Administrator's Guide

Eocortex

Version 3.4

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eocortex.com

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What's new

Novelties in Version 3.4:

Video Analytics

- The support of the inherited **Face Recognition (Basic)** module has been discontinued.
- The **Interactive Search** module has been renamed to **Search for objects**. Now it is possible to search for objects by the following categories: people, vehicles, weapons, bags, animals; the search for separate types of vehicles is also available. The search speed has been increased, and it is now possible to launch the module on a video analytics server.
- The **Face Recognition (Complete)** module has been enhanced: the accuracy of face detection and recognition has been improved; the recognition of turned and masked faces has been added; the events that allow to set scenarios based on the presence or absence of a mask on the face and on the face turned away from the camera have been added; now, when adding new faces to the database, it has become possible to learn that there are duplicates present; it is now possible to add persons who do not meet the requirements for samples of persons to the database. At the first launch of the improved module, the face database will be automatically updated; it will take some time.
- Testing of **Eocortex** video analysis modules has become even easier.
- In the **People counting** module, it is now possible to set individual counter reset parameters for each camera.

- New settings for each sabotage detector have been added to the **Sabotage detector**; the number of false triggering events has been reduced the sensitivity of several detectors has been increased.
- It is now possible to set individual face and license plate databases for different cameras.
- A black body calibrator setting for the **Temperature for recognized faces** video analytics built into a thermal camera has been added.

Server applications

- It is now possible to indicate two addresses for a server in the **Eocortex Configurator** application.
- Now, it is possible to generate RTSP links directly in the **Eocortex Configurator** application in order to connect to the **Eocortex** server via RTSP.
- It is now possible to receive H.265 video streams via ONVIF.
- Several improvements have been introduced to the ONVIF server: the **HTTP Digest** authorization (in addition to the existing **WS UsernameToken**); in response to a query for video and audio configuration, the information regarding the unavailability of Multicast has been added; responses to certain queries have been adjusted to comply with the applicable standard.
- A number of improvements have been made to the RTSP server: now an unknown command does not stop the video broadcasting, and the software with the ability to switch between TCP and UDP can correctly switch from UDP to TCP by default, without specifying the protocol in the settings.
- It is now possible to distribute the reencoding of video streams for mobile applications among various servers.

Security

- It is now possible to sign saved frames and video clips to be exported with an electronic signature.
- In **Eocortex** it is now possible to limit the number of connections to the video surveillance system under the same account.

Eocortex Client

- It is now possible to connect to the **Eocortex** server, to the **Eocortex** server via P2P, and to **Eocortex Cloud** using the **Eocortex Client** application.
- Now can be configure on the alarm monitor to open the video with a delay to see the situation at the time of the alarm.
- The consumption of hardware resources when operating in full screen mode has been reduced in the **Eocortex Client** application.
- 9 new grids have been added (2 of them with vertical alignment).

Integration

- The queries allowing to enable, disable and set up the **Face Recognition (Complete)**, **Unique Visitor Counting**, **License Plate Recognition (Complete)**, **Counting people in queue**, **People counting** video analysis modules have been added to REST API.
- Now, all the main license plate database interaction operations are available in REST API: obtaining, adding, editing and deleting data regarding vehicles and groups.
- The **Face recognized** and the **Large number of people in the queue** events, as well as the conditions for actions at occurrence of these events have been added to REST API.

- In HTTP API, the information regarding the coordinates of the detected objects has been added for those events that include frames of the objects. Also, in the face detection and recognition events, a field with the trajectory identifier has been added. In addition, a binary time field has been added to the above events.
- The **Send Push notifications to mobile devices** action has been added to REST API.

Deployment

- The size of the distribution kit has been significantly reduced by excluding PDF documentation from the installation packages. Now, in case there is no internet connection on the application deployment site, it is required to download the PDF documentation from the site in advance.
- The option of silent install under Linux has been added.

Novelties in Version 3.3:

- To facilitate setup of the systems with **Enterprise** and **Ultra** licenses, the possibility to set up user rights immediately upon creating a view has been introduced.
- The integration with Paxton Net2 systems has been performed.
- The synchronization of face database with external systems, allowing to upload data from the files located in a folder on the disc to the Eocortex face database has been implemented.
- The volume of data transmitted thru the network by the **Eocortex System Health Monitoring** sub-system has been reduced.
- The possibility to reduce the frequency of data exchange between the primary and secondary servers of the system has been added.
- The following new access rights have been added: Access to maps, Camera cell control, Access to face and license plate databases, Accept alarms without obligatory comments, Blurring disabled.
- The following archive export capabilities have been added: Adding a Watermark, Encrypting the Archive Using a Password.
- The **Frame area blurring** module intended for blurring the specified areas of a real-time video has been introduced.
- The time of operation of the server without the floating license key has been increased in order to reduce the risks of video surveillance system failure in case of network issuesx.
- Obtaining video encoded with H.265 (w/o B frames) using direct queries to the server via RTSP has been implemented.
- Now, the separate events and archive bookmarks are displayed on the timeline when viewing the archive of several cameras simultaneously.
- The constant camera redundancy is now available.
- The following improvements have been introduced to the face recognition modules: delays and discrepancies when displaying the recognized faces have been remedied, the requirements imposed on the images of the faces to be added to the database have been relaxed.
- The NVIDIA GeForce RTX™ 30 video cards based on the Ampere architecture are now supported by the modules that use neural networks.

- The **License Plate Recognition (Complete)** module has been updated: new license plate templates have been added for some countries; new settings and recognition methods have been added; now the module can be used on a Linux based server.
- The **License Plate Recognition (Light)** module has been updated: the recognition of license plates of five more countries has been added; new license plate templates for several countries have been added.
- The **Counting people in queue** module has been improved: the counting accuracy has been increased; the consumption of resources when using the GPU has been reduced.
- The view selection menu of the **Eocortex Client** application has been modified.
- Now, the Face Recognition (Complete) and Unique Visitor Counting modules can recognize emotions.
- The video analytics built in the cameras is now supported.
- Now, a server can be assigned as a video analytics server.

Novelties in Version 3.2:

- Now it is possible to use most video analysis modules and HASP license protection on Linux-based servers.

- A capability of setting counting zones and, subsequently, determining the number of people in the zones in real time has been added to the **People counting** module.
- **Tracking** video analysis module has been upgraded.
- **Search for objects** video analysis module has been upgraded.
- A capability of sending temperature data registered by a thermal camera to the Face Recognition module has been added.
- In the **Eocortex Configurator** application, the **Video analytics** page with the summarized info regarding the use of the video analysis modules in the system has been added. Also, the settings of the automated reports for some of the video analysis modules have been moved to this page.
- Now it is possible to place cameras, sensors, and relays on the geographical online maps provided by **Google Maps** and **OpenStreetMap**.
- Decoding of B-frames encoded in H.264 and H.265 is provided.
- Now, the switching of channels to a backup server is ensured not only when there is no access to the main server but also when all the archive drives of the main server fail.
- The intervals of prerecording and additional recording available for setting up have been increased to 10 seconds.
- Now, moving a camera to another server is done without losing the archive.
- The capability of P2P connection using the **Eocortex Client** application to the **Eocortex** server has been added.
- Smart assistant that allows to interact with the application using voice and text commands has been added to the Android app.
- Face recognition technologies used in the **Face Recognition (Light)** module have successfully passed FRVT conducted by NIST. The test results are available here: https://pages.nist.gov/frvt/html/frvt11.html.

Novelties in Version 3.1:

- Server and Client views have replaced screen grids in the Client Application.
- Floating licensing is now available in **Eocortex**.
- **Eocortex Web-client** is now fully in HTML5 (in the previous version, Adobe Flash Player was used in the full screen mode).
- Replication of the remote database allowing to perform recognition even in the temporary absence of a connection with the remote face and license plate databases has been implemented for the Face Recognition and License Plate Recognition modules.
- The trial version ordering tool has been incorporated into the setup interface of the **License Plate Recognition (Complete)** module. The trial version allows to test the module during 60 days.
- Now, the ONVIF server of **Eocortex** can use not only **Base Notification** but also **Pull-Point Notification** for transferring events.
- **Enterprise** license added.
- Now, the server and client software for all types of licenses is installed from a single distribution kit.
- The **Work time logging (Complete)** report has been developed for the **Face Recognition (Complete)** module.
- The **Sabotage detector** module's operation has been improved.
- It is now possible to connect RTSP devices using the following type of a connection string: **rtsp://-login:password@address**.

Novelties in Version 3.0:

- Server application for Linux.
- Possibility to execute tasks on commands of the users of client applications.
- Possibility to send HTTP requests to external web applications and to devices with web control.
- When sending a message created on the basis of the **Face recognized** event to the messengers, the image of a face from the archive at the moment of recognition and the reference image from the database will be attached to the message.
- Now the Face Recognition (Complete) and the Unique Visitor Counting video analysis modules use all the video cards installed on the server.

Novelties in Version 2.8:

- New video analysis module added: Face Recognition (Complete).
- New video analysis module added: Unique Visitor Counting.
- New video analysis module added: Face Recognition (Light).
- Video analysis module removed: **Face recognition module (Expert)**.

- In the Licence plate recognition (Light) video analysis module, the list of countries whose license plate numbers are supported has been extended, as well as new patterns of license plates for several supported countries have been added.
- To ensure the protection of data being transmitted between cameras and the **Eocortex** server and between the server and the **Eocortex Client** and **Eocortex Configurator** applications, the capability of using SSL/TLS security certificates has been added.
- The integration with the Honeywell's Pro-Watch® comprehensive security platform. has been implemented. Due to this integration, it is now possible to receive and display **Honeywell's Pro-Watch®** events and set up various responses to them.

Features

Secure Connections

To ensure proper data protection, **Eocortex** permits to use SSL/TLS security certificates for encrypting data being transferred between the system components.

It is possible to set secure connections using the SSL/TLS security certificates for the following:

- Connecting **Eocortex** server to IP cameras;
- Connecting **Eocortex Configurator** application to **Eocortex** server;
- Connecting **Eocortex Client**, **Eocortex Web-client**, **Mobile client for Android**, **Mobile client for iOS** client applications to **Eocortex** server.

At the same time, the insecure connection is used for the following connections:

- Data transfer between **Eocortex** servers in a multiserver system;
- Data transfer between **Eocortex** components and third-party systems, if the secure connection feature has not been implemented specifically during the process of integration with such systems;
- Multicasting of streaming video by **Eocortex** server for its use in **Eocortex Client** application.

Particularities of the secure connection of **Eocortex** server to cameras:

- Any SSL/TLS certificates are accepted, i.e. **Eocortex** does not check whether these certificates are trusted or not.
- The secure connection capability is available for the limited list of models. However, certain features may not be available when using secure connection with some models of cameras that support secure connection.
- The upgrade of **Eocortex** software to provide a capability of secure connection to certain camera models is performed per special request in accordance with the existing procedures.

Should the **Eocortex Configurator** application fail to establish the secure connection to the **Eocortex** servers, such servers will be marked as unavailable in the list of servers. A situation can also occur when in the course of adding a new server using the secure connection it is not possible to properly finalize the addition procedure. This issue may appear due to the inability of the server to launch using a secure port – it may be occupied by another application or made unavailable in the settings of the environment. In this case, it is required to free the corresponding port and ensure network access to it.

If the server's secure port is not available from the client application, the broadcasting from the cameras assigned to this server will stop, the archive of these cameras will not be played back, no reports on these cameras will be created in the client application, etc.

If the insecure connection to server is prohibited, the **Eocortex Client** and **Eocortex Web-client** applications connected to it will be automatically restarted using the secure connection. At the same time, the **Mobile client for Android** and **Mobile client for iOS** will not be restarted in this situation. The **Eocortex Configurator** application will not be restarted either (otherwise, the control over the server could be lost). When prohibiting the insecure connection to the server, such prohibition will become valid for all the new connections from the **Eocortex Client**, **Eocortex Web-client**, **Mobile client for Android** and **Mobile client for iOS** applications. At that, the **Eocortex Client** application will use a secure connection in a compulsory manner even in case of an attempt to establish an insecure connection.

The particularities of the SSL/TLS certificates being installed on the server are as follows:

- The confirmation of a certificate is required for each individual user of the operating system on each device that uses the certificate.
- The reliable (trusted) certificate is the one that is issued by a well-recognized (trusted) certification authority.
- For each secure connection to the server from the **Eocortex Web-client** application, the verification of reliability of the certificate used for the encryption of the session is performed in the web browser. If it is not possible to confirm the certificate's reliability, the user gets an insecure connection warning.
- In case that in the course of establishing a secure connection to server from the **Eocortex Configurator** and **Eocortex Client** applications it will be detected that the certificate being used is not a trusted one, the dialog box with a question regarding the trustworthiness of this certificate will appear. In this dialog box, the user will be able to forbid the connection or allow one-time or permanent use of the certificate. If the permission to use the certificate is permanent, the warning will not appear again.
- The verification of the certificate's authenticity is performed every time when a secure connection to server is established from the **Eocortex Configurator** and **Eocortex Client** applications. If the certificate is not trusted, the user will see a dialog box with the information about the certificate and with the possibility to reject the connection or confirm the use of the certificate. In case of the latter choice, the certificate will be considered trusted and its further confirmation will not be required. However, after the expiration of the certificate's validity period the confirmation to use it will be required for each new session.

If a third-party security certificate for the server is not installed or it has been impossible to load it during the launch of the server, the self-signed TLS certificate will be used for establishing secure connections with the server. Such certificate is generated on the server in the process of creating a new configuration of the video surveillance system. The self-signed TLS certificate has the following disadvantages:

- The certificate can be replaced by an insecure one within the network; the user may not even notice that, confirming the insecure connection.
- The users of the web application will have to confirm the insecure connection every time; it may lead to the distrust of the users.

The particularities of the use of certificates in the **Eocortex Client** application are as follows:

- During the use of the **Eocortex Client** application in a multiserver system, the verification of the security certificate may be performed in the course of operation. At that, when the untrusted certificates are detected, the corresponding notifications are shown in the lower right corner of the screen, and the connection

with the servers using such certificates is blocked until the user makes a corresponding decision.

- All the events of accepting the security certificates are registered in the event log of a video surveillance system.
- In case of using the **Eocortex Client** application in the multi-display mode, the notification regarding the insecure connection will appear on the main display only.
- It is possible to disable the verification of the security certificates for the **Eocortex Client** application using the special launch parameter.

Related references:

- Secure connection using Eocortex Configurator application
- Secure connection to camera
- Prohibition of insecure connections to servers
- Installation of a security certificate

User tasks

The users of **Eocortex** client applications can start any actions implemented in the video surveillance system, as well as the sequences of such actions, by themselves. To enable that, the user tasks are added to the **Eocortex Configurator** application, following which these tasks can be launched in Android, iOS and Windows client applications.

To prevent an erroneous launch of the tasks, the launch confirmation option has been introduced: the tasks where this option is enabled will only be launched after an additional confirmation by the user.

It is possible to forbid launching user tasks in the user rights settings: all the tasks on all cameras or individual tasks on the specified cameras can be forbidden. By default, all users have permission to launch user tasks.

Launching tasks in the client applications is performed in a similar manner, differing only in details.

If user tasks are set up on a camera, and the user has the rights to execute these tasks, then, in the client application, in the observation mode, during the activation of such camera, the or button will be displayed in the cell, depending on the quantity of tasks that can be launched on the camera (one or more).

If only one task is set up on the camera, it will be executed upon pressing the button.

If there are several tasks set up on the camera, a list of those tasks will open upon pressing the button, and the task will be executed only as it is selected in the list.

If the launch confirmation has been set in the configuration of the task, a dialog will open before the launch. In this dialog, it will be possible to confirm or cancel the launch.

After launching the task, the corresponding notification will appear on the screen.

Related references:

- Adding, modifying and deleting user tasks
- Setting up rights of access to user tasks

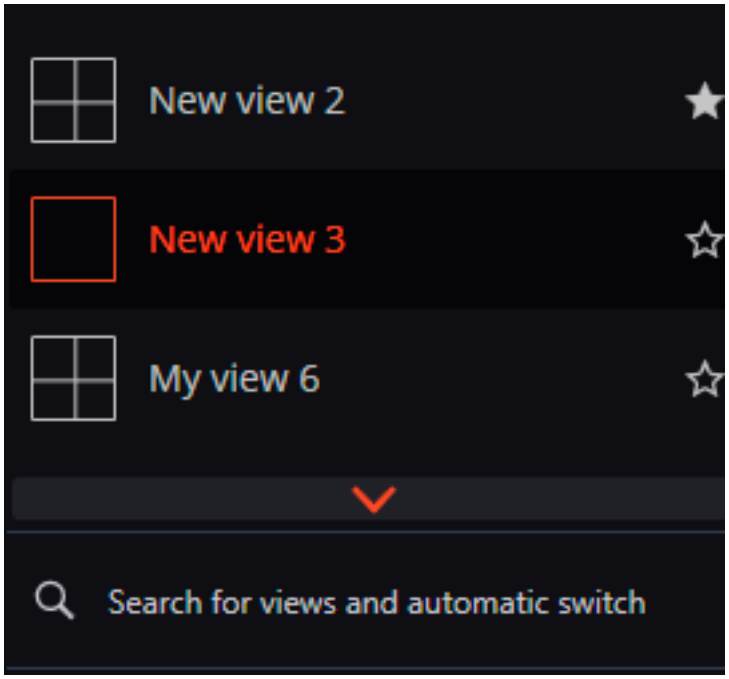
Server and Client views

To display the images from the cameras on the screen in the client applications, **Eocortex** uses **Views** – grids with the images from the cameras shown in the cells. There are two types of views: Server and Client ones.

- **Server View** is a view created by a video surveillance system administrator in **Eocortex Configurator**. The server views are available in the **Eocortex Client** application as well as in the mobile client applications working under Android and iOS. In a multi-server system, the server views are available when connecting to any server of the system via the client application. At that, the server view is added to the client application at the moment of launching it. Thus, if you create or modify a server view, the changes will appear only after the restart of the application.
- **Client View** is a view created by a user in the client application. The client views are available only on a particular device or computer on which they were created, and only for the particular user who created them. Upon the termination of a session of working with the client application, all the client views that contain no cameras are deleted.

⚠ The server views that contain no cameras will not be added to the client application when it is launched.

ⓘ In the client application, a server view can be distinguished from a client view by the presence of an icon in the form of a house in the lower right corner of the schematic representation of this view of the server application.



ⓘ Until version 3.0 inclusively, it was possible to use server views only for displaying cameras. That said, it was possible to select a screen grid in the client application and place cameras in its cells as required.

Related references:

- Server view setup

Floating licensing

The **Floating licensing** implemented in **Eocortex** allows using a single license key on several **Eocortex** servers.

This capability is not present in all types of licenses.

In the terminology of **Eocortex**, the keys with the floating license are called network keys to distinguish them from the traditional keys that are now called local keys.

The total number of cameras, modules and other licensed features are shown in the floating license. The administrator of a video surveillance system can distribute the cameras among servers at his/her discretion. However, it is not required to distribute the licenses among servers because the system core does it automatically. Whereby, upon binding the cameras to another server, the corresponding licenses will be moved accordingly.

Only one license can be activated on a single server, irrespective of whether this license is local or floating.

The network key must be installed on a computer where the **Eocortex** server is installed.

The network keys can only be used on the **Eocortex** servers of versions 3.1 and later. It is not possible to use the network keys on the earlier versions of the software, even as local keys.

In order to ensure access to a network key, it is required to allow the outgoing TCP and UDP traffic for the 1947 port both on the server where the key is installed and on the servers that use this key.

A single network key can be used in several **Eocortex** video surveillance systems. In such a case, the parameters of the key will not be shown correctly in the **Eocortex Configurator** application of each system because the systems have no information regarding the usage of licenses by other systems.

A network key is to be installed on any **Eocortex** server of the same local network or VPN where the servers using that key are located.

Several network and local keys can be installed in the same **Eocortex** video surveillance system. However, the number of local keys is limited by the quantity of **Eocortex** servers, but the number of network keys is unlimited.

The floating licenses can be used on any HASP keys, be it software or USB ones.

Related references:

- Installing and updating the license
- Server licenses

Replication of remote databases of faces and license plate numbers

For the face recognition and license plate recognition modules, the replication of the remote database allowing to perform recognition even in the temporary absence of a connection with the remote databases has been implemented.

The replication works as follows:

When a remote database (hereinafter face or license plate database is meant) is used on the server where the recognition is performed (to which the recognition cameras are bound), a local copy (replica) of the remote database is created. Further, a synchronization of the local copy with the remote database is performed. In the event of losing connection with the remote database, its local copy will be used.

All the modifications made to the database (adding, editing and removing entries) is performed exclusively upon availability of a connection with the remote database. When the connection is lost, the recognition will be performed on the basis of the entries present in the local copy of the database.

The remote database is copied (replicated) to the server in the following cases:

- Immediately after the changes to the database are made by the camera bound to the server or by the client computer connected to the server;
- Immediately after the connection of the server with the remote database is established (in case the connection was lost before that or the server has just been launched);
- Once every minute (if the connection has not been interrupted, and no changes have been made from the computer).

⚠ The replication was introduced in Version 3.1. In addition, the structure of the database has changed, as compared with the versions 3.0 and earlier. Due to that fact, in order to work properly with the remote database, it is required to update the version on all the video surveillance system servers, including the one where the remote database is located.

ⓘ If for some reason it becomes necessary to roll back to Version 3.0 or earlier, it is required to contact Eocortex technical support team.

Trial license for the License Plate Recognition (Complete) module

The trial license ordering tool that allows trying out the module to the full extent is embedded into the configuration interface of the **License Plate Recognition (Complete)** module's settings in the **Eocortex Configurator** application.

This tool permits to order one of the following **License Plate Recognition (Complete)** licenses that allow to perform recognition of the license plates during 60 days on 4 cameras assigned to the server:

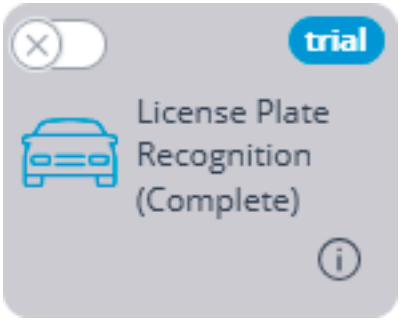
- Type of license: **Highway (25 fps)**
- Type of license: **Parking (6 fps)**

⚠ These temporary licenses will not work on virtual machines.

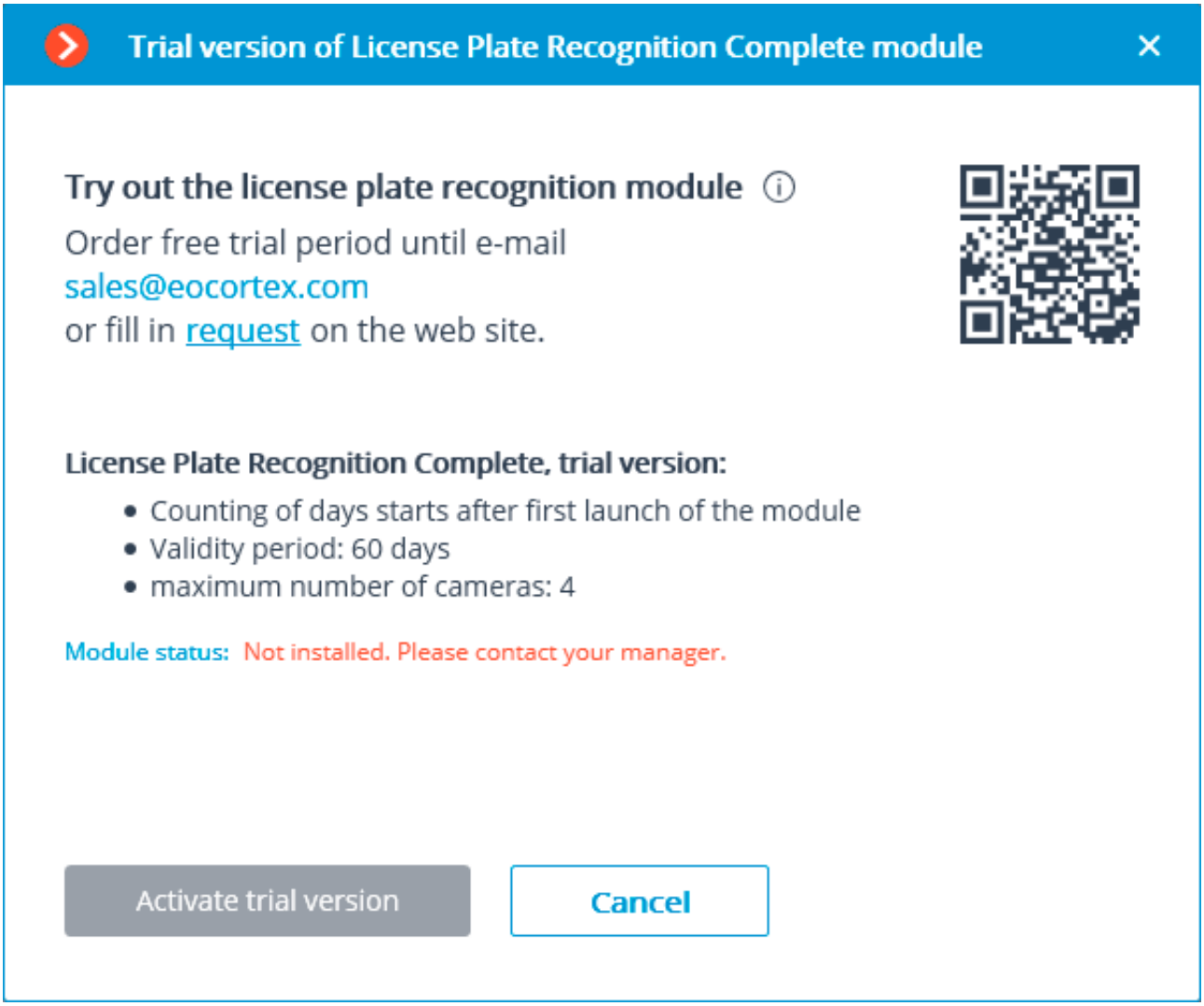
Requesting and installing a temporary license

⚠ Before ordering and using a temporary license, it is required to install the License Plate Recognition (Complete) module on your server.

To order a trial license, launch the **Eocortex Configurator** application, go to the Cameras tab, then select a camera in the list on the left side of the page, switch to the Analytics tab and press the trial button located in the upper right corner of the module's card.



The trial license ordering and tracking window will open.



You need to request the issuance of a trial license, using one of the following ways:

- Contact your personal manager at **Eocortex**;
- Call the telephone number shown in the window;
- Fill in the form made available in the link shown in the window (by clicking the word **request**);
- Scan the QR code shown in the window and complete the form on the web site using your mobile device (the QR code leads to the license request form).

Upon receiving a notification from the manager of **Eocortex** that the update of the **Eocortex** server license has been completed (i.e. when the **License Plate Recognition (Complete)** trial license has been added to the server license), it is required to update the license on the server. To do that, it is required to click on the **Update license** link in the trial license ordering and tracking window. The **License installation** wizard will open. In this window, you will be offered to perform an automatic update of the license on your server. Depending on the existing license, you will be offered to automatically update your software or USB key (see License update).

As soon as the **Eocortex** license on the server is updated and the server is restarted, it will be possible to activate the trial license of the **License Plate Recognition (Complete)** module. To perform the activation, it is required to click on the **Activate trial version** button in the trial license ordering and tracking window.

To activate, it is necessary to specify the type of the module for which the license will be activated: **Parking** or **Highway**. After that, press **Select**.

As soon as the trial license is successfully activated, the trial license ordering and tracking window will show the license data.

Instead of the

button, the number of days left before the end of the trial period will be displayed.

End of the temporary license validity period

Starting from the ninth day before the end of the trial license validity period, every time the client application is launched, the notification regarding the upcoming stop of the module's operation will appear.

Additionally, the day counter in the **Eocortex Configurator** application will change its color to attract the attention of the system administrator.

When the trial license validity period ends, the **License Plate Recognition (Complete)** module will stop functioning, and the notification regarding the absence of a license key required for starting the module will appear in the client application. However, the **Eocortex** license for using the **License Plate Recognition (Complete)** module will be retained, and it will be possible to use it in the future provided that the permanent license for the module is purchased.

Also, the

button will disappear from the module's card upon expiration of the trial version validity period.

Errors during activation and use of the trial license

Below is the list of errors displayed in the **Module status:** line of the trial license ordering and tracking window.

- **It is required to request and update the license of your server. Please contact your manager.** This status is displayed in case of an absence of the **License Plate Recognition (Complete)** module license on the server.
- **Not installed. Please download the module from the web site and install it.** This status appears when there is no **License Plate Recognition (Complete)** module installed on the server.
- **No connection with server. Please wait until the server restarts.** This status is shown in the process of restarting the server after updating the **Eocortex** license.
- **Error when receiving info from server.** The appearance of this status is unlikely. For example, it can appear if the server was rolled back from version 3.1 to an earlier version, while the trial license ordering and tracking window was still open.

Frequently asked questions

Q: I installed version 3.1, but the

button never appeared.

A: There are several possible causes of the

button not appearing:

- Server version is earlier than 3.1;
- Camera is bound to a different server;
- **Eocortex Configurator** has no direct access to the server to which the camera is attached;
- The trial license has already been used on the given server;
- A permanent license is already installed on the given server.

Q: What will happen if another temporary license for the **License Plate Recognition (Complete)** module is installed in **Eocortex Configurator**?

A: Such license will be displayed as well as the trial license. I.e., a day counter will be displayed in **Eocortex Configurator**, and 9 days before the license expiration date a corresponding notification will appear in the client application.

At the same time, if in the earlier version of **Eocortex** a trial license has already been activated on this server, it will not be possible to activate a new trial license.

Q: Is it possible to activate a separate trial license on each server of a multi-server system, or it is only allowed to activate a trial license on one of the servers of such system?

A: It is possible to activate a trial license on each server of a multi-server system.

Q: The following error message appears when attempting to activate a trial license: **Failure to activate trial license. Possible cause: installation on virtual machine.** . What to do in this case?

A: Probably, an old version of the **License Plate Recognition (Complete)** module is installed on the server. It is required to install version 3.1 or later of the module.

Related references:

- License Plate Recognition (Complete) module description
- License Plate Recognition (Complete) module installation
- License Plate Recognition (Complete) module setup

Work time logging (Complete) report

Work time logging (Complete) report is formed by areas (zones). An area is a territory where it is required to monitor the presence of persons. The people's faces must be recognized at the entrance to and the exit from the area by the **Face Recognition (Complete)** module. Several cameras may be used for a single area both at the entrance and at the exit.

Related references:

- Setting up areas for report
- Report generation

Decoding B frames of H.264 and H.265 video streams

In H.264 and H.265 codecs, the following types of frames are used for video stream compression:

- **I-frames** (reference frames, key frames) contain all the fragments of the image being encoded.
- **P-frames** (differentially dependent frames) contain new fragments of the image being encoded or the changes in relation to the key frame.
- **B-frames** (bidirectionally dependent) encode the difference between the neighboring frames by making reference to the encoded fragments in the key and differentially dependent frames.

  The video stream compressed using the B-frames have higher rate of compression in comparison with the video streams that were compressed using I and P-frames only. Thus, the video stream compressed using the B-frames requires less channel width for transmission via the network (from the camera to the server and from the server to the client application). It also occupies less drive space when stored in the archive. The volume of storage saving may reach 40% as compared with the video where only I and P-frames are used.

  The practically achievable compression value depends on many parameters, such as the number of details in a frame, the intensity of movement, the resolution, the frame rate and other characteristics, including those related to the codec's developer. At that, in most cases, the compression rate increases with the increase of the resolution and the frame rate.

  At the same time, more computing power is needed for encoding the B-frames in comparison with encoding I and P-frames only.

  Moreover, the use of the B-frames results in the increased delay in real-time video. It happens because the encoding and decoding of the B-frames requires buffering.

  The capability of encoding the B-frames is usually indicated in the documentation of a camera. For example, the **IBP** or **IBBP** support may be stated. In such a case, the H.264/H.265 video codec must, as a rule, support the profile not lower than the **Main Profile**.

  It is possible to ascertain if **Eocortex** supports the reception of a video stream with B-frames from a certain camera by contacting **Eocortex** technical support team.

  The debugging information can provide data regarding the presence of the B-frames in a video stream. To obtain this data, it is required to enable the output of the debugging information in the **Eocortex Client** application. The indication of **(B)** will imply that the B-frames are present in the video stream.

Client P2P connection to server

The P2P (Peer-to-peer) technology allows to connect to the **Eocortex** server using the **Eocortex Client** application running on a remote computer from anywhere in the world, provided that both of them have internet access. At that, the **Eocortex** server does not have to have a public static IP address or to be in the same VPN with the client computer. Thus, when it is required to connect to the **Eocortex** servers via internet, is becomes significantly easier to set up the networks and the need to rent public static IP addresses or VPN servers is eliminated.

Before connecting to the **Eocortex** server via the **Eocortex Client** application using the P2P technology, it is required to do the following:

1. Create an account in **Eocortex Cloud**.
2. Connect **Eocortex** servers to **Eocortex Cloud**.
3. Connect to **Eocortex Cloud** via **Eocortex Client**.

Creating an account in **Eocortex Cloud**

To create an account in **Eocortex Cloud** , it is required to follow the link https://cloud.eocortex.com/account/register

After creating an account, a message will be sent to the indicated address. To confirm, go to the link in the message or press **Activate**.

Connecting servers to **Eocortex Cloud**

After creating the account in **Eocortex Cloud**, it is required to connect a video surveillance system to it. To do that, go to the general server settings in the **Eocortex Configurator** application, then go to the **Eocortex Cloud**Cloud tab, enter the **Eocortex Cloud**account data (email and password) and, finally, press the **Connect** button.

⚠ The **Eocortex Cloud** connection setup is only available to the users with full rights (in case of the **Enterprise** and **Ultra** licenses these are the users who are included in the group with the **Senior administrators** rights.

After the successful connection, the status will change to **System connected**.

The settings will come into force only after they are applied.

Client P2P connection

After having connected the video surveillance system to **Eocortex Cloud**, it becomes possible to connect to it using P2P. For that end, a new type of connection was added to the authorization window of the **Eocortex Client** application called **Connection to Eocortex Cloud**. To connect, it is required to enter the email and password of the **Eocortex Cloud** account.

Description of **Eocortex Client** in case of its connection to server via P2P:

⚠ When making a connection via P2P using **Eocortex Cloud**, the user of **Eocortex Client** will enjoy full rights for the access to the video surveillance system.

On the other hand, the **Eocortex Configurator** application does not support the P2P access; thus, the user who has connected to the system vis P2P, will not be able to launch **Eocortex Configurator** from the client application.

Besides, when connecting via P2P, the **Eocortex Configurator** application will not be able to perform an automatic upgrade to the server's version.

ⓘ When connected to a multi-server system via P2P, it is possible to view the cameras only from those servers that are connected to **Eocortex Cloud** have internet access.

At the same time, if the main server has access to the internet, it is possible to gain the P2P access to the cameras of the servers without internet access but which are in the same local network or VPN with the main server by enabling a proxy access thru the main server.

⚠ If the **Eocortex** server is disconnected from the system that is already connected to **Eocortex Cloud**, that server will be disconnected from **Eocortex Cloud** and its **Eocortex Cloud** connection settings will be deleted.

ⓘ When combining two systems connected to **Eocortex Cloud**, the system being connected will be disconnected from the initial **Eocortex Cloud** account and connected to the account of the system to which it is being connected.

ⓘ Since in case of a P2P connection the data, in most instances, will be transmitted via internet, a secure connection will be employed.

Failure to connect to system via P2P

First, it is required to make sure that the system is connected to **Eocortex Cloud**. To do so, go to the **Eocortex Cloud** account and check the list of the connected servers. If the list is empty, it may be possible that the main server has no internet access and cannot connect to **Eocortex Cloud**.

If there are servers in the list but the main server has the **Disconnected** status, it is required to make sure that the server is in a working order.

In case the main server has the **Connected** status, but it is impossible to connect to the system, it is likely that the server or the client are in the network that does not support P2P connections.

Below are the options of the network organization that do not support P2P connections:

- Server and client are on the computer that is in the network after the router with *Symmetric NAT*.
- Server and client are on the computer that is in the network after two or more routers with different NATs.

Questions and answers

Q: How many video surveillance systems can be connected to a single **Eocortex Cloud** account?

A: Only one video surveillance system can be connected to a single **Eocortex Cloud** account.

Q: Are there any limitations as regards the number of system servers connected to **Eocortex Cloud**?

A: There are no such limitations.

Q: Is the load on the client and the server different depending on the type of connection (standard or P2P)?

A: On the client, the load is the same in both cases. The server, on the contrary, may consume somewhat more CPU resources when connected via P2P. The load depends on the volume of traffic sent by the server via P2P. The maximum increase of the load via P2P can reach 50% of the standard connection load. For example, if the server used 20% of the CPU capacity to transmit data to the client applications under the standard connection, this load can increase to 30% when all the clients are connected via P2P.

Q: Are there any traffic limitations in case of a P2P connection?

A: Yes. First, the maximum throughput of a single channel with the camera stream is around 40 Mbps. Second, since in the majority of cases the connection is via internet, the speed depends on a provider's internet plan.

Trial license for the License Plate Recognition (Complete) module

The trial license ordering tool that allows trying out the module to the full extent is embedded into the configuration interface of the **License Plate Recognition (Complete)** module's settings in the **Eocortex Configurator** application.

This tool permits to order one of the following **License Plate Recognition (Complete)** licenses that allow to perform recognition of the license plates during 60 days on 4 cameras assigned to the server:

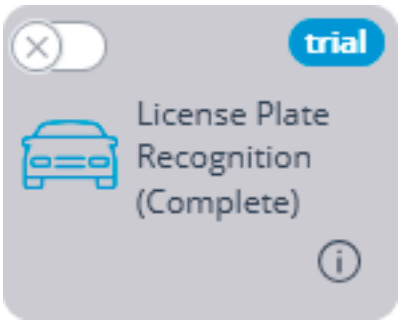
- Type of license: **Highway (25 fps)**
- Type of license: **Parking (6 fps)**

⚠ These temporary licenses will not work on virtual machines.

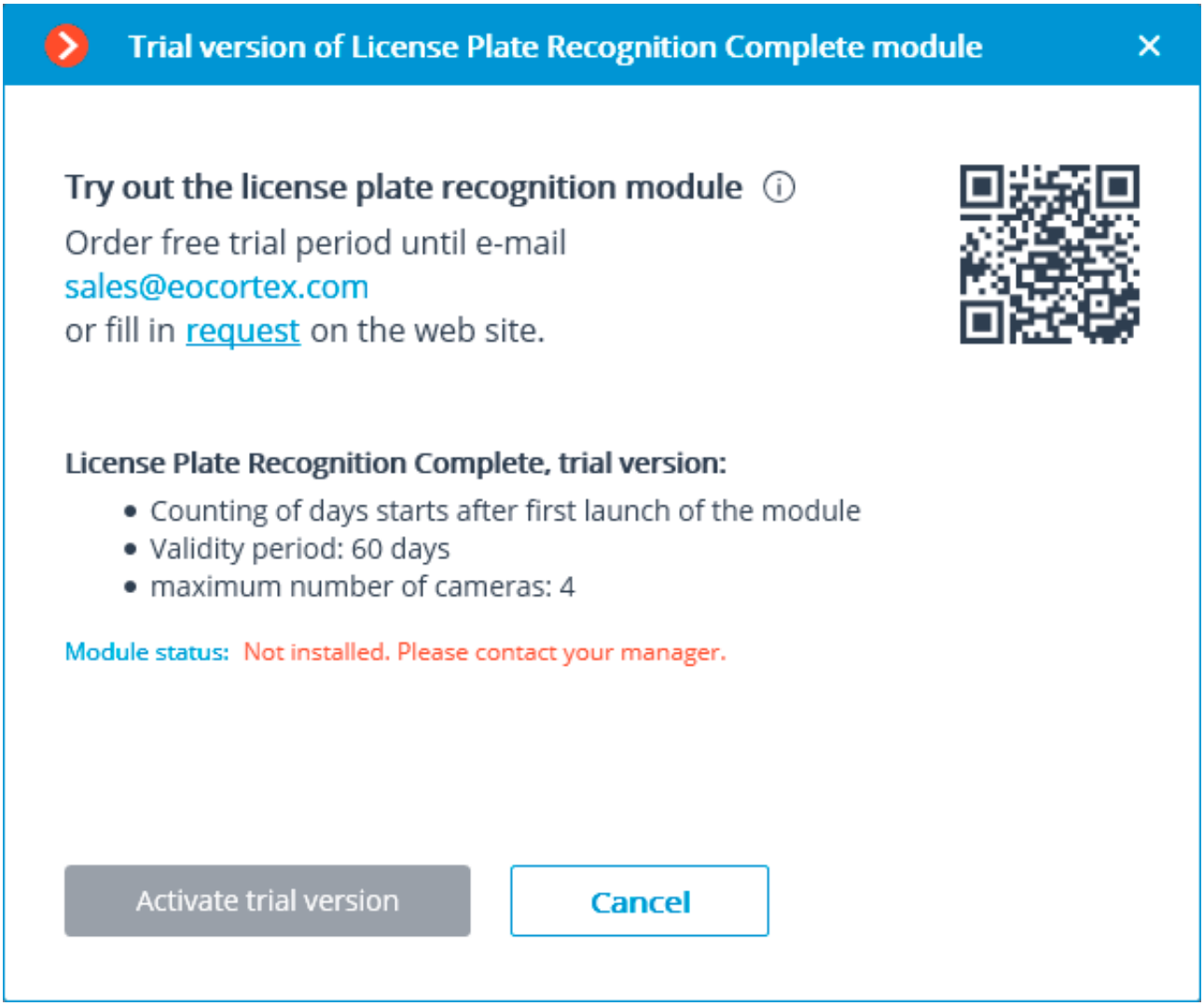
Requesting and installing a temporary license

⚠ Before ordering and using a temporary license, it is required to install the License Plate Recognition (Complete) module on your server.

To order a trial license, launch the **Eocortex Configurator** application, go to the Cameras tab, then select a camera in the list on the left side of the page, switch to the Analytics tab and press the trial button located in the upper right corner of the module's card.



The trial license ordering and tracking window will open.



You need to request the issuance of a trial license, using one of the following ways:

- Contact your personal manager at **Eocortex**;
- Call the telephone number shown in the window;
- Fill in the form made available in the link shown in the window (by clicking the word **request**);
- Scan the QR code shown in the window and complete the form on the web site using your mobile device (the QR code leads to the license request form).

Upon receiving a notification from the manager of **Eocortex** that the update of the **Eocortex** server license has been completed (i.e. when the **License Plate Recognition (Complete)** trial license has been added to the server license), it is required to update the license on the server. To do that, it is required to click on the **Update license** link in the trial license ordering and tracking window. The **License installation** wizard will open. In this window, you will be offered to perform an automatic update of the license on your server. Depending on the existing license, you will be offered to automatically update your software or USB key (see License update).

As soon as the **Eocortex** license on the server is updated and the server is restarted, it will be possible to activate the trial license of the **License Plate Recognition (Complete)** module. To perform the activation, it is required to click on the **Activate trial version** button in the trial license ordering and tracking window.

To activate, it is necessary to specify the type of the module for which the license will be activated: **Parking** or **Highway**. After that, press **Select**.

As soon as the trial license is successfully activated, the trial license ordering and tracking window will show the license data.

Instead of the

button, the number of days left before the end of the trial period will be displayed.

End of the temporary license validity period

Starting from the ninth day before the end of the trial license validity period, every time the client application is launched, the notification regarding the upcoming stop of the module's operation will appear.

Additionally, the day counter in the **Eocortex Configurator** application will change its color to attract the attention of the system administrator.

When the trial license validity period ends, the **License Plate Recognition (Complete)** module will stop functioning, and the notification regarding the absence of a license key required for starting the module will appear in the client application. However, the **Eocortex** license for using the **License Plate Recognition (Complete)** module will be retained, and it will be possible to use it in the future provided that the permanent license for the module is purchased.

Also, the

button will disappear from the module's card upon expiration of the trial version validity period.

Errors during activation and use of the trial license

Below is the list of errors displayed in the **Module status:** line of the trial license ordering and tracking window.

- **It is required to request and update the license of your server. Please contact your manager.** This status is displayed in case of an absence of the **License Plate Recognition (Complete)** module license on the server.
- **Not installed. Please download the module from the web site and install it.** This status appears when there is no **License Plate Recognition (Complete)** module installed on the server.
- **No connection with server. Please wait until the server restarts.** This status is shown in the process of restarting the server after updating the **Eocortex** license.
- **Error when receiving info from server.** The appearance of this status is unlikely. For example, it can appear if the server was rolled back from version 3.1 to an earlier version, while the trial license ordering and tracking window was still open.

Frequently asked questions

Q: I installed version 3.1, but the

button never appeared.

A: There are several possible causes of the

button not appearing:

- Server version is earlier than 3.1;
- Camera is bound to a different server;
- **Eocortex Configurator** has no direct access to the server to which the camera is attached;
- The trial license has already been used on the given server;
- A permanent license is already installed on the given server.

Q: What will happen if another temporary license for the **License Plate Recognition (Complete)** module is installed in **Eocortex Configurator**?

A: Such license will be displayed as well as the trial license. I.e., a day counter will be displayed in **Eocortex Configurator**, and 9 days before the license expiration date a corresponding notification will appear in the client application.

At the same time, if in the earlier version of **Eocortex** a trial license has already been activated on this server, it will not be possible to activate a new trial license.

Q: Is it possible to activate a separate trial license on each server of a multi-server system, or it is only allowed to activate a trial license on one of the servers of such system?

A: It is possible to activate a trial license on each server of a multi-server system.

Q: The following error message appears when attempting to activate a trial license: **Failure to activate trial license. Possible cause: installation on virtual machine.** . What to do in this case?

A: Probably, an old version of the **License Plate Recognition (Complete)** module is installed on the server. It is required to install version 3.1 or later of the module.

Related references:

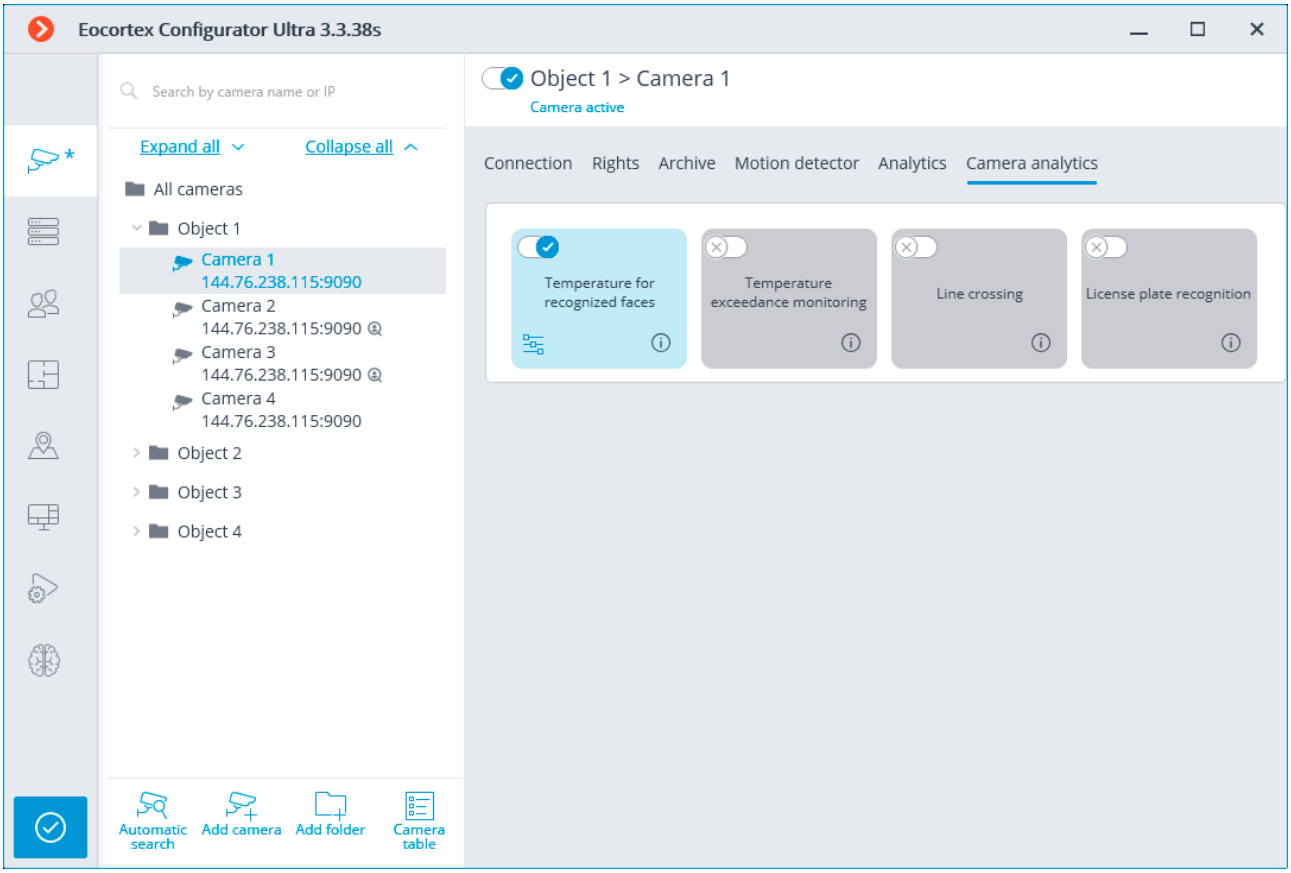
- License Plate Recognition (Complete) module description
- License Plate Recognition (Complete) module installation
- License Plate Recognition (Complete) module setup

Integration of thermal cameras and face recognition

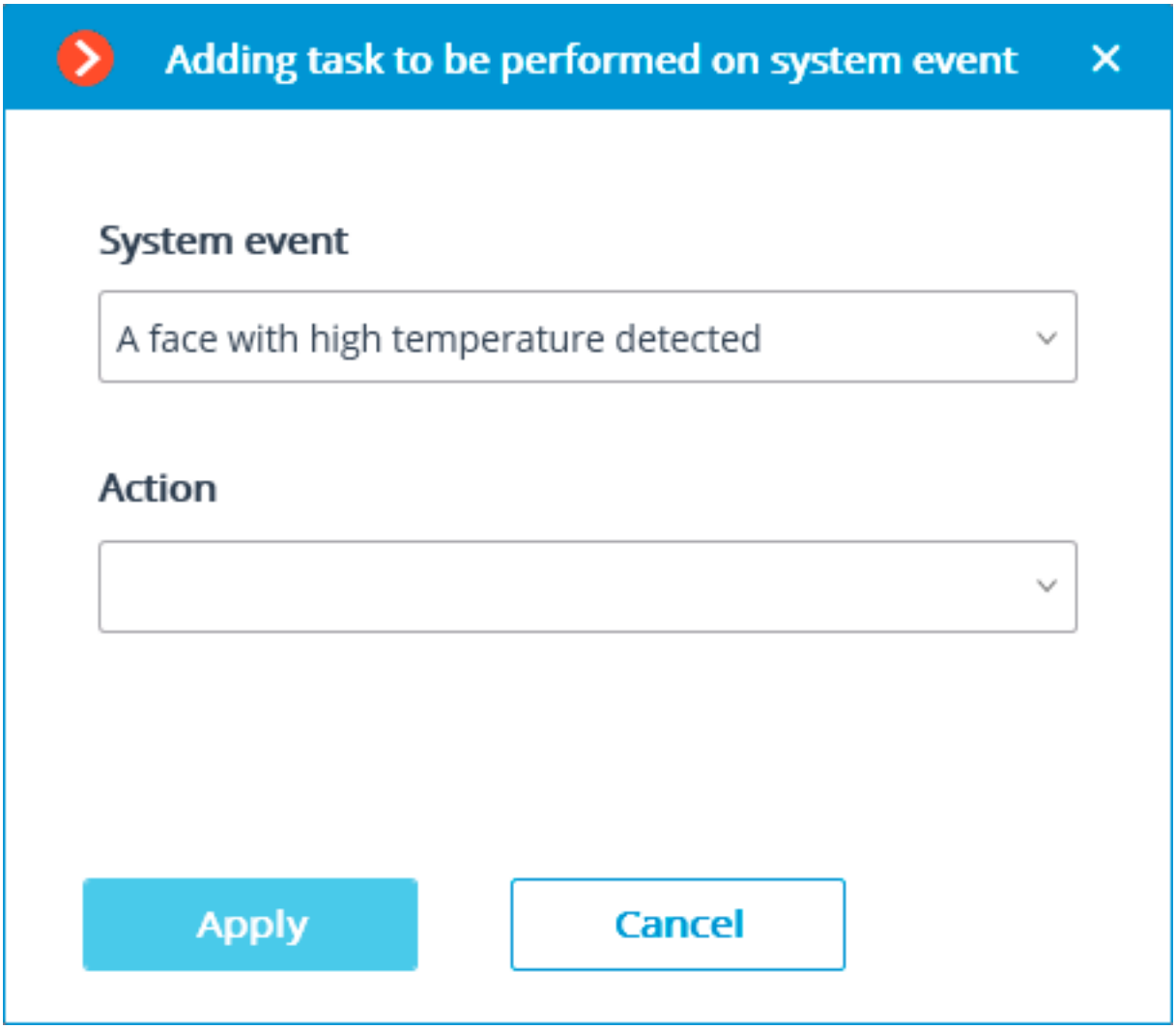
For some camera models that combine the features of a thermal camera and a normal surveillance one, it is possible to send the thermal camera data to the face recognition module.

⚠ This capability is for a limited number of camera models only and can be used exclusively in the 64-bit Windows version of **Eocortex**.

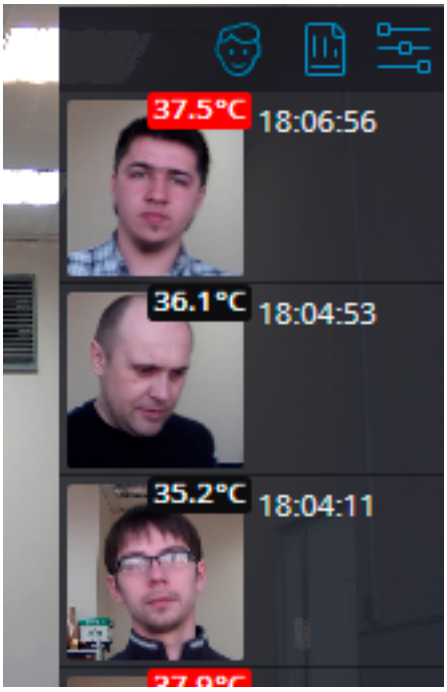
To enable this capability, go to the **Camera analytics** tab in the camera settings of the **Eocortex Configurator** application, activate **Temperature for recognized faces**, open the settings window by pressing and set the alarm temperature that will generate the alarm events. It is also required to enable and set up any face recognition module on the camera.



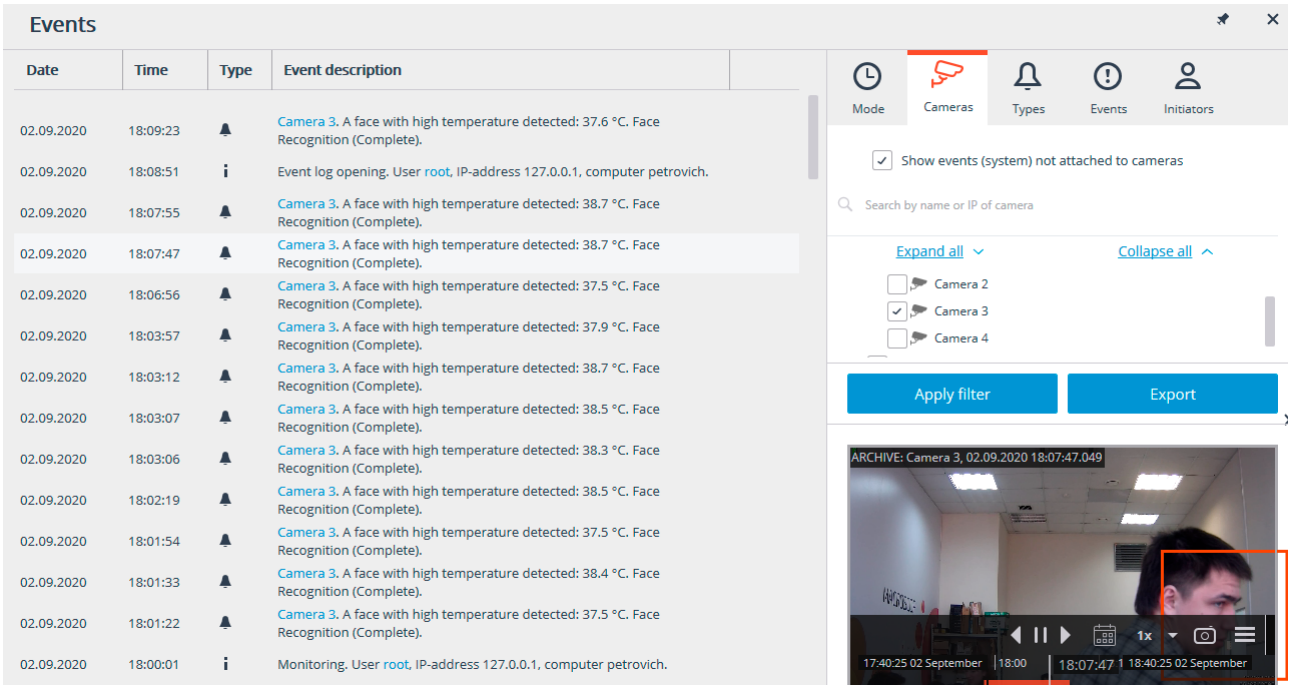
That done, it will be possible to set up a task upon the event of **Face with high temperature detected**.



In the **Eocortex Client** application, the temperature of the person will be displayed in the real-time video on the face recognition panel.

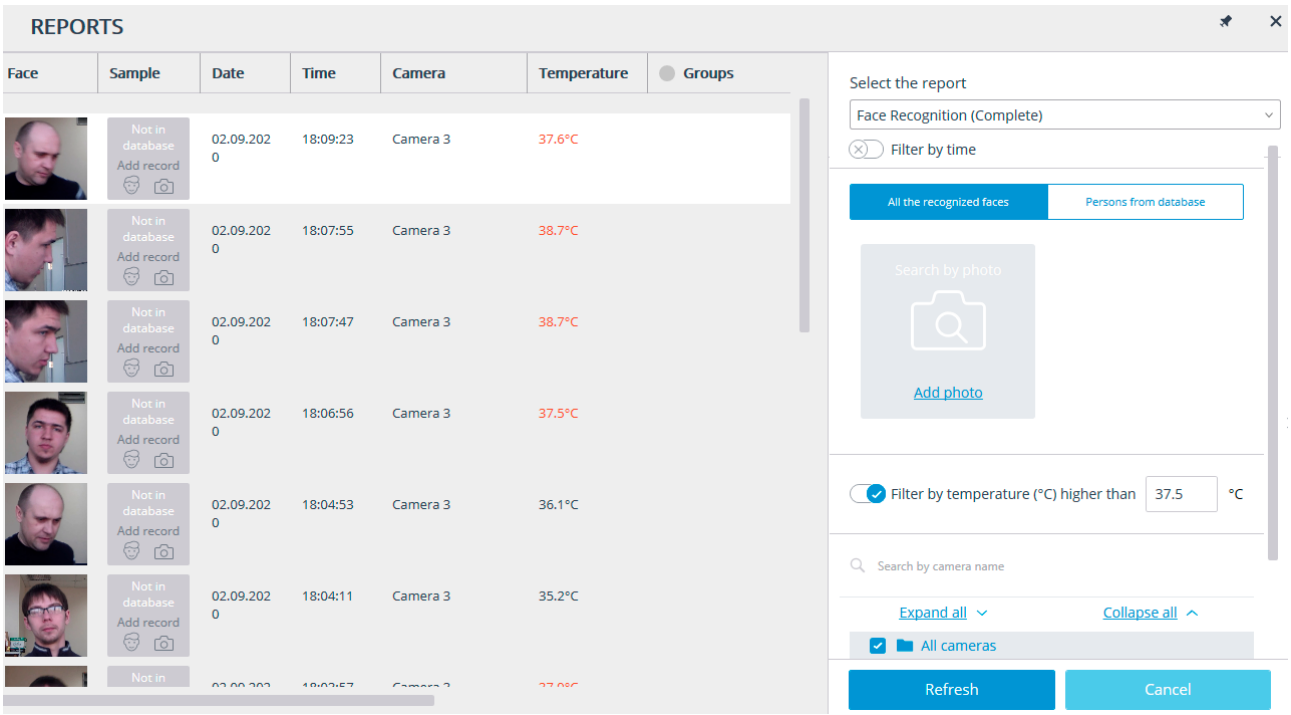


In case a person running a fever is detected, a corresponding event will be registered in the event log. The corresponding frame from the archive will be displayed upon selecting this event; the recognized face will be highlighted by a rectangular frame.



The temperature of the person will be registered in the report regarding the recognized faces. Persons running a fever will be marked by orange rectangular frames, those with normal temperature will be marked by grey frames.

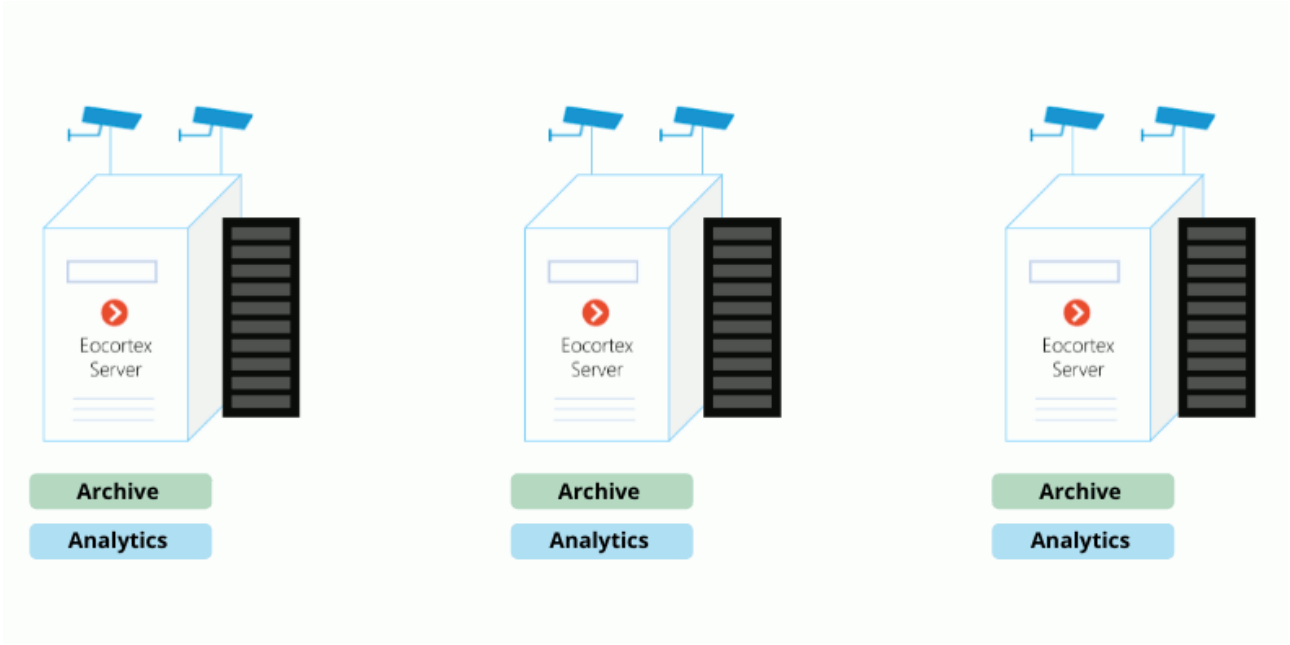
It is also possible to filter the list to display the persons with high temperature.

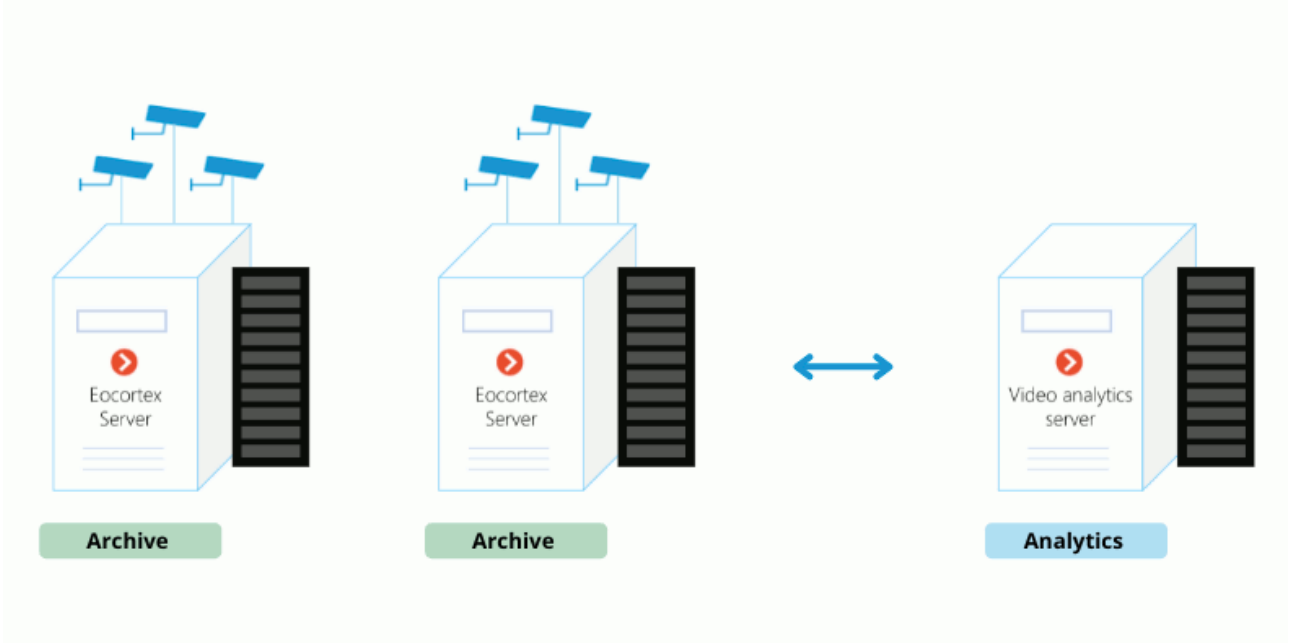


Video analytics server

Video analytics server is a server exclusively dedicated to launching video analysis modules that process video data sent from other servers. Having said that, the video analytics server does not perform archiving of the video data being analyzed nor its broadcasting to client workplaces; these actions are performed on the general servers of a video surveillance system. Thus, the Video analytics server allows to remove the load associated with video analysis from the rest of the servers.

Pictures





Details

⚠ In case one or more video surveillance servers whose data is being processed by a Video analytics server operate under Linux, the Video analytics server must also run under Linux.

The Video analytics server supports all the video analysis modules apart from the following:

- Loud sound detection
- Fisheye dewarping

Likewise, if the Video analytics server operates under Linux, it is subject to the limitations relevant to the use of the video analysis modules on this operating system.

To assign a server as a video analytics server, it is required to install a special license on it. At that, other licensing capabilities will become unavailable on this server.

Consequently, if the server was used as a video surveillance server before, it is required to transfer all of its cameras to another video surveillance server before using it as a video analytics server.

Assigning the server as a video analytics server for a camera is performed in the camera connection settings of the **Eocortex Configurator** application.

Features and limitations

⚠ The Video analytics server must be of the same version as the video surveillance servers whose video it processes.

A single video surveillance server may have connections with several video analytics servers, and a single video analytics server can process video streams from several video surveillance servers.

If a video analytics server has been assigned for a camera, a motion detection will also be performed on the video analytics server; all the features that use the results of the operation of the motion detector, however, will continue running on the main server.

If a video analytics server has been assigned for a camera, all the video analytics enabled on the camera, with the exception of the unsupported modules, will be processed on the video analytics server.

The video analytics server does not perform recording of the archive, events or any other data related to video processing, apart from the logs that monitor operability. All the events and the archive are recorded on the main server.

To ensure proper operation of the license plate recognition modules and the modules that use neural networks, the corresponding components are required to be installed on the video analytics server. However, it is not necessary to install such components on the video surveillance server.

For the license plate recognition module to work, it is required to install the corresponding license protection key on the video analytics server.

The video analytics server cannot be set as main, backup or replication server for the cameras.

The video analytics server cannot operate under Windows 7 operating system.

The main server cannot use a video analytics server if it runs under Windows 7.

It is not recommended to use the video analytics server as a main server in a multiserver system since it may lead to malfunctions of such system due to the fact that the video analytics server is under high load of the video analysis modules.

The operation of the archive on the main server when recording by the signal of a motion detector running on the video analytics server is described below.

- When recording to the archive by the signal of a motion detector, the results of data processing on the video analytics server will be used.
- In case the connection with the video analytics server is lost, the continuous recording to the archive will be enabled. The recording to the archive will stop as soon as the connection with the video analytics server is restored.
- The continuous recording to the archive will also start if the video analytics server has not sent any events of movement or lack thereof in the course of 30 seconds.

⚠ If the connection with the video analytics server is lost, the video from the camera will not be analyzed. The software motion detection will not work either.

Multiserver system

To ensure scalability and fault tolerance of multiserver video surveillance systems, as well as to minimize service data exchange over the network and reduce collisions associated with server synchronization, **Eocortex** uses a master server architecture. A description of this architecture can be found below.

ⓘ The master server architecture was first introduced in **Eocortex** version 2.2. Previously, all servers in a multi-server system had equal rights which could lead to significant performance degradation and collisions.

In a multiserver system, only one server is the master server. The rest of the servers in the multiserver system are called slave servers and interact with the master server to update settings. Since the settings are synchronized by the slave servers making queries to the master server and not vice versa, the master server must be accessible to all servers in a multiserver system.

Main server

The main server stores and allows to edit the following data:

- General system settings: data regarding servers, cameras, users etc.;
- Data regarding licenses of each server;
- Information about the most recent connection of each slave server to the main server;
- Site plans.

ⓘ The information about the most recent connections of the slave server to the master is used, in particular, for diagnostics: if the slave server has not connected to the master within the last 2 minutes, then its status will be changed accordingly.

Also, the functions of the main server include checking the authorization of each incoming queries from system users, including those from external applications.

Slave server

The slave server stores and allows you to modify its own single-server configuration, which contains the settings of this server and cameras bound to it, as well as a number of other parameters, including the location (address: port) of the main server. Also, the slave server stores a copy of the general settings obtained from the master server, in case the main server fails.

Every few seconds the slave server connects to the master server for synchronization purposes. The interval between connections is determined automatically and ranges from 5 to 15 seconds. In addition, the connection to the master server occurs immediately after changes are made to the settings of the slave server.

The following tasks are performed within the scope of synchronization (moreover, some of the tasks are not performed during each synchronization session, but only when certain events occur or certain conditions are met):

- The main server receives the information regarding the operability of the slave server;
- The slave server performs time synchronization with the main server;
- The main server receives information regarding the modification of settings and about licenses of the main server;
- The slave server receives from the main server the information regarding the necessity to launch or stop the backup or channel replication processes coming from other servers;
- The slave server downloads a copy of the general settings from the main server.

In addition to synchronization requests, the slave server redirects requests from client applications to the master server, if necessary.

Fail safety

To ensure that the main server does not become a common point of failure, a mechanism of transferring a copy of the general system settings to each slave server has been implemented. Below is the list of events and conditions for the general settings to be automatically downloaded by the slave servers:

- Once every 12 hours;
- Upon the launch of the slave server;
- When the number of servers in the system has changed;
- When the number of channels in the system has changed;
- When the system users have changed;
- Upon the change of binding of cameras to the servers;
- When the bindings of replication or backup bindings have changed.

Thus, in the event of a failure of the main server, any of the remaining servers in the system can be designated as the main server.

Adding other servers and multiserver systems

ⓘ The following terms are introduced for the purposes of this document:

Current system is a multiserver system or a system consisting of a single server connected to the **Eocortex Configurator** application at the given moment.

External system is a multiserver system or a system consisting of a single server that is being connected to the current system.

ⓘ To connect an external system, it is required to connect only one of the external system servers to the current system - after connecting, the **Eocortex Configurator** application will send information to the other servers of the external system that the main server of the current system becomes their main server. In other words, when a server of another system joins the current system, all servers on that external system will join the current system.

⚠ In the process of connecting an external system, the **Eocortex Configurator** application must have access to all servers of this system in order to inform them of the new address of the main server.

In case the **Eocortex Configurator** application does not have access to any server of the external system at the time of connecting, such server will attempt to automatically receive information about the change of address of the main server from the server that was the main server in the external system.

If the operation of obtaining a new address of the main server by an unavailable server automatically did not lead to the connection of this server to the current system (for example, if the main server of the external system was unavailable), it is necessary to make direct connection to this server using the **Eocortex Configurator** application, subsequently changing the address of the main server on the server (specifying the address of the main server of the current system).

The following happens when an external system is connected:

- All the servers of the external system will be added to the current system.
- On the former main server of the external system, all the general settings of the external system will be deleted, including users and the associated permissions. Further, to connect to the former servers of the external system, the authorization system of the current system will be used.
- All the cameras and folders of the external system will be added to the current one. In this case, the camera settings and the distribution of cameras among servers will be preserved.
- All site plans, archive bookmark categories, screen profiles and profile switching lists will be added to the current system from the external one.
- If the **Eocortex Configurator** application is connected to the servers of the external system at the time of connecting, then, depending on whether the username and password of the current and external systems for this session match or not, the client application will either automatically restart or remain idle until the user restarts it under the correct username and password.

Disconnections of servers

The following terms are introduced for the purposes of this document:

Current system is a multiserver system or a system with a single server to which the **Eocortex Configurator** application is connected at the moment of disconnection.

Disconnected system is a system with a single server that is disconnected from the current system.

⚠ The master server cannot be disconnected from a multiserver system. If such need arises, it is required to designate another server in the system as the master one before disconnecting.

The following happens when a server is disconnected from the system:

- The disconnected server is removed from the general settings of the current system. This means that all the cameras for which the disconnected server was the primary one, as well as all replication and backup bindings associated with the disconnected server will be removed from the general settings and site plans.
- The disconnected server becomes the main server of the single-server system.
- General settings for the single server system are created on the disconnected server. At the same time, all cameras for which this server was the main one at the time of disconnection are preserved. However, all replication and backup bindings are removed from the settings, as well as all cameras for which this server has been designated as a replication or backup server. If the server was a replication one before disconnection, after disconnection it becomes a basic server.
- The disconnected system retains all users of the current system with their assigned permissions.
- The disconnected system retains all site plans, archive bookmark categories, screen profiles, and profile switch lists. At the same time, all cameras that remain in the current system will be removed from the site plans.
- The archive of replicated and backup cameras will remain on the disconnected server and it will be possible to view it using the **Local monitoring and backup archive** utility. This archive will be deleted as the disk space is filled with the current archive from the cameras remaining on the disconnected server. In this case, if the disconnected server is re-connected to the current system, the archive of replicated and backup cameras will become available for viewing in the **Eocortex Client** application.
- If the **Eocortex Client**application is connected to the servers at the time of disconnection, it will continue to operate and will be automatically restarted only if the system is modified in such a way that the parameters of the current display, user rights, settings of currently displayed channels and a number of other settings are affected.

  As a result, two systems with the same set of users and their rights, as well as site plans, categories of archived bookmarks, screen profiles and profile switching lists will be available after the server's disconnection.

Interaction of client applications with servers

Eocortex client applications include **Eocortex Client**, **Eocortex Web-client** and mobile client applications.

To work in a multiserver system, the users of client applications do not need to know the address of the main server and connect specifically to it - it will be sufficient to connect to any of the servers in the sys-

tem. In this case, if the user connects to a slave server that does not have access to the master server, the client application will only have access to those cameras that are bound to that server.

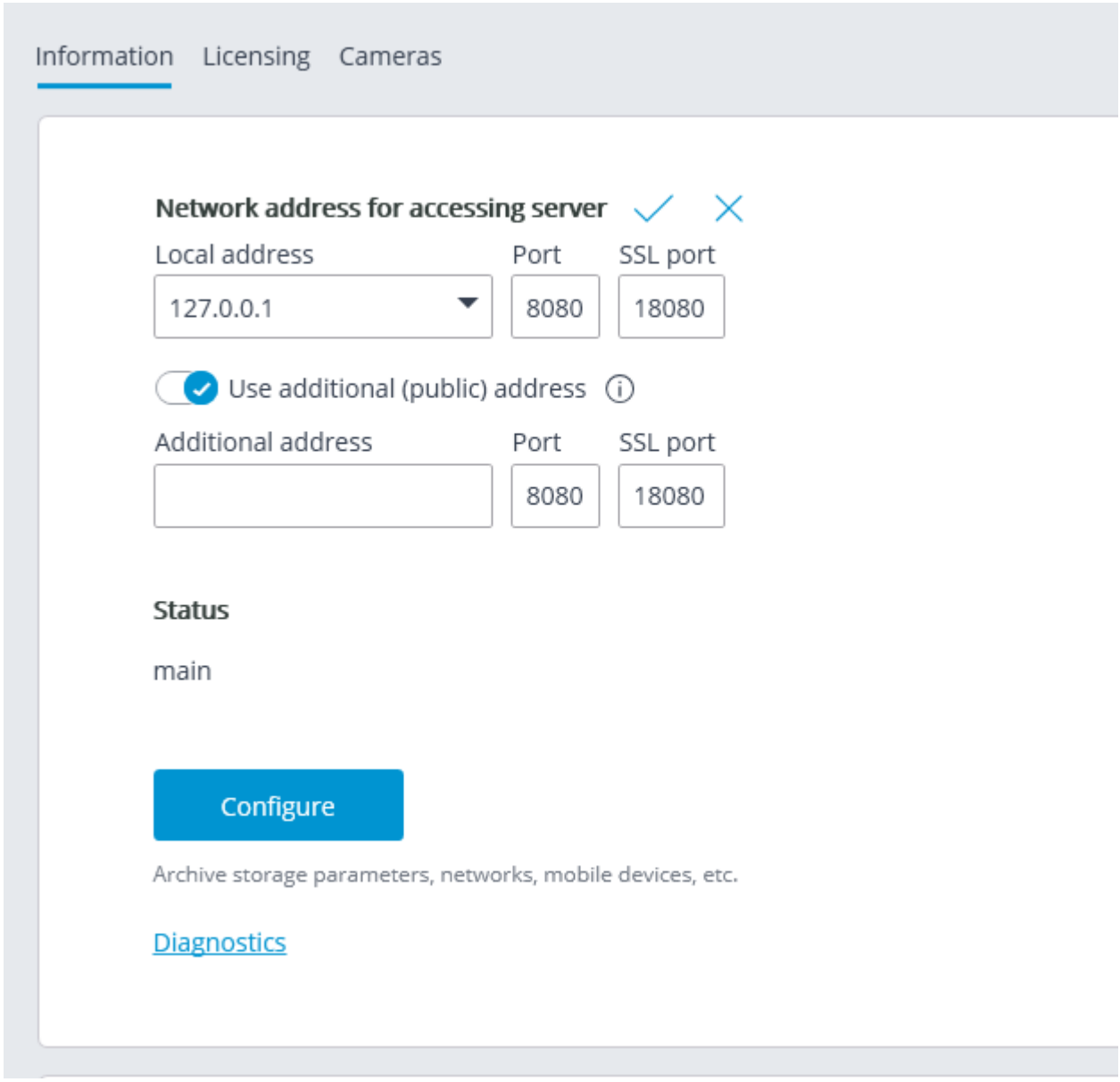
Two addresses for the same server

In **Eocortex**, it is possible to use two addresses for connecting for the same server:

- **Local address**: the main address of the server. It is possible to use this address for connecting to a server within the local network.
- **Additional address**: the address that is set optionally. This address will be used in a situation when it is not possible to connect to the server using a local address.

Setup

In order to use the additional address, it is required to enable the option **Use additional (public) address** on the **Information** tab located on the **SERVERS** page.



The connection to the server is always carried out using the local address first. If the connection to the local address fails, the connection to the additional address shall be made.

One exception is the connections to the server for the purpose of broadcasting live video. In such a case, if the connection to the local address is unsuccessful, a connection to the additional address will be made. Then, in case of a successful connection, a timer starts, which checks the availability of the local address every 10 minutes. When access to the local address is restored, a connection to this address occurs.

This algorithm is used not only for client connections to the server but also for connecting servers that broadcast real-time video in proxy mode.

Related references

Setting up two addresses of the server in the configurator.

Generation of RTSP links to cameras in Eocortex Configurator application

The generation of RTSP links allows to facilitate the process of setting up the receipt of the video stream from a camera via the RTSP server of **Eocortex**.

Before, the RTSP links had to be created manually. The detailed process is described in the SDK and API documentation.

Generating a link for a specific camera

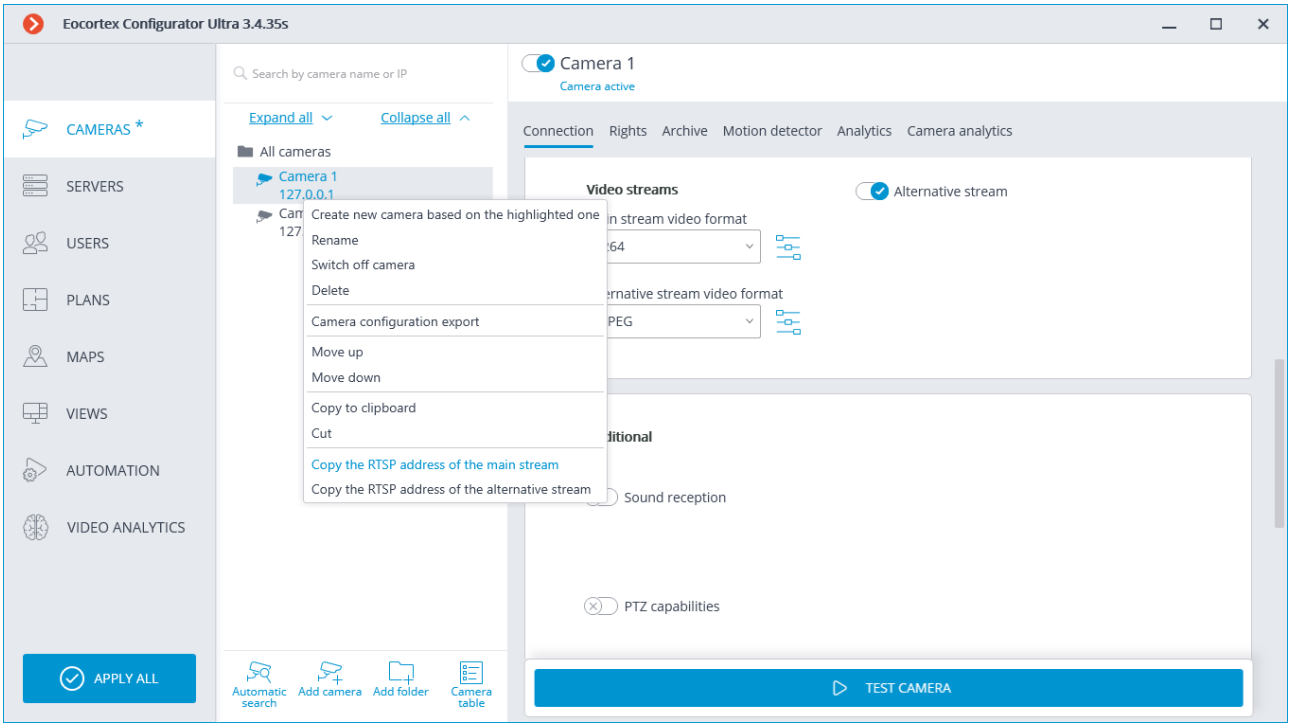
To obtain a RTSP link, it is required to perform the following steps:

Step 1: Launch the **Eocortex Configurator** application.

Step 2: Open the **CAMERAS** page.

Step 3: Select a camera and open the context menu with the right mouse button.

Step 4: Select the item that allows to copy the RTSP address of the main or alternative stream.



A separate link is generated for each of the streams – main and alternative. At that, the parameter **streamtype=alternative** is used for the alternative video stream.

Generating links for a list of cameras

To obtain the RTSP links, do the following:

Step 1: Launch the **Eocortex Configurator** application.

Step 2: Open the **CAMERAS** page.

Step 3: Press the **Cameras table button**.

Step 4: Press the **Export** button.

Step 5: Save the file in the CSV format.

The link does not contain user's login or password – they need to be entered manually in the system where the link is copied.

The RTSP links are not generated if the XPS format has been selected for export.

The RTSP links are also generated for those cameras that have been disabled in the configuration.

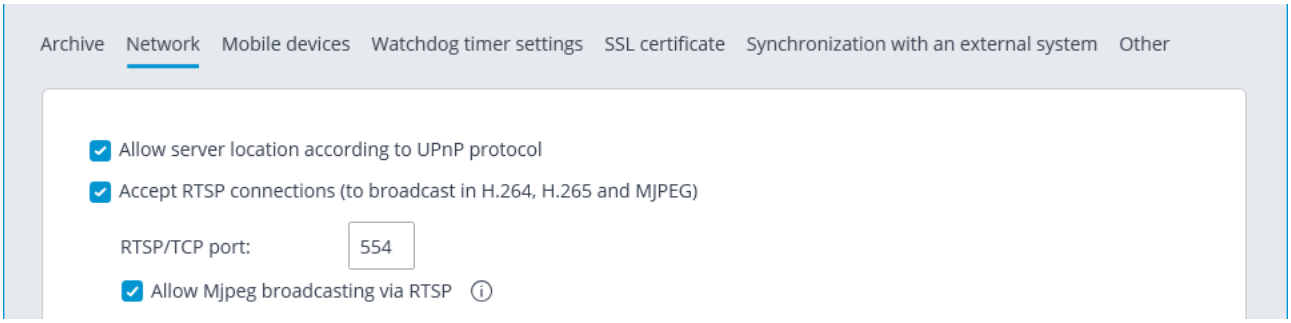
For many systems, the login and password can be pasted directly into the link after the protocol and before the address as follows: **rtsp://-**

login:pass@address/rtsp?channelid=0eea2046-7d4c-4a25-9df8-e0ae-dae99bed.

Some applications allow to indicate login and password in the separate entry fields or request them.

The RTSP broadcasting may be disabled on the **Eocortex** server; that is why it is required to enable the possibility of RTSP connections to the server before the generation of links.

By default, the IP cameras use port 554 for RTSP broadcasting. However, the port can be modified in the network settings of the server.



Samples of RTSP links

Non-standard RTSP port, main stream: **rtsp://192.168.100.118:556/rtsp?channelid=0eea2046-7d4c-4a25-9df8-e0aedae99bed**

Non-standard RTSP port, sound reception enabled, alternative stream: **rtsp://192.168.100.118:556/rtsp?channelid=00c8365c-8c42-46a3-bcdd-5187461e9bb2&-login-=test-&password=81DC9BDB52D04DC20036DBD8313ED055&sound=on&streamtype=alternative**

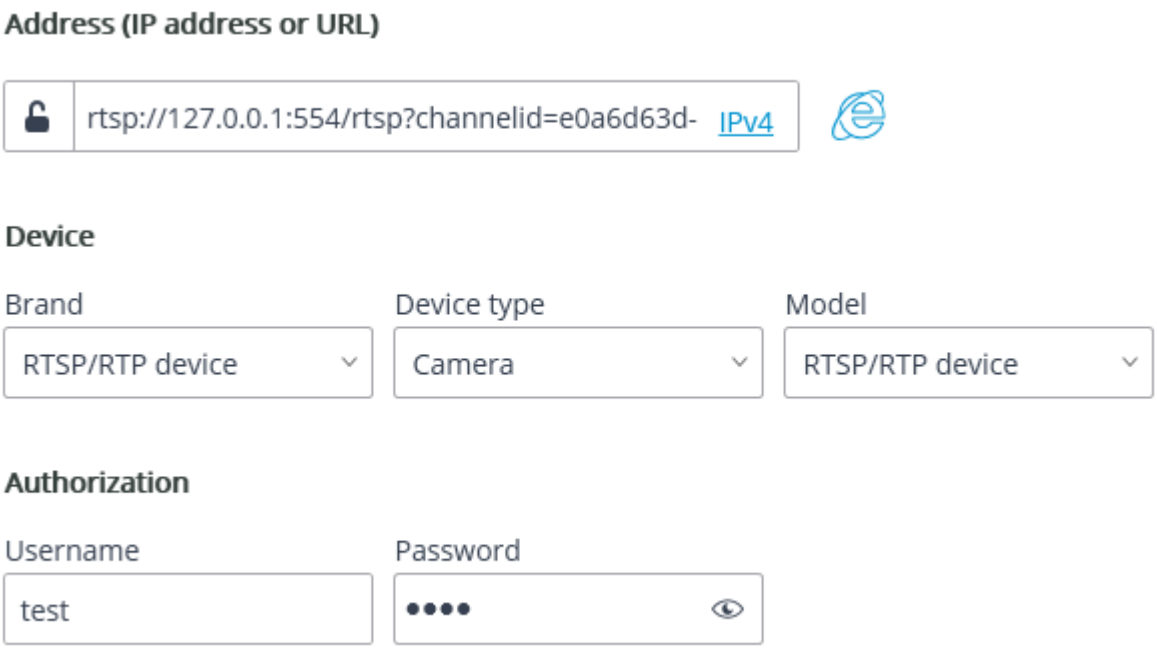
Example use of a RTSP link

To connect to the **Eocortex** server via RTSP from the same server as well as from another server, including the cloud one, it is required to do the following:

Step 1: Copy the RTSP link from the server from which the video stream is received via RTSP.

Step 2: Using the **Eocortex Configurator** application, connect to the server that will receive the video stream.

Step 3: Add a RTSP camera and insert the RTSP link into the address field. Enter the **Eocortex** login and user name in the corresponding fields.



The RTSP link is inserted in other applications in the similar fashion, e.g., Windows Media, VLC, MPlayer, RealPlayer, Media Player Classic video players.

Testing of video analysis modules

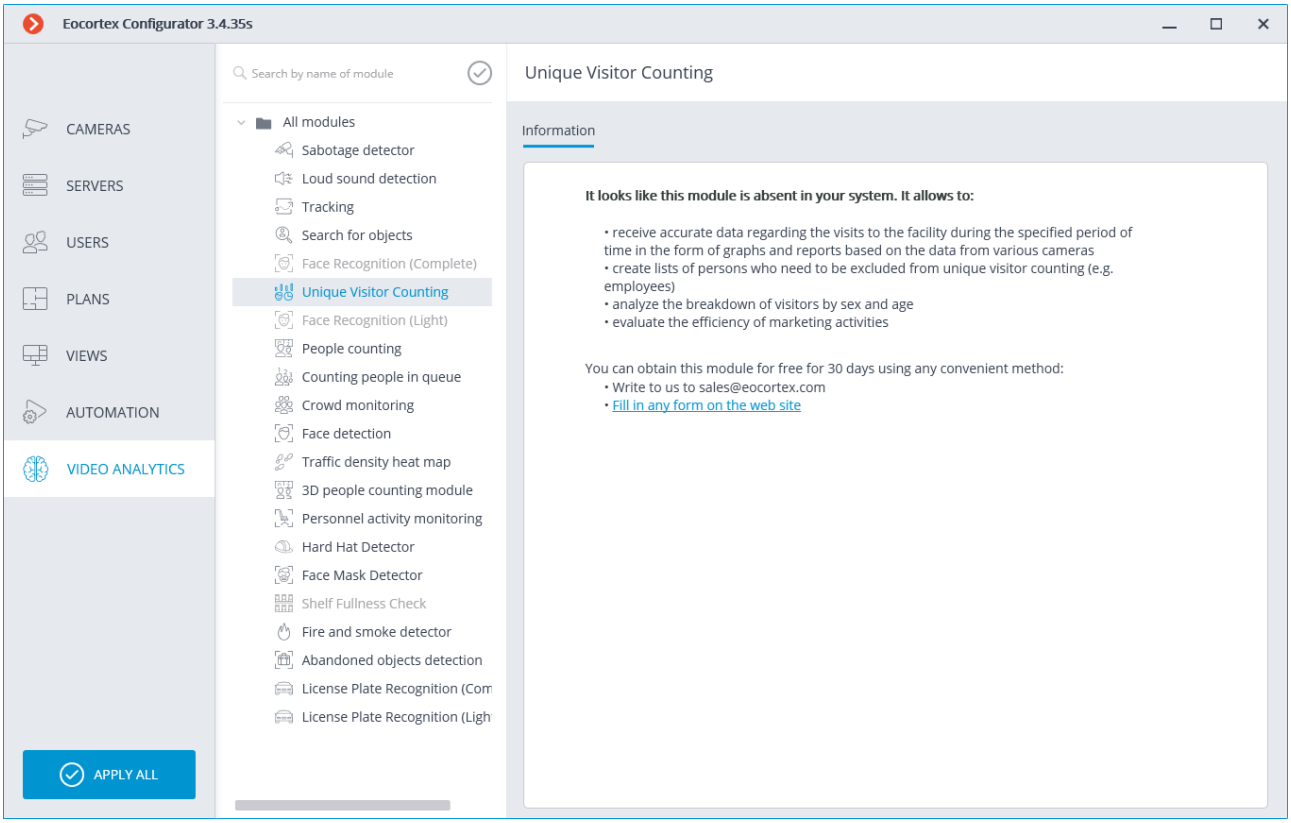
Eocortex provides a simple way of obtaining trial licenses for any video analysis modules used in the current version of the software.

To obtain a trial license, please do the following:

Step 1: Launch the **Eocortex Configurator** application.

Step 2: Open the **Video analytics** page.

Step 3: Select the module highlighted grey (this color is used to mark the modules that are not used in the system).



Step 4: Call the number indicated on the **Information** tab or follow the link and fill in any form.

The **Automatic reports** tab is not available for the trial modules.

Electronic signature

The electronic signature permits to confirm the authenticity of the exported file, as well as the its ownership.

The availability of an electronic signature is one of the requirements of the General Data Protection Regulation (GDPR).

Preparation of electronic signature

The exported files are electronically signed using X509 certificates. Only the certificates that use the RSA asymmetric algorithm are supported.

The signatory's root certificate can be either a self-signed root certificate or a certificate purchased from a certification authority.

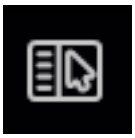
The end certificates must be generated on the basis of the signatory's main certificate, one for each user. These certificates must be installed on a computer. Their installation is carried out either by means of the operating system or using specialized software.

The signatory's root certificate must be included in the trusted list of the relying party.

Eocortex Client application setup

Step 1: Open the **Eocortex Client** application under the account that will be used to export the signed files.

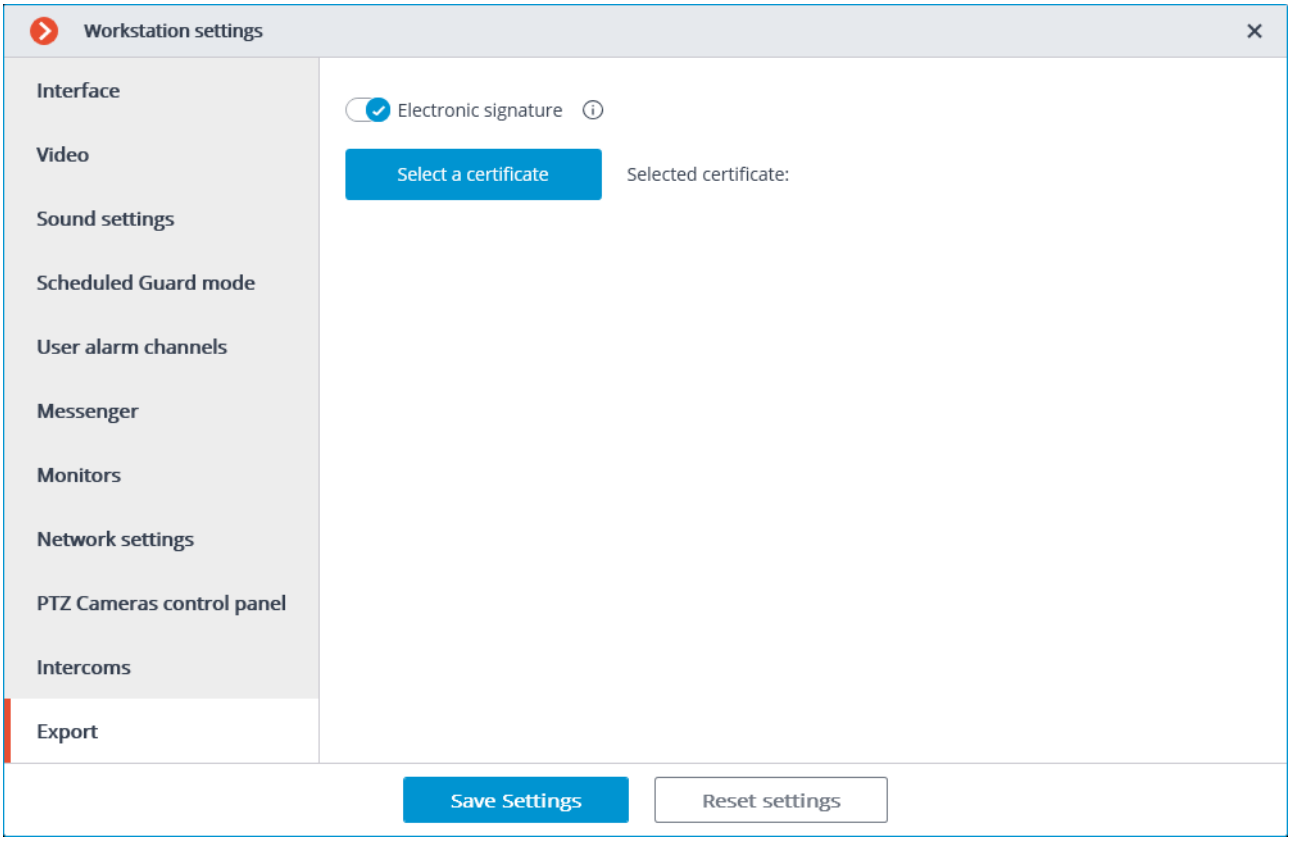
Step 2: Go to the control panel clicking on the button located in the upper left corner of the window.

