not filled in or the data has an invalid format, the **SAVE** button is disabled.

To enable notification about the errors that occurred when trying to save files on the server, check the **Activate save error notifications** box.

To enable notification about the storage unavailability, check the **Storage notifications** box.

To enable notification upon reaching the storage space threshold, check the **Activate storage space run out notifications** box. By default, the storage space threshold is 4096 MB. You may change the threshold value (in MB) after reaching which a notification will be sent.

Click **SAVE** to apply the settings, or **CANCEL** to reset them.

To test the work of the service, send a message by clicking the  **Send a command** button. The results of the test will be shown in a pop-up message in the right-hand bottom corner.

If the value in the **Email address** field has been deleted, sending notifications is deactivated, even if the notification sending checkboxes are checked.

2.4 Messaging with the RabbitMQ server

The DICOM Server is capable of sending messages to the RabbitMQ server and receiving messages from it via the AMQP protocol. The DICOM Server administrator has the ability to enable or disable messaging with the RabbitMQ server, as well as change the settings for connecting to the RabbitMQ server.

2.4.1 Setting up a messaging service with the RabbitMQ server

The connection of DICOM Server to the RabbitMQ server is configured on the **RabbitMQ** tab of the **Settings** page.

The section **Messaging with the RabbitMQ server** (Fig. 2.7) displays the following fields:

- **RabbitMQ server address**. It is allowed to enter the values IPv4, IPv6 or URL (without indicating the protocol). The default value is **127.0.0.1**;
- **Port** for input the server port. The default value is **5672**;
- **URL** is the address of the virtual server in RabbitMQ. The default value is **/**;
- **Channel** for connecting to RabbitMQ. The default value is **1**;

- the **User** field shall contain the user name of the RabbitMQ server. The name in the field may contain any symbols. The default value is **guest**;
- the **Password** field may also contain any symbols. The input password is hidden and displayed as asterisks. The default value is **guest**.

Setup fields are checked for accuracy when values are entered. If an invalid value is entered, the input field frame turns red and the **SAVE** button is disabled.

Messaging with the RabbitMQ server

AMQP ☒ AMQP-service

RabbitMQ server address: 127.0.0.1 ✓ Port: 5672 ✓

Virtual host: / ✓ Channel: 1 ✓

User: guest ✓

Password: ✓

Sending and receiving messages will not work until all connection data have been entered

☒ Send notifications when MWL status changes

☒ Send notifications when a new study is received

☒ Send notifications when a new series is received

CANCEL SAVE

Figure 2.7: Messaging with the RabbitMQ server section

To activate the messaging service with RabbitMQ server, check the box **AMQP-service**. The checkbox is empty by default. When activating/deactivating the AMQP service, the DICOM Server must be restarted.

When the RabbitMQ server is activated, notification options become available. Check the boxes of the events, which should send the notification message:

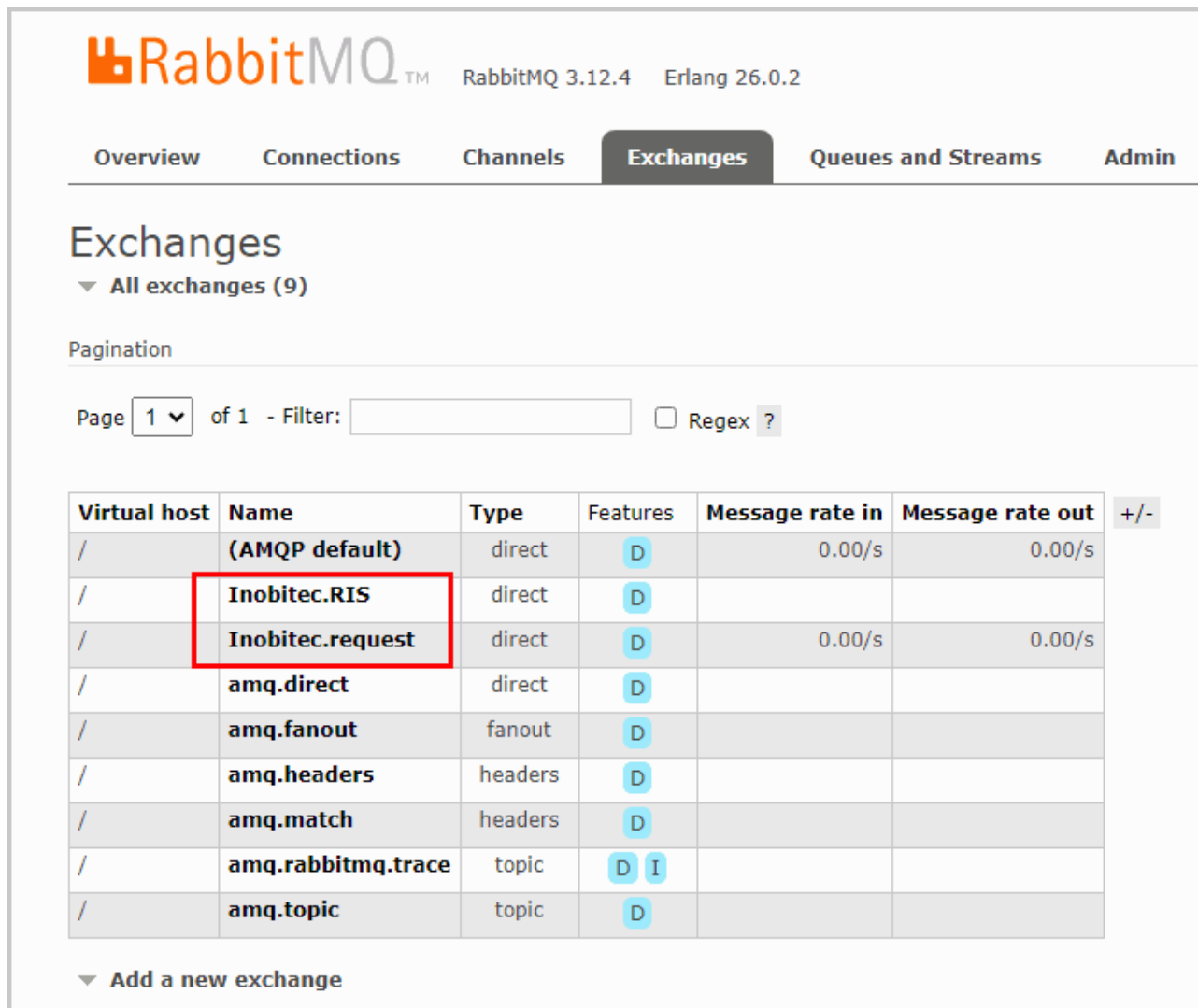
- when MWL status changes;
- when a new study is received;

- when a new series is received.

Click **SAVE** to apply the settings, or **CANCEL** to reset them.

To check the connection with the RabbitMQ server click on the **Connection test** button. The connection status message is being popped up in the bottom right corner of the window.

2.4.2 Configuration of the RabbitMQ server



RabbitMQ™ RabbitMQ 3.12.4 Erlang 26.0.2

Overview Connections Channels **Exchanges** Queues and Streams Admin

Exchanges

▼ All exchanges (9)

Pagination

Page 1 of 1 - Filter: ☐ Regex ?