Step 3: Select the item **Settings** in the menu, then select the subitem  **Workplace settings**.

Step 4: Go to the **Export** tab.

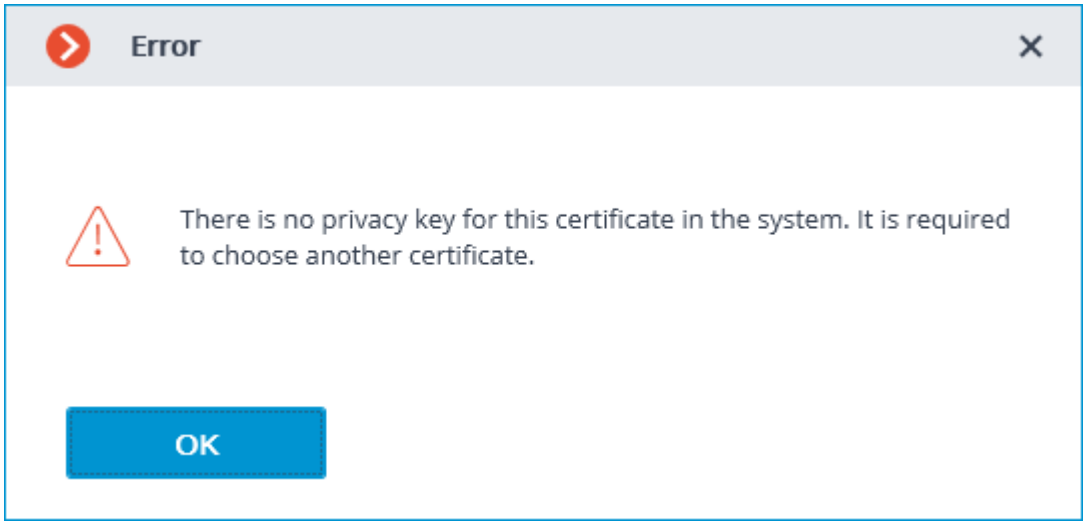
Step 5: Enable the **Electronic signature** option using the switch .

Step 6: Press the button **Select a certificate**.



Step 7: In the opened window, select the certificate that the given user will use for signing the files.

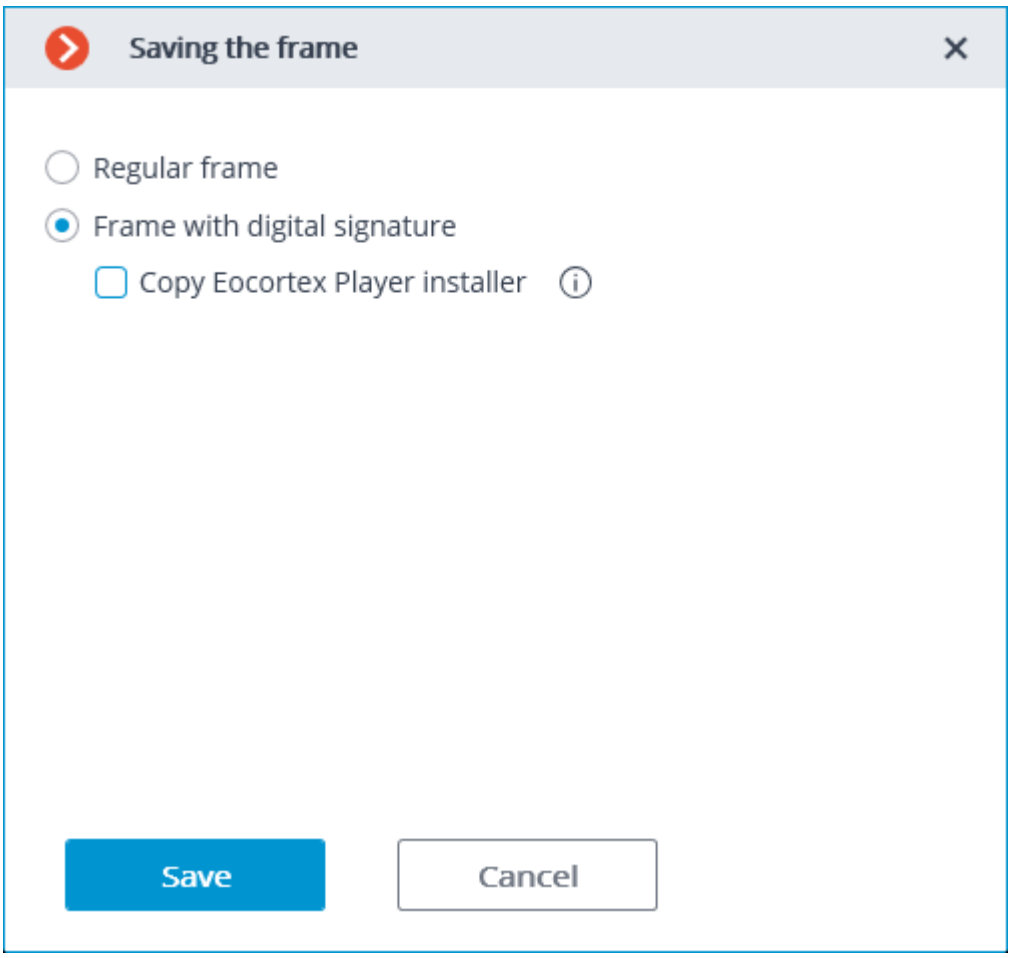
⚠ It is important that the imported certificate has a private key. If there is no such key, or the certificate uses an asymmetric algorithm other than RSA, then when you will receive the following error message when trying to select such a certificate:



Signing a saved frame

In order to sign a saved frame, click on the icon in the active cell or in the archive cell, or open the context menu and select the **Save frame** item.

Subsequently, open the item **Frame with digital signature** in the window that has appeared.

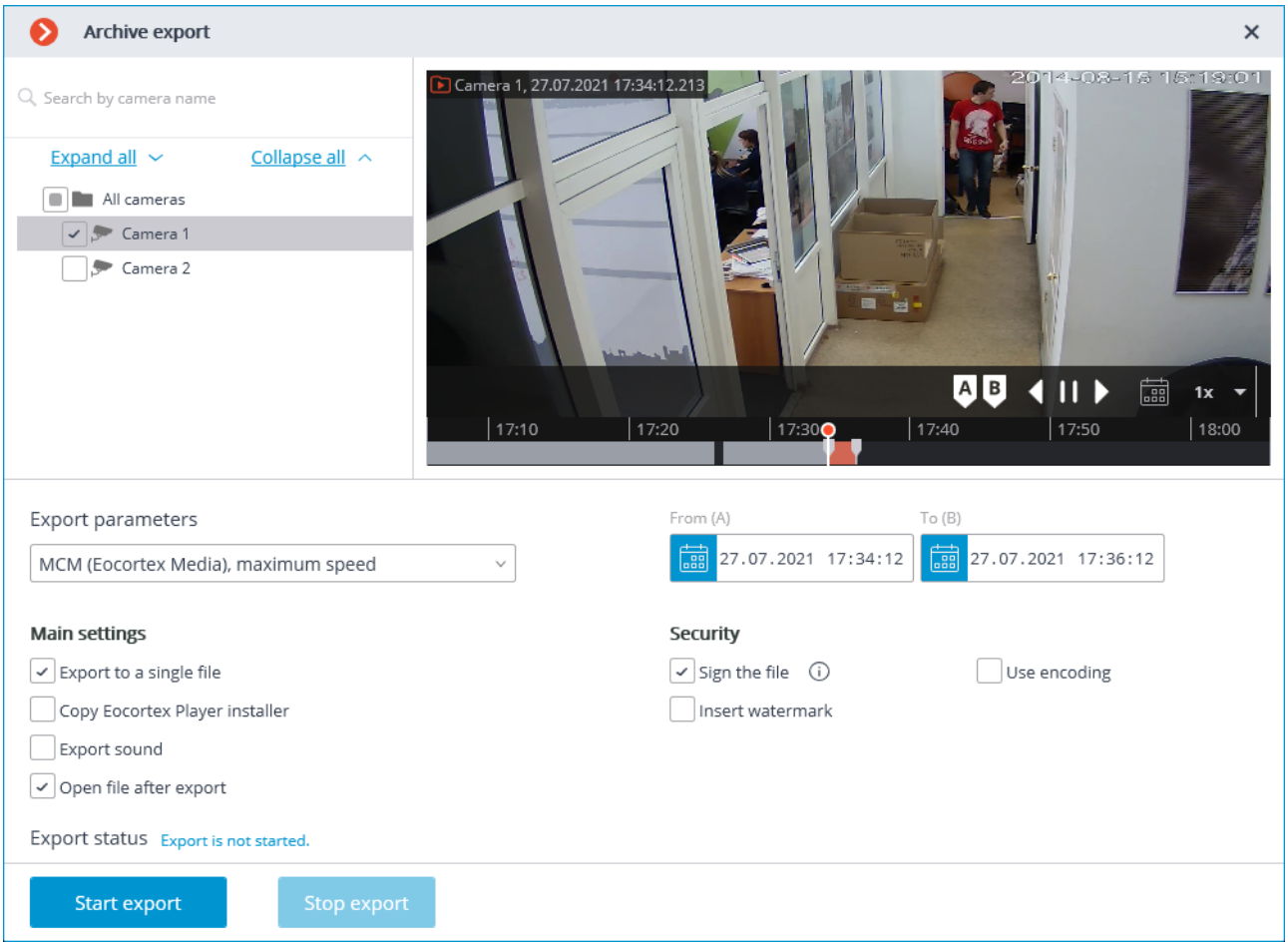


Pressing the **Save** button opens the dialog screen with the option of selecting the storage location for the frame to be saved.

⚠ If an electronic signature has not been set, the dialog screen with the option of selecting the storage location for the frame to be saved will open immediately instead of the **Save frame** window.

Signing video clips to be exported

Enable the option **Sign the file** in the Archive export window in order to sign the archive to be exported.

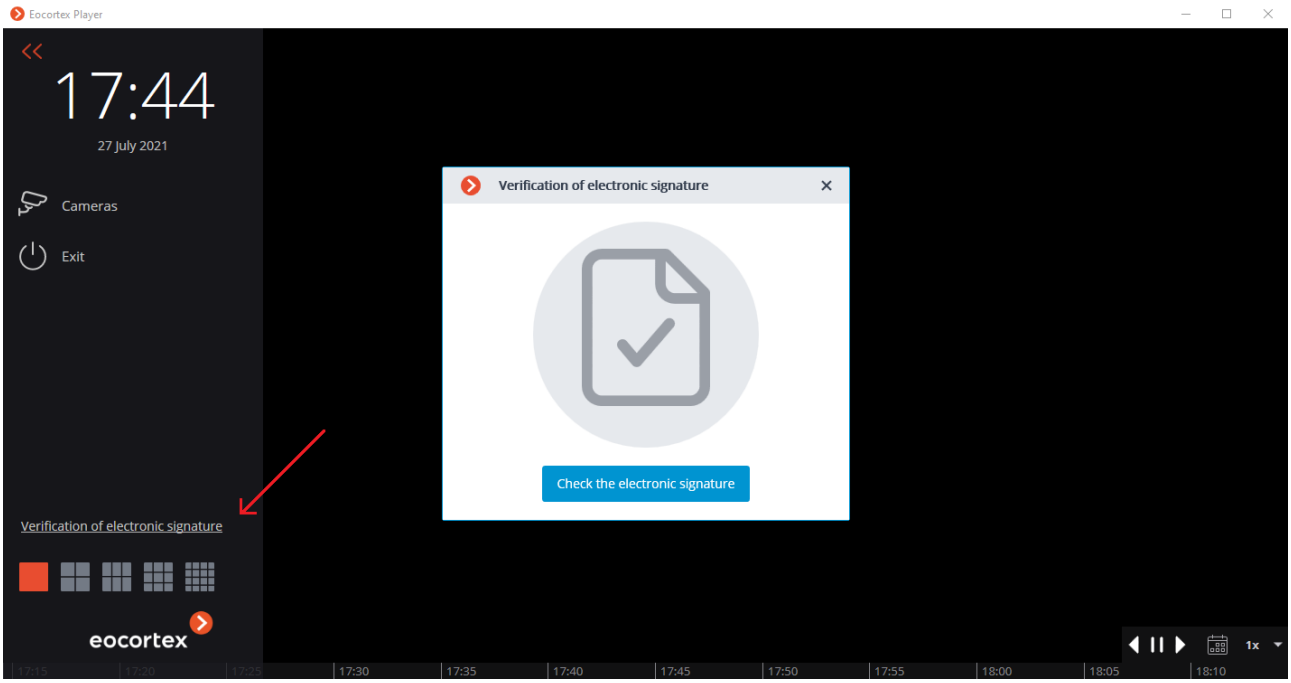


⚠ If an electronic signature has not been set, the **Sign the file** item will not be available.

ⓘ The electronic signature file is saved alongside the exported file. The signature file name consists of the exported file name and the **msig** extension.

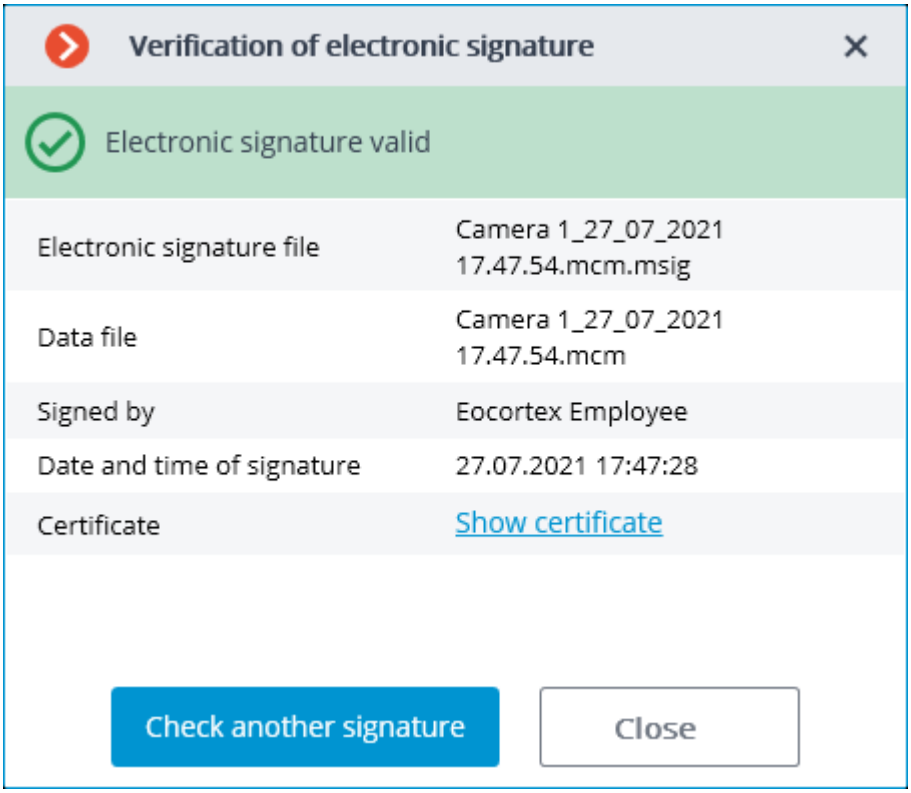
Verification

The **Eocortex Player** application is used to check the signed files. To check the electronic signature of a file, open the file with the msig extension, or open it with the **Check electronic signature** button in the window of the application.

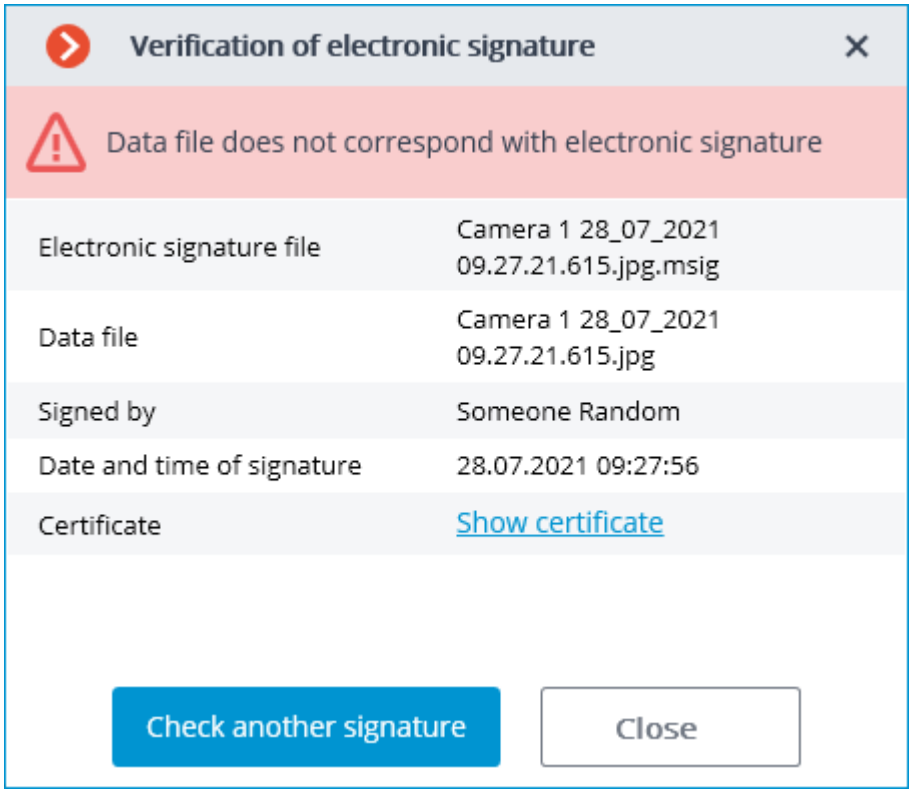


Eocortex Player will try to find and check the exported file automatically. If an error occurs during the process, you will be prompted to select the file manually.

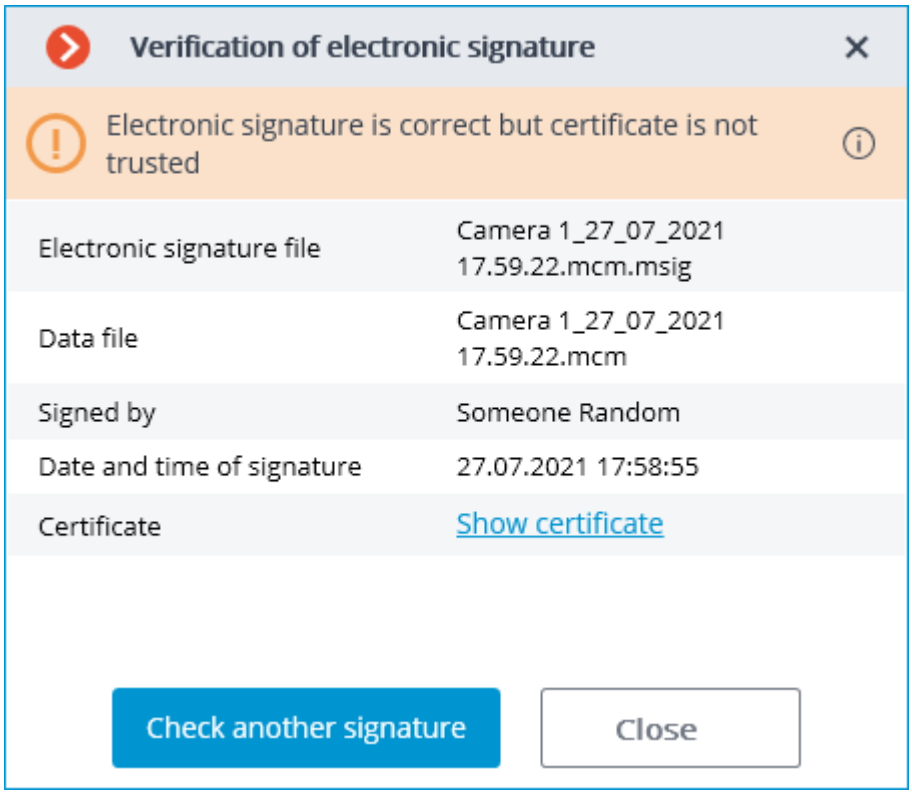
The following window will appear in case of a successful verification:



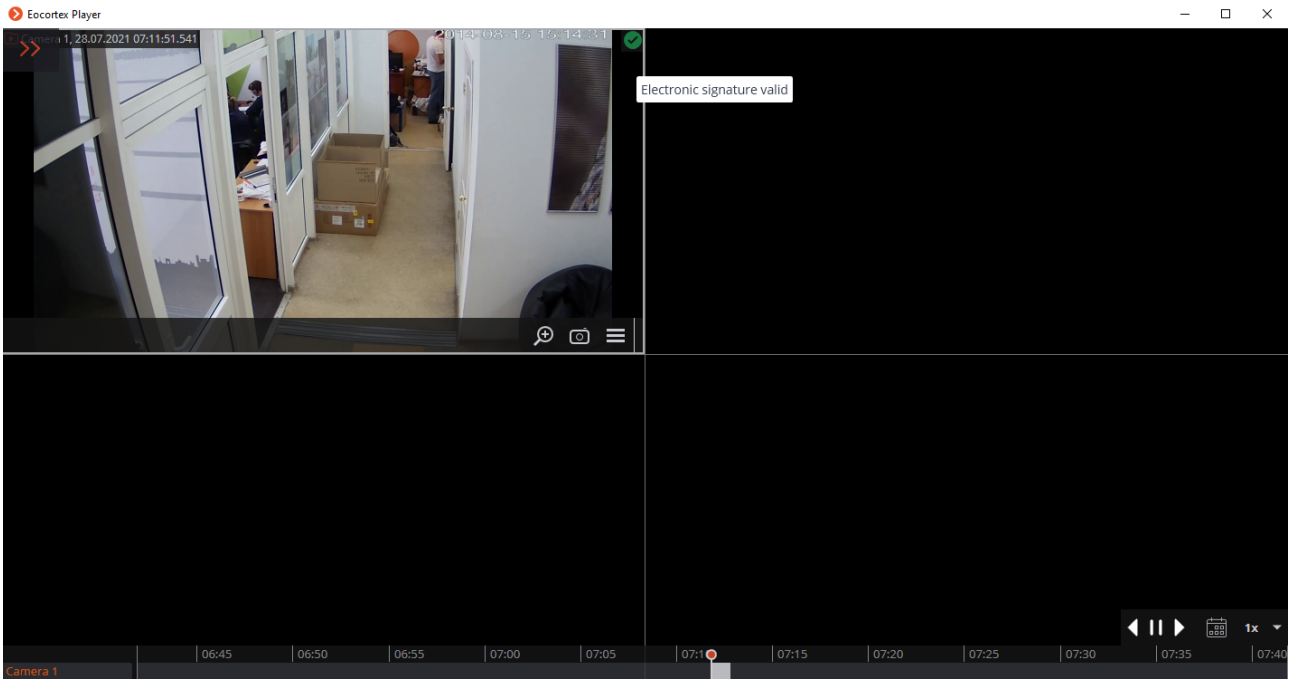
If the file has been modified, the following window will appear:



If the certificate is not a trusted one but the file has not been modified, the following window is displayed:



Additionally, the status of the electronic signature can be viewed in MCM format in the cells of the **Eocortex Player**. To do this, it is required to move the cursor over the status icon. The verification takes place automatically if the corresponding signature file was found.



Click on the status icon to view the details.

Related references:

- Archive export
- Enabling Electronic signature

Limitation of client connections

Eocortex permits to limit the number of connections to the video surveillance system under the same account.

This option is initially disabled.

Setup of group rights

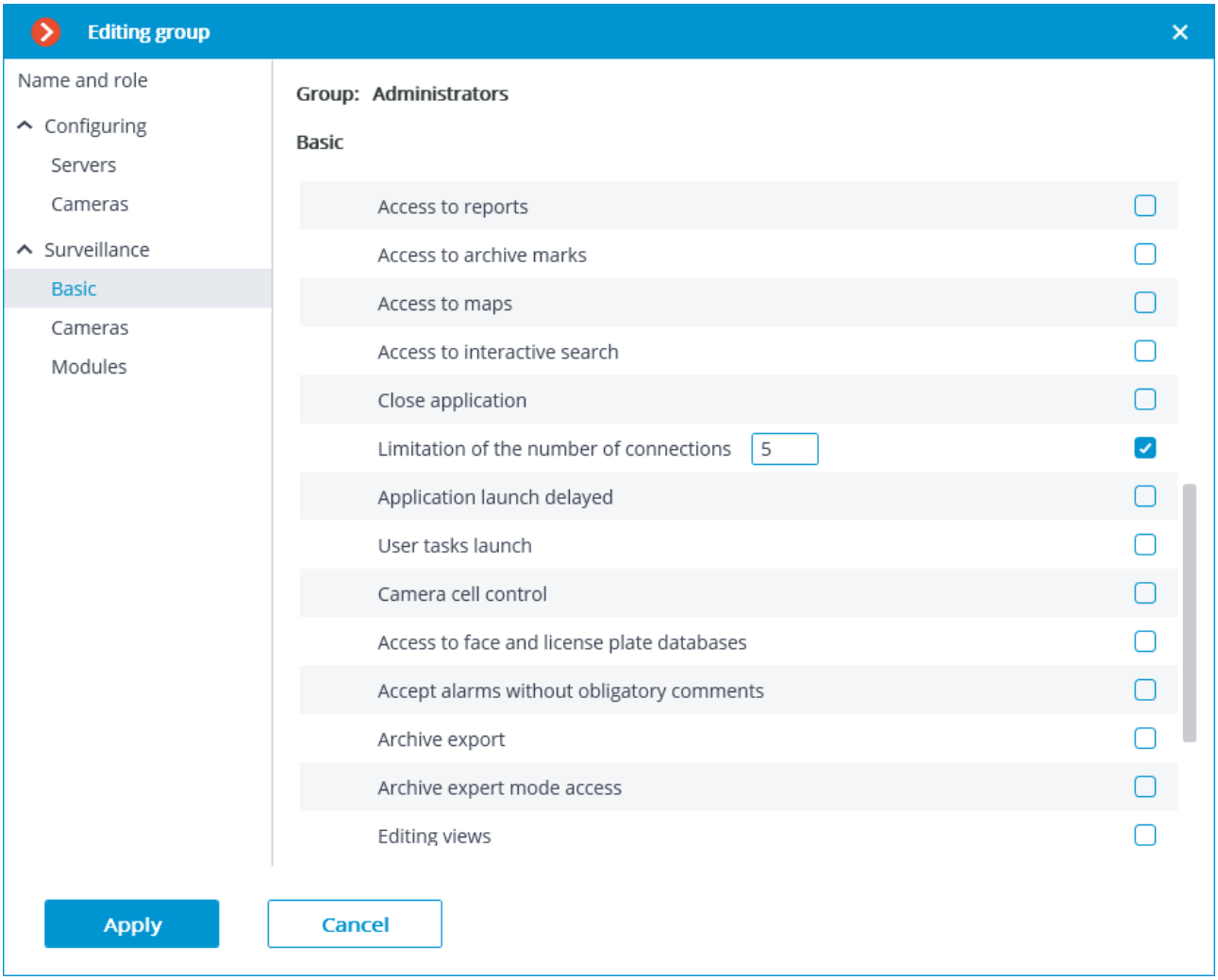
To limit the number of client connections to a user group, it is required to configure the group rights as follows:

Step 1: Open the **Eocortex Configurator** application, go to the tab **Users** and press the button **Users of Eocortex applications**.

Step 2: Select a group and press **Edit**.

Step 3: Go to the tab **Basic**.

Step 4: Enable the **Limitation of the number of connections** right and indicate the maximum number of connections for the group members.



The value of the number of connections for users of the group must be at least 1 and no more than 1000. When the right is first enabled, the value is set to 1.

Step 5: Apply settings.

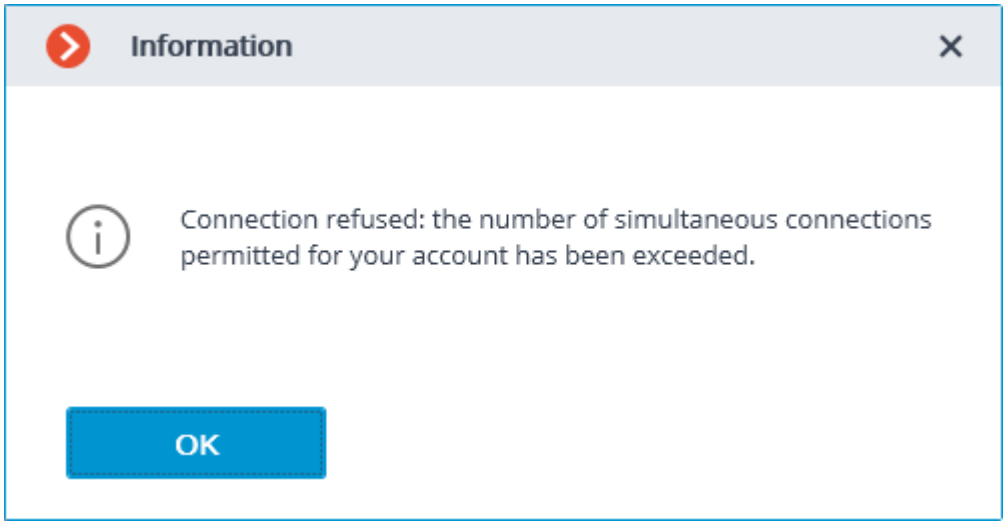
New settings will become effective as soon as they are applied.

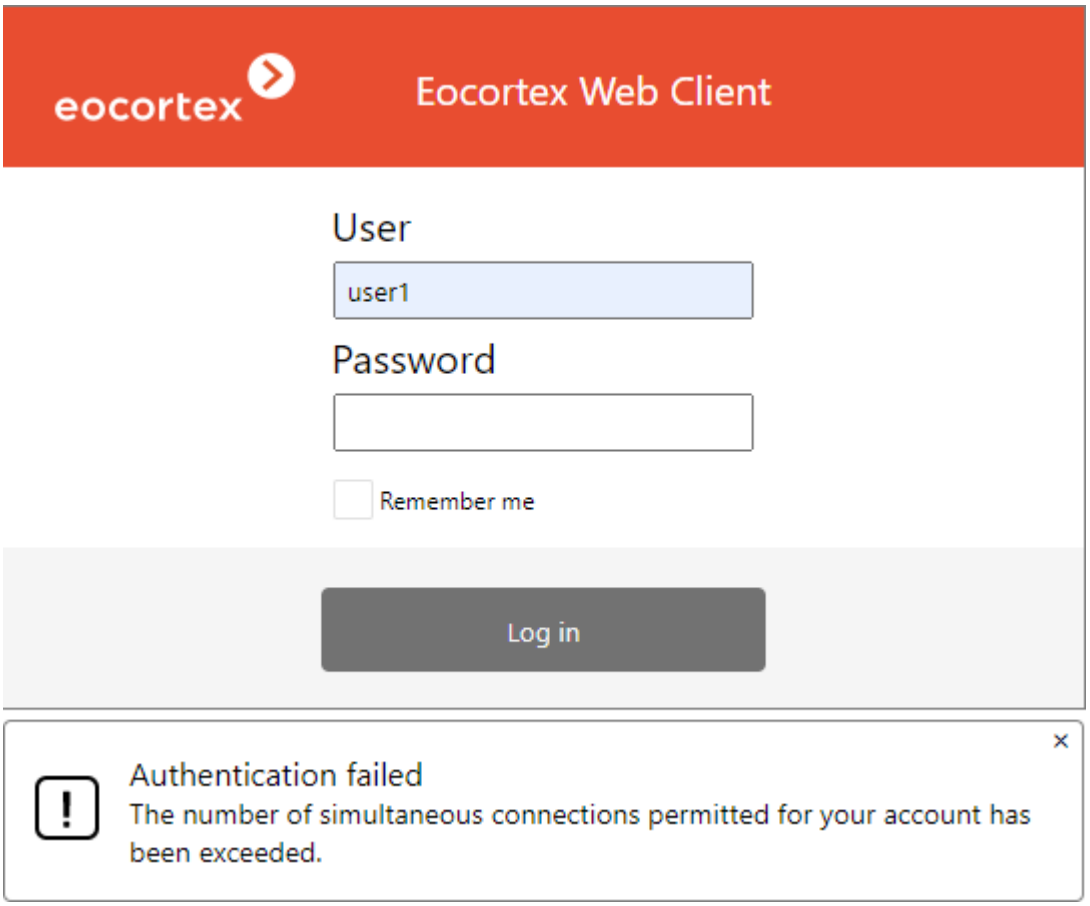
The stated limitation applies to each user of the group.

The limitation on the number of client connections also applies to Active Directory users, whereby:

- If an Active Directory user is added to the group as a user, the restriction will apply to him, as well as to the regular users of **Eocortex**.
- If an Active Directory group is added as a user, the restriction will be applied separately to each user of this group.

If the limit has already been reached, an attempt to connect via the client application will result in a message that the number of client connections has been exceeded.





Management of client connections

Client Connection Limitation is the maximum number of unique client connections made under the same user account.

The connections are counted for each account, not as a total for a group of users.

A unique connection identifier is used to track the connections. Each connection to the system is unique in the **Eocortex Client** application. In the **Eocortex Web-client** application, a unique identifier is bound to the address of the client connection to the server.

⚠ If the browser is running in the **Incognito** mode, each tab will have its own identifier.

⚠ If **Eocortex Web-client** is launched from another browser, it will have a different identifier.

⚠ After enabling the right and applying the settings, client connections exceeding the limit will be disconnected randomly.

⚠ After reducing the number of connections and applying the settings, current connections that exceed the new limit are not terminated.

⚠ A client connection is considered completed if it has not sent requests to the server within 6 minutes.

Thus, when the connection limit is reached, after the completion of one client application, at least 6 minutes must pass to allow a new connection using the same credentials.

Requirements, limitations and features of usage

⚠ For this restriction to work correctly, it is necessary to ensure that each **Eocortex** server has access to the main server of the system, since it is the main server that is responsible for accounting for the client connections throughout the system.

When the connection to the main server is lost, the member server will only count its own connections and restrict connections based on this data. Thus, if the main server is unavailable, the number of client connections for the system as a whole may be exceeded.

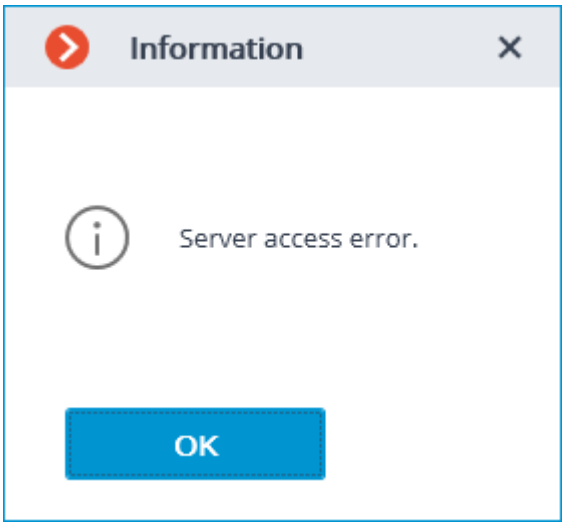
After the connection is restored, the main server updates its data using the information from the member server. If after updating the total number of connections by one user has exceeded the limit, the client applications will remain connected. However, new connections by the same user will not be possible.

⚠ The limitation will not work correctly if the system has servers running Windows 7, since the connections for such servers will be counted locally.

If the main server is using Windows 7, all servers in the system will count the connections locally.

If the system has servers with **Eocortex** version 3.3 or lower, the client connections to such servers will not be taken into account when limiting the overall number of connections.

When connecting to the **Eocortex** server of version 3.4 and higher with **Eocortex Client** application of version 3.3 or lower, such connections will be counted. In this case, if the connection limit is exceeded, the following error window will appear in the client application:



Different databases of faces and license plates for different cameras

Eocortex permits to create a database of faces or license plates for a specific camera or a group of cameras. It allows to add cameras of different users to the system and to work with various databases.

The support of several databases is available for the following modules:

- **Face Recognition (Complete)**.
- **License Plate Recognition (Complete)**.

The setup of different databases for different cameras is available only via REST API.

It is required to specify the same unique identifier of a database to use the same unique database on several cameras.

The identifier of the database is the DbId string that can only be set via REST API.

To perform the setup, it is required to do the following:

Step 1: Enable the module on the camera in the **Eocortex Configurator** application.

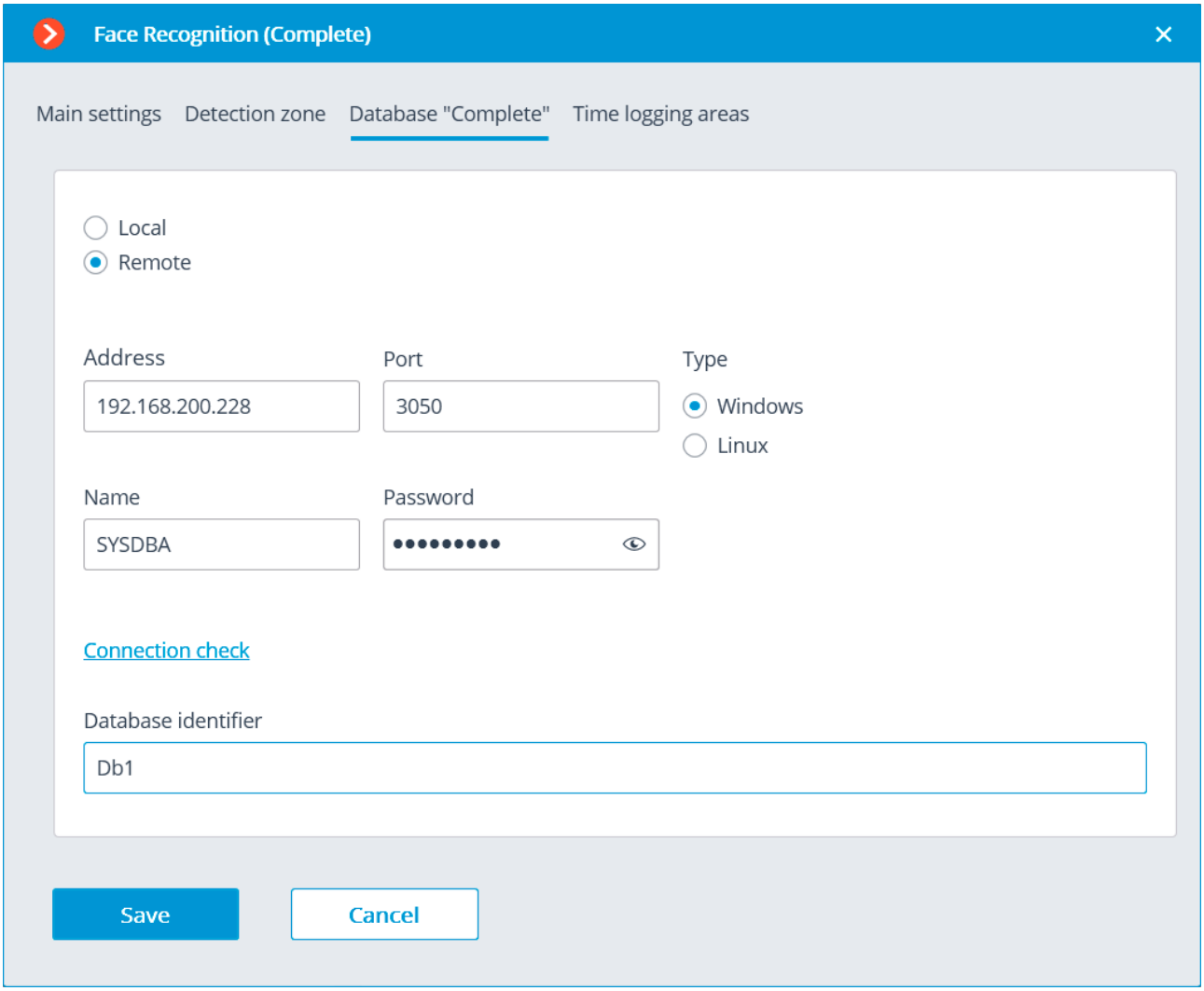
Step 2: Send a request with the same value of the **DbId** parameter to nodify the settings of the corresponding recognition module via REST API for all cameras on which it is required to use the same unique database.

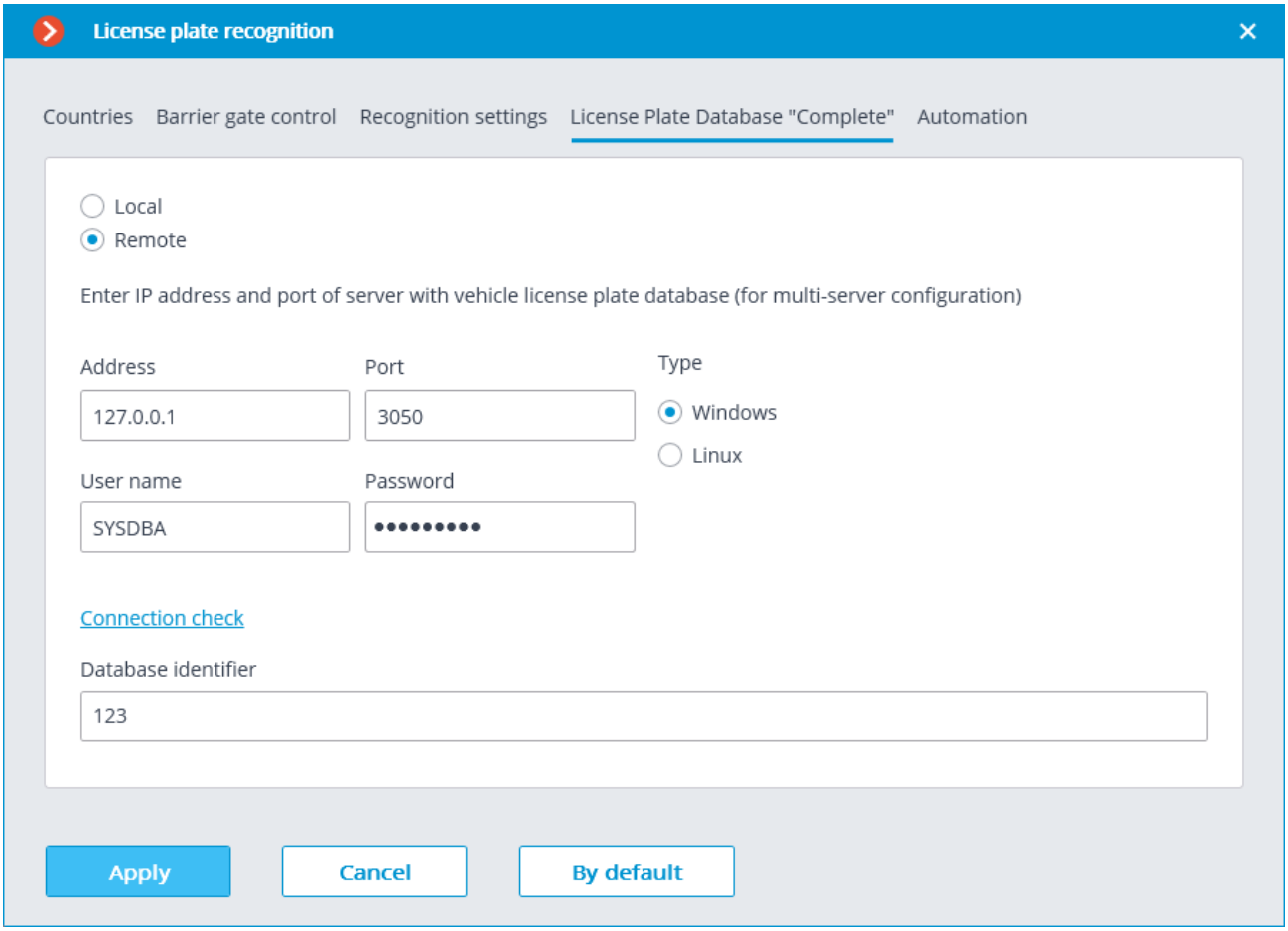
Step 3: In the **Eocortex Configurator** application, go to the **Users** tab and press the **Users of Eocortex applications** button, then set up the rights in such a way as to grant each user the access only to those cameras that have the same database identifier.

⚠ When editing a database from the **Eocortex Client** application, it is imperative that all the cameras of the connected client have the same database; otherwise, one of the databases will be selected randomly.

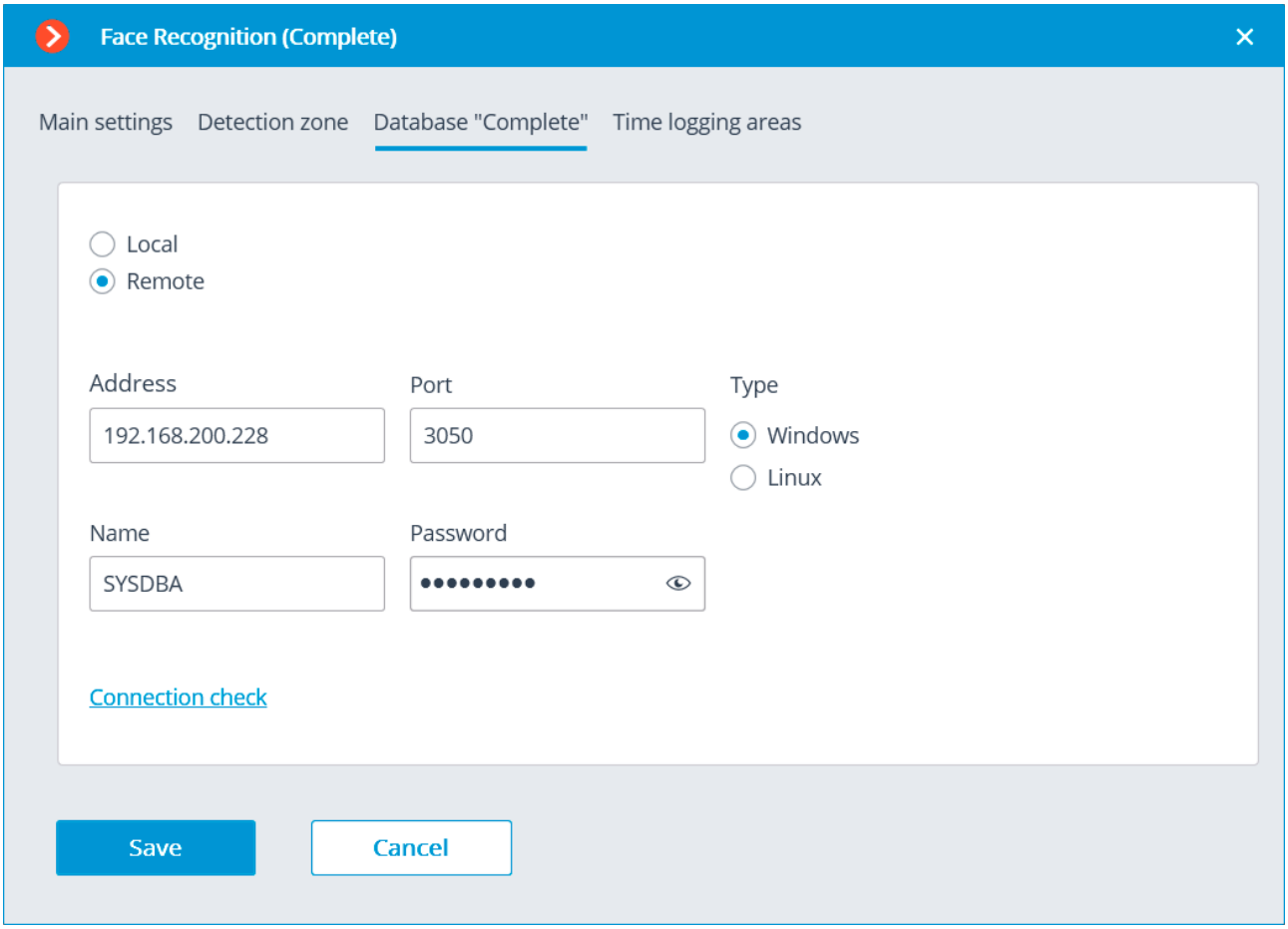
Limitations and unique features

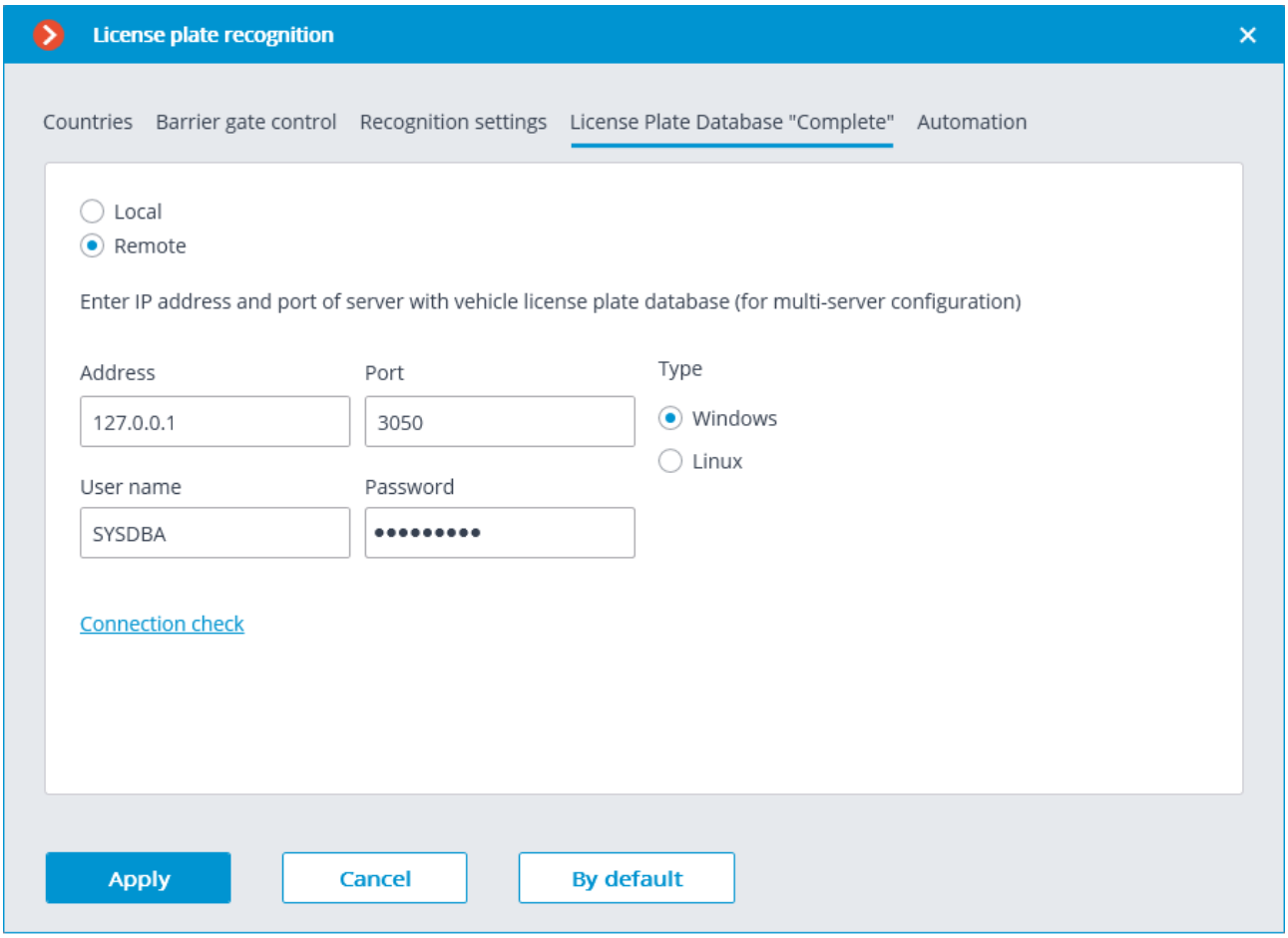
The **Database identifier** field has been added to the settings of each module to enable the user to set a unique database.





⚠ The **Database identifier** field is not initially displayed upon enabling the **License Plate Recognition (Complete)** or **Face Recognition (Complete)** modules.


Face Recognition (Complete)
Main settings
Detection zone
Database "Complete"
Time logging areas
Local
Remote
Address
192.168.200.228
Port
3050
Type
Windows
Linux
Name
SYSDBA
Password
Connection check
Save
Cancel


License plate recognition
Countries
Barrier gate control
Recognition settings
License Plate Database "Complete"
Automation
Local
Remote
Enter IP address and port of server with vehicle license plate database (for multi-server configuration)
Address
127.0.0.1
Port
3050
Type
Windows
Linux
User name
SYSDBA
Password
Connection check
Apply
Cancel
By default

To use this feature, it is required to specify the **Database identifier** via REST API.

The blank value of the identifier is indicative of the fact that all the cameras are interacting with the same database.

The quantity of the unique databases is not limited.

The number of cameras that can be connected to the selected database is not limited.

Filename creation rules

For the face database: <DatabaseID_>FRDATABASECOMPLETE.FDB.

E.g.:

- FRDATABASECOMPLETE.FDB: common face database Complete.
- USER12713_FRDATABASECOMPLETE.FDB: unique face database Complete.

For license plate databases: <DatabaseID_>PRDATABASE.FDB.

E.g.:

- PRDATABASE.FDB: common license plate database.
- USER12713_PRDATABASE.FDB: unique license plate database.

The similar rules apply for the replicated databases.

The filename (**Database ID**) must be no more than 32 symbols long, contain Latin letters, numbers and the underscore (_). If this rule is not followed, the unique database will not be set.

Alarms

In **Eocortex**, the term **Alarm** refers to an event requiring attention.

Description

In the **Eocortex Client** application, an alarm is triggered on a camera only when the **Guard mode** is enabled on that camera.

The **Guard mode** can be enabled from the context menu of the camera cell either manually or automatically, using a schedule. The Guard mode schedule can be set in the current workplace settings.

The alarm on the camera is triggered in the following cases (in such cases, the **Guard mode** on the camera must be enabled):

- From the context menu of the cell;
- When the on-screen button is pressed (in this case, the alarm will be triggered on cameras specified in the settings of the current workplace);
- When the motion detector is triggered;
- When the **Alarm generation** action is performed (it can be configured in the **Eocortex Configurator** application, in the **AUTOMATION** section).

Alarms are displayed on screen as follows:

- If an alarm is triggered on a camera that is displayed on the screen in real time, the alarm icon in the upper right corner of the camera cell will flash.
- If an alarm is triggered on a camera that is not displayed on the screen, or is reproducing the archived video at the time of the alarm, a large alarm icon will blink in the lower right corner of the screen.

Every alarm must be accepted. To accept the alarm, it is required to click on the cell of the alarm camera. An alarm not accepted within 60 seconds is considered missed.

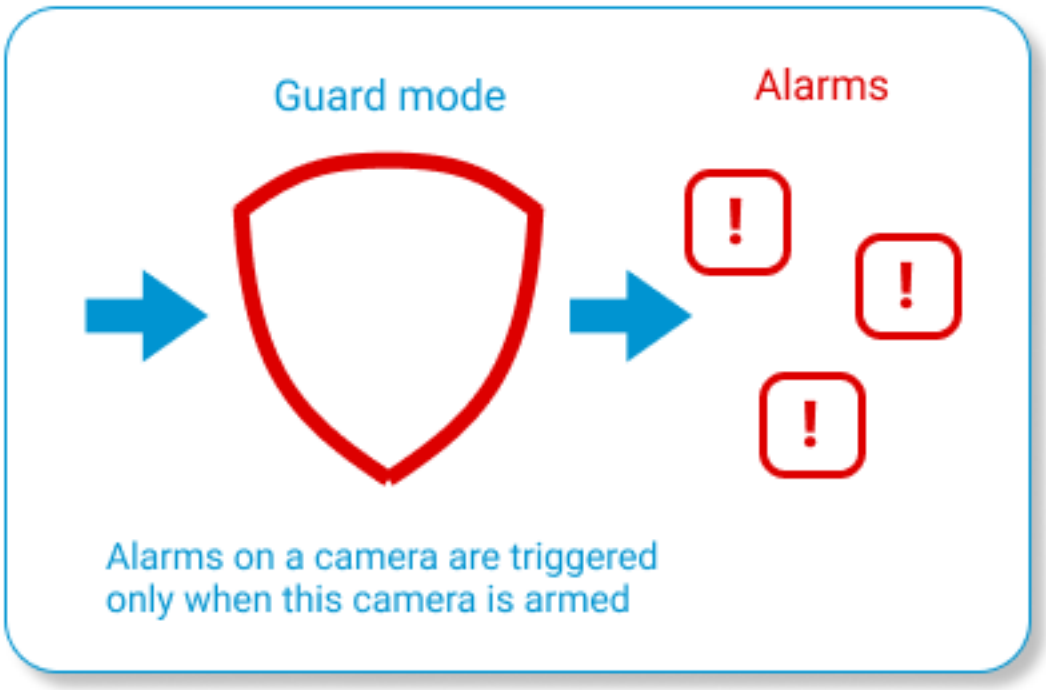
All alarms are stored in the **Event Log**. When viewing the **Event Log**, it is possible to filter alarms by various criteria, including whether they have been accepted or missed. In this case, it is possible to go to the archive from the **Event Log** to see the situation that caused the alarm.

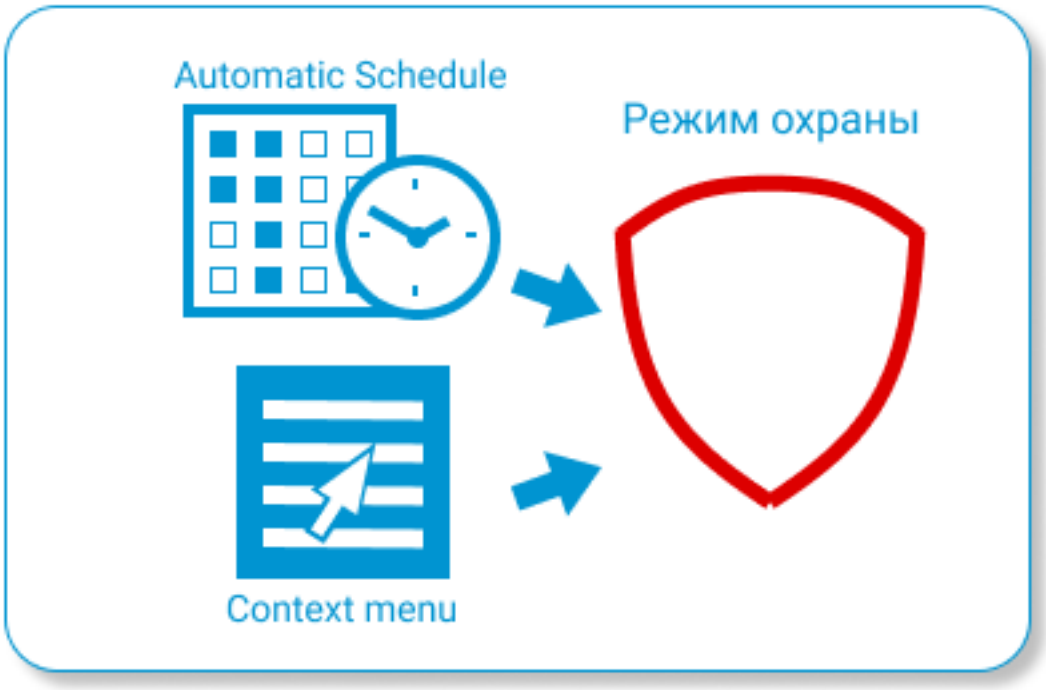
Some of the cells on the screen can be used as alarm cells. In such a case, the cameras that are not on the screen at the time of alarm will be displayed in alarm cells. If all the alarm cells are occupied, the cameras will remain hidden and a large alarm icon will flash in the lower right corner of the screen. A cell is considered free if no cameras are displayed in it, or when a camera with an already received or missed alarm is displayed.

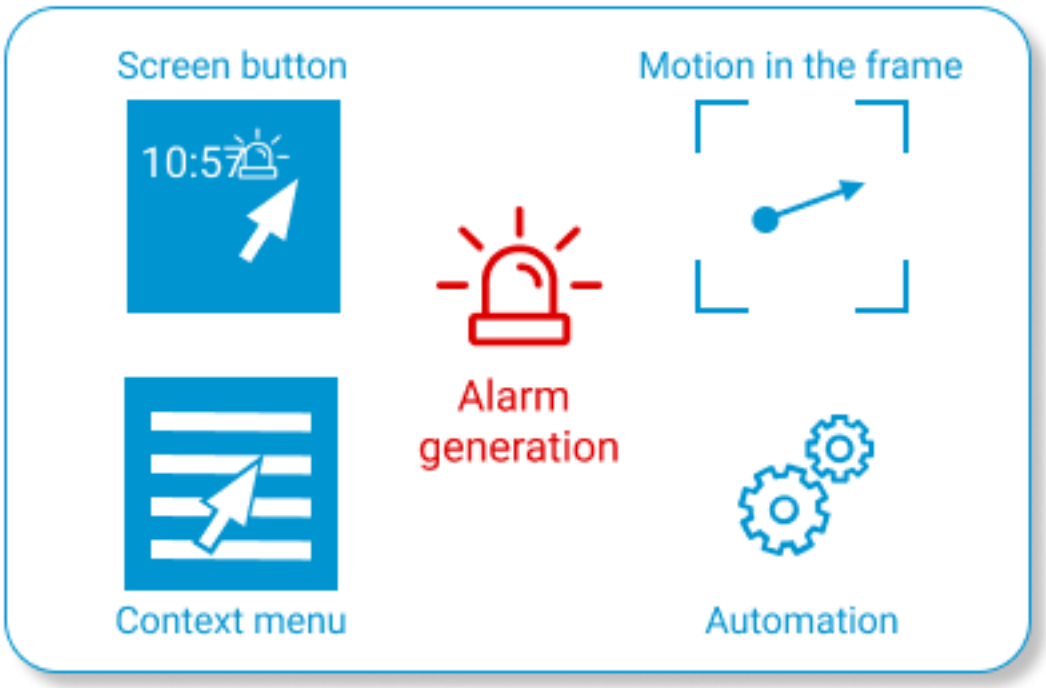
One of the monitors can be used as an alarm monitor. In this case, the cameras that are absent in the normal cells of the main monitors at the time of the alarm will be displayed on the alarm monitor. The screen grid on the alarm monitor is automatically selected so that all the alarm cameras are displayed on the screen. The cells with alarms already received or missed are considered free.

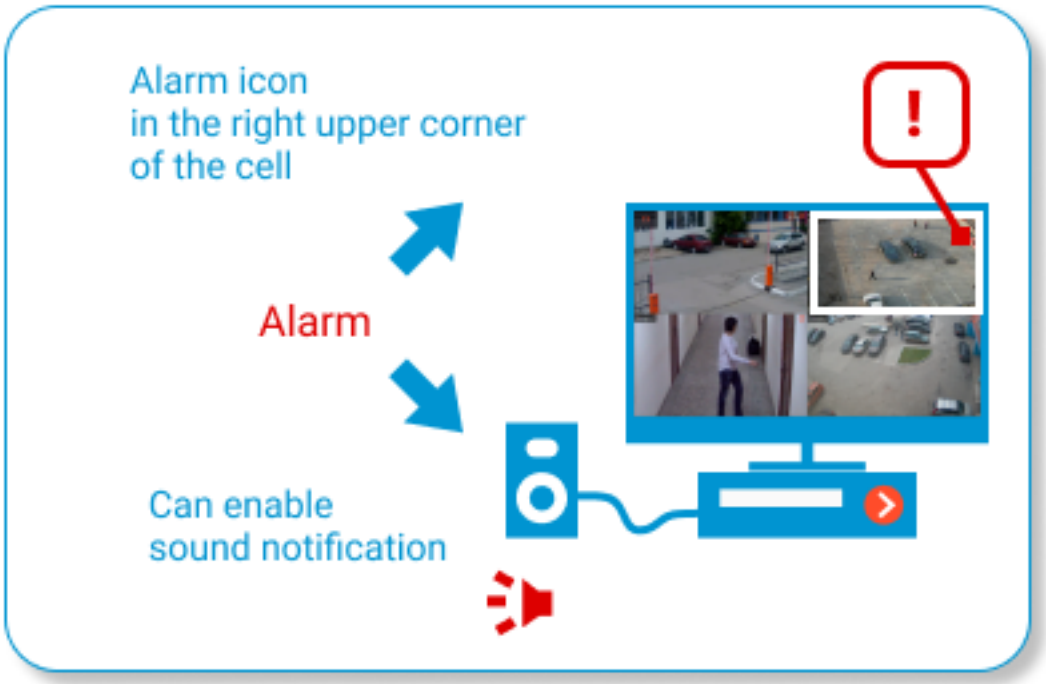
If the workplace has audio playback devices, it is possible to configure audio alerts for alarms.

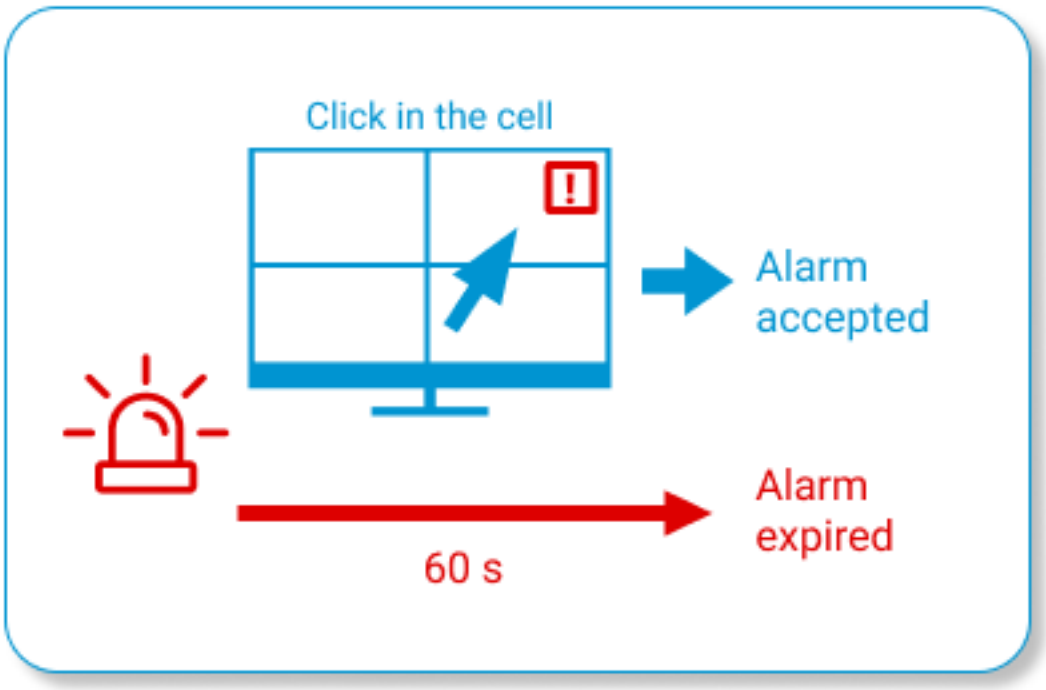
Pictures

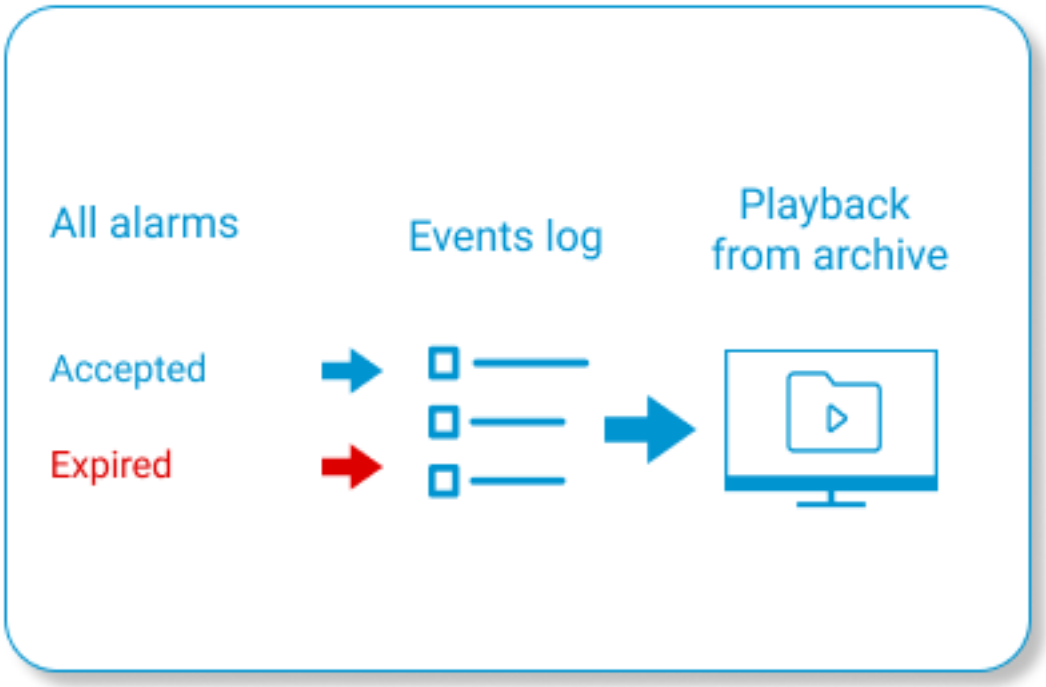

Guard mode
Alarms
Alarms on a camera are triggered
only when this camera is armed

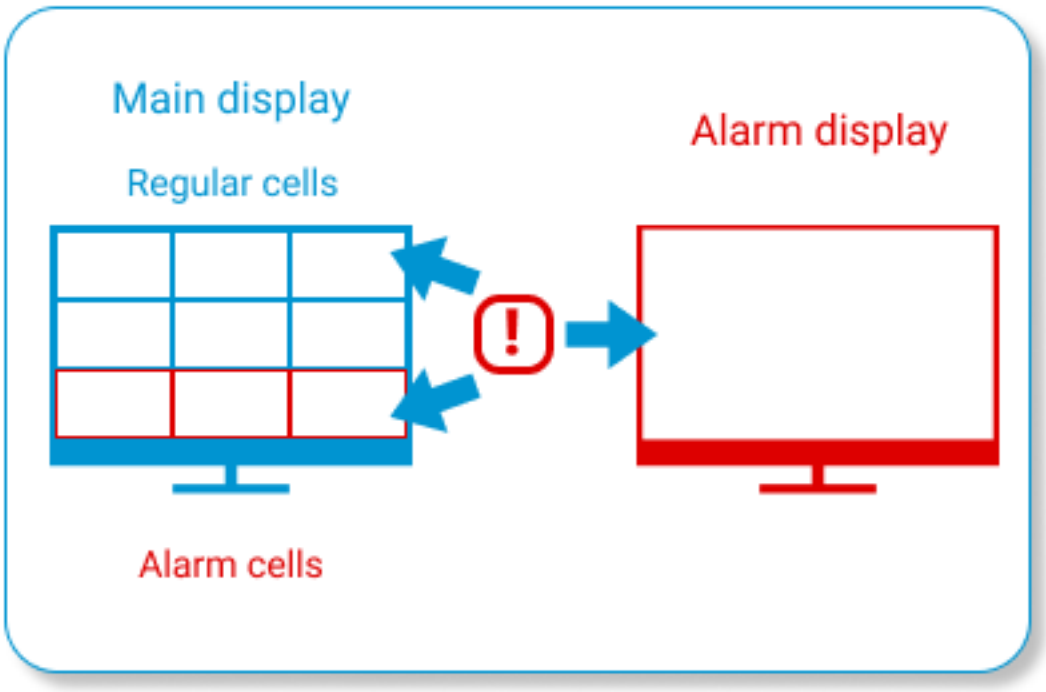

Automatic Schedule
Режим охраны
Context menu

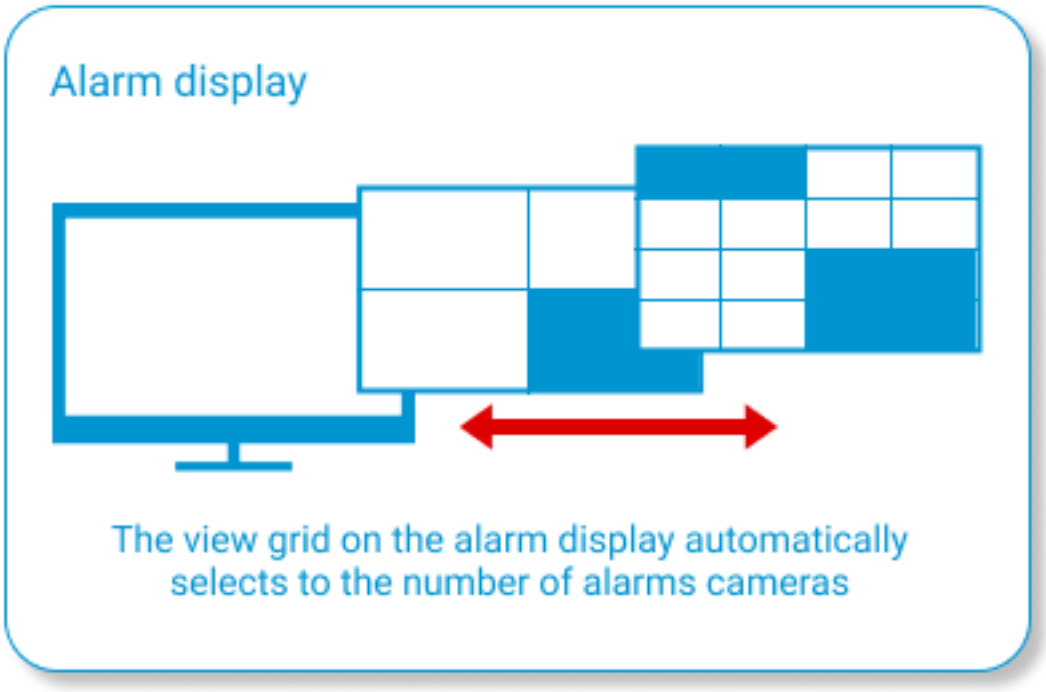

Screen button
10:57
Motion in the frame
Alarm
generation
Context menu
Automation


Alarm icon
in the right upper corner
of the cell
!
Alarm
Can enable
sound notification


Click in the cell
Alarm accepted
Alarm expired
60 s


All alarms
Events log
Playback from archive
Accepted
Expired





Related references

Working with alarms in the **Eocortex Client** application

Setting up alarm buttons and cells

Setting up alarms, sound annunciation and scheduled guard mode

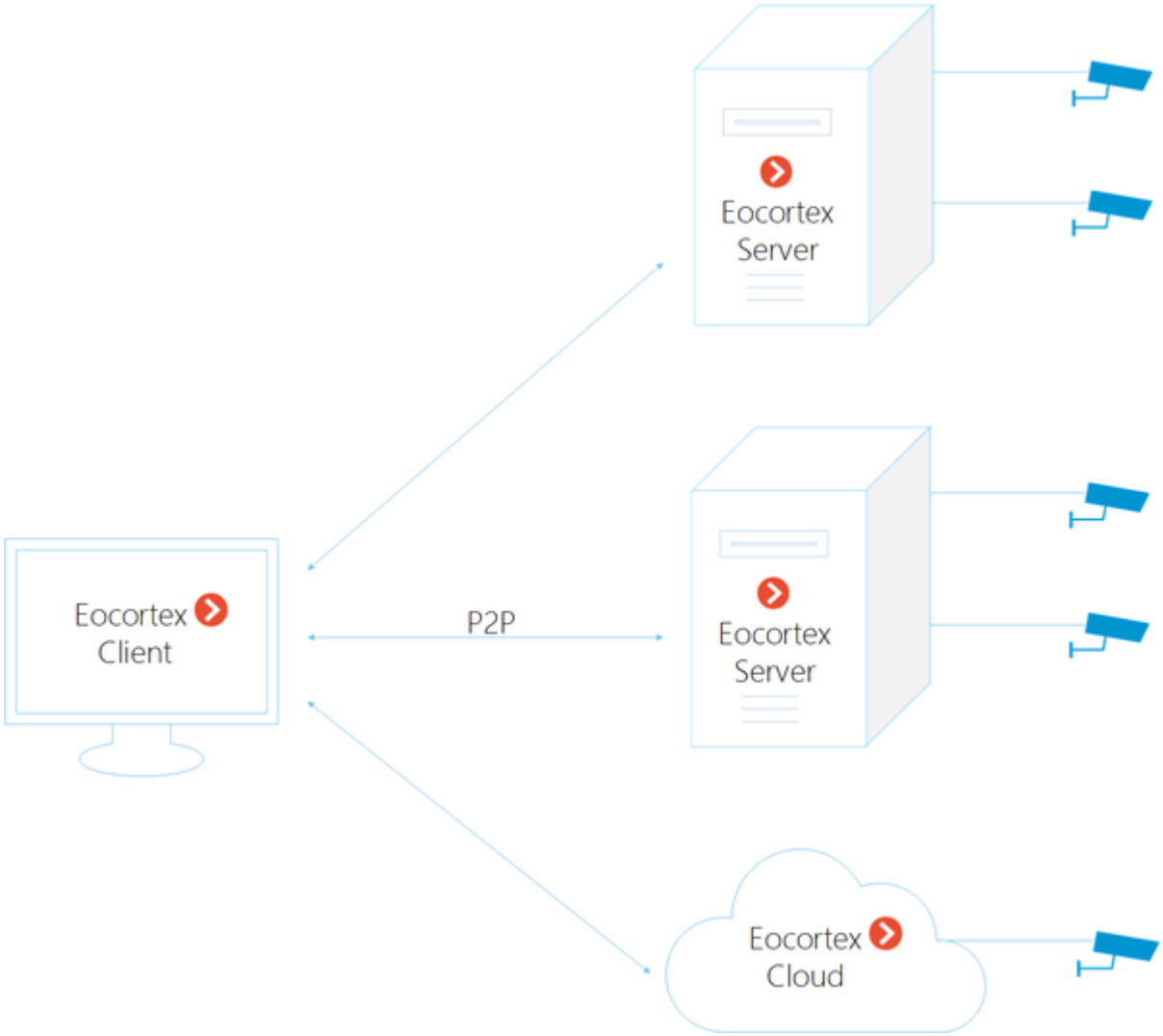
Selecting cameras for user alarm

Setting up alarm monitor

Alarm generation actions

Unified for cloud and conventional version

In the **Eocortex Client** application, it is possible to simultaneously view cameras connected to both the **Eocortex**, servers and the **Eocortex Cloud**.



Use cases

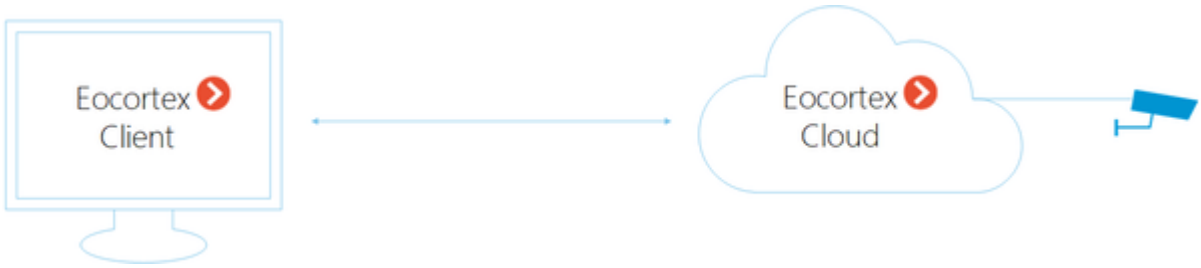
Connecting to **Eocortex** server:

Details...

Connecting to **Eocortex** server via P2P:

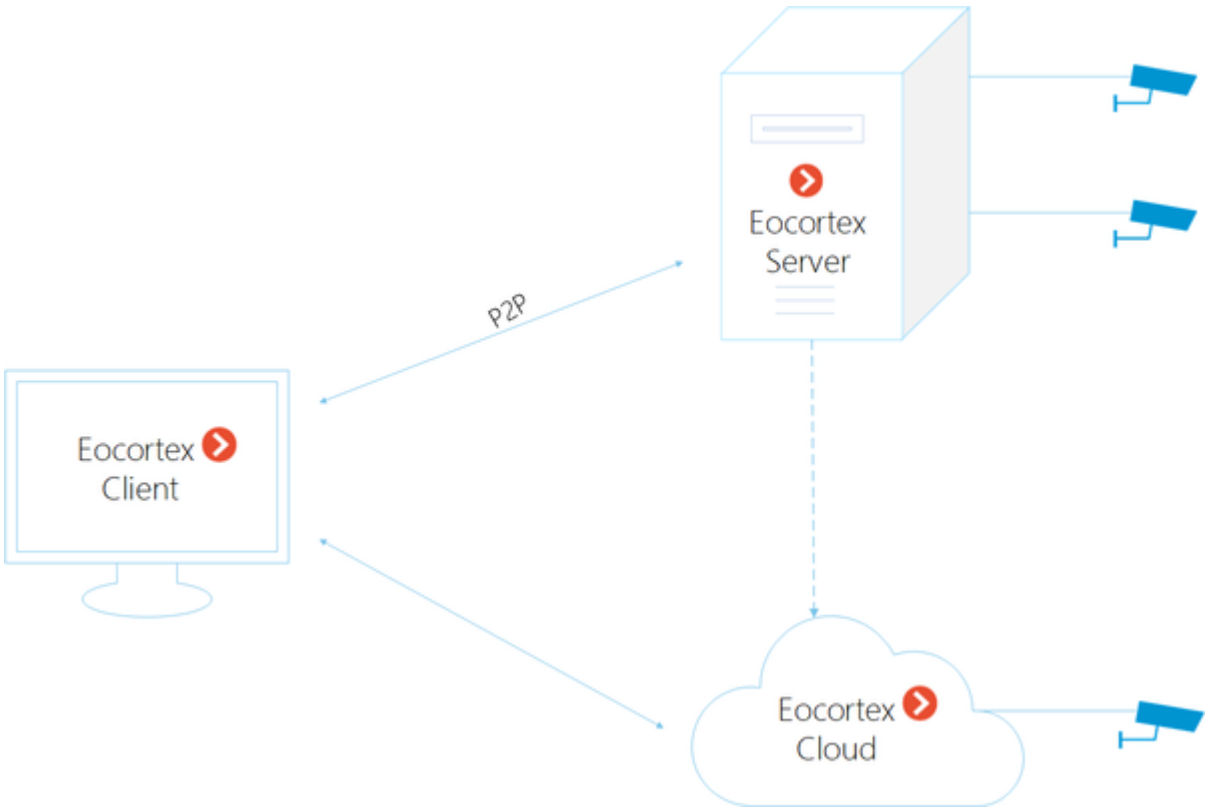
Details...

Connecting to **Eocortex Cloud**:



Details...

Simultaneous viewing of cameras from the local server via P2P and cloud cameras:



More about P2P and cloud cameras

Using PostgreSQL

Starting from version 3.4 of **Eocortex**, certain components use PostgreSQL database management system of version 11 or later.

Eocortex version	Eocortex components	PostgreSQL installation	
		Windows	Linux
3.4	**Search for objects module**	Automatically, in the course of installing **Eocortex Neural Networks** package with **Search for objects** module	Separate installation of PostgreSQL

Installation and setup under Windows

Installation

The automatic installation of PostgreSQL on Windows performs a check whether PostgreSQL is installed on the server.

If PostgreSQL version 11 or higher is already installed on the server, it will be used by **Eocortex**. The existing PostgreSQL data will be preserved

If PostgreSQL version 10 or lower is installed on the server, it will be updated to version 11. Later on, **Eocortex** will use the updated instance of PostgreSQL. The existing PostgreSQL data will be preserved

In a situation when no PostgreSQL is found on the server, it will be installed from the installer of the **Eocortex Neural Networks** package. In this case, the user will be prompted to select the path for allocating PostgreSQL data. This installation option will create a PostgreSQL user named **postgres** with the password **sysdba**.

Setup

By default, a user named **postgres** with a password **sysdba** is used to connect to PostgreSQL from **Eocortex**. In the case when it is required to use other user credentials to connect, the changes must be made to the PostgreSQL connection settings.

PostgreSQL connection settings are stored in the configuration file **C:\ProgramData\eocortexServerConfig\ArchiveSystem.xml**. An example of such settings is shown below.

```
<PostgreSqlConfig>
    <Ip>127.0.0.1</Ip>
    <Port>5432</Port>
    <User>postgres</User>
    <Password>12kdwp9</Password>
</PostgreSqlConfig>
```

After PostgreSQL is removed from the operating system, usernames and passwords are saved in the folder where the data is located. If PostgreSQL is installed on the server again later, the saved users and

passwords will be restored. This can lead to the need to reconfigure passwords, either in PostgreSQL or in the **ArchiveSystem.xml** file.

Installation and setup under Linux

Installation

⚠ CentOS 7 is not supported because this distribution kit does not support the required version of PostgreSQL.

Below are the options for installing PostgreSQL on a server operating under Linux.

Option 1. Install version 11 of PostgreSQL according to the instructions posted on the PostgreSQL web site.

Option 2. If the server has internet access, execute the following command:

```
sudo apt-get install postgresql-11
```

Option 3. If the server has no internet access, it is required to download the **postgresql-11** package and its dependent components from the internet first and then install the package and the dependent components on the server.

Setup

After installing PostgreSQL, it is required to set a password for the user **postgres**. To do this, the following commands need to be run:

```
sudo -i -u postgres
 psql
 ALTER USER CURRENT_USER PASSWORD 'masterkey';
 \q
```

Video analytics

Abandoned object detection module

The **Abandoned object detection module** is intended for finding objects that have stayed in the field of view of the camera without moving for the time that exceeds the preset value.

When an abandoned object is detected, the corresponding alarm is generated and the object becomes highlighted in the frame. It is possible to set a user action scenario for this alarm. Moreover, all the alarms are stored in the event log, allowing to view all the abandoned objects in the video archive.

The module can be used for locating abandoned objects outside or inside.

Details

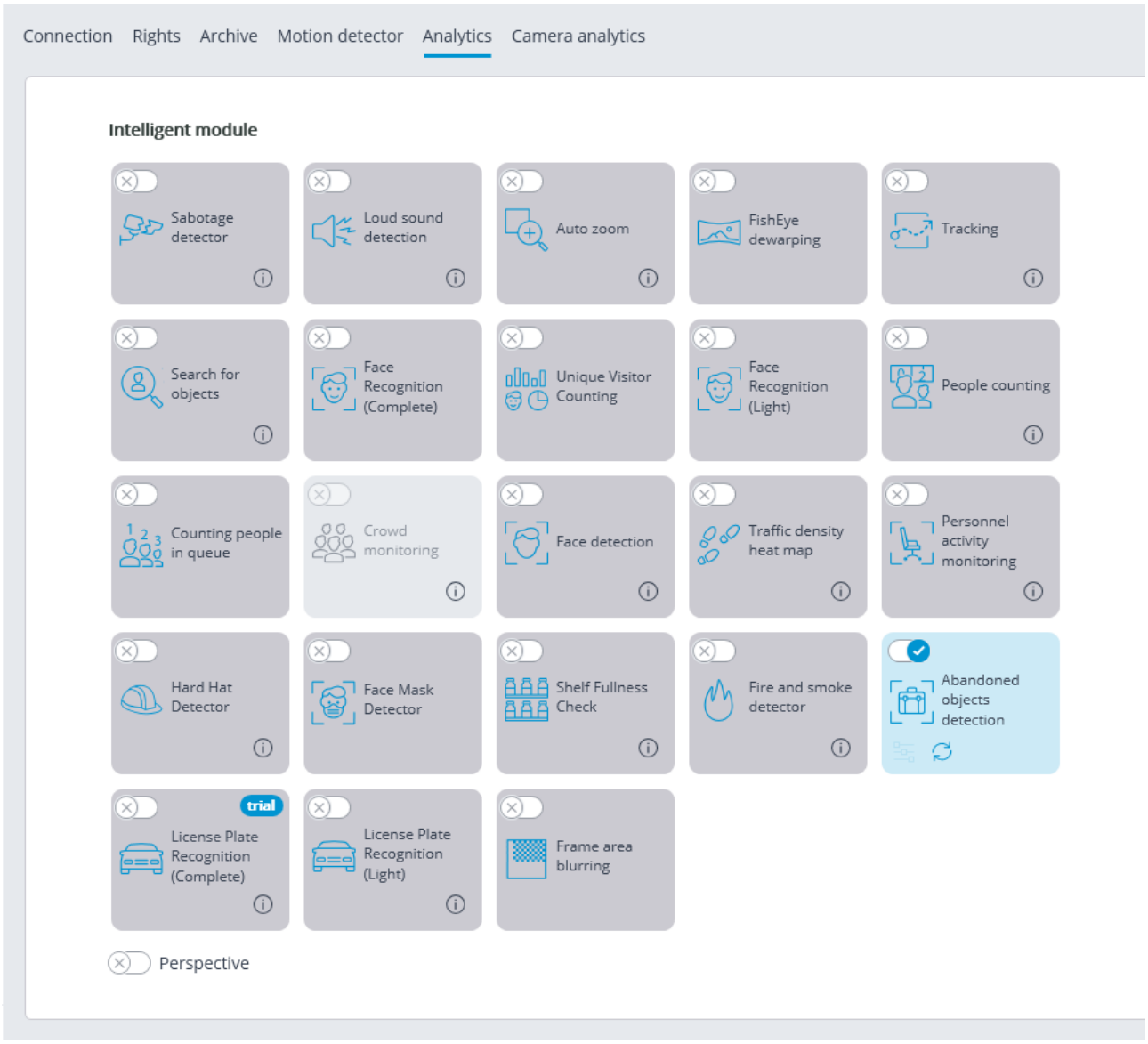
For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the module.

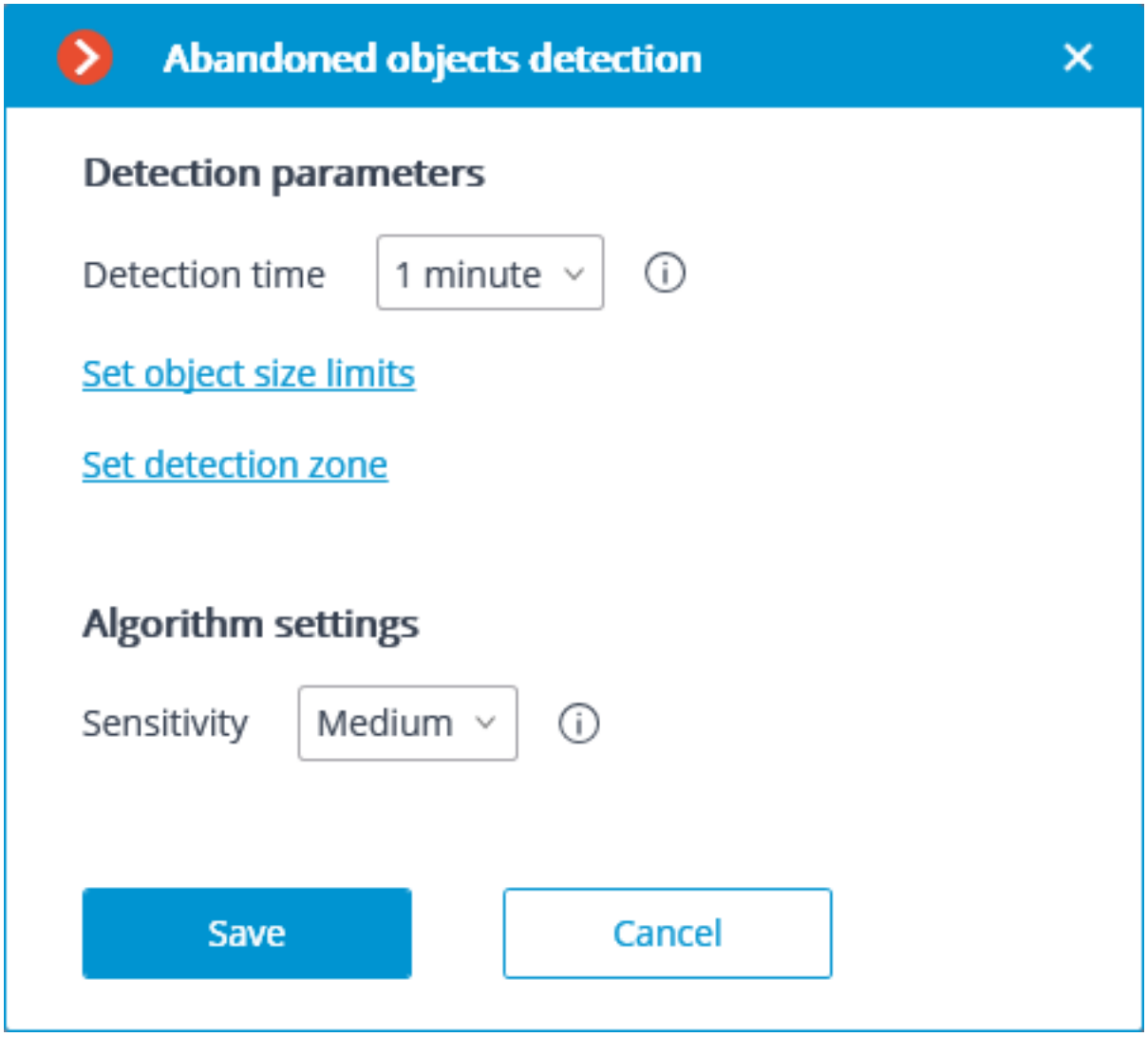
Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the module. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, go to the Analytics tab on the right part of the page and enable the module using the switch, then adjust it pressing the button.

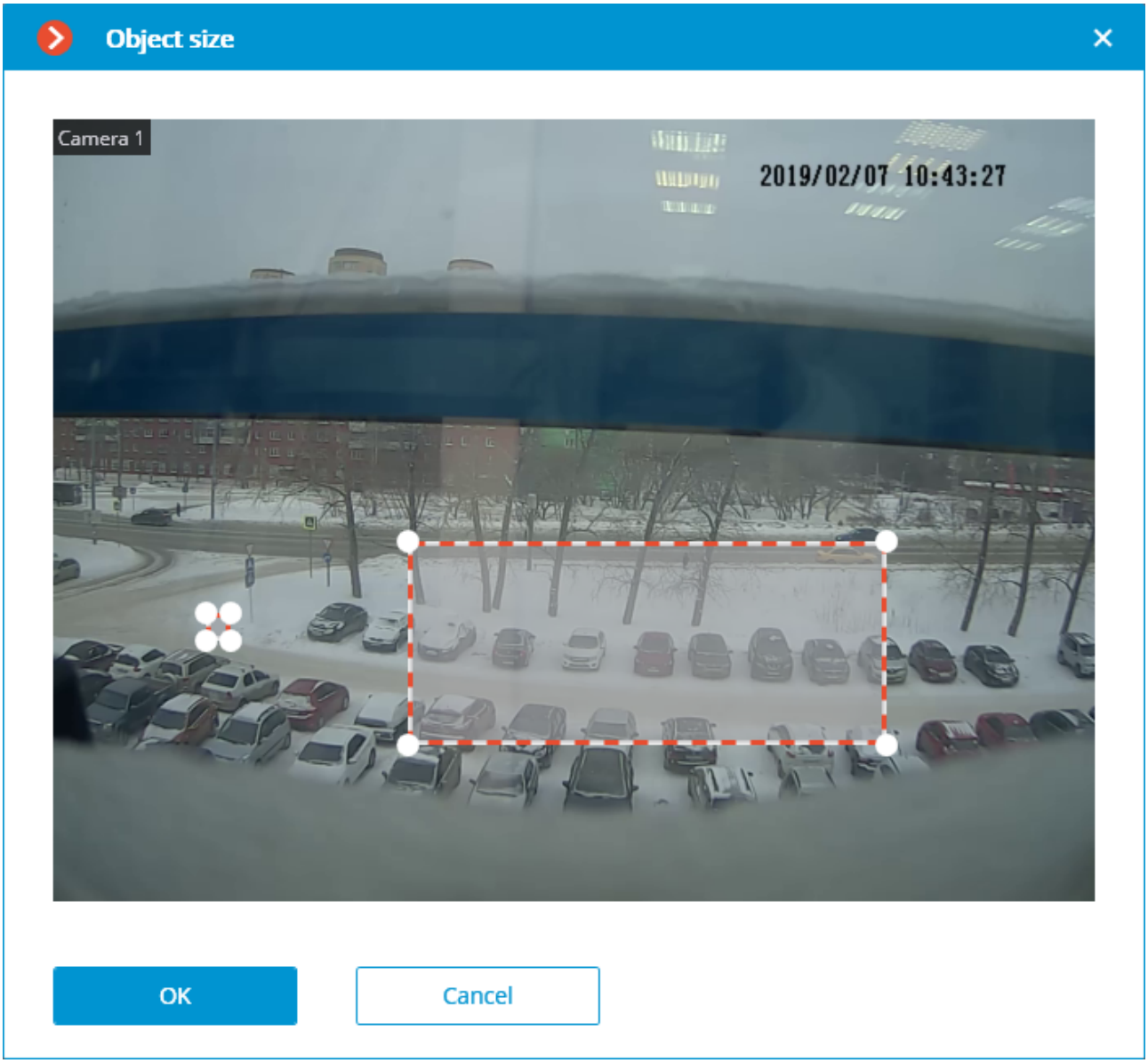

Connection
Rights
Archive
Motion detector
Analytics
Camera analytics
Intelligent module
Sabotage detector
Loud sound detection
Auto zoom
FishEye dewarping
Tracking
Search for objects
Face Recognition (Complete)
Unique Visitor Counting
Face Recognition (Light)
People counting
Counting people in queue
Crowd monitoring
Face detection
Traffic density heat map
Personnel activity monitoring
Hard Hat Detector
Face Mask Detector
Shelf Fullness Check
Fire and smoke detector
Abandoned objects detection
trial
License Plate Recognition (Complete)
License Plate Recognition (Light)
Frame area blurring
Perspective



In the opened window the following settings have to be made:

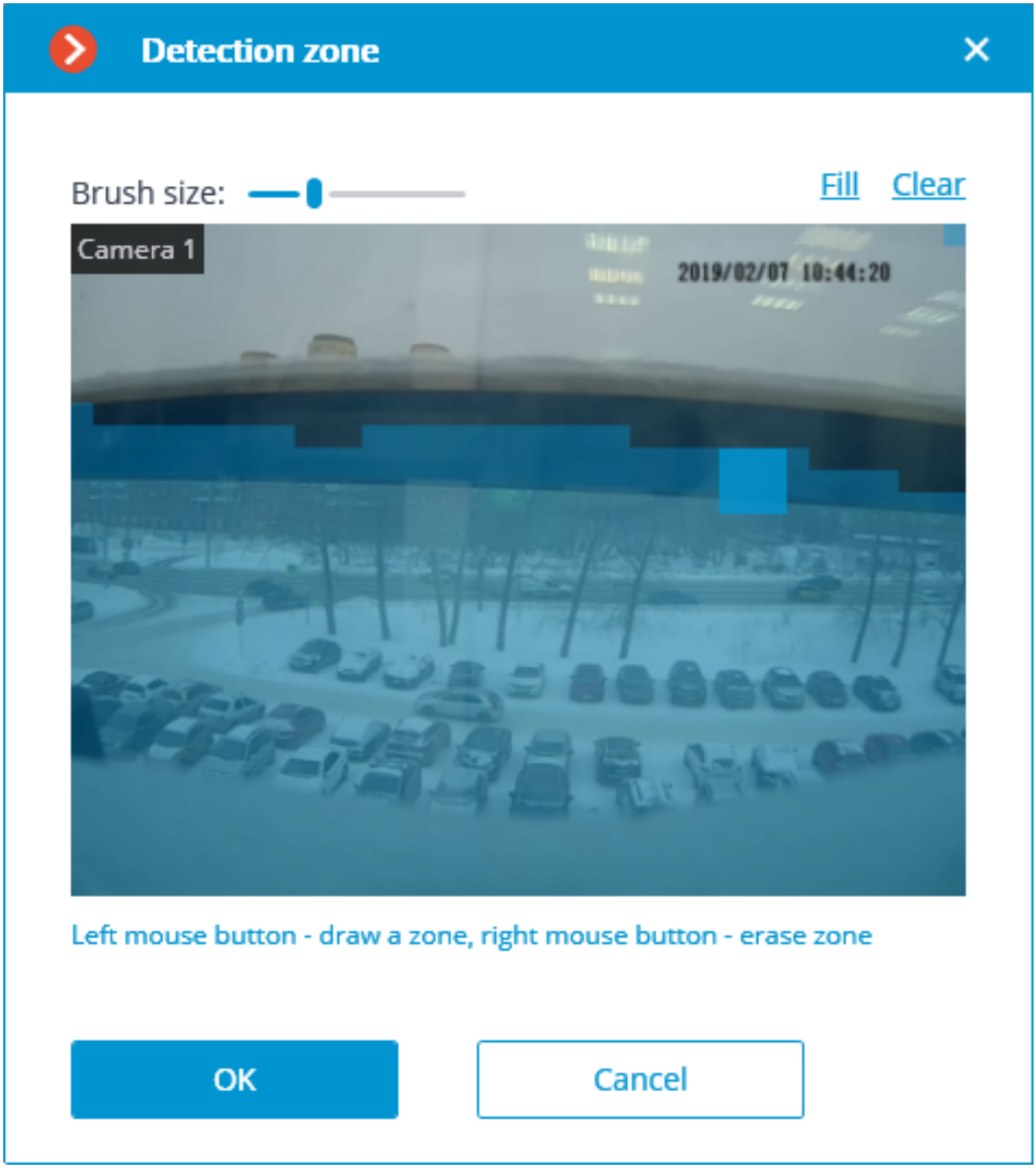
Detection time: the objects that do not move during the time that exceeds the time preset in this window will be considered abandoned. The time from 30 seconds to 10 minutes can be set.

Set object size limits: opens the window where the minimum and maximum sizes of the objects that may be considered abandoned are set.



Set detection zone: opens the window where the abandoned objects detection zone is set.

Control zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.



⚠ The use of the module will start only after the settings are applied.

⚠ After launching or relaunching, the module will need time for learning. During the learning process the objects will not be detected. This period roughly equals the double detection time set in the settings.

⚠ For reducing module learning errors, it is recommended to ensure that during the launch of the video surveillance server there are no moving objects in the frame, and the static background is not blocked by temporary static and slow-moving objects.

Requirements and recommendations

For detecting the abandoned objects, it is required to provide the following conditions:

- Static and reliable camera fixing.
- View from the above, or perspective view from the above.
- Absence of refocusing and changing image sharpness.
- Absence of non-mobile or slow-moving objects in the frame, for example, trees or clerks sitting at their desks. Such objects in the frame may lead to false triggering of the detector. At the same time, the presence of a non-mobile object close to the abandoned object may result in the triggering of the detector since the abandoned object and the non-mobile object may incorporate into one moving area.
- Absence of the light sources slowly changing their position in the frame.

The most favorable conditions are as follows:

- Static background.
- No windows in the frame.
- Small quantity of moving objects.
- Constant lighting; for example, light fixtures in the premises.
- The abandoned objects are not blocked by other objects.
- The abandoned object color differs significantly from the color of the background.
- Absence or small number of the outstanding small-size objects.

Influence of the module's settings:

- Detection zones: if more than a half of the object is in the zone, the object is detected; if not, it is not detected.
- Maximum dimensions: if both dimensions (width and height) are smaller than the set maximum dimensions, the object is detected; if at least one of the dimensions exceeds the set limitations, the object is not detected.
- Minimum dimensions: if both dimensions (width and height) are larger than the set minimum dimensions, the object is detected; if a t least one of the dimensions is smaller than the set limitations, the object is not detected.
- If one of the dimensions of the object is close to the set limitations, the probability of the detector's triggering decreases.

  Since the current version of the module cannot determine the shifts of the objects (insignificant changes of the object's position), such shifts will result in the triggering of the detector.

  There are no more particular requirements to the frame's parameters or the software motion detector's settings.

Auto zoom

The **Auto zoom** module serves to display a separate zoomed-in area of the frame with the moving objects in the **Eocortex Client** application.

Details

⚠ The **Auto zoom**, **Fisheye dewarping module** and **Frame area blurring** modules are mutually exclusive, meaning that only one of these modules can be used on a camera at a given moment.

Use

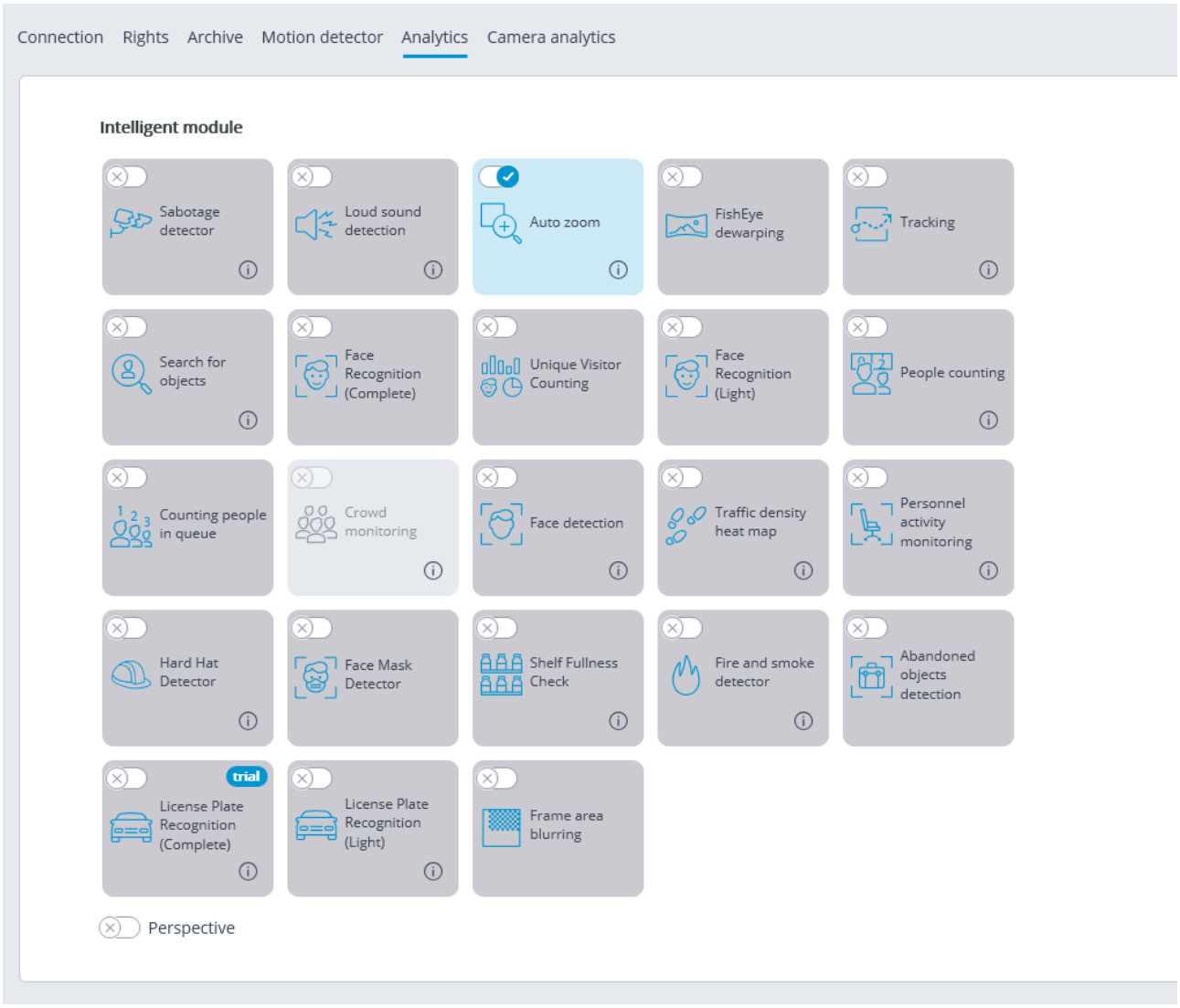
ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

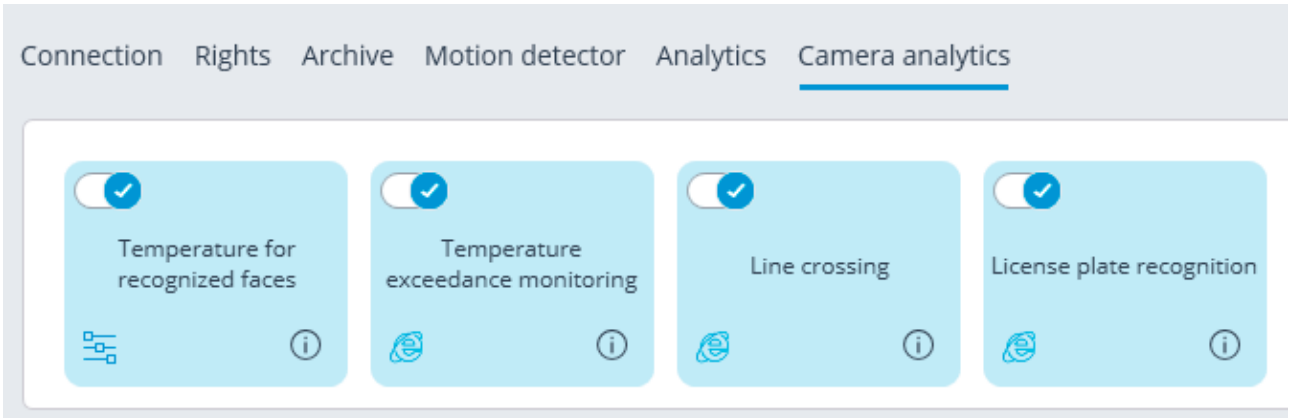
After that, it is required to switch to the Analytics tab and enable the module using the toggle.



⚠ The use of the module will start only after the settings are applied.

Camera analytics

The video analytics built into a camera can be set up in the camera settings on the **Camera analytics** tab of the **Eocortex Configurator** application.



The video analytics is enabled using the toggle switch .

The button opens the prompt for video analytics.

If the analytics is set up in the **Eocortex Configurator** application, the settings window of this video analytics can be opened upon clicking on the button .

If the analytics is set up directly on the camera, the camera's web interface can be opened by clicking the button .

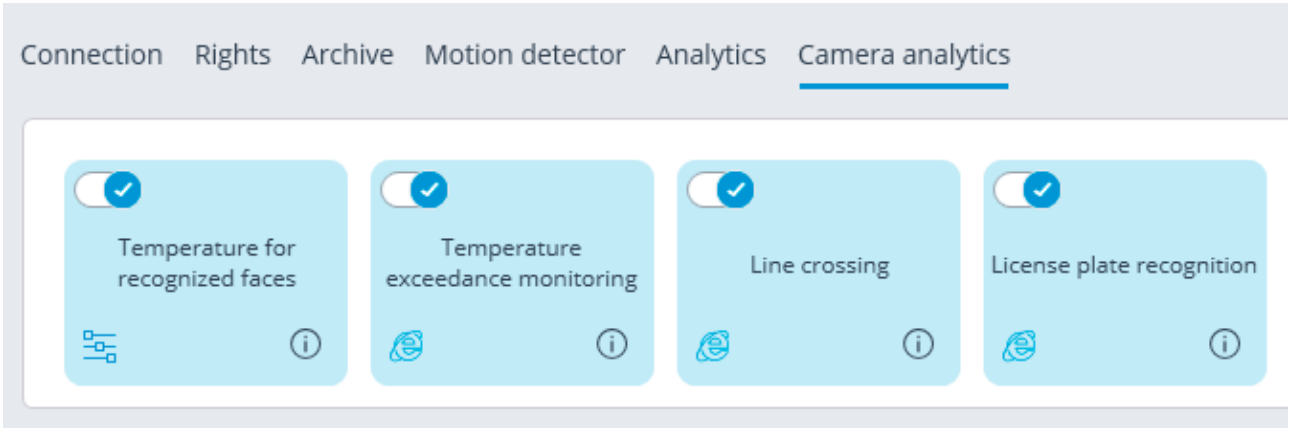
Temperature for recognized faces

Description

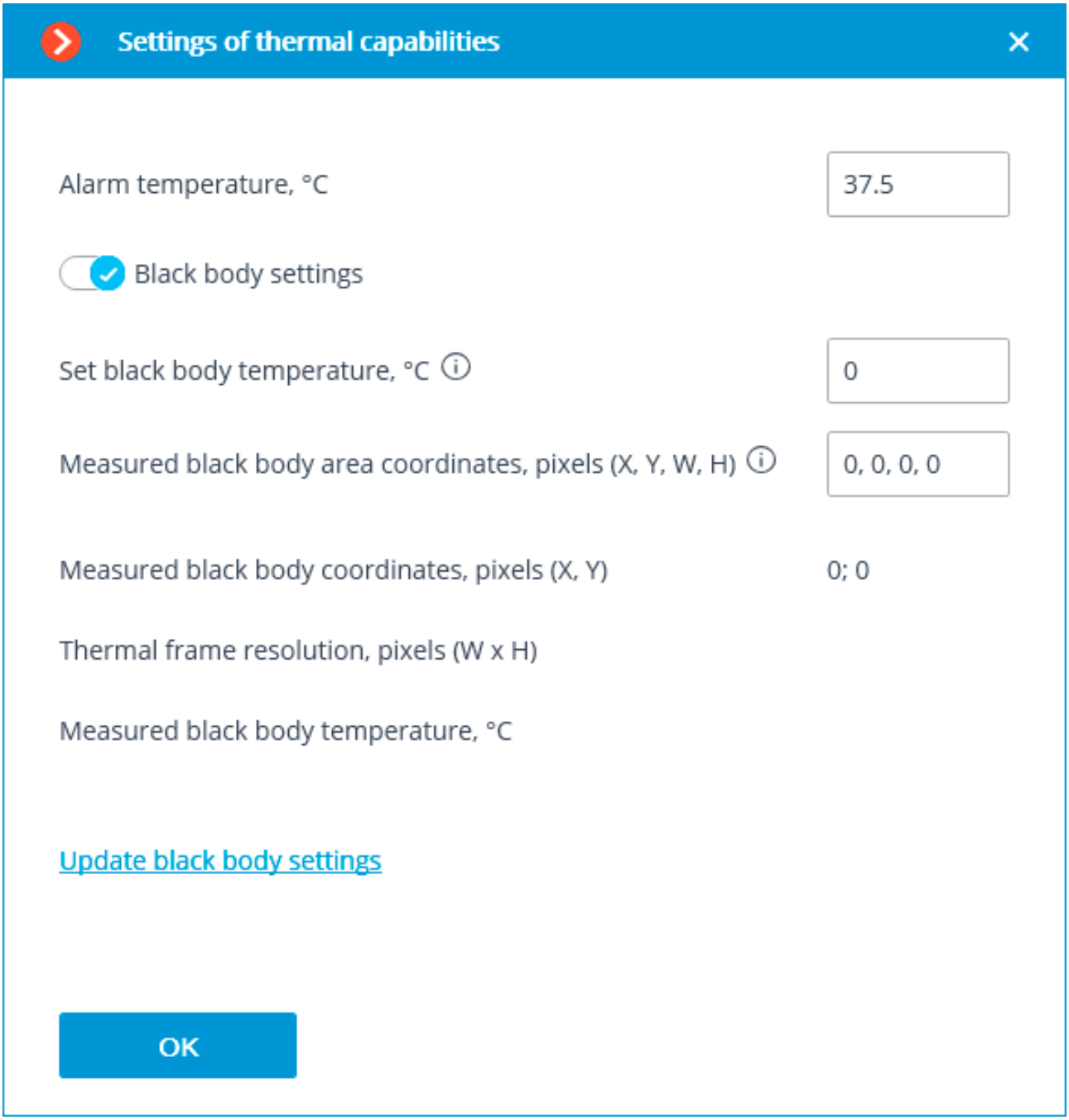
The **Eocortex** server receives the temperature of a person from the camera. If the automatic calibration using a black body calibrator has been configured, the resulting temperature is corrected according to the specified settings.

Setup

To enable support of the **Temperature for recognized faces** video analytics used on a thermal camera, it is required to toggle the switch on the **Camera analytics** tab in the camera settings in the **Eocortex Configurator** application.



To open the analytics settings, it is required to press .



Alarm temperature, °C: If this preset temperature threshold is reached or exceeded, an alarm will be trigged.

If a black body calibrator is used to automatically calibrate the thermal camera, it can be configured by enabling the **Black body settings** option and setting the following parameters:

Temperature set on black body.: Set black body temperature, °C.

Measured black body area coordinates, pixels (X, Y, W, H): Optional. Frame area where the search for black body will be performed by the highest temperature. 0,0, _, _ - upper left corner coordinates.

In order to update the black body settings on the server, it is required to click the **Update black body settings** link. In this case, the fields **Measured black body coordinates, pixels (X, Y)**, **Thermal frame resolution, pixels (W x H)** and **Measured black body temperature, °C** will display data transmitted by the camera.

Use

To set up automatic calibration, it is required to follow the steps below.

1. Enter the temperature set on the black body calibrator in the **Temperature set on black body.** field. If a value of zero **0** is entered, no automatic temperature compensation will be performed.

2. Make sure that there are no people in the frame and click the **Update black body settings** link.
3. If the coordinates or the temperature of the black body do not match the actual values, adjust the area of the black body.
4. Press **OK** and apply the settings.

Requirements and recommendations

Ideally, there should be no objects in the frame whose temperature is higher than that of a person.

Since the highest temperature on the face is usually found in the inner corner of the eye, in the cases described below the temperature of a person may be determined as being lower than in reality:

- if the face of a person is tilted and the inner corner of the eye is not visible to the camera;
- if a person is far from the camera and the inner corner of the eye in the frame is too small;
- if a person is wearing glasses, the temperature of the inner corners of their eyes cannot be determined.

If a person is too close to the camera, the thermal camera may pick up hot objects (e.g., incandescent lamps) behind the person since the thermal camera and the video camera are at a distance between them.

The following can be done to improve the accuracy of the measurements:

- make the thermal imaging background for cameras more or less uniform;
- remove any objects with the temperature that exceeds the human temperature from the thermal imaging background (e.g., by bringing the camera closer or moving it);
- move the black body so that it is as close to the detected person as possible.

By changing the value of **Temperature set on black body.**, it is possible to compensate for the temperature detection in the current conditions.

Troubleshooting

If the displayed temperature does not approach the actual temperature on the black body or the coordinates are much displaced, the area should be adjusted (in particular, it will be required to remove all objects whose temperature exceeds the black body temperature) and update the settings.

Crowd counting module

The **Crowd counting module** is intended to count people in crowds and alert the operator in case of the preset limits are exceeded.

Capabilities of the module

- Setting up to sex zones in the frame and setting two quantitative criteria (levels) for each zone: the level that demands attention and the maximum allowable level.
- Counting of the number of people in each zone.
- Alarm generation in case of exceedance of each level in the zone.
- Creation of reports with the number of people in each of the zones.
- Real-time display of the number of people in each zone.

ⓘ Estimation of the number of people is performed analytically, with the help of the special algorithms, so the estimated number of people may differ from their actual quantity.

Details

For correct operation of the module it is imperative to properly place and set up the camera, enable and adjust the software motion detector, perspective and the module itself.

Use

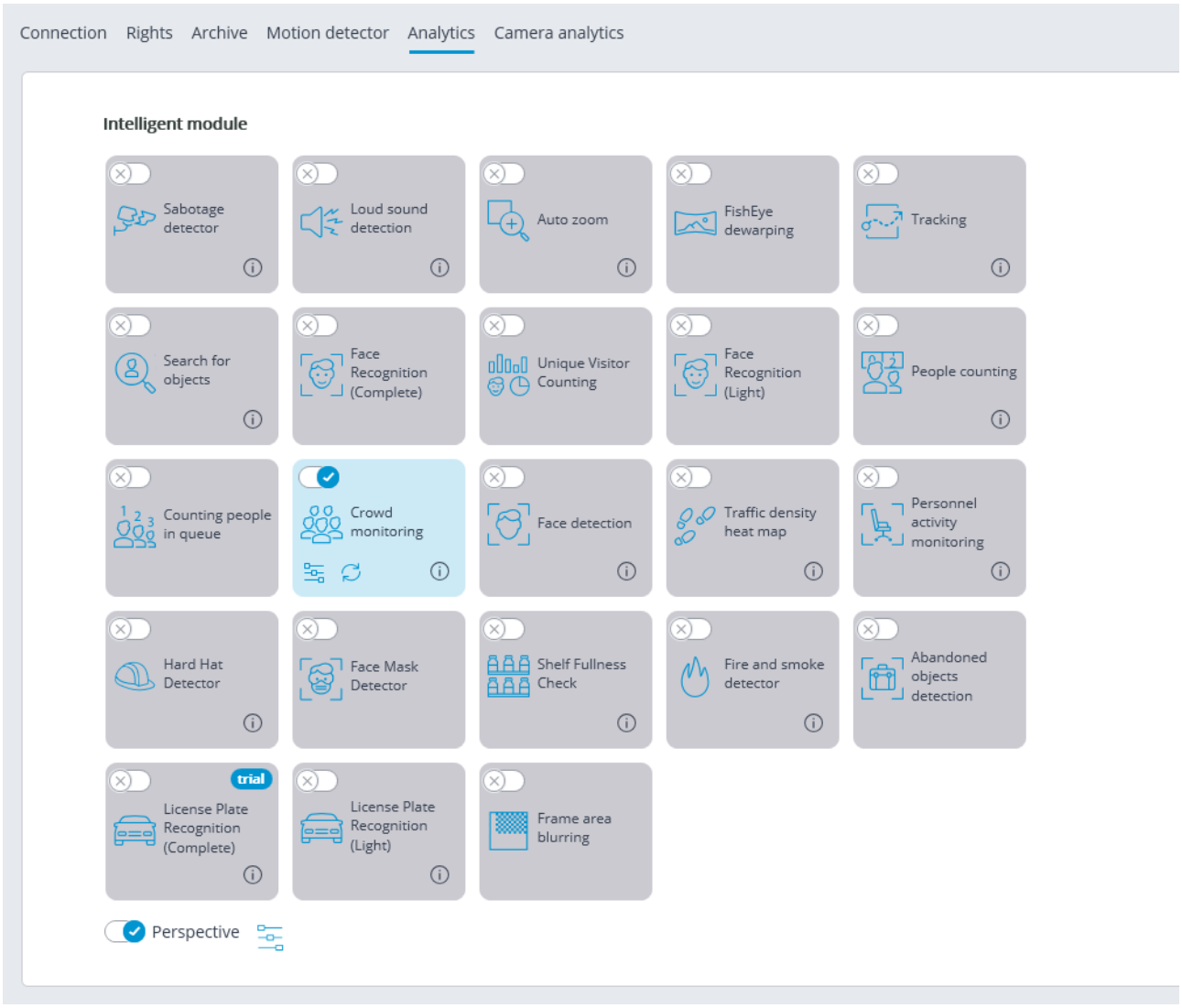
ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

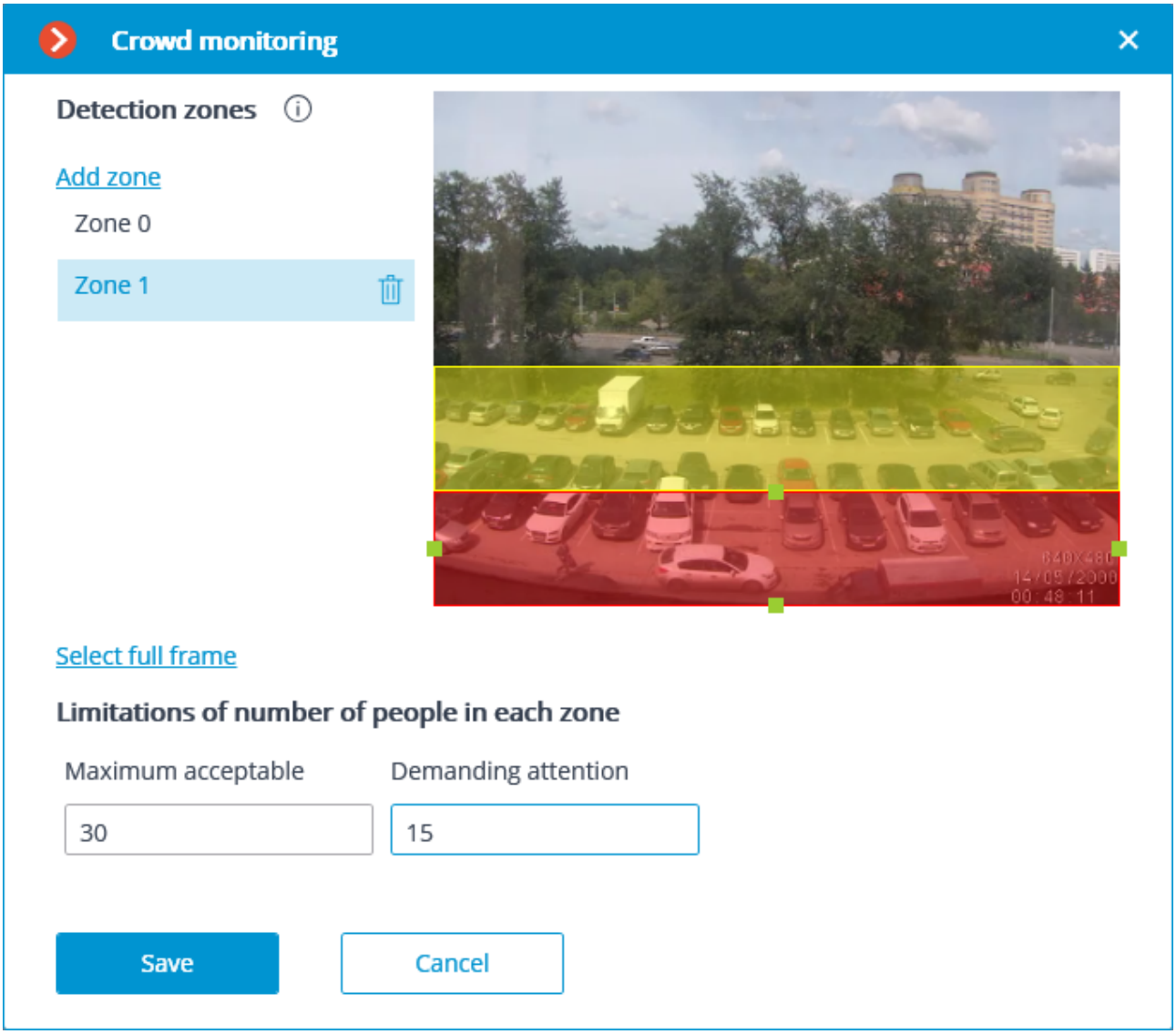
Module setup

⚠ Before using the module, it is required to enable and set up the perspective.

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module

using the switch, then adjust it pressing the button.





In the opened window, set and adjust up to six detection zones.

Control zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.

⚠ To avoid counting errors at the zone borders it is recommended, wherever practical, to use the smallest possible number of zones.

It makes sense to use several zones in the following situations:

- If there are an automobile road and a pedestrian zone in the frame. In this case it is required to limit the controlled area to the pedestrian zone.
- If there is a rest area in the frame that is crossed by the pedestrian way with heavy foot traffic. In case it is necessary to prevent people from flocking in the recreational area, the controlled area shall be limited to the rest area.

It is needed to indicate the limit of the number of people for each zone: **Maximum permissible** and **Demanding attention**.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

When installing the camera, it is recommended to meet the following requirements:

- Heads and shoulders of the people to be counted must be in full view.
- Minimum head size is 1/30 of the largest dimension of the zone. For example, for the 1024x640 zone the size of the head must be no less than 1024/30 = 34 pixels.

There are no specific requirements regarding the framerate and video stream format.

Face detection

The **Face detection** module finds faces in the frame allowing to watch them in the Eocortex Client application both in real time and in the archive. It is possible to set the scenarios to pe performed by the events of face detection, as well as save the frames with the detected faces to disc or send them by email.

Details

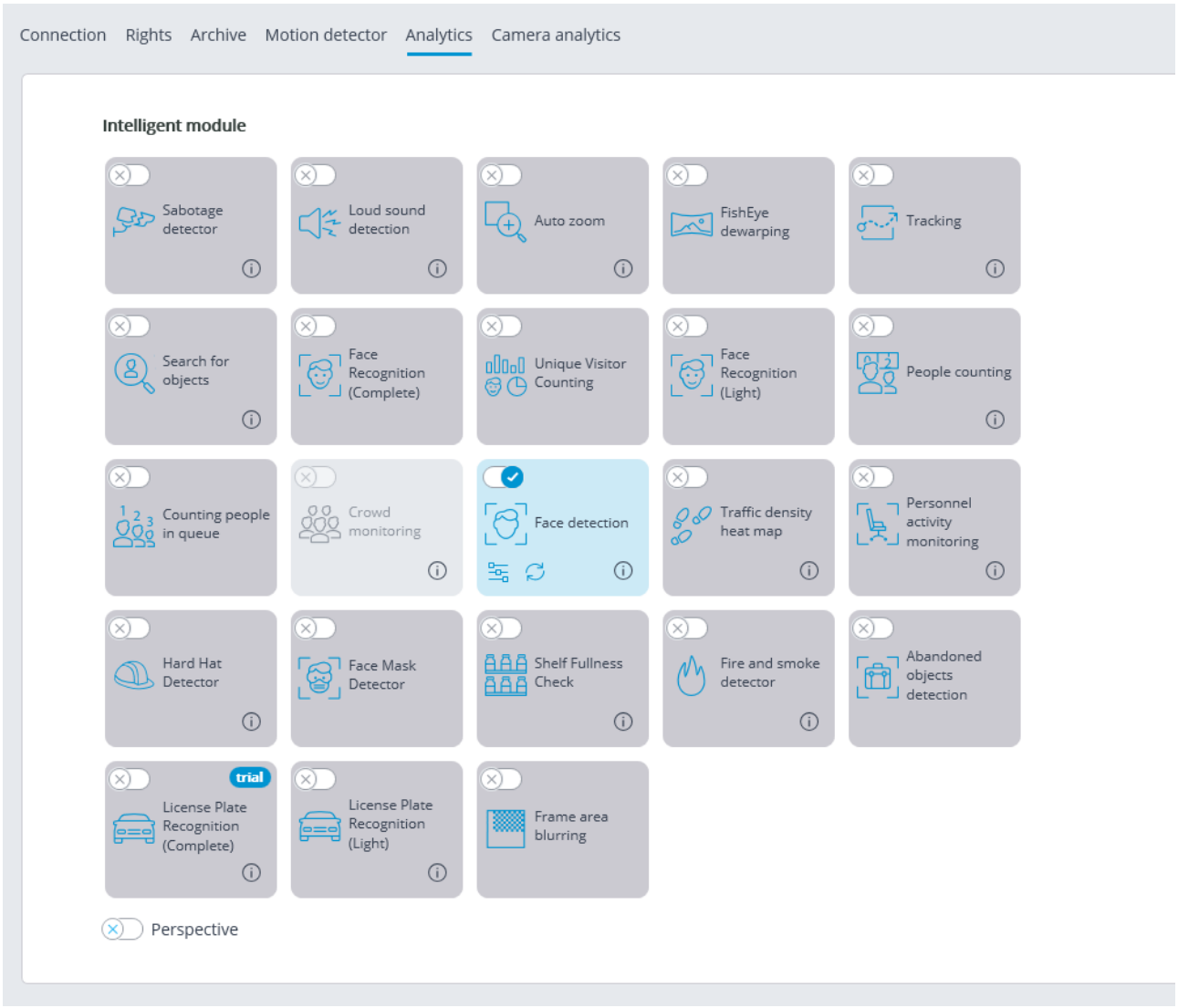
For the correct operation of the module it is required to set up the software motion detector. There are no specific requirements to the image.

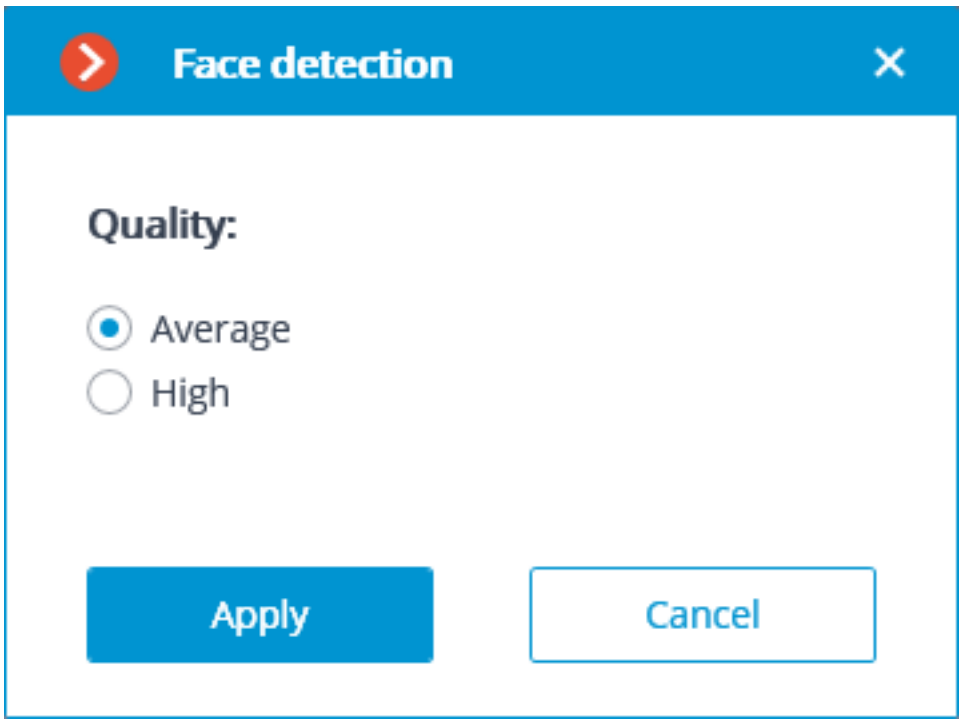
Use

ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.


Connection
Rights
Archive
Motion detector
Analytics
Camera analytics
Intelligent module
Sabotage detector
Loud sound detection
Auto zoom
FishEye dewarping
Tracking
Search for objects
Face Recognition (Complete)
Unique Visitor Counting
Face Recognition (Light)
People counting
Counting people in queue
Crowd monitoring
Face detection
Traffic density heat map
Personnel activity monitoring
Hard Hat Detector
Face Mask Detector
Shelf Fullness Check
Fire and smoke detector
Abandoned objects detection
trial
License Plate Recognition (Complete)
License Plate Recognition (Light)
Frame area blurring
Perspective


Face detection
Quality:
Average
High
Apply
Cancel

In the settings window it is required to set the module efficiency. This parameter influences the computer system resources: processor load and RAM usage. High efficiency of the module operation consumes more system resources that the medium efficiency.

⚠ The use of the module will start only after the settings are applied.

Face Mask Detector

The **Face Mask Detector** module is designed to detect people not wearing medical face masks in the frame. When such persons are detected, the module highlights them in the frame with a square in real time and enters the event in the event log.

Details

For the module to work properly, it is necessary to correctly position and configure the camera, install the **Eocortex Neural Networks** package, and enable and configure the module.

Use

ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

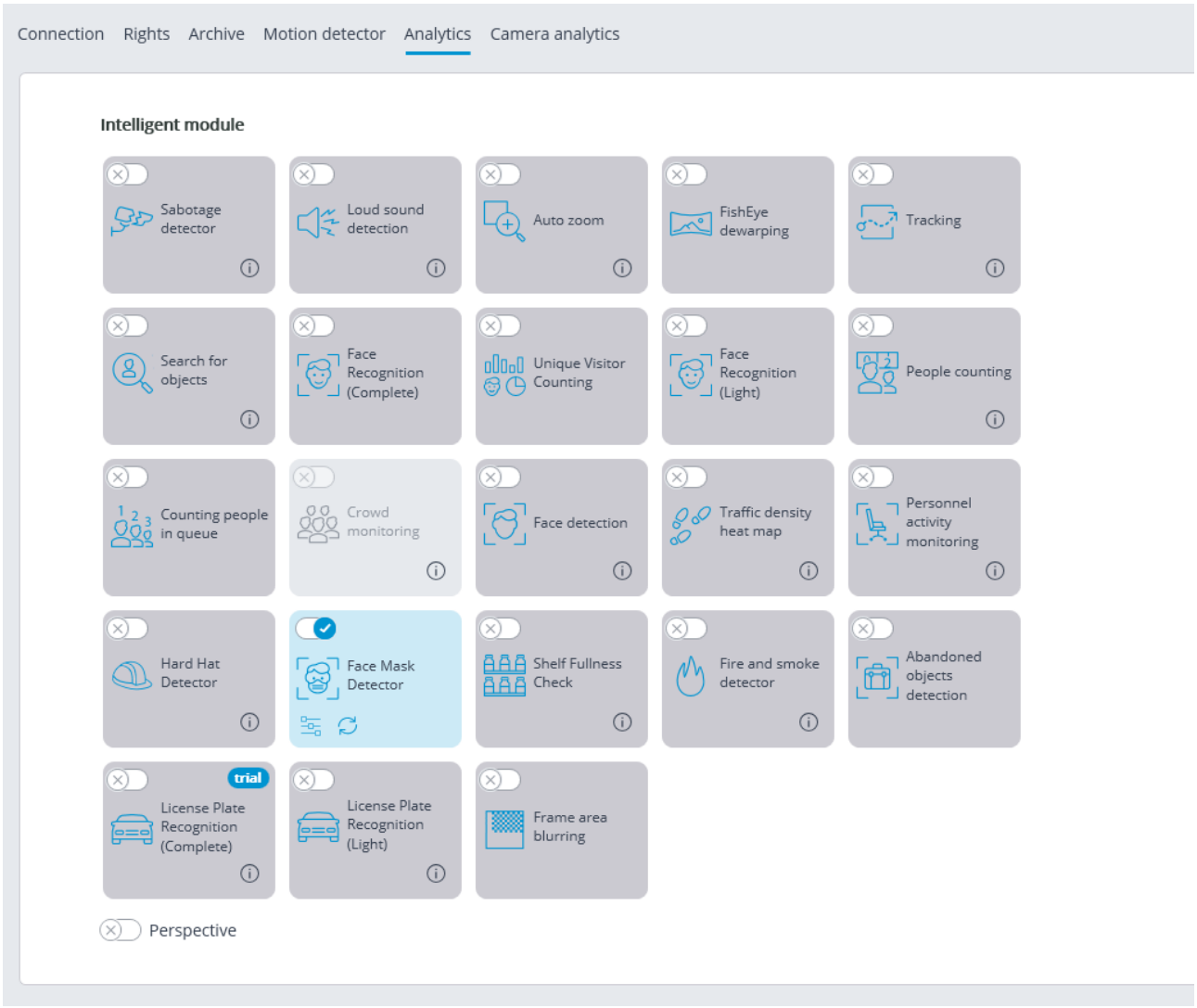
Module setup

⚠ Before using the module, it is required to install the Eocortex Neural Networks software package.

To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

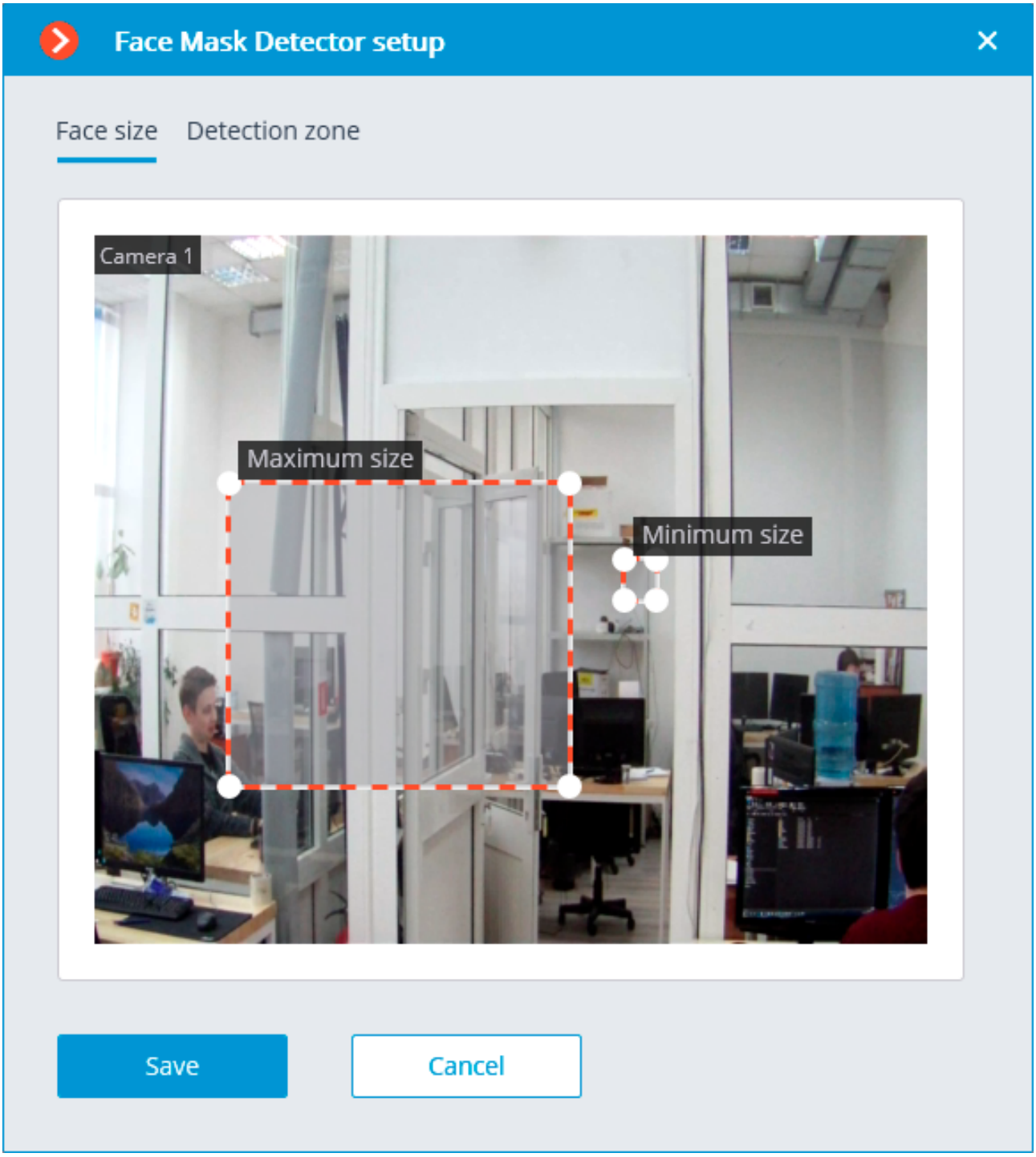
After that, it is required to switch to the Analytics tab and enable the module using the toggle.



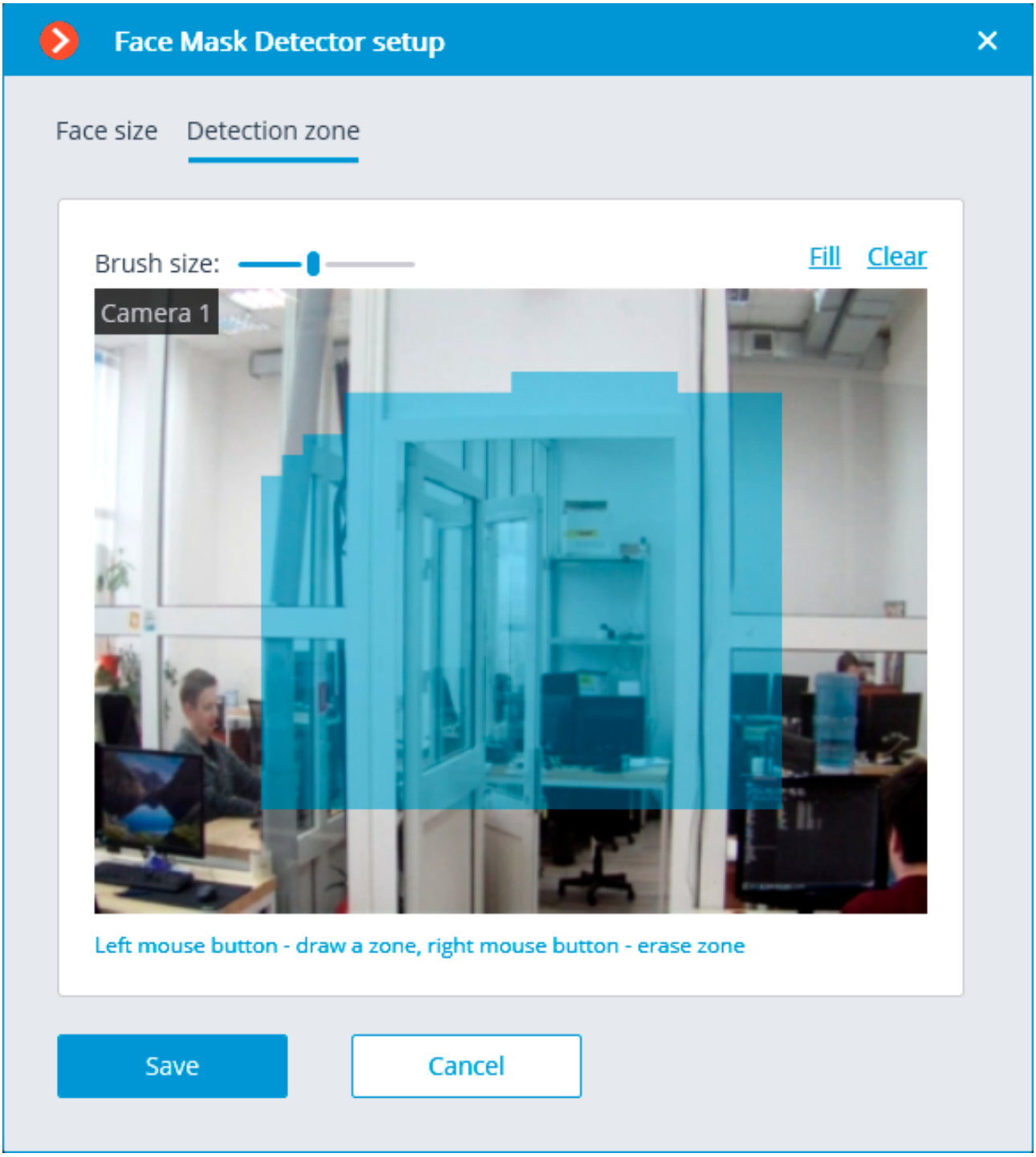
The button opens the module setup window.

In the opened window, it is required to make the appropriate settings in the corresponding tabs.

Face size: the minimum and maximum sizes of the faces of the people to be monitored.



Detection zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.



⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Detection

The module is capable of detecting up to ten people not wearing face masks in the frame at the same time (if allowed by the computing capacity).

The module does not recognize (identify) faces, it cannot tell one person from the other or compare a person's face with the faces from a database; it only finds people without face masks in the frame.

When an infringement event (no mask) is detected, the module briefly highlights the person's face with a red square in the client application and creates a corresponding event in the event log. The repeated detection of the infringement by the same person will become possible only after the disappearance of this person from the frame for three seconds minimum (e.g. when the person leaves the frame or covers his/her face completely).

Hardware and software

The following equipment is required to use this neural network-based module:

- A processor with AVX instructions support;
- An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model.

The neural network works with the 64-bit version of **Eocortex** only.

Module settings

Setting too small minimum face size may lead to false positives due to low image quality.

The shape of the detection area can be arbitrary.

Masks

The examples of supported face masks:

The supported colors are as follows: white, black, yellow, different tones of green.

The face covered by a hand or a scarf will trigger the detector unless the area of a nose is covered.

Video Stream

Optimum resolution for the module's operation: HD or FullHD.

Framerate: 15 fps or more.

Illumination and image quality

Illumination of faces in the frame must be uniform and constant.

If the camera is installed opposite a bright source of light (sun behind the entrance door, etc.), it is required to adjust the exposure or brightness in such a way that the face in the frame is light. The overexposed background is acceptable.

The image quality must be medium or better. Significant compression artefacts are not acceptable.

No blurring of moving people's faces is allowed.

The image must be in color.

Scene and camera position

The faces must be fully seen in the frame.

There must be no mirror surfaces giving reflections in the frame (glass, mirrors, etc.).

Strong lateral illumination (e.g. sunlight from the window) resulting in the overexposure of one part of the face is not acceptable.

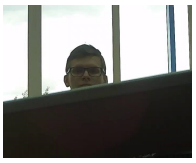
The camera may be placed above the face level, directly facing the people to be recognized. In such a case, the camera elevation angle must not exceed 35°.

The distance between the pupils of a face to be recognized must be at least 30 pixels.

The camera must directly face the people to be recognized. The camera angle between the face direction and the lens axis must not exceed 30°.

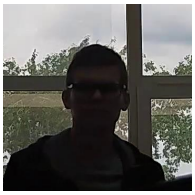
Examples of non-compliance with the requirements

Covering (overlapping):



✓ X

Face illumination:



✓ X X

Blurring of face in motion:

✓ X

Unacceptable distance between pupils:

30 pixels 15 pixels

✓ X

Video stream quality:

✓ X

Camera tilt:

35° 50° 70°

✓ ! X

Lateral light source:

✓ X

Reflecting surfaces:

✓ X

Horizontal turn of camera from face plane:

0° 15° 30° 45° 60° 90°

✓ ✓ ✓ ! X X

Black and white image (night mode):

✓ X

Recommended camera settings

Quality: highest.

Bitrate: maximum possible.

Profile: maximum possible.

I-frame interval (GOV): 50.

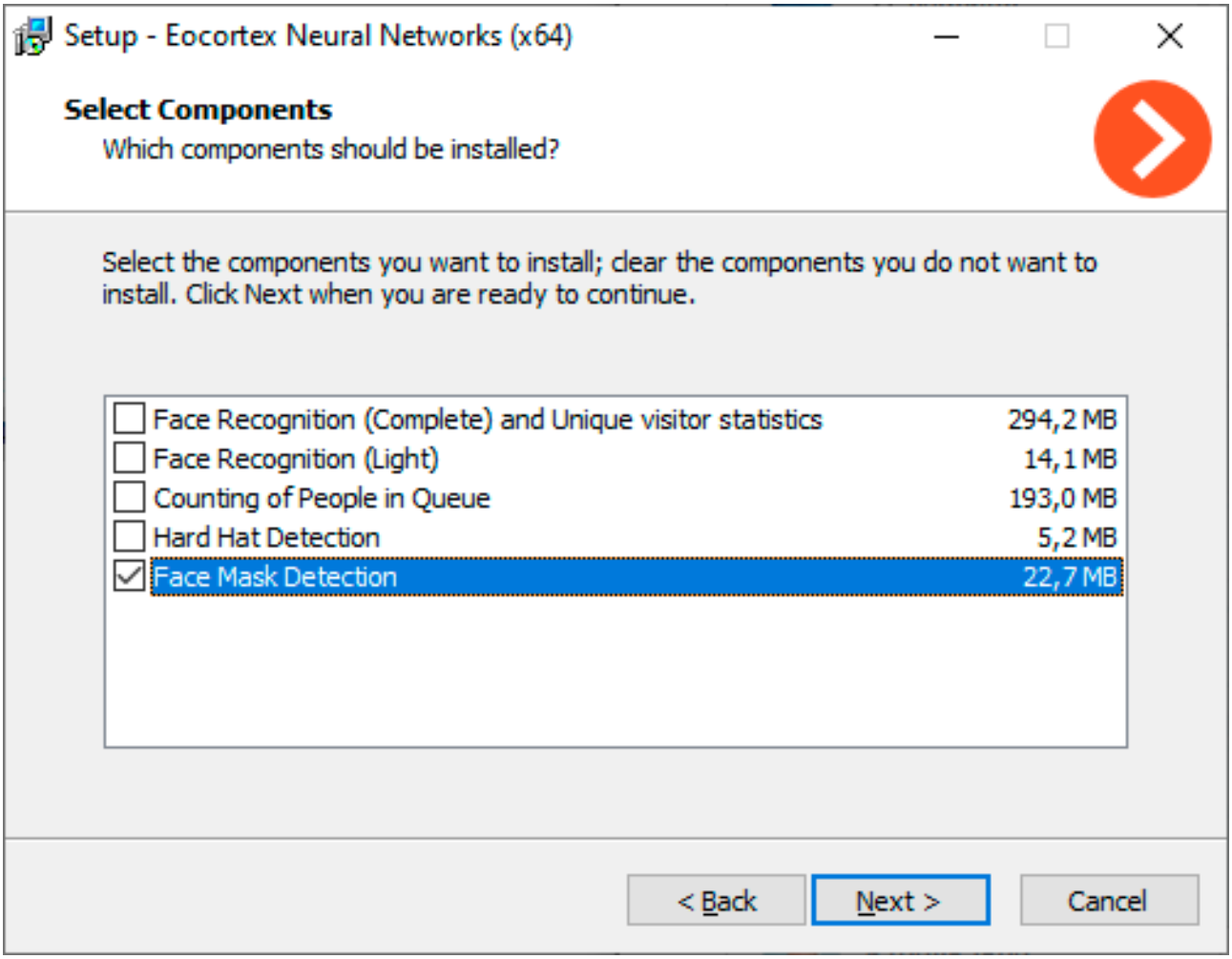
Stream anti-aliasing: off.

Exposure and brightness: ensuring that the face is clearly seen (if the camera faces the light source, the overexposed background is acceptable).

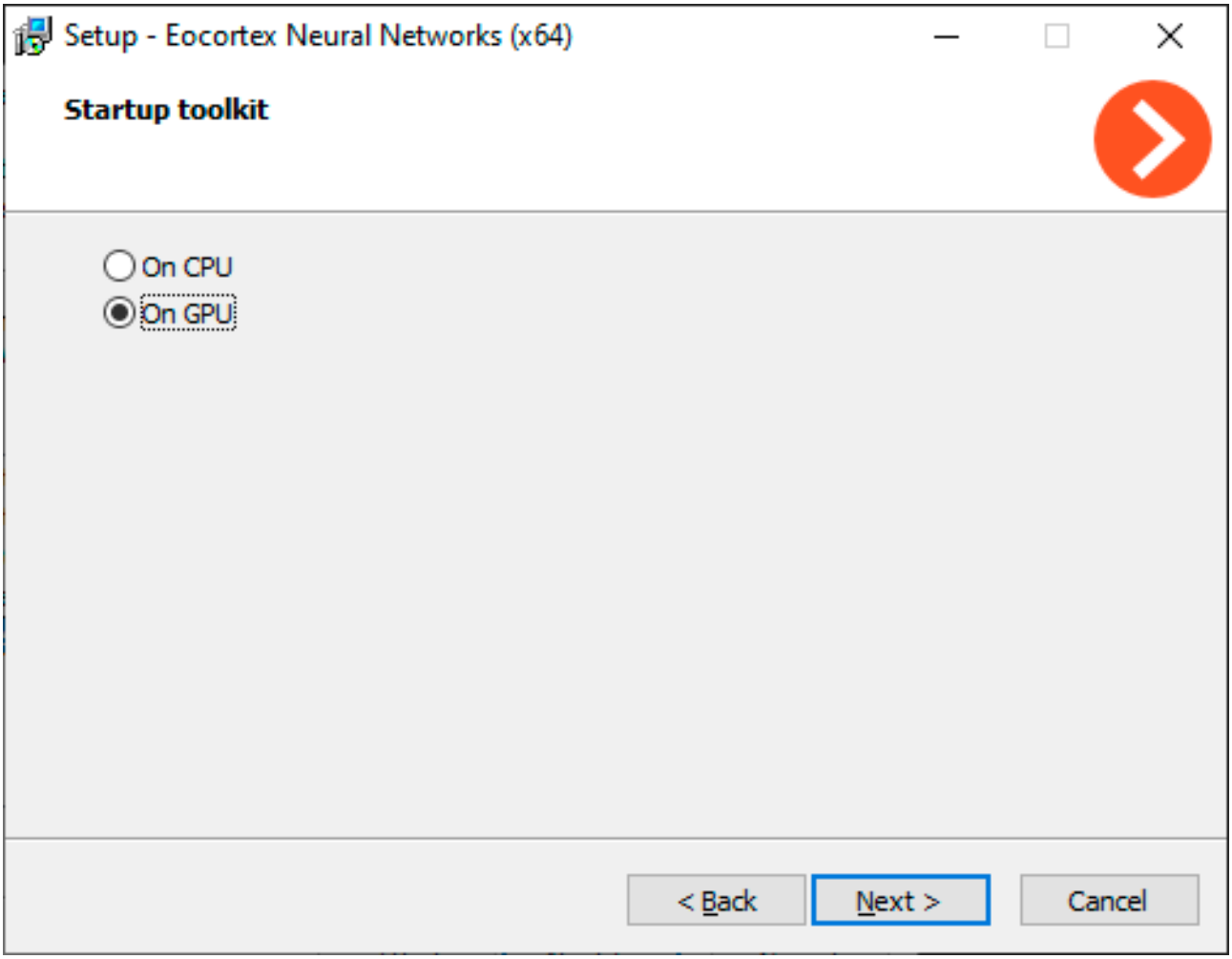
Shutter speed: must not be too low (more than 1/50), because in such a case the blurring of moving objects will occur).

⚠ Before using the module, it is required to install the Eocortex Neural Networks software package.

In the process of installation of **Eocortex Neural Networks** it is required to select the **Face Mask Detector** component.



It is recommended to use video cards (GPUs) for the optimum operation of the module.



Face recognition

Eocortex allows to use several modules that perform face recognition using a database: **Face Recognition (Complete)**, **Face Recognition (Light)** and **Unique Visitor Counting**.

However, it is not possible to use **Face Recognition (Light)** module with otherface recognition modules on one camera at the same time.

The modules ensure high recognition accuracy and can be used together with access control systems at the facilities with high security requirements, for example, at banks or restricted access facilities. Another important use of the modules can be automatic identification of the hotel guests, restaurant customers, and the visitors of other similar enterprises.

Comparison of modules

Capabilities	Versions		
	Face Recognition (Light)	Face Recognition (Complete)	Unique Visitor Counting
Identification of faces contained in a database	✓	✓	—
Identification of people wearing sunglasses, headgear, etc.	—	✓	✓
Relative recognition accuracy	Medium	High	—
Number of people in database	Up to 500	Unlimited	—
Determination of sex and age	—	✓	✓
Recognition of emotions	—	✓	✓
Recognition of faces in archive	—	✓	—
Reports regarding faces	✓	✓	Detection only
Reports regarding unique visitors	—	—	✓
Receiving reports via API	✓	✓	✓
Usage of high-performance video card (GPU)	+	✓	✓

Capabilities	Versions		
	Face Recognition (Light)	Face Recognition (Complete)	Unique Visitor Counting
Usage of several video cards (GPUs)	—	✓	✓

Legend: ✓ Yes; — No; + Optionally.

The following emotion recognition results are available: **Positive**, **Neutral**, **Negative** and **Unknown**.

Details

Face Recognition (Complete) and **Unique Visitor Counting** modules use all the suitable video cards installed on the server. Every camera with the recognition module enabled is assigned to one of the cards.

When the number of cameras with the recognition modules enabled exceeds the quantity of video cards used, the cameras will be uniformly distributed among the video cards, as applicable, without considering the characteristics of the video streams coming from the cameras and the performance of the video cards (i.e. an equal number of cameras will be assigned to each video card, wherever possible).

Unique Visitor Counting module is intended for generating unique visitor counting reports based on detecting and recognizing faces. It is possible to exclude faces pertaining to certain groups from the counting, for example, to avoid counting employees.

The **Face Recognition (Complete)**, **Face Recognition (Light)** and **Unique Visitor Counting** modules determine the uniqueness of a face on the basis of the set of features jointly called the "index". The modules do not use individual points (dots) of faces when determining the index; instead, the image with the size of 100x100 pixels (using the "points" terminology, a face is recognized using approximately 10 thousand points). For each face located, an entry is created in the archive of the server where this face was found, even if the face has not been explicitly entered into the database. Subsequently, these events will be available for viewing in the event archive. These modules are capable of recognizing several faces present in the frame at the same time (10 or more, if the computing capacity allows it).

The **Face Recognition (Complete)** module can identify masked faces with high accuracy; provided that the database contains samples of these persons without a mask. Also, this module can recognize turned faces; despite the fact that only images of faces looking directly into the camera are entered into the database.

The face database may be located on the same server where the recognition is being performed, or, alternatively, on another server of a unified multiserver video surveillance system.

Each entry in the face database contains the following:

- One or more images (screenshots and/or photographs) of a person's face;
- Surname, first name, patronymic of a person that are entered manually and are optional;
- Additional information (optional text box);
- Group affiliation (optional parameter).

The uniqueness of the entries of the database is determined by the face index. Thus, the database can contain several entries with the coincident surname, first name and patronymic (including the empty field).

It is possible to work with the face database from the **Eocortex Client** application, or using the API.

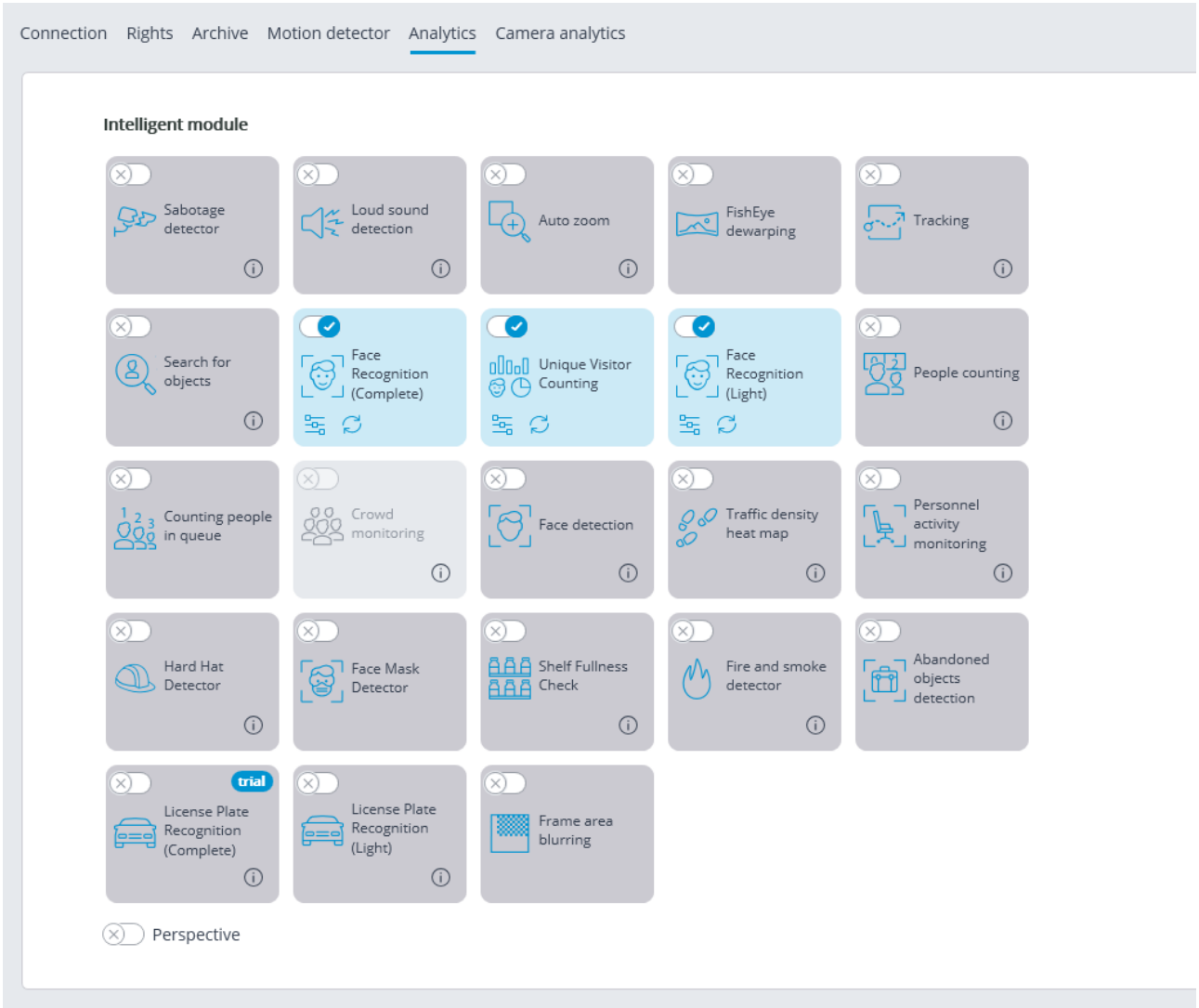
Module setup

⚠ Before using the face recognition or unique visitor counting modules, it is required to install the additional components on the server.

To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.

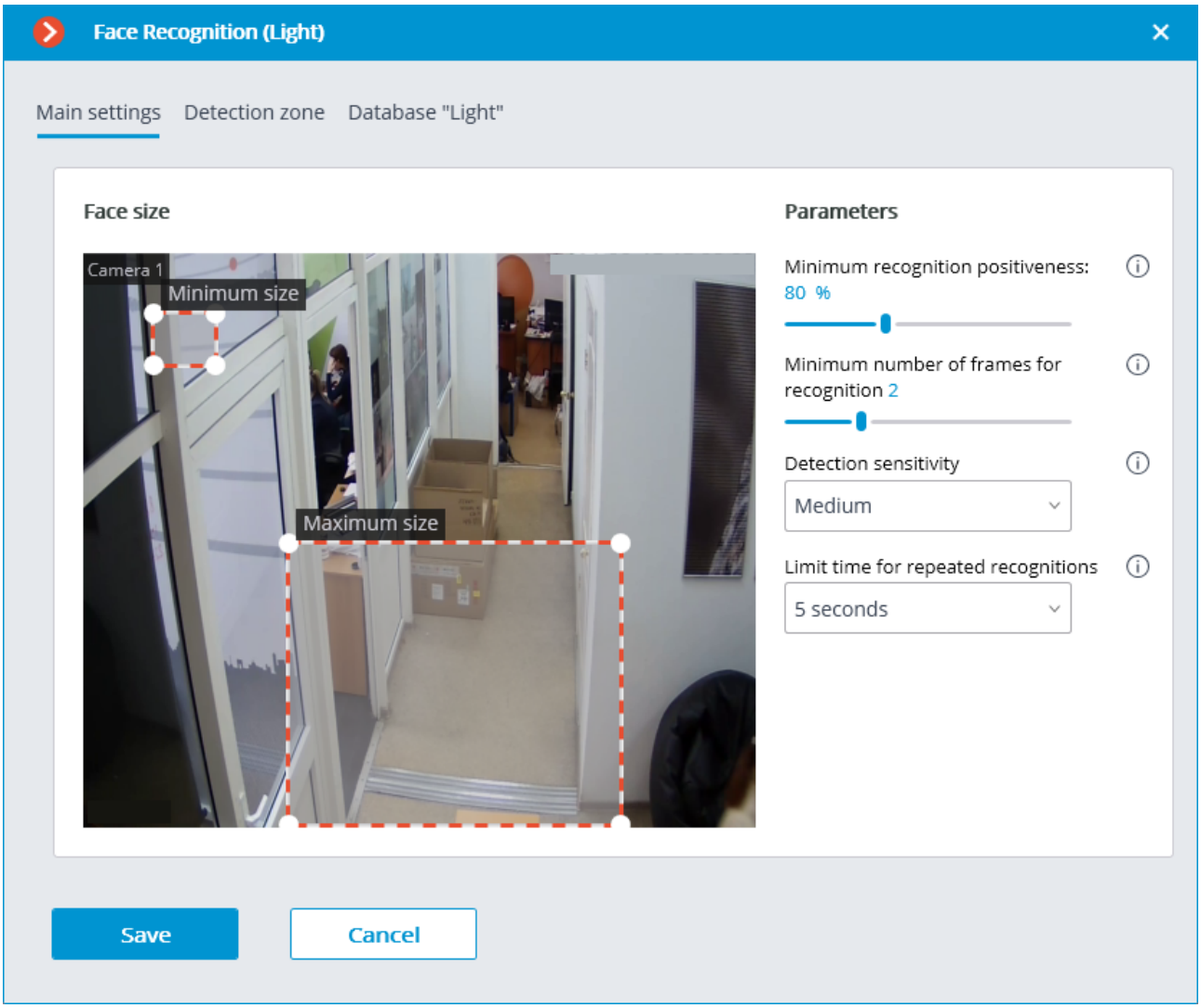


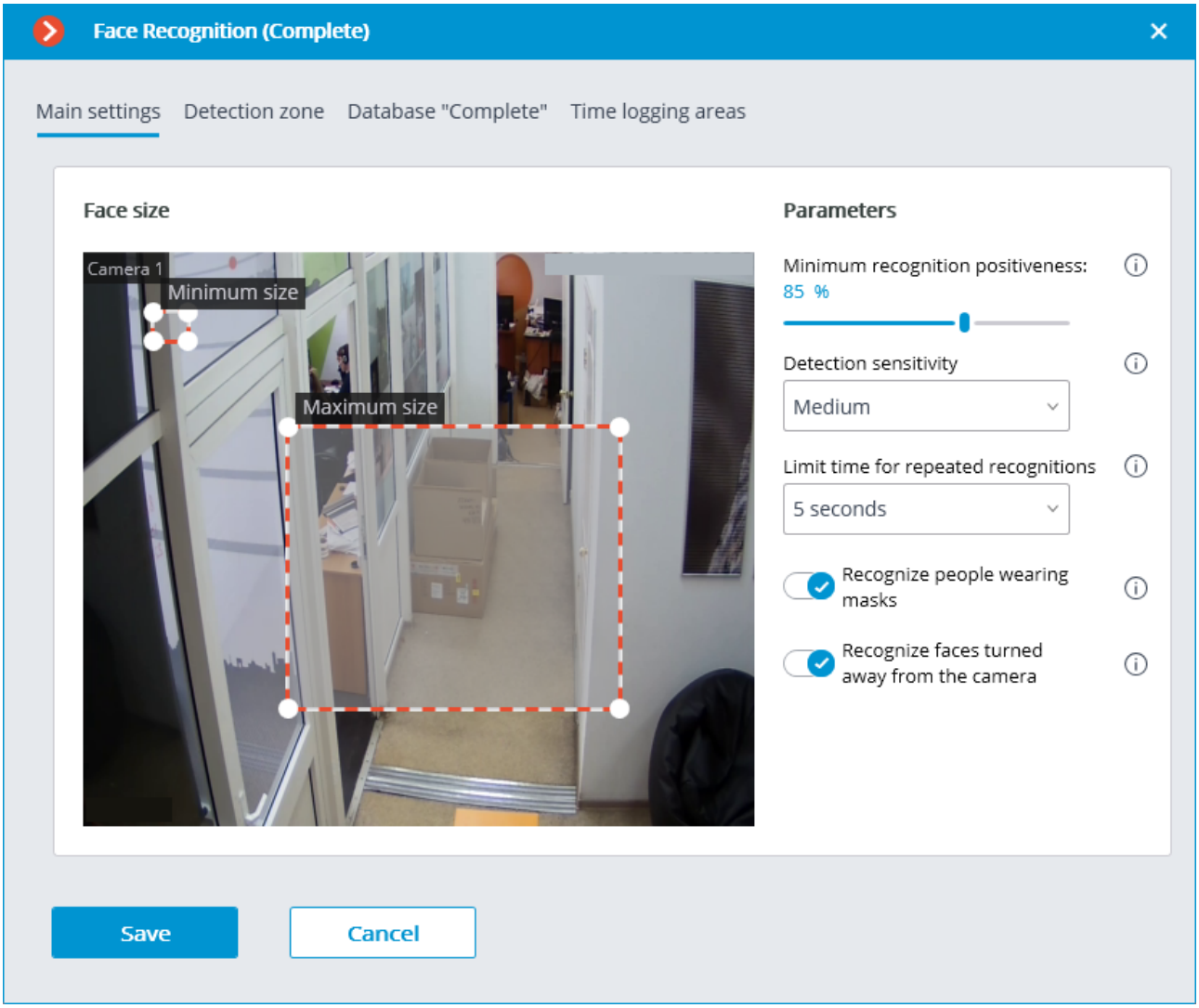
The button opens the module setup window.

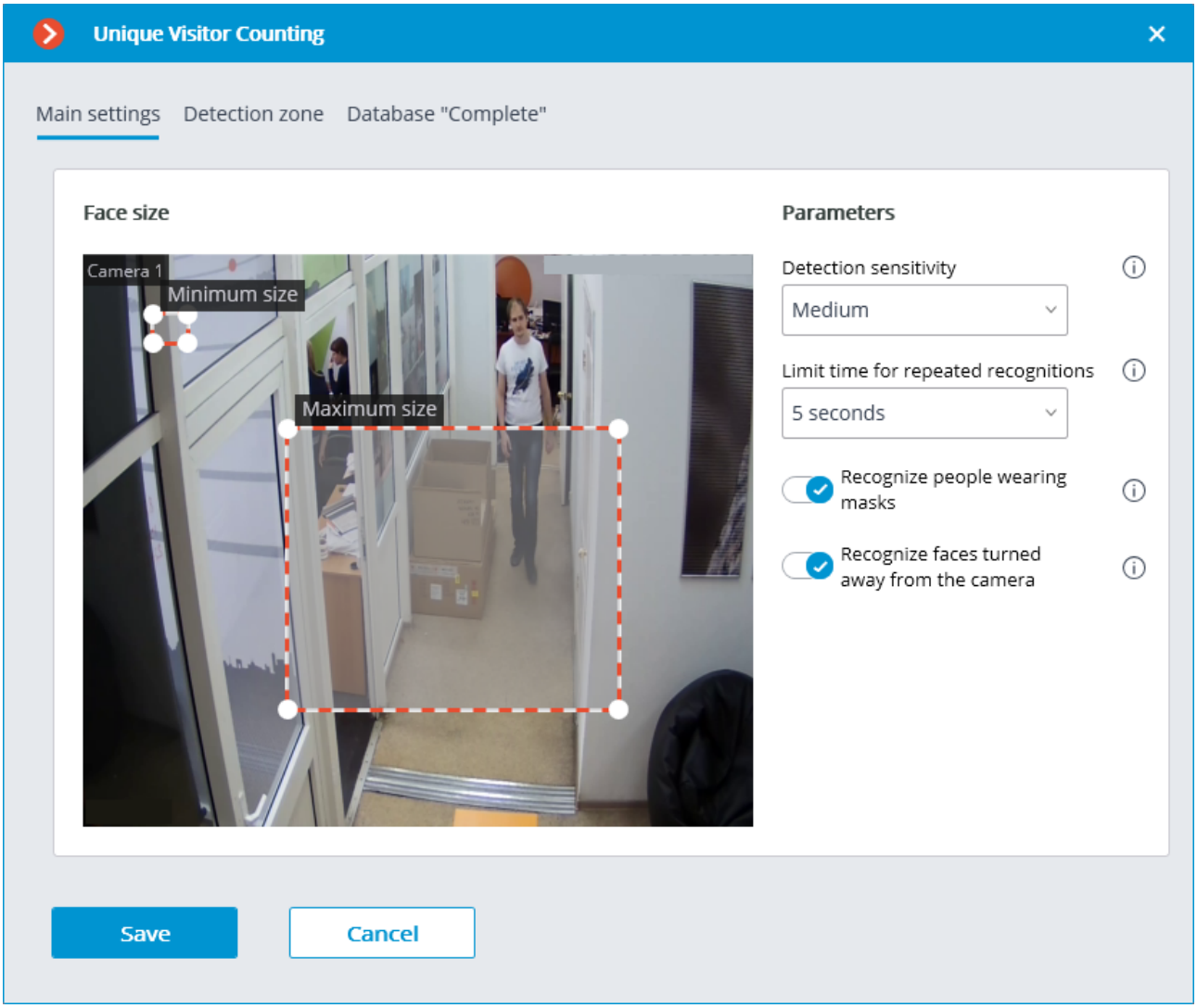
It is possible to simultaneously enable on the same camera only those modules that are based on the face recognition technology: **Face Recognition (Complete)** and **Unique Visitor Counting**. No other face recognition modules can be enabled simultaneously on the same camera.

The minimum width and height of an object in the software motion detector settings must be smaller than the size of a face.

Some of the settings of the modules are the same; others are unique for each one. The module settings are described below.




Face Recognition (Complete)
Main settings
Detection zone
Database "Complete"
Time logging areas
Face size
Camera 1
Minimum size
Maximum size
Parameters
Minimum recognition positiveness:
85 %
Detection sensitivity
Medium
Limit time for repeated recognitions
5 seconds
Recognize people wearing masks
Recognize faces turned away from the camera
Save
Cancel



Minimum recognition positiveness:: the cases of recognition with the similarity value lower than the specified threshold will not count. Lowering the value will allow to better recognize people wearing sunglasses, with partially covered faces, etc., but, at the same time, may lead to false recognitions. The available range of values is 70–100%; default value: 80%.

Detection sensitivity: The higher the sensitivity, the lower the minimum acceptable quality of the images of the faces required for recognition. The higher value can help in case of low light conditions, but may also result in erroneous detections and in detecting bad quality images of the faces. The lower value reduces the module's capability to detect faces turned away from the camera. The allowable range of values is as follows: **Minimum**, **Low**, **Medium**, **High** and **Maximum**; the default value is **Medium**.

Limit time for repeated recognitions: the minimum time between detections of a face of the same person. It prevents occurrence of the identical entries in case of the successive appearances of the same person in the frame. The allowable range of values: **Not to limit**, **5 seconds**, **30 seconds**, **1 minute**; the default value is **Not to limit**.

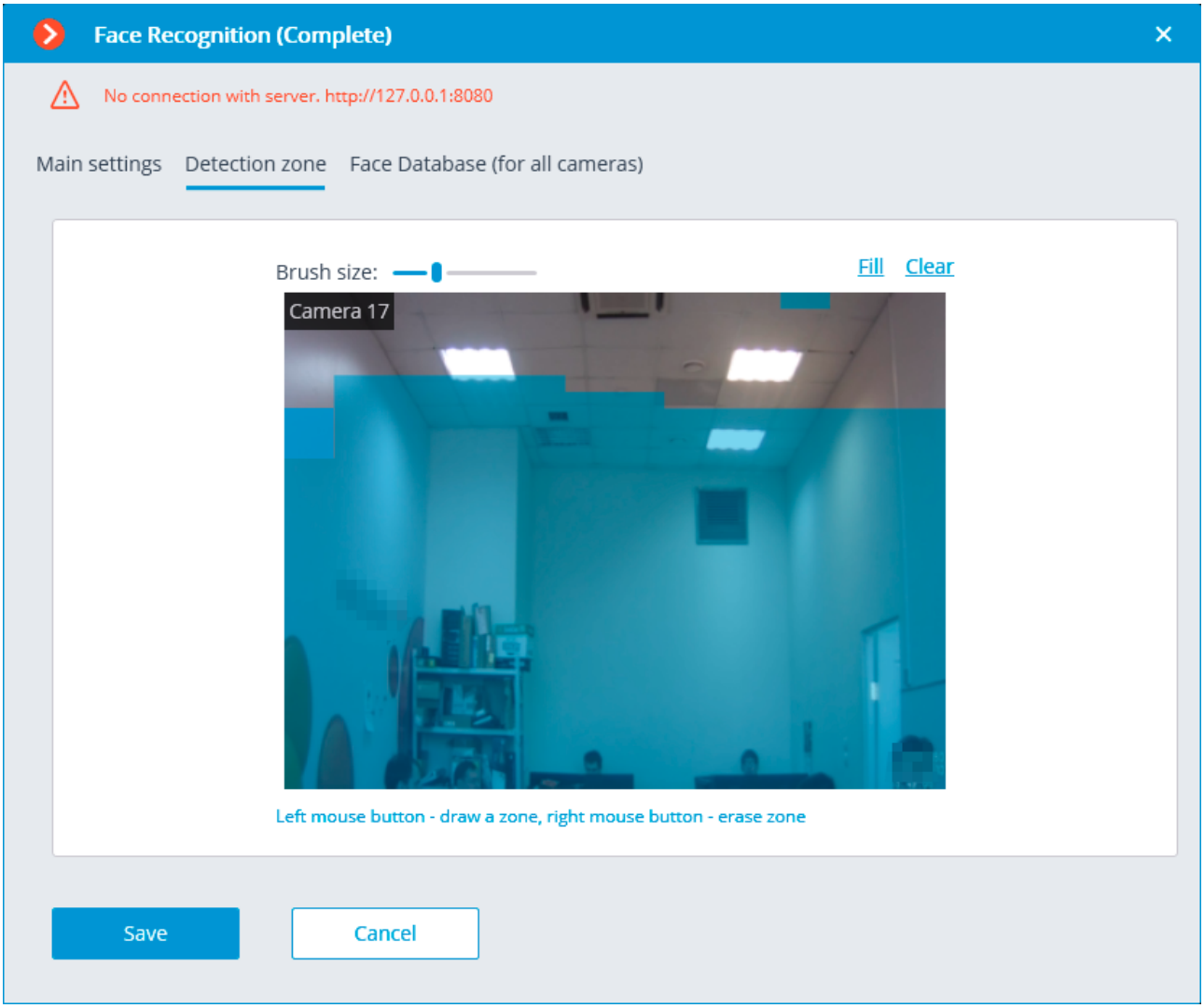
Minimum number of frames for recognition: if a person was detected in the camera field of view less than a specified number of times, no recognition will be performed. The available range of values is 1-5; the default value is 2.

Minimum size of the face and **Maximum size of the face**: Allow to set, using frames, the minimum and the maximum size of a face to be detected. The minimum size that is too small may lead to false detections due to the low quality of small images of the faces.

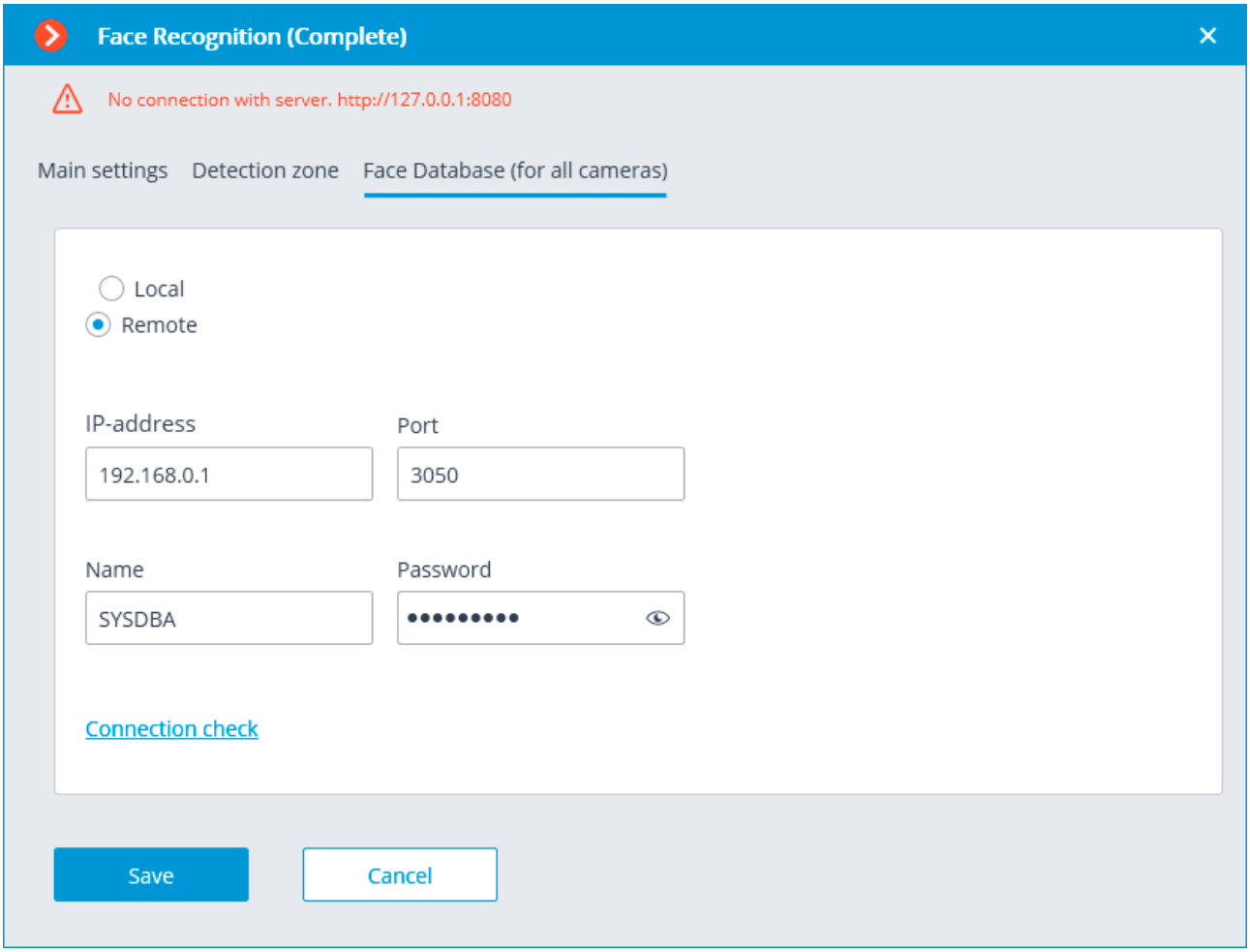
Recognize people wearing masks and **Recognize faces turned away from the camera**: allow more flexible configuration of the module: if these parameters are disabled, this will reduce the number of potentially false triggerings, and if they are enabled, the module will detect and recognize faces more accurately.

These parameters only affect the ability to identify masked and turned away faces, detection will be performed in any case.

In Tasks by event, it is possible to set scenarios based on the presence or absence of a mask on a person's face, as well as by the attribute of whether a person's face is turned away from the camera.



On the **Detection zone** tab, the user can specify the area where the system will search for faces. By default, the detection zone occupies the whole frame.



On the **Face Database (for all cameras)** tab, the parameters of connection to the face database are set.

Local and **Remote** options are available.

If the recognition is performed on one server only, it is recommended to select **Local**.

If the recognition is performed on several servers, it is recommended to store the database on one server only. In that case, it is required to select **Remote** for all cameras and set the following parameters of connection to the database: server address, user name and password. By default, the port of connection to the database is **3050,** the user name is **SYSDBA**, and the password is **masterkey**.

⚠ Independent of the database location, the recognition events (date and time of recognition, coordinates of the object in the frame, binding of the recognized object to the database) will always be stored on the server to which the camera with the corresponding events is bound.

When using a remote database, remote database replication will be involved.

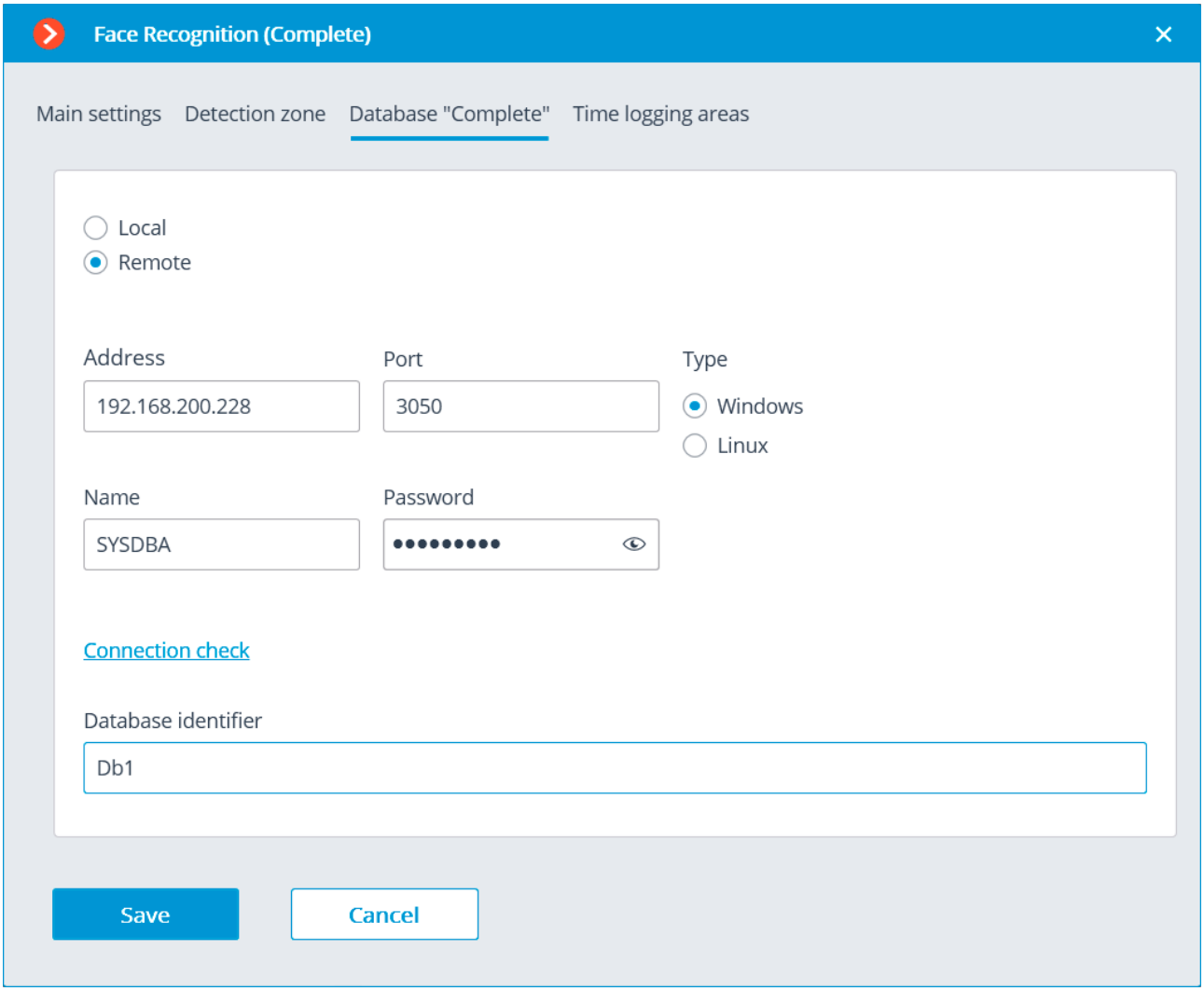
When using a remote database, remote database replication will be involved.