Virtual host	Name	Type	Features	Message rate in	Message rate out	+/-
/	(AMQP default)	direct	D	0.00/s	0.00/s	
/	Inobitec.RIS	direct	D			
/	Inobitec.request	direct	D	0.00/s	0.00/s	
/	amq.direct	direct	D			
/	amq.fanout	fanout	D			
/	amq.headers	headers	D			
/	amq.match	headers	D			
/	amq.rabbitmq.trace	topic	D I			
/	amq.topic	topic	D			

▼ Add a new exchange

Figure 2.8: Two exchanges with the names **Inobitec.RIS** and **Inobitec.request** have been created

1. Configuring exchangers

Use the **Exchanges** tab to create two exchangers with the names **Inobitec.RIS** and **Inobitec.request**, configuring the following parameters:

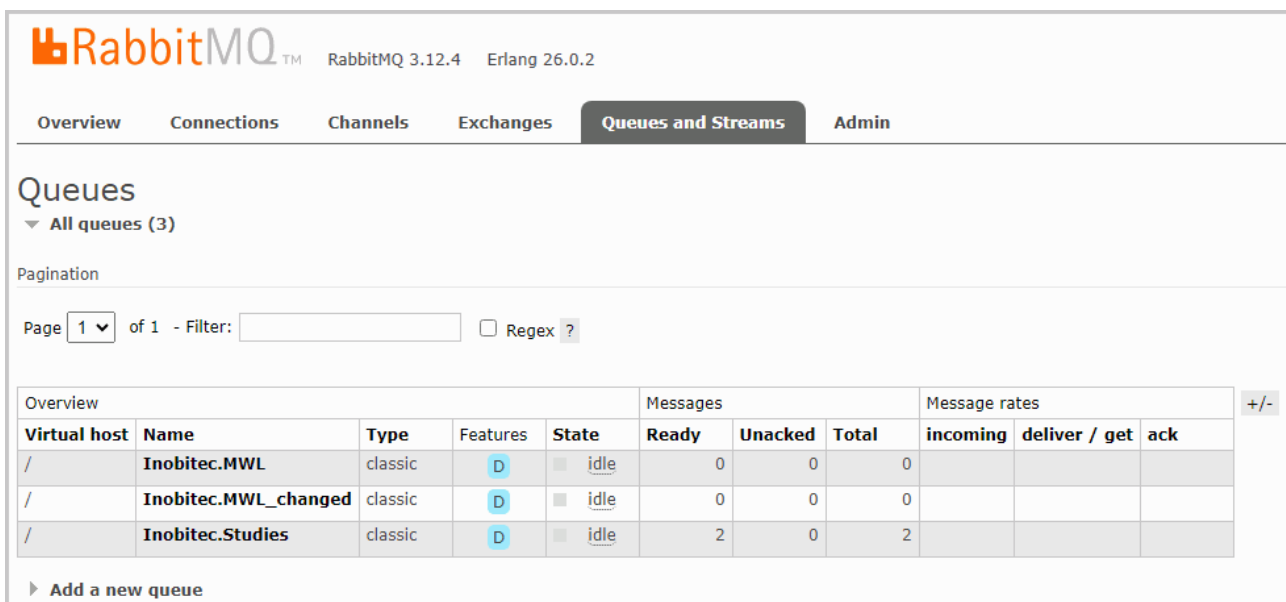
- Type: **direct**;
- Durability: **Durable**;

- Auto delete: **No**;
- Internal: **No**.

2. Configuring queues

Use the **Queues and Streams** tab to create the queue for the incoming messages **Inobitec.MWL** and two queues for the outgoing messages of the DICOM Server **Inobitec.Studies** and **Inobitec.MWL_changed**, configuring the following parameters:

- Virtual host: **/**;
- Type: **default for virtual host**;
- Durability: **Durable**.



Overview					Messages			Message rates			
Virtual host	Name	Type	Features	State	Ready	Unacked	Total	incoming	deliver / get	ack	
/	Inobitec.MWL	classic	D	idle	0	0	0				
/	Inobitec.MWL_changed	classic	D	idle	0	0	0				
/	Inobitec.Studies	classic	D	idle	2	0	2				

Figure 2.9: The configured queues in the **Queues and Streams** tab

3. Configuring bindings

Create the binding with the following parameters for the incoming message queue of the DICOM Server **Inobitec.MWL**:

- From exchange: **Inobitec.RIS**;
- Routing key: **MWL**.

Create the binding with the following parameters for the outgoing message queue of the DICOM Server **Inobitec.MWL_changed**:

- From exchange: **Inobitec.RIS**;
- Routing key: **mwL_state_rk**.

Create two bindings for the outgoing message queue of the DICOM Server **Inobitec.Studies**. The first binding shall be configured as follows:

- From exchange: **Inobitec.request**;
- Routing key: **pacs_new_study_rk**;

the second binding shall be configured as follows:

- From exchange: **Inobitec.request**;
- Routing key: **pacs_new_series_rk**.



Figure 2.10: The bindings for the **Inobitec.Studies** queue

4. Notifications

The DICOM Server is capable of sending the notification messages about the following events:

- MWL state is changed;
- a new study is received;
- a new series is received.

The MWL state message is sent to the **Inobitec.RIS** exchanger with the key **mw_l_state_rk**. It is an XML format message, which contains the study *accession number* and its new status. For example:

```
<?xml version="1.1" encoding="UTF-8" ?>
<mw_l>
  <accession_number>3076578</accession_number>
```

```
<status>IN_PROGRESS</status>
</mwl>
```

This message is sent only if the MWL status has been changed in the MWLService or UPSService.

The messages about the received studies or series are sent to the **Inobitec.request** exchanger with the respective keys **pacs_new_study_rk** or **pacs_new_series_rk**. The messages are sent in an XML format. The examples of the messages can be found below.

A new study message:

```
<?xml version="1.1" encoding="UTF-8" ?>
<study>
  <uid>1.2.276.0.7230010.3.1.2.8323328.8294.1623491973.961533</uid>
</study>
```

A new series message:

```
<?xml version="1.1" encoding="UTF-8" ?>
<series>
  <uid>1.2.840.113704.7.32.07.5.1.4.75560.30000017011800140287500011681</uid>
</series>
```

These messages are sent only from StoreService and WADOService.

5. Incoming message processing

The incoming messages are received by the DICOM Server in an XML format. Each message may contain only one of the MWL commands or the change of its status into **MISSED** or **CANCELED**. The examples can be found below.

A new MWL message:

```
<?xml version="1.0" encoding="utf-8"?>
<mwl>
  <procedure>
    <patient_id>3</patient_id>
    <pid>333</pid>
    <patient_name>PATIENT</patient_name>
    <patient_sex>F</patient_sex>
    <patient_dob>yyyymmdd</patient_dob>
    <patient_weight>70</patient_weight>
    <patient_height>1.7</patient_height>
    <military_rank>KAPITAN</military_rank>
    <medical_alerts>TEST</medical_alerts>
```

```
<referring_physician_name>DOCTOR^R.F.</referring_physician_name>
<requesting_physician_name>Doctor^R.Q.</requesting_physician_name>
<pregnancy_status>0</pregnancy_status>
<study_uid>:SERVER</study_uid>
<accession_number>3</accession_number>
<admission_id>3</admission_id>
<proc_description>proc_desc</proc_description>
<rpcs_code_value>1</rpcs_code_value>
<rpcs_coding_scheme_version>2</rpcs_coding_scheme_version>
<rpcs_coding_scheme_designator>3</rpcs_coding_scheme_designator>
<rpcs_code_meaning>4</rpcs_code_meaning>
<step>
  <modality>MR</modality>
  <station_ae_title>MRI_SCU3</station_ae_title>
  <start_date>yyyymmdd</start_date>
  <start_time>145000</start_time>
  <step_description>spine lumbosacral</step_description>
  <physician_name>Dokt^O.R.</physician_name>
  <spcs_code_value>5</spcs_code_value>
  <spcs_coding_scheme_version>6</spcs_coding_scheme_version>
  <spcs_coding_scheme_designator>7</spcs_coding_scheme_designator>
  <spcs_code_meaning>8</spcs_code_meaning>
</step>
</procedure>
</mwl>
```

The **patient_height**, **military_rank**, **referring_physician_name**, **requesting_physician_name**, and **medical_alerts** tags are not required and may be absent from the message.

A **MISSED** status message:

```
<?xml version="1.0" encoding="utf-8"?>
<mwl-missed>
  <accession_number>3076578</accession_number>
</mwl-missed>
```

A **CANCELED** status message:

```
<?xml version="1.0" encoding="utf-8"?>
<mwl-canceled>
  <accession_number>3076578</accession_number>
</mwl-canceled>
```

2.5 Configuring an HL7 connection

HL7 protocol connections are configured on the **HL7** tab (fig. 2.11) of the **Settings** page.

The **HL7 connection settings** page displays a table of created connections and control buttons: **Refresh** , **Edit** , **Remove** , and **CREATE**. The **Edit** and **Remove** buttons become available after a connection is selected in the table.



Description	Port	HL7 version
Connection 1 (client)	2575	2.5.1
Connection 2 (server)	2575	2.5.1

Figure 2.11: HL7 protocol connections

The table displays the main parameters of the created connections:

- **Description** — connection description;
- **Port** — connection port;
- **HL7 version** — HL7 protocol version.

For more information on configuring parameter display, see section 2.13.1. Connections can be sorted in the table by the values of one of the displayed columns (see section 2.13.2).

2.5.1 Creating a new connection

To create a new connection, follow these steps:

1. Click **CREATE** in the upper-right corner of the window (fig. 2.11).
2. In the **Create new connection** dialog box that opens, on the **General** tab (fig. 2.12), configure the following parameters:

Create new connection ×

[General](#)
[Identifiers](#)
[Messages](#)

Description

Example (Client) ✓

Connection type

TCP/IP Client ▾


☒ Enabled

IP

127.0.0.1 ✓

Port

2575 ✓

HL7 version

2.3.1 ▾

Encoding

UTF-8 ▾

UNICODE interpretation

UTF-8 ▾

Start block (1 byte)

0x 0B ✓

End blocks (1-2 bytes)

0x 1C0D ✓

Segment separator (1 byte)

0x 0D ✓

Timeout for sending completion status (s)

60 ✓

CANCEL

SAVE

Figure 2.12: Creating a new connection

- in the **Description** field, add a brief description of the connection being created. The field may be left empty;
- in the **Connection type** drop-down list, select **TCP/IP Server** if DICOM Server acts as a server, or **TCP/IP Client** if it acts as a client;
- to activate the connection, select the **Enabled** checkbox. By default, the checkbox is cleared. This checkbox allows the user to enable and disable selected connections;

- if **TCP/IP Client** was selected as the connection type, specify the IP address of the server to connect to in the **IP** field. The default value is **127.0.0.1**;
- in the **Port** field, specify a value in the range from 1 to 65535. The default value is **2575**;
- in the **HL7 version** drop-down list, select the protocol version: **2.5.1** or **2.3.1**;
- in the **Encoding** drop-down list, select the message encoding: **UTF-8** or **WINDOWS-1251**. The default value is **UTF-8**;
- if HL7 version **2.3.1** is selected, additionally specify the value of the **UNICODE interpretation** field. The available value is **UTF-8**;
- specify the HL7 message structure parameters:
 - **Start block (1 byte)** — HEX value of the first byte of the message. The default value is **0B**;
 - **End blocks (1-2 bytes)** — HEX value of the final byte or byte pair. The default value is **1C0D**;
 - **Segment separator (1 byte)** — HEX value of the segment separator byte. The default value is **0D**.

Only uppercase hexadecimal characters can be entered in HEX fields. Single-byte fields require 2 characters, and the two-byte field requires 2 or 4 characters;

- in the **Timeout for sending completion status (s)** field, specify the interval in seconds. The default value is **60**.

3. On the **Identifiers** tab (fig. 2.13), specify the connection identifiers:

- in the **Service identifier** field, specify the PACS server identifier. The default value is **PACS-Service-1**;
- in the **Clients identifiers** block, specify one or more client identifiers. By default, one field with the value **MIS-Name-1** is displayed.

To add a new field for a client identifier, click **ADD IDENTIFICATOR**. To delete a field, click **Delete**  to the right of the text field.

The screenshot shows a 'Create new connection' dialog box with three tabs: 'General', 'Identifiers' (selected), and 'Messages'. Under the 'Identifiers' tab, there is a 'Service identifier' field containing 'PACS-Service-1' with a green checkmark. Below it, there is a 'Clients identifiers' section with two entries: '1. MIS-Name-1' and '2. MIS-Name-2', each with a green checkmark and a red trash icon to its right. At the bottom of the dialog, there is a blue button labeled 'ADD IDENTIFICATOR', a grey button labeled 'CANCEL', and a blue button labeled 'SAVE'.

Figure 2.13: Connection identifiers

4. On the **Messages** tab (fig. 2.14), select the types of incoming and outgoing messages that will be processed by the connection. Sections with message lists are displayed only if messages are available for the selected HL7 version.

- for version **2.5.1**, the **Incoming** section provides **ORM**, **OMG**, and **OMI** messages, and the **Outgoing** section provides **OMG** and **OMI**;
- for version **2.3.1**, the incoming **ORM** message is available.

The screenshot shows a dialog box titled "Create new connection" with a close button (x) in the top right corner. It has three tabs: "General", "Identificators", and "Messages" (which is selected and underlined). Under the "Messages" tab, there are two sections: "Incoming" and "Outgoing". Each section contains three checkboxes for message types: ORM, OMG, and OMI. At the bottom of the dialog, there are two buttons: "CANCEL" (grey) and "SAVE" (blue).

Figure 2.14: Message types of the connection being created

5. Click **SAVE** to create the new connection, or **CANCEL** to exit without saving.

Attention! All fields except **Description** are required. Data is sent to the server only when the form is completed correctly. If any required field is not filled in, the **SAVE** button in the dialog box will be unavailable.

2.5.2 Actions with connections

To refresh the list of connections, click **Refresh**  in the upper-right corner of the window.

To change the parameters of an existing connection, select it in the table and click **Edit** . In the **Update connection** dialog box that opens, change the connection parameters in the same way as when creating a new connection (see section 2.5.1).

To delete a connection, select it in the table and click **Remove** . In the dialog box that opens, confirm the deletion by clicking **YES**, or select **CANCEL** to cancel.

2.6 Web services to access the DICOM Server

In the current version of the DICOM Server, interaction with the regional server via Web-services (WADO, QIDO) is not available.

WADO protocol access settings for the DICOM Server are located in the **Web-services** tab of the **Settings** page.

The **Web-services** block (Fig. 2.15) displays the following fields:

- **HTTP-service** field for receiving HTTP requests.

The service is required for correct administrator web console operation. If the service has been deactivated, the web console cannot be accessed. The port value for the HTTP request service is displayed in the **Port** field. The default value is 8000. To change the port, enter a number between 1 and 65535 in the **Port** field. If an invalid value is entered, the input field border turns red and the **SAVE** button is disabled;

- **DICOM Study Web-service** field.