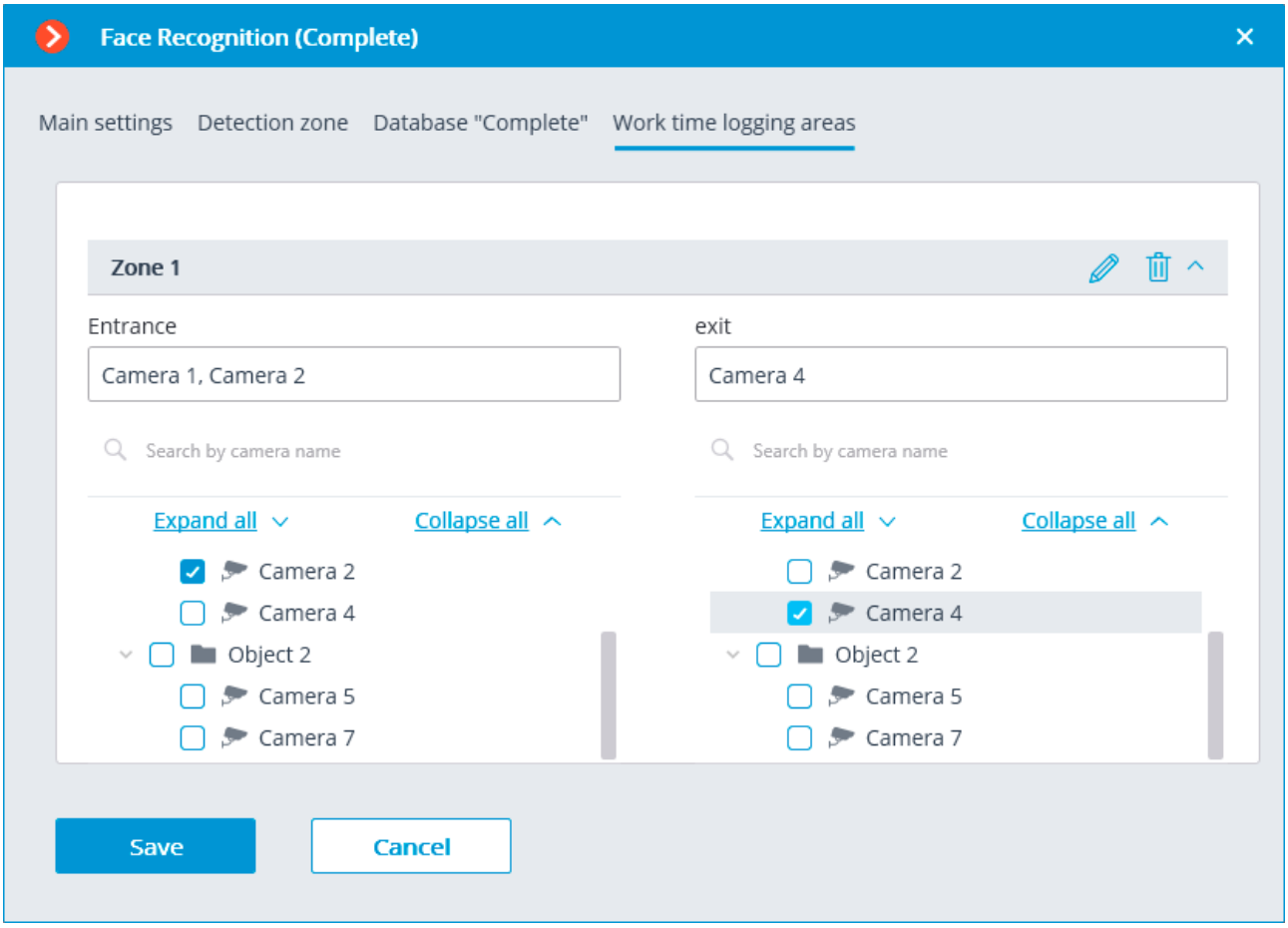
It is possible to check the availability of the database clicking on the **Connection check** link. If the server is unavailable, the corresponding message will be displayed.

It is possible to set the own face database for the **Face Database Complete** for an individual camera of a group of cameras using the field **Database identifier**.

⚠ The field **Database identifier** is not initially displayed at the launch of the module.

ⓘ To use this capability, it is required to set **Database identifier** via REST API.





The parameters to be used for creating **Work time logging (Complete)** report are set on the **Time logging areas** tab.

⚠ This tab is only available in the settings of the **Face Recognition (Complete)** module.

Work time logging (Complete) report is formed by areas (zones). An area is a territory where it is required to monitor the presence of persons. The people's faces must be recognized at the entrance to and the exit from the area by the **Face Recognition (Complete)** module. Several cameras may be used for a single area both at the entrance and at the exit.

For each area, it is possible to open the settings and set the cameras for performing face recognition on the entrance and exit. Only the cameras with the **Face Recognition (Complete)** module enabled will be shown in the hierarchical list.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Face Recognition (Complete)

Server

The following equipment is required to use this neural network-based module:

- A processor with AVX instructions support;
- An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model.

The neural network works with the 64-bit version of **Eocortex** only.

Faces

The images to be added to the database must conform to the following requirements:

- Face position: strictly face forward, no turns;
- Look: directly into the lens;
- Neutral facial expression;
- Eyes open and clearly seen;
- No headgear or sunglasses;
- Sharp and clear image;
- No heavy shadows;
- No scanning artifacts, no retakes from screens;
- No disfigured proportions;
- Lateral illumination is not permissible (e.g. sunshine from window);

The module is tolerant to appearance modification:

DB ✓ ✓ ✓ ✓

Video Stream

Optimum resolution for the module's operation: HD or FullHD.

Framerate: 10 fps or more.

No mirrored (horizontally flipped) stream.

Illumination and image quality

Illumination of faces in the frame must be uniform and constant.

If the camera is installed opposite a bright source of light (sun behind the entrance door, etc.), it is required to adjust the exposure or brightness in such a way that the face in the frame is light. The overexposed background is acceptable.

The image quality must be medium or better. Significant compression artefacts are not acceptable.

No blurring of moving people's faces is allowed.

The image must be in color.

Scene and camera position

The faces must be fully seen in the frame.

There must be no mirror surfaces giving reflections in the frame (glass, mirrors, etc.).

Strong lateral illumination (e.g. sunlight from the window) resulting in the overexposure of one part of the face is not acceptable.

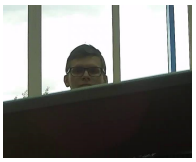
The camera may be placed above the face level, directly facing the people to be recognized. In such a case, the camera elevation angle must not exceed 35°.

The distance between the pupils of a face to be recognized must be at least 30 pixels.

The camera must directly face the people to be recognized. The camera angle between the face direction and the lens axis must not exceed 30°.

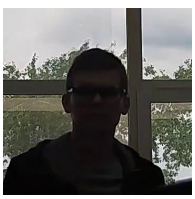
Examples of non-compliance with the requirements

Covering (overlapping):



✓ X

Face illumination:



✓ X X

Blurring of face in motion:

✓ X

Unacceptable distance between pupils:

30 pixels 15 pixels

✓ X

Video stream quality:

✓ X

Camera tilt:

35° 50° 70°

✓ ! X

Lateral light source:

✓ X

Reflecting surfaces:

✓ X

Horizontal turn of camera from face plane:

0° 15° 30° 45° 60° 90°

✓ ✓ ✓ ⚠ X X

Black and white image (night mode):

✓ X

Recommended cameras

Tested camera models:

- DS-2CD2723G0-IZS
- DH-IPC-HFW2431TP-ZS

Recommended camera settings

Quality: highest.

Bitrate: maximum possible.

Profile: maximum possible.

I-frame interval (GOV): 50.

Stream anti-aliasing: off.

Exposure and brightness: ensuring that the face is clearly seen (if the camera faces the light source, the overexposed background is acceptable).

Shutter speed: must not be too low (more than 1/50), because in such a case the blurring of moving objects will occur).

Use of computing resources

The modules use much RAM during launching. Due to that fact, in the course of starting the server with the operating module it is recommended to have a reserve of free RAM in the amount of 3–5 GB. At that, the swap file must be enabled on the server (when setting its size, you may choose **Select automatically**).

Acceptable number of cameras for various server configurations, without displaying.

For video stream from camera: 2 MP, 25 fps:

Processor	GPU	RAM	No. of cameras
Intel Core i5-2400	NVIDIA GeForce GTX-1050 Ti	8 ГБ	5
Intel Core i7-2600	NVIDIA GeForce GTX-1060	8 ГБ	9
Intel Core i7-7700	NVIDIA GeForce RTX-2070	8 ГБ	13
Intel Core i9-9900K	NVIDIA GeForce RTX-2080	16 ГБ	20

For video stream from camera: 1 MP, 25 fps:

Processor	GPU	RAM	No. of cameras
Intel Core i5-2400	NVIDIA GeForce GTX-1050 Ti	8 ГБ	8

Face Recognition (Light)

Server

To use this neural network-based module, a A processor with AVX instructions support is required.

It is also possible (optionally) to use a video card. In this case, a An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model will be required.

The neural network works with the 64-bit version of **Eocortex** only.

Faces

The images to be added to the database must conform to the following requirements:

- Face position: strictly face forward, no turns;
- Look: directly into the lens;
- Neutral facial expression;
- Eyes open and clearly seen;
- No headgear or sunglasses;
- Sharp and clear image;
- No heavy shadows;
- No scanning artifacts, no retakes from screens;
- No disfigured proportions;
- Lateral illumination is not permissible (e.g. sunshine from window);
- The faces being recognized in the frame must correspond to the faces from the database as accurately as possible. The people whose faces are covered by sunglasses, hoods, headgear, etc. will be significantly more difficult to recognize.

Video Stream

Optimum resolution for the module's operation: HD or FullHD.

Framerate: 10 fps or more.

No mirrored (horizontally flipped) stream.

Illumination and image quality

Illumination of faces in the frame must be uniform and constant.

If the camera is installed opposite a bright source of light (sun behind the entrance door, etc.), it is required to adjust the exposure or brightness in such a way that the face in the frame is light. The overexposed background is acceptable.

The image quality must be medium or better. Significant compression artefacts are not acceptable.

No blurring of moving people's faces is allowed.

The image may be black and white or color.

Scene and camera position

The faces must be fully seen in the frame.

There must be no mirror surfaces giving reflections in the frame (glass, mirrors, etc.).

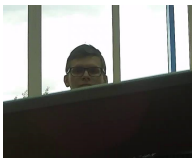
Strong lateral illumination (e.g. sunlight from the window) resulting in the overexposure of one part of the face is not acceptable.

The camera may be placed above the face level, directly facing the people to be recognized. In such a case, the camera elevation angle must not exceed 35°.

The distance between the pupils of a face to be recognized must be at least 30 pixels.

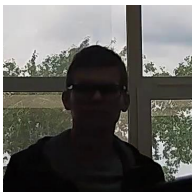
Examples of non-compliance with the requirements

Covering (overlapping):



✓ X

Face illumination:



✓ X X

Blurring of face in motion:

✓ X

Unacceptable distance between pupils:

30 pixels 15 pixels

✓ X

Video stream quality:

✓ X

Camera tilt:

35° 50° 70°

✓ ! X

Lateral light source:

✓ X

Reflecting surfaces:

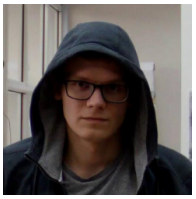
✓ X

Horizontal turn of camera from face plane:

0° 15° 30° 45° 60° 90°

✓ ✓ ⚠ X X X

Modified appearance:



DB ✓ X X X

Recommended cameras

Tested camera models:

- DS-2CD2723G0-IZS
- DH-IPC-HFW2431TP-ZS

Recommended camera settings

Quality: highest.

Bitrate: maximum possible.

Profile: maximum possible.

I-frame interval (GOV): 50.

Stream anti-aliasing: off.

Exposure and brightness: ensuring that the face is clearly seen (if the camera faces the light source, the overexposed background is acceptable).

Shutter speed: must not be too low (more than 1/50), because in such a case the blurring of moving objects will occur).

Use of computing resources

The modules use much RAM during launching. Due to that fact, in the course of starting the server with the operating module it is recommended to have a reserve of free RAM in the amount of 3–5 GB. At that, the swap file must be enabled on the server (when setting its size, you may choose **Select automatically**).

Acceptable number of cameras for various server configurations, without displaying.

For video stream from camera: 2 MP, 25 fps:

Processor	RAM	No. of cameras
Intel Core i5-2400	8 ГБ	1
Intel Core i5-2600	8 ГБ	2

For video stream from camera: 1 MP, 25 fps:

Processor	RAM	No. of cameras
Intel Core i5-2300	8 ГБ	1
Intel Core i5-2400	8 ГБ	2
Intel Core i5-3570	8 ГБ	3

Processor	RAM	No. of cameras
Intel Core i5-2600	8 ГБ	4

Unique Visitor Counting

Server

The following equipment is required to use this neural network-based module:

- A processor with AVX instructions support;
- An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model.

The neural network works with the 64-bit version of **Eocortex** only.

Faces

The images to be added to the database must conform to the following requirements:

- Face position: strictly face forward, no turns;
- Look: directly into the lens;
- Neutral facial expression;
- Eyes open and clearly seen;
- No headgear or sunglasses;
- Sharp and clear image;
- No heavy shadows;
- No scanning artifacts, no retakes from screens;
- No disfigured proportions;
- Lateral illumination is not permissible (e.g. sunshine from window);

The module is tolerant to appearance modification:

DB ✓ ✓ ✓ ✓

Video Stream

Optimum resolution for the module's operation: HD or FullHD.

Framerate: 10 fps or more.

No mirrored (horizontally flipped) stream.

Illumination and image quality

Illumination of faces in the frame must be uniform and constant.

If the camera is installed opposite a bright source of light (sun behind the entrance door, etc.), it is required to adjust the exposure or brightness in such a way that the face in the frame is light. The overexposed background is acceptable.

The image quality must be medium or better. Significant compression artefacts are not acceptable.

No blurring of moving people's faces is allowed.

The image must be in color.

Scene and camera position

The faces must be fully seen in the frame.

There must be no mirror surfaces giving reflections in the frame (glass, mirrors, etc.).

Strong lateral illumination (e.g. sunlight from the window) resulting in the overexposure of one part of the face is not acceptable.

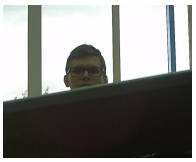
The camera may be placed above the face level, directly facing the people to be recognized. In such a case, the camera elevation angle must not exceed 35°.

The distance between the pupils of a face to be recognized must be at least 30 pixels.

The camera must directly face the people to be recognized. The camera angle between the face direction and the lens axis must not exceed 30°.

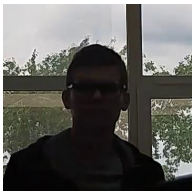
Examples of non-compliance with the requirements

Covering (overlapping):



✓ X

Face illumination:



✓ X X

Blurring of face in motion:

✓ X

Unacceptable distance between pupils:

30 pixels 15 pixels

✓ X

Video stream quality:

✓ X

Camera tilt:

35° 50° 70°

✓ ! X

Lateral light source:

✓ X

Reflecting surfaces:

✓ X

Horizontal turn of camera from face plane:

0° 15° 30° 45° 60° 90°

✓ ✓ ✓ ⚠ X X

Black and white image (night mode):

✓ X

Recommended cameras

Tested camera models:

- DS-2CD2723G0-IZS
- DH-IPC-HFW2431TP-ZS

Recommended camera settings

Quality: highest.

Bitrate: maximum possible.

Profile: maximum possible.

I-frame interval (GOV): 50.

Stream anti-aliasing: off.

Exposure and brightness: ensuring that the face is clearly seen (if the camera faces the light source, the overexposed background is acceptable).

Shutter speed: must not be too low (more than 1/50), because in such a case the blurring of moving objects will occur).

Use of computing resources

The modules use much RAM during launching. Due to that fact, in the course of starting the server with the operating module it is recommended to have a reserve of free RAM in the amount of 3–5 GB. At that, the swap file must be enabled on the server (when setting its size, you may choose **Select automatically**).

Acceptable number of cameras for various server configurations, without displaying.

For video stream from camera: 2 MP, 25 fps:

Processor	GPU	RAM	No. of cameras
Intel Core i5-2400	NVIDIA GeForce GTX-1050 Ti	8 ГБ	5
Intel Core i7-2600	NVIDIA GeForce GTX-1060	8 ГБ	9
Intel Core i7-7700	NVIDIA GeForce RTX-2070	8 ГБ	13
Intel Core i9-9900K	NVIDIA GeForce RTX-2080	16 ГБ	20

For video stream from camera: 1 MP, 25 fps:

Processor	GPU	RAM	No. of cameras
Intel Core i5-2400	NVIDIA GeForce GTX-1050 Ti	8 ГБ	8

Installing and updating the module

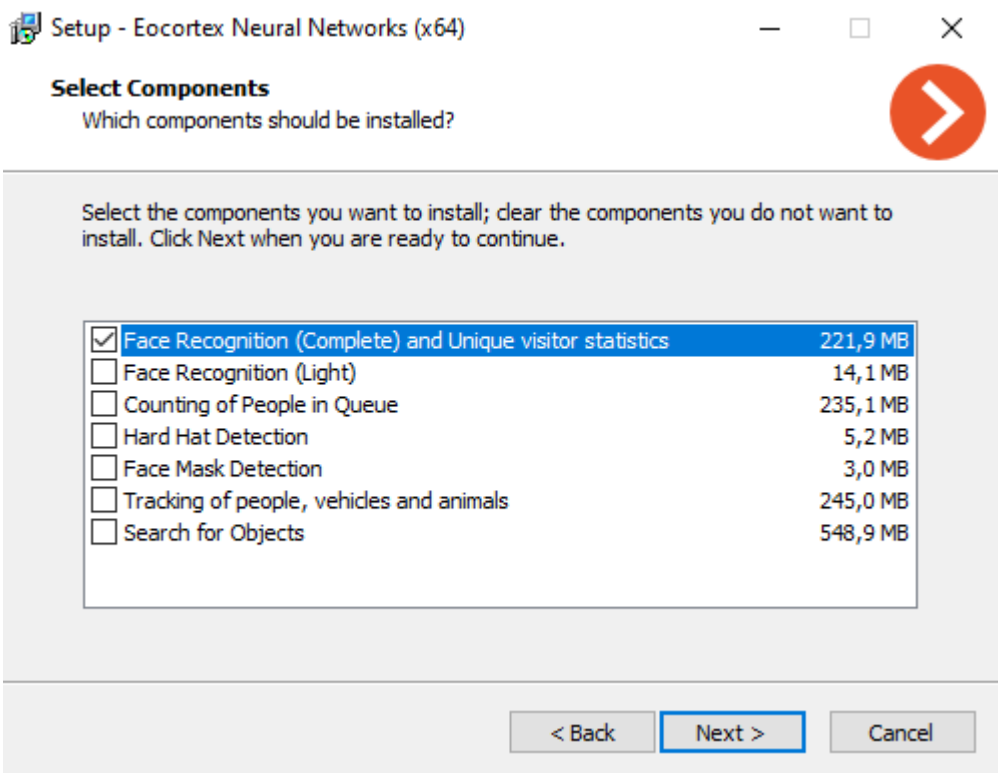
⚠ It is required to install the **Eocortex Neural Networks** package before using the module.

The neural network works with the 64-bit version of **Eocortex** only.

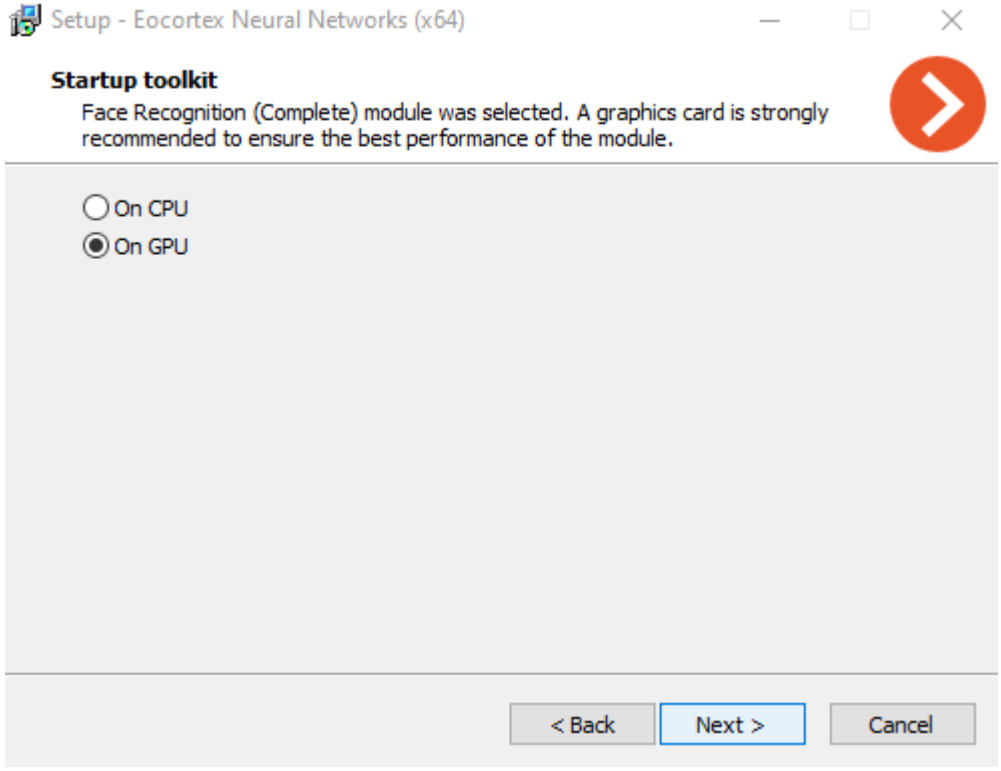
When updating **Eocortex** to a different version, it is also required to update the **Eocortex Neural Networks** package to the relevant version.

⚠ If the **Face Recognition (Complete)**module is used, the face databases will be automatically updated at the first start after updating **Eocortex** and the **Eocortex Neural Networks** package from version 3.3 or lower to version 3.4 or higher. It will take some time.

In the process of installation of **Eocortex Neural Networks** it is required to select the corresponding components.



For the **Face Recognition (Complete)** and the **Unique Visitor Counting** modules, it is required to select the **On GPU** option at the **Startup toolkit** settings screen. For the **Face Recognition (Light)** module, selecting this option is preferable but not obligatory.



Fire and smoke detection

The **Fire and smoke detection** module is intended for detecting smoke and open flame in the frame.

Details

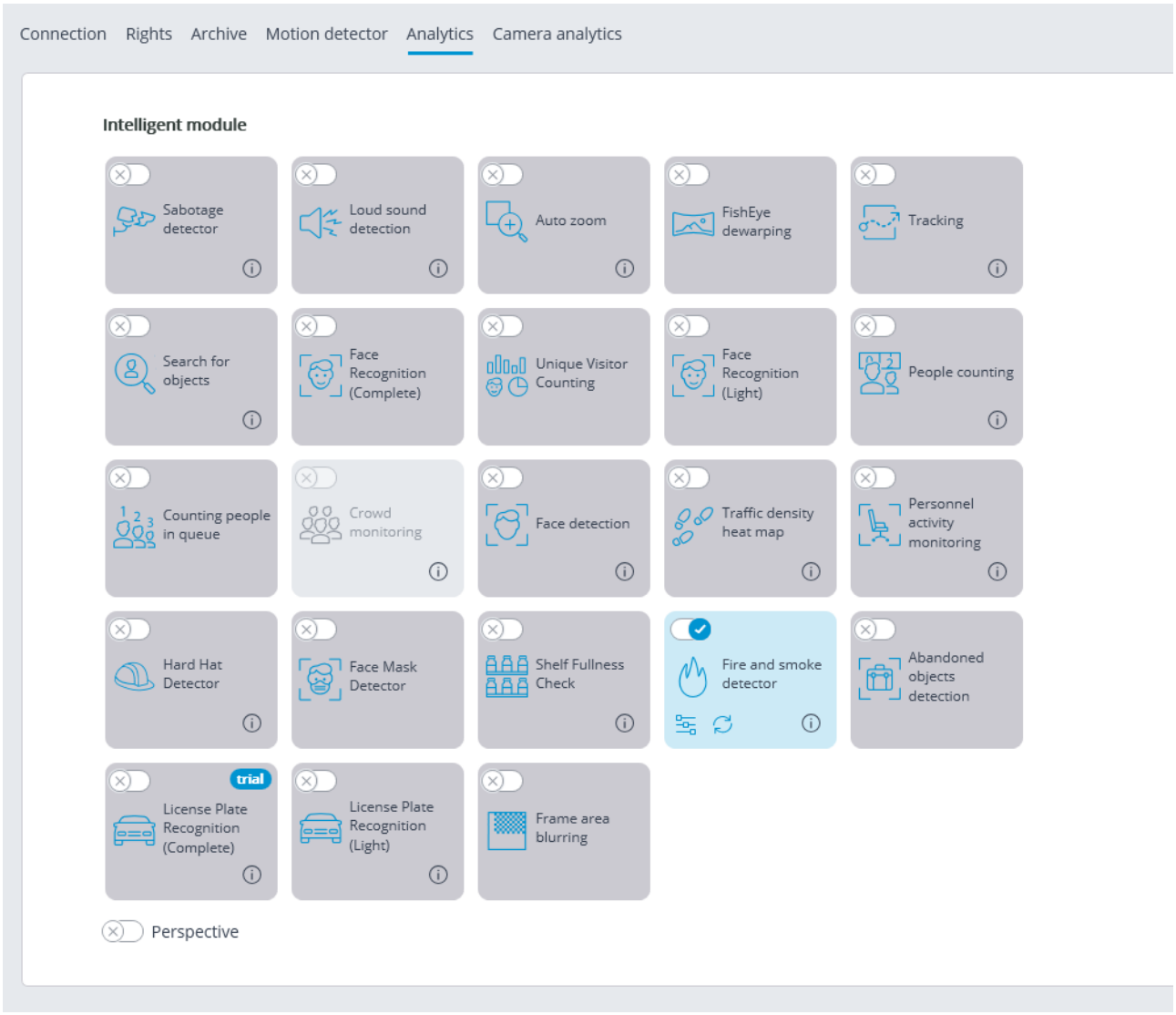
For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the software motion detector and the module itself.

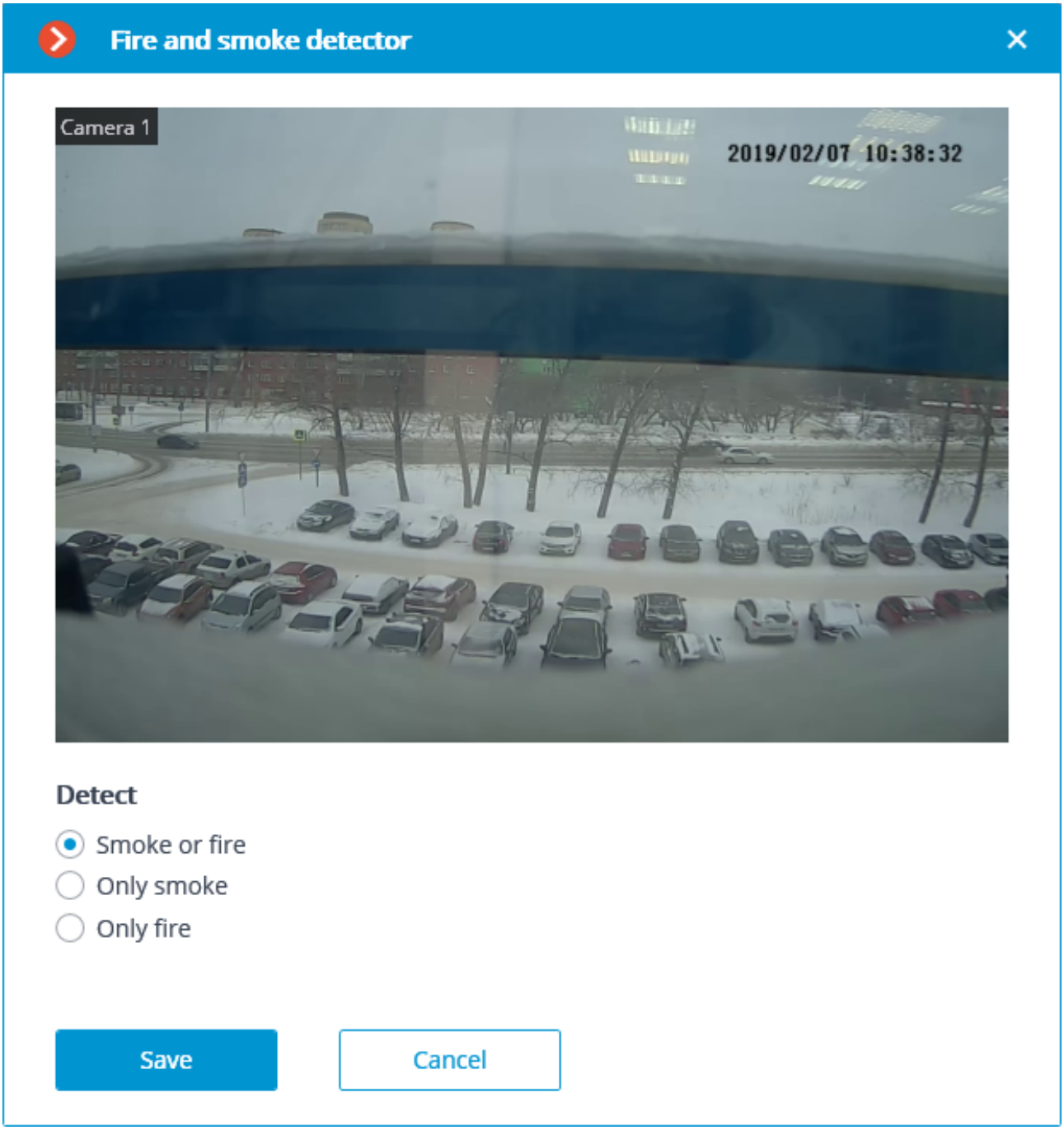
Use

> The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.


Connection
Rights
Archive
Motion detector
Analytics
Camera analytics
Intelligent module
Sabotage detector
Loud sound detection
Auto zoom
FishEye dewarping
Tracking
Search for objects
Face Recognition (Complete)
Unique Visitor Counting
Face Recognition (Light)
People counting
Counting people in queue
Crowd monitoring
Face detection
Traffic density heat map
Personnel activity monitoring
Hard Hat Detector
Face Mask Detector
Shelf Fullness Check
Fire and smoke detector
Abandoned objects detection
trial
License Plate Recognition (Complete)
License Plate Recognition (Light)
Frame area blurring
Perspective



In the opened settings window, select one of the detection options: **Smoke or fire**, **Only smoke**, or **Only fire**.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Image and background must be static: the camera shall be rigidly fixed, there shall be no constantly moving objects in the frame.

The camera shall be placed at the angle of 0 - 70 degrees in reference to the level surface.

The illumination of the detection area must not change drastically (for example, when the light is switched on, when the camera switches to night mode, etc.).

In the smoke detection mode, it is necessary to ensure minimum required illumination and to avoid that the direct light shines on the lens.

The objects of potential hazard must be located in the line of site of the camera. That means that they must not be blocked by other objects.

In the camera field of view there must be no "benign" sources of smoke and fire, such as furnaces, steam boilers or pipes, welding equipment etc.

The dimensions of the objects to be detected (smoke and fire areas) must be no less than 10% of each linear measure of the frame.

Minimum permissible resolution of the frame is 400x300 pixels.

Minimum permissible framerate is 15 and 5 frames per second for smoke detection and fire detection modes respectively.

Fisheye dewarping module

The **Fisheye dewarping module** is designed to perform software dewarping (converting) the images obtained from the panoramic cameras.

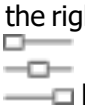
Details

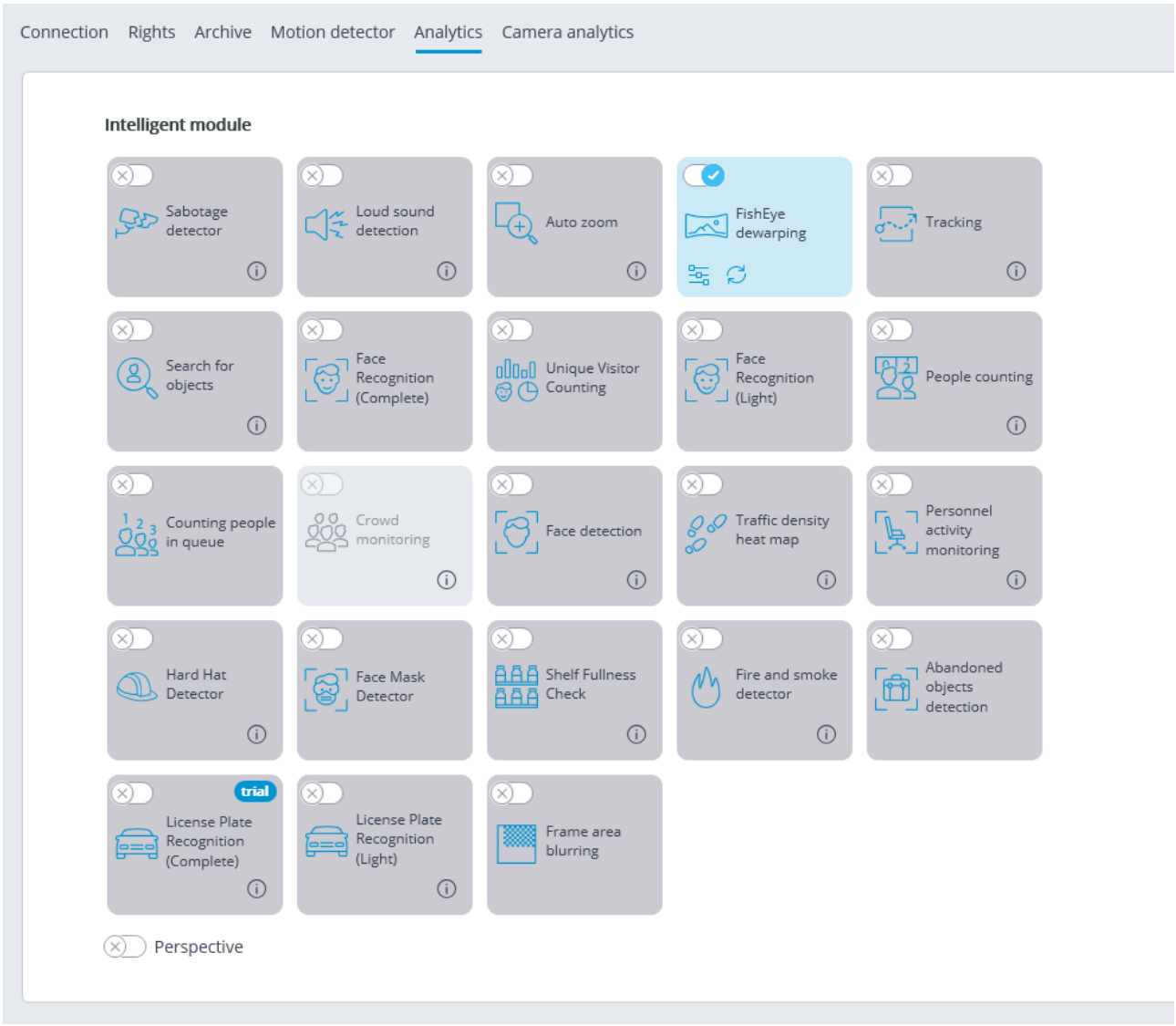
⚠ The **Auto zoom**, **Fisheye dewarping module** and **Frame area blurring** modules are mutually exclusive, meaning that only one of these modules can be used on a camera at a given moment.

Use

ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

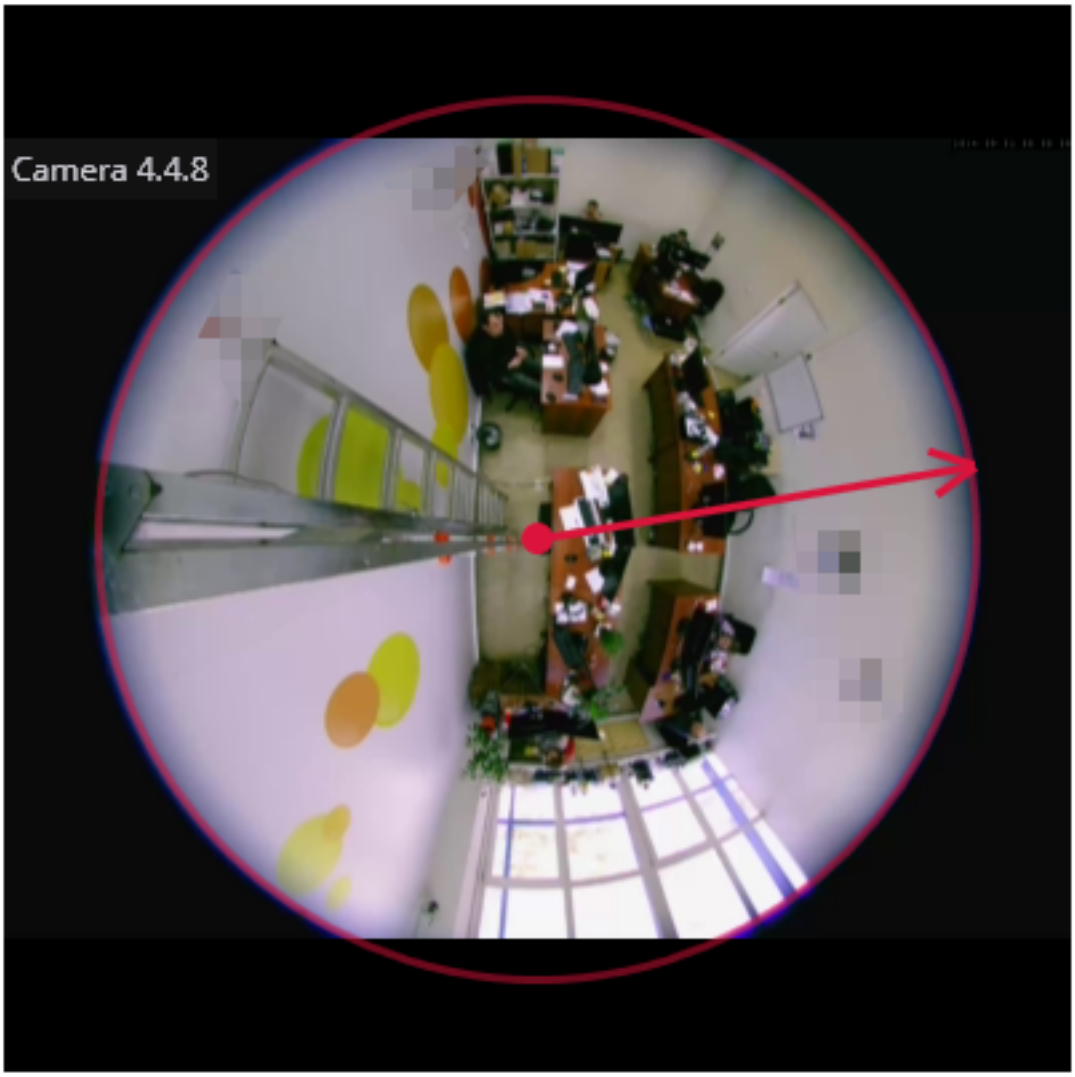
Module setup

In order to use the module, it is required to enable and set up the module. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, go to the Analytics tab on the right part of the page and enable the module using the switch, then adjust it pressing the  button.


Connection
Rights
Archive
Motion detector
Analytics
Camera analytics
Intelligent module
Sabotage detector
Loud sound detection
Auto zoom
FishEye dewarping
Tracking
Search for objects
Face Recognition (Complete)
Unique Visitor Counting
Face Recognition (Light)
People counting
Counting people in queue
Crowd monitoring
Face detection
Traffic density heat map
Personnel activity monitoring
Hard Hat Detector
Face Mask Detector
Shelf Fullness Check
Fire and smoke detector
Abandoned objects detection
trial
License Plate Recognition (Complete)
License Plate Recognition (Light)
Frame area blurring
Perspective

Fisheye dewarping

Dewarping settings



To adjust the image from the FishEye camera: stretch an arrow to match the boundary of circumscribed circle and the boundary of the image from the camera. Select the direction of view "by default".

Save Cancel

In the settings it is required to indicate the image radius and the "By default" view direction by clicking on the image boundary: the circle must coincide with the camera image boundary. The arrow will indicate the "By default" view direction. It is also possible to drag the center of the circle using the mouse.

⚠ The use of the module will start only after the settings are applied.

Frame area blurring

The **Frame area blurring** module is designed to blur the specified areas of the frame on a real-time video.

Details

⚠ The **Auto zoom**, **Fisheye dewarping module** and **Frame area blurring** modules are mutually exclusive, meaning that only one of these modules can be used on a camera at a given moment.

Use

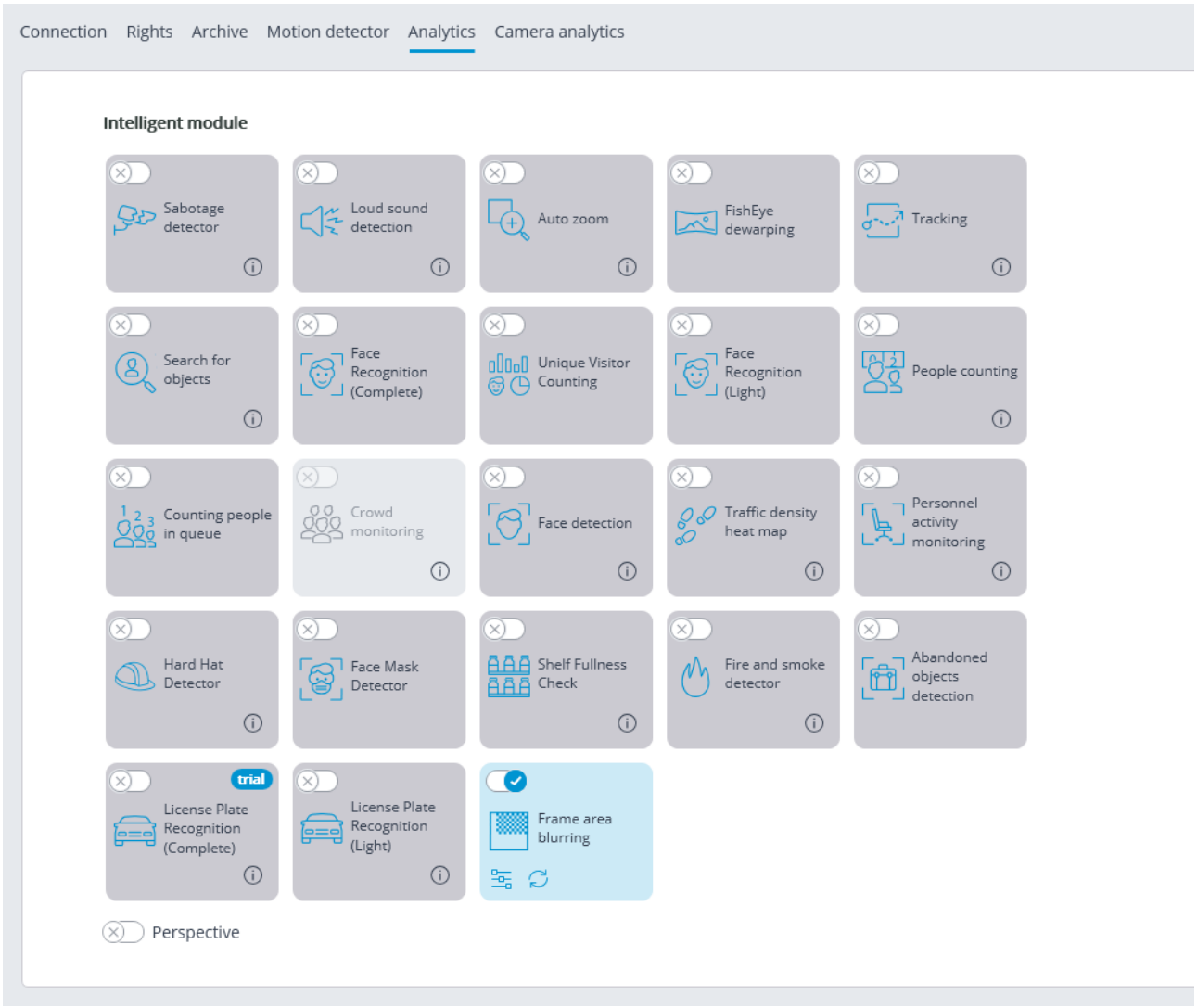
ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

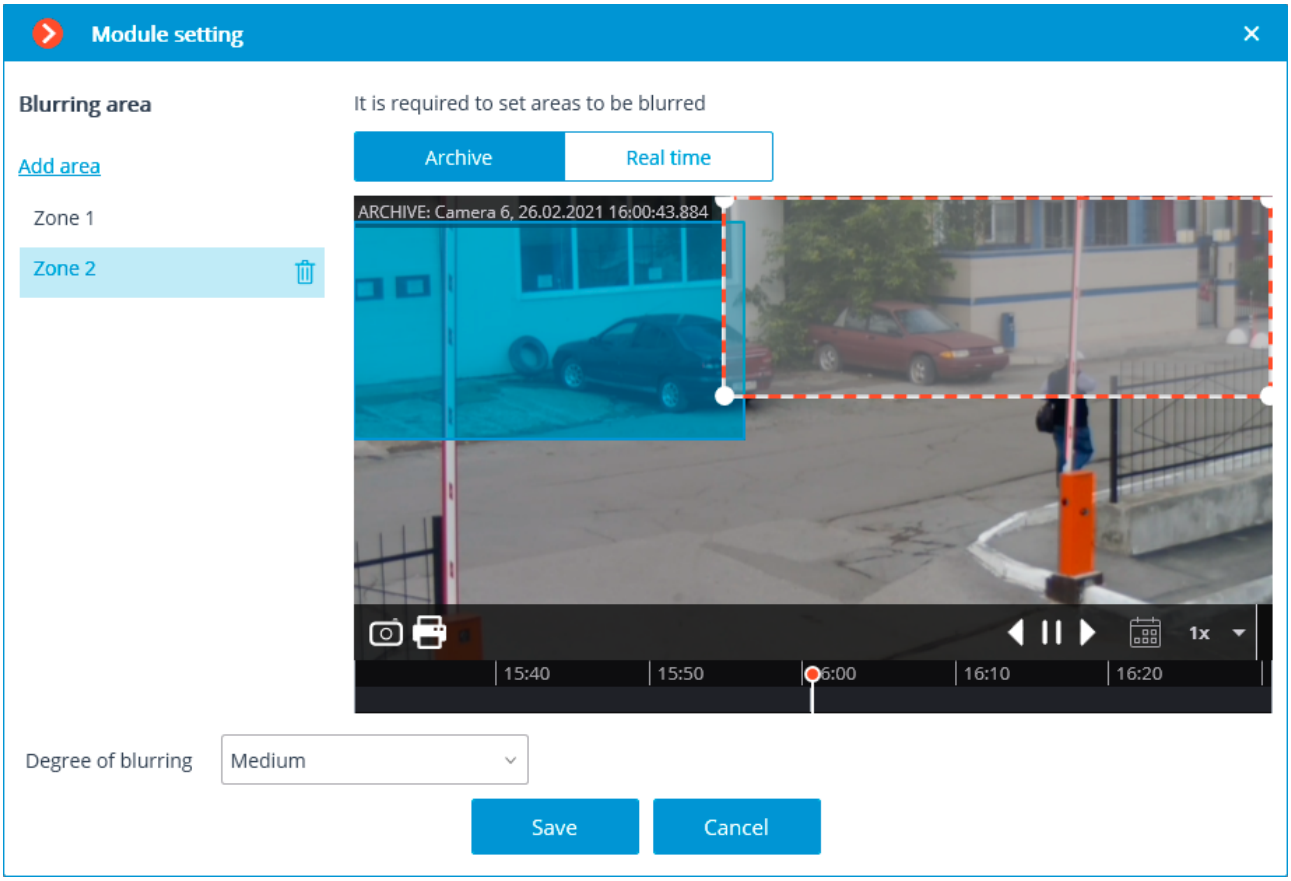
To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.



The button opens the module setup window.



In the window that opens, it is required to specify one or more rectangular blurring zones, as well as the degree of blurring.

In total, it is possible to add up to 10 blurring zones. All the zones will have the same degree of blurring.

⚠ The blurring is applied only when the real-time video is being broadcast, as well as on a freeze-frame from the archive. When the video archive is being played back, the image is not blurred. Thus, if it is required to prevent a user from watching an unblurred video, it is necessary to deny that user the access to the archive.

⚠ The use of the module will start only after the settings are applied.

Hard Hat detector

The **Hard Hat detector** module is intended for detecting people not wearing hard hats. When such persons are detected in real time, the module frames them and registers the event in the log.

The main purpose of the module is to monitor the observance of the labor safety regulations at the industrial and construction sites.

At the present moment, the hard hats of the following colors are supported:

- white;
- orange;
- red;

- green;
- yellow;
- blue.

Details

For the proper functioning of the module it is required to place the camera correctly and to set up the software motion detector and the module itself.

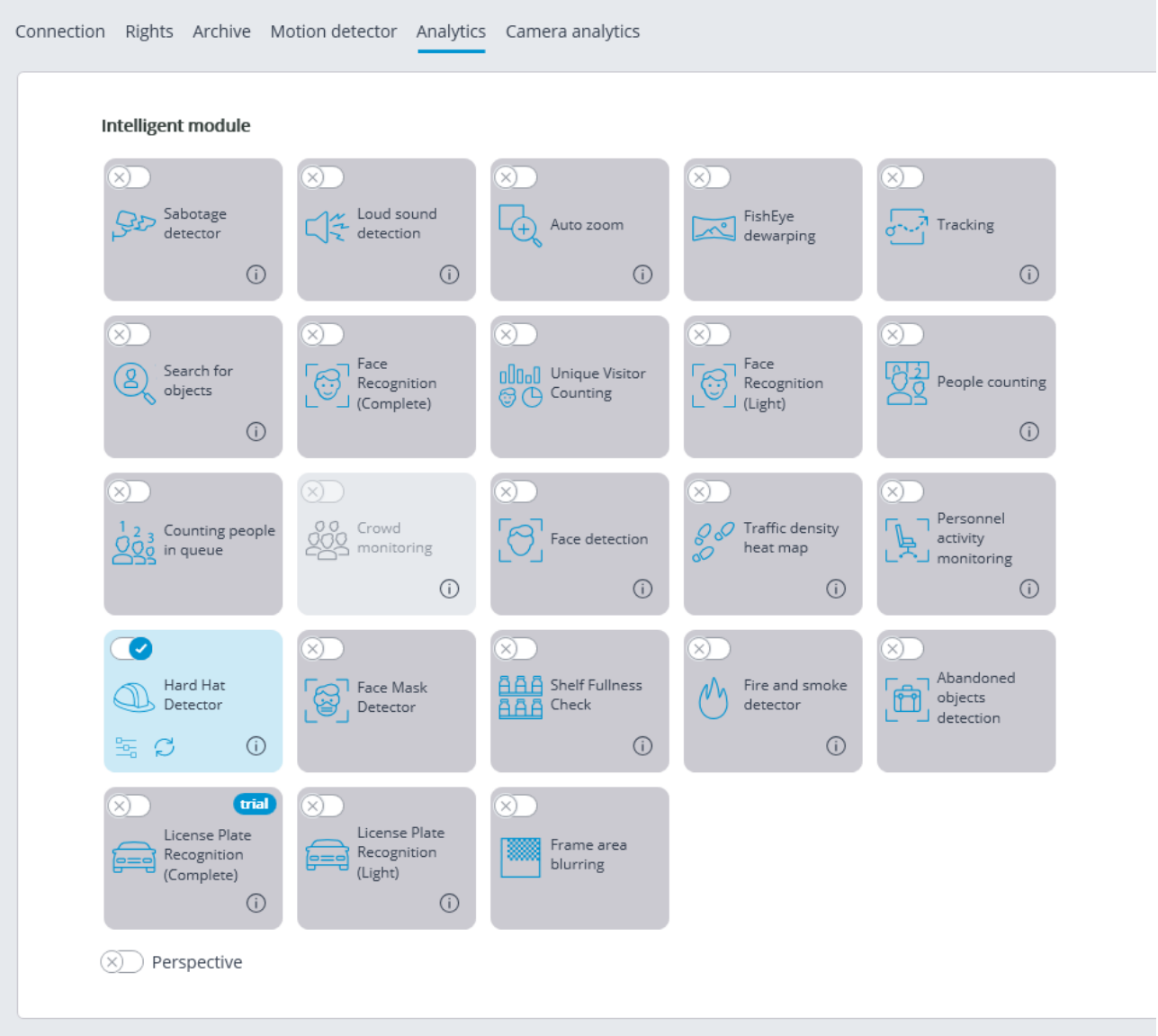
Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

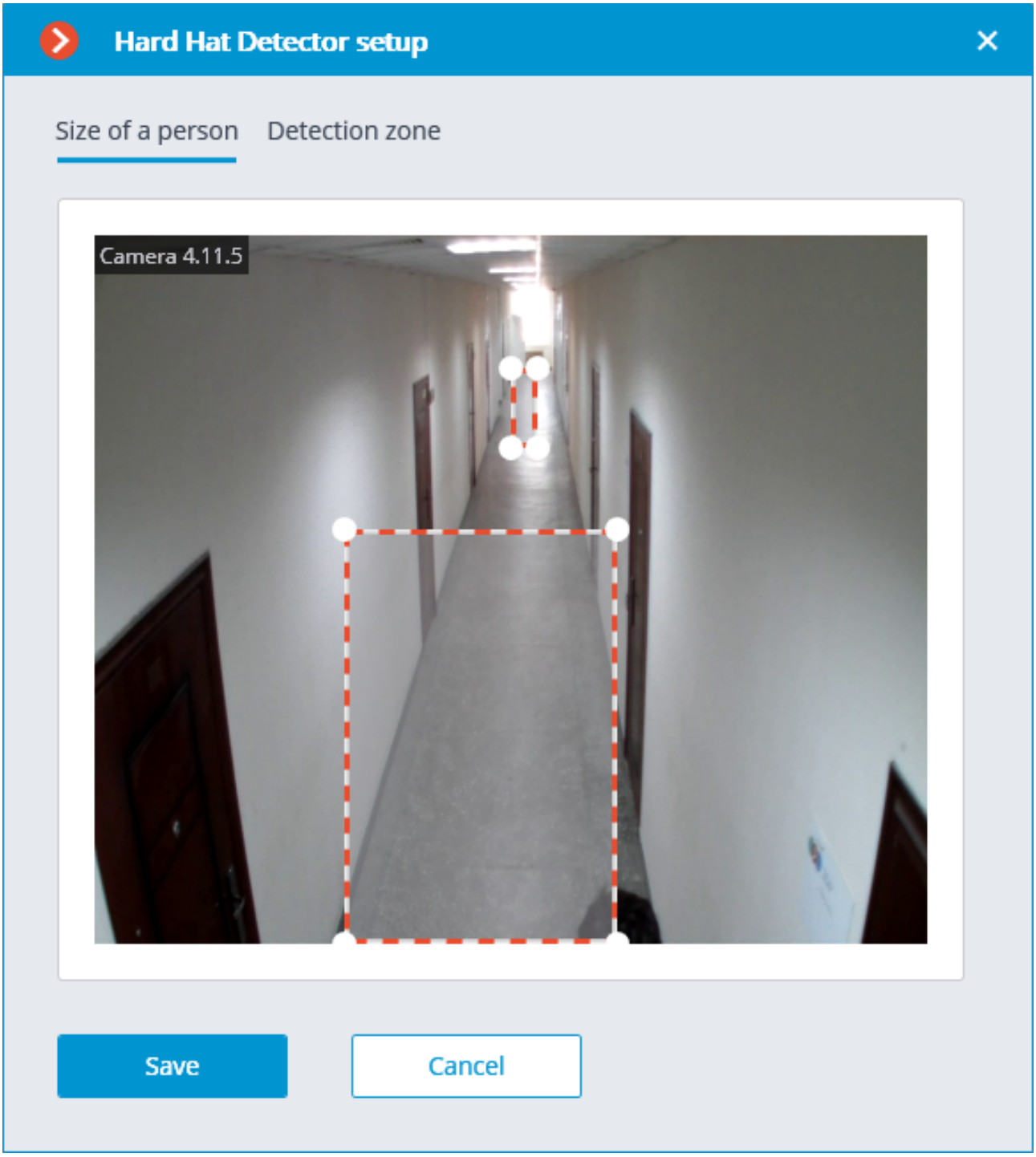
Before using the module, it is required to install the Eocortex Neural Networks software package.

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.

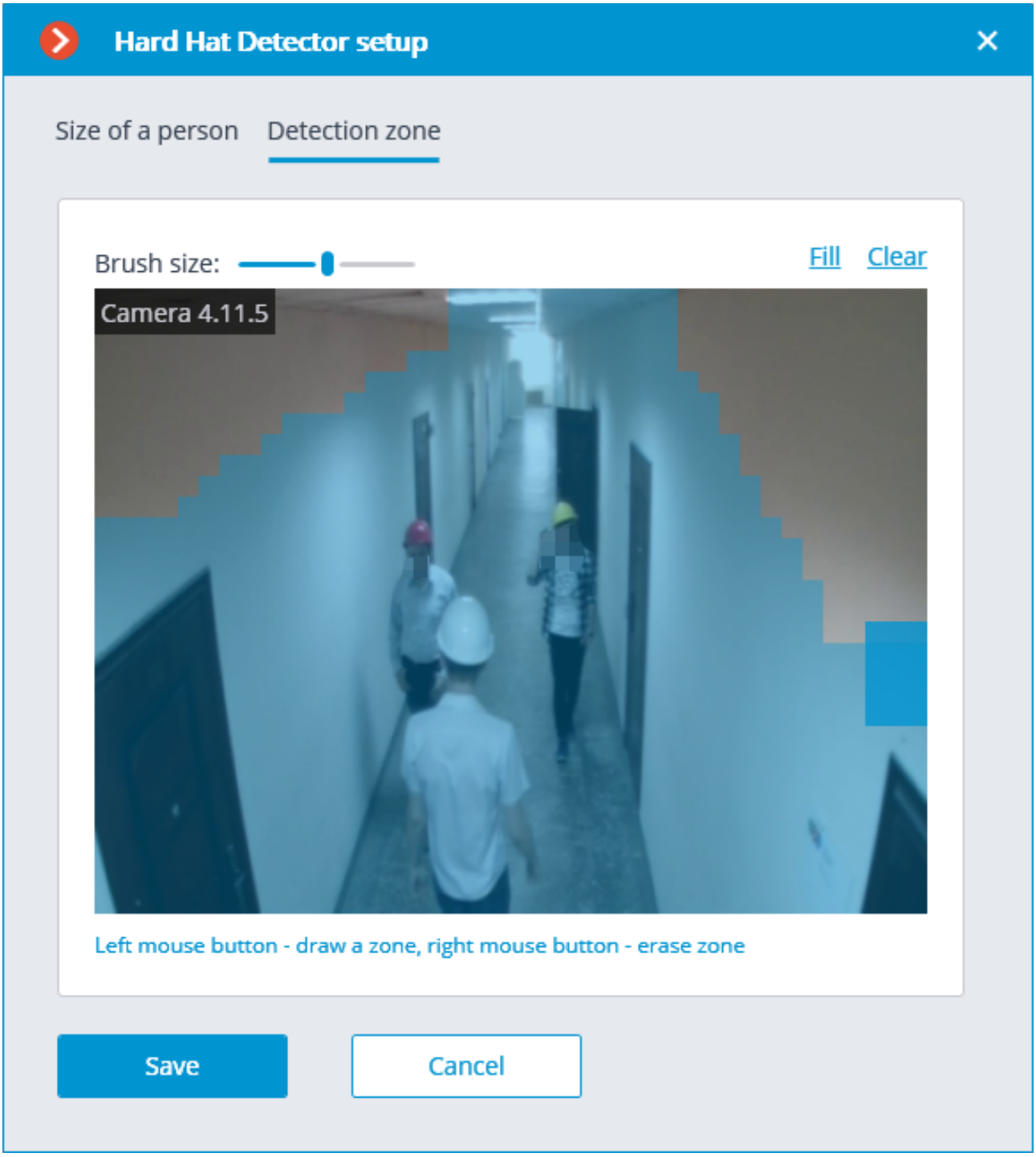


In the opened window, make the settings in the following tabs:

Size of a person: the minimum and maximum sizes of the persons to be detected.



Control zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.



⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Requirements to hardware and software

To use this neural network-based module, a A processor with AVX instructions support is required.

It is also possible (optionally) to use a video card. In this case, a An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model will be required.

The neural network works with the 64-bit version of **Eocortex** only.

Since this module places heavy demands on the computing resources, high performance processors must be used for its operation with several cameras bound to the same server.

It should be pointed out that the resolution of the analyzed video has no significant impact on the module's performance.

Requirements to images and video stream

The people being detected must appear in the frame standing, at full length, not blocked by other objects.

The height in the frame of the persons to be detected must be not less than 120 pixels.

The tilt of the persons in the frame in relation to the vertical axis of the camera must not exceed 15 degrees.

The camera deviation in relation to the horizontal axis must not exceed 45 degrees.

The uniform illumination of the area is required. The people must not stay in the badly illuminated zones against the brightly lighted area. Moreover, glare of the bright light sources on the hard hats and heads, Sun and light fixtures-related flaring, high-luminance areas on the dark background (for example, opened doors and windows in a dark room) are unacceptable.

The image must be high quality, with low or medium compression rate.

It is recommended to use low noise color image due to the fact that using black and white image may lead to significant reduction of the recognition precision.

The outlines of the moving objects must not be blurred.

The hard hat must be properly worn. Foreign objects (ear muffles, hoods, etc.) must cover as small area of the hat as possible.

The camera shall transmit the video stream with the constant frame rate that must be at least 9 fps.

In case the abovementioned conditions are met, the module is capable of ensuring average sensitivity of 65% with the false triggering rate of around 1-3%. The time of triggering will be between 1 and 3 seconds from the moment of appearance of a person without a hard hat in the frame to the moment of registering the infraction.

Below are the examples of images that do not conform with the requirements:

Tilt of persons in reference to the camera vertical axis is 20 degrees.

Non-uniform illumination of the scene.

Insufficient contrast, badly distinguishable boundaries of objects, flaring, image compression too high.

Outlines of the moving people are blurred.

Ear mufflers cover too much of the hard hat.

Hard hat not worn correctly.

Heat map module

The **Heat map module** is designed for the visualization of the traffic intensity in the different areas of the frame. The heat map is generated by the way of summing up the time during which the movement is observed in the selected point. As a result, the areas where the objects are staying during the longest period of time are highlighted.

Capabilities of the module

For the visualization, the color scale is used: the color areas hued depending on the intensity of traffic are superimposed on the video image as a semitransparent layer. For example, when using the four-color scale, the area with high traffic density is colored red, with low traffic density – blue; the green and yellow areas are transitional.

The module can be used for determining the popularity of various locations in the shopping mall, to visualize the preferred routes of visitors or vehicles on the premises, for analyzing statistics of visits to various facilities etc.

There are three ways of using the heat maps:

- real time mode;
- report;
- superimposition of the heat map on the camera field of view on the facility plan.

In the real time mode, the areas of the frame where movement has been registered in the course of the last 10 minutes are displayed. In the report, the time interval is set during which the information regarding movement intensity in the frame will be analyzed. The heat map superimposition mode allows to generate the heat map not only in the frame, but also on the facility plan.

Details

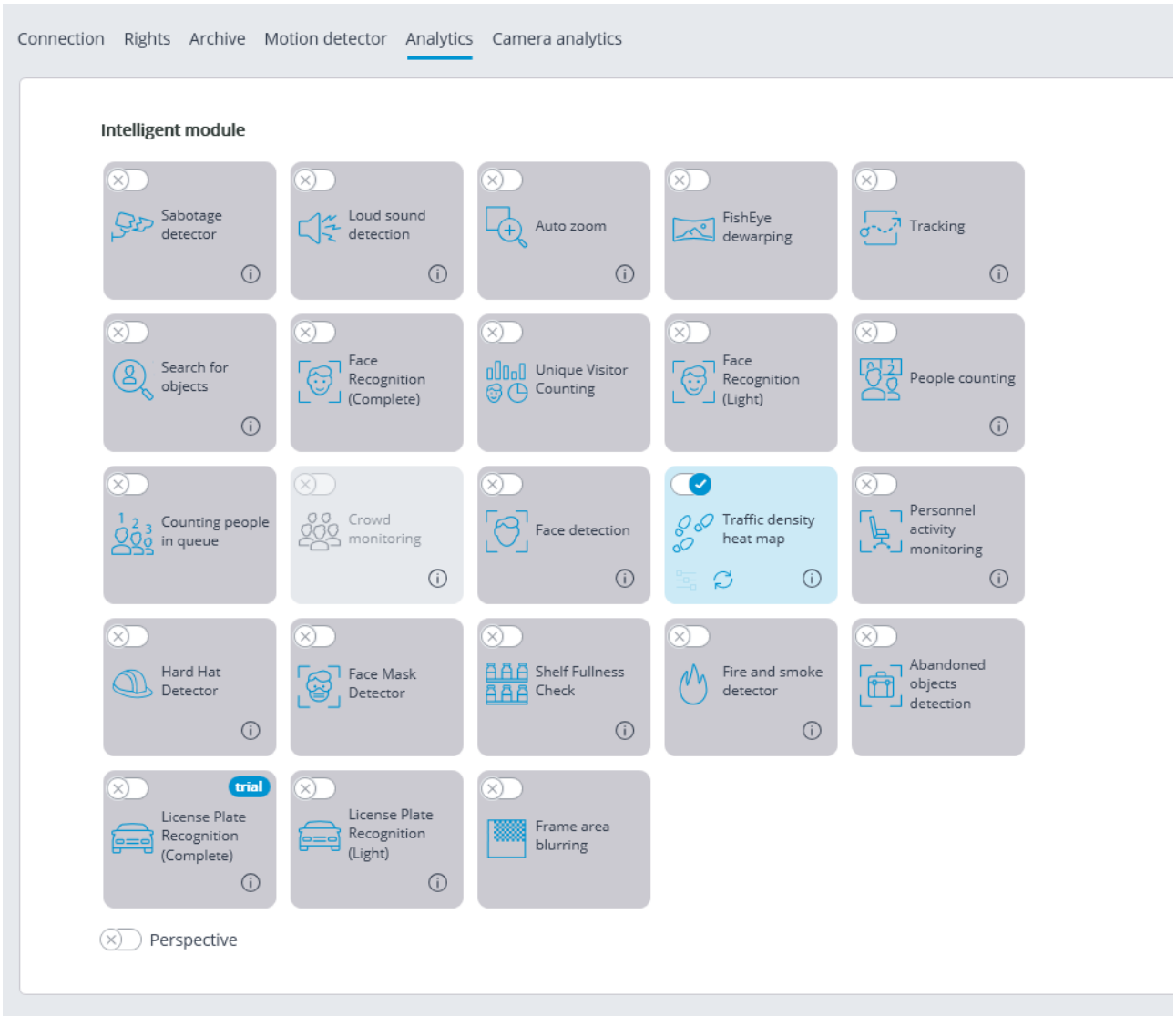
For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the software motion detector and the module itself.

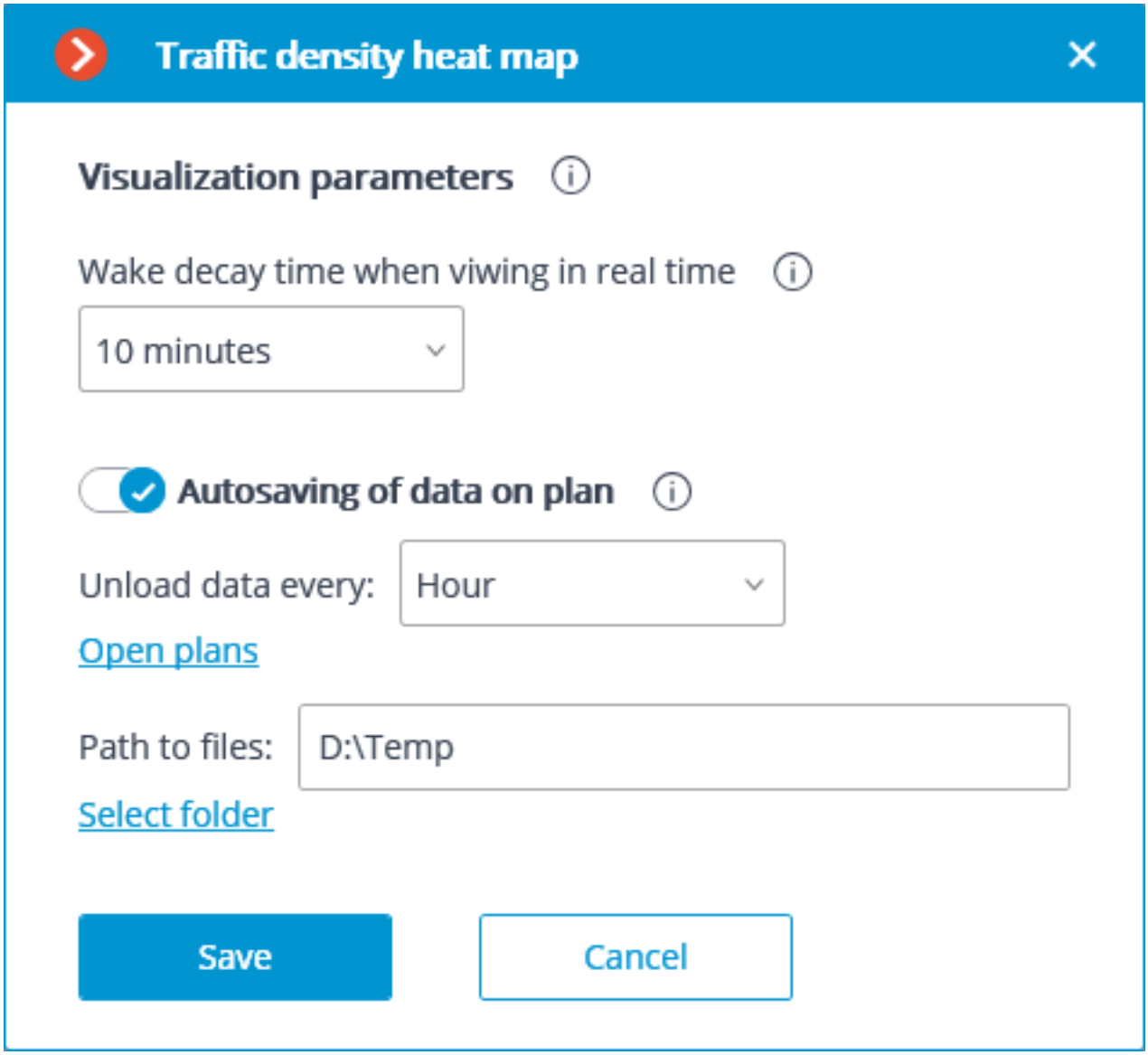
Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.


Connection
Rights
Archive
Motion detector
Analytics
Camera analytics
Intelligent module
Sabotage detector
Loud sound detection
Auto zoom
FishEye dewarping
Tracking
Search for objects
Face Recognition (Complete)
Unique Visitor Counting
Face Recognition (Light)
People counting
Counting people in queue
Crowd monitoring
Face detection
Traffic density heat map
Personnel activity monitoring
Hard Hat Detector
Face Mask Detector
Shelf Fullness Check
Fire and smoke detector
Abandoned objects detection
trial
License Plate Recognition (Complete)
License Plate Recognition (Light)
Frame area blurring
Perspective

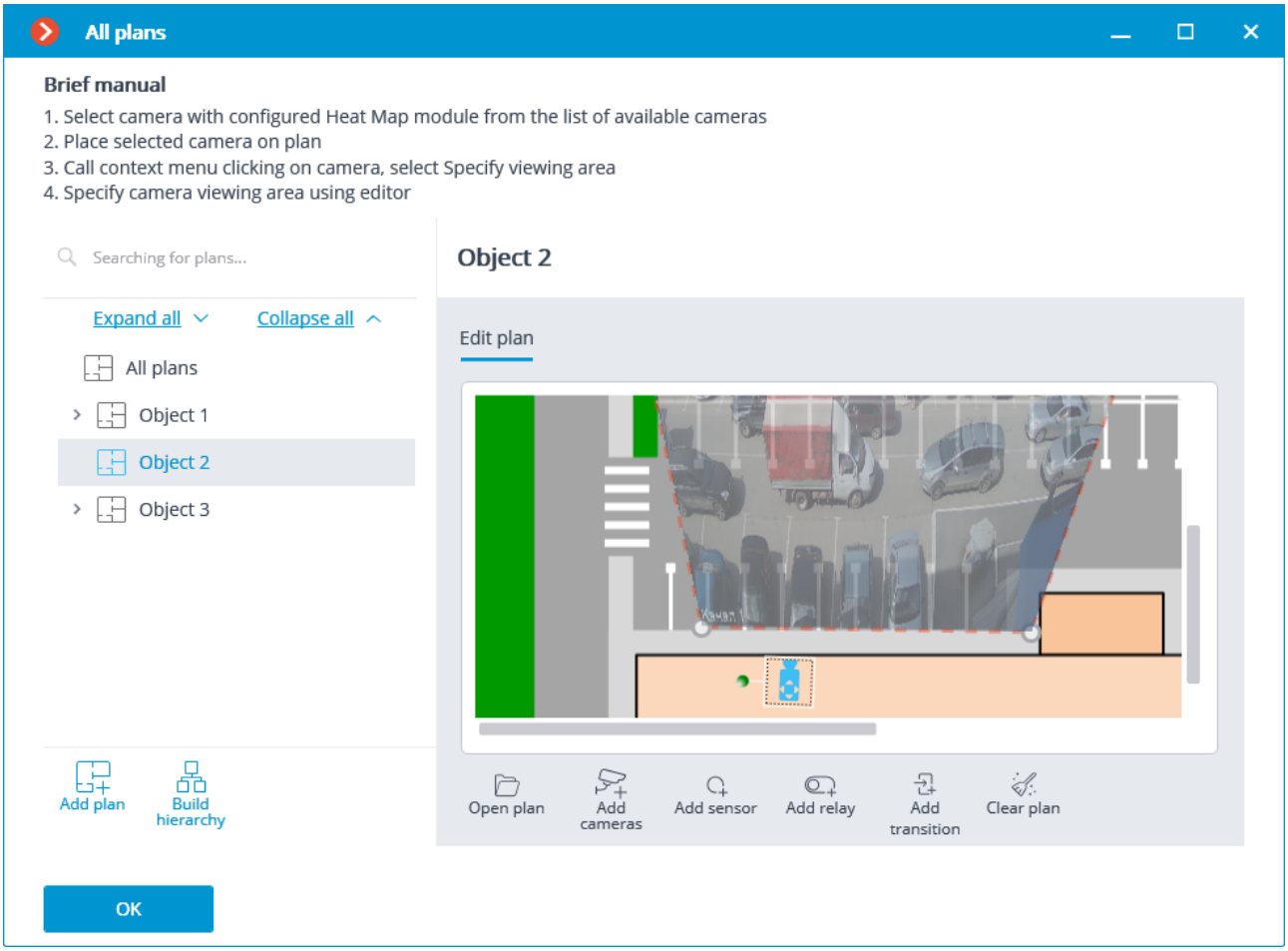


The following settings are to be made in the opened window:

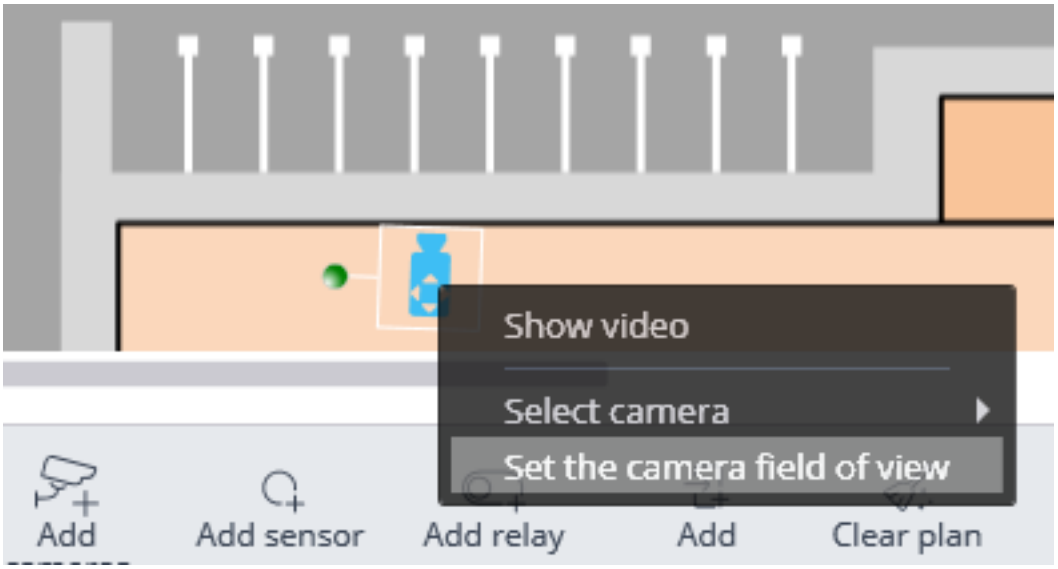
Wake decay time when viewing in real time: sets the time during which the wake of the moving object in the frame disappears completely.

Autosaving of data on plan: when this option is enabled, the server, with the indicated regularity, will save the plan images with the superimposed heat maps for the specified period. This option will work only if the camera being set up and its field of view are placed on the plan.

Clicking on the **Open plans** link will open the plan setup window.



For setting up the field of view, it is required to load the plan, place the camera on it, select the **Set the camera field of view** item in the context menu, then stretch the field of view by the corners to make the image correspond with the plan, then save the field of view settings by pressing **OK**.



For interactive selection of a folder on the drive, click on the **Select folder** link.

⚠ It is only advisable to select the folder interactively if the **Eocortex Configurator** application is launched directly on the server, because in case of performing remote setup, the file explorer of a local computer used for making adjustments will be opened when

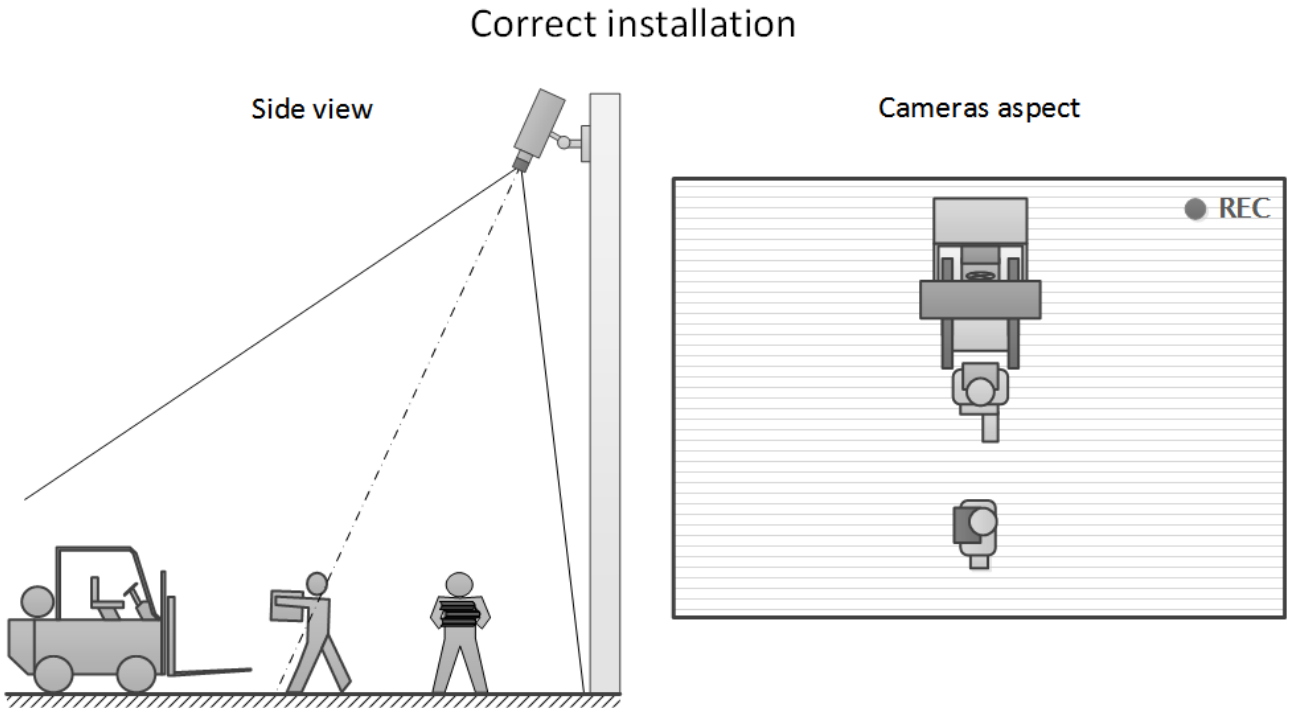
⚠ selecting a folder. Consequently, when performing adjustments from the remote computer, the path shall be entered as text, thereupon the folder must already exist on the server.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

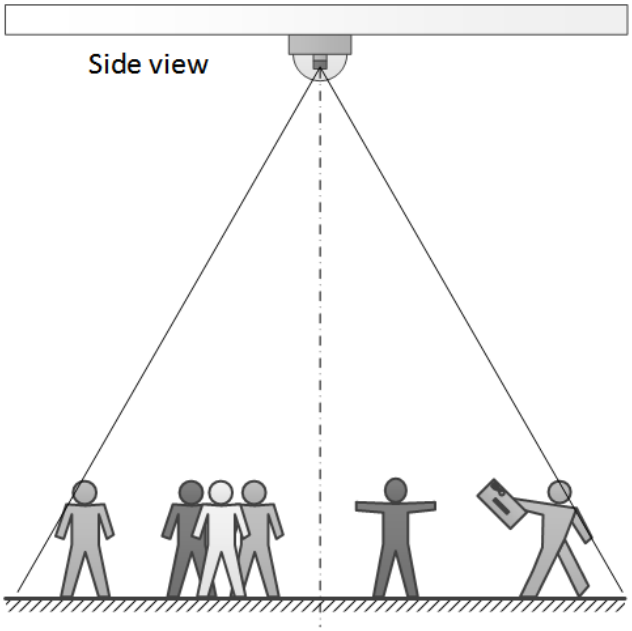
For the proper operation of the module, it is required to install the camera as high as possible to minimize the influence of the perspective and avoid the superimposing of the objects of the foreground on the remote areas. The ideal position of the camera is from above, at right angle to the horizontal plane.

There are no specific requirements regarding framerate, resolution and video stream format.

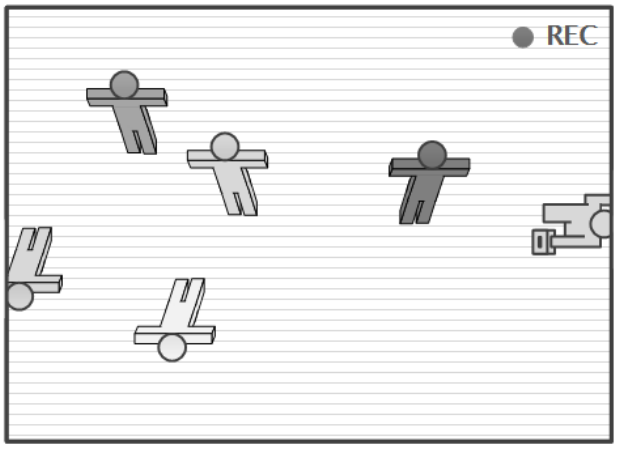


Correct installation

Side view

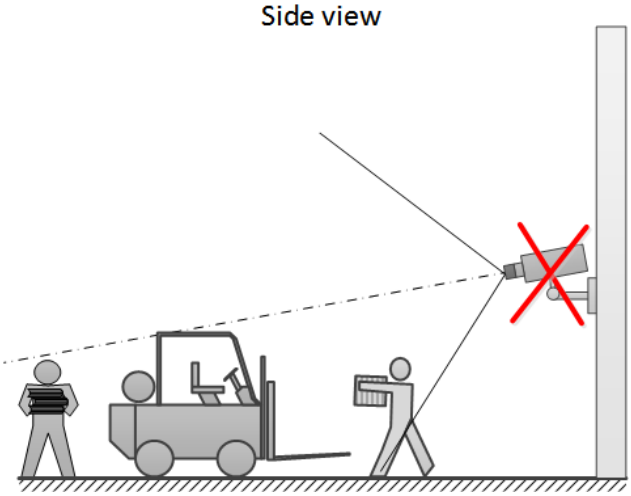


Cameras aspect

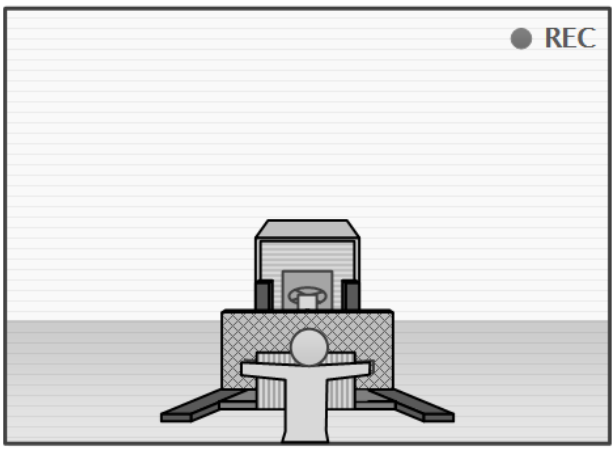


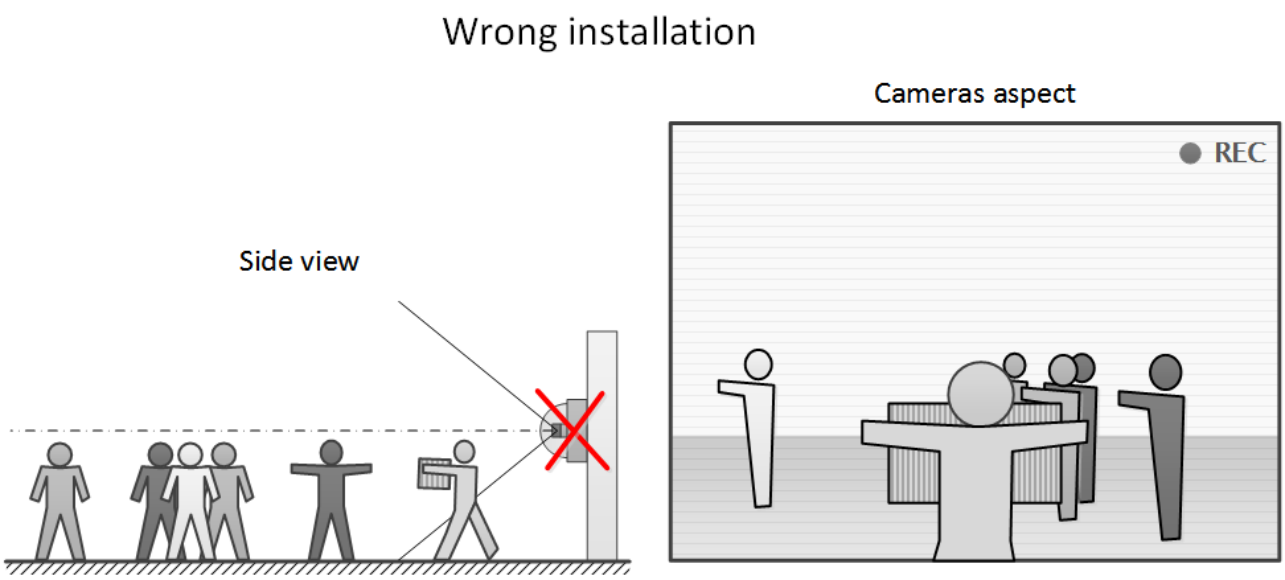
Wrong installation

Side view



Cameras aspect





Licence plate recognition (Complete)

The **Licence plate recognition (Complete)** module is intended for recognizing the license plates of the moving vehicles and saving the information regarding the time and date of recognition, the license plate number and the reference to the corresponding video frame.

Capabilities of the module

- Real-time recognition of the license plate numbers of moving vehicles.
- Recognition of the license plate numbers of the vehicles of 120 countries:

  Abhasia, Accord Dangereuses Route, Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Bolivarian Republic of Venezuela, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Finland, France, Georgia, Germany, Gibraltar, Greece, Grenada, Guatemala, Holy See (Vatican City State), Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Islamic Republic of Iran, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Kosovo, Kuwait, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Madagascar, Malaysia, Malta, Mexico, Monaco, Mongolia, Montenegro, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Ossetia, Panama, Paraguay, Peru, Philippines, Plurinational State of Bolivia, Poland, Portugal, Pridnestrovian Moldavian Republic, Puerto Rico, Qatar, Republic of Korea, Republic of Moldova , Republic of North Macedonia, Romania, Russian Federation, Saudi Arabia, Serbia, Seychelles, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tajikistan, Tunisia, Turkey, Turkmenistan, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, USSR, Uzbekistan, Vietnam, Zambia.
- Recognition of the license plate numbers of vehicles travelling with the following velocities:
- up to 250 km/h for the **Highway** license
- up to 20 km/h for the **Parking** license.
- Recognition of up to 10 license plates in the frame.

- Saving the recognized license plate number in the archive, including the date and time of recognition and the link to the corresponding video frame.
- Real-time comparison of the recognized license plate numbers with the license plate number database and generation of the alarm if the recognized number is in the list of the vehicles to be intercepted.
- Working with the integrated database of automobile license plate numbers: adding and editing of numbers, providing additional information regarding the vehicles, such as color, owner, etc.
- Possibility to import the license plate numbers into the database from a CSV file.
- Creating the groups of license plate numbers for interception, automatic opening of a rising arm barrier etc.; adding a number to one or more groups.
- Searching for the recognized numbers in the archive by time, by date and by additional information from the database.
- Downloading of the recognized license plate numbers to Microsoft Excel or CSV format.
- Automatic sending of the lists of recognized license plate numbers by email.
- Rising arm barrier control.

Details

⚠ Since this module is external and is not included into the basic Eocortex installation package, before setting it up and using it install it on the computer to which the cameras that will use this module are connected.

⚠ The module is intended for recognizing the license plates of moving vehicles only. The parked vehicles' numbers will not be recognized.

ⓘ It is possible to use the capabilities of the **Eocortex API** for the automation of the downloading of the recognized license plate lists.

ⓘ Interaction with the rising arm barriers is performed via signal outputs of the IP cameras.

Use

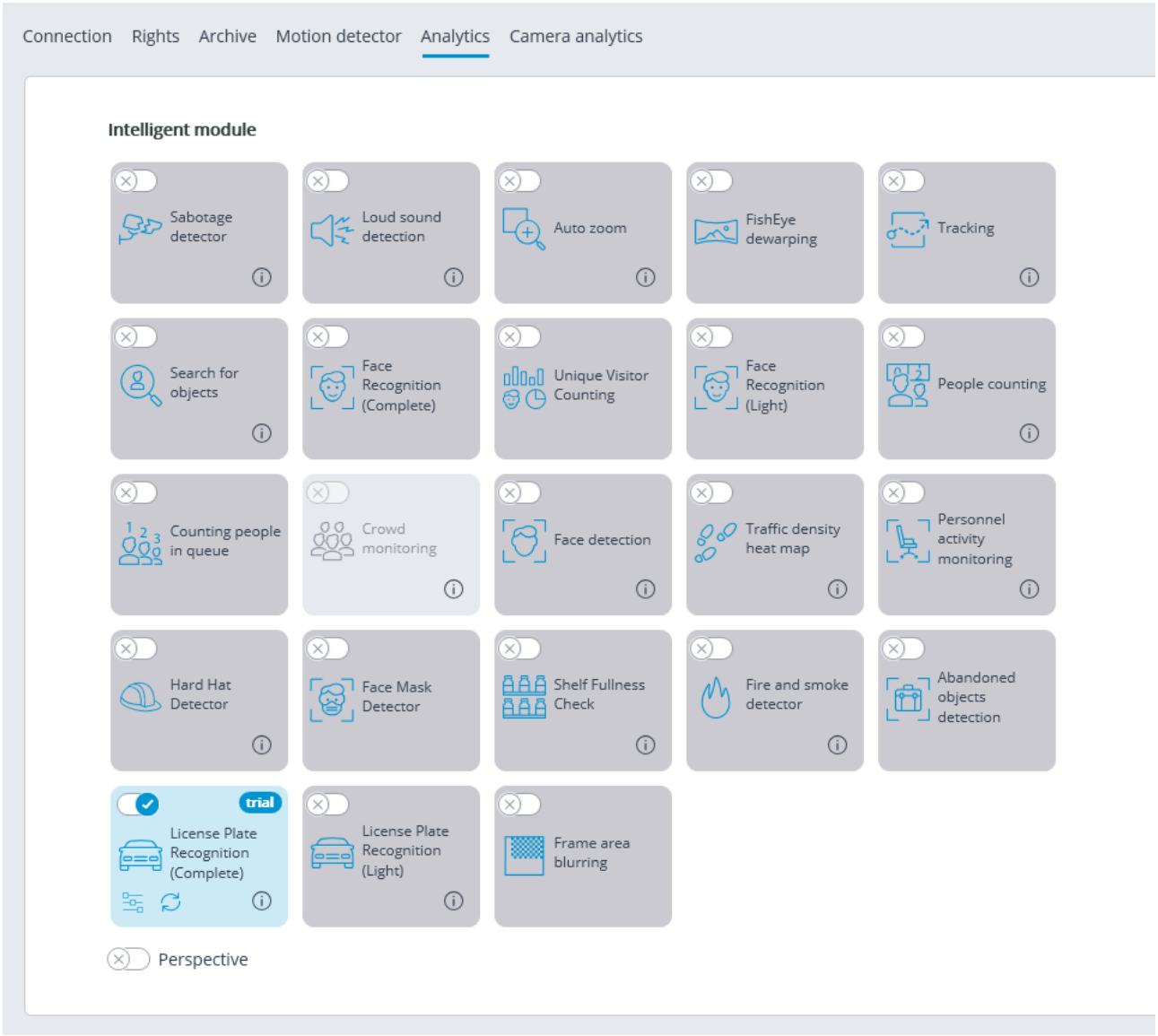
ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

Since this module is external and is not included into the basic **Eocortex** package, before setting it up and using it, install it on the computer to which the cameras that will use this module are connected.

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the

Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.



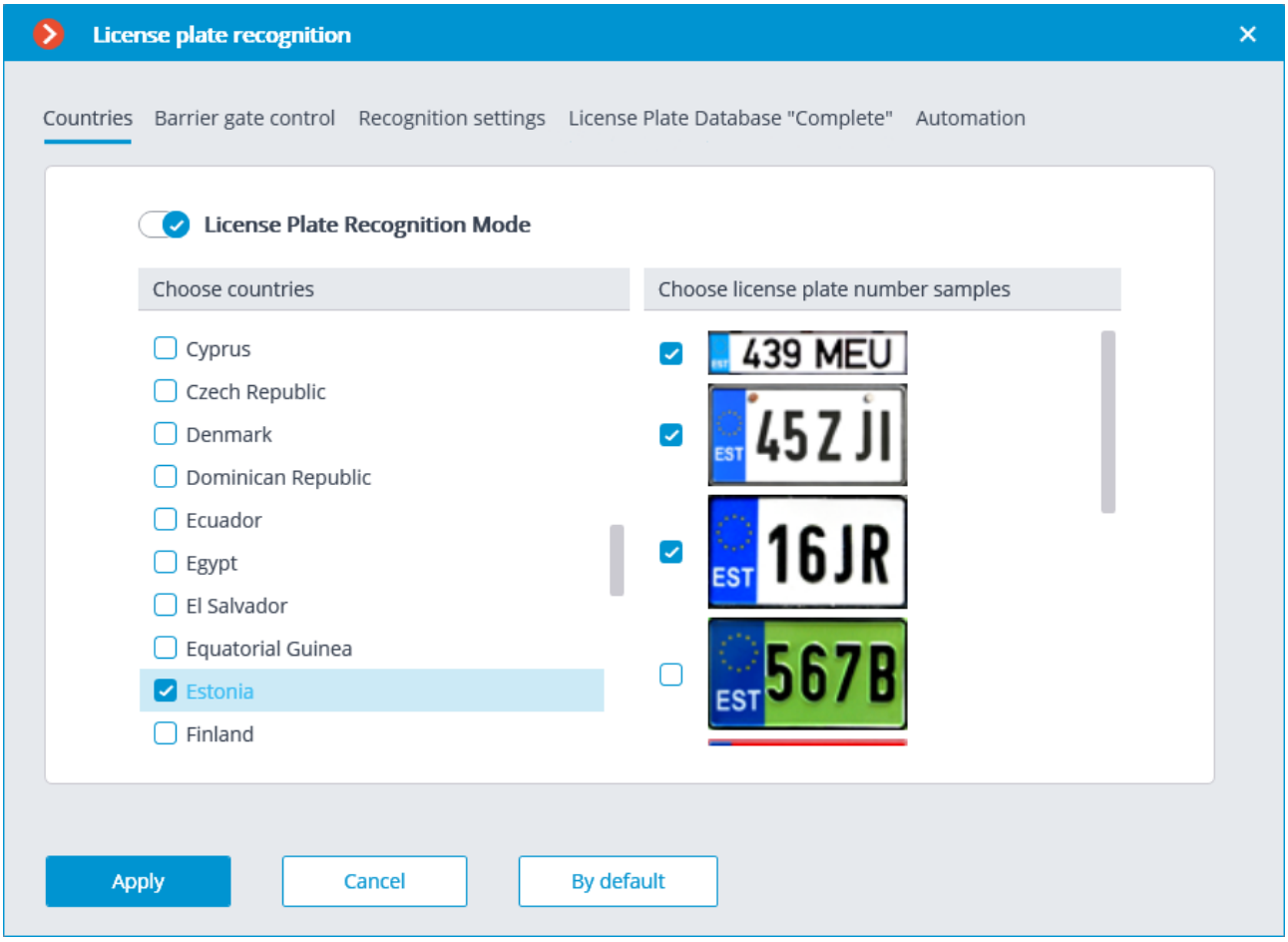
⚠ It is only possible to use one of the two versions of the module on the same camera: **Licence plate recognition (Complete)** or **Licence plate recognition (Light)**.