The DICOM Study Web Service provides an opportunity to download studies from a server (WADO-RS), search for studies at a server (QIDO-RS), and upload studies to a server (STOW-RS). The service is disabled by default. To enable the service, check the box. The DICOM Study Web Service port value is displayed in the **Port** field. The default value is 8010. To change the port value, enter a number between 1 and 65535 in the **Port** field. In the event that an invalid value is entered, the input field border will turn red and the **SAVE** button will be disabled.

Click **SAVE** to apply the settings, or **CANCEL** to reset them.

The new **Web-services** parameters will be applied after you relaunch the DICOM Server.

Web-services

	☒ HTTP-service	Port	8000	✓
	☐ DICOM Study Web-service	Port	8010	✓

The "Port" field must be set to a value, even if the corresponding service is not used

CANCEL **SAVE**

Figure 2.15: The **Web Services** settings box

2.7 System logging settings

The system logging settings are changed on the **Logging** tab (fig. 2.16) of the **Settings** page.

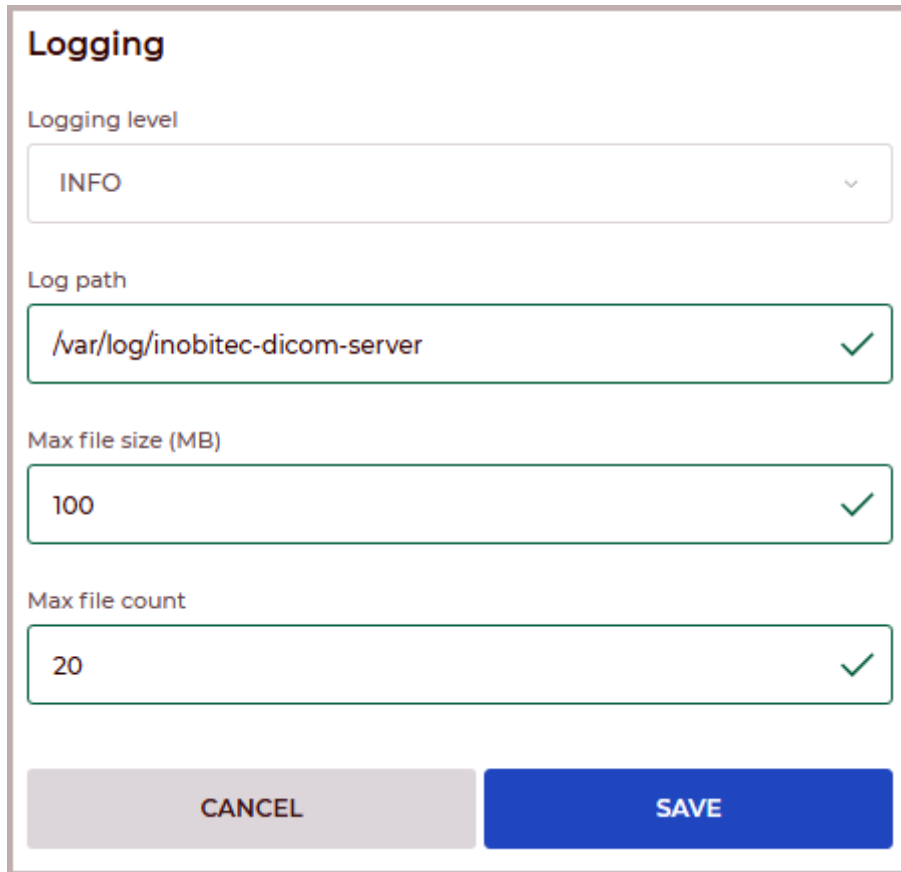
The image shows a 'Logging' settings window. It has a title bar 'Logging'. Below it, there are four input fields: 'Logging level' with a dropdown menu showing 'INFO'; 'Log path' with a text box containing '/var/log/inobitec-dicom-server' and a green checkmark; 'Max file size (MB)' with a text box containing '100' and a green checkmark; and 'Max file count' with a text box containing '20' and a green checkmark. At the bottom, there are two buttons: 'CANCEL' (light gray) and 'SAVE' (blue).

Figure 2.16: System logging settings block

To change the logging level, select the required level from the **Logging level** drop-down list. The following logging levels are available:

- **TRACE** — DICOM data dumps, method execution time, input parameters, and intermediate function execution results are recorded. DEBUG, INFO, WARN, ERROR, and FATAL messages are also recorded;
- **DEBUG** — detailed diagnostic information is recorded (for example, the order in which methods are called when processing a command). INFO, WARN, ERROR, and FATAL messages are also recorded;
- **INFO** (set by default): — the main operation stages are recorded (for example, an incoming connection or the command processing result). WARN, ERROR, and FATAL messages are also recorded;
- **WARN** — any abnormal situations that do not disrupt program operation are recorded. ERROR and FATAL messages are also recorded;
- **ERROR** — errors that affect program operation but do not cause it to terminate are recorded (for example, inability to connect to the DBMS at startup, or lack of access to resource files or other services). FATAL messages are also recorded;
- **FATAL** — critical errors after which further program execution is impossible are recorded.

If necessary, change the path to the directory containing the system log files in the **Log path** field.

In the **Max file size (MB)** field, specify the maximum size of one log file in the range from 10 to 1024 MB. When the size of the current file reaches the specified value, a new log file will be created automatically, and events will continue to be written to it.

In the **Max file count** field, specify the maximum number of stored log files in the range from 1 to 10,000. When the number of files reaches the specified value, the oldest file will be deleted automatically.

Click **SAVE** to apply the settings, or **CANCEL** to reset the settings to their current values.

After changes are made to the system logging settings, the DICOM Server does not need to be restarted.

2.8 DICOM Server Certificates

After the DICOM Server has been installed, demo keys and certificates are shown in the Certificates settings window. It is not safe to use demo keys and certificates. Upload your own certificates and keys to the DICOM Server administration web console.

You can work with certificates only from the administration web console. Certificate files are automatically provided with the correct extensions. The names of such files are saved in the database.

Viewing and editing DICOM Server certificates is done in the **Certificates** tab on the **Settings** page.

In the **Certificates** block (see Fig. 2.17), the following read-only fields with certificate information are displayed:

- Root certificate (CA);
- Public and private keys for acceptance of TLS-protected DICOM connections;
- Public and private keys for initiation of TLS-protected DICOM connections.

The DICOM Server uses the **Private SCP key** and the **Public SCP** certificate for inbound connections. It uses the **Private SCU key** and the **Public SCU** certificate for outbound connections. All the keys must be signed with the DICOM Server **Root certificate (CA)**.

Certificates

Path to the certificate directory

Root certificate (CA)

Private SCP key

Public SCP

Private SCU key

Public SCU

Figure 2.17: Certificates settings section

The **Download** and **Upload** buttons you see next to each field are used for downloading the current and uploading new certificate or key files. To download a certificate or key file, click the **Download** button. The certificate file is saved to the folder specified in your browser settings. The **Downloads** folder is used by default. If the certificate is missing from the server, the **Download** button becomes unavailable.

The **Path to the certificate directory** field displays the path to the directory containing the certificates. Before uploading certificates, specify the path to the directory where trusted certificates will be stored and click the **SAVE** button. If the field is empty, the **SAVE** button is unavailable.

To upload a certificate, click the **Upload** button. In the dialog box, choose the file and click **Open**.

Click **SAVE** to apply the settings, or **CANCEL** to reset them.

Each time any changes referred to certificate or key files are introduced, you need to restart the server. The new settings will be applied after you have restarted the DICOM Server.

The names of the certificates and keys displayed in the **Certificates** box will not be changed when you replace a certificate or a key.

2.9 Integration of the DICOM Server with other Services via the HTTP Protocol

To access to the DICOM Server via the HTTP protocol, use the REST API commands, which can be found from the link: <https://inobitec.com/downloads/dicomserver/>.

Integration of the DICOM Server into third-party services via the HTTP protocol is performed in the **Web access** tab on the **Settings** page.

In the **Access without authorization by login and password** block (Fig. 2.18), the following fields are displayed:

Access without authorization by login and password

Master cookie

dcf4f3c9-fa8a-4a79-b239-9b9b90f475bf

Add this value in Cookie header when sending HTTP commands in order for the DICOM Server to process them without authorization by login and password

Address (IP or FQDN)

127.0.0.1

If this field is filled, then the DICOM Server will execute without authorization by login and password those HTTP commands with the master cookie that are sent from the host. If the field is empty, the server will process HTTP commands with the master cookie coming from any host

CANCEL SAVE

Figure 2.18: Setting up access to the DICOM Server via the HTTP Protocol

- A read-only field with the **Master-cookie** value. The Master-cookie value is generated in the DICOM Server web console. This value must be entered in the settings of third-party services. When sending requests to the DICOM Server, the Master cookie value must be added to the HTTP request cookie header. To generate a new Master-cookie value, click the **Generate** button. To delete the Master-cookie value, click the **Delete** button;
- To restrict access to the DICOM Server enter the IP address or the FQDN of the host from which master cookie requests are to be accepted in the **Address** field. If the **Address** field is already filled, then without user name and password verification the DICOM Server will only execute those HTTP commands with the Master cookie that were sent

from this host. If the **Address** field is empty, the server will process HTTP commands with the Master cookie received from any host.

Click **SAVE** to apply the settings, or **CANCEL** to reset them.

2.10 Changing the administrator username and password

The username and password of the DICOM Server administrator are changed on the **Web access** tab of the **Settings** page.

To change the username of the DICOM Server administrator, click **CHANGE USERNAME** in the **User settings** block (fig. 2.19).

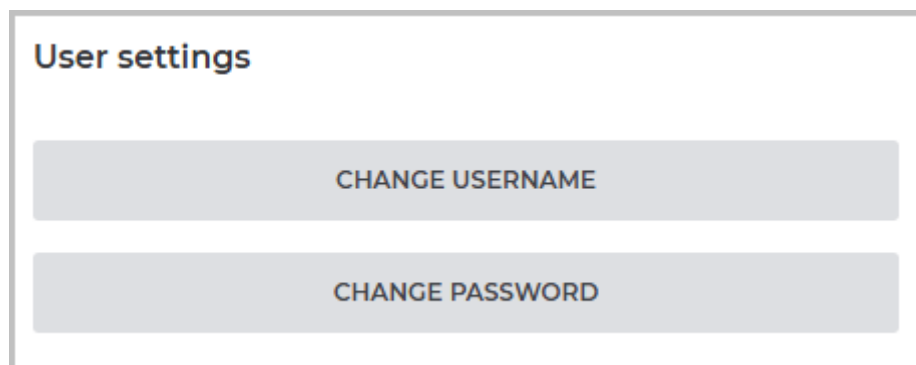


Figure 2.19: **User settings** block

In the **Change username** dialog box that opens (fig. 2.20), enter the new username and current password in the corresponding fields.

The entered username is displayed in the input field. The password is hidden by default and displayed as dots. To make it visible, click the closed-eye icon. Click **UPDATE** to apply the changes, or **CANCEL** to close the window without saving.

The username must contain 3 to 32 characters and consist of Latin letters, digits, and special characters: periods, hyphens, underscores, and the @ symbol.

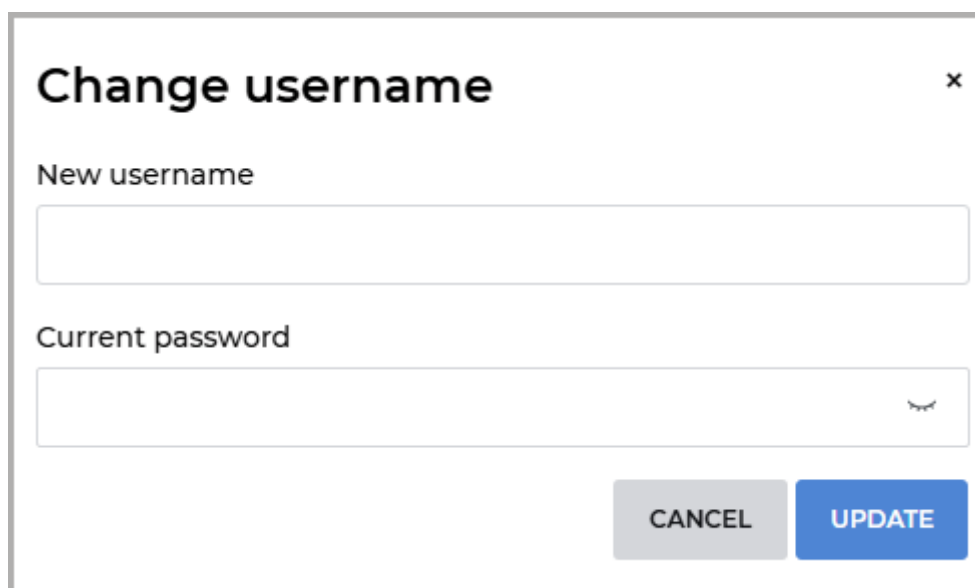
A dialog box titled "Change username" with a close button (x) in the top right corner. It contains two input fields: "New username" and "Current password". The "Current password" field has a closed-eye icon on the right side. At the bottom right, there are two buttons: "CANCEL" (gray) and "UPDATE" (blue).

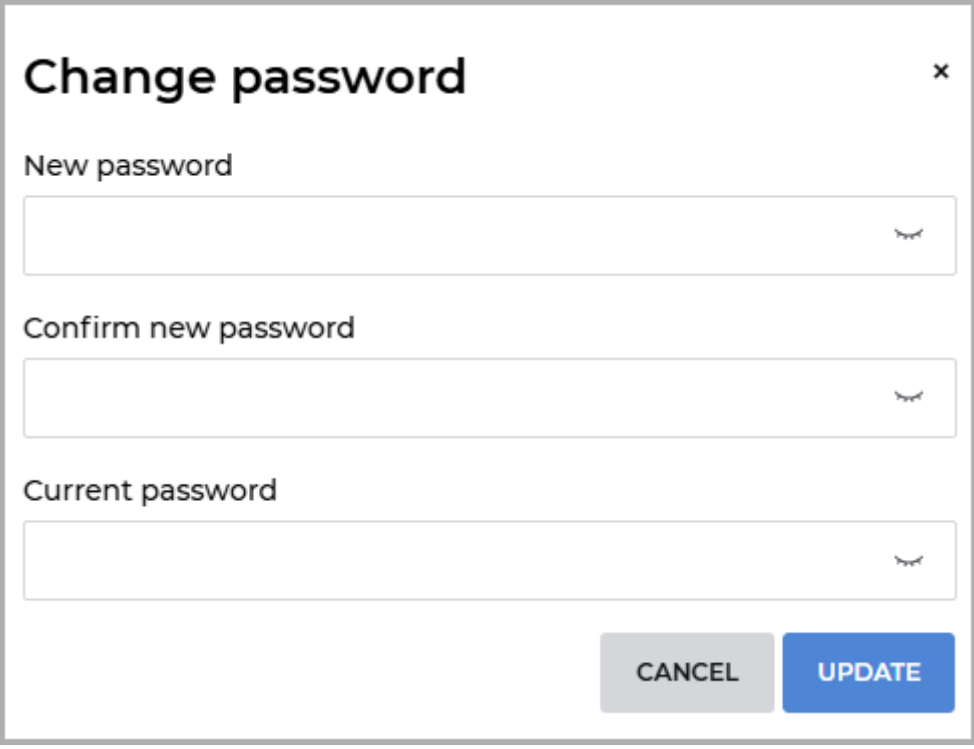
Figure 2.20: Administrator username change dialog box

To change the password of the DICOM Server administrator, click **CHANGE PASSWORD** in the **User settings** block (fig. 2.19).