⚠ In the software motion detector settings, the minimum width and height of the object must be smaller than the dimensions of a vehicle.

Additionally, it is recommended to set the whole frame as the detection area for the software motion detector to ensure reliable recognition.

In the subheader of the module settings window you can see the version of the SDK libraries used by the module for recognizing license plates.

The module settings description is given below.



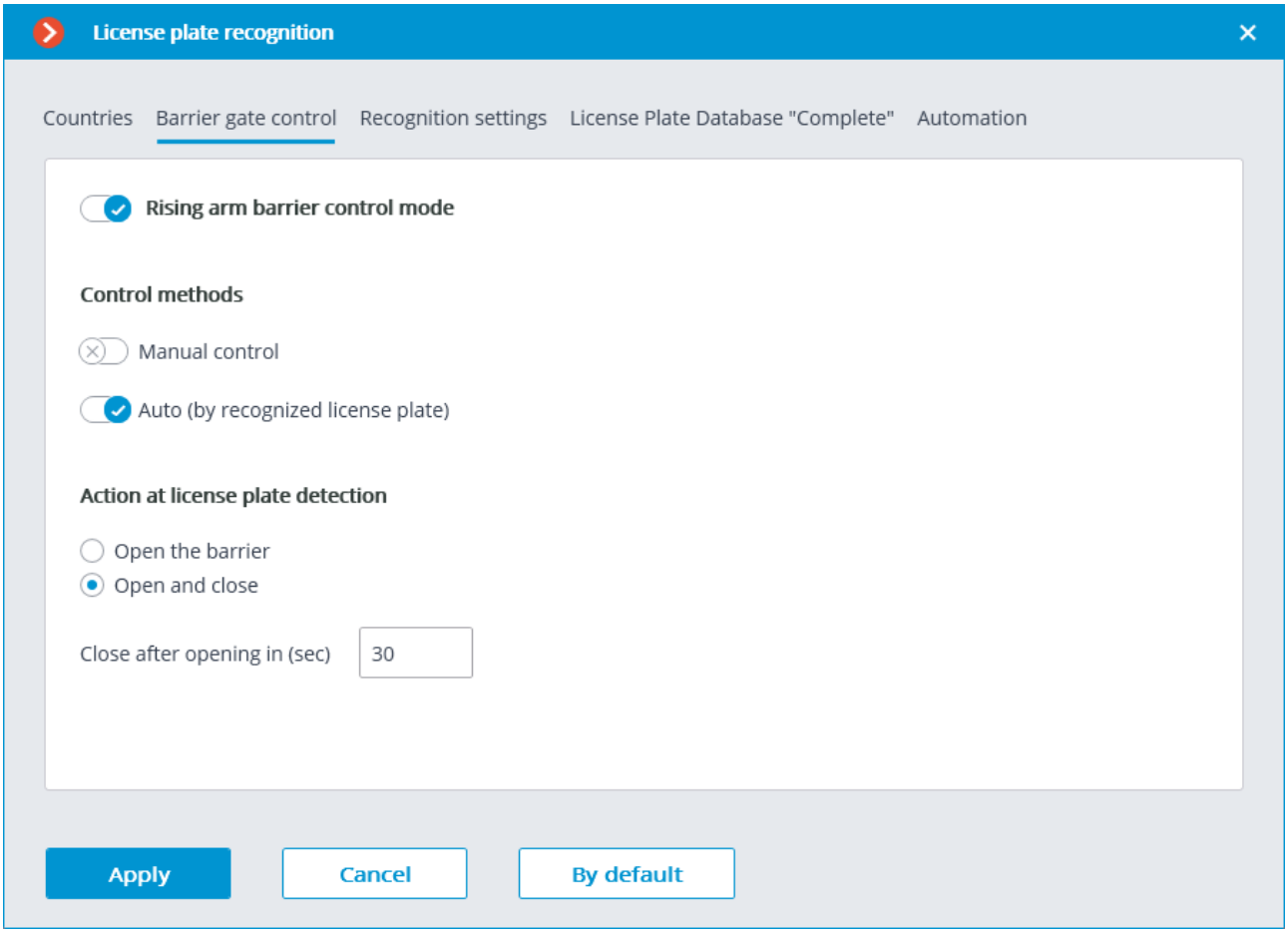
The countries and samples of the license plate numbers to be recognized are set on the **Countries** tab.

In order to gain access to the settings of the countries and samples, it is required to activate the **License plate Recognition Mode** switch. If this option is disabled, the recognition will not be performed; this mode can be used when the module is only utilized to control the rising arm barrier.

With the license plate recognition module enabled, it is required to tick the countries the license plates of which will be recognized by the module, and the corresponding samples of the license plates for each selected country. The countries and samples not ticked will not be recognized.

⚠ The empty list of countries means that the **Licence plate recognition (Complete)** module is not installed, or that errors occurred during its installation, or that there is no protection key, or its activation encountered problems.

⚠ The more countries and samples have been selected for recognition, the higher the computing load on the server. When the processor load exceeds 80%, the recognition quality may drop significantly.



The settings of the module's interaction with a rising arm barrier can be made on the **Barrier gate control** tab.

The **Rising arm barrier control mode** must be activated to access the settings of the module's interaction with a rising arm barrier.

To use the module only for controlling a rising arm barrier, the **Licence plate recognition (Complete)** module license or protection key is not required. However, for ensuring the abovementioned functionality, it is necessary to have the **Licence plate recognition (Complete)** module support indicated in the **Eocortex** license file or software key for the corresponding quantity of cameras.

When the rising arm barrier control mode is activated, the following capabilities are available:

Control methods:

- **Manual control**: allows the operator to open and close the barrier using the **Eocortex Client** application.
- **Auto (by recognized license plate)**: allows to open the rising arm barrier automatically if the recognized number is in the white list, i.e. is included in the group of vehicles for which the automatic opening of the barrier is envisioned.

In case the automatic rising arm barrier control is activated, the following options are available:

- **Open the barrier**: if the recognized number is in the white list, the **Eocortex** server generates a command to open the barrier.

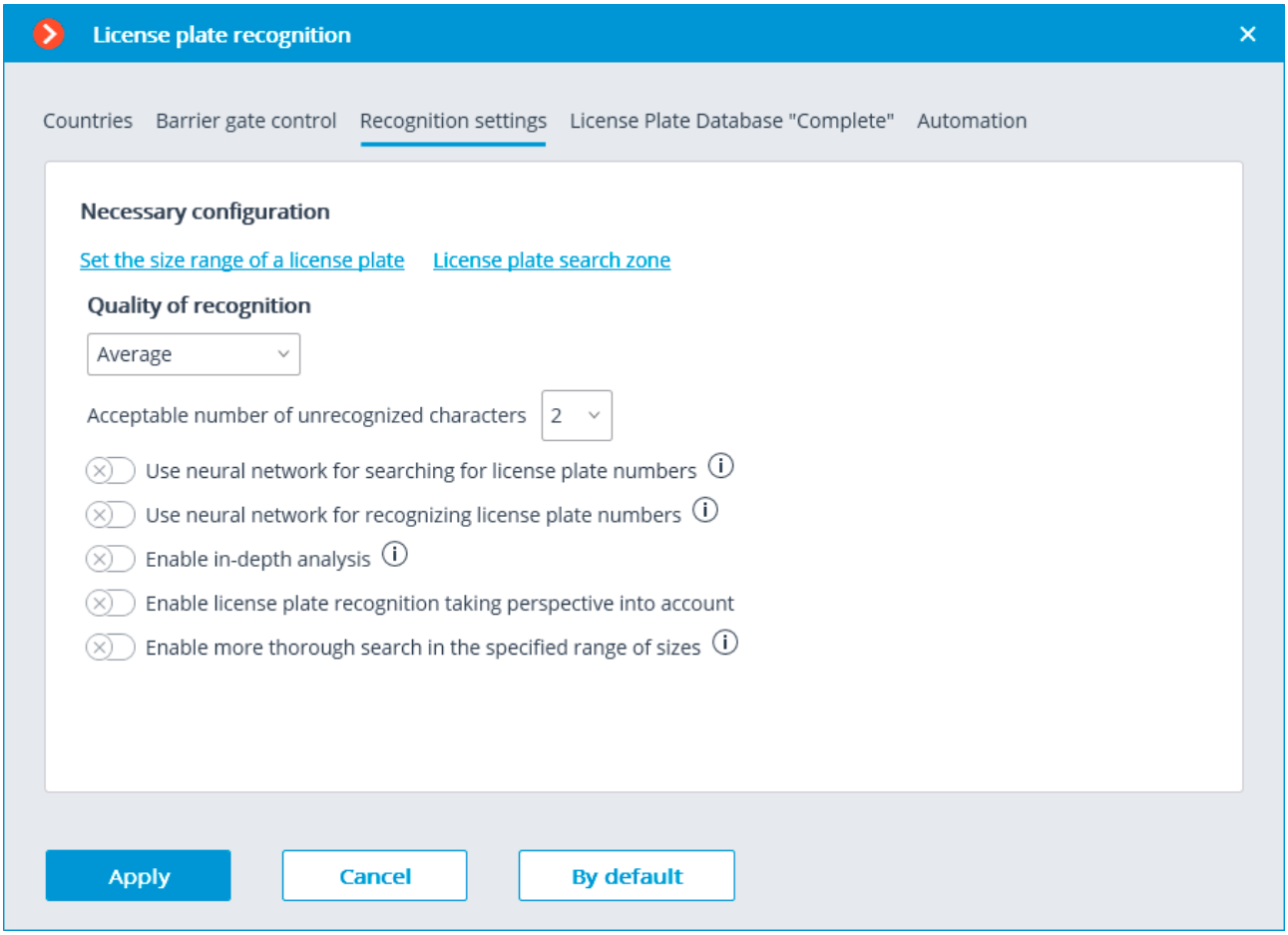
- **Open and close**: if the recognized number is in the white list, the Eocortex server generates a command to open the barrier; then, in a number of seconds set in the **Close after opening in (sec)** field, a command for closing the barrier is generated.

ⓘ Most of the modern rising arm barriers automatically close after the passing of one vehicle. For such barriers, the **Open the barrier** option shall be selected.

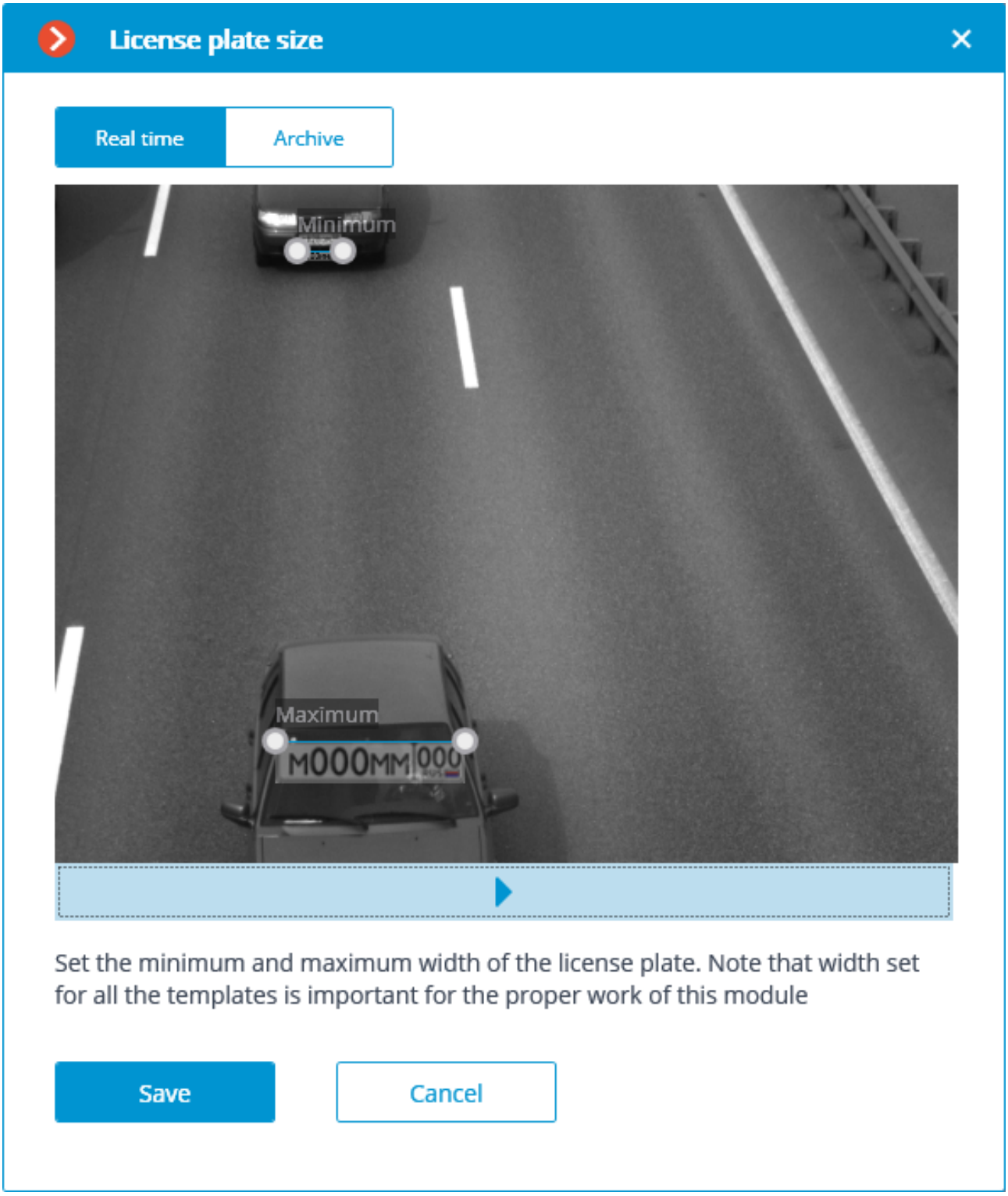
⚠ When the **Open and close** option is selected, it is imperative that the barrier itself has a feature of preventing its closing when a car is below the rising arm. It means that after generating the closing command the barrier's automatics must check if there is a vehicle or a person on the line of closing, and proceed with the closing only in the absence of the above.

ⓘ Both in manual and in automatic barrier control mode, the opening or closing command is understood as the generation of the Request to open rising arm barrier or Request to close rising arm barrier event, correspondingly. To control the rising arm barrier, it is required to set the actions for these events depending on the control wiring diagram of the particular barrier.

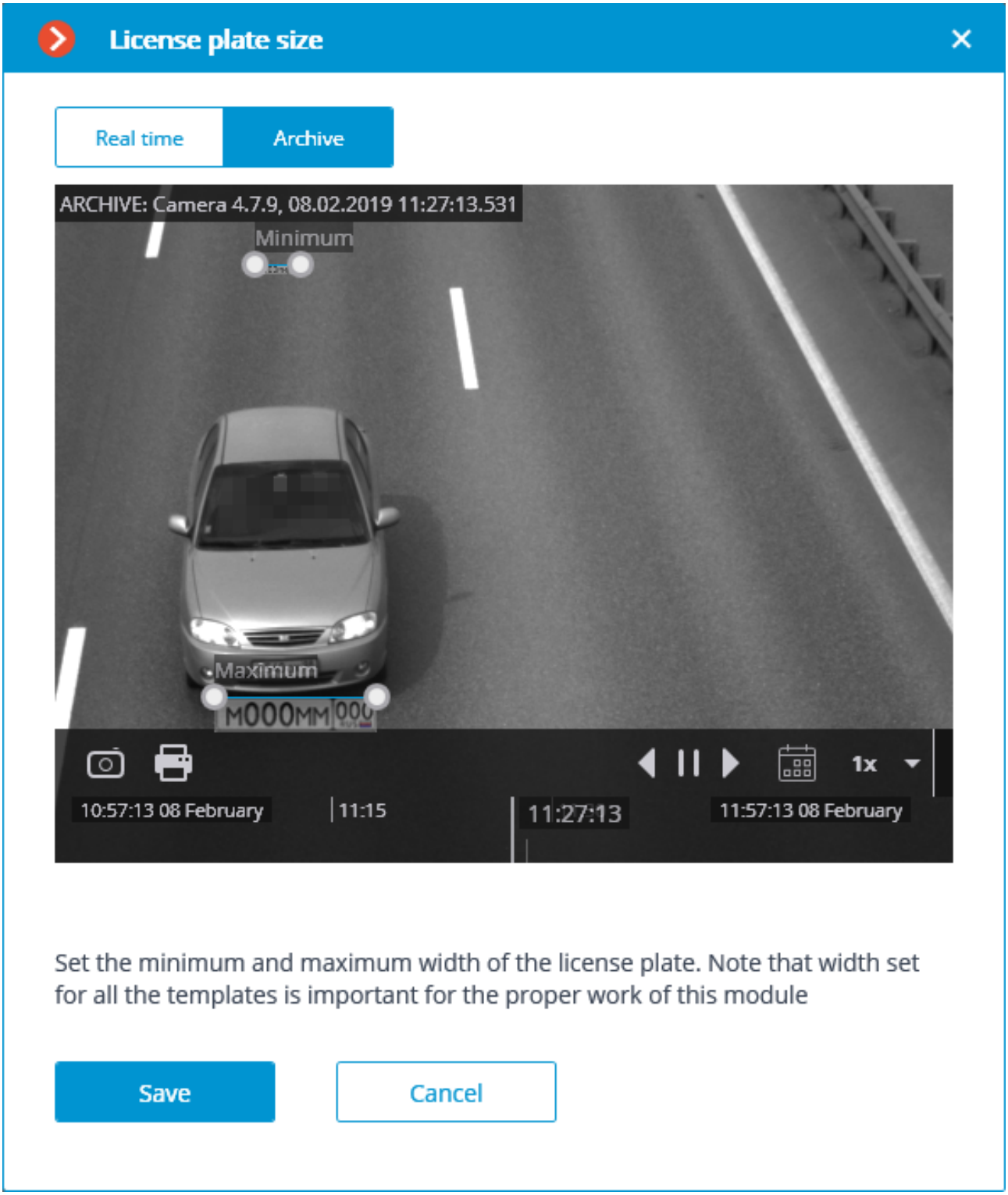
The recognition algorithm settings are made on the **Recognition settings** tab.



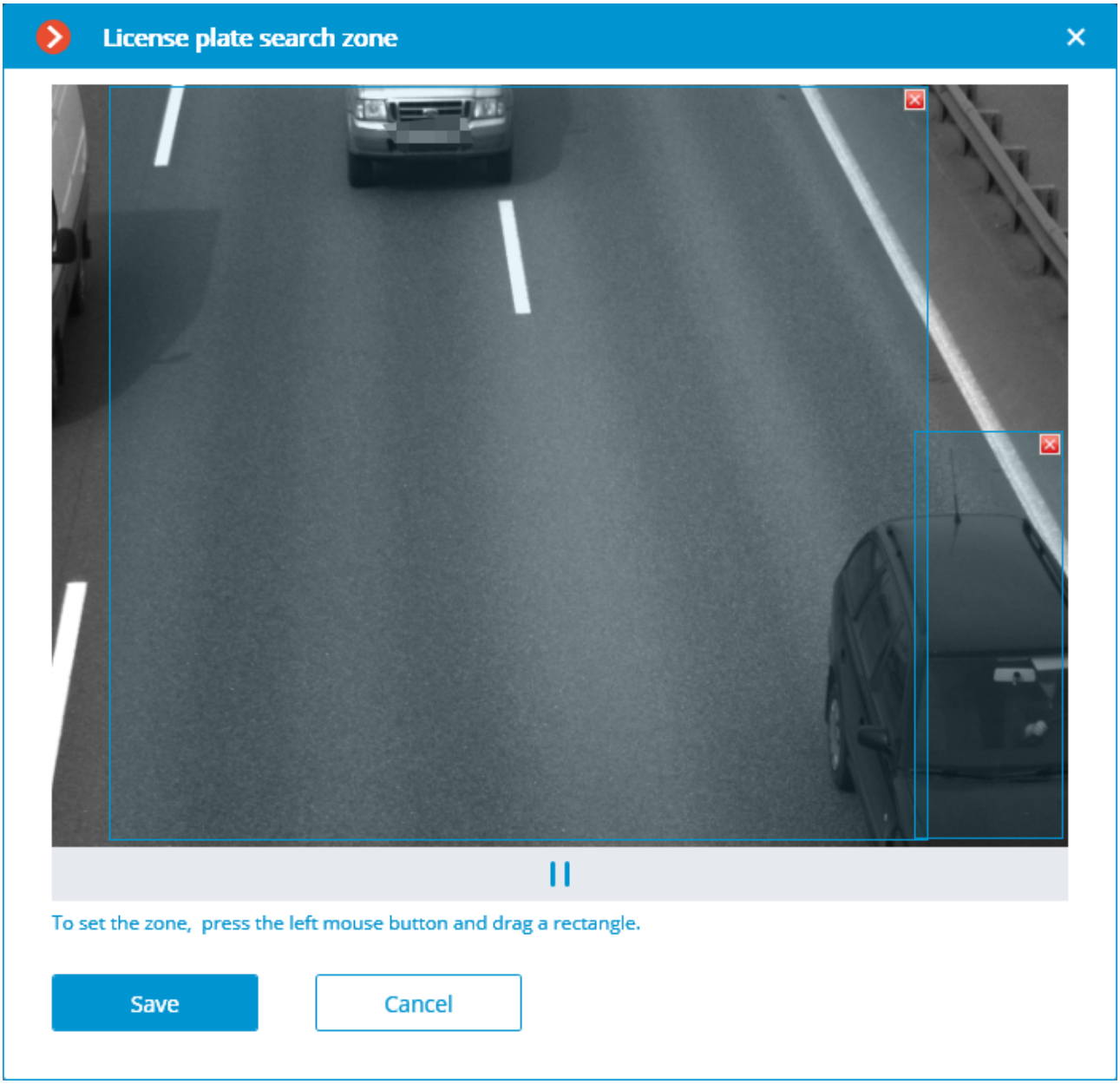
Set the size range of a license plate opens the window of setting the minimum and maximum width of the license plates to be recognized.



It is required to specify the minimum and maximum width of the plates to be recognized with the help of the adjustment scales. The scales can be moved by dragging them by the left round marker. The stretching and the contraction of the scales is performed by moving the right round marker.



License plate search zone opens the window of setting up the zones of the frame where the license plate numbers to be recognized will appear.



For creating a new zone, it is required to press the left mouse button and, holding it, select a rectangular area. The total area uniting all the set zones will be used for recognition. To delete the zone, click on the close icon in the upper right corner of the zone.

Quality of recognition is the internal parameter of the module's operation. It sets the filtering by the quality of recognition, meaning that the license plates the reliability of whose recognition is lower than a preset value will be automatically discarded. The value of this parameter shall be selected tentatively: when it is higher, the reliability of the recognized numbers will be higher, but the total quantity of the recognized numbers will be smaller; when it is lower, the quantity of the recognized numbers will be larger, but the number of recognition mistakes will increase.

The **Acceptable number of unrecognized characters** setting filters the license plate numbers by the quantity of the unrecognized symbols: the plates where the number of unrecognized symbols is bigger than the preset value will be automatically discarded.

Use neural network for searching for license plate numbers: Enabling this option allows to increase accuracy of searching for number plates. However, the server load from the given camera will increase 50% approx.

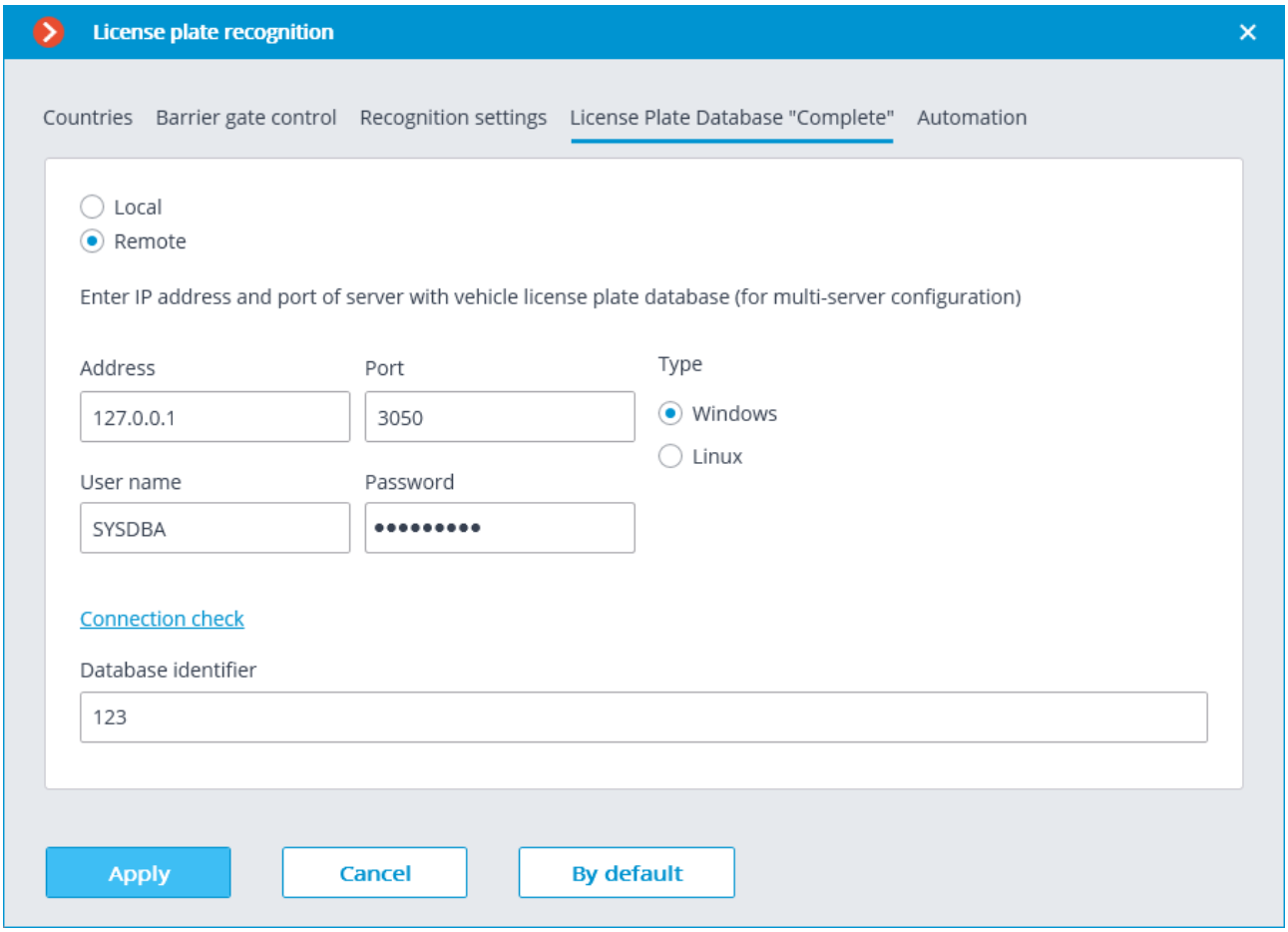
Use neural network for recognizing license plate numbers: Enabling this option will increase accuracy of license plate symbols' recognition. However, the load on the server from the given camera will increase 50% approx.

Enable in-depth analysis: Enabling this option allows to improve license plate recognition accuracy under unfavorable conditions, e.g. when the camera's parameters are not in complete conformance with the relevant requirements, or when the weather conditions are poor. Using this option leads to the increase of the frame processing time of 20 to 30%. Under normal conditions, this parameter has no effect on the recognition quality.

Enable license plate recognition taking perspective into account: allows to make allowance for a perspective distortion.

Enable more thorough search in the specified range of sizes: Enabling this option allows to improve recognition accuracy in a case when the difference between the minimum and the maximum dimensions of the license plate number is very big (more that three times). In this case, the load on the server from the given camera will increase 30% approx.

The access to the license plate database can be set on the **Database** tab.



If the license plate recognition is performed only on one server, it is recommended to set the value to **Local**.

In the multiserver system, the database can be stored on one server only. In this case it is required to select **Remote** and indicate the **IP address** and the **Port** of the server, as well as the **User name** and **Password** of the database administrator.

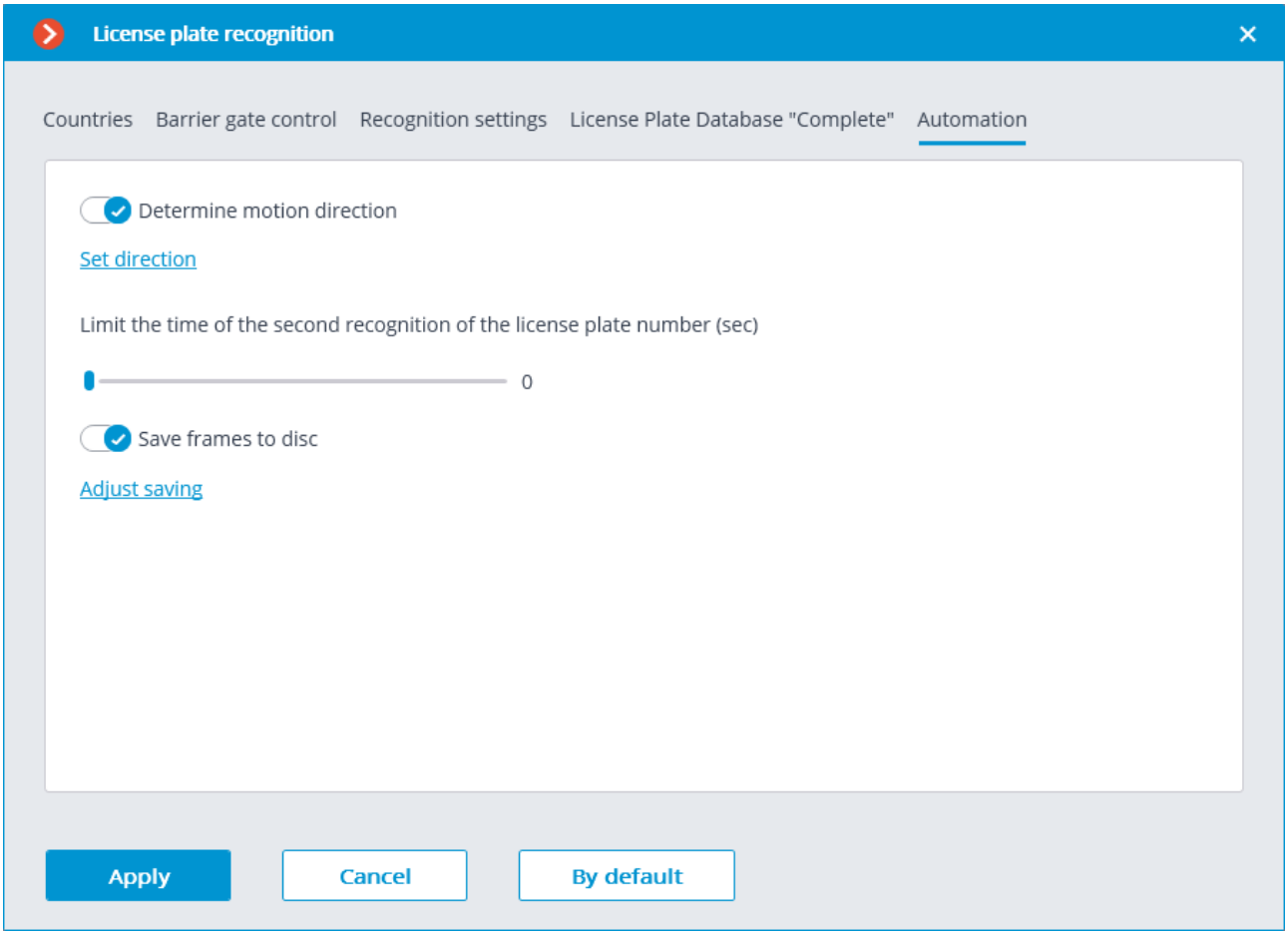
Eocortex uses **Firebird** database management system with the following default values: database connection **Port** – **3050**, **User name** – **SYSDBA**, **Password** – **masterkey**.

⚠ The server where the license plate database is stored must be assigned as the main server for at least one camera that uses the **Licence plate recognition (Complete)** module.

The **Database identifier** field sets its own license plate database for an individual camera or groups of cameras.

⚠ The field **Database identifier** is not initially displayed at the launch of the module.

ⓘ To use this capability, it is required to set **Database identifier** via REST API.



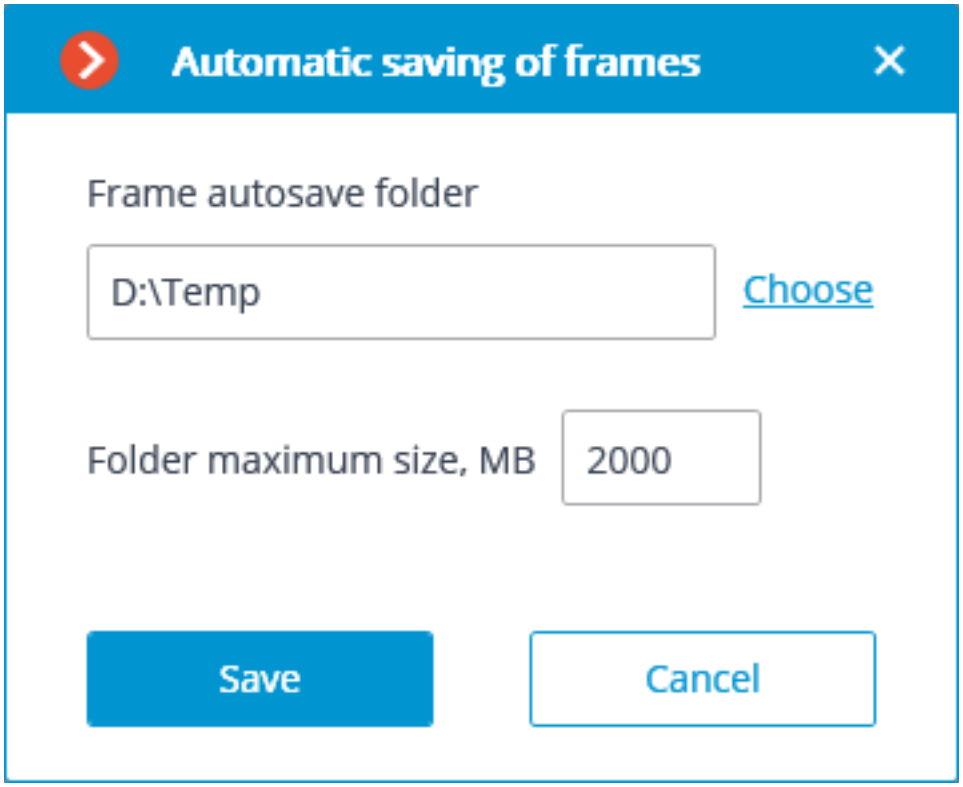
The following settings are available on the **Automation** tab:

Limit the time of the second recognition of the license plate number is used for setting the period of time starting from the initial recognition of the license plate number during which no attempts to recognize the same number will be made.

ⓘ This setting may be useful, for example, for the situations involving the automatic opening of a rising arm barrier, when the vehicle stops before the barrier and the module may attempt to recognize its license plate one more time after the vehicle starts to move again. Such repeated recognition may also happen when the license plate was temporarily blocked by some object.

Determine motion direction enables the mode of determining the travel direction. After activating this mode, it is required to click on the **Set direction** link and select the arrow that specifies the entrance direction in the opened window. In this case the vehicles travelling in the opposite direction will be considered as the ones leaving the area.

Save frames to disc activates the mode of automatic saving the frames with the recognized license plate numbers to disc. After enabling this mode, click the **Adjust saving** link, and in the opened window indicate the folder where the image files with the recognized license plates will be stored, then specify the **Maximum folder size, Mb**.



⚠ If the size of the saved files exceeds the maximum preset limit, the saving of the frames will continue, but the oldest files will be deleted to uphold size restrictions.

ⓘ If **0** is specified in the **Maximum folder size, Mb** field, the folder size will not be limited.

⚠ It is only advisable to select the folder interactively using the Choose link if the **Eocortex Configurator** application is launched directly on the server, because in case of performing remote setup, the file explorer of a local computer used for making adjustments will be opened when selecting a folder. Consequently, when performing adjustments from the remote computer the path shall be entered as text, thereupon the folder must already exist on the server.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

For the proper operation of the module, it is imperative to correctly select, place and set up the camera, adjust the software motion detector and the module itself. When choosing the camera, it is recommended to consider the image quality requirements, control zone particularities, and the conditions of the camera installation and operation.

Requirements to the license plate image

It is assumed that the license plates of the vehicles to be recognized correspond to the requirements of the Vienna Convention on Road Traffic (Part I: Convention on Road Traffic – Attachment 2), in particular:

"2. The registration number shall be so composed and displayed as to be legible in normal daylight at a distance of at least 40 m by an observer placed on the axis of the vehicle, the vehicle being stationary ..."

"3. When the registration number is displayed on a special plate, this plate shall be flat and fixed in a vertical or nearly vertical position and at right angles to the vehicle's median longitudinal plane".

The license plate number will be recognized only if its image is rich in contrast and fits entirely in the frame.

Additionally, there is a requirement regarding the minimum height of a symbol on the image of the license plate in the frame (i.e. the height at which it is still possible to provide recognition): 30 pixels. This limitation is illustrated on the picture below. You can also see the minimum permissible dimensions for the license plate of Ukraine and Russia (the overall width is given for reference because it may help when calculating the focal distance).

When the camera is installed outside, the natural noise pollution of the video image may happen due to the unfavorable weather conditions (rain, snow). In order to improve recognition in such circumstances, it is advisable to increase the size of the license plates in the frame.

Recommendations on camera installation

In this section you will find the recommendations on camera installation that need to be followed in order to ensure the reliable recognition of license plates in the control zone. Each installation location has its individual characteristics. This section contains the typical camera installation diagrams. They are to be taken into consideration at the stage of designing the traffic video surveillance systems with due account for the specific parameters of the site.

The correctly performed installation must ensure the following:

- The license plate image in the frame must correspond with the requirements specified in the previous section;
- The maximum duration of presence of the license plate in the frame.

It is also necessary to fulfill the following requirements listed below (both for highway and checkpoint installation locations).

To minimize the occurrence of false triggering in the process of recognition, it is imperative to install the camera in such a way as to avoid the presence of the high-contrast objects in the frame, for example, billboards, trees, grille fences etc.).

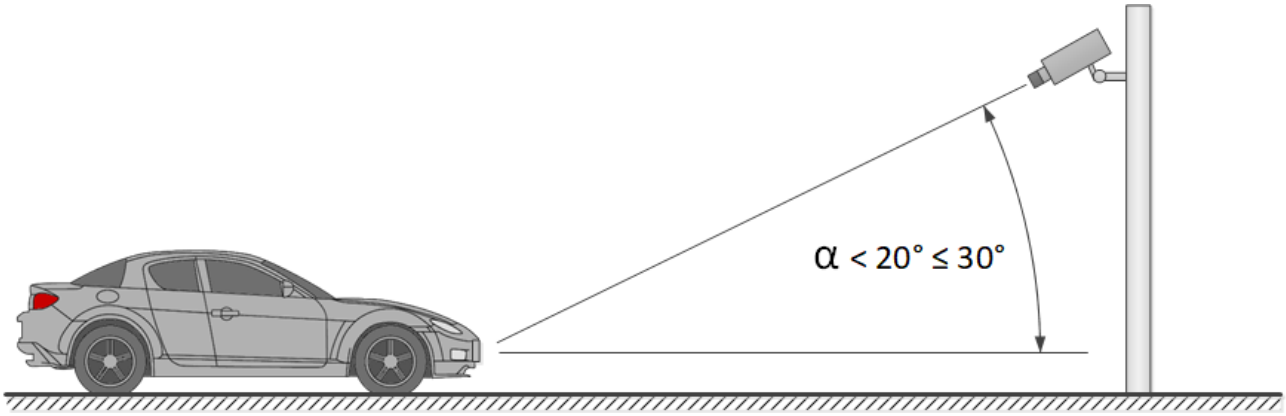
In order to avoid camera flaring, it shall not be directed at the light sources (the Sun, streetlamps) and at the highly reflective objects.

To prevent the distortion of the symbols on the license plate image, it is advisable to ensure the optimal camera installation angles. When performing the surveillance on descending or ascending vehicles, the road inclination angle must also be taken into consideration.

Vertical camera installation angle

Recommended: up to 18–20°

Maximum permissible: 30°



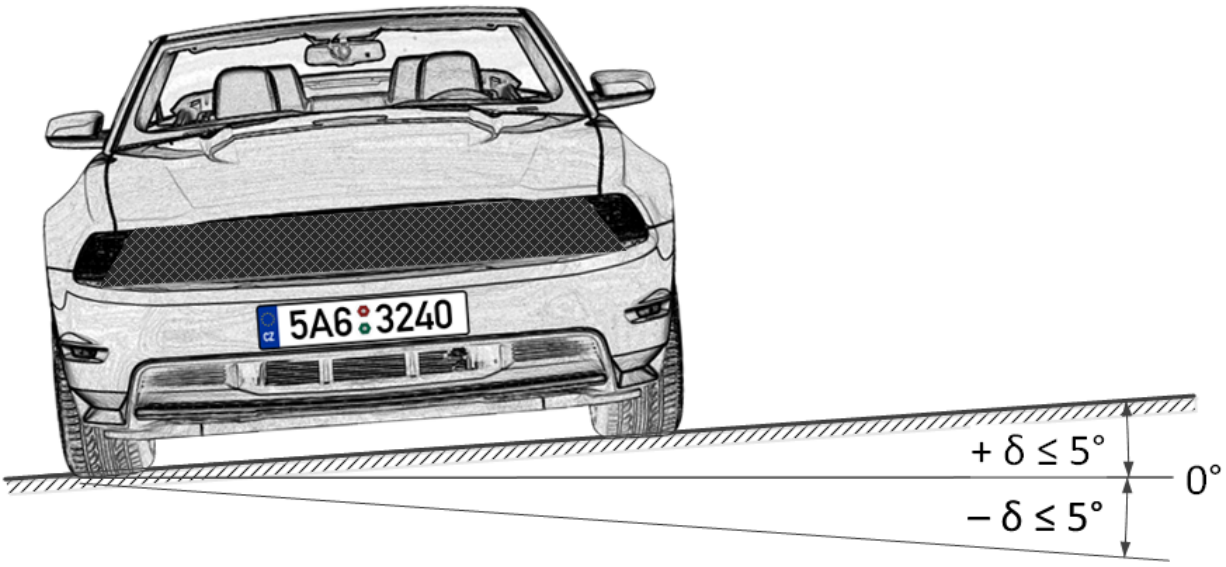
Horizontal camera installation angle

Recommended: up to 5–10°

Maximum permissible: 20°

In the course of the installation, it is required to ensure that the tilt of the license plate on the image in relation to the horizontal plane of the camera does not exceed 5° both clockwise and counterclockwise. When recognizing the single line numbers with no more than six symbols it is possible to check the appropriateness of the selected camera tilt angle using the "single line rule": the imaginary horizontal line must cross the first and the last symbols of the license plate.

Permissible license plate banking angle



Single line rule

The distance from the camera installation location to the beginning of the viewing zone is determined by the focal length of the lens. And conversely, if the distance from the camera installation location to the center of the control zone is known, it is required to ensure the appropriate focal length of the lens.

When using the separate IR illuminator, the angle of the infrared light must correspond to the camera viewing angle. The correspondence of the IR illuminator beam angle and the camera lens viewing angle is especially important at the large distances, when the camera operates at the limit of its sensitivity.

The typical camera installation diagrams for license plate recognition are given below.

Camera installation on a checkpoint

When performing video surveillance of the entrances and exits of the protected areas, the speed of the vehicles normally do not exceed 20 km/h, meaning that it is possible to use the license plate recognition module in the Parking mode. In this case, the camera is normally installed at the edge of the lane.

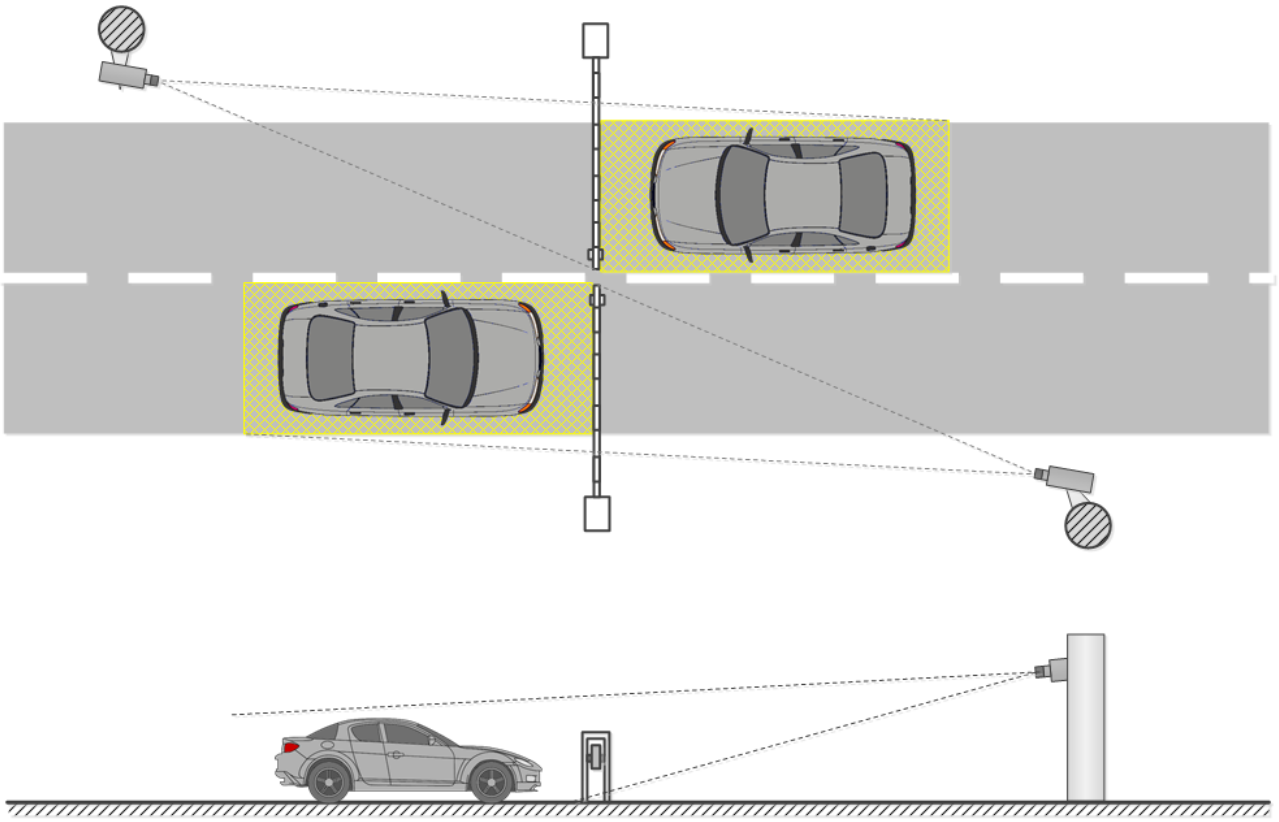
- The camera installation height shall be above the level of the headlights of the vehicles.
- The distance between the place of installation and the focus area must be at least 3 meters.

The installation of the camera in close proximity to the prospected license plate detection area and the usage of the short focus lenses lead to the depth of field reduction and the distortion of the image at the edges. Both must be avoided to ensure reliable recognition.

For the separate control of the exits and entrances, it is recommended to install separate cameras, one on the entrance and the other on the exit. When only one camera is used, the vehicles travelling in the opposite directions may block one another. Moreover, it is advisable to separate the traffic lanes not only with road marking, but also with a barrier, where the width of the road allows it.

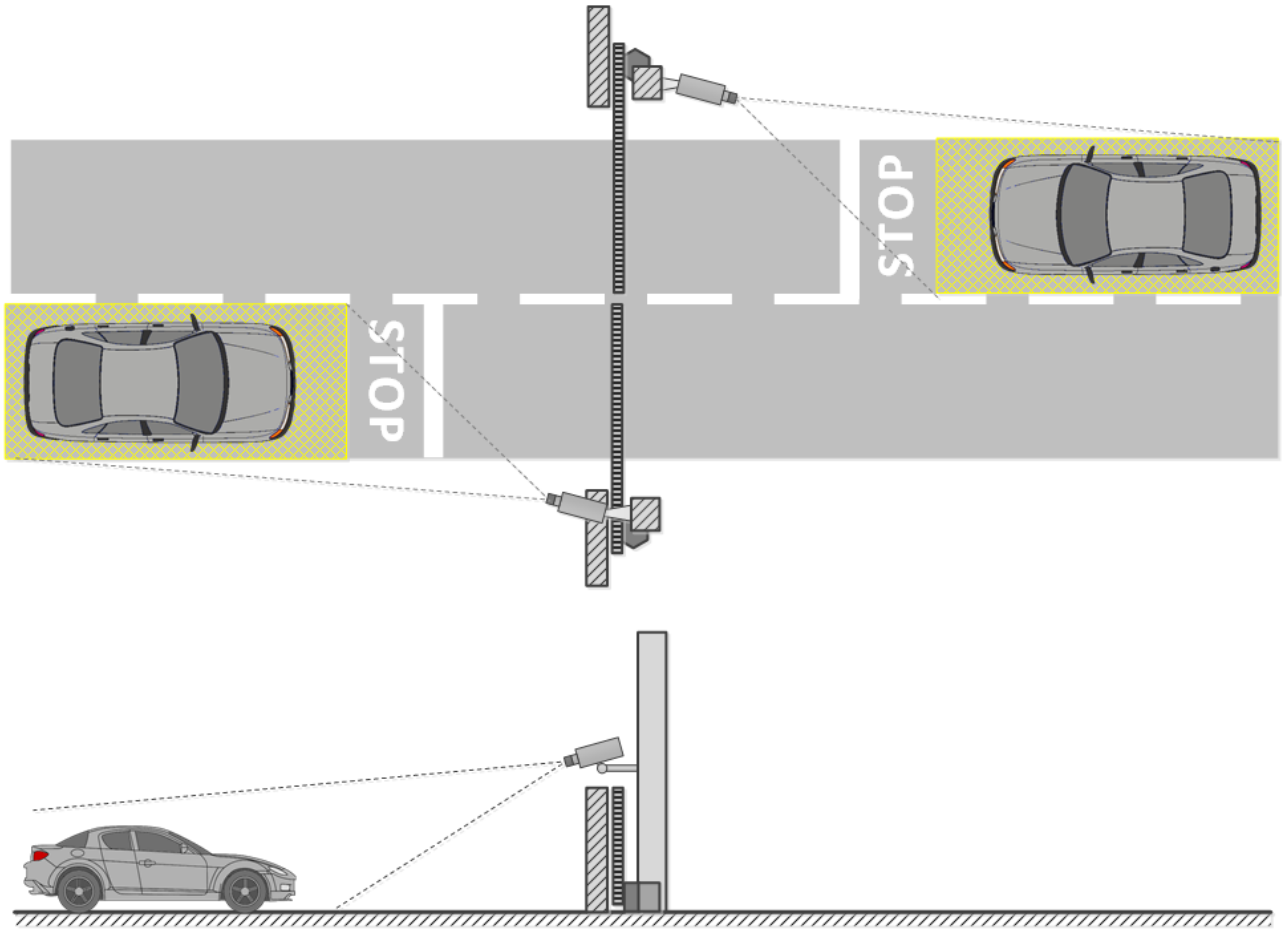
When using the rising arm barrier, the controlled area may start immediately before it. In this case the camera is to be installed at a distance from the barrier line.

Controlled areas with separate lanes and a rising arm barrier



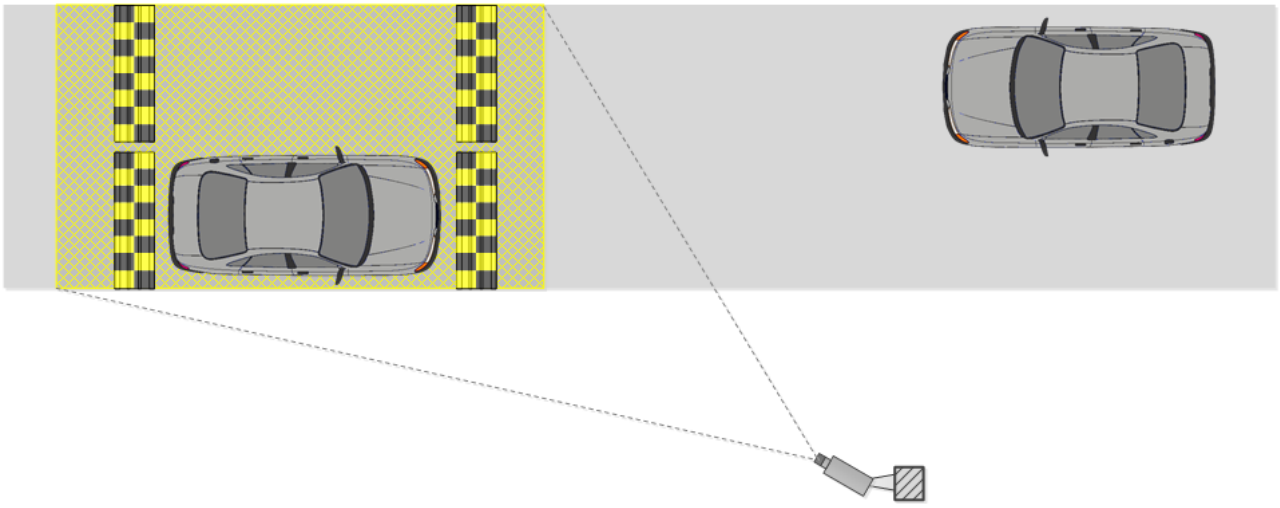
When using the gates, the controlled area must not start immediately before the gates, because the camera is usually installed at the level of the gates. In such a case a stop line, a mandatory stop sign or a traffic light is used for stopping the vehicle in the controlled area.

Controlled areas with separate lanes and gates



At the unregulated crossing points it is required to use speed bumps (road humps) to make the drivers reduce speed to ensure successful recognition; it is also advisable to use additional means such as the speed limit signs (up to 5 km/h), mandatory stop signs, stop lines etc.

Open controlled area with two-way traffic



The suggested camera installation parameters for surveillance of exits and entrances calculated for the cameras with the sensor size of 1/3" are shown in the following table. These parameters allow to provide the minimum distance between the camera installation location and the controlled area of the given width.

It is also required to be guided by the quality of the license plate image in the focusing area in the course of the installation.

Sensor size: 1/3"						
Installation height (m)	**1**	**1,5**	**2**	**2,5**	**3**	**4**
Area width: 3 m						
Vertical angle, °	18	25	30	30	30	30
Focal distance (mm)	5	5	6	7	8	11
Near zone (m)	1,3	1,6	1,9	2,6	3,5	5
Focal zone (m)	3,1	3,4	3,5	4,3	5,2	7
Far zone (m), м	∞	20	8,5	9	9,6	10
Area width: 6 m						
Vertical angle, °	9	14	19	23	28	30
Focal distance (mm)	5	5	5	5	5	6
Near zone (m)	1,7	2,2	2,5	2,7	2,7	4
Focal zone (m)	5,7	6	5,8	5,9	5,6	7
Far zone (m)	∞	∞	∞	44	21	17

The parameters shown in the above table are indicative. It is strongly recommended to calculate the camera installation parameters individually, using the CCTV calculator, with due regard for the design and operational characteristics of the particular cameras and their working environment.

Camera installation on a highway

When organizing the surveillance on a highway, the camera is normally installed on an L-shaped pole at the edge of the lane or on the arch support above the center of the lane.

The standard installation height is 4 to 6 (maximum 20) meters.

The vertical camera tilt angle is regulated by the basic guidelines.

The distance to the controlled area and, correspondingly, the focal distance of the lens are determined based on the camera installation height, tilt angle and width of capture.

The higher the camera is installed, the higher is the probability that the license plates of the vehicles moving at a small distance from one another (for example, in case of a traffic jam) will get into the frame. But it needs to be noted that the increase of height leads to the higher distortion of the license plate images, and the symbol size may be close to the permissible minimum (or may even be unacceptable). In such cases it is possible to shift the region of interest to the higher distance by reducing the camera vertical tilt angle and changing the focal distance in order to ensure reliable recognition.

The modern IP cameras are capable of covering several (up to 4) traffic lanes. Thus, it is possible to reduce the quantity of cameras to be installed in the controlled area. But in this case it is required to choose the installation height, tilt angle, and focal length in such a way as to minimize the optical image distortion (for example, the short focus lenses give significant image distortion on the periphery of the frame).

In the table below you will find the approximate parameters of camera installation for performing video surveillance on a highway. The camera parameters used for the calculation are as follows: 1/3" sensor and 5-50 mm varifocal lens. The values shown in the table allow to provide the minimum distance from the camera installation location to the controlled zone of the specified width. In the course of the installation it is imperative to ensure the quality of the license plate image to be obtained by the camera in the focal zone.

Sensor size: 1/3"					
Installation height (m)	**4**	**6**	**10**	**15**	**20**
Area width: 3 m					
Vertical angle, °	30	30	30	30	30
Focal distance (mm)	11	17	28	42	(56)*
Near zone (m)	5	8,2	15	23,6	(32)
Focal zone (m)	7	10,4	17	26	(34,6)
Far zone (m)	10	13,5	20	29	(37,4)
Area width: 6 m					
Vertical angle, °	30	30	30	30	30
Focal distance	6	8	14	21	28

Sensor size: 1/3"					
Installation height (m)	**4**	**6**	**10**	**15**	**20**
Area width: 3 m					
Area width: 6 m					
(mm)					
Near zone (m)	4	6,5	13	21,5	30
Focal zone (m)	7	10,4	17	26	34,6
Far zone (m)	17	19,2	24	32	40,4

The table above contains the indicative values. It is strongly advised to perform calculations of camera installation parameters individually, using the CCTV calculator, with due consideration to the design and operational characteristics of the particular cameras and their working environment.

Module installation and update

- Installation under Windows OS
- Installation under Linux OS

Installation under Windows OS

This module is external; it is not included in the basic **Eocortex** distribution package and requires individual installation.

The module must be only installed on the computer with **Eocortex Server** or **Eocortex Standalone** application, to which the license plate recognition cameras are bound. The computers with just **Eocortex Client** application installed do not require installation of the module.

The module's version must match the version of **Eocortex** software installed on a particular computer.

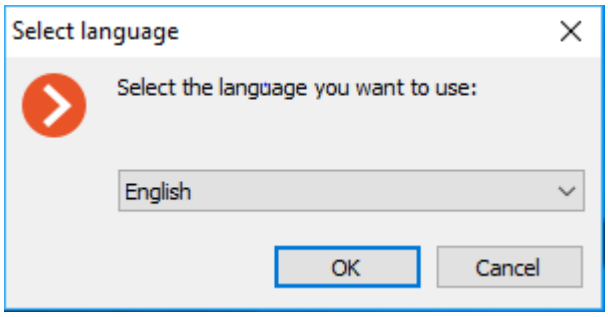
The installation files must be run under the administrator's account.

To update the module, it is required to perform the same steps as for the initial installation of the module. After selecting the installation language but prior to launching the installation wizard, the windows offering to uninstall the previous version will appear. It is required to confirm the uninstall. After the uninstall is complete, the module installation wizard will appear.

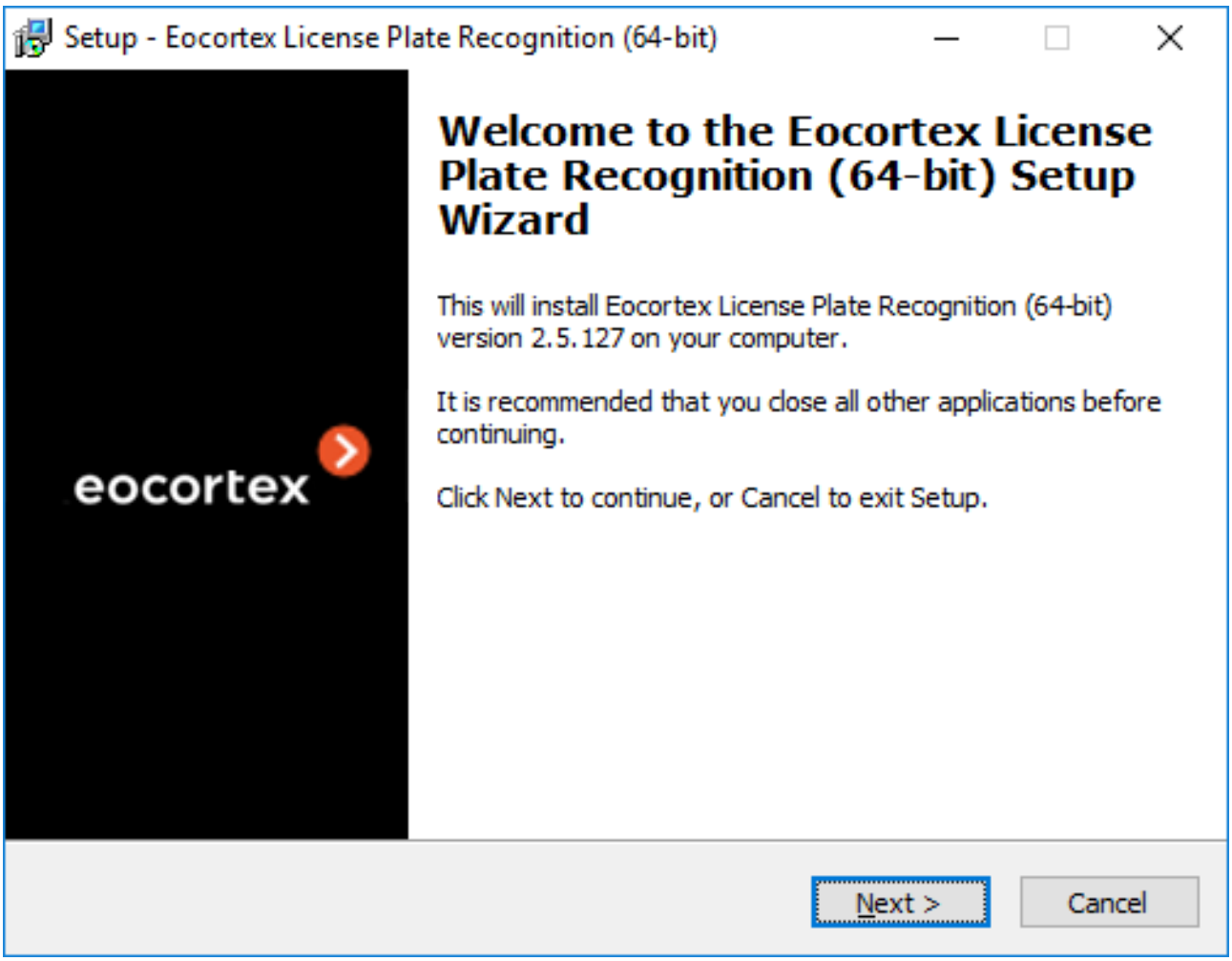
Before installing the module, it is required to stop all the **Eocortex** applications running on the computer, and to insert the module protection key in the USB port.

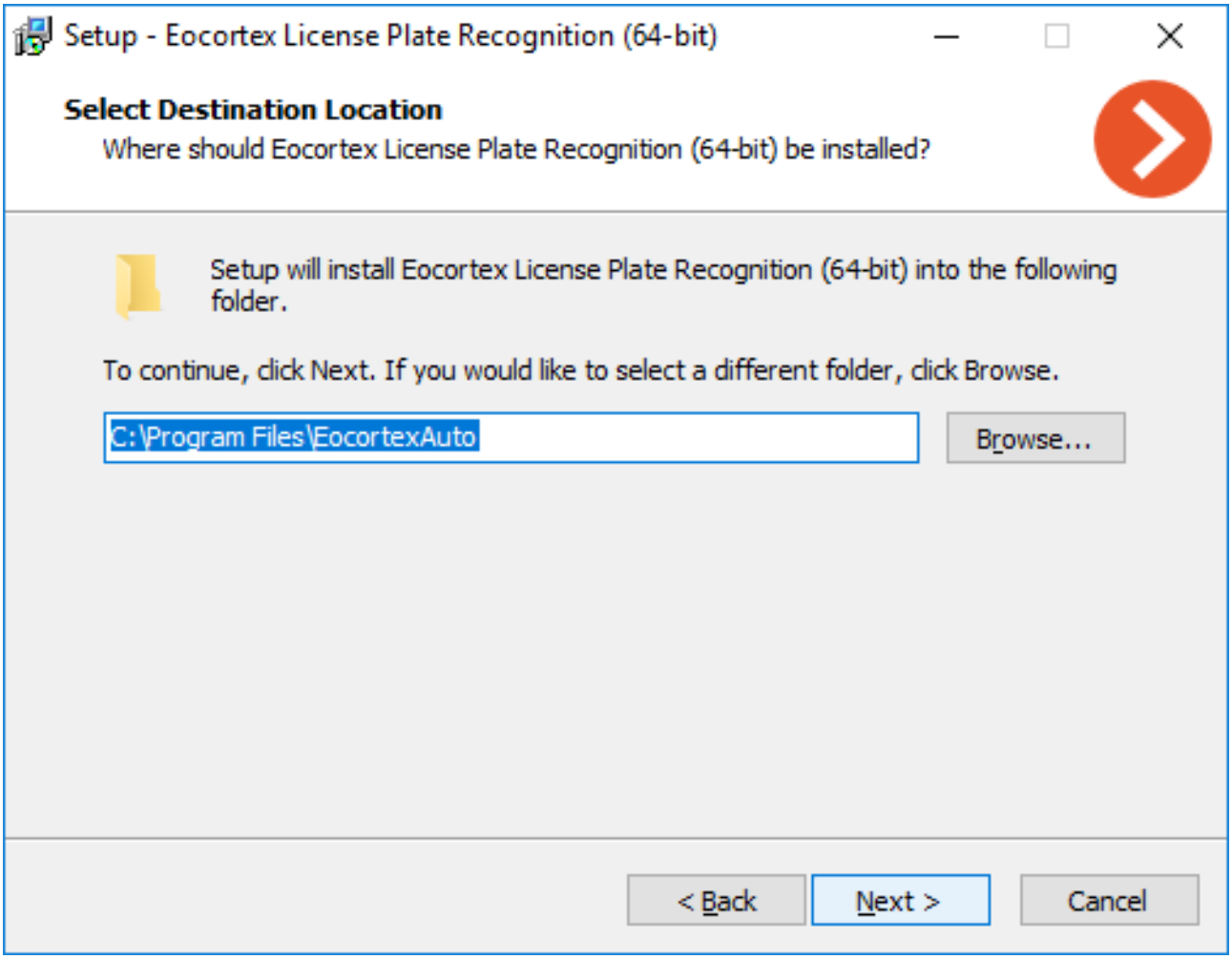
To install the module, it is required to run **EocortexAuto Installer_x64.exe** file for a 64 bit version of **Eocortex** or **EocortexAuto Installer.exe** for a 32 bit version.

It is required to choose the installation language in the opened **Select language** window.

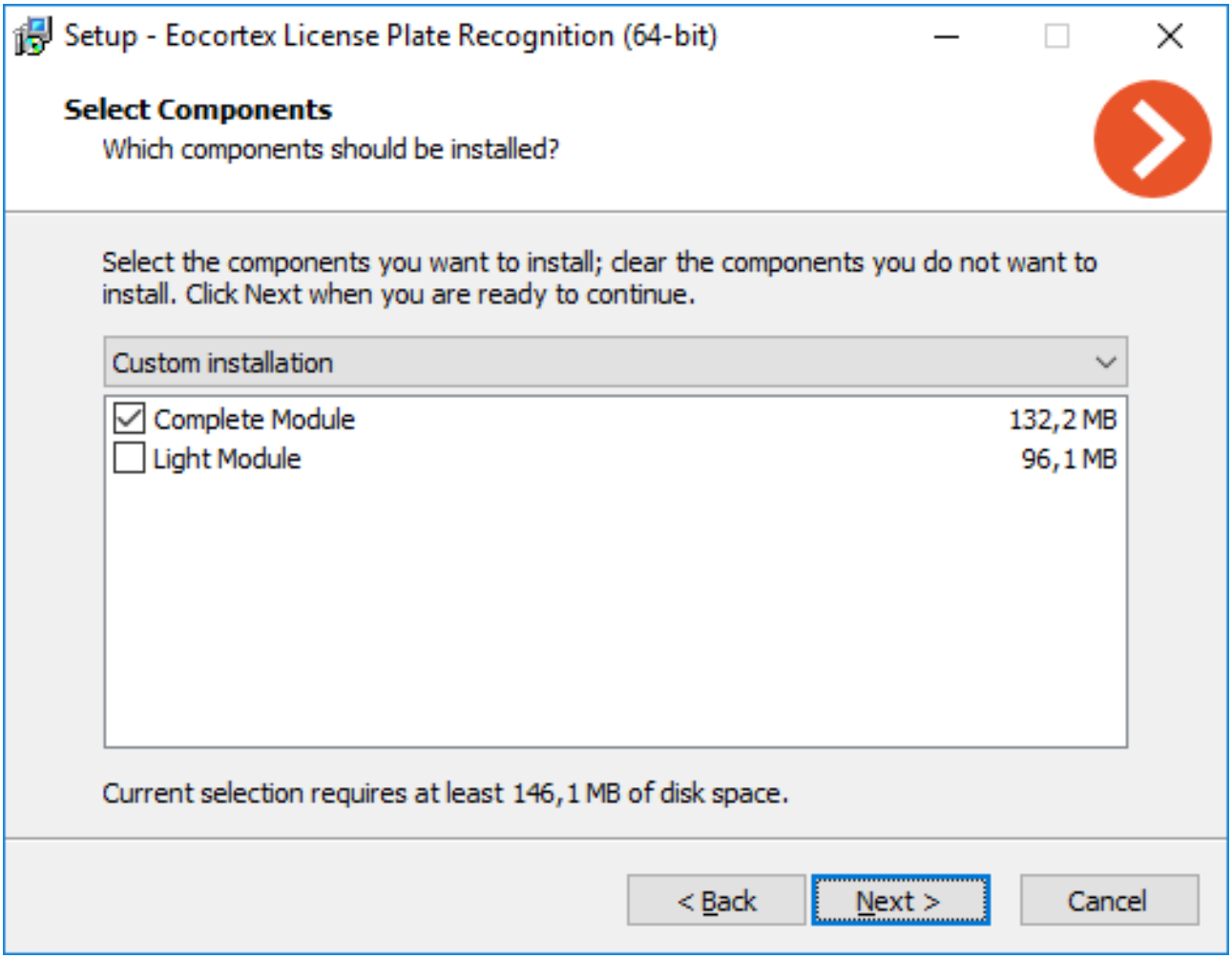


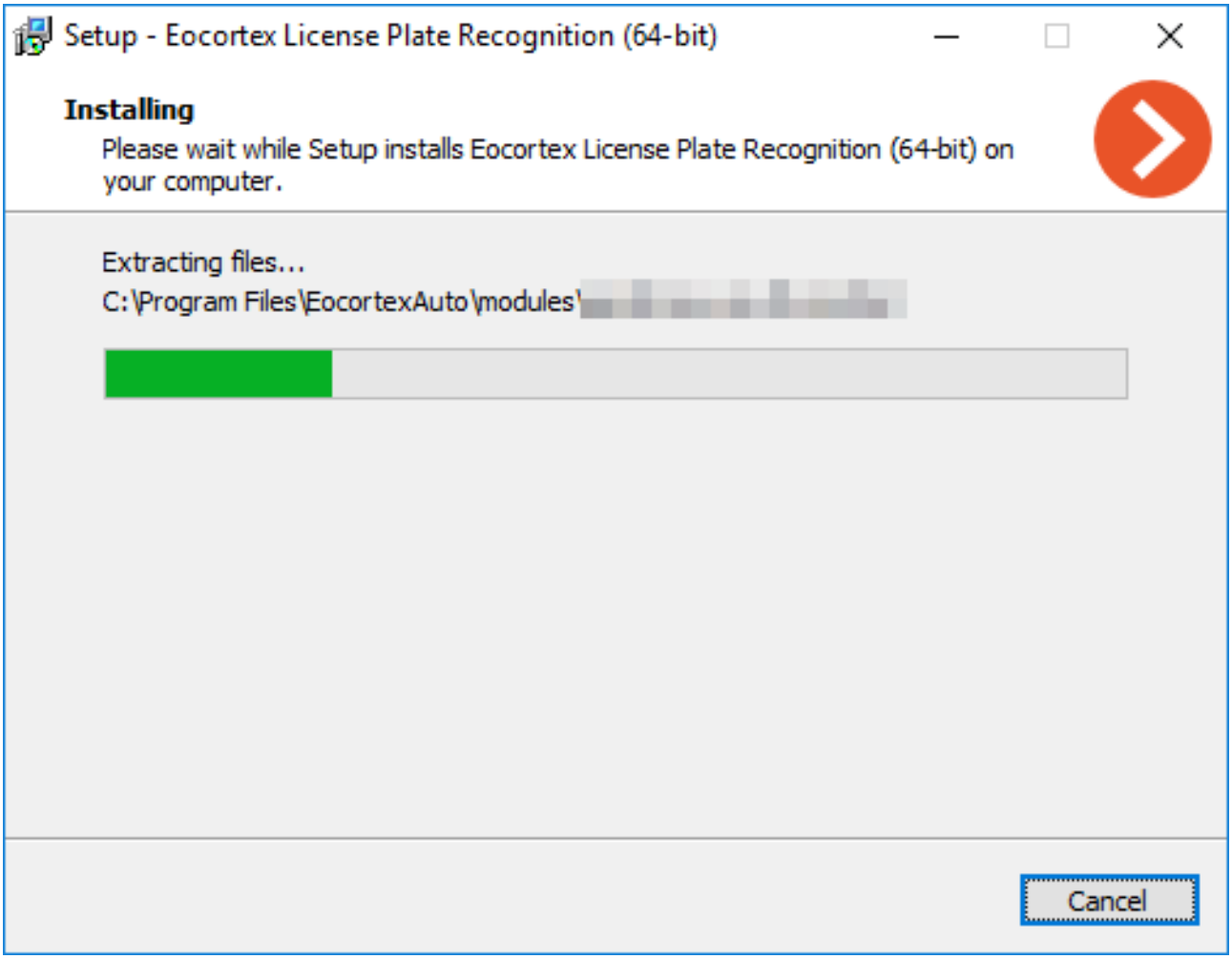
Then it is necessary to follow the steps of the installation wizard.

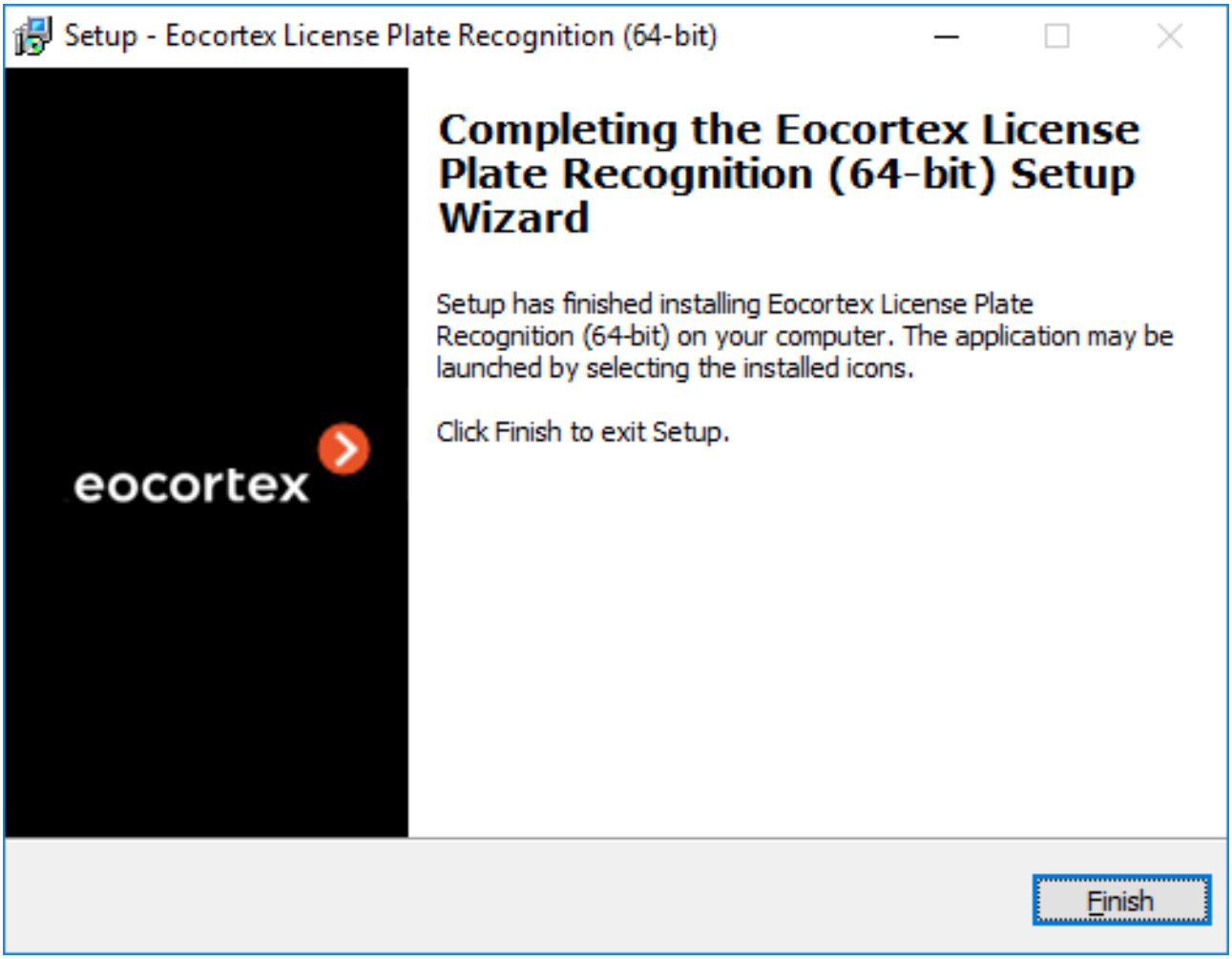




⚠ At the **Select component** step, choose the **Licence plate recognition (Complete)** option.


Setup - Eocortex License Plate Recognition (64-bit)
Select Components
Which components should be installed?
Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.
Custom installation
Complete Module
132,2 MB
Light Module
96,1 MB
Current selection requires at least 146,1 MB of disk space.
< Back
Next >
Cancel


Setup - Eocortex License Plate Recognition (64-bit)
Installing
Please wait while Setup installs Eocortex License Plate Recognition (64-bit) on your computer.
Extracting files...
C:\Program Files\EocortexAuto\modules\
Cancel



By default, the module will be installed to **C:\Program Files\EocortexAuto** folder.

Installation under Linux OS

This module is external, meaning that it is not a part of the main distribution kit of **Eocortex** and needs to be installed separately.

It is required to install the module exclusively on a computer that already has the **Eocortex Server** application installed; this computer must have the cameras for license plate recognition bound to it.

The module's version has to be the same as the version of **Eocortex** installed on the given computer.

The module is installed on Linux using the standard procedure. The files are located in the repository http://packages.eocortex.com/rpm/.

Depending on the type of processor and recognition procedure, it is necessary to choose one of the following packages:

With neural network technology:

- eocortex-plate_3.3.21_amd64.deb
- eocortex-plate-3.3.21-1.x86_64.rpm

Without neural network technology:

- eocortex-plate-non-dnn_3.3.21_amd64.deb
- eocortex-plate-non-dnn-3.3.21-1.x86_64.rpm

Licensing the module

Since the module uses the libraries developed by a third party that require separate licensing, two engineering elements are used for its license protection: the hardware protection key of the **Licence plate recognition (Complete)** module and the license bound to the **Eocortex** protection key.

ⓘ The presence of two license protection elements is just a technical particularity: only one license per server is to be paid for. The type of module (**Highway** or **Parking**) and the number of cameras for license plate recognition on the given server are indicated in the license.

The hardware protection key of the module is a USB HASP key.

The **Eocortex** protection key may be a hardware or a software key.

The module is licensed according to the type of license, to the groups of countries whose license plates will be recognized, and by the quantity of the recognition channels.

Types of licenses:

- **Highway** is intended for the recognition of the license plates of the vehicles travelling at the speed of up to 250 km//h. The analysis of the video stream is performed with the actual framerate of the stream received from the camera, or in accordance with the analysis frequency indicated in the settings of the software motion detector.
- **Parking** is designed for the recognition of the license plates of the vehicles travelling at the speed of up to 20 km/h. The analysis of the video stream is performed with the framerate of no more than 6 fps, irrespective of the actual framerate of the stream received from the camera.

For the operation of the **Licence plate recognition (Complete)** module it is required that the module protection key is inserted into the **Eocortex** server to which the cameras recognizing the license plates are bound. The **Eocortex** license with the specified support of the **Licence plate recognition (Complete)** module must also be activated on the server.

⚠ One **Eocortex** server may have only one **Licence plate recognition (Complete)** module protection key installed.

⚠ Only one of the modes (**Highway** or **Parking**) may be used on the same server.

The quantity of the cameras that recognize license plates on the server may be increased. To do it, it is required to purchase a license for the module, then, with the help of the **Eocortex Configurator** application, update the Eocortex license, and upgrade the firmware of the module protection key.

The type of license may also be changed, but only from **Parking** to **Highway**. To do it, it is required to purchase a license for the module and upgrade the firmware of the module protection key. If the quantity of the cameras that perform recognition stays the same, the **Eocortex** license does not need to be updated.

In the multiserver system, it is possible to set up the license plate recognition on the cameras bound to different **Eocortex** servers, however:

- It is required to use a separate module protection key on each server, and the corresponding number of cameras that perform recognition must be indicated in the **Eocortex** licenses;
- The common database and the common archive of the recognized license plate numbers will be used for all cameras.

⚠ If third party software using **HASP** software protection keys is installed on the **Eocortex** server, the **Licence plate recognition (Complete)** module operation on such server may be unstable.

Licence plate recognition (Light)

The **Licence plate recognition (Light)** module is intended for recognizing the license plates of the moving vehicles and for saving the information regarding the time and date of recognition, the license plate number and the reference to the corresponding video frame.

Capabilities of the module

- Real-time recognition of the license plate numbers of moving vehicles.
- Recognition of the license plate numbers of the vehicles of 43 countries.
- Recognition of the license plate numbers of vehicles travelling with the following velocities:
- Up to 270 km/h for the **Highway** license
- Up to 30 km/h for the **Parking** license
- Saving the recognized license plate number in the archive, including the date and time of recognition and the link to the corresponding video frame.
- Real-time comparison of the recognized license plate numbers with the license plate number database and generation of the alarm if the recognized number is in the list of the vehicles to be intercepted.
- Working with the integrated database of automobile license plate numbers: adding and editing of numbers, providing additional information of the vehicles, such as color, owner, etc.
- Possibility to import the license plate numbers into the database from a CSV file.
- Creating the groups of license plate numbers for interception, automatic opening of a rising arm barrier etc.; adding a number to one or more groups.
- Searching for the recognized numbers in the archive by time, by date and by additional information from the database.

- Downloading of the recognized license plate numbers to Microsoft Excel or CSV format.
- Automatic sending of the lists of recognized license plate numbers by email.
- Rising arm barrier control.

Details

The module is intended for recognizing the license plates of moving vehicles only. The parked vehicles' numbers will not be recognized.

It is possible to use the capabilities of the **Eocortex API** for the automation of the downloading of the recognized license plate lists.

Interaction with the rising arm barriers is performed via signal outputs of the IP cameras.

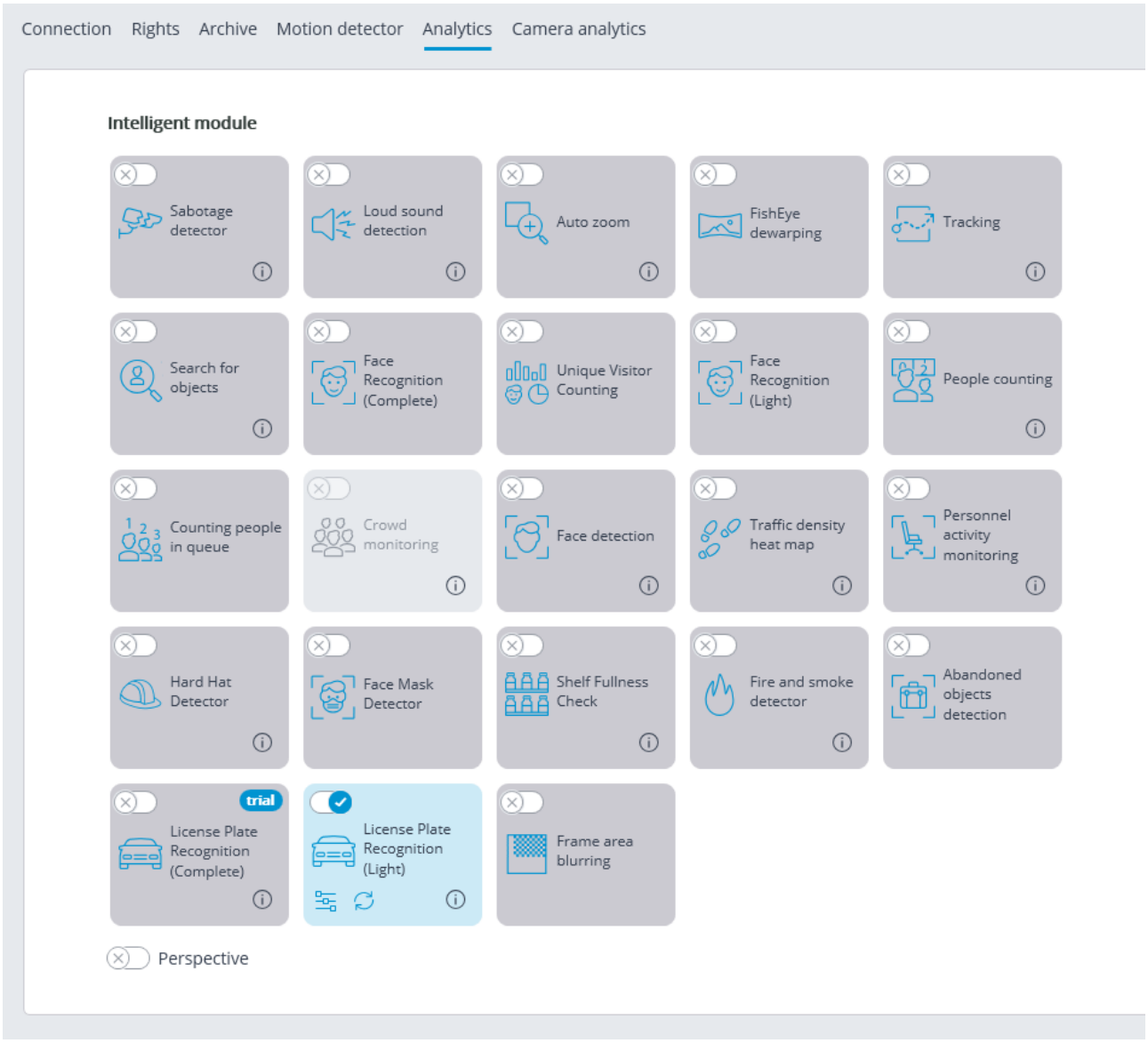
Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

Since this module is external and is not included into the basic **Eocortex** installation package, before setting it up and using it install it on the computer to which the cameras that will use this module are connected.

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.



⚠ It is only possible to use one of the two versions of the module on the same camera: **Licence plate recognition (Complete)** or **Licence plate recognition (Light)**.

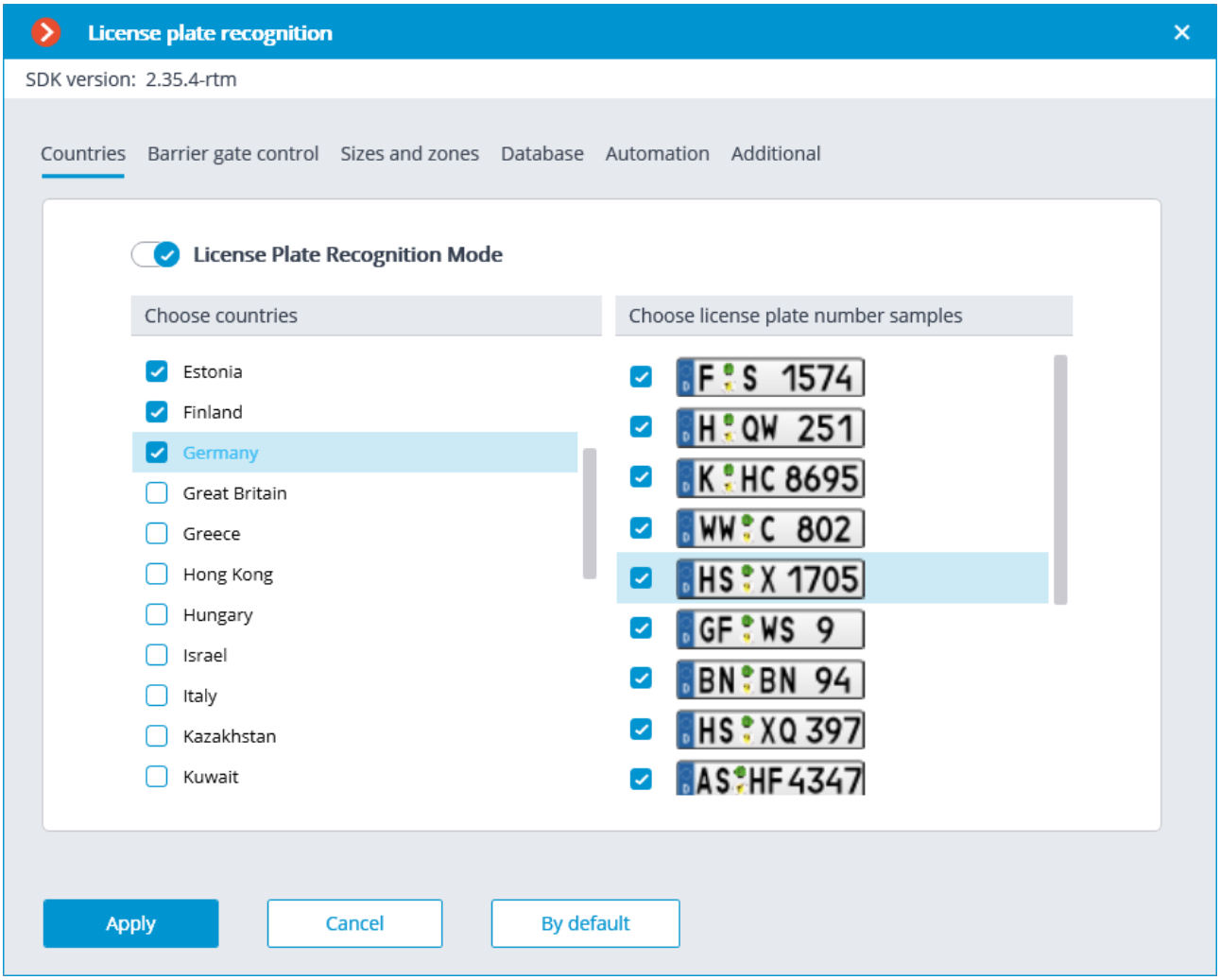
⚠ In the software motion detector settings, the minimum width and height of the object must be smaller than the dimensions of a vehicle.

Additionally, it is recommended to set the whole frame as the detection area for the software motion detector to ensure reliable recognition.

In the subheader of the module settings window you can see the version of the SDK libraries used by the module for recognizing the license plates.

The module settings description is given below.

The countries and samples of the license plate numbers to be recognized are set on the **Countries** tab.



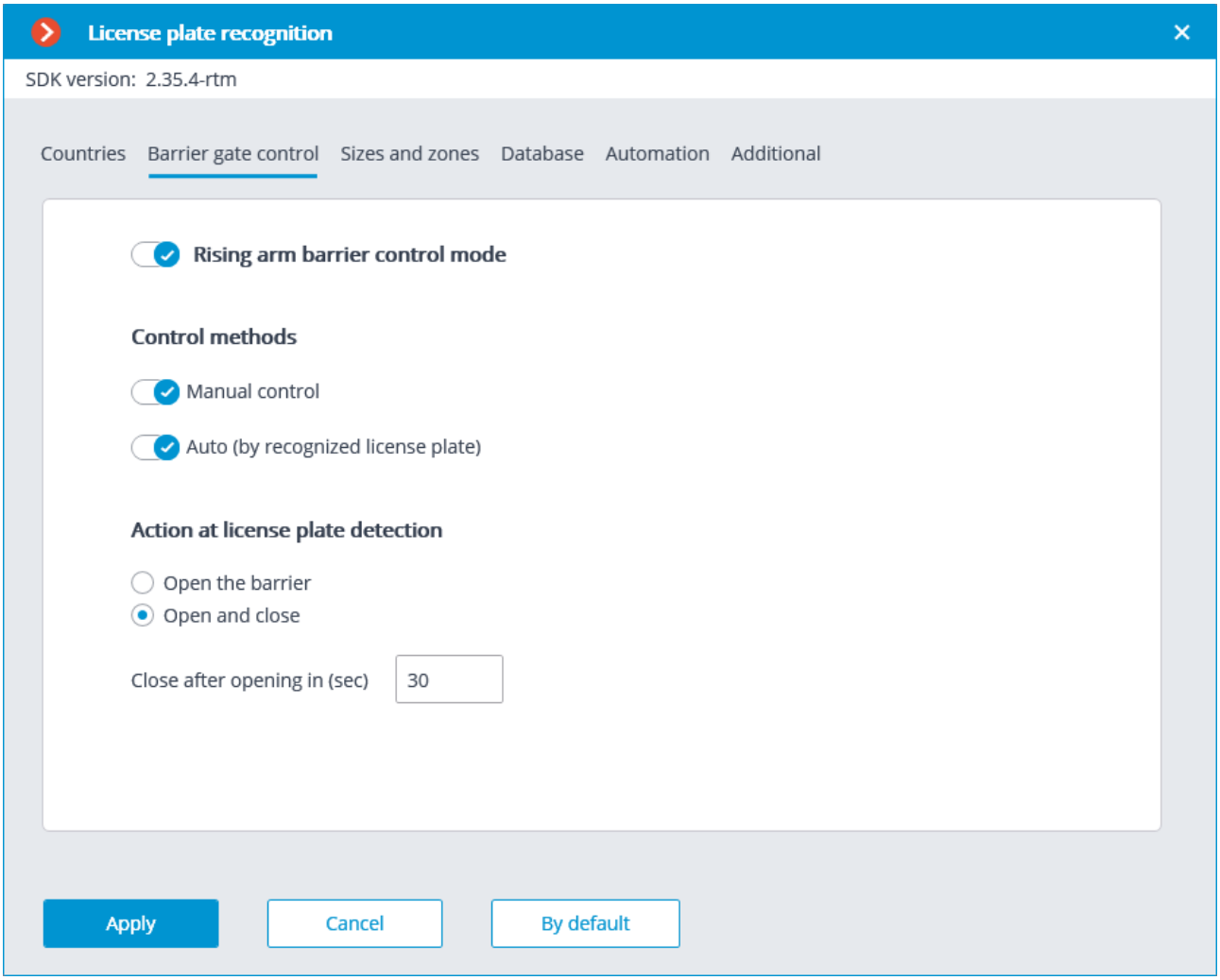
It is required to enable the **License Plate Recognition Mode** using the corresponding switch in order to gain access to the settings of countries and samples. If this option is not on, the license plates recognition will not be performed. This option is to be activated only if the module is used just for controlling the rising arm barrier.

When the license plate mode is activated, select the countries whose license plates are to be recognized, as well as the samples of the license plates to be recognized for each chosen country. **Countries** and samples not selected will not be recognized.

⚠ The empty list of countries means that the **Licence plate recognition (Light)** is not installed, or that errors occurred during its installation, or that there is no protection key or its activation encountered problems.