In the **Change password** dialog box that opens (fig. 2.21), enter the new password in the **New password** field. To confirm the new password, enter it again in the **Confirm new password** field. In the **Current password** field, enter the current password.

All entered passwords are hidden by default and displayed as dots. To make them visible, click the closed-eye icon in the corresponding field. Click **UPDATE** to apply the new password, or **CANCEL** to close the window without saving changes.

The password must contain 8 to 32 characters, including uppercase and lowercase Latin letters, digits, and special characters except & and %. Spaces are not allowed.

A dialog box titled "Change password" with a close button (X) in the top right corner. It contains three password input fields: "New password", "Confirm new password", and "Current password". Each field has a small eye icon on the right side to toggle visibility. At the bottom right, there are two buttons: a grey "CANCEL" button and a blue "UPDATE" button.

Change password ×

New password

Confirm new password

Current password

CANCEL **UPDATE**

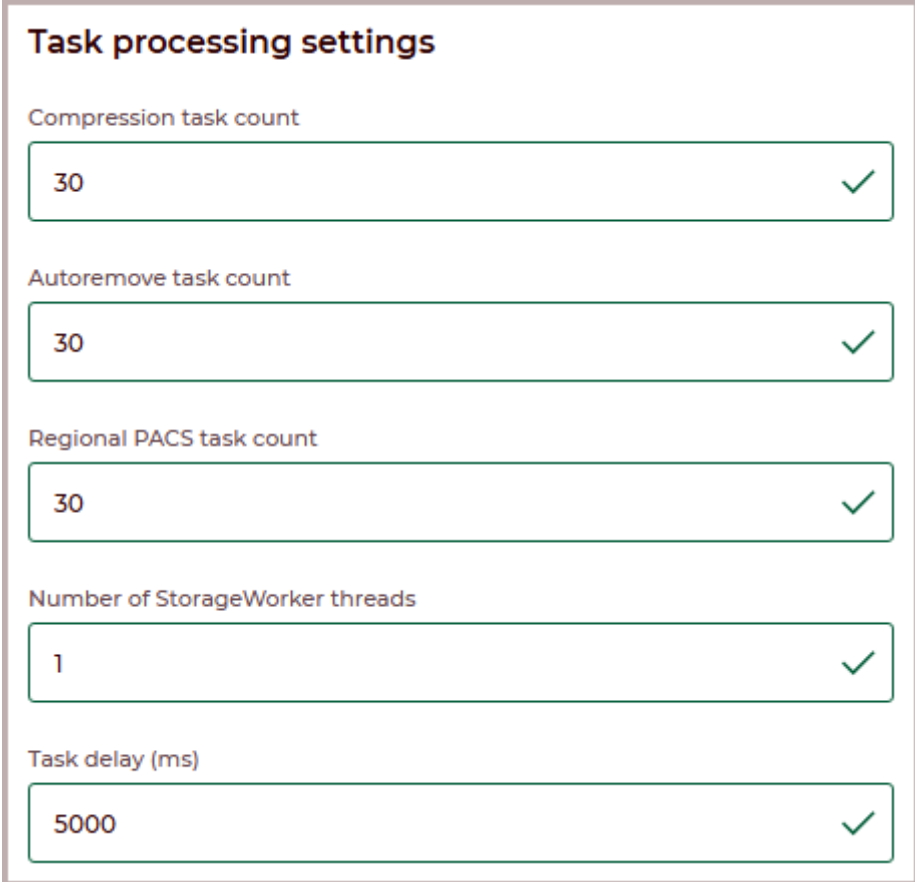
Figure 2.21: Administrator password change dialog box

2.11 DICOM Server system settings

DICOM Server system settings are configured on the **System settings** tab of the **Settings** page.

2.11.1 Storage maintenance task processing settings

The **Task processing settings** block (fig. 2.22) displays the following fields used to configure operation of the DICOM Server storage maintenance service:



Task processing settings

Compression task count

30 ✓

Autoremove task count

30 ✓

Regional PACS task count

30 ✓

Number of StorageWorker threads

1 ✓

Task delay (ms)

5000 ✓

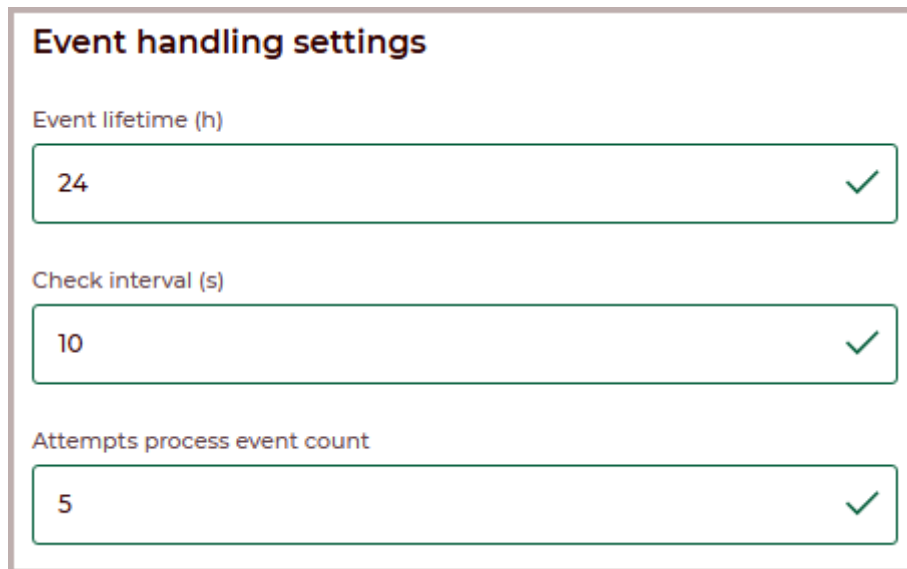
Figure 2.22: Task processing settings

- in the **Compression task count** field, specify the number of series selected for compression during one iteration of the storage maintenance service. The allowed value is an integer starting from 0 inclusive. The default value is **30**;
- in the **Autoremove task count** field, specify the number of series selected for removal during one iteration of the storage maintenance service. The allowed value is an integer starting from 0 inclusive. The default value is **30**;
- in the **Regional PACS task count** field, specify the number of series selected for sending to the regional DICOM server during one iteration of the storage maintenance service. The allowed value is an integer starting from 0 inclusive. The default value is **30**;
- in the **Number of StorageWorker threads** field, specify the number of concurrently executed storage maintenance tasks. The value is set depending on system performance. The default value is **1**;
- in the **Task delay (ms)** field, specify the delay between storage maintenance tasks, in milliseconds. The default value is **5000**.

Click **SAVE** at the bottom of the page to apply the changes, or **CANCEL** to restore the previous values.

2.11.2 Event handling settings

The DICOM Server can notify its clients, for example, the system administrator, about the occurrence of an event using messages sent by email. The **Event handling settings** block (fig. 2.23) displays the following fields used to configure the event processing and deletion service:



Event handling settings

Event lifetime (h)

24 ✓

Check interval (s)

10 ✓

Attempts process event count

5 ✓

Figure 2.23: Event handling settings

- in the **Event lifetime (h)** field, set the event lifetime in hours, after which completed events with an expired lifetime will be deleted from the database. The default value is **24**;
- in the **Check interval (s)** field, specify the time interval, in seconds, after which events awaiting processing are collected from the database and sent for processing. The default value is **10**;
- in the **Attempts process event count** field, specify the number of failed attempts to send event messages (default value: 5), upon reaching which an error message will be added to the log and the event status will change to *failed*. In this case, the user can retry sending the event through the administration web console.

Click **SAVE** at the bottom of the page to apply the changes, or **CANCEL** to restore the previous values.

2.11.3 Configuring study import to DICOM Server

In the **HTTP import settings** block, in the **Maximum HTTP request body size (Mb)** field, specify the maximum file size in MB that the server can accept within a file import session. The default value is **512**.

Click **SAVE** at the bottom of the page to apply the changes, or **CANCEL** to restore the previous values.

2.11.4 Resetting DICOM Server settings

To reset all settings and return to the initial DICOM Server settings, click **RESET SETTINGS** in the **Default settings** block.

In the dialog box that opens, click **YES** to return to the initial server settings, or **CANCEL** to cancel the action.

2.12 Uploading and downloading DICOM Server settings



Do not modify the settings files created by DICOM Server. Manually editing these files may cause the server to operate incorrectly or result in the loss of settings.

On the **Backup** tab of the **Settings** page, the user can download the current DICOM Server settings or apply previously saved settings.

To download the settings, click the **DOWNLOAD SETTINGS** button in the **Backup and restore settings** block. The **settings.json** file with the settings is downloaded to the folder specified in the browser settings. By default, the **Downloads** folder is used.

To apply previously saved settings, perform the following steps:

1. Click the **UPDATE SETTINGS** button in the **Backup and restore settings** block.
2. In the **Update settings** dialog box that opens (fig. 2.24), upload the settings file in one of the following two ways:
 - drag the file from the File Explorer window to the dashed area of the window;
 - left-click in the dashed area. In the standard system dialog, select the file and click **Open**.

Supported file formats: *.json*, *.ini*. To apply settings for DICOM Server version 2.10 or earlier, upload the *.ini* configuration file.
3. Click **SAVE** to apply the settings, or **CANCEL** to cancel.

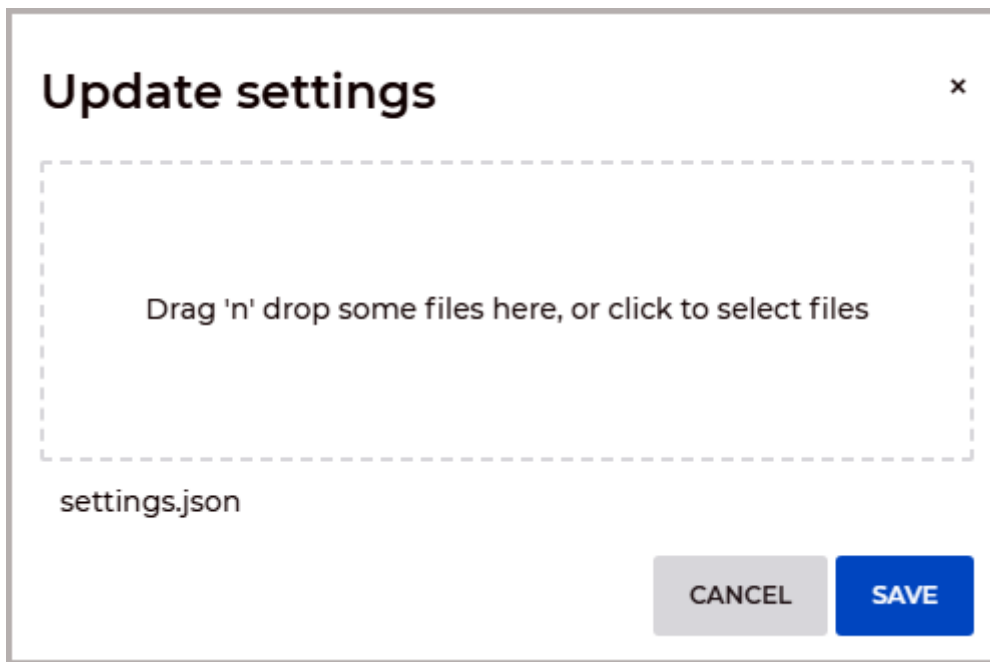


Figure 2.24: Settings file upload dialog box

Warning! When transferring the settings file to another the DICOM Server, check that all file and folder paths are correct.

2.13 Tables

On the pages named **Devices (AE)**, **Studies**, **Modality Worklist**, and **Storages** the data are presented in tables. The user can customize the tables for better presentation of information.

2.13.1 Customizing Parameters Display Options

To customize the parameters display options, right-click on the table header and choose the **Table settings** option in the right-click menu. A dialog box shown in Fig. 2.25 will pop up. Our example shows the settings for the table on the **Devices (AE)** page. The tables presented on the pages named **Studies**, **Modality Worklist**, and **Storages** can be customized by analogy.

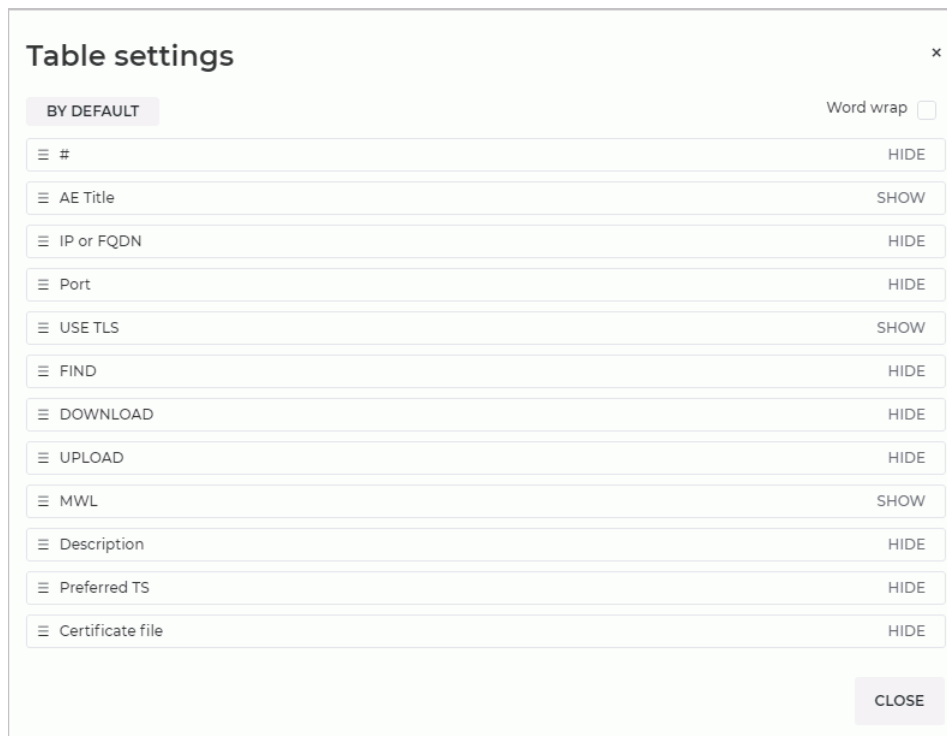


Figure 2.25: The **Table settings** dialog box

To change the order of parameters display in the table header, move the cell with the selected parameter. To display or hide a column with a table parameter, click the **HIDE** or **SHOW** button in the cell with this parameter. Check the **Word wrap** box to move the parameters within the line. To restore the default settings, click the **BY DEFAULT** button.