⚠ The more countries and samples have been selected for recognition, the larger the computing load on the server. When the processor load exceeds 80%, the recognition quality may drop significantly.

The settings of the module's interaction with a rising arm barrier can be made on the **Barrier gate control** tab.



The **Rising arm barrier control mode** must be activated to access the settings of the module's interaction with a rising arm barrier.

To use the module only for controlling a rising arm barrier, the **Licence plate recognition (Light)** module license or protection key is not required. However, for ensuring the abovementioned functionality, it is necessary to have the **Licence plate recognition (Light)** module support indicated in the **Eocortex** license file or software key for the corresponding quantity of cameras.

When the rising arm barrier control mode is activated, the following capabilities are available:

Control methods:

- **Manual control**: allows the operator to open and close the barrier using the **Eocortex Client** application.
- **Auto (by recognized license plate)**: allows to open the rising arm barrier automatically if the recognized number is in the white list, i.e. is included in the group of vehicles for which the automatic opening of the barrier is envisioned.

In case the automatic rising arm barrier control is activated, the following options are available:

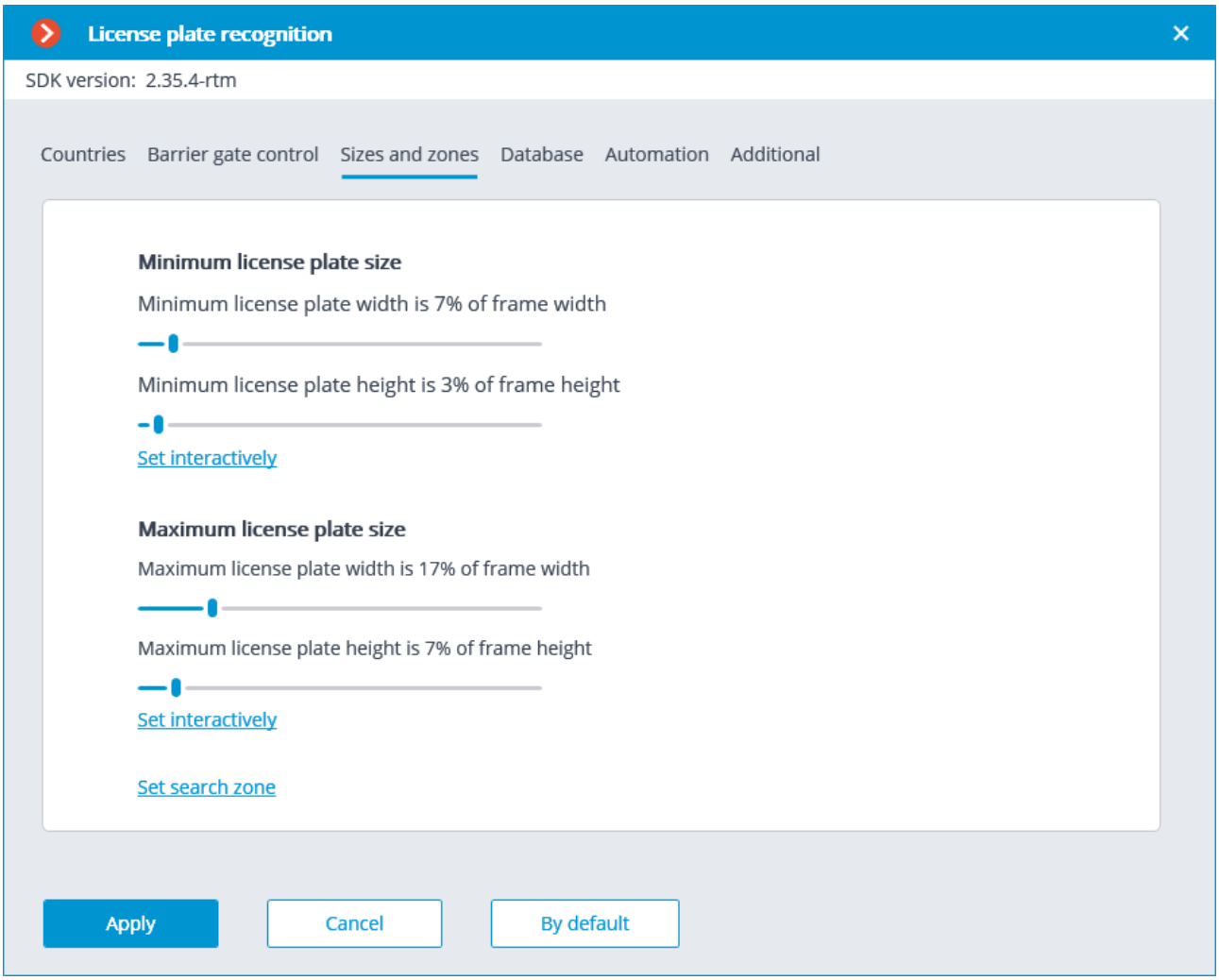
- **Open the barrier**: if the recognized number is in the white list, the **Eocortex** server generates a command to open the barrier.

- **Open and close**: if the recognized number is in the white list, the **Eocortex** server generates a command to open the barrier; then, in a number of seconds set in the **Close after opening in (sec)** field, a command for closing the barrier is generated.

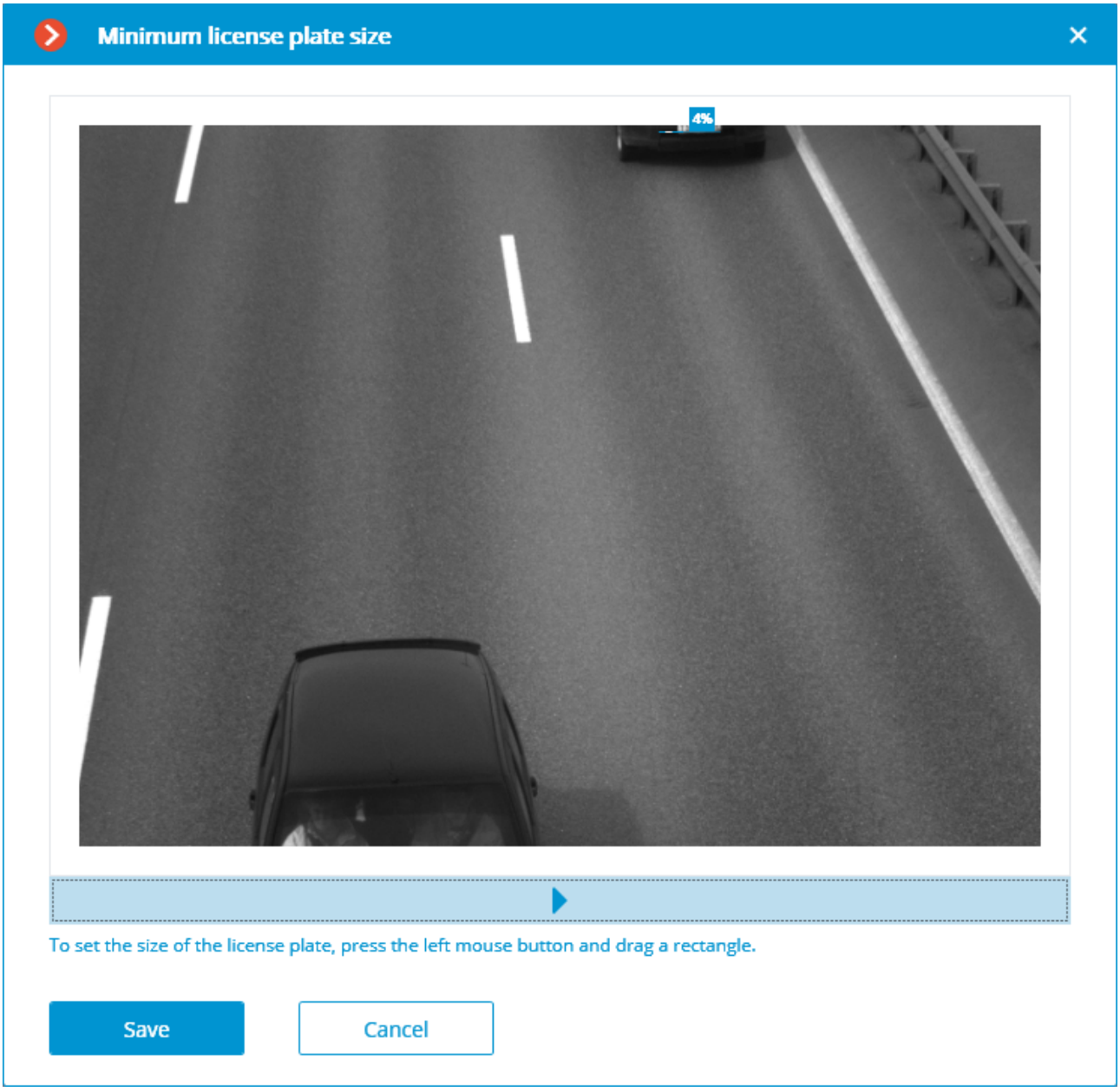
ⓘ Most of the modern rising arm barriers automatically close after the passing of one vehicle. For such barriers, the Open the barrier option shall be chosen.

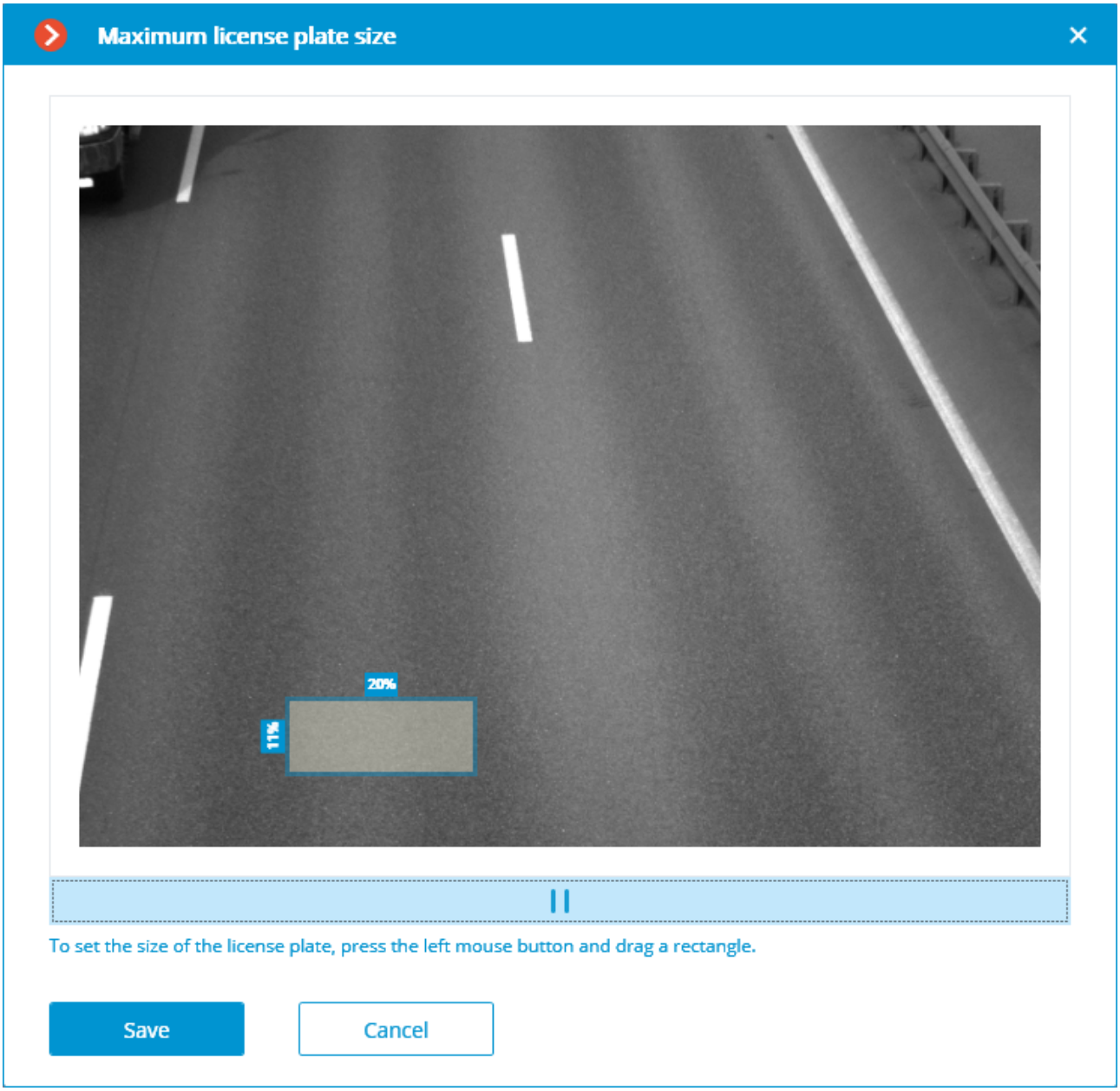
⚠ When **the Open and close** option is selected, it is imperative that the barrier itself has a feature of preventing its closing when a car is below the rising arm. It means that after generating the closing command the barrier's automatics must check if there is a vehicle or a person on the line of closing, and proceed with the closing only in the absence of the above.

ⓘ Both in manual and in automatic barrier control mode, the opening or closing command is understood as the generation of the Request to open rising arm barrier or Request to close rising arm barrier event, correspondingly. To control the rising arm barrier, it is required to set the actions for these events depending on the control wiring diagram of the particular barrier.

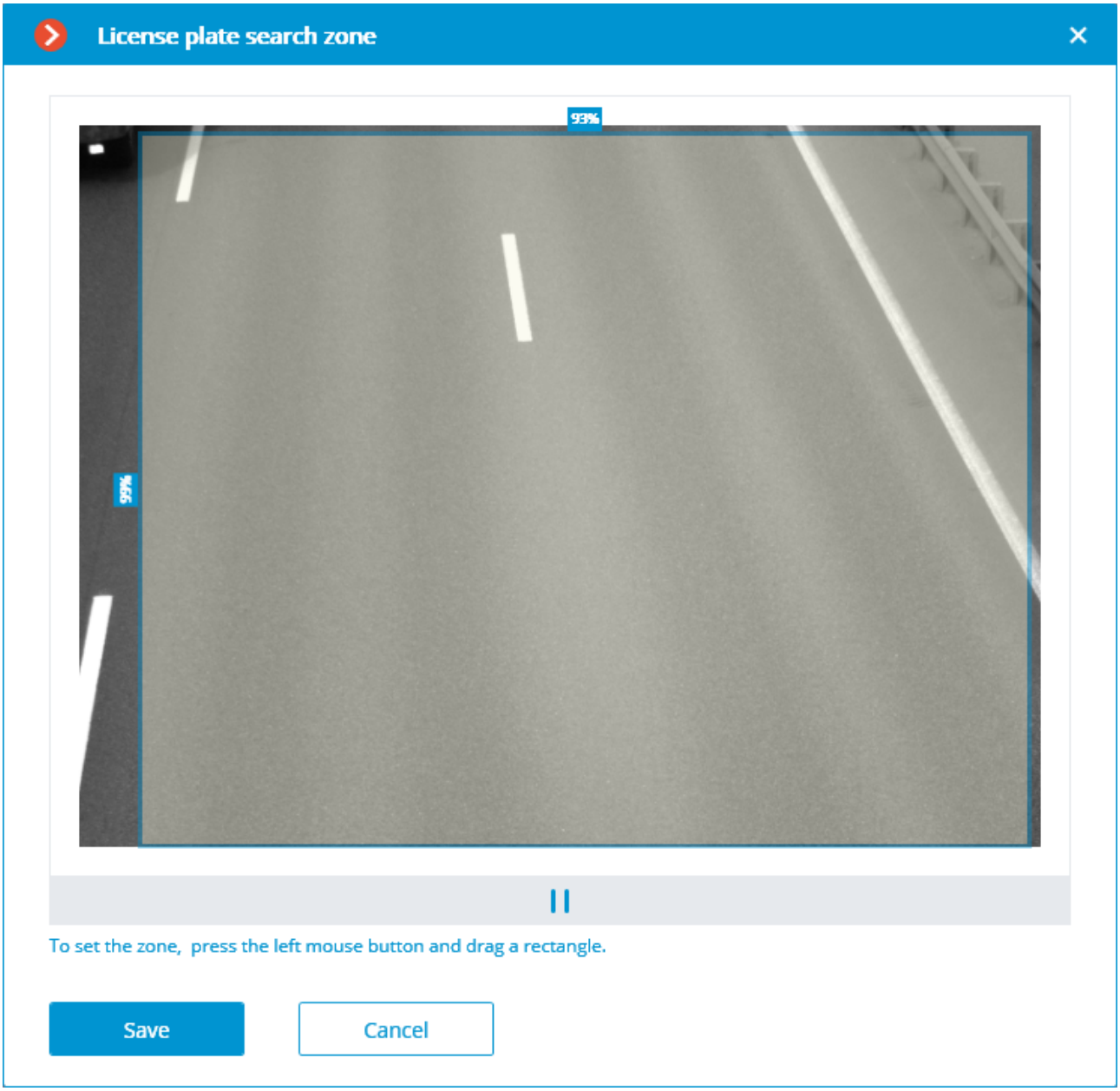


Minimum license plate size and Maximum license plate size sliders specify the limiting dimensions of the plates to be recognized. These sizes can be set with the sliders or interactively by opening the size setting window clicking on **the Set interactively** link.

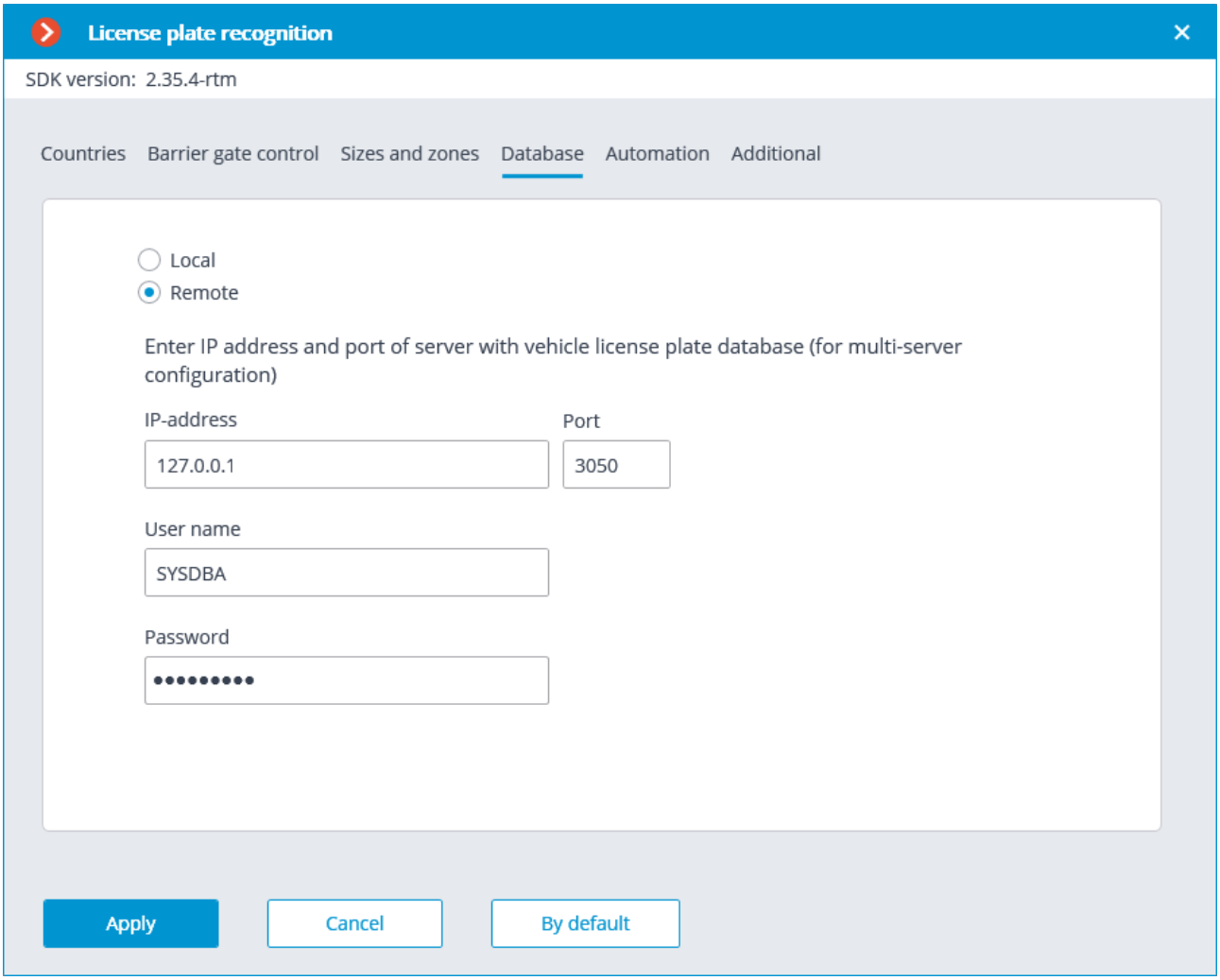




License plate search zone opens the window of setting up the zones of the frame where the license plate numbers to be recognized will appear.



The access to the license plate database can be set on the **Database** tab.



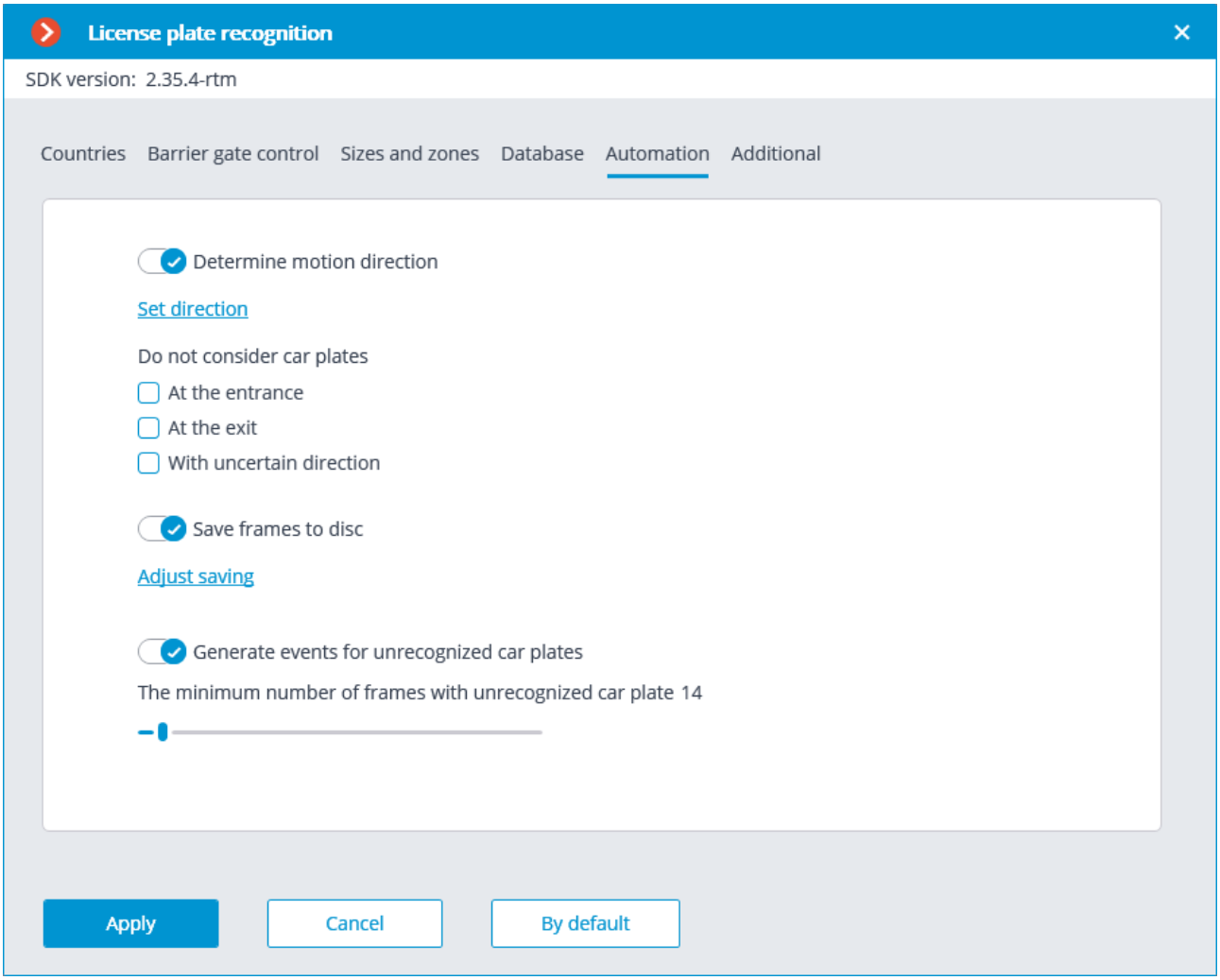
If the license plate recognition is performed only on one server, it is recommended to set the value to **Local**.

In the multiserver system, the database can be stored on one server only. In this case it is required to select **Remote** and indicate the **IP address** and the **Port** of the server, as well as the **User name** and **Password** of the database administrator.

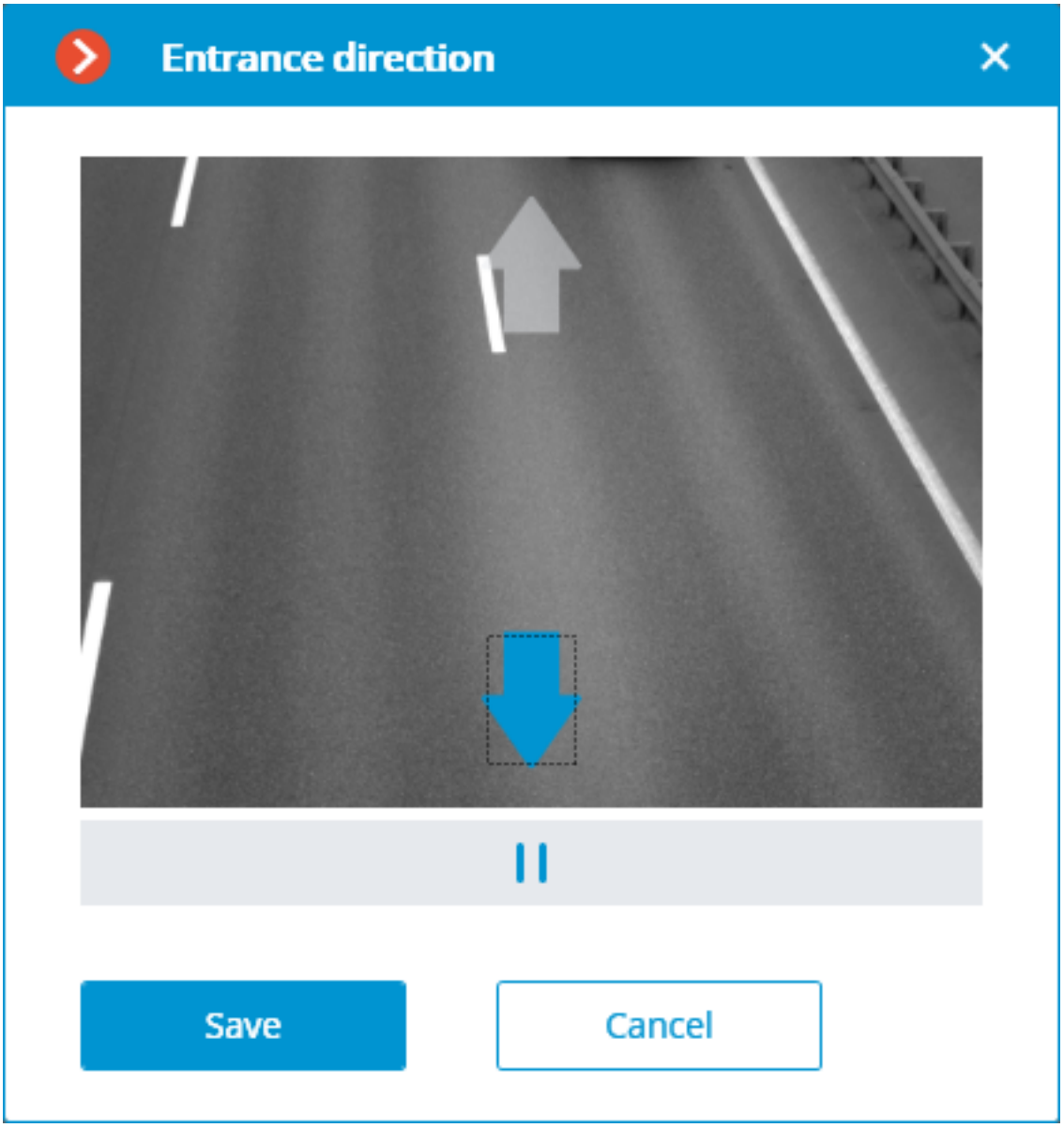
Eocortex uses **Firebird** database management system with the following default values: database connection **Port** – 3**050**, **User name** – **SYSDBA**, **Password** – **masterkey**.

⚠ The server where the license plate database is stored must be assigned as the main server for at least one camera that uses the **Licence plate recognition (Light)** module.

The following settings are available on the **Automation** tab:

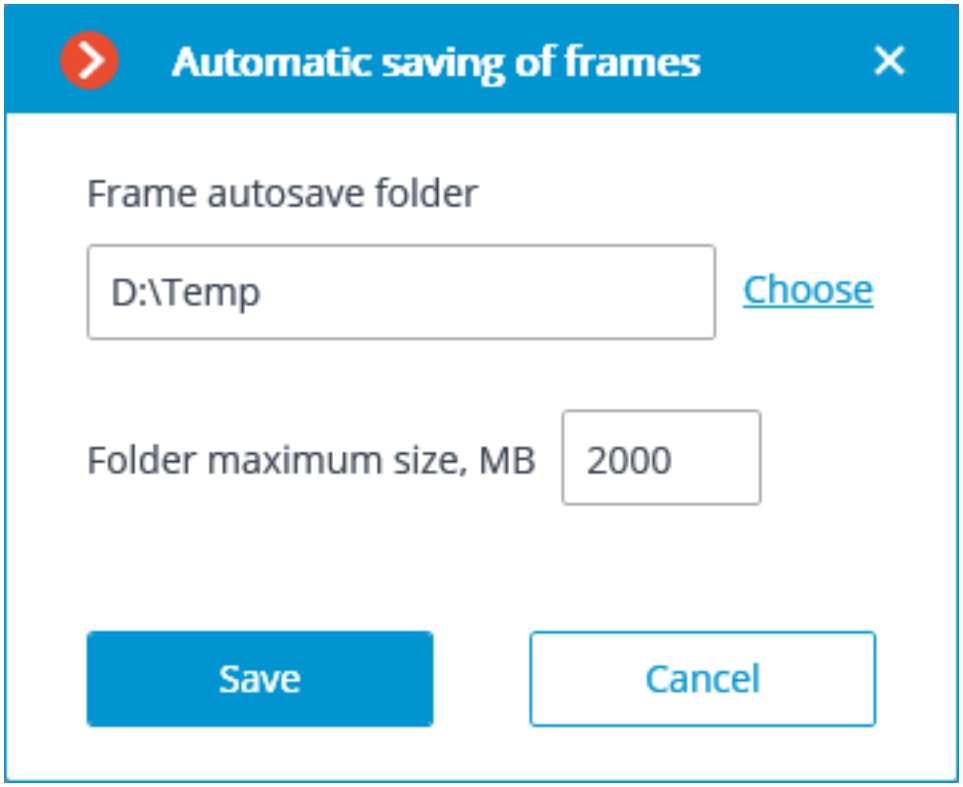


Determine motion direction enables the mode of determining the travel direction. After activating this mode, it is required to click on the **Set direction** link, and in the opened window select the arrow that specifies the entrance direction. In this case the vehicles travelling in the opposite direction will be considered as the ones leaving the area.



Additionally, in the mode of determining motion direction, it is possible to exclude from the recognition the license plates of the vehicles travelling in a particular direction. For that end, the **Do not consider car plates** group of settings is used. This group has the following options: **At the entrance**, **At the exit**, and **With uncertain direction**.

Save frames to disc enables the mode of automatic saving the frames with the recognized license plate numbers to the specified drive. Upon enabling this mode, it is required to click on the **Adjust saving** link and specify the folder where the image files with the recognized license plate numbers will be stored. It is also required to set **the Maximum folder size, Mb**.



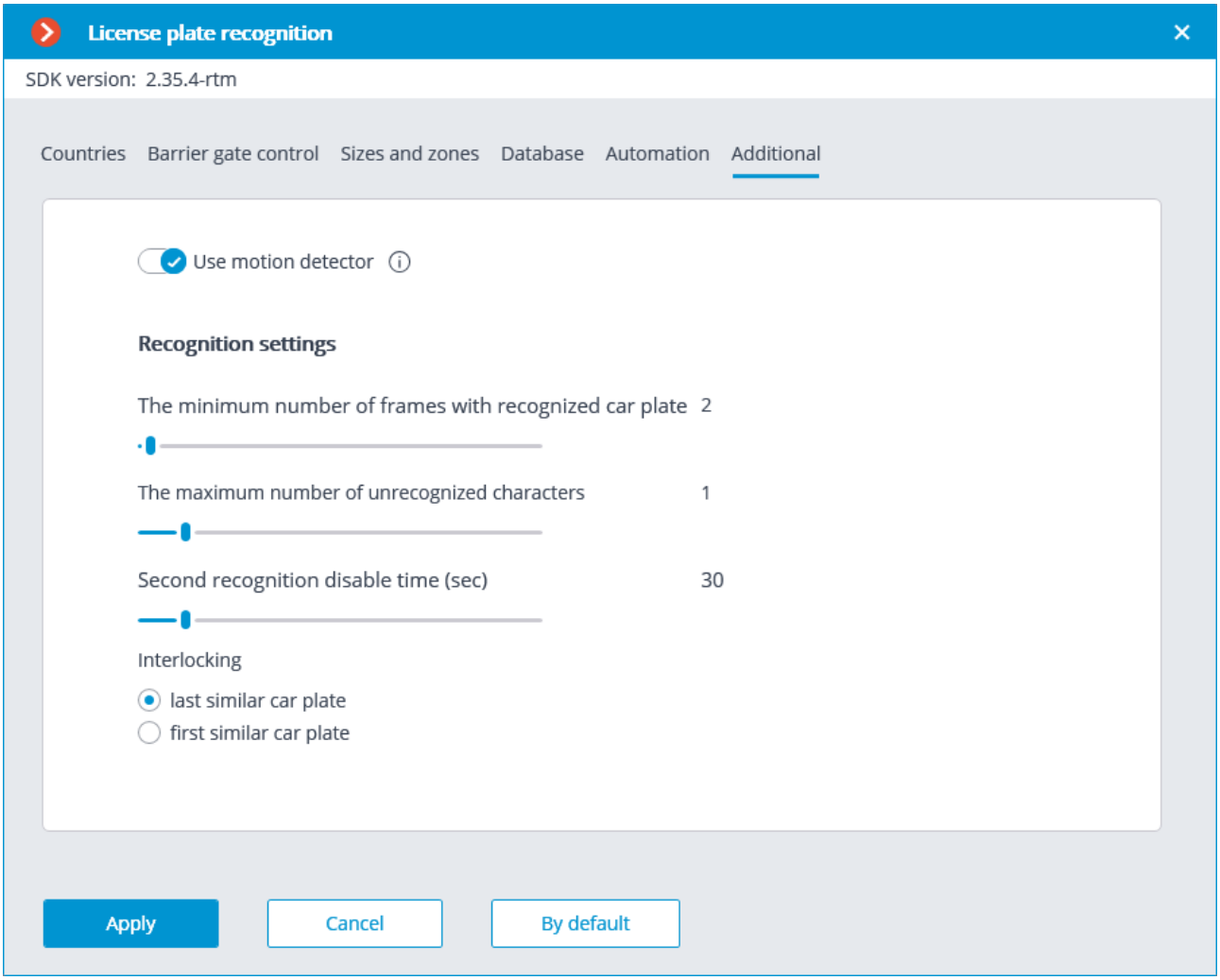
⚠ If the size of the saved files exceeds the maximum preset limit, the saving of the frames will continue, but the oldest files will be deleted to uphold size restrictions.

ⓘ If **0** is specified in the **Maximum folder size, Mb** field, the folder size will not be limited.

⚠ It is only advisable to select the folder interactively using the Choose link if the **Eocortex Configurator** application is launched directly on the server, because in case of performing remote setup, the file explorer of a local computer used for making adjustments will be opened when selecting a folder. Consequently, when performing adjustments from the remote computer the path shall be entered as text, thereupon the folder must already exist on the server.

Generate unrecognized license plate events enables the mode of event generation in case a license plate was not recognized in the number of frames set with the **Minimum number of frames with unrecognized car plate**.

The following settings can be made on the **Additional** tab:



If the **Use motion detector** option is activated, only those frames and zones where motion is present will be analyzed. This option allows to reduce the computational load of the processor and RAM. In this case the motion detector built into the module will be used.

The minimum number of frames with recognized car plate: the license plate recognition event will be generated only after the preset number of frames, even if the number was recognized on the smaller number of frames. The larger this value, the higher the possibility to obtain the correctly recognized number.

The maximum number of unrecognized characters: this setting specifies the maximum permissible number of unrecognized characters when recognizing the license plate. If the quantity of the unrecognized characters exceeds the specified limit, the license plate recognition event is not generated.

Second recognition disable time allows to avoid the repeated generation of the recognition event for the same number because the second recognition is only possible after the specified interval. The interlocking modes are as follows:

- **Last similar car plate**: the counting starts only after the license plate disappears from the frame. This mode is recommended for use when there are static license plates (parked vehicles) in the frame in order to avoid the second recognition of such numbers.
- **First similar car plate**: the counting starts immediately after the initial recognition of the license plate. If after the expiry of the set period of time the license plate is still in the frame, it will be recognized again.

⚠ The use of the module will start only after the settings are applied.

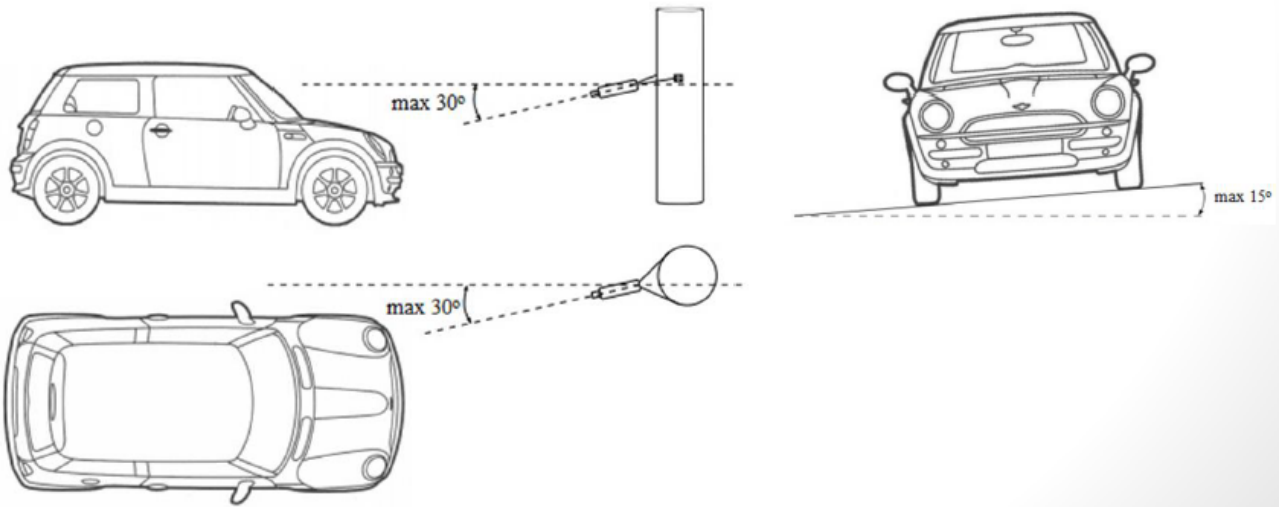
Requirements and recommendations

For correct operation of the module, it is imperative to properly choose, place and set up the camera, adjust the software motion detector and the module itself. When selecting the camera, it is necessary to take into consideration the image requirements, the controlled zone particularities, and the conditions of the installation and operation of the camera.

Requirements to the license plate image

The vehicle license plates (registration plates) to be recognized must conform to certain requirements. The **Licence plate recognition (Light)** module cannot guarantee the reliable recognition of a license plate if it is extremely dirty, low in contrast or significantly tilted or displaced. Below are the requirements to the license plates and their images (the vehicles whose license plates do not meet these requirements will not be identified).

- No visible blurring of the license plate number on the image of the moving vehicle.
- No sharp glare or shadows on the license plate.
- The characters on the license plate must be in total accord with the applicable state standard as regards their font and size.
- The license plate must meet the requirements concerning the cleanliness and legibility. All the characters shall be distinctly visible and not blocked by anything.
- The images of the license plate numbers must be sharp. The contrast between the characters and the background must be at least 15%.
- The height of the characters in the image must be at least 10 pixels.
- The distortions of the perspective of the license plate image that occur due to the tilt and turn of the license plate's surface in relation to the camera axis shall not exceed 30°.
- The horizontal deviation of the license plate must not be more than 15°.
- The camera must have a straight part of the road in its field of view (without turns).



Recommendations on camera installation

In this section you will find the recommendations on camera installation that need to be followed in order to ensure the reliable recognition of license plates in the control zone. Each installation location has its individual characteristics. This section contains the basic camera installation recommendations.

Installation of cameras on roads

For ensuring reliable recognition of the license plate numbers of the vehicles that travel in the stream, it is optimal to install the camera on a structure above the road in such a way that the camera is directed at the center of the recognition area. For example, if it is required to recognize the plates of the vehicles travelling along a particular lane, the camera must be pointed at the center of that lane.

It is also possible to install the camera on a pole standing on the edge of the road. In this case it must be considered that when the recognition is to be performed on both lanes there may occur the situations when the farther lane will be blocked by the large vehicles such as a tractor-trailer unit, a truck, a bus etc. travelling on the lane close to the camera.

Installation of cameras indoors

Special considerations: low height; closeness to a license plate.

When installing the camera, it is required to avoid flaring from the vehicle headlights.

The camera must not face the outside because it will create flaring.

It is recommended to select one of the following installation arrangements:

- Direct the camera toward the interior of the premises, at the rear license plate of a vehicle;
- Install the camera at the height of 2 to 3 meters and direct it in such a way as to avoid flaring the camera lens by the light from the outside.

Module installation and update

This module is external; it is not included in the basic **Eocortex** distribution package and requires individual installation.

The module must be only installed on the computer with **Eocortex Server** or **Eocortex Standalone** application, to which the license plate recognition cameras are bound. The computers with just **Eocortex Client** application installed do not require installation of the module.

The module's version must match the version of **Eocortex** software installed on a particular computer.

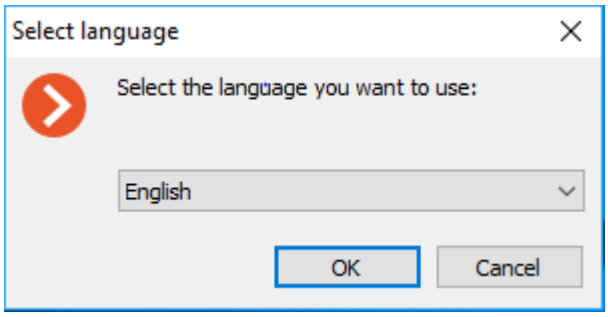
The installation files must be run under the administrator's account.

To update the module, it is required to perform the same steps as for the initial installation of the module. After selecting the installation language but prior to launching the installation wizard, the windows offering to uninstall the previous version will appear. It is required to confirm the uninstall. After the uninstall is complete, the module installation wizard will appear.

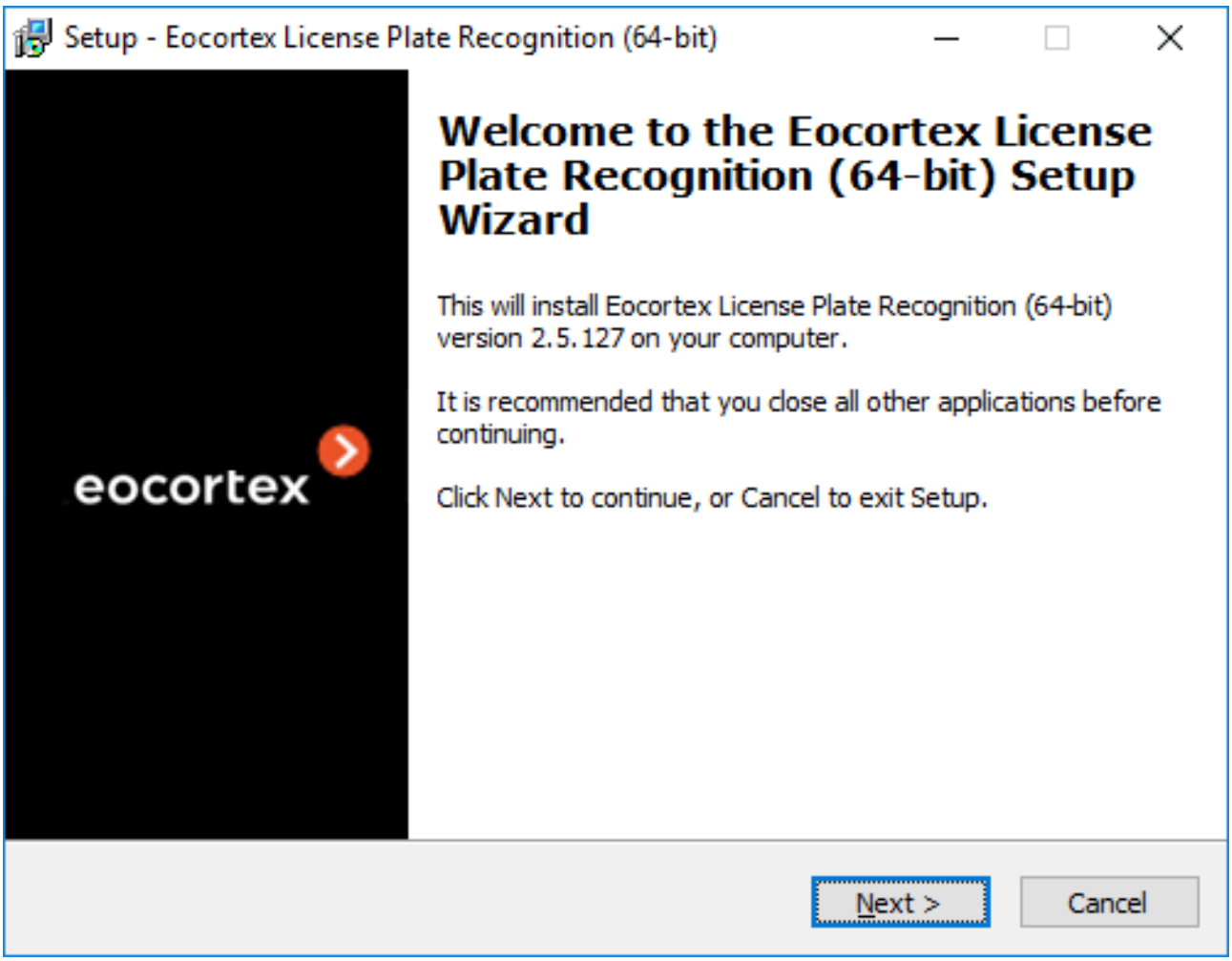
Before installing the module, it is required to stop all the **Eocortex** applications running on the computer, and to insert the module protection key in the USB port.

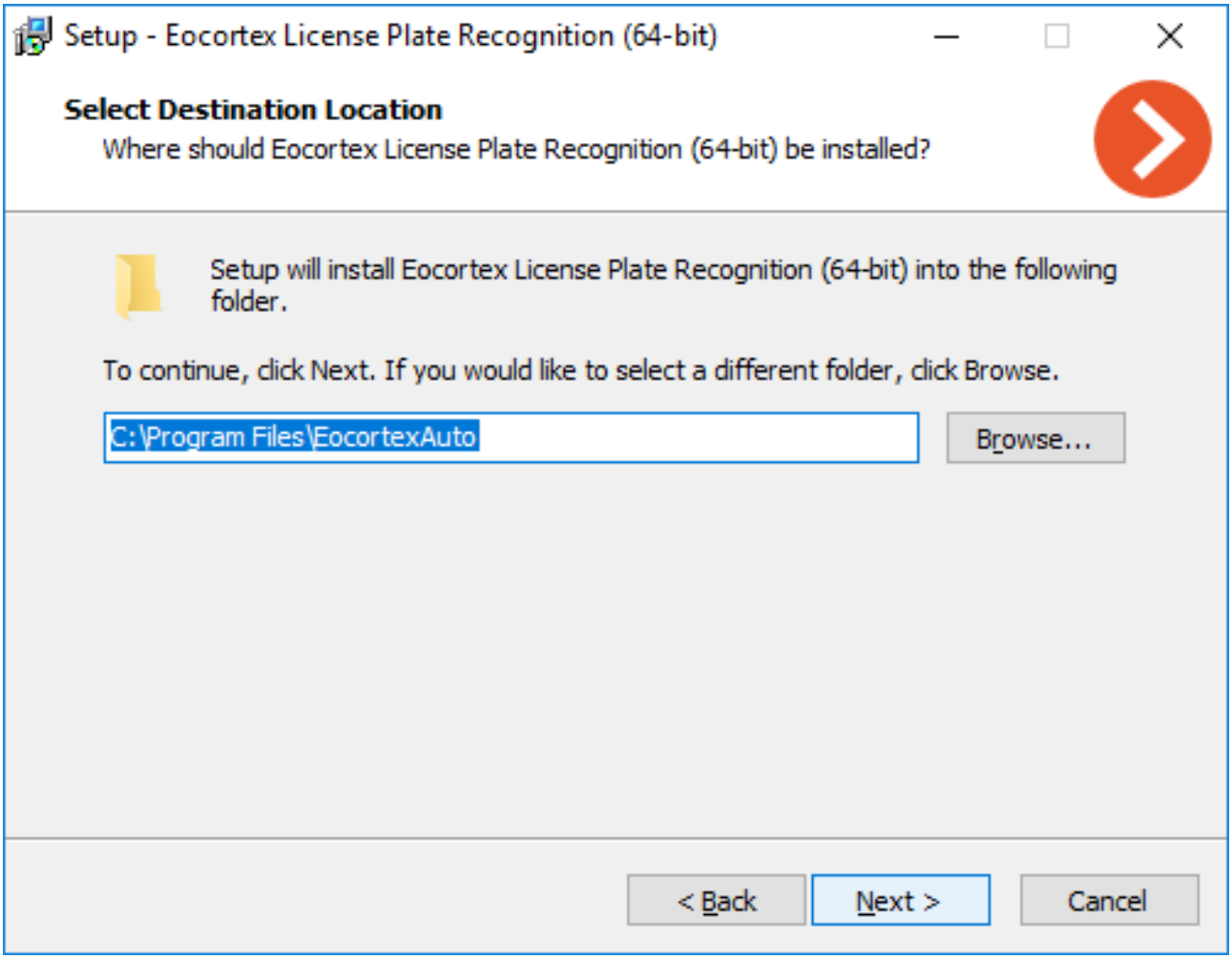
To install the module, it is required to run **EocortexAuto Installer_x64.exe** file for a 64 bit version of **Eocortex** or **EocortexAuto Installer.exe** for a 32 bit version.

It is required to choose the installation language in the opened **Select language** window.

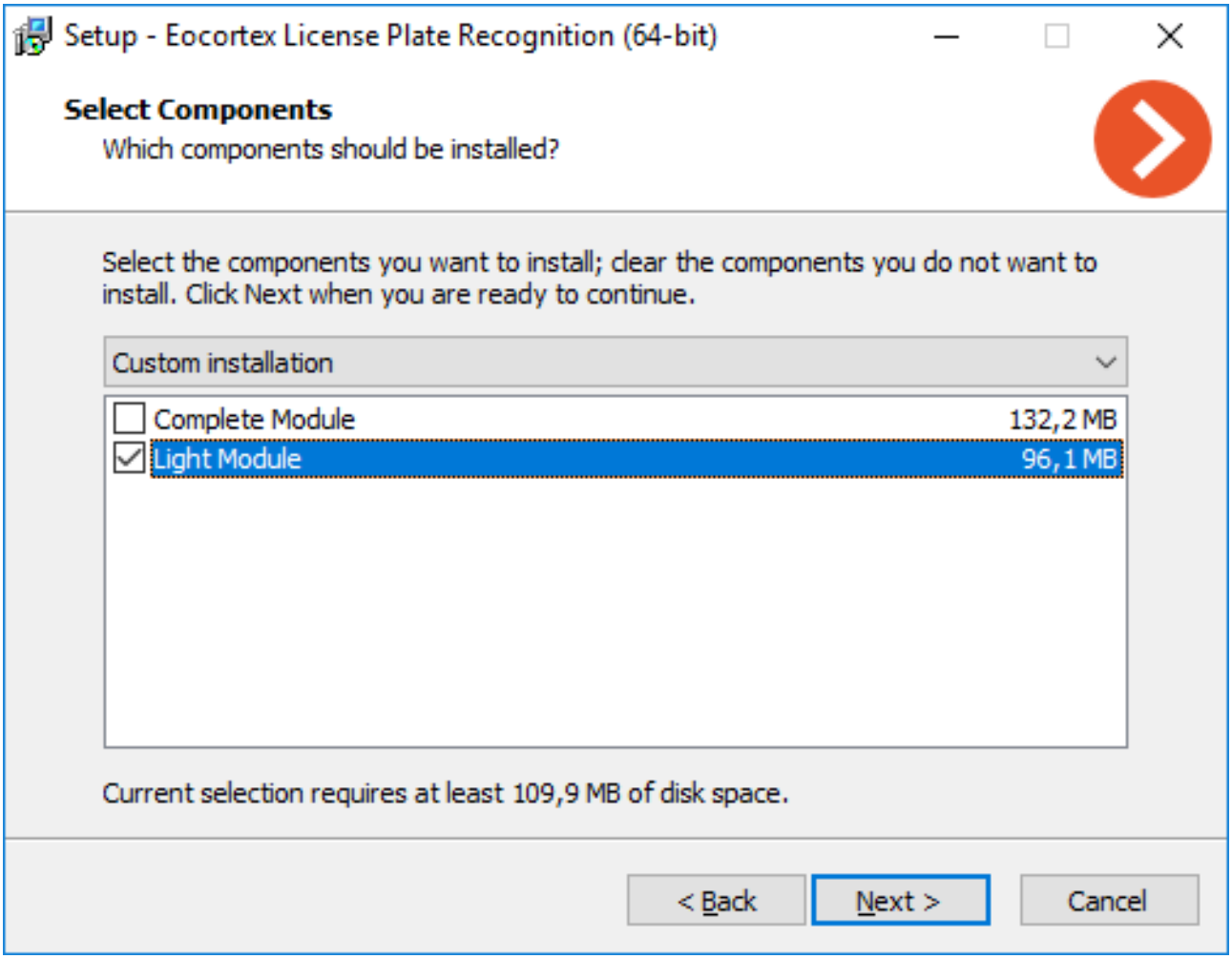


Then it is necessary to follow the steps of the installation wizard.

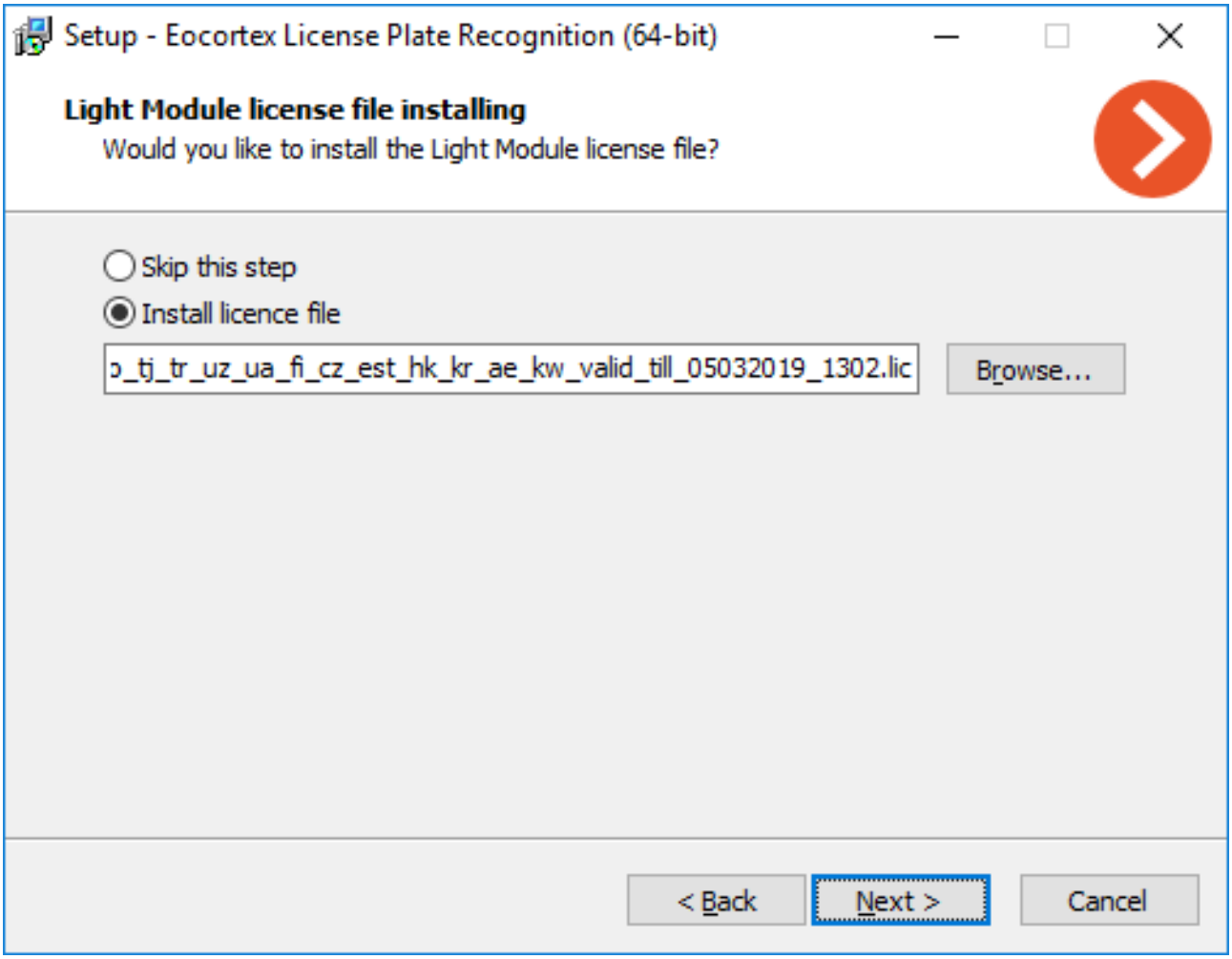


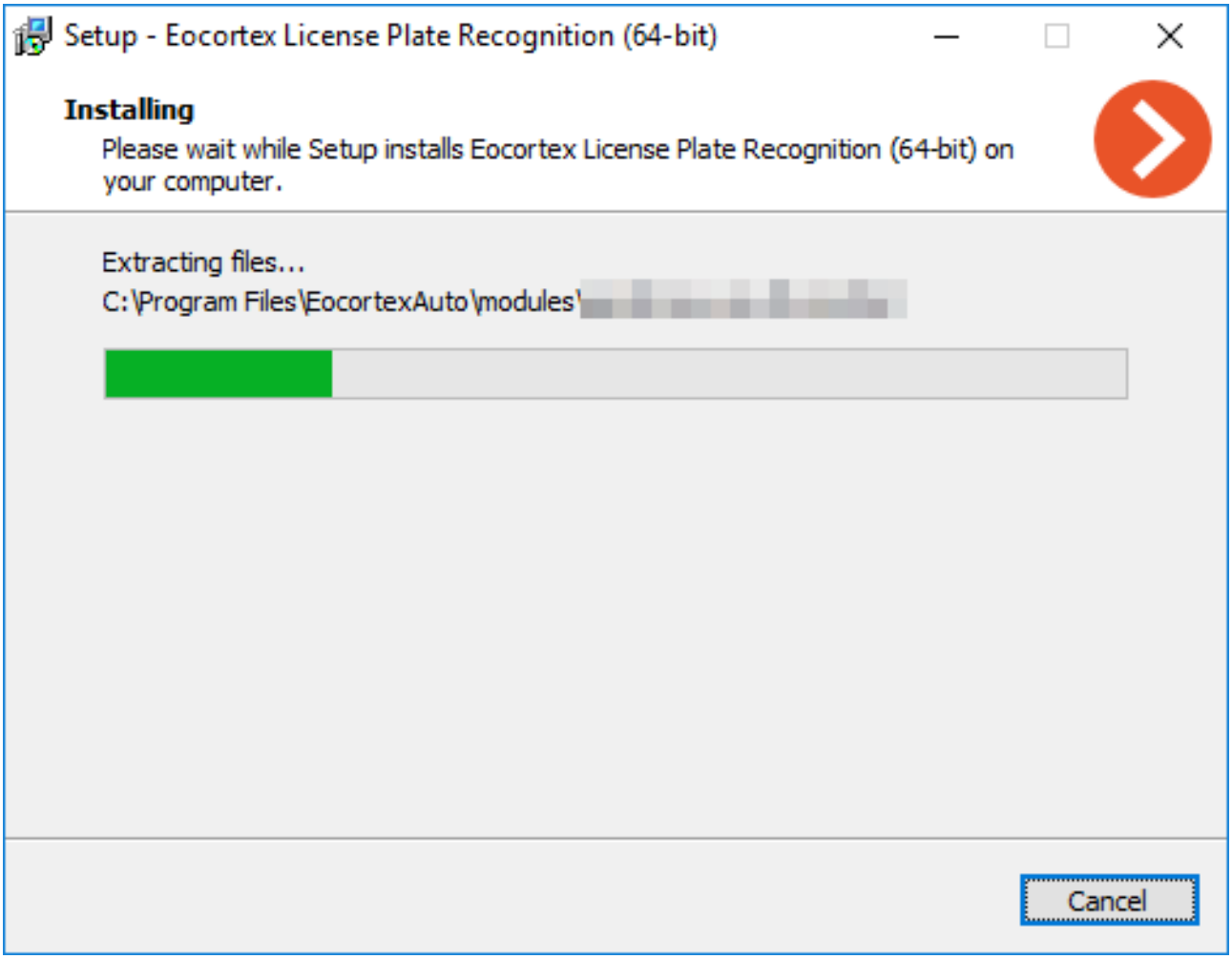


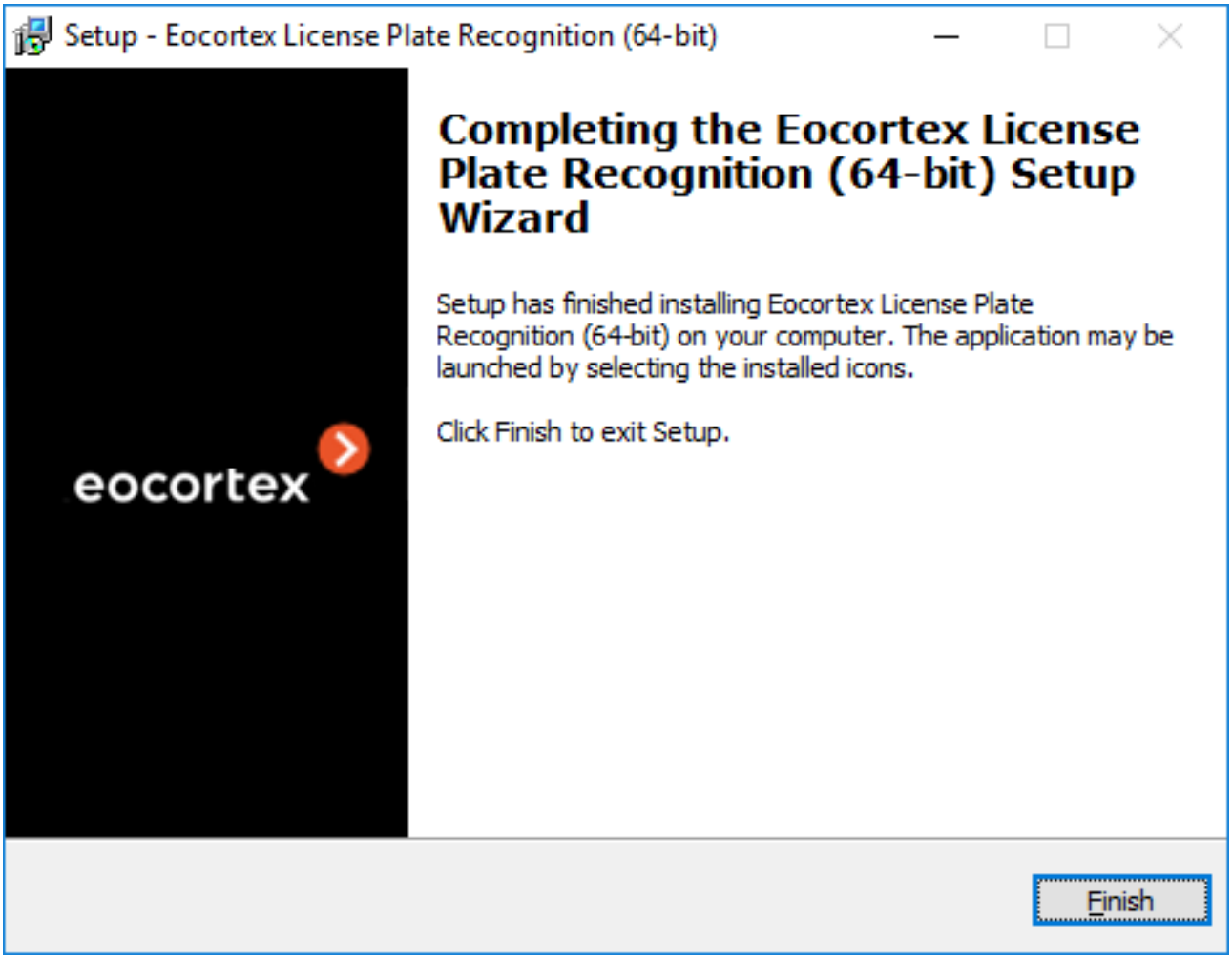
⚠ At the **Select component** step, choose the **Licence plate recognition (Light)** option.



⚠ At the next step it is required to indicate the path to the module license file.


Setup - Eocortex License Plate Recognition (64-bit)
Light Module license file installing
Would you like to install the Light Module license file?
Skip this step
Install licence file
ɔ_tj_tr_uz_ua_fi_cz_est_hk_kr_ae_kw_valid_till_05032019_1302.lic
Browse...
< Back
Next >
Cancel


Setup - Eocortex License Plate Recognition (64-bit)
Installing
Please wait while Setup installs Eocortex License Plate Recognition (64-bit) on your computer.
Extracting files...
C:\Program Files\EocortexAuto\modules\
Cancel



By default, the module will be installed to **C:\Program Files\EocortexAuto** folder.

Licensing the module

Since the module uses the libraries developed by a third party that require separate licensing, two engineering elements are used for its license protection: the hardware protection key of the **Licence plate recognition (Light)** module and the license bound to the **Eocortex** protection key.

The presence of two license protection elements is just a technical particularity: only one license per server is to be paid for. The type of module (**Highway** or **Parking**) and the number of cameras for license plate recognition on the given server are indicated in the license.

The hardware protection key of the module is a Guardant USB key:

The **Eocortex** protection key may be a hardware or a software key.

The module is licensed according to the type of license and to the quantity of the recognition channels. It is also required to specify the list of countries whose license plates it is planned to recognize.

Types of licenses:

- **Highway** is intended for the recognition of the license plates of the vehicles travelling at the speed of up to 270 km/h.
- **Parking** is designed for the recognition of the license plates of the vehicles travelling at the speed of up to 30 km/h.

The license plates meeting the standards of the following countries will be recognized:

Abkhazia, Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Czech Republic, Estonia, Georgia, Germany, Greece, Hong Kong, Hungary, Ireland, Israel, Italy, Kazakhstan, Korea, Kuwait, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, the Netherlands, Poland, Portugal, Romania, Russia, South Korea, Spain, Tajikistan, Turkey, Ukraine, United Arab Emirates, United Kingdom, Uzbekistan, Finland, France.

For the operation of the **Licence plate recognition (Light)** module it is required that the module protection key with the activated license is inserted into the **Eocortex** server to which the cameras recognizing the license plates are bound. The **Eocortex** license with the specified support of the **Licence plate recognition (Light)** module must also be activated on the server.

One **Eocortex** server may have only one **Licence plate recognition (Light)** module protection key installed.

Only one of the modes (**Highway** or **Parking**) may be used on the same server.

The quantity of the cameras that recognize license plates on the server may be increased. To do it, it is required to purchase a license for the module, then, with the help of the **Eocortex Configurator** application, update the **Eocortex** license and activate the license of the module by launching the module installation software and selecting the corresponding key activation option.

The type of license may also be changed, but only from **Parking** to **Highway**. To do it, it is required to purchase a license for the module and activate the license of the module by launching the module installation software and selecting the corresponding key activation option.

In the multiserver system, it is possible to set up the license plate recognition on the cameras bound to different **Eocortex** servers, however:

- It is required to use a separate module protection key on each server, and the corresponding number of cameras that perform recognition must be indicated in the **Eocortex** licenses;
- The common database and the common archive of the recognized license plate numbers will be used for all cameras.

If third party software using Guardant protection keys is installed on the **Eocortex** server, the **Licence plate recognition (Light)** module operation on such server may be unstable.

Loud sound detection

The **Loud sound detection** module allows to register the situations when the sound received by the camera microphone exceeds the preset level. Additionally, it displays the current sound level in the Eocortex Client application.

Details

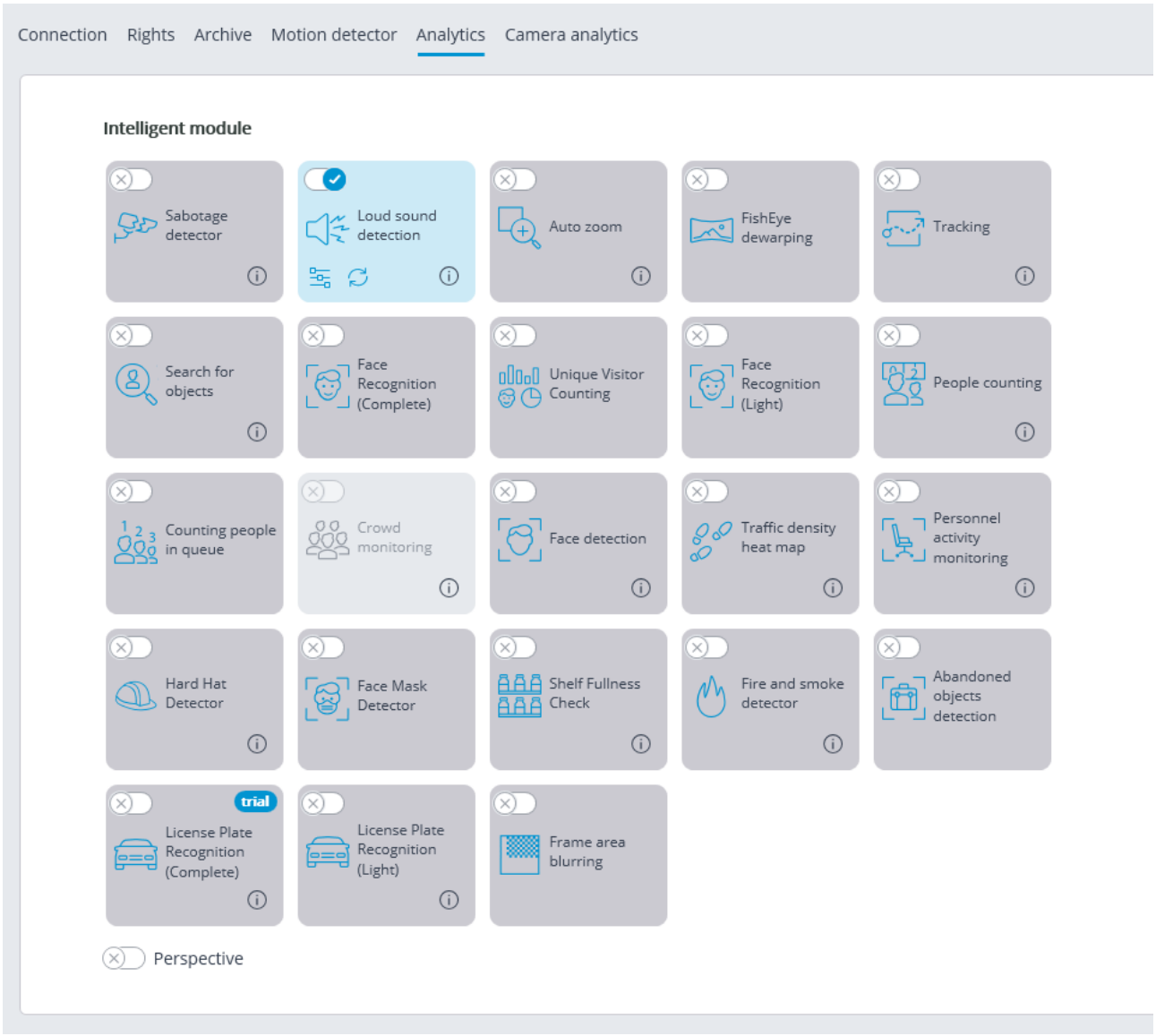
For the proper operation of the module, it is required to correctly aim the microphone and set up the module.

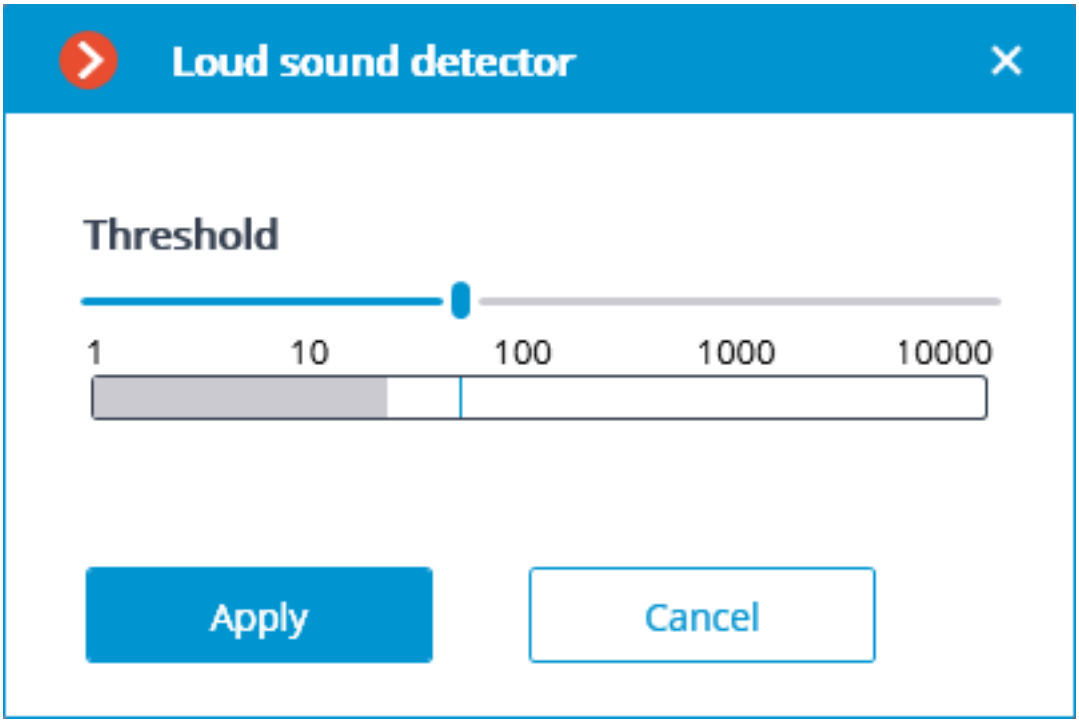
Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.


Connection
Rights
Archive
Motion detector
Analytics
Camera analytics
Intelligent module
Sabotage detector
Loud sound detection
Auto zoom
FishEye dewarping
Tracking
Search for objects
Face Recognition (Complete)
Unique Visitor Counting
Face Recognition (Light)
People counting
Counting people in queue
Crowd monitoring
Face detection
Traffic density heat map
Personnel activity monitoring
Hard Hat Detector
Face Mask Detector
Shelf Fullness Check
Fire and smoke detector
Abandoned objects detection
trial
License Plate Recognition (Complete)
License Plate Recognition (Light)
Frame area blurring
Perspective


Loud sound detector
Threshold
1
10
100
1000
10000
Apply
Cancel

The sound level logarithmic scale will appear in the opened setup window, where the sound level entering the camera microphone will be displayed in real-time mode. Using the **Threshold** slider, you will be able to set the sound level that will trigger the detector.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

It is required to take into consideration that the detector reacts only to the level of sound. For the detector, the sounds of various types differ only by their levels. The subjective perception of the sound level by a person and the evaluation of the level of a particular sound among the sounds of the camera's sound stream by the detector may differ; for example, the camera may be more sensitive to the sounds of a particular frequency, or it may subdue sounds according its own algorithms.

Another adverse factor is the high noise level that leads to the situation when some sounds that require a response (for example, shouts or banging of a door) become poorly perceivable against the sounds in the background, making the triggering of the detector unreliable.

Also, wind gusts perceived by a camera microphone not protected against the wind may lead to the false triggering of the loud sound detector.

The abovementioned factors are required to be taken into consideration at the stage of choosing a camera or a microphone as well as when setting up the detector.

People counting in queue module

The **People counting in queue module** is intended for counting people in lines and warning the operator about the exceedance of the preset threshold.

Capabilities of the module

- Setting of up to six lines (queues) in the frame as the non-intersecting controlled zones.
- Counting people in each of the lines.
- Generation of the alarm when the preset threshold of the number of persons in a line is exceeded.
- Generation of the reports regarding the number of people in each of the lines.
- Real-time display of the quantity of people in each of the lines.

Details

For the module to work properly, it is necessary to correctly position and configure the camera, install the **Eocortex Neural Networks** package, and enable and configure the module.

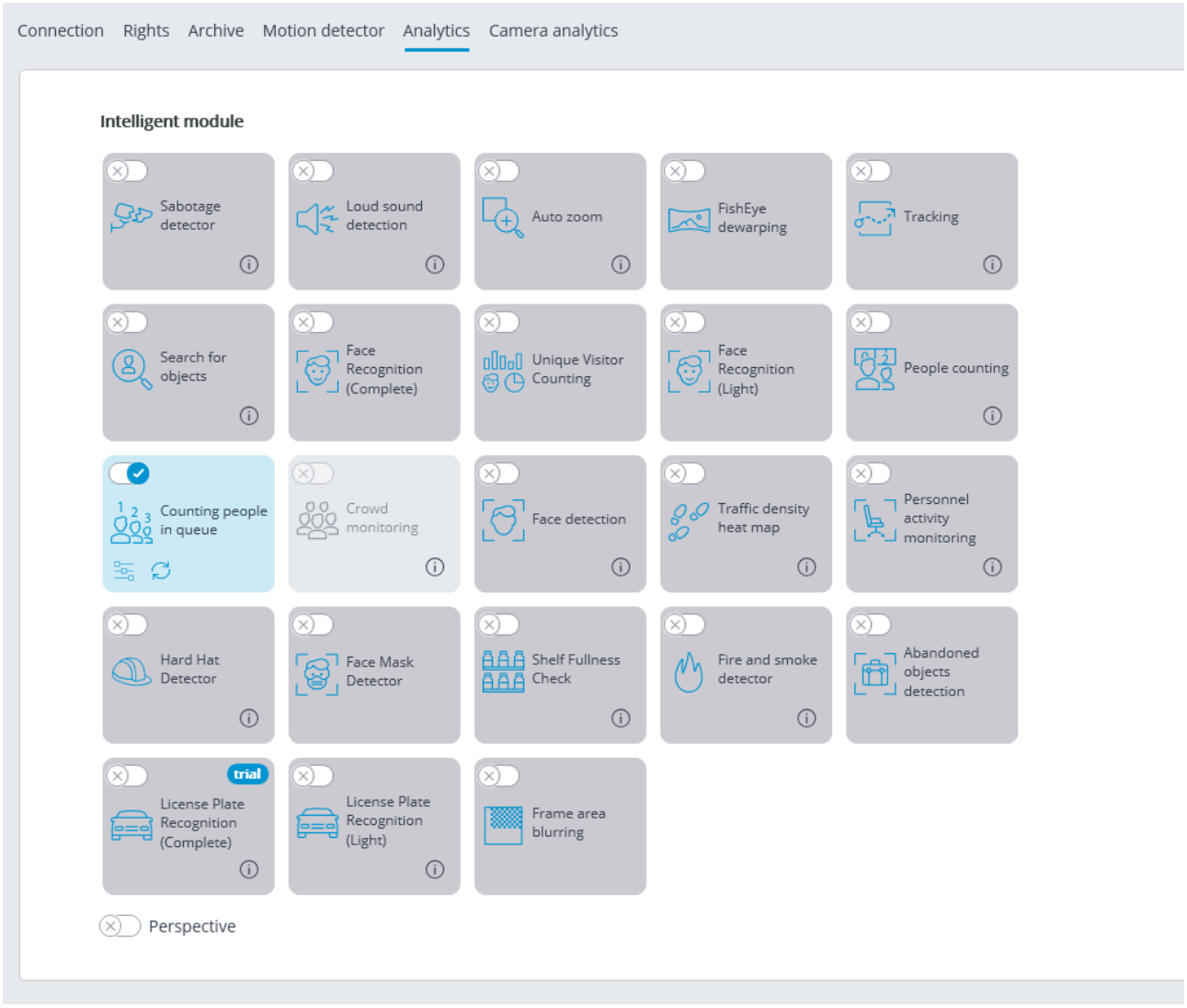
Use

ⓘ The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

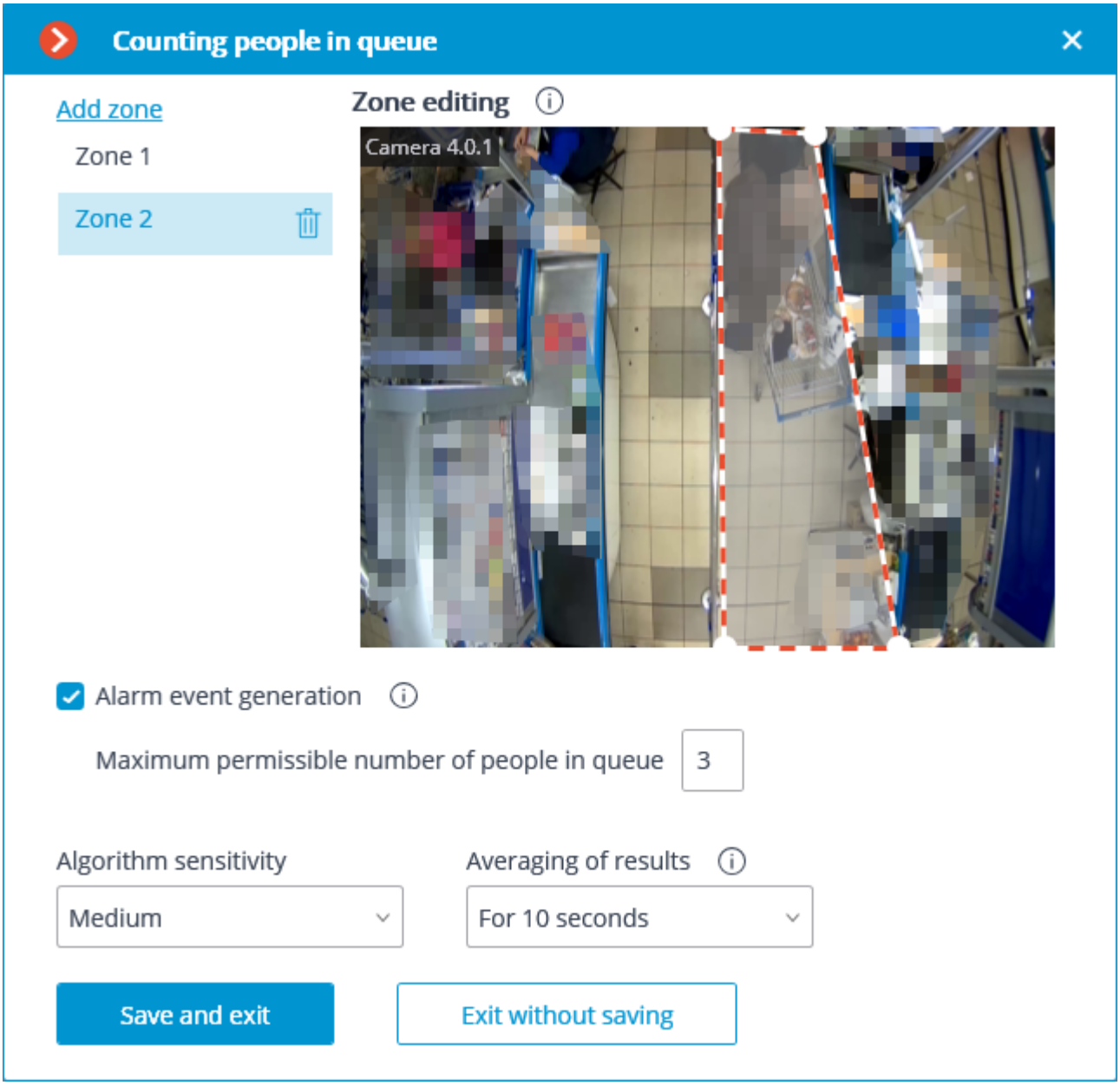
Module setup

⚠ Before using the module, it is required to install the Eocortex Neural Networks software package.

In order to use the module, it is required to enable and set up the module. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, go to the Analytics tab on the right part of the page and enable the module using the switch, then adjust it pressing the button.



In the opened window, it is required to set the detection zones (up to 6) and set the line parameters for each of the zones.



Control zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.

Alarm event generation: when this option is enabled and in the case of the number of people in the zone exceeding the value set in the Maximum permissible number of people in queue, the **Large number of people in the queue** alarm event will be generated.

Algorithm sensitivity is the internal value of the module. If the module fails to correctly detect people in the set zone, it is required to increase the sensitivity; if the module counts the foreign objects as people, it is needed to lower the sensitivity.

Averaging of results allows to make counting more resistant to the sharp changes of the quantity of people in the zone. At the same time, the raise of the averaging interval leads to the lag between the actual change of the number of people in the queue and the reflection of this change in the system. The following averaging periods are available: 10, 15, 30 and 60 seconds; it is also possible to disable the usage of averaged results.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Image requirements

The camera must be fixed in position.

The camera tilt angle must be between 40 and 70 degrees to the vertical plane.

A person to be counted must have at least 70% of its head visible.

The people may overlap each other but to ensure detection of both the overlapped and the one who overlaps him/her the overlapping in the head and shoulders area shall not exceed 30%.

The head and shoulders of a person must comprise at least 10% of the largest dimension of the counting zone and have a size of at least 30×30 pixels.

The head and shoulders of a person must comprise less than 50% of the largest dimension of the counting zone.

The image must be in color.

The image must have a moderate contrast; the people must be distinguishable from the background.

The people to be detected must not be too blurred.

The image compression rate shall ensure the medium or better image quality; the compression must not create significant artifacts.

The optimal image resolution for ensuring proper operation of the module is HD or FullHD.

Hardware and software requirements

This module operates on the 64-bit platforms only.

To use this neural network-based module, a A processor with AVX instructions support is required.

It is also possible (optionally) to use a video card. In this case, a An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model will be required.

The neural network works with the 64-bit version of **Eocortex** only.

Performance

The time it takes the CPU to process one frame, depending on the CPU used, may be up to 2 seconds.

The time it takes the module to update the data for each camera is in a linear dependence of the number of cameras using the module.

The usage of the GPU permits to lessen the CPU load and reduce the time of processing of one frame.

All the cameras are processed by the same module, so the increase of the number of cameras using the module does not lead to the proportional raise of the computational load; only the decoding time for each additional camera will be longer.

When the module operates on the CPU, its load will always be relatively high, so it is advisable to use the GPU for the module's operation.

The architecture of the module is such that when it is launched on even a single camera, the module immediately allocates a large volume of computing resources for its needs. When the number of cameras using the module is increased later, the load is only moderately increased.

Directly after the launching, the module allocates a significant amount of RAM - around 1,5 Gb. After several minutes the majority of the resources is freed and the usage of RAM by the module becomes low.

People counting

The **People counting** is designed for counting people in the frame who cross a preset line, taking into account the direction of crossing.

Capabilities of the module

- Real-time counting of the entering and exiting visitors at one or more entrances (using several cameras).
- Displaying the readings of the counters in the **Eocortex Client** application.
- Creating the reports of the number of visitors who entered, exited and remain in the premises for different periods of time, and for one or several cameras.
- Automatic and manual download of the reports and the automatic sending of the reports by email.
- Automatic update and reset of the counters.

Additionally, the module allows to set the counting zones and, subsequently, determine the number of people in the zones in real time, providing the following capabilities:

- Setting several counting zones each of which can include an unlimited number of cameras with the active module, assigned to the same server.
- Displaying in real time the information regarding the current number of people in each zone where the camera being viewed is included.
- A possibility to set the current value of the number of people in a zone manually.
- Generating alarm events in case of the maximum allowable number of people in a zone is exceeded as well as in case of the return of this number to the allowable value.

⚠ The number of people in the zones comes into account only when the server is functioning. When the server is restarted, the values of the counters will be set to zero; in such a case, the values can be set manually.

Details

For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the software motion detector and the module itself.

Use

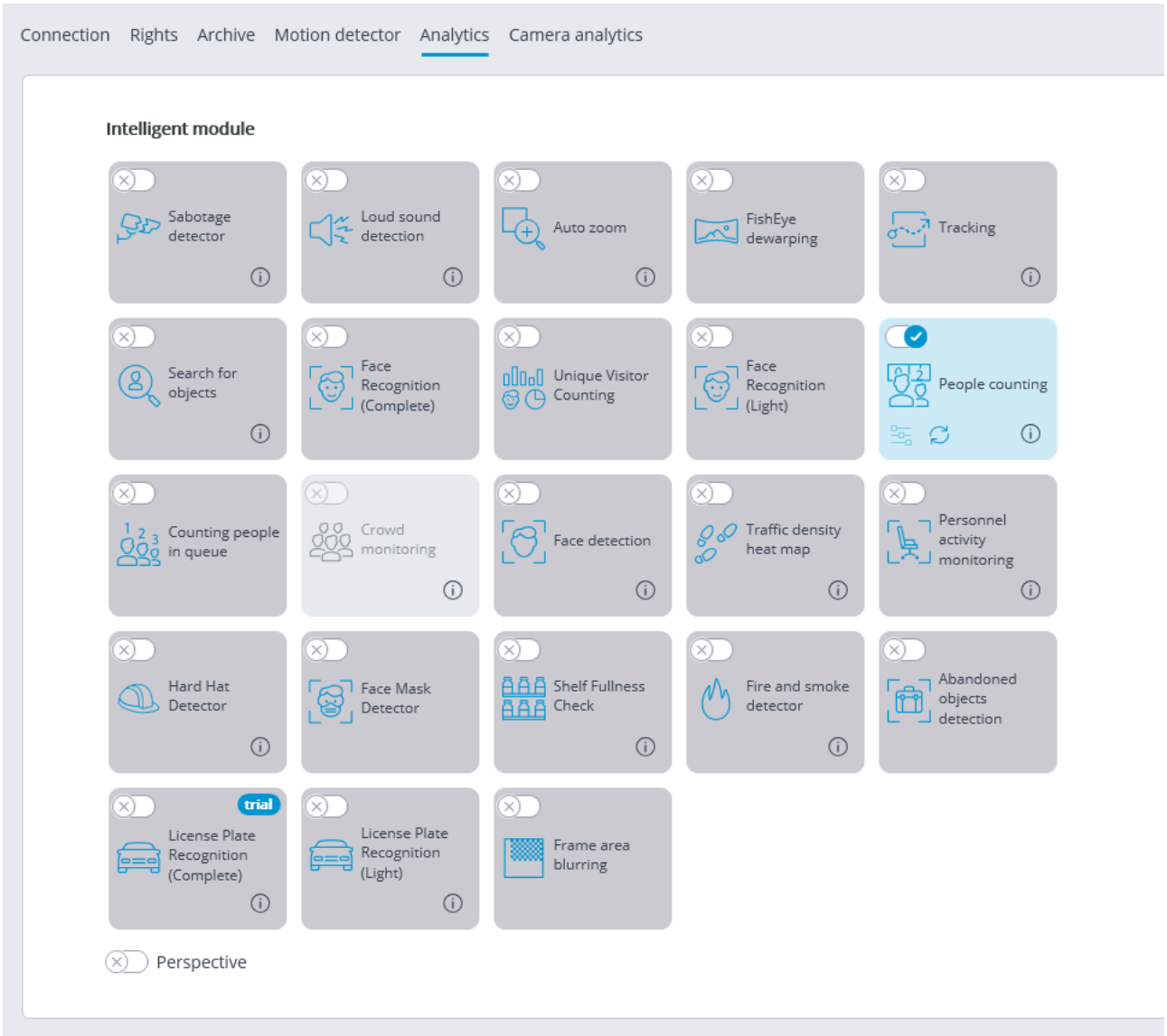
The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.



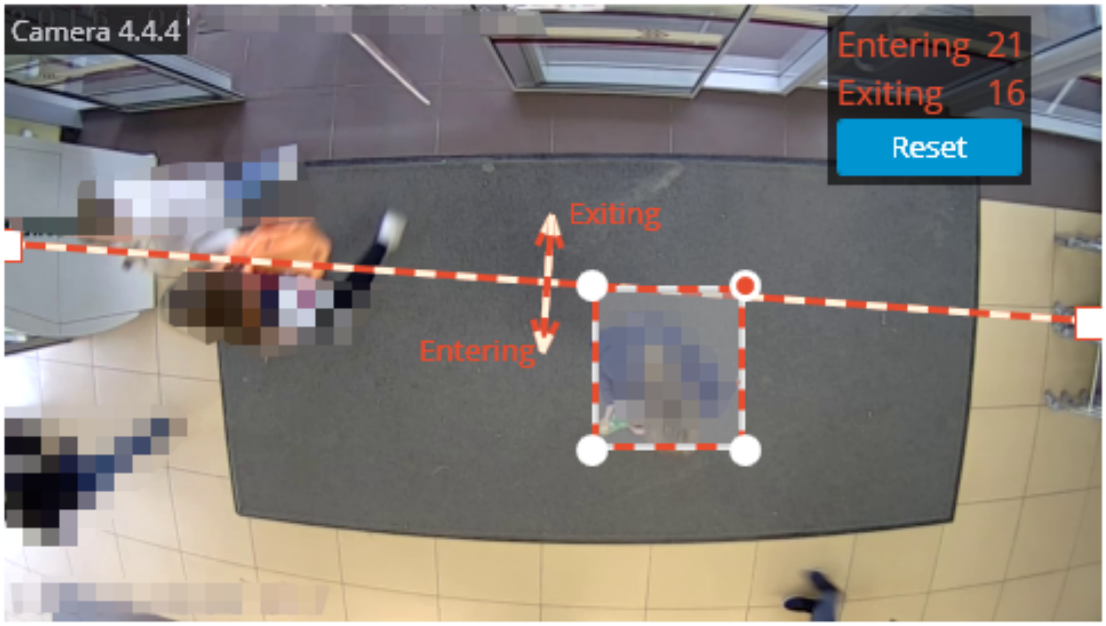
The button opens the module setup window.