To escape from the table settings dialog box, click the **CLOSE** button.

2.13.2 Sorting by Values

If there are several lines in the table, you can sort the lines by the values displayed in one of the columns. To do that, click on the header of a column with the respective parameter. Next to the name of this column, you will see an arrowhead showing the sorting order (∨ **down** — in descending order, ∧ **up** — in ascending order). To change the sorting order, click on the column header once again. You cannot sort the lines by several parameters simultaneously.

Chapter 3

Licensing

3.1 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).

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 (Fig. 3.1).
- At the command prompt using the `-p` key. On the command prompt run:
`«program_path>\inobitec-dicom-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.

3.2 DICOM Server Licensing

The right side of the **ABOUT** page displays information about the license parameters (fig. 3.1). Here, the DICOM Server administrator can also activate a license or download the current one.

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**).

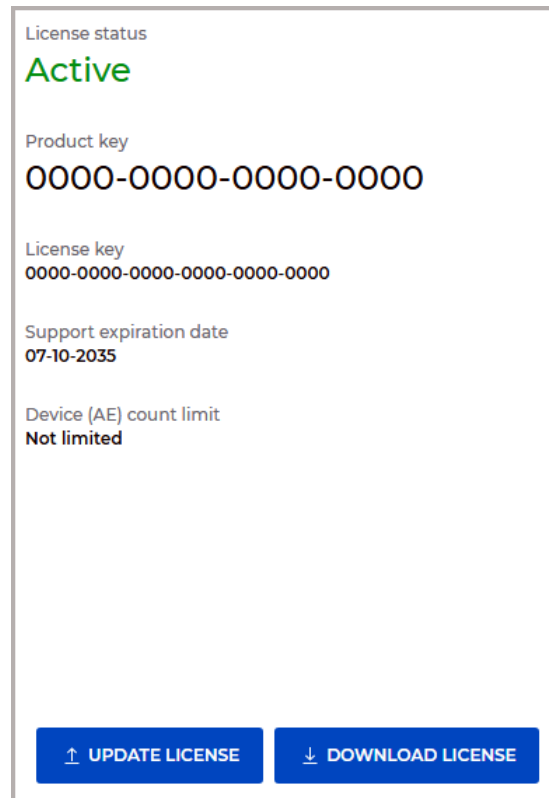


Figure 3.1: License parameters

To license the DICOM Server, click the **UPDATE LICENSE** button. In the **Update license** dialog box that opens (fig. 3.2), upload the license file in one of the following two ways:

- drag the file from the File Explorer window to the dashed area of the window;
- left-click in the dashed area. In the standard system dialog, select the file and click **Open**.

Click the **SAVE** button to save the license or **CANCEL** to cancel the action.

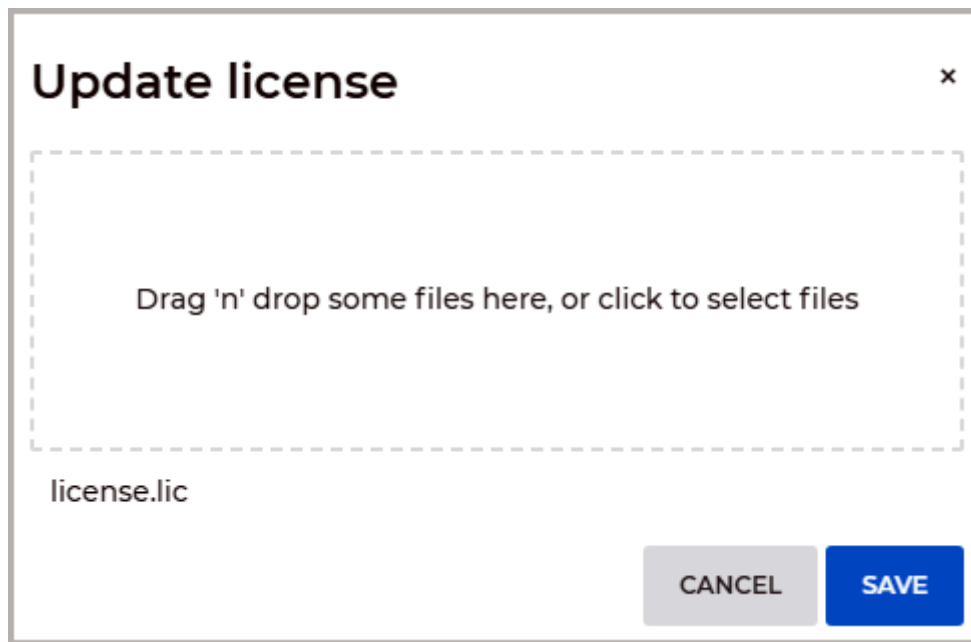


Figure 3.2: License file upload dialog box

If the license is successfully activated, its parameters are displayed on the right side of the **ABOUT** page, and the license file is saved in the DICOM Server database.

To download the license file, click the **DOWNLOAD LICENSE** button. The license file is downloaded to the folder specified in the browser settings. By default, the **Downloads** folder is used.

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 4

DICOM Files Import Utility

inobitec-dicom-server-import-util

We use the inobitec-dicom-server-import-util 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.

The inobitec-dicom-server-import-util utility uploads all the images from the chosen folder to the DICOM Server. By default, the DICOM Server does not overwrite the existing images when images with the same names are uploaded. To overwrite the existing images, check the **Overwrite existing DICOM files** box in the DICOM Server Management Web Console.

Restart the DICOM Server to apply the changes.

If this box is unchecked, the images sharing their names with the existing images will be ignored.

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.

4.1 Using inobitec-dicom-server-import-util 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 inobitec-dicom-server-import-util 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 inobitec-dicom-server-import-util utility is run (see Section 4.2).

4.2 Using inobitec-dicom-server-import-util with Command Line Parameters

To import data to the DICOM server, run the inobitec-dicom-server-import-util utility with the following parameters:

[<program_path>]inobitec-dicom-server-import-util [<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\bin\inobitec-dicom-server-import-util.exe 192.168.1.10 3000 D:\dicom_data PACS_Inobitec.

If the inobitec-dicom-server-import-util utility is started with no parameters, it works interactively (see Section 4.1).

Chapter 5

Features and limitations

5.1 Peculiarities of DICOM Server operation in Windows OS

If the DICOM Server runs under Windows OS, using a period or a space at the end of strings in patient data, for example in the PatientID field, is not allowed. Using these characters may cause errors when saving a study or make it unavailable for further use.

This peculiarity is due to the fact that Windows OS ignores periods and spaces at the end of file and folder names, which leads to path conflicts when writing data to the file system.

5.2 Peculiarities of Message Display When Deploying or Updating a PostgreSQL Database

When deploying or updating a PostgreSQL database using a utility launched in an operating system different from the operating system of the PostgreSQL server, error messages may be displayed incorrectly.

To avoid incorrect message display, run the database deployment and update utility in the same operating system in which PostgreSQL is installed.

Thanks for selecting our product! Inobitec Software FZ-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!