Visitor counting

Main settings | Additional settings

Counting parameters

Real time | Archive



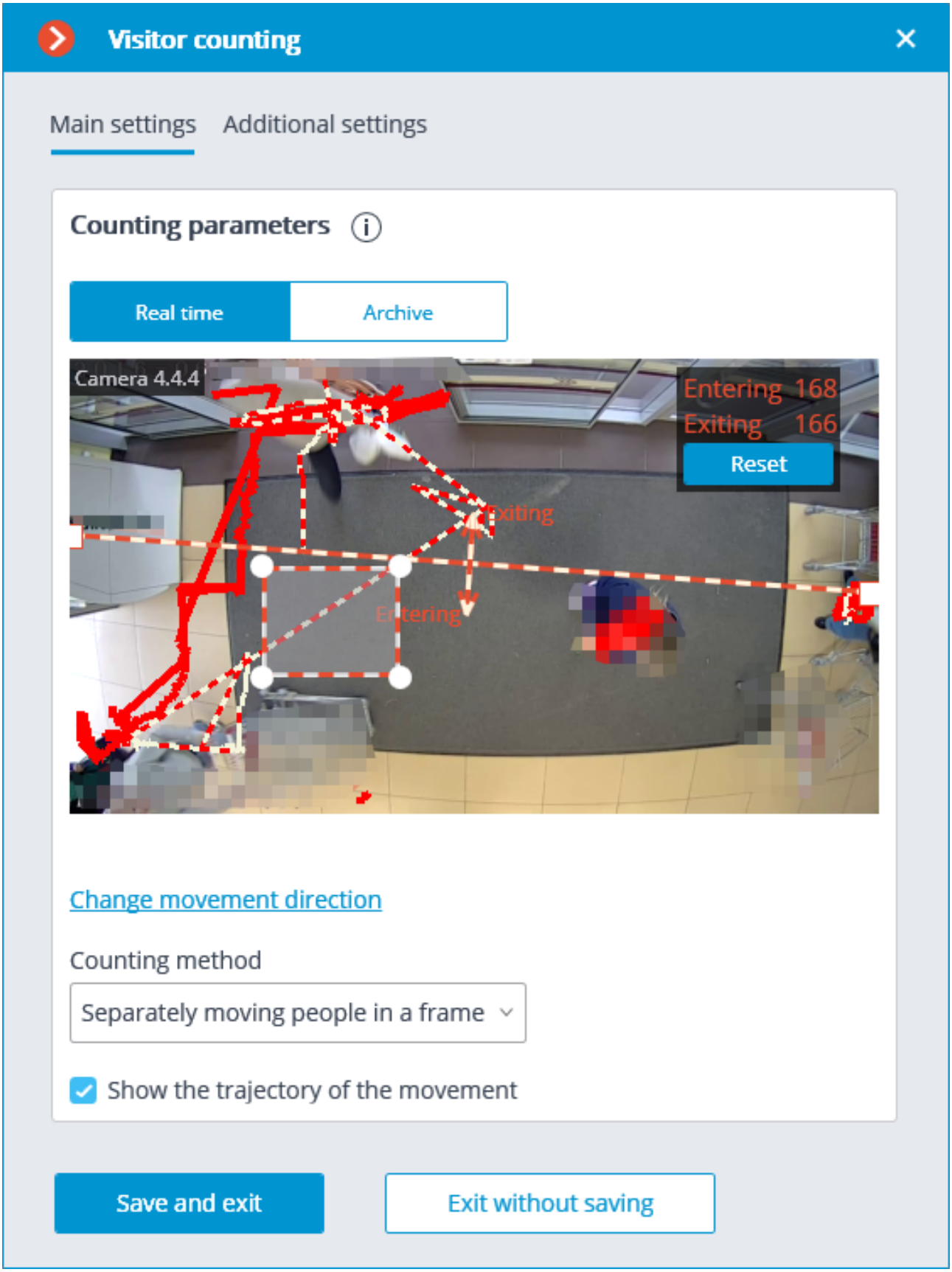
Change movement direction

Counting method

Several people in a frame

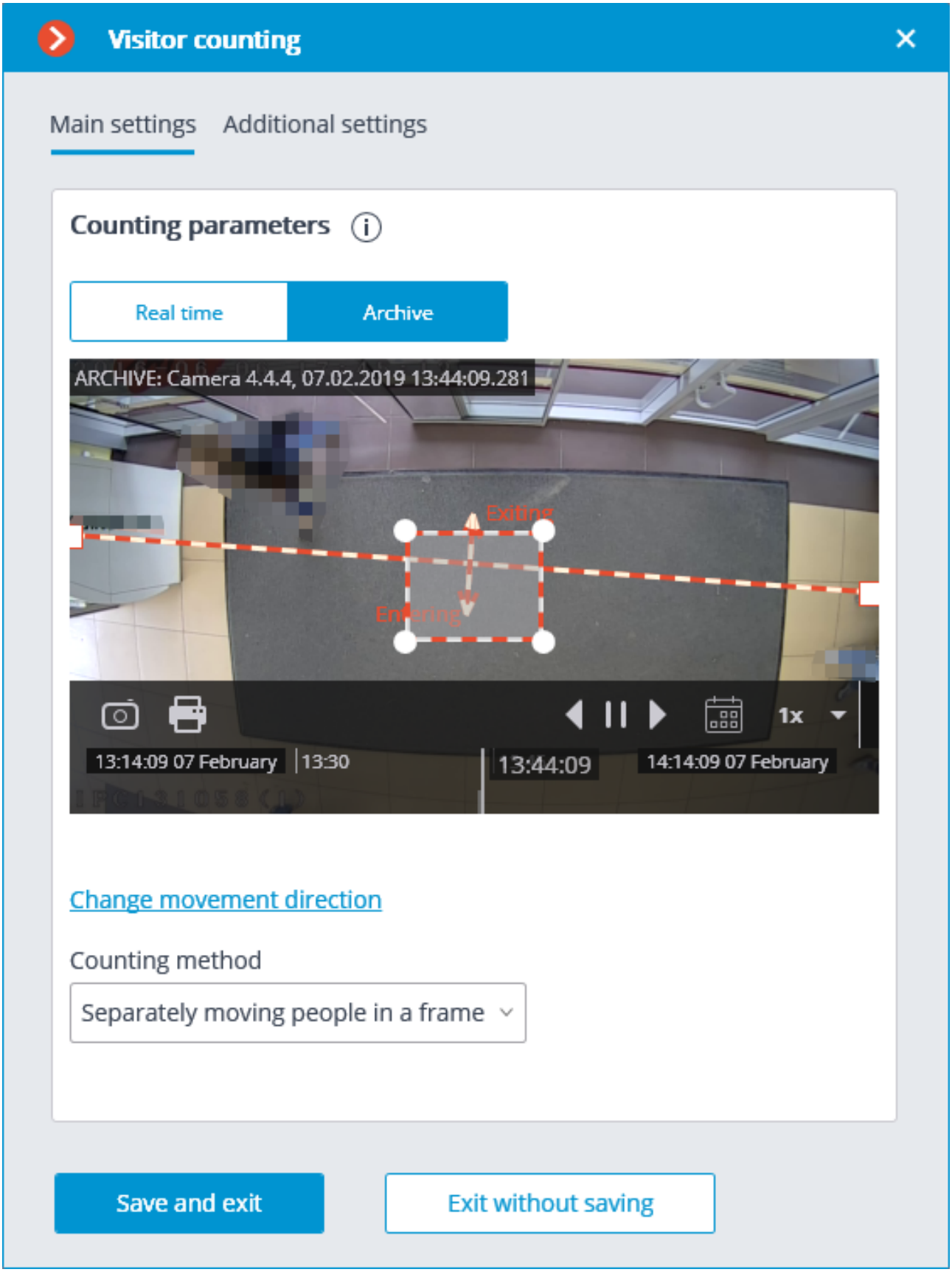
Show the suggested size of the object

Save and exit | Exit without saving



The module settings are described below.

The **Real time** and **Archive** buttons permit to select the source of video for the preview window.



It is required to specify the crossline in the preview window by dragging the ends of the line with the mouse. This line must be crossed by all the entering and exiting visitors in order for the counting to be performed.

⚠ It is not recommended to place the crossline in the immediate proximity of doors or other moving objects.

Additionally, in the preview window, it is required to set up the average object size by dragging the corners of the rectangular frame with the mouse. The dimensions of the frame must enclose the counted object of the average size in the confluence with the line. This dimension is taken into account whe counting: if the line is crossed by the object significantly bigger than the frame dimensions, it will be counted as several objects (for example, if the object is three times larger than the frame, it will be counted as three separate objects).

ⓘ It is recommended to use the video from the archive for the convenience of setting up the average size.

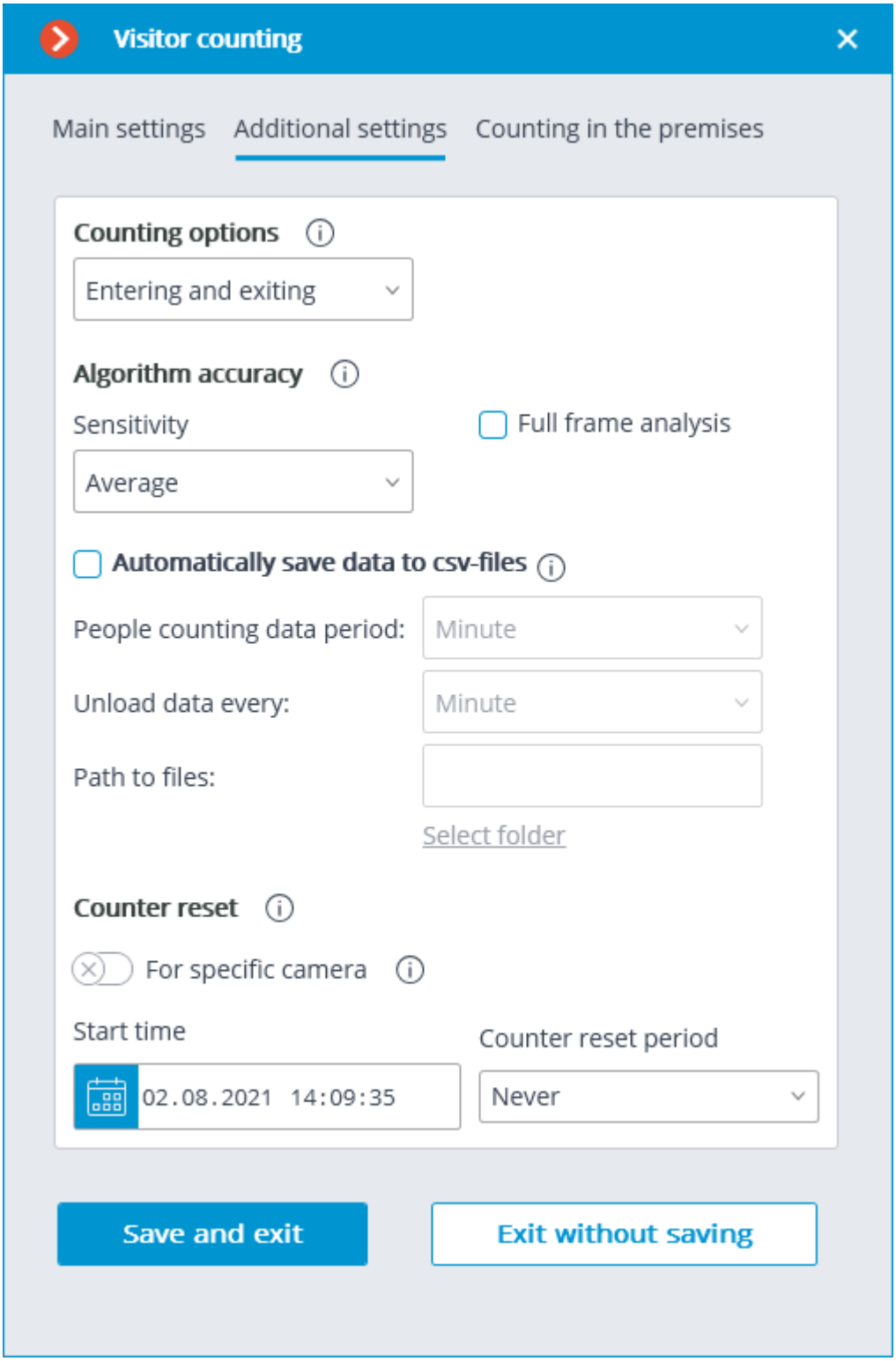
ⓘ The rectangle of setting the average size may be located in any part of the frame, i.e. it is not required to place it on the crossline.

The **Change movement direction** link permits to change the direction in which the entering people will be counted. To designate the direction of entrance and exit, the ends of the arrows perpendicular to the counting line are provided with the corresponding legends.

The **Counting method** dropdown list allows to select the way of counting in accordance with the conditions of the module's operation. The following options are available:

- **Several people in frame** ensures the counting of both separately moving people and groups of people. This method is recommended to be used in the majority of cases when the conditions of the module operation are met.
- **Separately moving people in frame**: this method is recommended to be used only when it is not possible to provide all the conditions of the module's operation (for example, if the camera is installed in a low position, or when it is not installed vertically) and more than one moving person rarely enters the field of view of the camera.

The following settings are available on the **Additional settings** tab:



Counting options is used to select the value that will be calculated, stored in the archive, and displayed in the client application.

Sensitivity: high sensitivity increases the chances of detecting objects but the probability of false triggering also increases; low sensitivity reduces the instances of false triggering but the counting accuracy may suffer.

Full frame analysis: activation of this option allows to increase the counting accuracy at the cost of the increased processor load.

Automatically save data to csv files enables automatic data saving to disc.

People counting data period sets the interval for which the counter data of one report line are summed up.

Unload data every determines the interval of the creation and saving of the report.

Path to files allows to set the folder on the server where the report files will be stored.

⚠ The folder on the server to which the camera being set up is bound is specified for automatic saving.

The **Select folder** button may be used only when the **Eocortex Configurator** application is launched on the server to which the camera is bound.

ⓘ The CSV filename format is as follows: **Counters_CameraName_DDMMYYYY# hhmm.csv**. For example, for the **Hour** period of autosaving for **Camera 1** camera the following files will be saved:

Counters_Camera 3_02022017#10.csv

Counters_Camera 3_02022017#11.csv

Counters_Camera 3_02022017#12.csv

The example of the CSV file contents:

time;in;out;inside;

02/02/2017 12:00:00;6;4;2;

02/02/2017 12:01:00;6;11;-5;

02/02/2017 12:02:00;10;6;4;

where **time** is the date/time of the beginning of the single counting interval; **in**/**out**/**inside** is the quantity of the people who, correspondingly, entered, exited and remain inside for the given period of time.

Counter reset determines the reset to zero parameters of the counters in the **Eocortex Client** application.

Start time sets the date and time the reset intervals will be counted from.

Counter reset period sets the counter reset interval.

The switch **For specific camera** sets the counter reset settings for an individual camera or for all cameras.

ⓘ If this switch is off, the counter reset settings will be applied to all cameras whose switches are off as well.

When the switch is on, the counter reset settings are set for an individual camera and do not change the counter reset settings for other cameras.

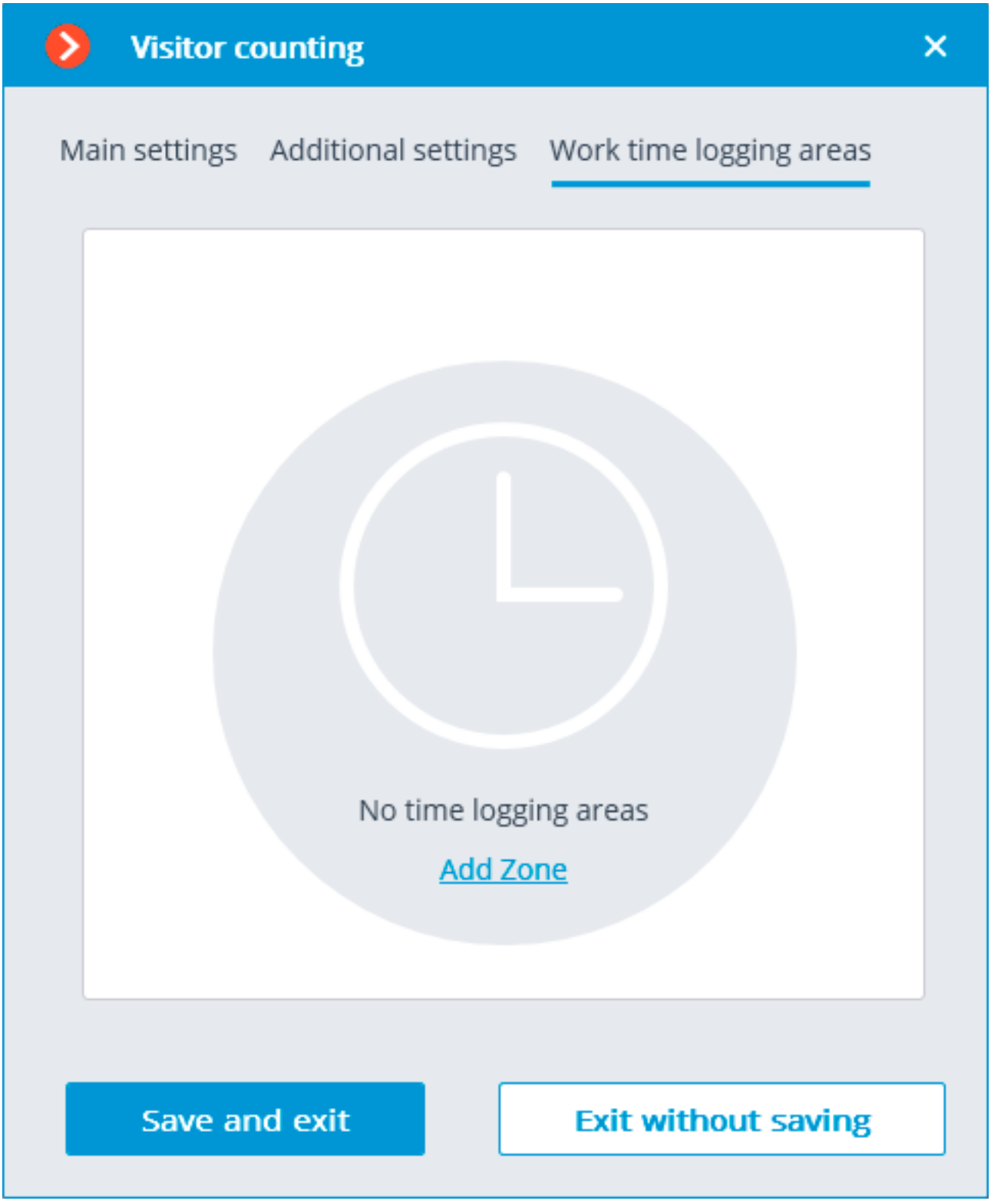
If the switch for an individual camera is off and the changes are made, the selected settings will be applied to all other cameras with the switch off upon saving the settings.

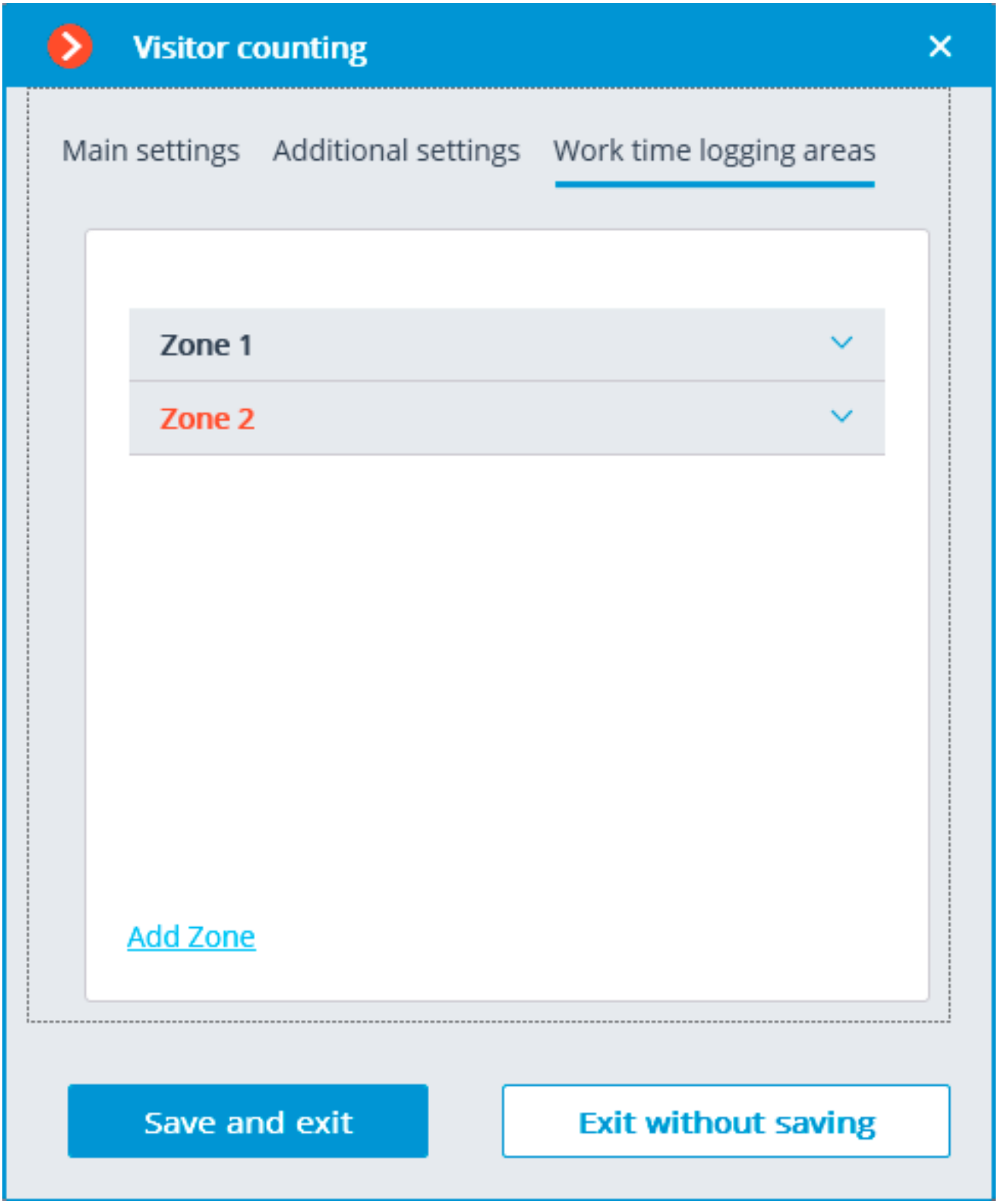
When the switch mode is changed, the following settings are made automatically:

- When switching to general settings: general settings
- When switching to unique settings: the most recent (saved) unique settings.

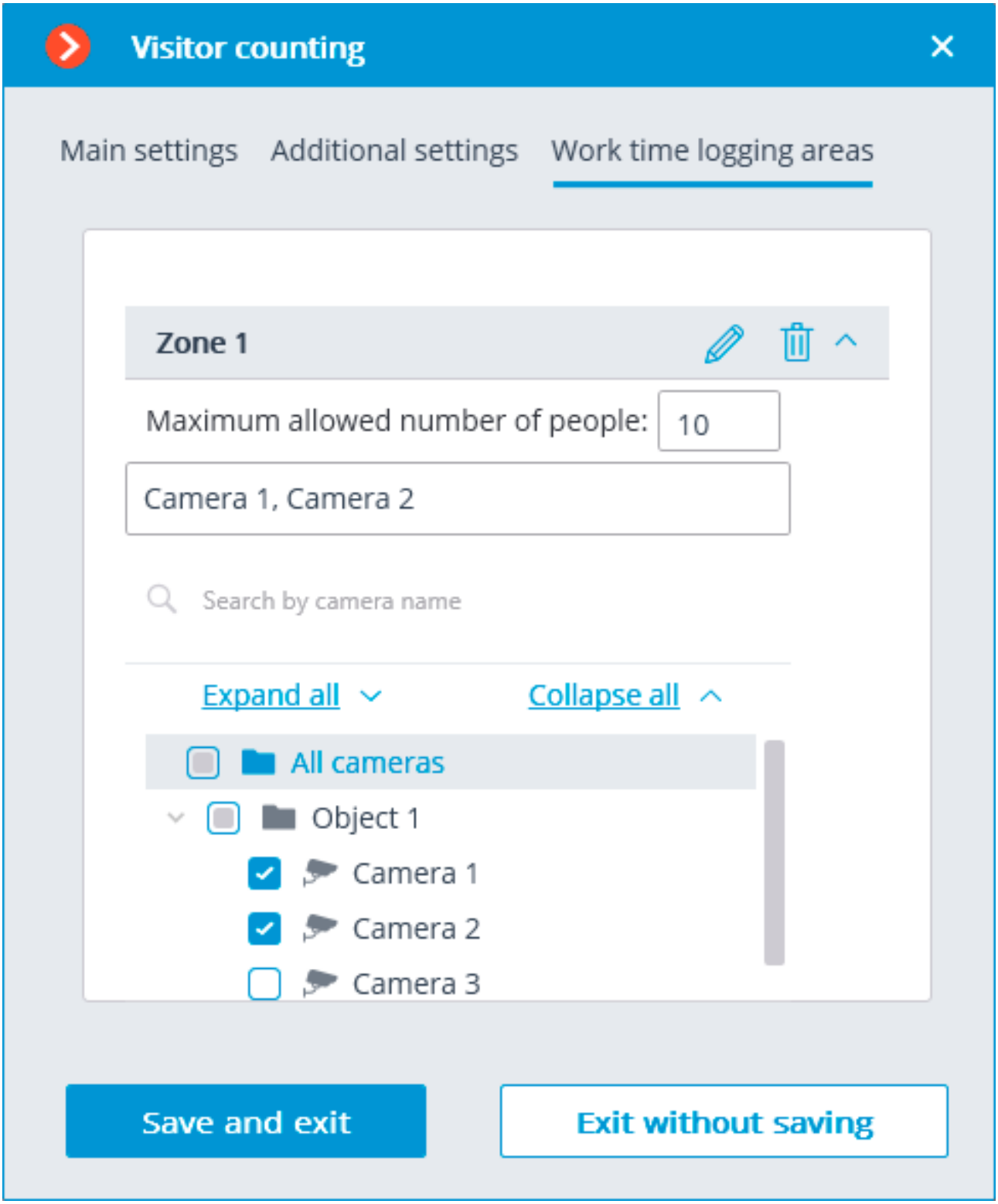
By default, the switch is off.

On the **Time logging areas** tab, it is possible to set the zones that will be used for counting visitors in the premises.


Visitor counting
Main settings
Additional settings
Work time logging areas
No time logging areas
Add Zone
Save and exit
Exit without saving



In order to set the maximum allowable quantity of visitors and to include the cameras into the zone, it is required to open the settings of the corresponding zone.



⚠ The use of the module will start only after the settings are applied.

ⓘ Within 10 to 15 seconds after the application of the settings the module will be in the process of "learning"; during this time the counting results will not be accurate.

Since during "learning" the registering of the permanent background is performed, it is recommended to use this setting when there is a minimal number of moving and foreign objects in the frame in order to ensure the more accurate counting.

Requirements and recommendations

For the proper operation of the module, it is recommended to ensure that the following conditions are met:

The camera must be installed vertically. A different way of camera installation may adversely affect the counting accuracy.

The recommended minimum camera installation height is 3 meters above the ground.

The camera must be fixed.

Depending on the operation conditions, the framerate must be as follows:

- **Several people in frame**: at least 10 fps;
- **Separately moving people in frame**: at least 5 fps.

For reducing false triggering due to the changes of the background and lighting, it is required to ensure uniform illumination without flicker and sharp changes of brightness. The presence of moving foreign objects in the camera field of view is to be avoided because such objects may also be counted.

If the **Separately moving people in frame** option is used and there are moving foreign objects in the frame, including such objects as doors, escalators etc., it is recommended to specify the detection zone that does not include these objects in the software motion detector settings.

Personnel monitoring module

The **Personnel monitoring module** is designed for monitoring personnel activity at their workplaces. The activity in this context is the movement in the work zone, including minor movements.

Details

For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the software motion detector and the module itself.

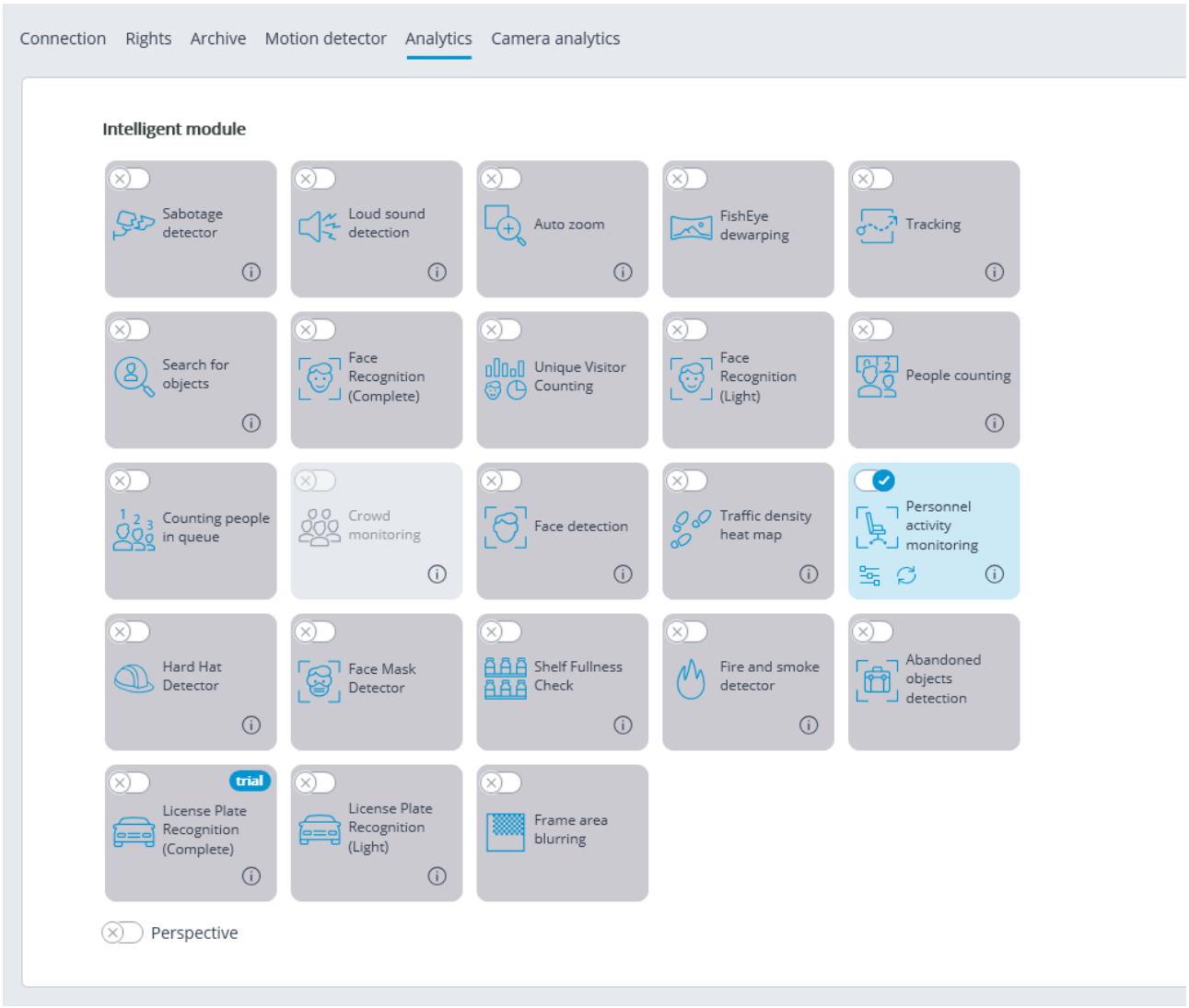
Use

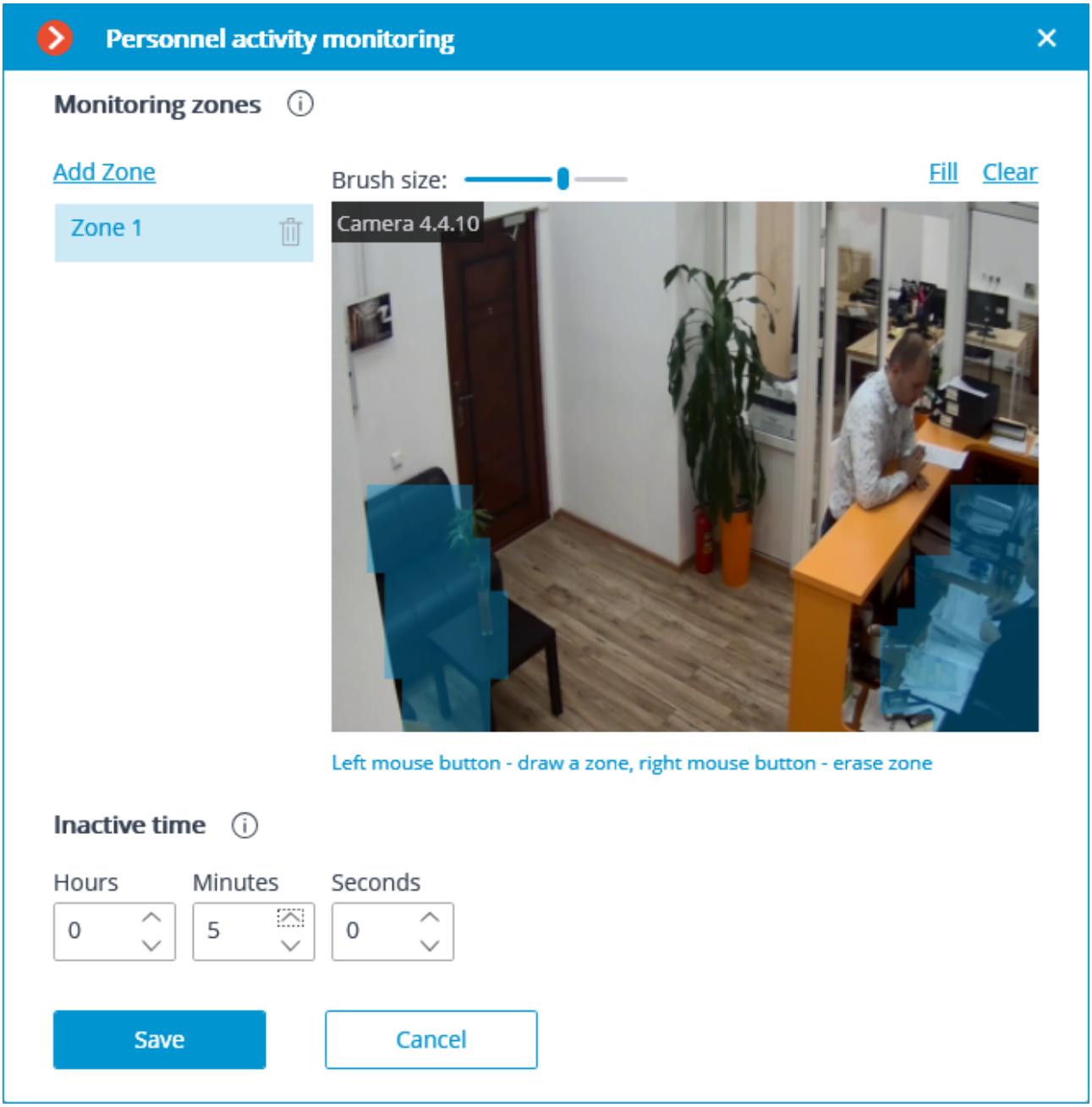
The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself. To do it, it is required to launch the Eocortex Configurator application, go to the Cameras tab, select a camera in the list on the left side of the page, and set up the motion detector on the

Motion detector tab on the right part of the page. Then go to the Analytics tab and enable the module using the switch, then adjust it pressing the button.





In the opened window it is required to specify up to six detection zones and the inactivity time.

Control zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.

Zone setup requirements:

- The zones must not overlap;
- Only one employee must be present in the zone;
- The small movements of the personnel must be taken into consideration in the zone, such as sitting back, rolling back on the chair etc.;
- The zone must not contain any moving objects not depending on the activity of the personnel: fans, water

tanks, moving parts of the equipment etc.;

- No computer displays, instrument panels, clock faces etc. shall be present in the zone.

Inactive time is the time interval upon the expiry of which the Inactive zone event will be generated in case of the absence of activity in the zone. The specified value is extended to all of the zones.

The inactivity in the zone does not mean that no employee is present: for example, a person may stay motionless of be asleep. The presence of the activity in the zone, in its turn, does not necessarily mean that the employee is in his or her workplace – it may be caused by the presence of other persons in the given zone.

The use of the module will start only after the settings are applied.

Requirements and recommendations

The camera must be fixed. It is preferable to mount the camera on the ceiling facing vertically down in order to isolate the workplace of each employee.

Sabotage detector

The **Sabotage detector** module is designed for detecting the actions deliberately aimed at the disturbance of the normal operation of the CCTV cameras by impairing the image quality or provoking the loss of visual information about the objects under surveillance.

Capabilities of the module

The module allows to detect the following events:

- Defocusing the camera.
- Camera turnaway.
- Camera flaring.
- Blocking the field of view of the camera.

Use

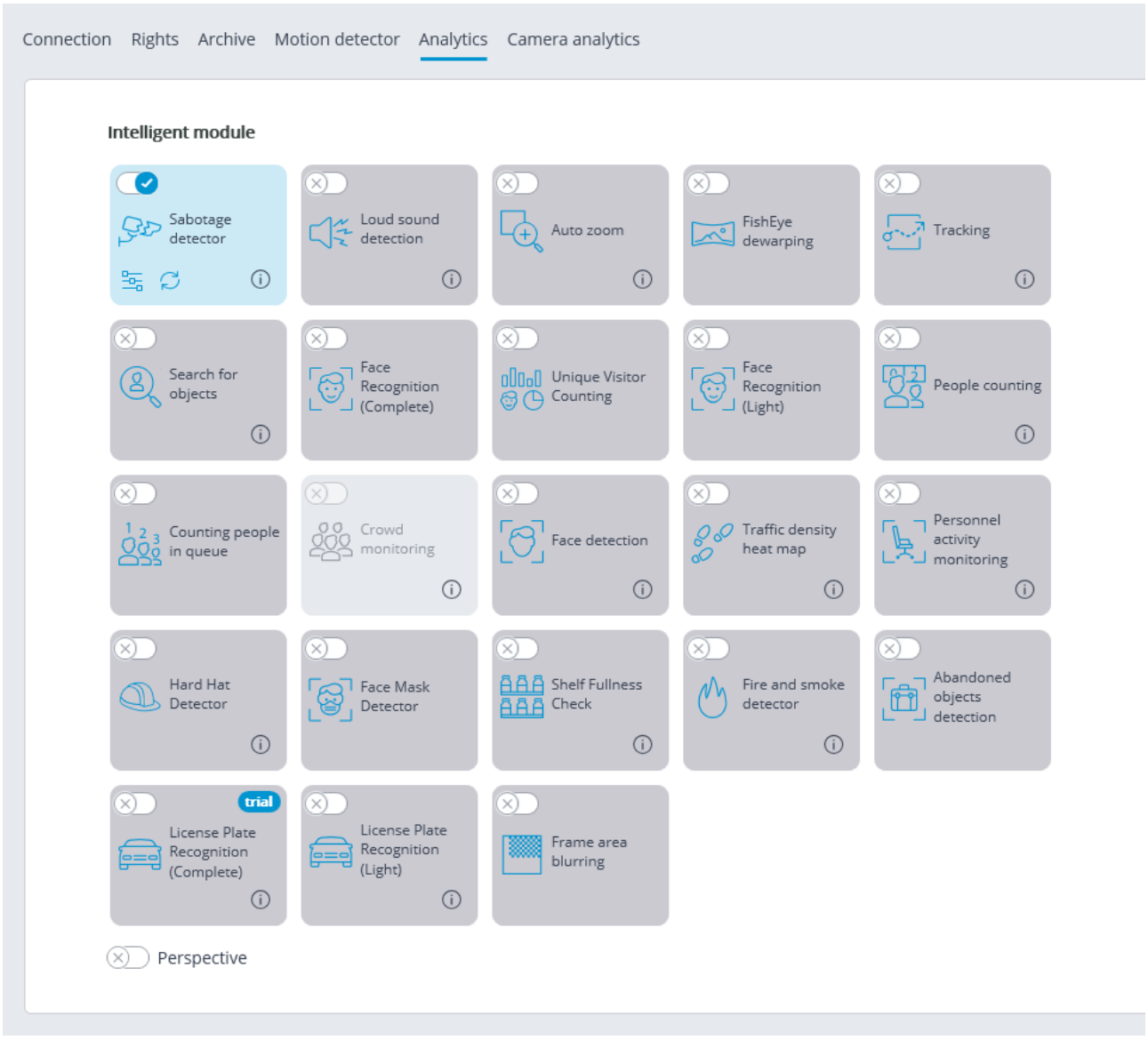
The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

In order to use the module, it is required to enable and set up the software motion detector, then activate the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.

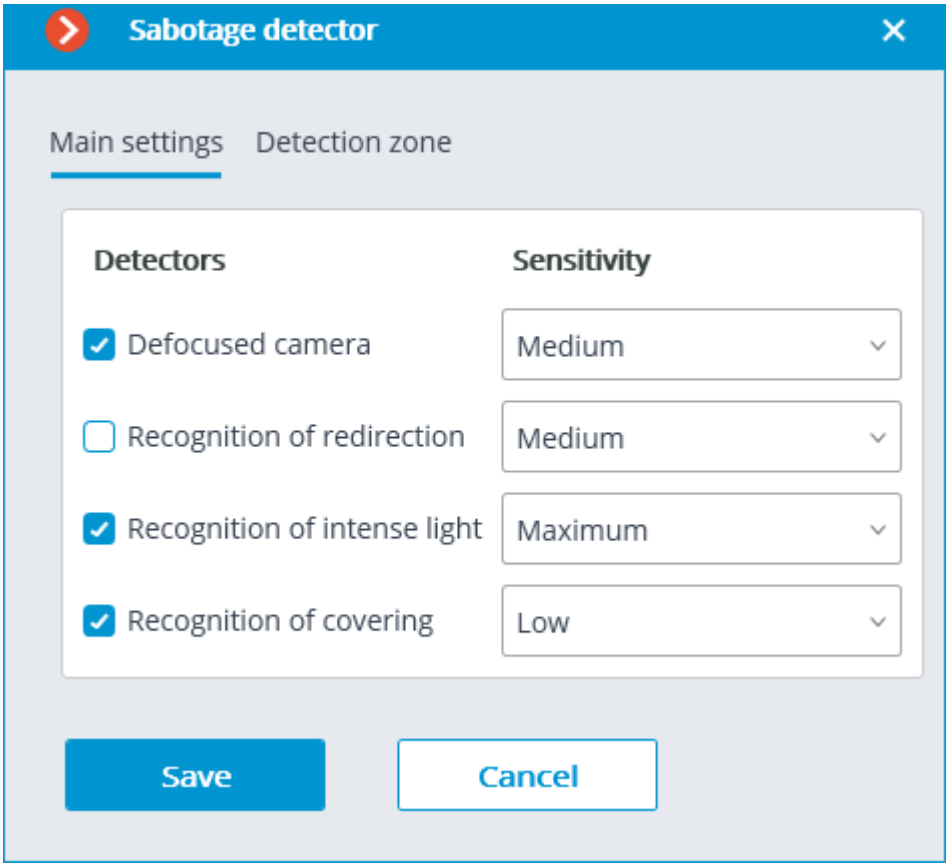


The button opens the module setup window.

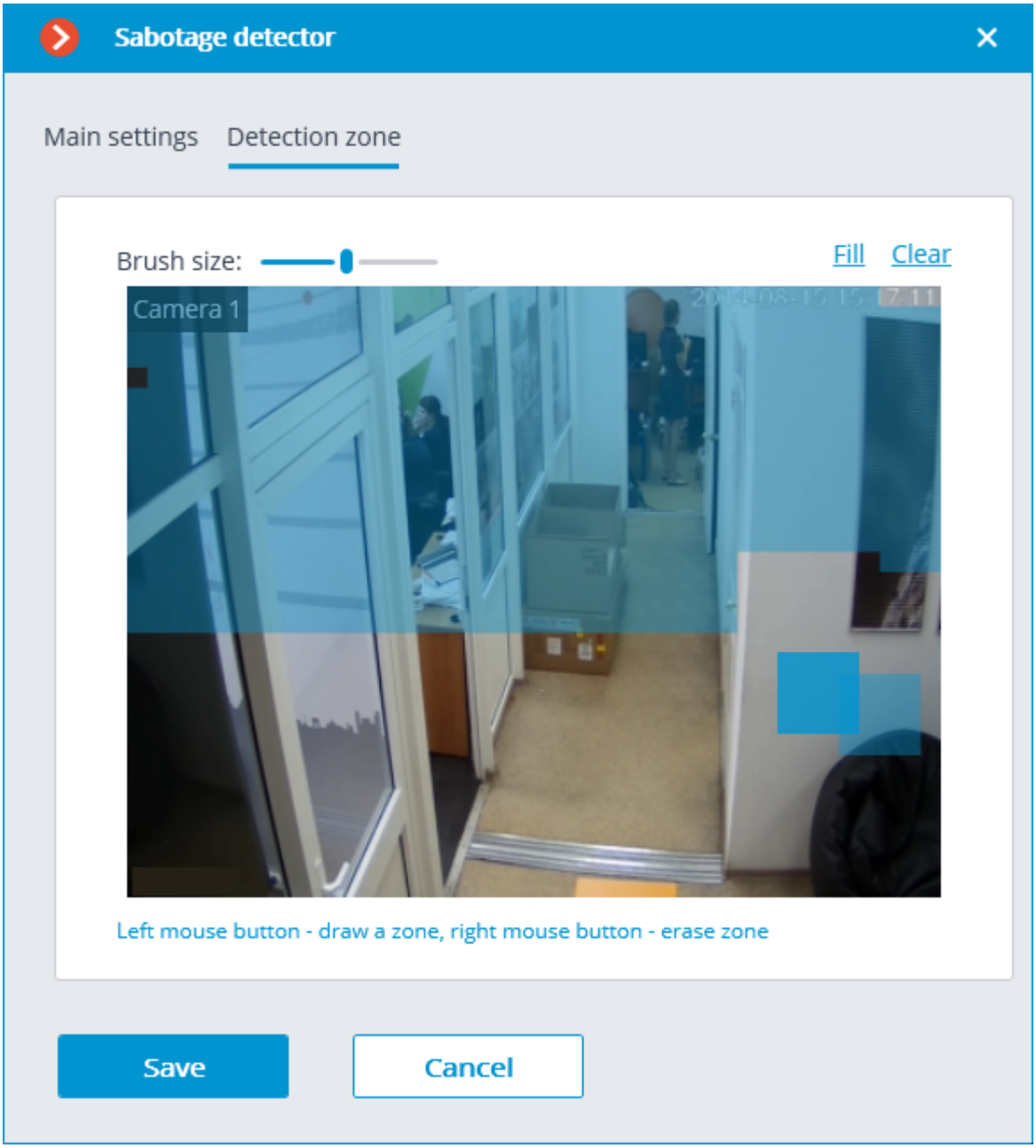
It is required to make the following settings on the appropriate tabs in the window that opens:

Main settings: enabling detectors and adjusting **Sensitivity** of any of them.

The higher the value of the **Sensitivity** parameter, the greater the likelihood of detecting a sabotage. If the detector raises false alarms, the value of this parameter needs to be decreased.



Detection zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.



⚠ Do not turn on the module on the cameras that are equipped with the automatic focus or focal distance control, and on the PTZ cameras.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Camera requirements

The video resolution must be at least 0.3 MP; the framerate must be at least 5 frames per second; the image quality must not be reduced significantly by compression, because the high compression rate may negatively affect the work of the defocusing detector.

Aspects of operation

For the detector to trigger, it is required that the changes in the video stream that are indicative of the sabotage of the video surveillance last at least 5 seconds. The detector does not trip in case of brief flashes, darkening, etc. Among other things, this is done to avoid triggering of the detector during the switching of the camera from the day mode to the night mode, because such switching may be accompanied by a significant short-term change of brightness in the frame.

It is allowed to use the detector round-the-clock on the cameras with night mode and on those cameras that switch to such mode. However, the switching to the night mode and back must not take more than 3 - 4 seconds.

The repeated generation of the event cannot happen earlier than in 2 minutes.

After the launch of the module, it is required to wait for 15 seconds for the initial automatic adjustment to be completed.

Aspects of individual detectors

Camera flaring detector

The camera flaring detector is designed for detecting the attempts of flaring a video camera by directing a bright beam of light (e.g. of a flashlight) at its lens. Normally, a camera tries to compensate for the local flaring by darkening the rest of the image. That leads to the indiscernibility of objects in the whole field of view of the camera. For the detector to trip, the specific brightness and area of the flaring spot are required.

Camera defocusing detector

This detector is triggered by an attempt to defocus the image.

Camera overlapping detector

This detector trips when the lens is covered by foreign objects.

The detector triggers with the following area of overlapping:

- 50% of the area of the frame is overlapped by a dark stationary object, or by an object placed very close to the lens;
- 78% of the area of the frame is overlapped by a light moving object, or by an object placed at some distance from the lens.

Detector of an attempt to turn the camera away from the pre-defined view

This detector trips when the camera is turned.

It triggers only when the turning angle exceeds 20 degrees and the turning rate is more than 6 degrees per second.

Search for objects

The **Search for objects** module allows to quickly find people and other objects in the archive.

Capabilities of the module

Search in the archive for

- any moving objects:
  - in a set rectangular area;
  - crossing a set line.
- people:
  - any people;
  - by the color of clothes;
  - by samples from the archive or an image file.
- vehicles:
  - by category: passenger cars and trucks, buses, two-wheel transport;
  - by color;
  - by samples from the video archive or an image file.
- dangerous objects.
- animals.

Cross-camera tracking:

- chronologically connected search among several cameras for the person found before using the interactive search;
- generating a video clip of the fragments found;
- displaying a trajectory on the plans (if the cameras with the found fragments were placed on the plans).

Details

For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the software motion detector and the module itself.

Use

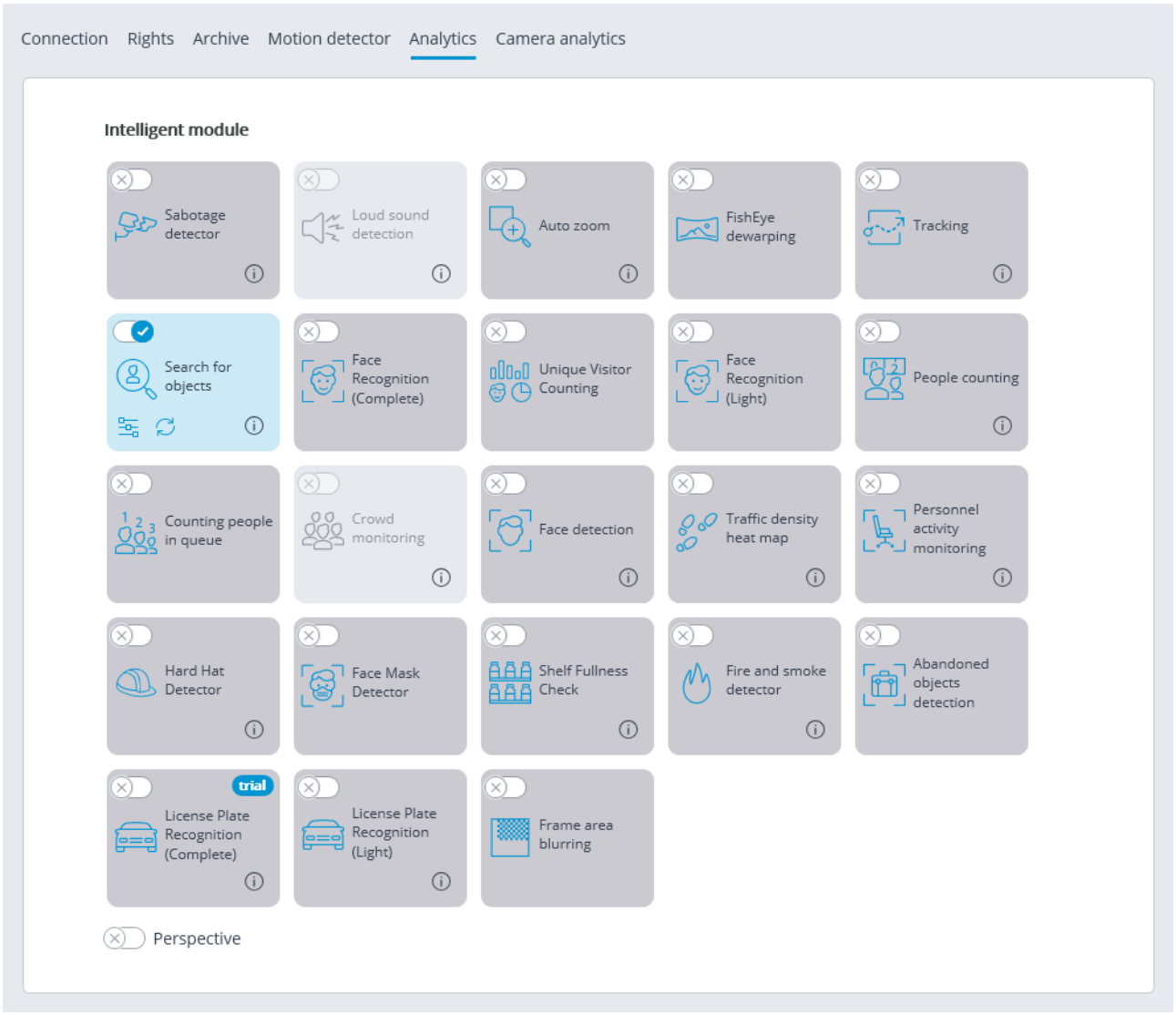
The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

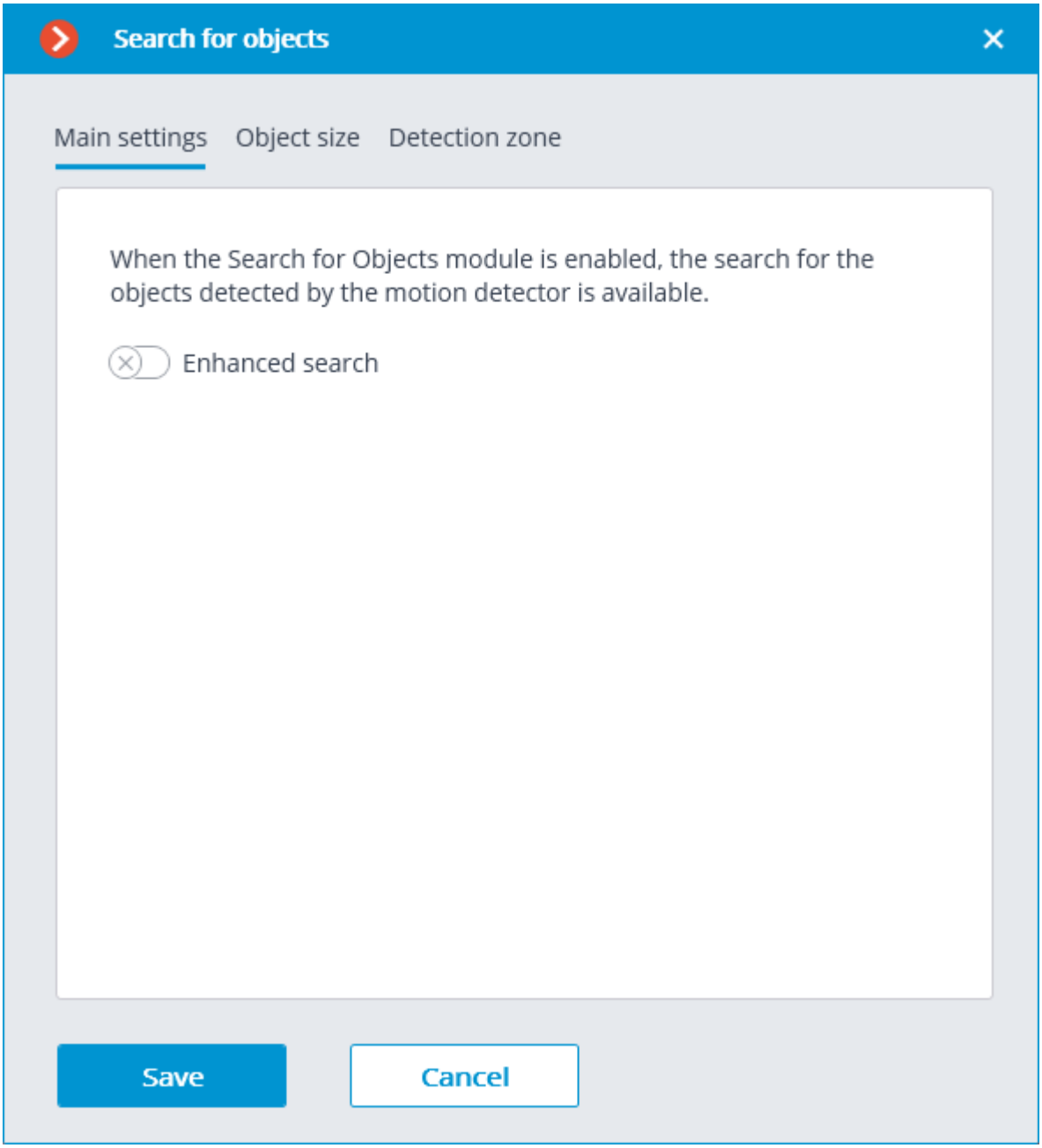
To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.

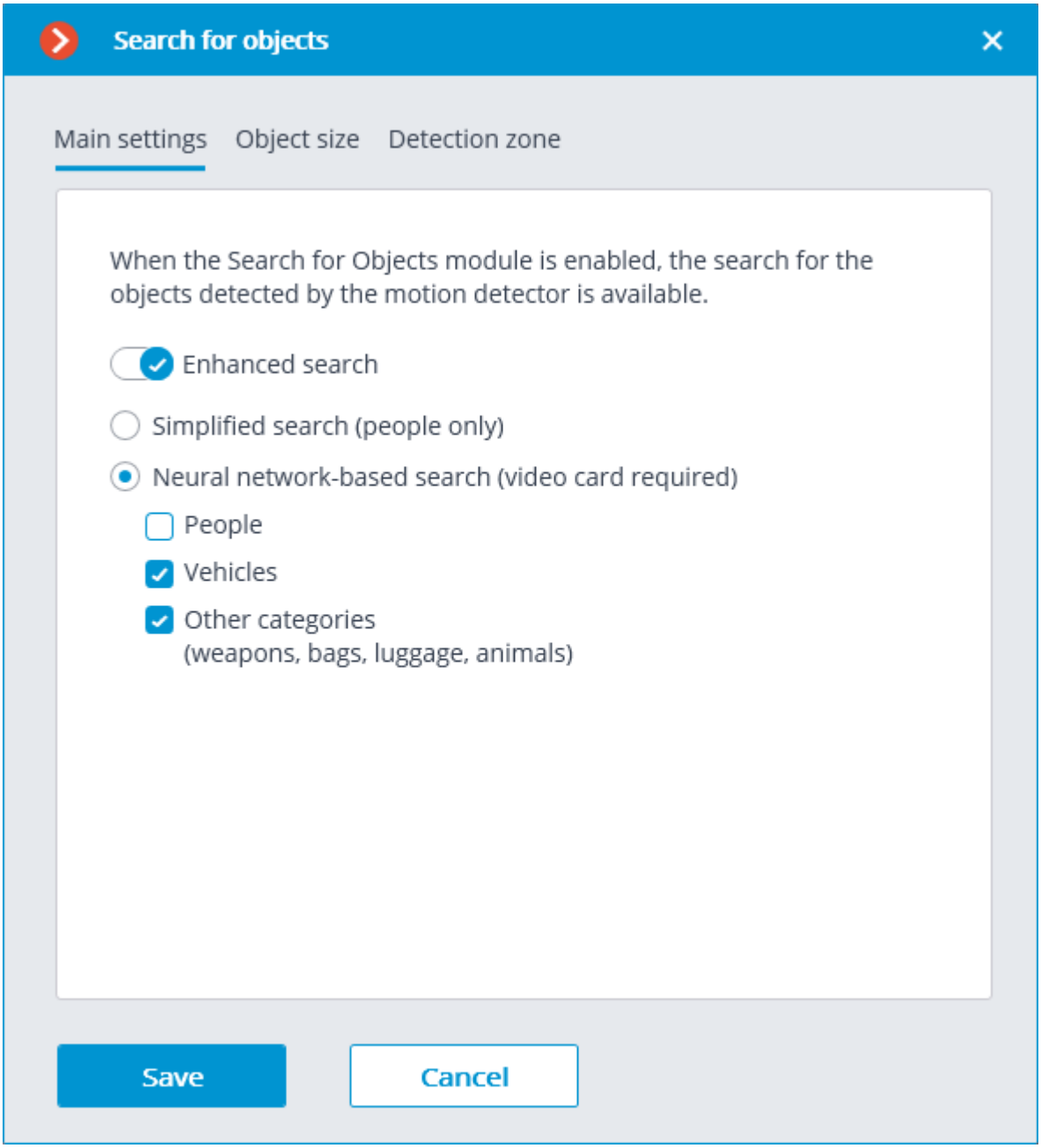


The button opens the module setup window.



When the **Search for objects** module is enabled on the camera for the first time, the search for moving objects only mode is enabled. This mode corresponds to the disabled **Enhanced search** switch .

When the **Enhanced search** switch is on, it is possible to select one of the following two modes: **Simplified search (people only)** or **Neural network-based search (video card required)**.



After upgrading **Eocortex** from version 3.3 and lower to version 3.4 and higher, the cameras that use this module and have the **Enable detection of people**, option on, the following search modes will be set: if the **Increase detection accuracy by using GPU** option has been switched on, the **Neural network-based search (video card required)** option will be enabled; if the option **Increase detection accuracy by using GPU** has been disabled, the **Simplified search (people only)** mode will be enabled.

The **Neural network-based search (video card required)** mode allows to search for the objects of the following categories:

- People;
- Vehicles;
- Other categories.

Later, when receiving search results, objects from **Vehicles** and **Other categories** can be filtered by object type.

The **Vehicles** category includes objects of the following types:

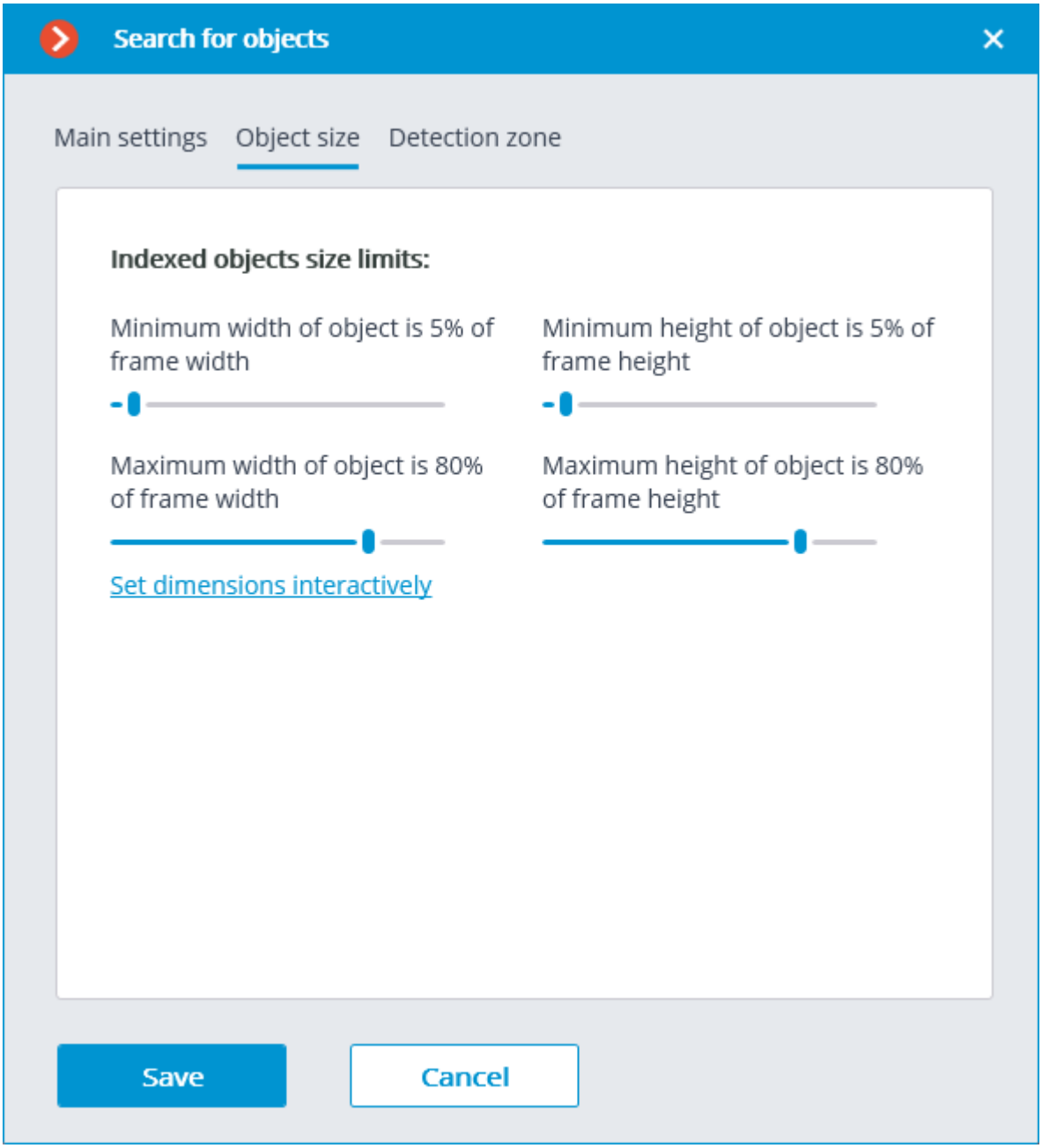
- Passenger cars;
- Trucks;
- Buses;
- Two-wheelers.

The **Other categories** includes objects of the following types:

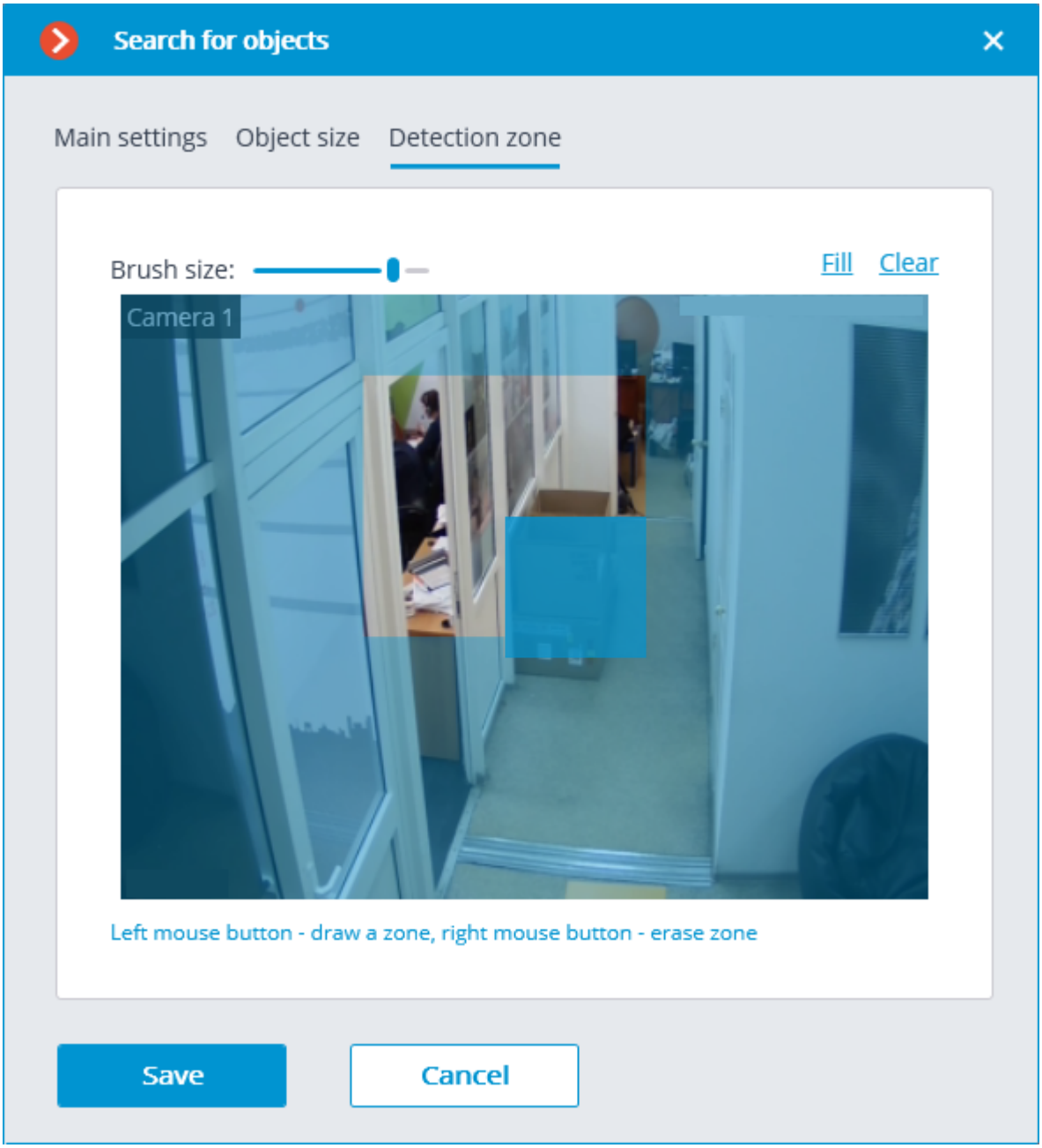
- Animals (terrestrial animals and birds);
- Bags (luggage, suitcases and backpacks);
- Hazardous items (firearms and baseball bats).

When searching for objects from the **Other categories**, the consumption of server resources increases significantly.

The **Object size** tab sets the minimum and maximum sizes of the detected objects.



Detection zone is the zone of the frame filled with the semitransparent blue fill in the settings window. The mouse is used for modifying the zone: left mouse button serves for filling the zone, and the right one is used for clearing it. With the help of the **Fill** and **Clear** buttons you can fill or clear the whole area of the frame. The corresponding slider is used to modify the **Brush size**.



⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Functionality limitations

⚠ After updating **Eocortex** from version 3.3 and lower to version 3.3 and higher, the **Search for objects** module will not be able to search for objects for the period preceding the update. This is due to the database change in version 3.4.

Hardware and software

⚠ It is required to install the **Eocortex Neural Networks** package before using the module.

The neural network works with the 64-bit version of **Eocortex** only.

When updating **Eocortex** to a different version, it is also required to update the **Eocortex Neural Networks** package to the relevant version.

The following is required when using the neural network-based search mode:

- A processor with AVX instructions support;
- An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model.
  For searching for moving objects only and for simplified search, the video card is not used.

⚠ When using a video card, the stable operation of the module is guaranteed on operating systems Windows 10, Windows Server 2016, Ubuntu versions 18.04 and 20.04 exclusively, as well as on the newer versions of these operating systems.

On other operating systems (Windows versions 7 and 8, Windows Server versions 2008 and 2012, CentOS, Debian, Astra Linux), issues may arise when trying to use NVIDIA graphics cards. On Windows 8, this is due to the cessation of support for NVIDIA graphics card drivers. On CentOS, Debian and Astra Linux, the problem is due to the high complexity of installing workable versions of video card drivers.

⚠ The **Eocortex Neural Networks** package must be installed on a video surveillance server even when a video analytics server is used. This is due to the fact that the module uses PostgreSQL DBMS that is installed together with the **Eocortex Neural Networks** package.

Performance

The tables below show the permitted number of cameras for various types of video streams and server configurations without displaying.

CPU	GPU	RAM, GB	Number of cameras
Video stream from cameras: 2 megapixels, 25 frames per second			
Intel® Core™ i5-2400	NVIDIA GeForce GTX-1050 Ti	8	5
Intel® Core™ i7-2600	NVIDIA GeForce GTX-1060	8	9
Intel® Core™ i7-7700	NVIDIA GeForce RTX-2070	8	13

CPU	GPU	RAM, GB	Number of cameras
Intel® Core™ i9-9900	NVIDIA GeForce RTX-2080	12	20
Video stream from cameras: 1 megapixel, 25 frames per second			
Intel® Core™ i5-2400	NVIDIA GeForce GTX-1050 Ti	8	8

Video stream

- The frame rate must not be lower than 10 frames per second;
- The optimal resolution is HD or FullHD.

Image

- Lighting in the frame should be uniform and constant.
- If the camera is installed in front of a bright light source (the sun behind an entrance door, etc.), it is required to adjust the exposure (or brightness) to ensure that the objects in the frame have a natural color (not overexposed or darkened). In this case, it is permissible for the background to be overexposed.
- The image must be in color.
- There must be no significant compression artefacts.
- The compression quality must not be lower than average.
- The object must be seen from a suitable angle, at which it will be clearly distinguishable from the background and plainly visible when observed by the human eye.

  For searching for people:
- A strong lateral light source (sunlight from a window) is not permitted because in this case one half of the person will be overexposed and the other half will be too dark.

Scene and camera position

- The frame must not contain mirrored surfaces that give reflections: glasses, mirrors, etc.
- It is allowed to place the camera overhead. The tilt angle of the camera should not exceed 45 ° from the horizontal line.

  For searching for people:
- People must be visible at full height.

  For searching for vehicles:
- Installing the camera at an angle to the axis of movement of the vehicles provides the most advantageous perspective.

Module’s performance

The accuracy of searching for people using colors is about 70%.

The accuracy of searching for people using samples is about 80%.

The accuracy of searching for vehicles using colors and samples is from 50 to 70%, depending on the perspective of the vehicle and lighting. Glare and flare from headlights significantly reduce the accuracy of color definition.

Minimum requirements for searching vehicles by color:

- The vehicle must be of single color, without multicolored stickers or the like.
- The vehicle must be captured during daylight hours and in good weather.
- The exposure and contrast on the camera must be adjusted in such a way that the color of the subject can be unambiguously determined by the human eye.
- The body of the vehicle must not be light-struck by headlights or other reflections of light, including sunlight.
- The angle at which the vehicle was captured must allow to correctly determine the dominant color of the object (for example, if the car is seen from behind, the bumper is painted in a dark color and the rear window is tinted, the color of the car may be detected as black).

  Below are the examples of favorable and unfavorable angles for determining the type of vehicle. The better the perspective, the higher the accuracy of determining the type of a passing vehicle. On average, under good conditions, the accuracy of determining the type of vehicle is about 80%.

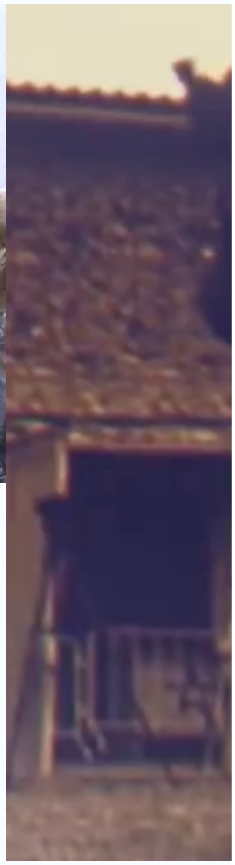
Favorable perspective	Unfavorable perspective

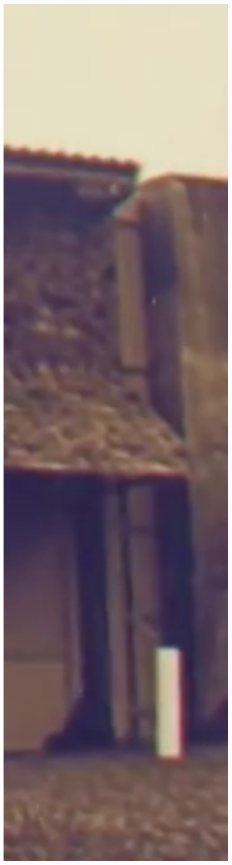
Favorable perspective		Unfavorable perspective

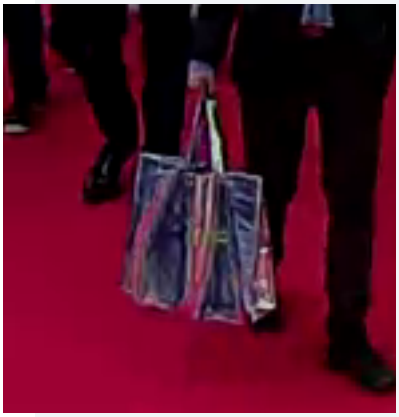
The accuracy of searching for other objects significantly depends on the quality of the image, on the size of the object in the frame, as well as on the perspective from which this object is seen. Under suitable conditions, the accuracy of searching for other objects can reach 40% to 60%, depending on the degree of visibility of the object in the frame and its size (for example, a partially hidden weapon or a suitcase hidden behind a corner will be much less likely to be detected than clearly distinguishable objects of the same type). Moreover, this category of objects is characterized by a greater number of false triggerings than others.

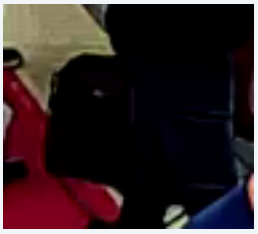
Below are the examples of favorable and unfavorable angles for searching for other objects.

Favorable perspective		Unfavorable perspective









Favorable perspective		Unfavorable perspective

Installation and update of the module

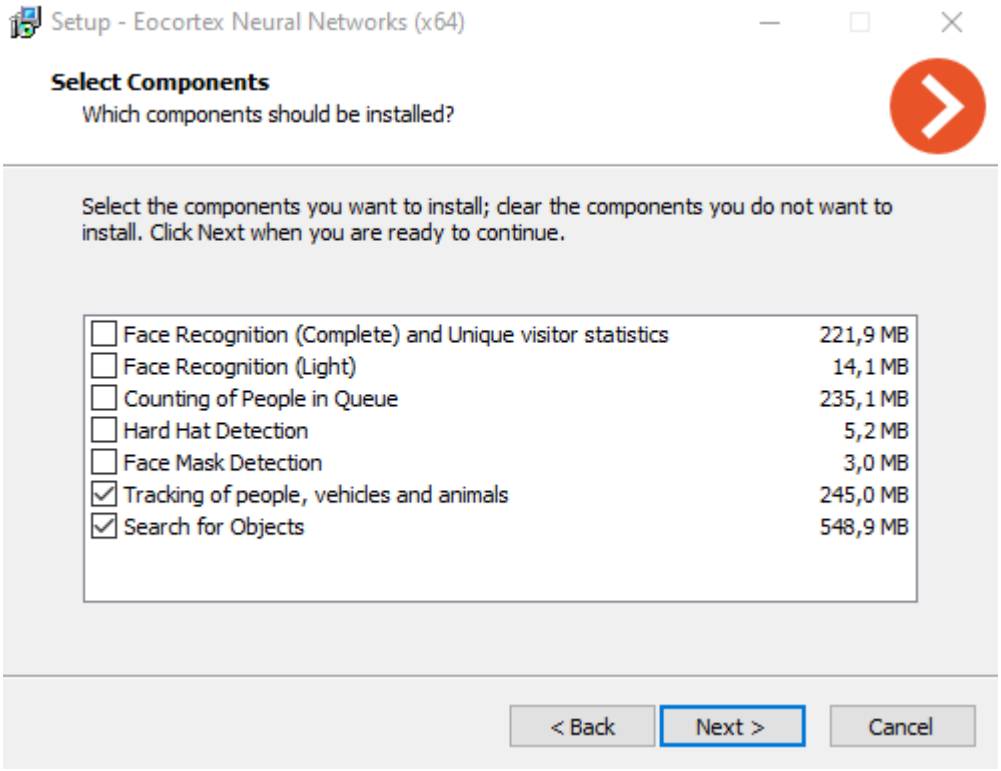
⚠ It is required to install the **Eocortex Neural Networks** package before using the module.

The neural network works with the 64-bit version of **Eocortex** only.

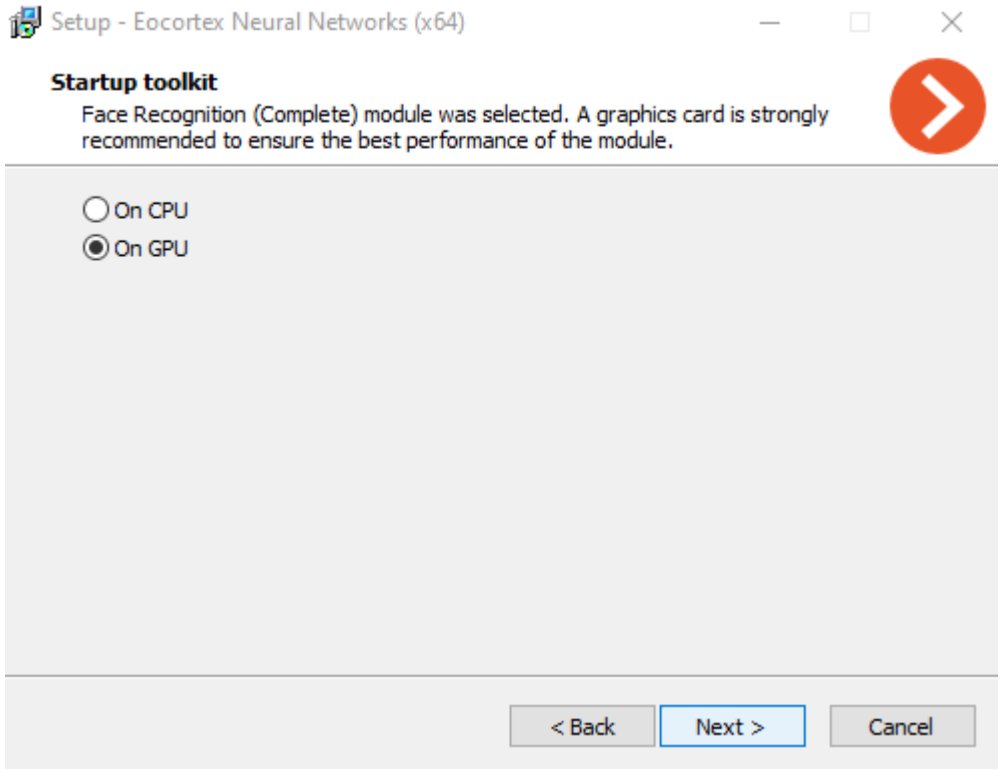
When updating **Eocortex** to a different version, it is also required to update the **Eocortex Neural Networks** package to the relevant version.

⚠ Starting with version 3.4 of **Eocortex**, the **Search for objects** module uses version 11 or higher of PostgreSQL. In this respect, before installing version 3.4 and higher (as well as when upgrading from version 3.3 and lower to version 3.4 and higher), it is required to review the PostgreSQL installation information.

When installing the **Eocortex Neural Networks** package, it is required to select the appropriate component.



For neural network-based search, at the stage of picking tools for launching, it is necessary to select the **On GPU** option. For searching for moving objects only and for simplified search, the video card is not used.



Shelf Fullness Check

The **Shelf Fullness Check** module is designed for monitor the fullness of shelves in a store in order to fill them with merchandize in time.

Details

For the correct operation of the module, it is required to properly place and set up the camera, enable and adjust the software motion detector and the module itself.

Use

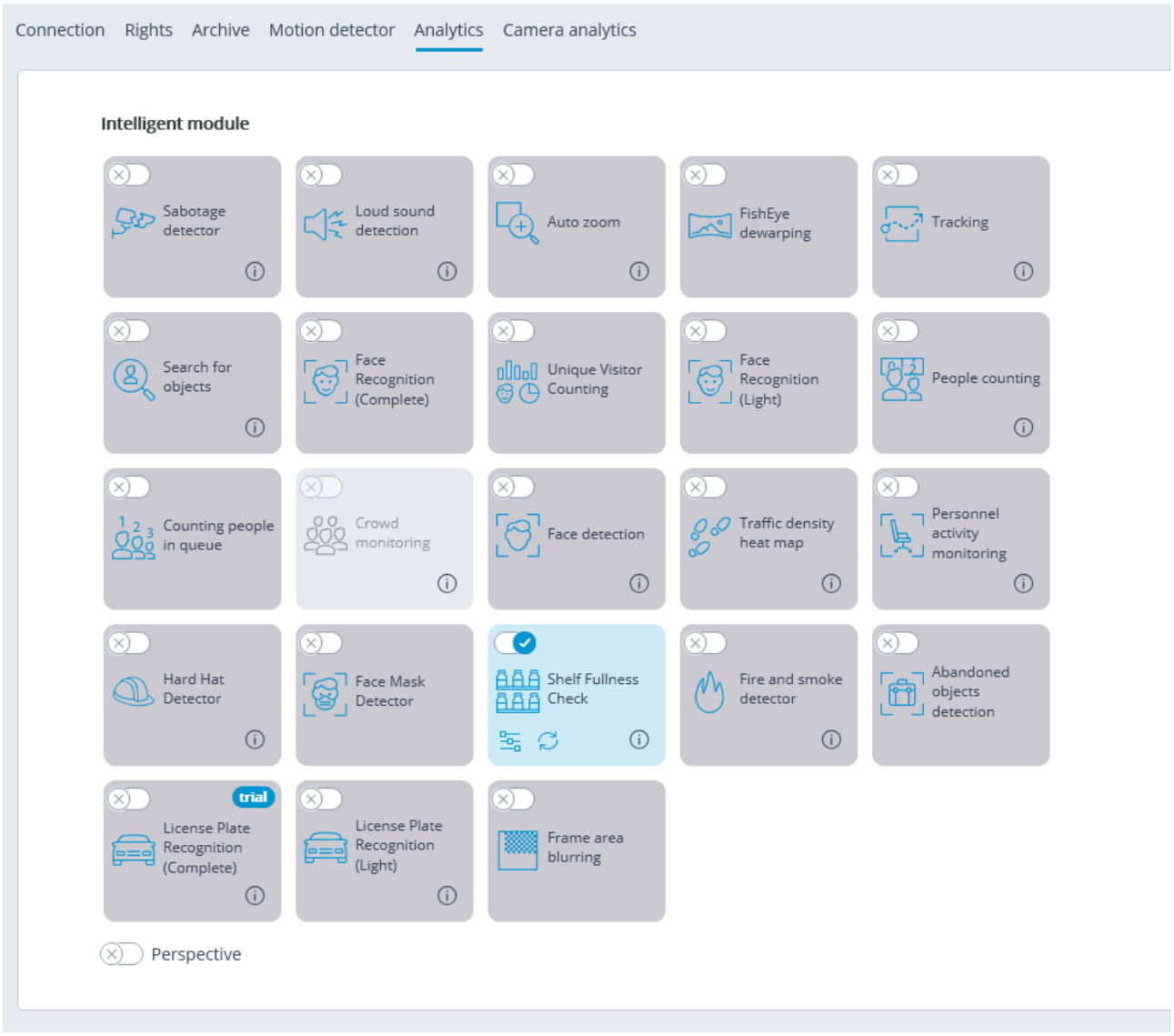
The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Module setup

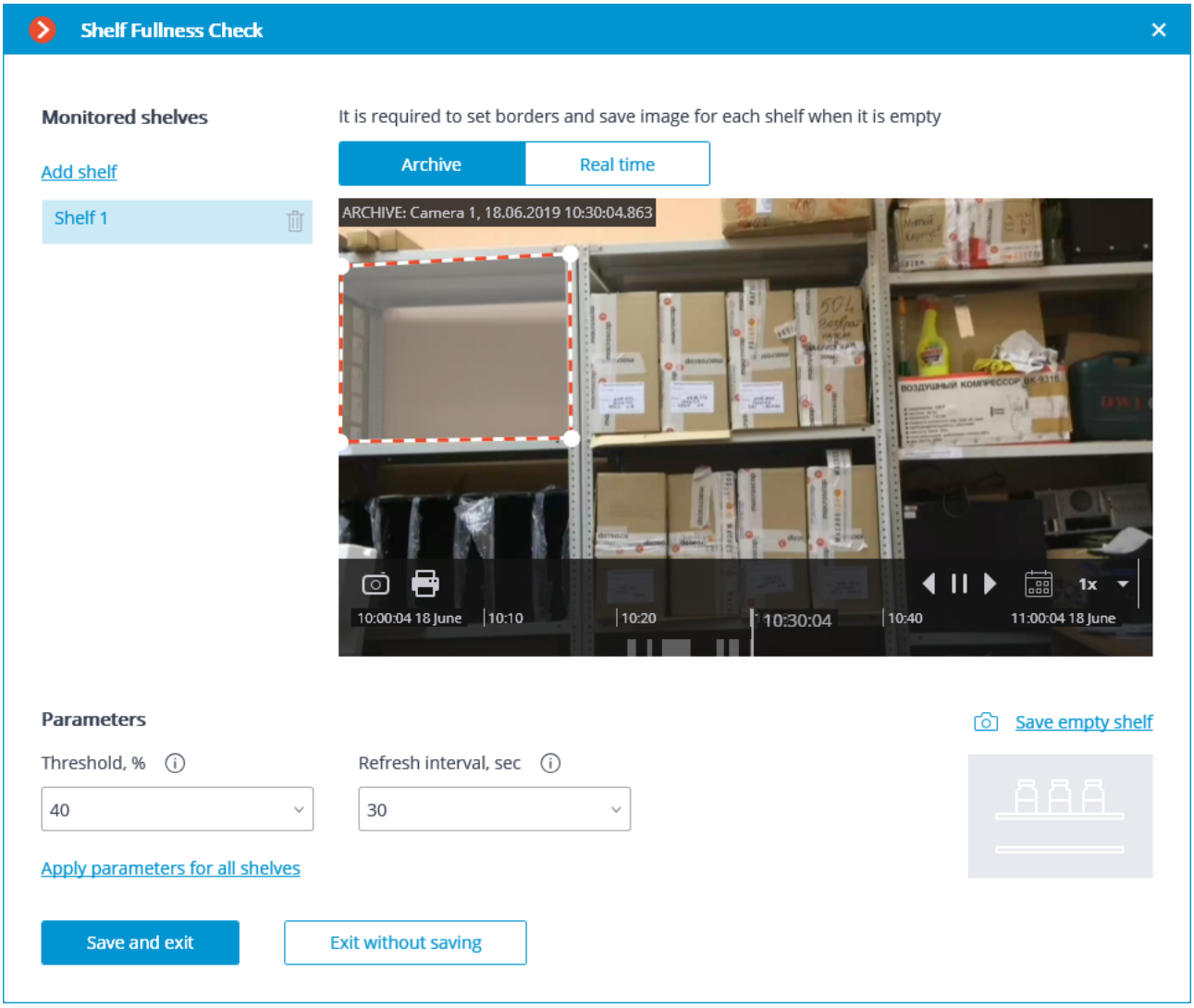
To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.



The button opens the module setup window.



The following controls are located in the opened window:

The cell that transmits the video from the camera both in real time and from the archive. The shelf outlines are displayed in the cell. The list of the shelves being monitored is located to the left of the cell.

⚠ You can specify up to 10 shelves for one camera.

⚠ The outline of the shelf must be set in such a way as to fully enframe the zone to be monitored.

⚠

The parameters chosen for the selected shelf are shown in the lower part of the window:

- **Threshold, %**: Shelf fullness percentage below which an alarm will be generated.
- **Refresh interval, sec**: Shelf condition refresh interval. When this value is smaller, the empty shelf will be detected earlier, but the processor load is larger.

Apply parameters for all shelves: Applies the selected parameters for all shelves.

Save empty shelf: An image of empty shelf.

⚠ It is obligatory to save the image of an empty shelf for all the shelves being monitored.

⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

⚠ The update of the values is made only within the intervals when there has been no motion in the shelf's outline for three seconds.

Camera installation and zone assignment requirements

The camera installation angle in relation to the shelf must not be too acute.

The image must be in color.

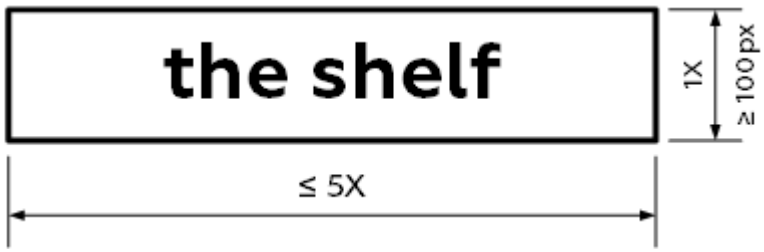
The image must be of moderate contrast.

The quality of the image must be moderate to high, without significant compression artefacts.

The optimal resolution for the module operation is HD or FullHD.

The shelf zone must not be too stretched. The maximum acceptable length to height ratio is 1/5.

The shelf image resolution in the lowest measurement must be at least 100 pixels.



The color and texture of the goods on the shelf must be visually different from those of the shelf itself. For example, it is not recommended to put goods in blue packaging on a blue shelf.

To ensure maximum accuracy, the perspective distortion must be kept to the minimum.

There must be no jumps in brightness and contrast, no illumination flickering, no glare or flaring in the shelf area. It is also advisable to disable automatic white balance and exposure in the camera settings.

It is not advisable to use cameras with different aspect ratio for the main and alternative streams.

Performance

Since the central processor load becomes higher when the video resolution is increased, it is not recommended to use video with the resolution higher than FullHD.

A square shelf with high original resolution will take the longest time to process.

In order to reduce the overall server load, it is recommended to increase the intervals of updating the shelf condition.

Tracking

The **Tracking** module allows to build trajectories of the objects that move in the fields of view of the cameras, track the crossing of lines by these objects in one or both directions, as well as monitor the presence of the objects in the zones of arbitrarily set shapes. At that, the monitored lines and zones as well as the objects' trajectories can be shown on the screen in real time, and the objects themselves can be highlighted by the rectangles of various colors. All the events of the module are recorded in the event log.

Capabilities of the module

Depending on the settings, the module can track all the moving objects as well as the objects of a certain type: people only, vehicles only, people and vehicles only. Moreover, it is possible to set up the tracking of objects of a certain range of dimensions.

Details

⚠ To track people, vehicles and animals, it is required to install the **Eocortex Neural Networks** software package; a video card with the parameters matching the module's requirements is also necessary.

Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

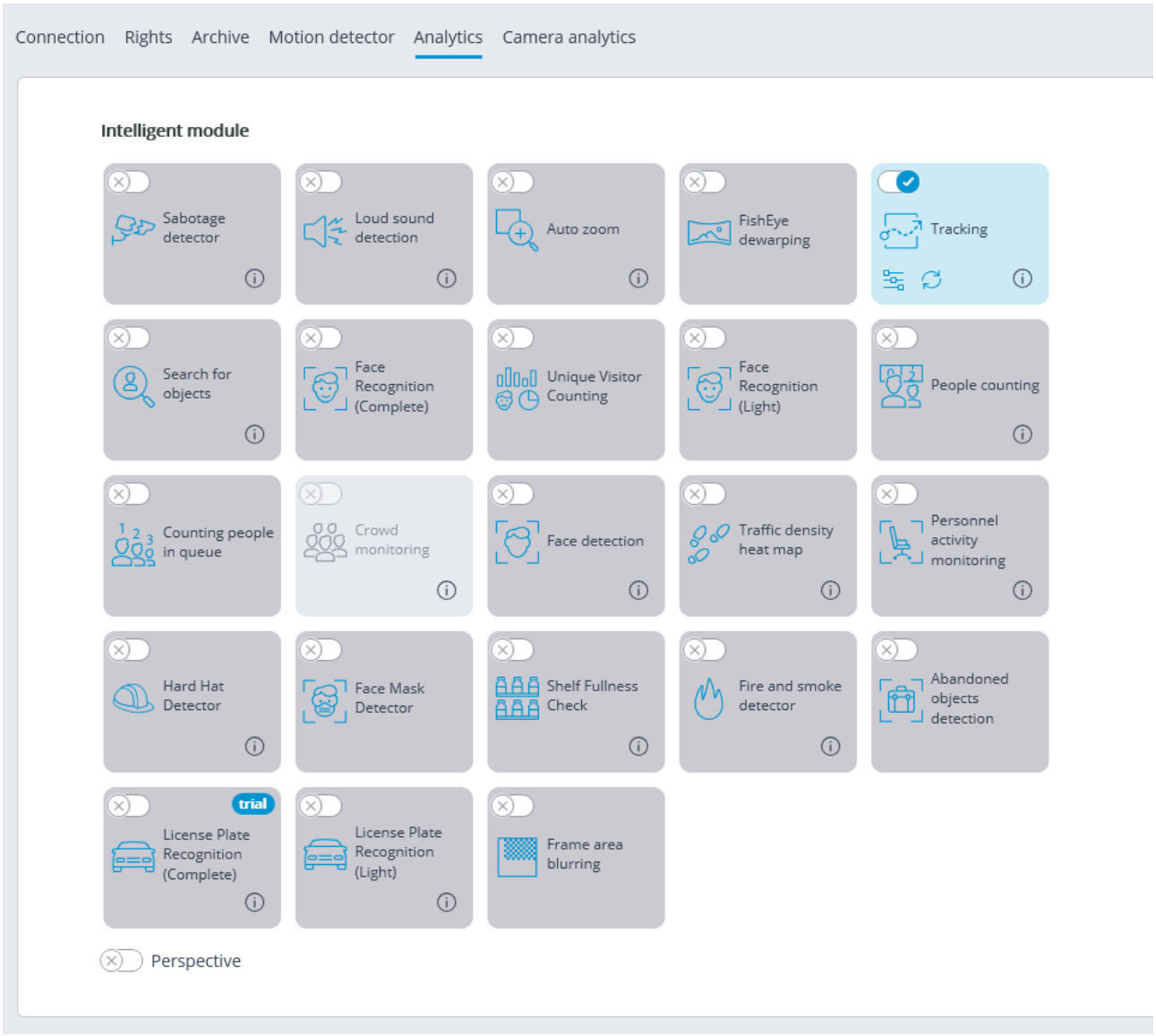
Module setup

To track people, vehicles and animals, it is required to install the **Eocortex Neural Networks** software package; a video card with the parameters matching the module's requirements is also necessary.

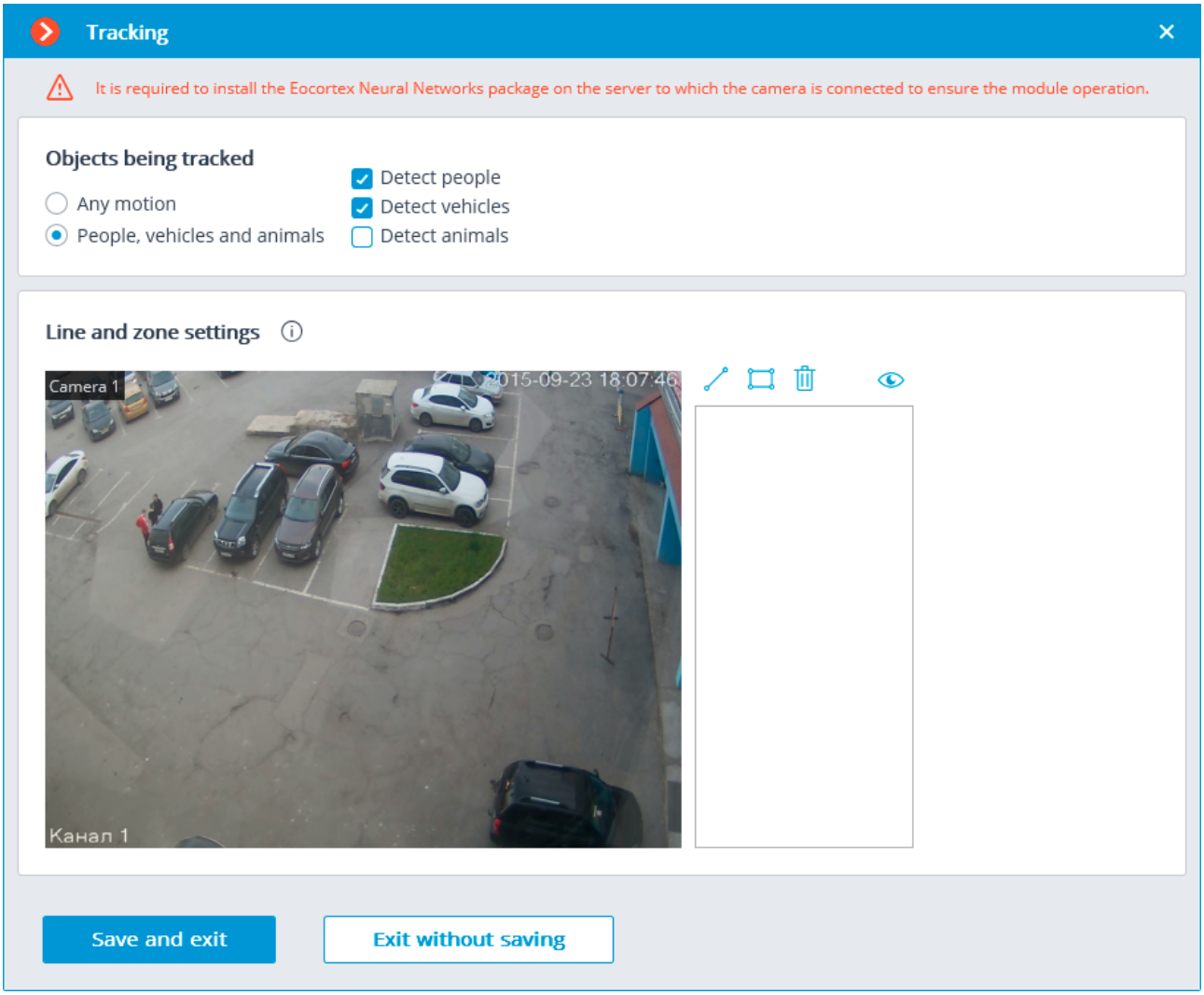
To use the module, it is required to enable and set up the software motion detector, then enable and set up the module itself.

To do that, it is required to launch the Eocortex Configurator, go to the Cameras tab, select a camera in the list located on the left side of the page, and set up the motion detector on the Motion detector tab on the right side of the page.

After that, it is required to switch to the Analytics tab and enable the module using the toggle.



The button opens the module setup window.



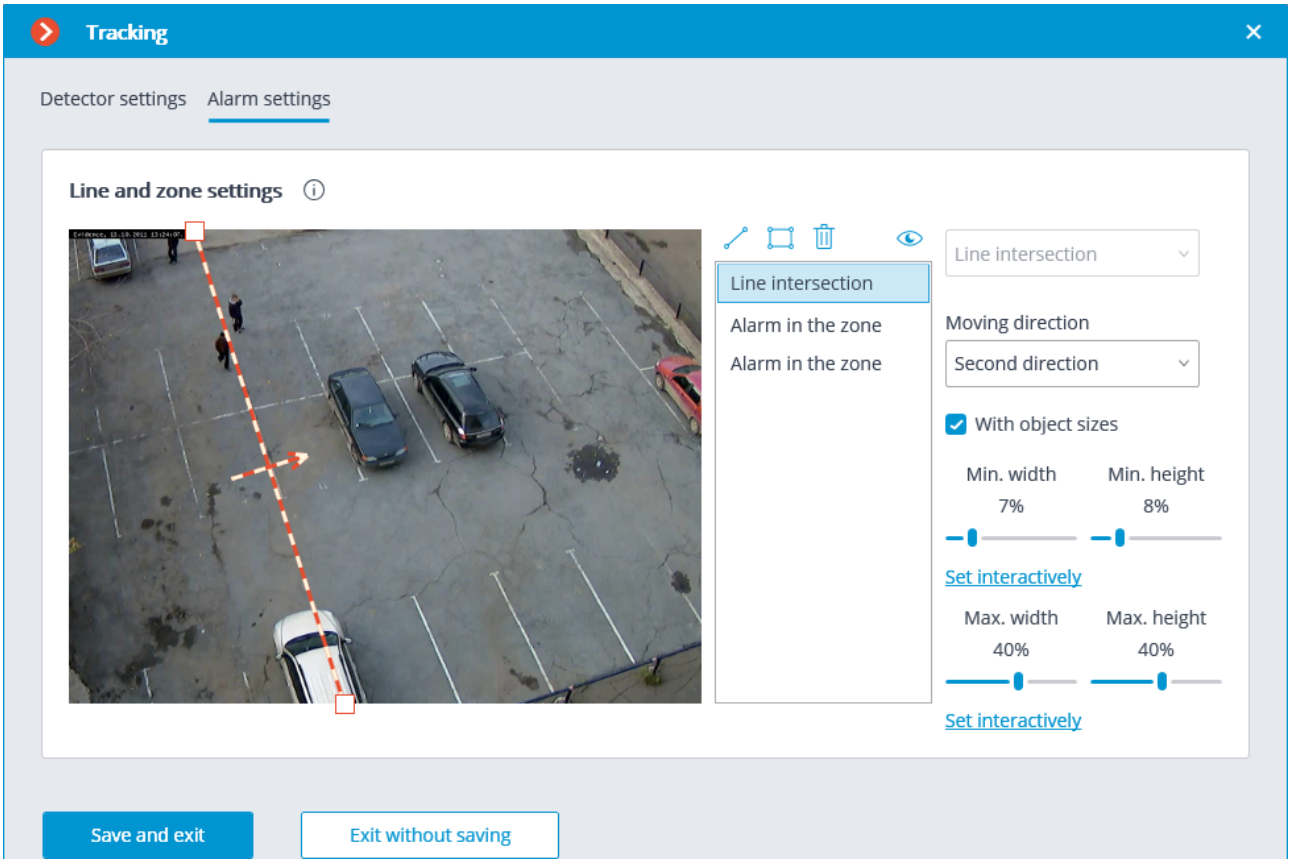
In the **Objects being tracked** group of settings, the user can choose which objects to track: all the objects, or people, vehicles and animals only. At that, in case of selecting **People, vehicles and animals**, it is possible to select, optionally, which types of objects exactly will be tracked.

In the **Line and zone settings** group of settings, it is possible to set the situations that will trigger alarms:

- Crossing of a preset line;
- An object entering a preset area;
- Long stay of an object in a preset area.

It is also possible to set additional limitations as regards the sizes of the objects to be tracked.

Line intersection

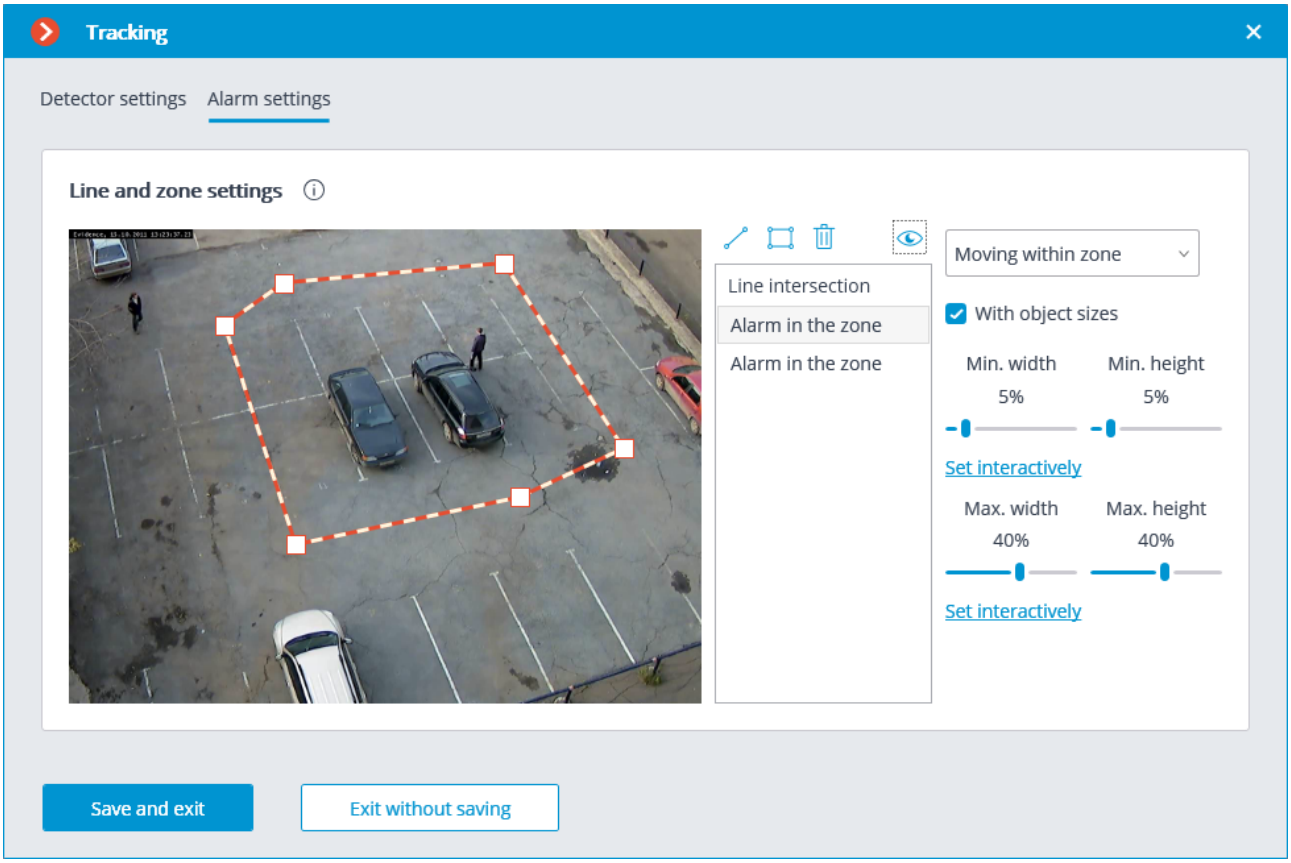


To set an intersection line, it is required to press the button. A line will appear in the preview window.

The position of the line can be changed by dragging the key points on its ends.

In order to indicate the direction of triggering, it is required to select the corresponding value in the **Moving direction** dropdown list. When only one direction is selected, an arrow showing the set direction will appear perpendicular to the line. In this case, an alarm will be generated only when the line is crossed in the preset direction.

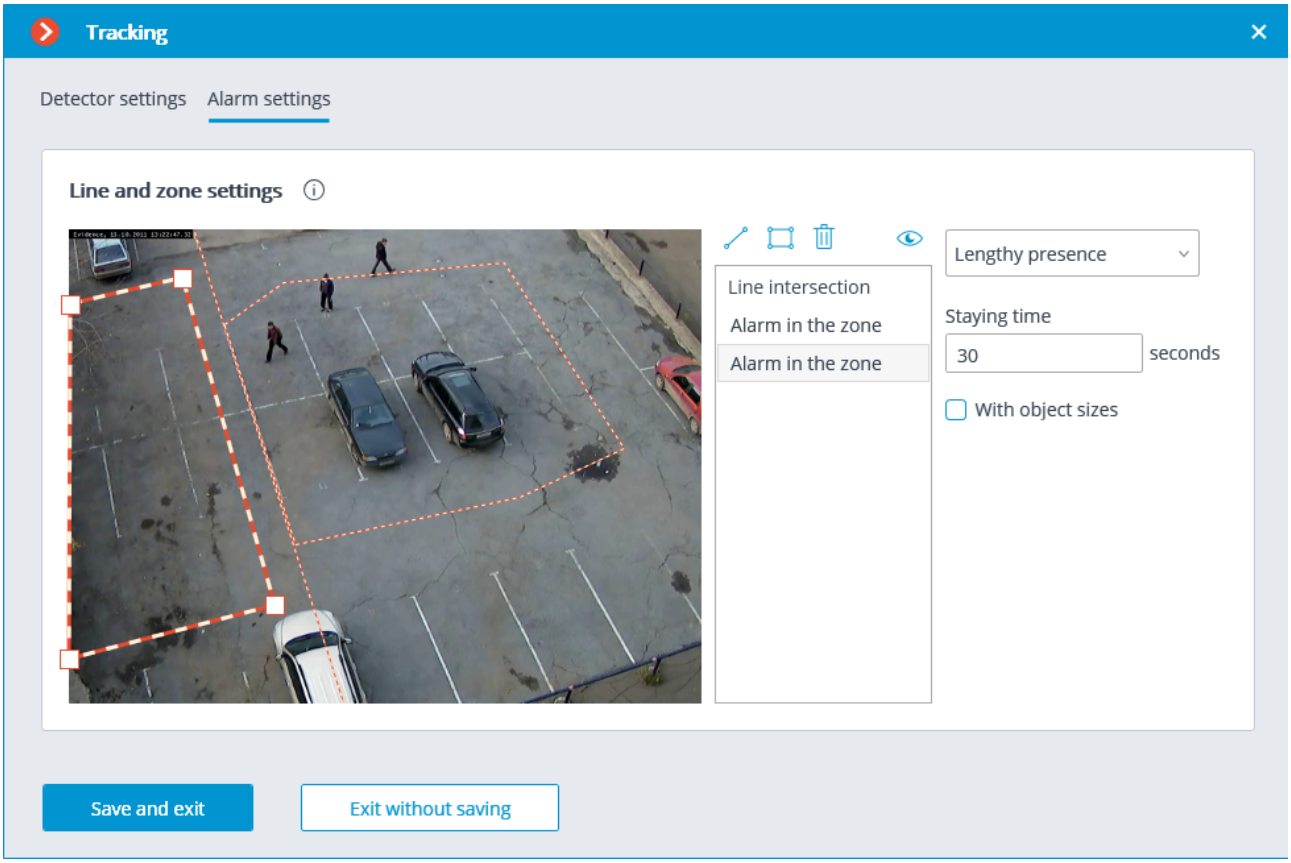
Alarm in the zone



To set the control zone, it is required to press the button. A rectangular zone will appear in the preview window.

The shape of the zone can be modified by dragging the key points in the corners of the rectangle. To add a key point, it is required to make a double click on a line; to delete it, click on the key point with the right mouse button.

If **Moving within zone** is selected in the dropdown list, an alarm will be generated when any object matching the preset parameters enters the zone. When **Lengthy presence** is selected, an alarm will be generated only if the object stays in the zone for more time than preset in the **Staying time** field.



⚠ The use of the module will start only after the settings are applied.

Requirements and recommendations

Hardware and software

It is required to use a neural network to track people, vehicles and animals. In this case, the following equipment is required:

- A processor with AVX instructions support;
- An **NVIDIA** video card (GPU) with the computation capacity index of at least 5.0 and with at least 3 Gb of memory; the parameters and performance of the video card must be similar or better than those of **NVIDIA GTX 1050 Ti** model.

  The neural network works with the 64-bit version of **Eocortex** only.

Detection

The minimum allowable height of the objects being tracked is 40 pixels while the recommended height is at least 80 pixels. The maximum shift of an object from frame to frame is no more than 1/5 of the frame.

In the mode of tracking all the moving objects, only those objects that are detected by the motion detector will be tracked.

In the mode of tracking people and vehicles, the objects will be tracked irrespective of whether they have been detected by the motion detector or not.

To search for small objects, it is required to set up the minimum dimensions of the objects accordingly in the software motion detector. In this case, if several zones have been set up in the software motion detector, the module will use the smallest size among all the zones as the minimum size.

When the objects intersect, the tracking accuracy is reduced and the trajectories of the objects after their separation may get mixed up.

When the density of the moving objects in the frame increases, the tracking accuracy of these objects decreases.

Video stream

The recommended resolution for the module's operation is from 0.3 to 2 MP.

The frequency must be at least 25 fps.

It is recommended to use color image for the module's operation, because the low contrast of the background and the objects may result in the significant drop of quality of the module's operation.

Aspects of the module's operation

Below are the aspects of the module's operation when the crossing of a line is monitored.

- The smaller the object and the higher its velocity, the higher frequency (fps) is required for tracking it.
- The more complex the background, the higher the probability of error (meaning that this surveillance mode works better with a monotone background).
- This surveillance mode may not work well with very small objects.

The aspects of operation when monitoring movement in the zone are as follows:

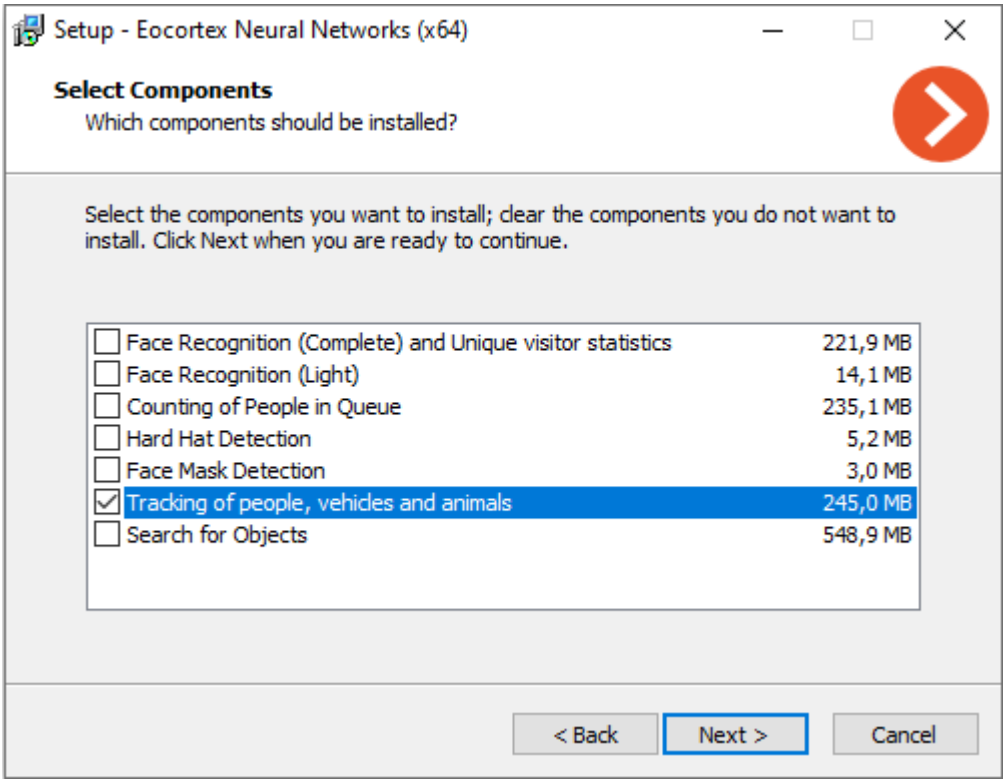
- The point of reference for the analysis is the geometric center of the object seen in the frame, i.e. if only the edge of an object is present in the frame, no alarm will be generated.

The aspects of operation when monitoring time of stay in the zone are as follows:

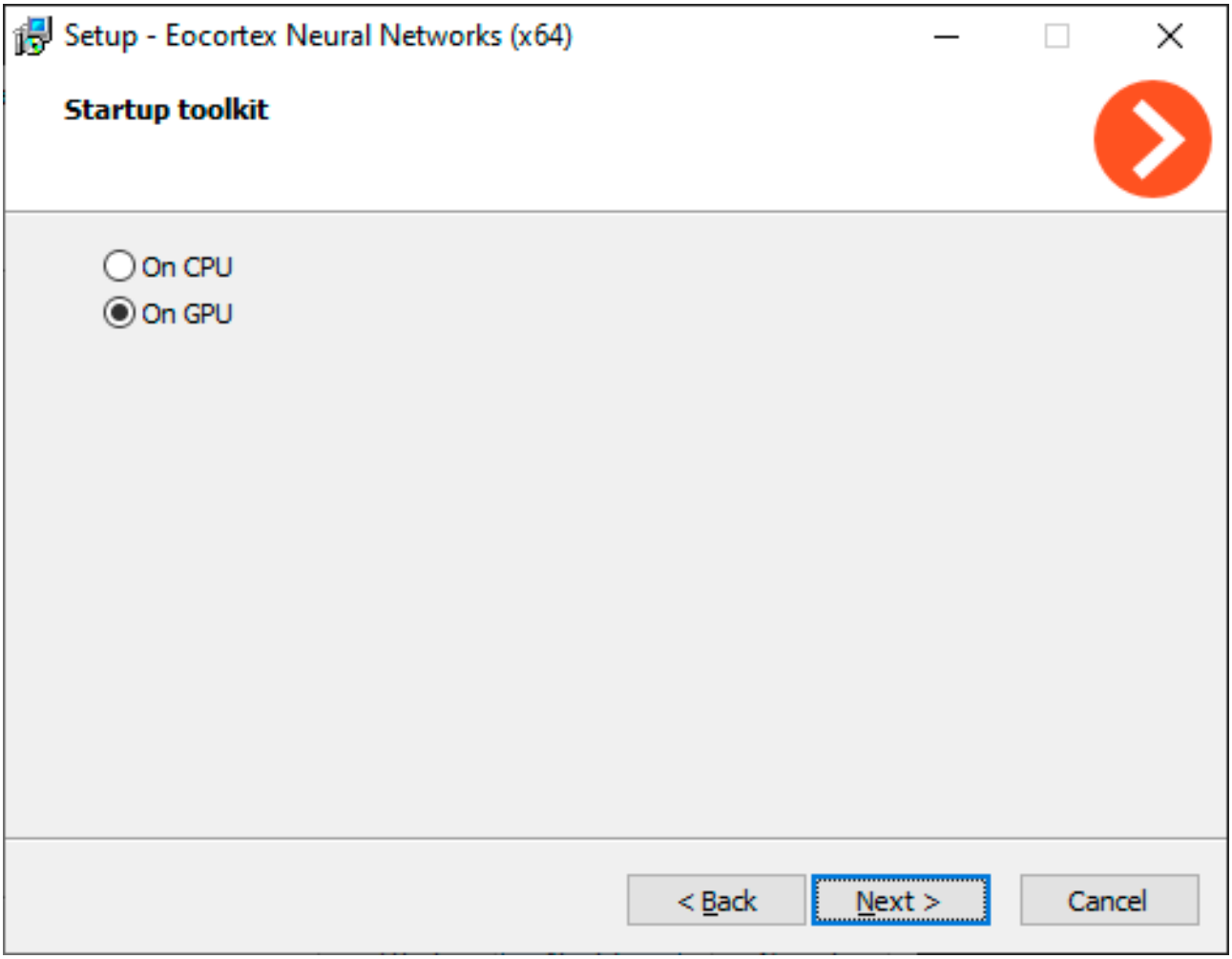
- The duration of stay in the zone is counted for all the objects and not for each one individually, meaning that the overall activity in the zone is monitored, from the entrance of the first object until the egress of the last object from the zone.
- If the object is not present in the zone anymore (e.g. leaves the zone or stops moving, leading to its loss by the motion detector, and is found again in the zone within 5 seconds (e.g. reenters the zone or is registered by the motion detector), the timer will continue counting from the previous value. Otherwise, the timer will be reset.
- The maximum duration of stay determined by the module is 5 minutes.

⚠ To track people, vehicles and animals, it is required to install the **Eocortex Neural Networks** software package; a video card with the parameters matching the module's requirements is also necessary.

In the process of installation of **Eocortex Neural Networks**, it is required to select the **Tracking of people, vehicles and animals** component.



The module's operation requires a video card (GPU).



Unique Visitor Counting

Unique Visitor Counting module is intended for generating unique visitor counting reports based on detecting and recognizing faces. It is possible to exclude faces pertaining to certain groups from the counting, for example, to avoid counting employees.

Details

See Face recognition.

Use

The use of video analytics modules in **Eocortex Client** is described in the **User's guide**, in the **Eocortex Client** / **Video analytics** section.

Client applications

Eocortex Configurator

With the help of the **Eocortex Configurator** application, the **Eocortex** video surveillance system is set up, including license management, parameters of connected cameras, features used for the cameras, scenarios, schedules and intelligent modules, video server parameters, archive and redundancy settings, user authority, site plans, display profiles, archive bookmarks categories and other settings.

The **Eocortex Configurator** application is included in all the installation packages and is automatically installed with both server and client applications of **Eocortex** .

To work with the **Eocortex Configurator**, it is recommended to use the screen resolution of no less than 1024×768 since using the screens with lower resolution may lead to issues with displaying the application.

Below you will find the procedure to be followed after having installed **Eocortex Server** (or **Eocortex Standalone**), in order to start the full-scale work with the system.

- Start the Eocortex Configurator application stating the IP address and the network port (**8080**by default) of the server, as well as the username and password of the user with configuration privileges (by default, **root** user with the empty password).
- Set up servers.
- Set up cameras (connection to cameras, archiving parameters, video analytics, etc).
- If required, set up system user authority.
- Apply settings and close **Eocortex Configurator** application.
- Install and launch the **Eocortex Client** application, set up client workplace parameters, if required.

Launching Eocortex Configurator

The video surveillance server (**Eocortex Server** or **Eocortex Standalone**) application to which the connection is being made must be operating at the moment of the connection.

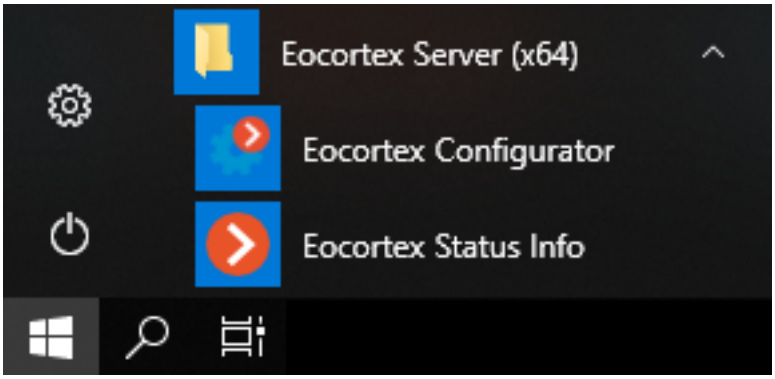
In the course of setting up the server, the same version of the **Eocortex Configurator** application as the server version must be used.

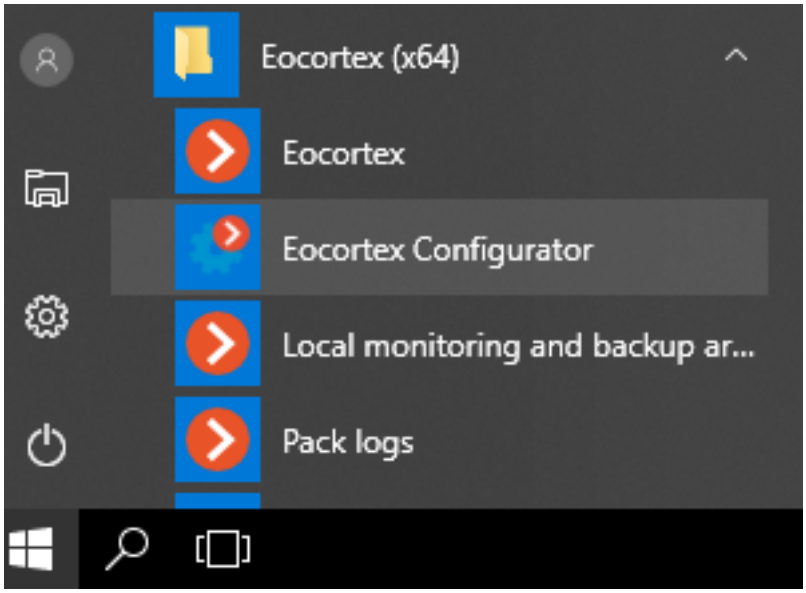
The active system configuration is stored on the **Main server**. In the event of making changes to the configuration, the **Eocortex Configurator** application automatically saves the configuration on the **Main server**, sending it afterwards to all the available member servers. Consequently, to avoid system conflicts, it is recommended to perform the

connection via the **Eocortex Configurator** or directly connect to the **Main server**, or to the server that has access to the **Main server** at the moment.

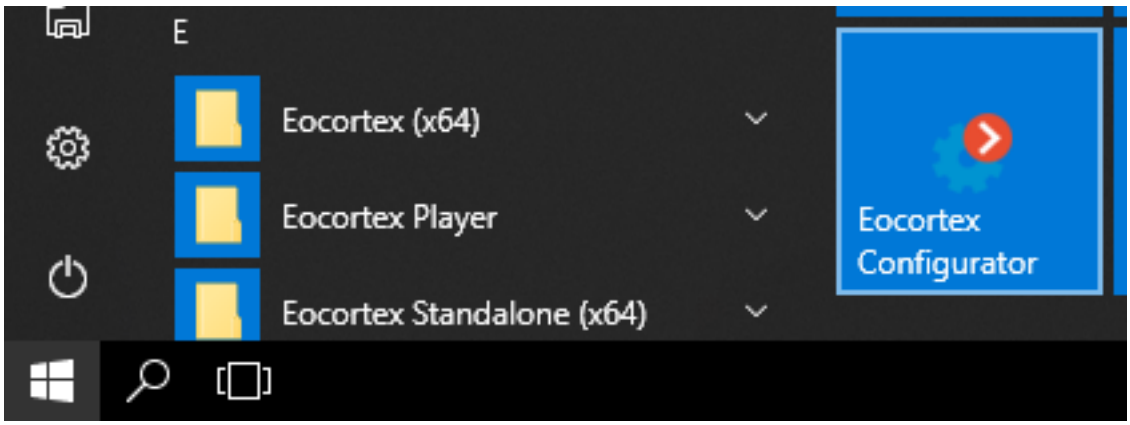
There are several ways to launch the application:

- From the Start menu ;

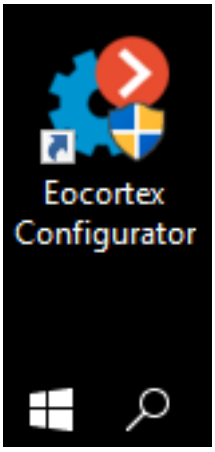




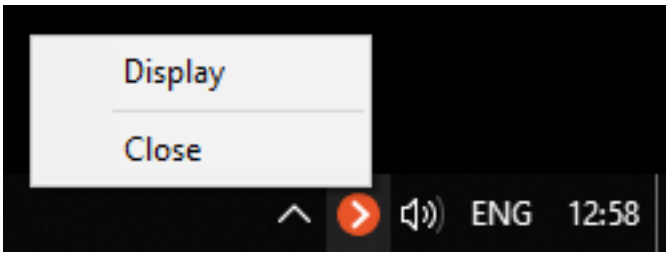
- From the Windows Start screen;

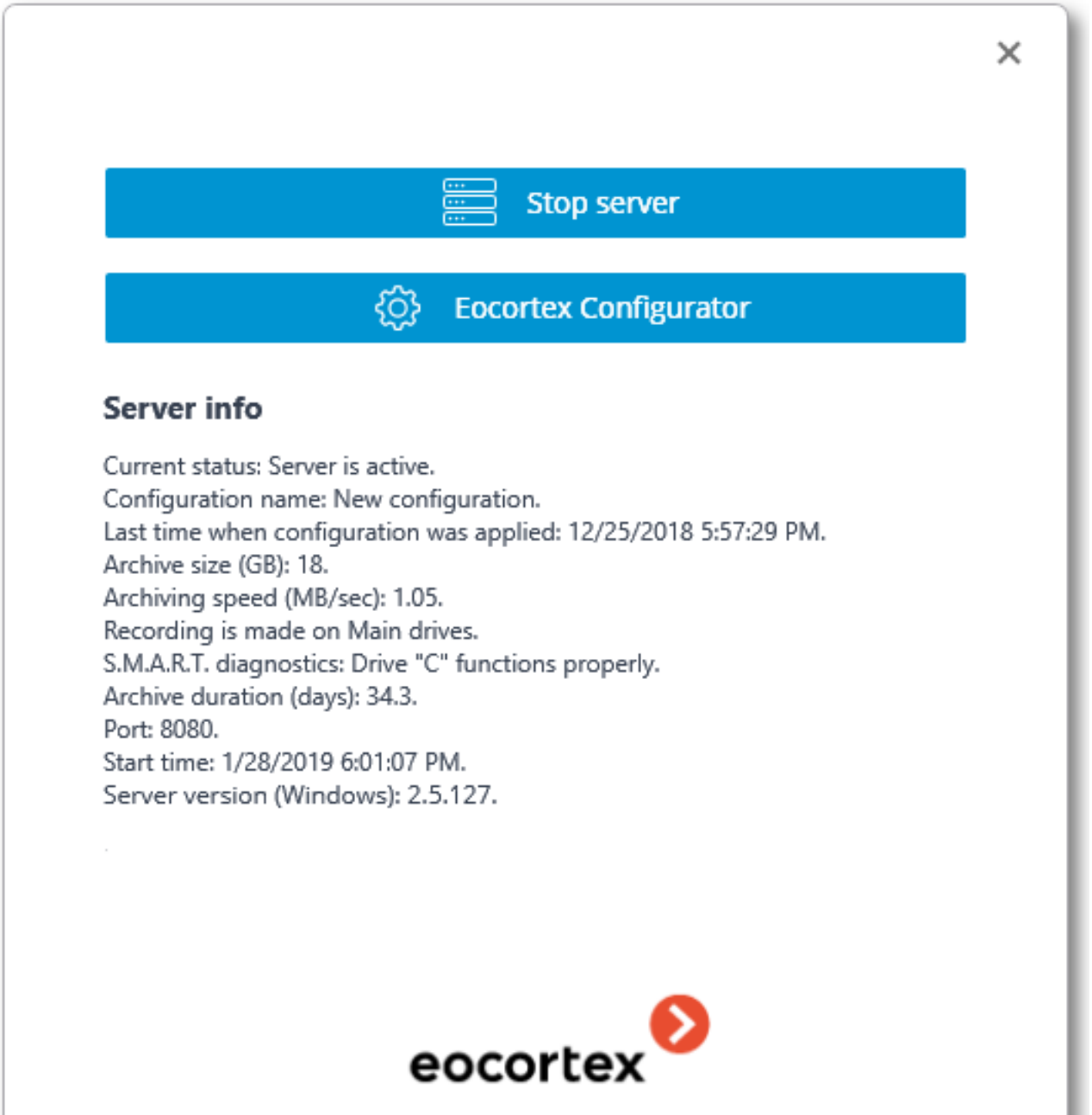


- Using the icon on the Desktop;

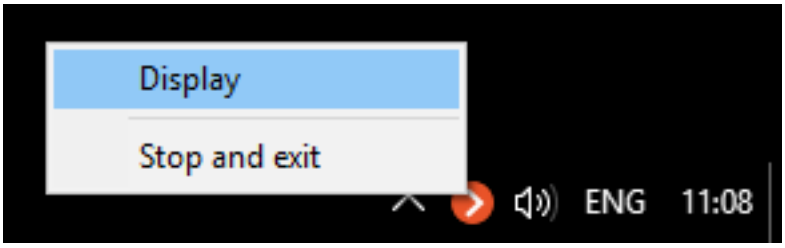


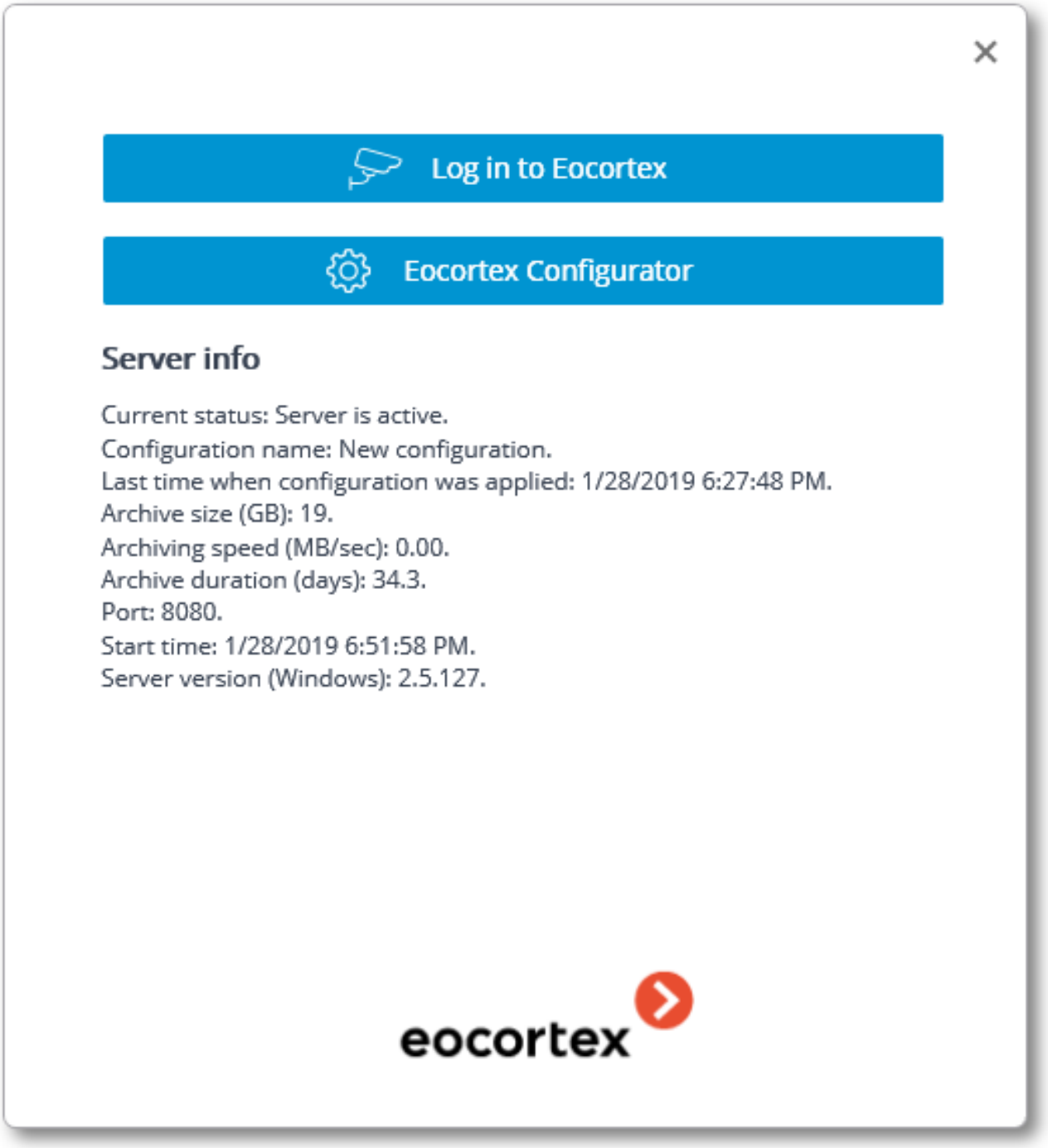
- From the **Eocortex Server Info** utility window;



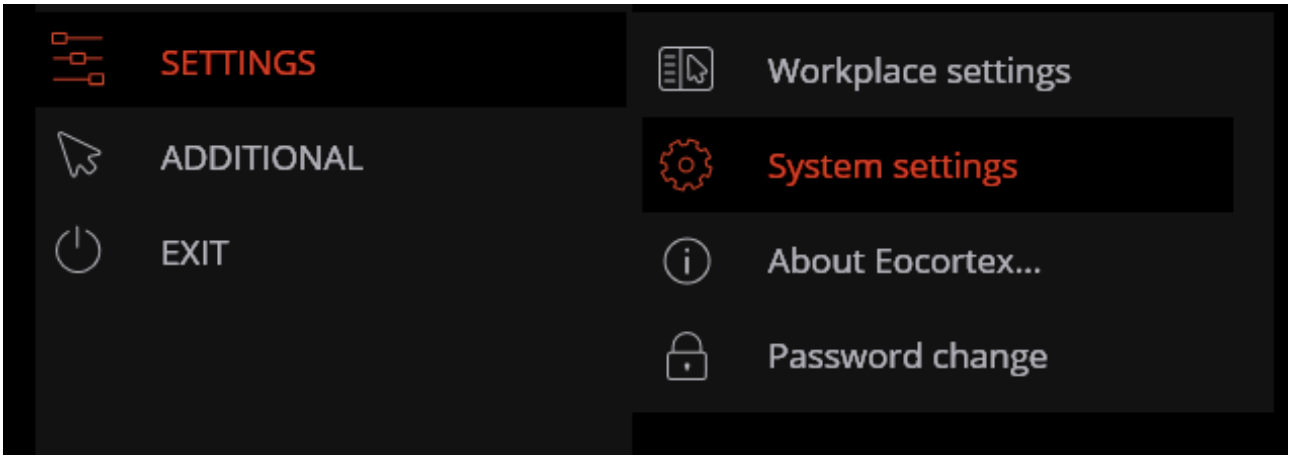


- From the **Eocortex Standalone** application start window;





- From the **Eocortex Client** application.

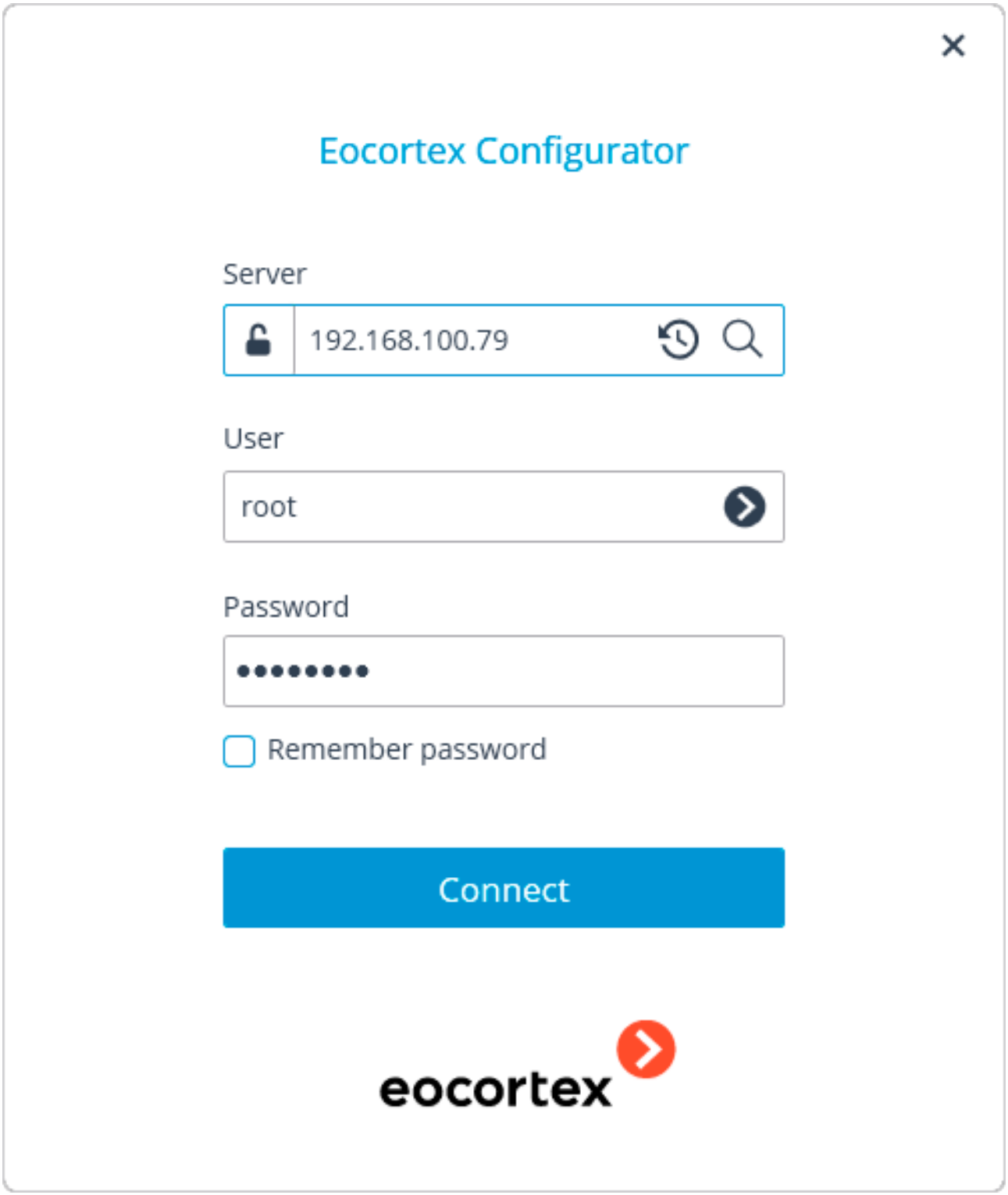


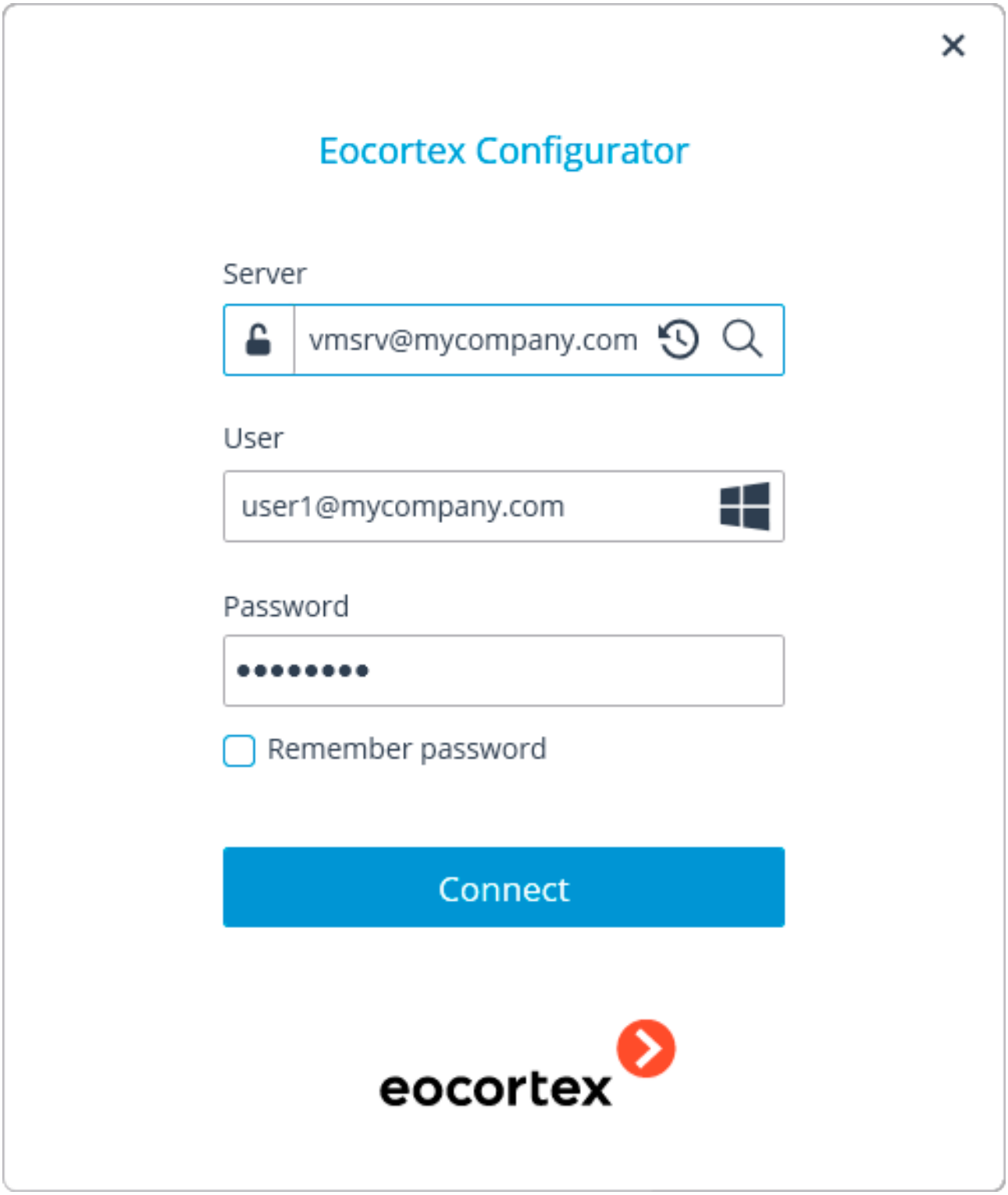
In the course of the launch, the authorization window will open. It is required to indicate the server address there in the **Server** field (or select the address in the dropdown list to the right of the input field) and the account type, username and password, then press the **Connect** button.

Account types: — **Eocortex**, — **Active Directory**.

For **Active Directory** accounts, the user name is specified as: **username@domain**; where **domain** is the domain name, **username** is the name of the user in the domain.

Registration under an **Active Directory** account is not available in all types of licenses.


Eocortex Configurator
Server
192.168.100.79
User
root
Password
Remember password
Connect
eocortex



The secure connection to the server via HTTPS is enabled by pressing button located in the left side of the field with the server's address.

Since the capability of a secure connection to the server is set up by the system administrator on the server itself, the parameters of such connection must be obtained from the administrator.

In the cases when it is impossible to obtain the secure connection parameters from the system administrator, it is important to keep in mind that the port explicitly indicated after the two-spot in the end of the connection address line is used for the secure connection. If no port is explicitly indicated, the port **18080** will be used for the secure connection.

The system administrator can forbid the connection to the server using the insecure protocol. Such servers will always require a secure connection.

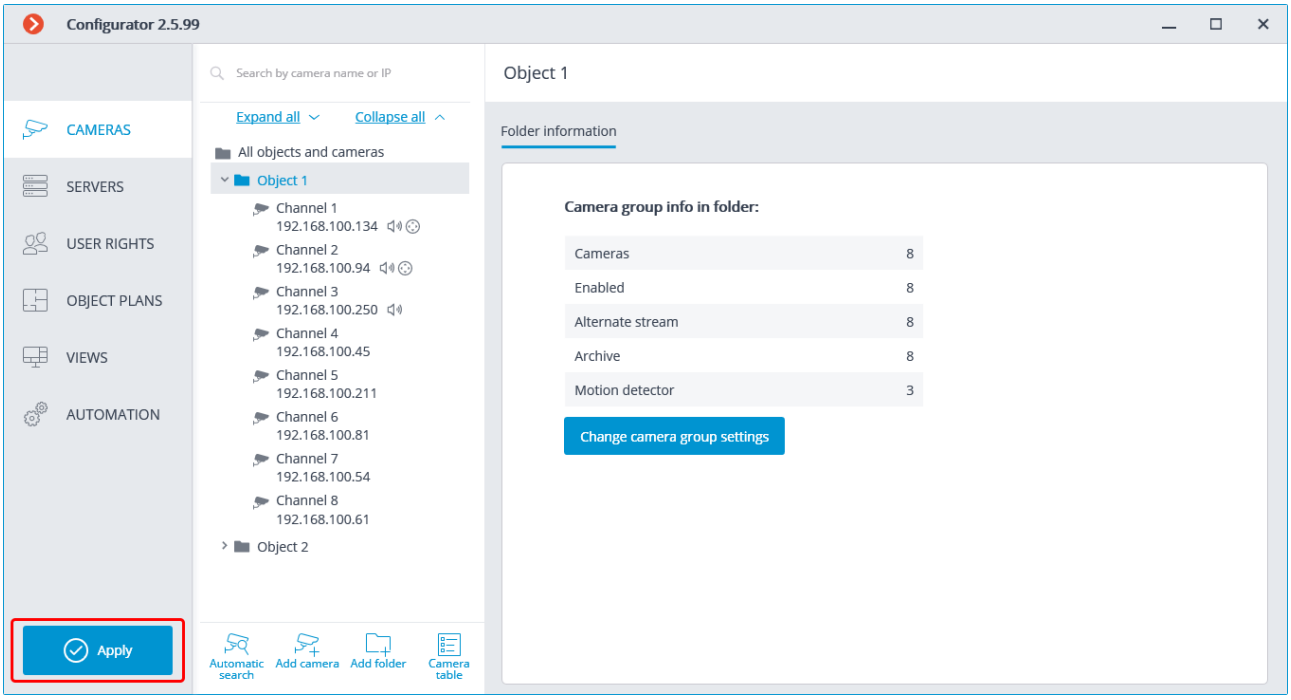
During the initial installation on the **Eocortex** server the **root** user with an empty password is created. This user has a full set of rights. In the course of setting up user authorities it is recommended to change the username and password of this user. Client connection port is **8080** by default; if required, it can be changed in the **Eocortex Configurator** application.

Following the successful authorization, the main window of the **Eocortex Configurator** application will open.

Applying settings

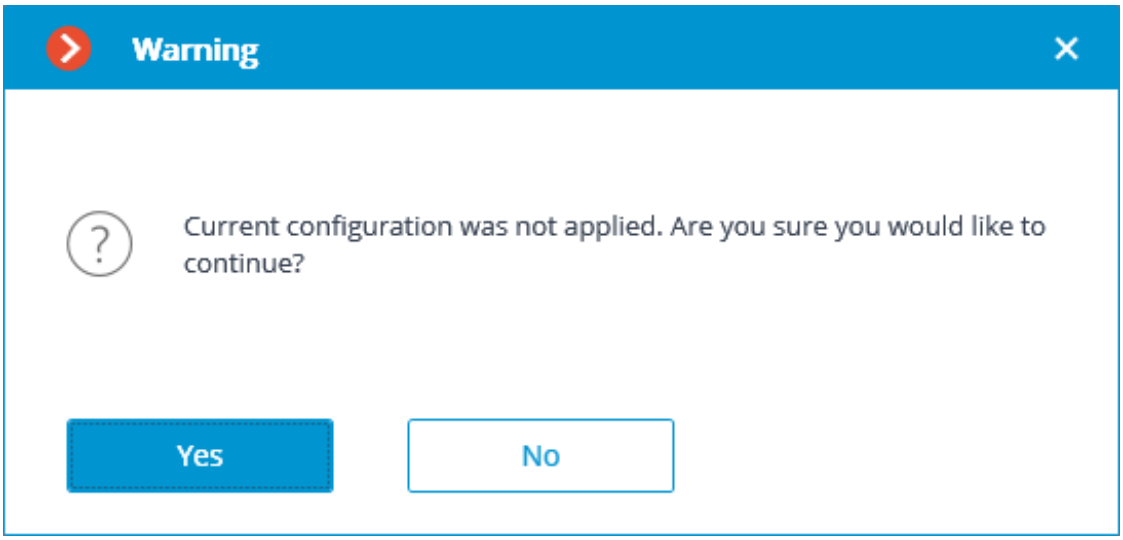
After making any changes to the settings, it is required to apply them. The new settings will be enabled only after their application.

In order to apply settings, press the **Apply** button.



The **Apply** button will be visible only in case there are unapplied changes in the configuration. Titles of the settings tabs with the unapplied changes are marked by an asterisk.

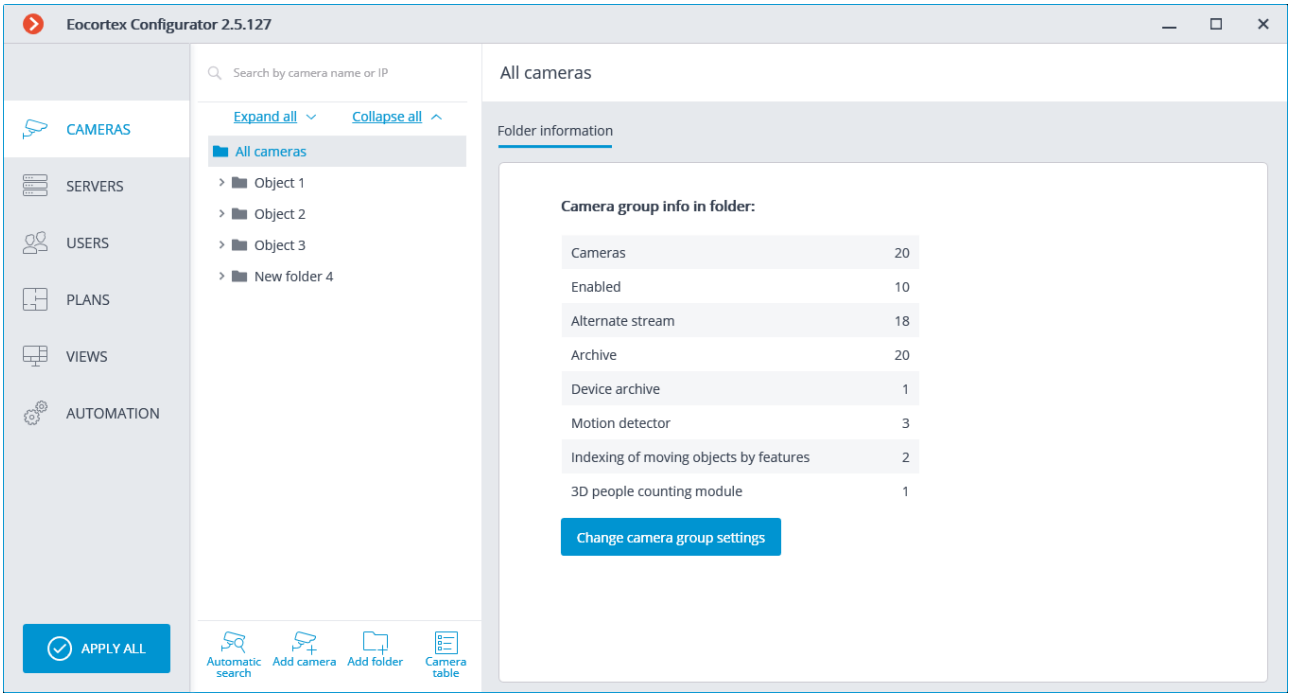
At an attempt of exiting the **Eocortex Configurator** application without applying the changes, the Warning window will appear.



In order to return and apply the changes, press the **No** button. To exit without applying settings, press **Yes**.

Cameras

For setting up cameras in the **Eocortex Configurator** application it is required to go to the **Cameras** tab.



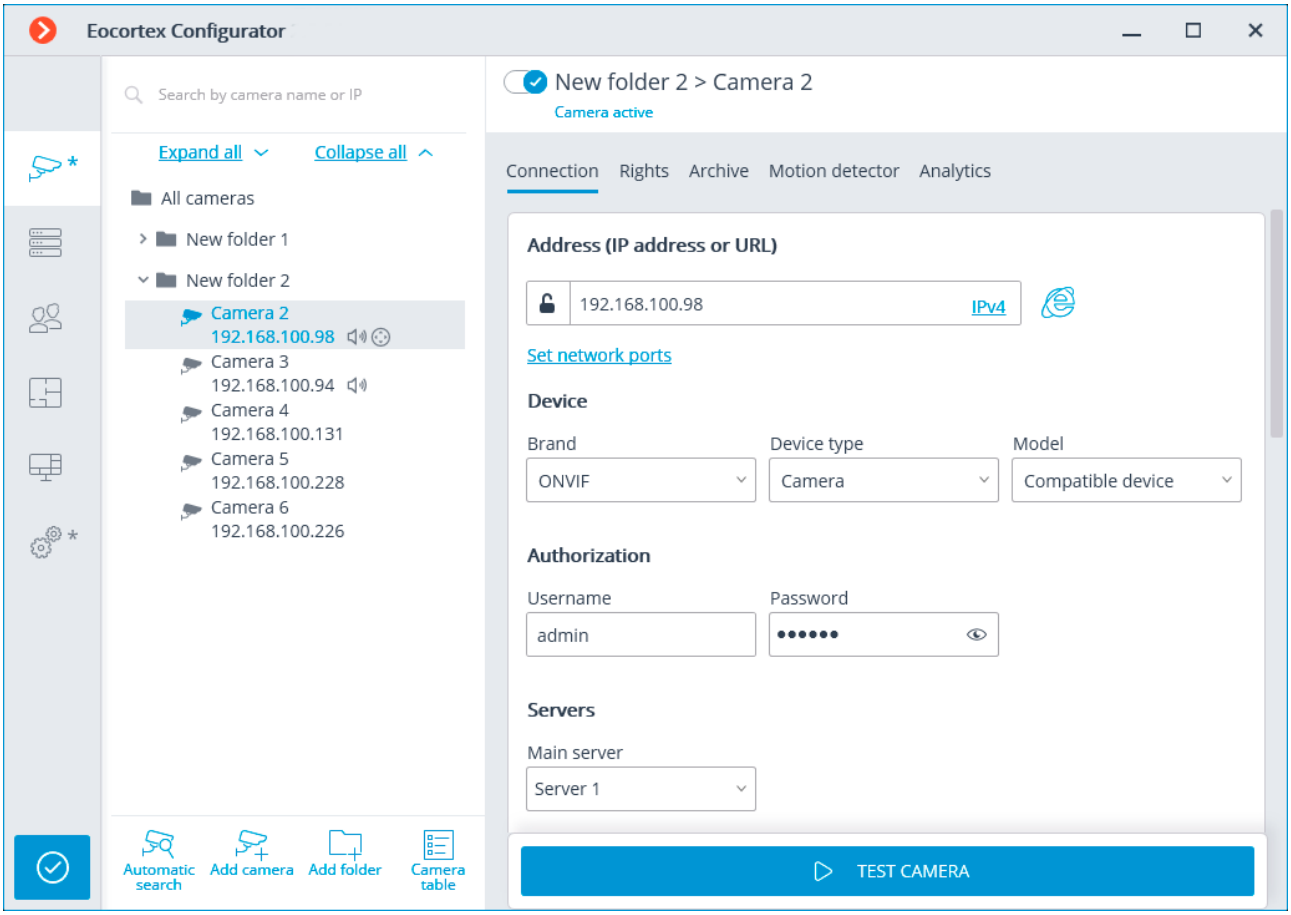
The **Camera** term in the **Eocortex** system has a wide meaning, because, apart from the cameras, one can connect video server and video encoder channels to the system, as well as video recorders, door phones, sound capture devices, thermal cameras, and digital to analog converters

Not all the features of the devices are supported by **Eocortex** even if such features are available in the **Eocortex Configurator** application.

The list of cameras in the **Eocortex** system has a tree structure and uses **Folders** which may contain cameras or other folders. Such hierarchy is easy to use for both navigation thru the list and for grouping cameras by various characteristics.

In particular, it is possible to create a tree by the territorial principle; for example, **City** / **Building** / **Floor** / **Room**. Also, for convenience, on one of the levels of the tree one can group the cameras by type; for example, **Fixed**, **Controllable**, **Video recorders**. Moreover, it is possible to group the cameras based on security principles; for example, **Shared access** and **Restricted access**.

For setting up a particular camera it is required to highlight it in the tree. At that, the settings page of the camera will be displayed in the right part of the window.



In the upper part of the settings page there is a full name of the camera, including the path to it in the tree. To the left from the name there is a switch that allows to disconnect the camera from the system or reconnect a previously disconnected camera.

A disconnected camera, including the features used at its setup, are disregarded by the license protection.

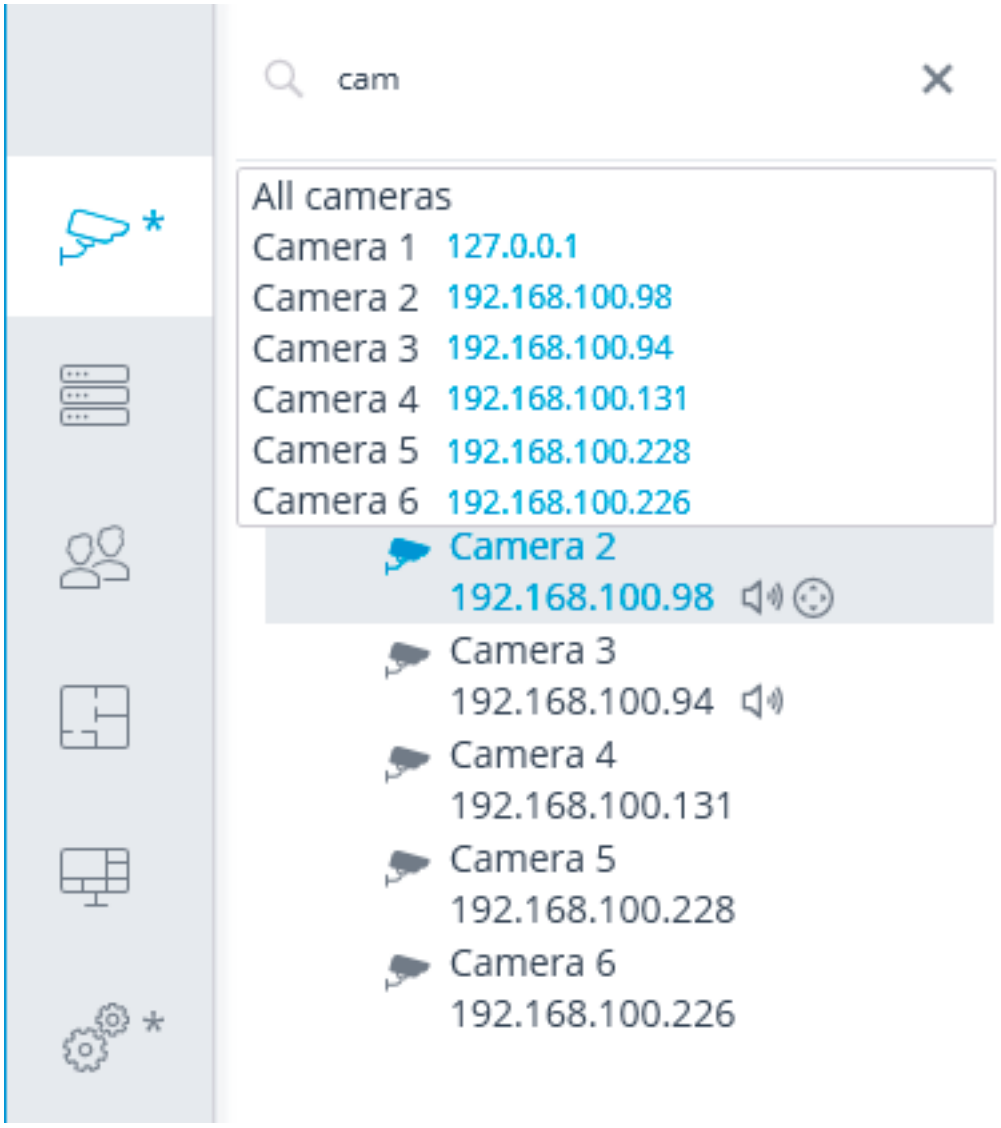
For example, a single-server system has a license for 100 IP cameras and 2 channels with face recognition installed. At that, 100 cameras are connected to the server, and the face recognition operates on two of the channels. If 20 cameras are disconnected, including one face recognition channel, it will be possible to connect 20 cameras more, including one camera with face recognition feature.

The camera settings page contains several tabs:

- Connection — camera connection parameters.
- Rights — camera access rights.
- Archive — camera archive settings.
- Motion detector — motion detector settings.
- Analytics — video analytics settings.
- Camera analytics: setting up video analytics built into a camera.

For setting up a group of cameras located inside a folder and its subfolders it is required to select this folder in the tree and press the **Change camera group setting** button in the right side of the window on the **Folder information** tab. The Camera group editing window will open.

The search field located above the list serves for finding cameras and folders in the tree.



Listed below are the commands available during the camera hierarchy setup. All the commands are accessible from the context menu. Some commands are doubled by buttons and hotkeys.

- **Add folder** (button) adds a new folder to the selected current folder.
- **Add camera** (button) adds a new camera to the current selected folder.
- **Create new camera based on the highlighted one** adds a new camera on the basis of the selected one.
- **Rename** (**F2** shortcut or double click on the name) allow to rename the selected folder or camera. To do so, it is required to type a new name and press**Enter**.
- **Delete** removes the selected camera or folder.

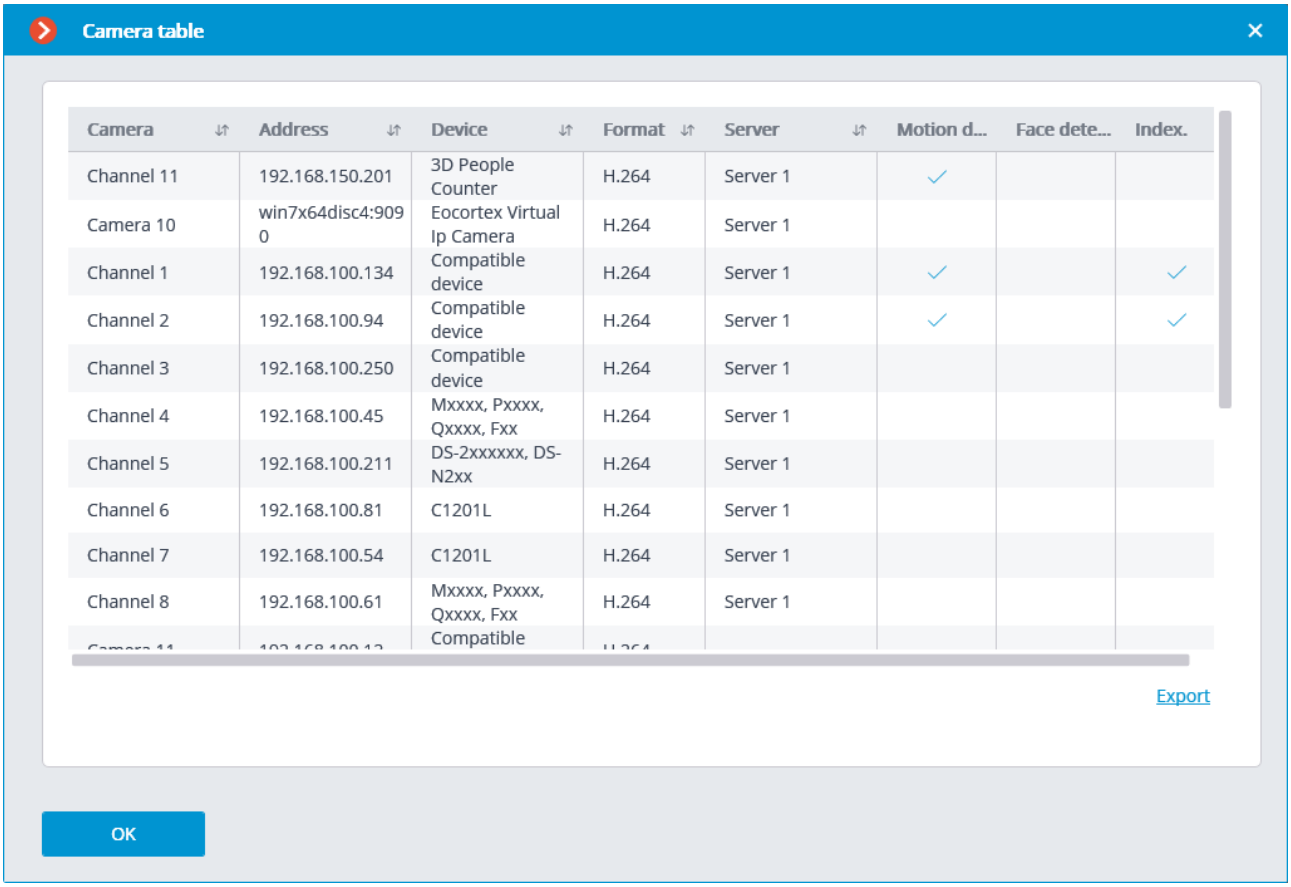
- **Switch off camera** disconnects a camera: removes it from the system but keeps it in the tree preserving all its settings.
- **Switch on camera** enables a camera, adding it to the system.
- **Move up** moves camera or folder up within the parent folder.
- **Move down** moves camera or folder down within the parent folder.
- **Copy to clipboard** (**Ctrl + C** shortcut) copy camera or folder to the clipboard for its subsequent pasting.

- **Cut** (**Ctrl + X** shortcut) copy camera or folder to the clipboard for its subsequent moving.
- **Paste** (**Ctrl + V**shortcut) pastes camera or folder from the clipboard.
- **Expand folder** expands the selected folder.
- **Collapse folder** collapses the selected folder.
- **Camera configuration export** saves the settings of a selected camera or all the cameras and folders within the selected folder to disk. The user sets the name and location of the destination file in the prosses of uploading.
- **Camera configuration import** loads the previously saved camera and folder settings from the disk. The loading is performed to the selected folder.

⚠ The loading of the camera settings file from the disk does not cause the deletion of all the current folders and cameras. Thus, if the same settings file is imported to the same folder twice, the uploaded files and folders will be duplicated.

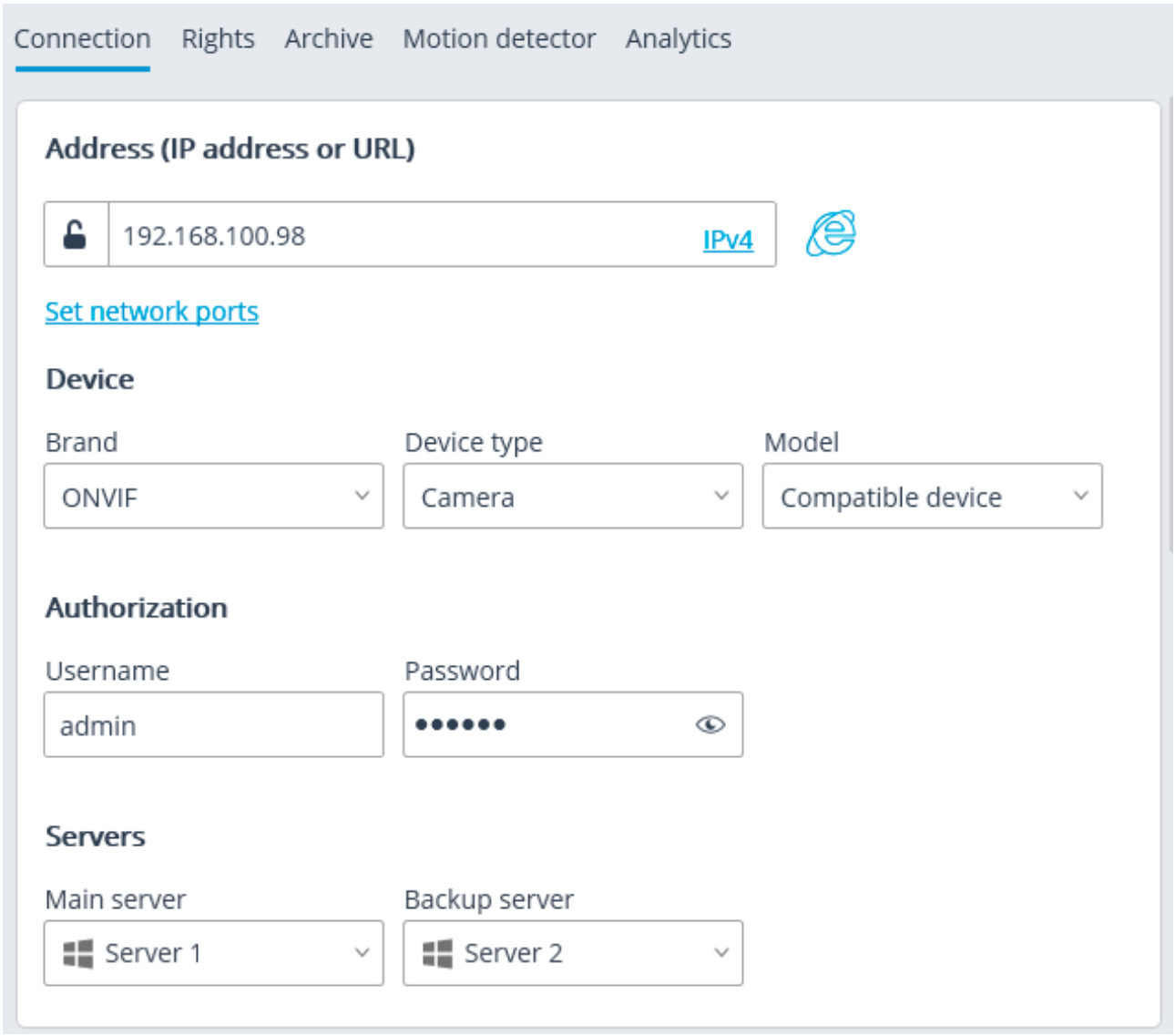
Automatic search button performs the automatic search of the available cameras in the local network and connects them to the system.

Camera table button opens the table with the information about all the cameras connected to the system. The table can be exported in **CSV** and **XPS** formats.



Connection setup

On the **Connection** tab, the connection to camera is set up as well as the parameters of the video streams received from the camera.



In order to connect to a camera, it is required to indicate its **Address (IP address or URL)**. Prefixes like **http://** are not required in this field). In some cases, it may be required to state a management port / data port of the device, for example, **192.168.1.55:8000**.

If a camera supports the secure connection via HTTPS, it can be enabled by clicking on button.

This capability is available for selected cameras.

The port indicated in the connection address field is used for the secure connection. If no port has been explicitly indicated, the port **443** will be used for secure connection.

The operability of all the utilized camera features with the secure connection is checked before starting to use such connection. The camera features whose safety cannot be verified will not work when the secure connection is established.

With the majority of cameras, all the features will work via HTTPS port with the secure connection. However, some cameras may use different ports for different functions. That is why the availability of all camera ports is verified.

Due to the above reasons, when the secure connection is used, it is recommended to check the operability of all the required camera features, such as alarm inputs and outputs, before applying the settings.

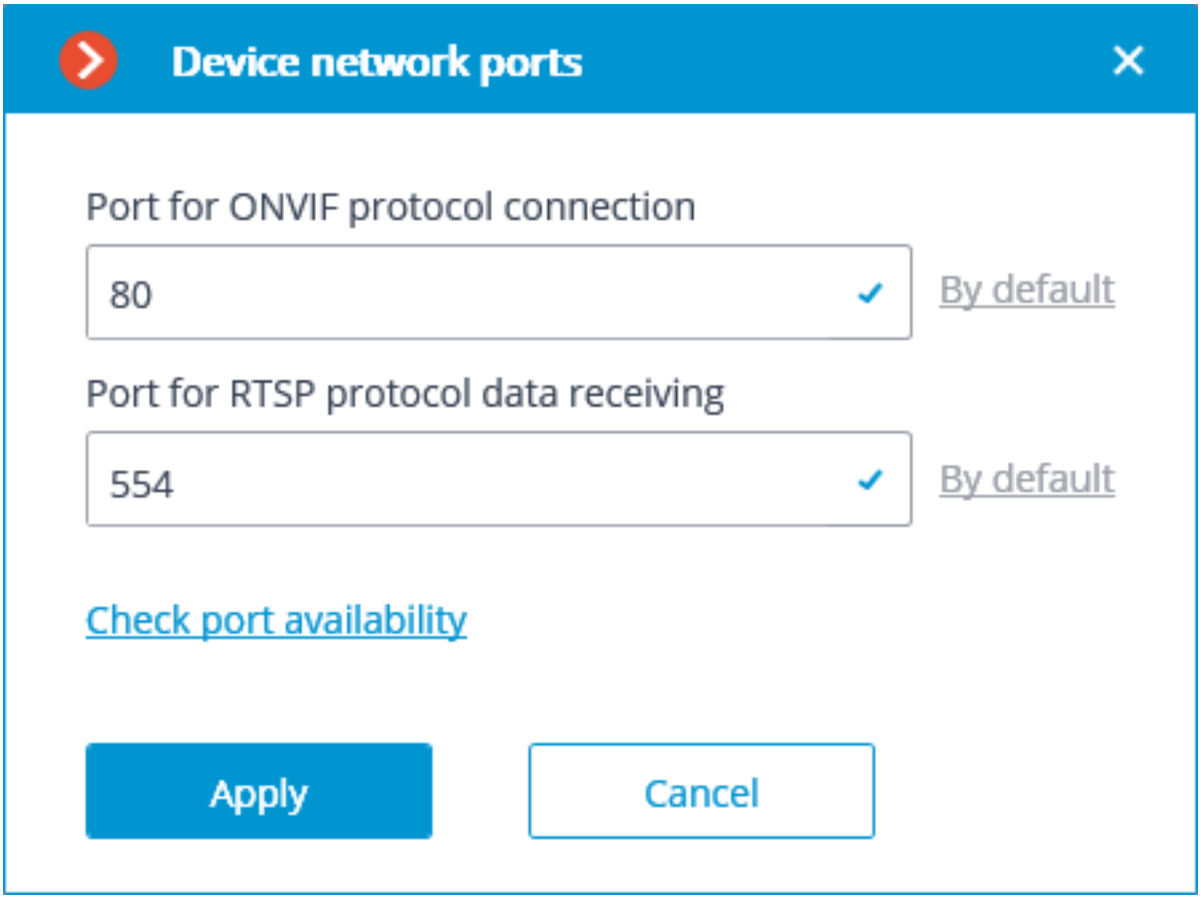
The validation of the TLS/SSL certificates used for the secure connection with the cameras is not performed. Thus, it is possible to use any certificate for the above mentioned means.

In case of using the secure connection, the connection to the camera thru the server is always used.

If the **DevicePack** or the server version earlier than 2.8 is used, the secure connection will be unavailable.

If a camera is connected using the IPv6 protocol, it is required to select this protocol in the dropdown list in the right part of the **Address (IP address or URL)** field.

Set network ports link opens the **Device network ports** window allowing to specify ports that differ from those used by default.

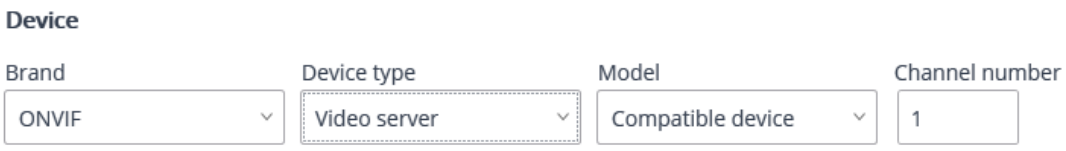


It is also necessary to set the manufacturer and the model of the camera.

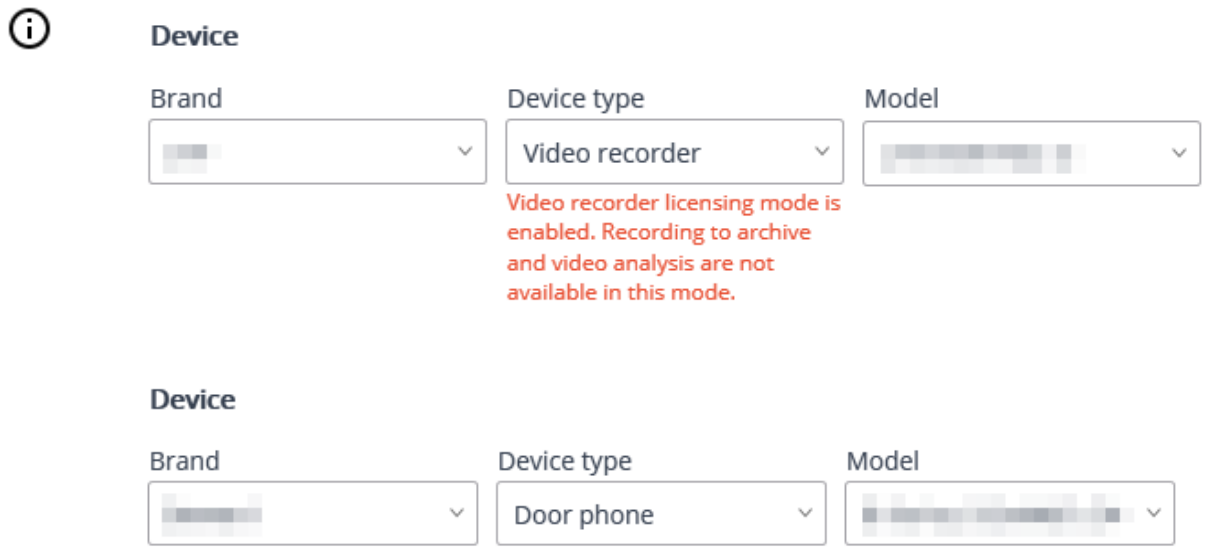
The connection of cameras the manufacturers or model of which are not in the list is described in Camera connection features section.

Apart from the cameras, it is possible to connect video servers, video recorders and door phones selecting the appropriate device type.

For video servers, it is required to additionally indicate the number of a channel that the camera on this server is connected to.



For video recorders, the special licenses approved by the video recorder manufacturers are used.



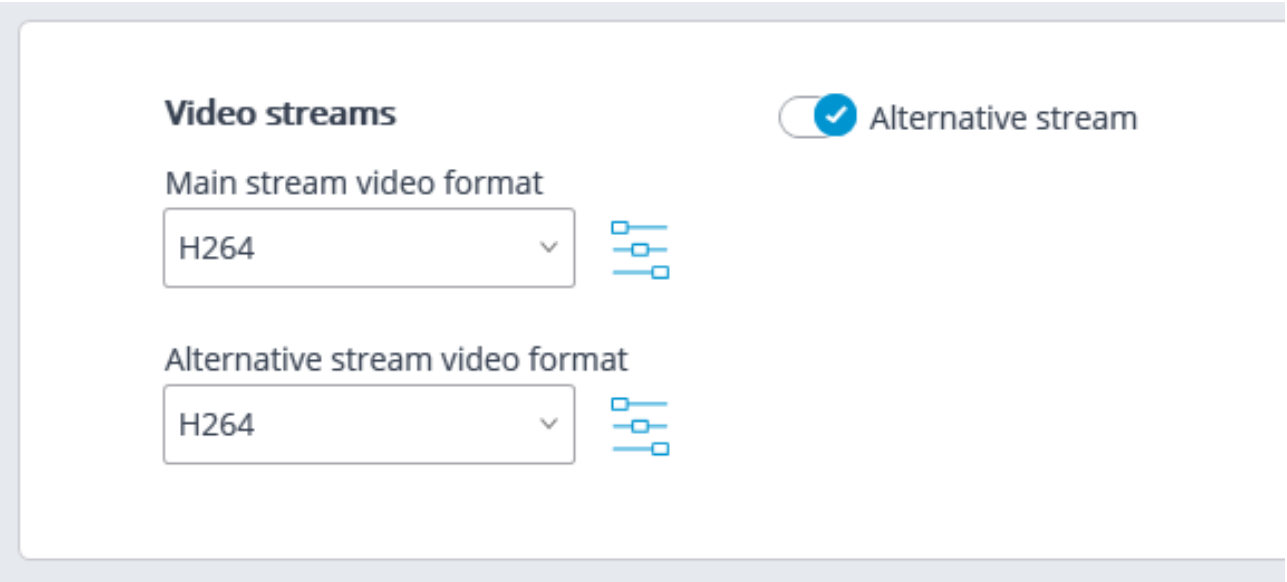
If in order to connect to the camera it is required to log in, **Username** and **Password** must be set.

In the multi-server system, it is required to indicate which server will be assigned as main for the given camera. In case there are redundancy licenses, it is also possible to specify a backup server for the camera.

Main server is the server that connects to the camera and processes its video and audio data, including the analysis performed by the video analytics, recording to the archive and forwarding to the client applications.

Backup server is the server that connects to the camera and processes its video and audio data in case of a failure of the main server or all of its archive drives. Switching to the backup server means that all of the video analysis modules enabled on the camera will cease to operate.

Pressing the button attempts to open the camera in a web browser.



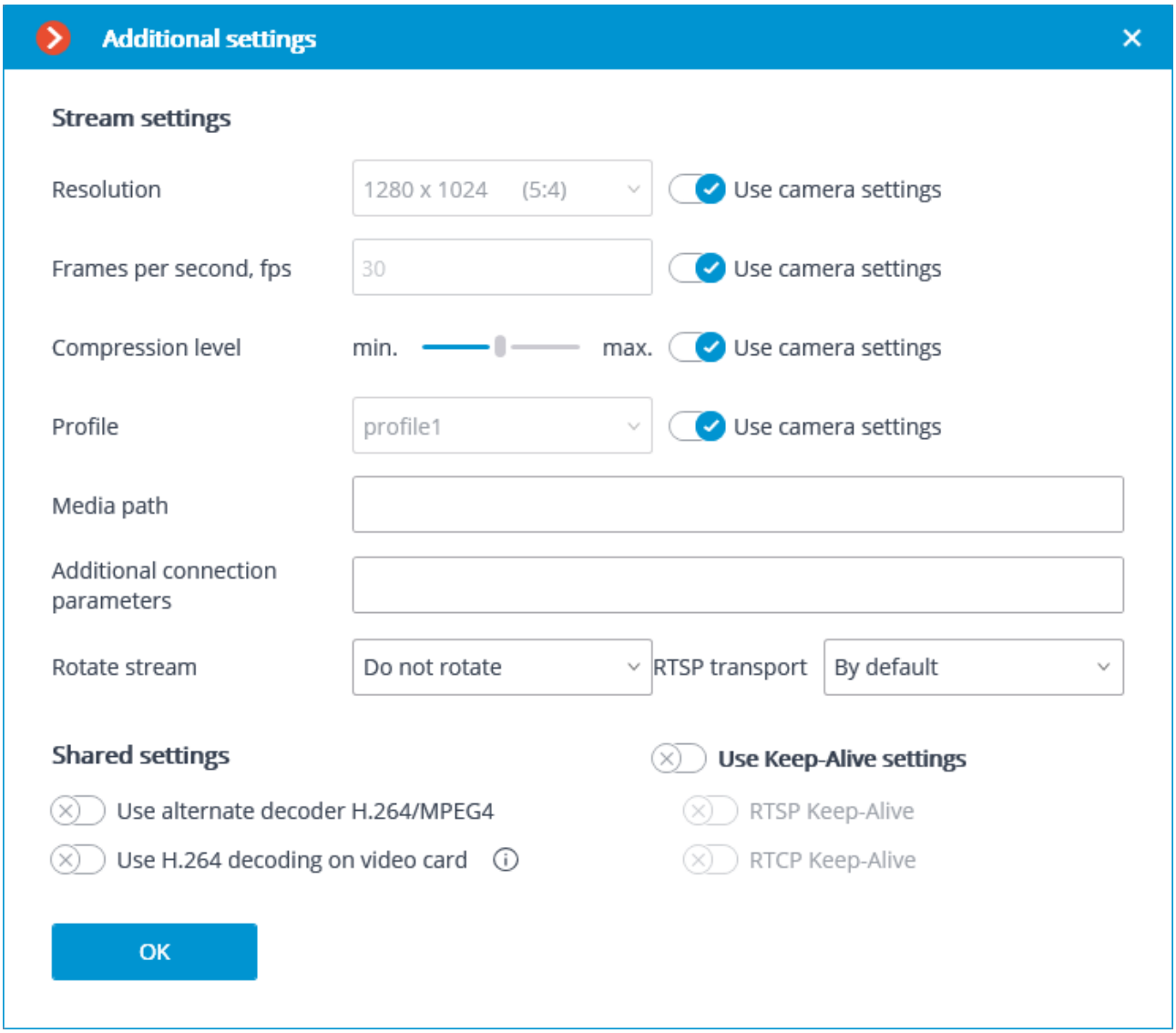
In the **Video streams** group of settings, the reception of the alternative video stream is enabled in case it is required, as well as the parameters of each video stream are set: the codec is indicated in the dropdown

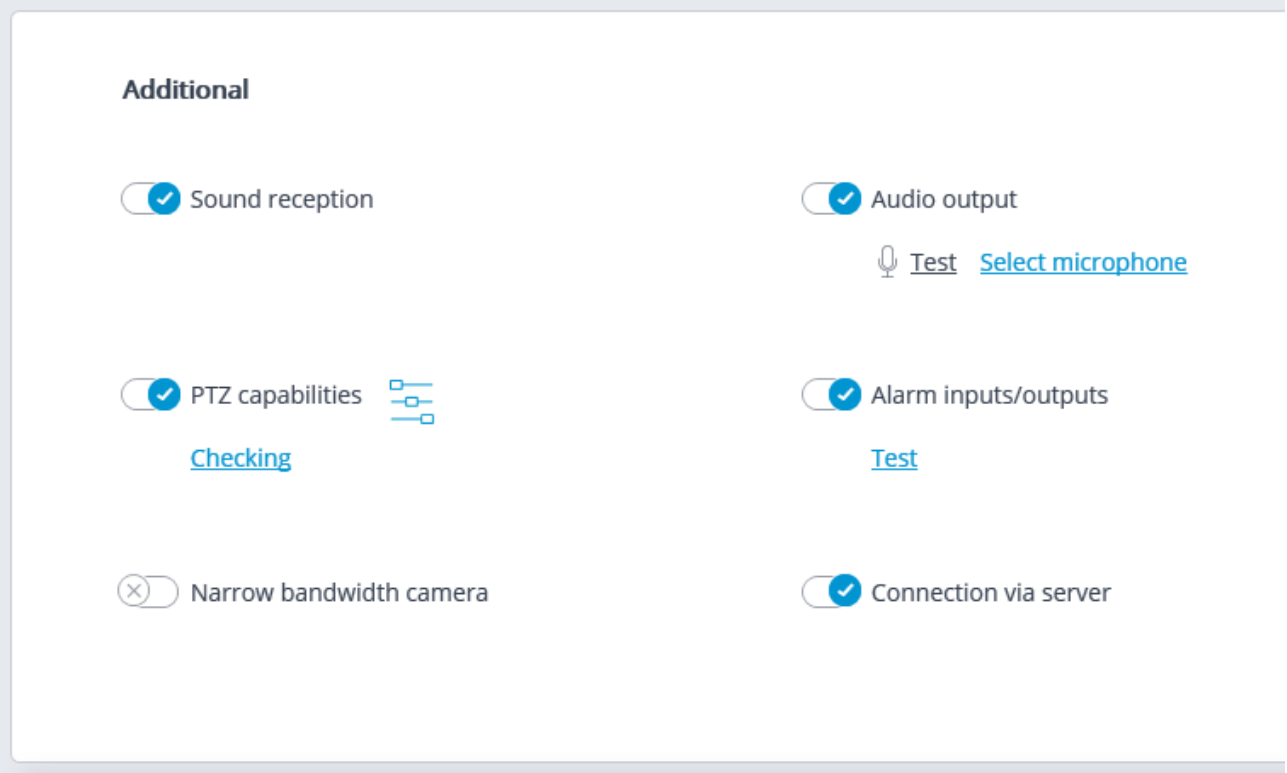
list, and the additional video stream settings window is opened by pressing the button.

More details regarding the video streams can be found in the Using two streams section.

The parameters available in the **Additional** window may differ depending on the camera models.

Setting camera parameters from the **Eocortex Configurator** application is available for a limited list of camera models.





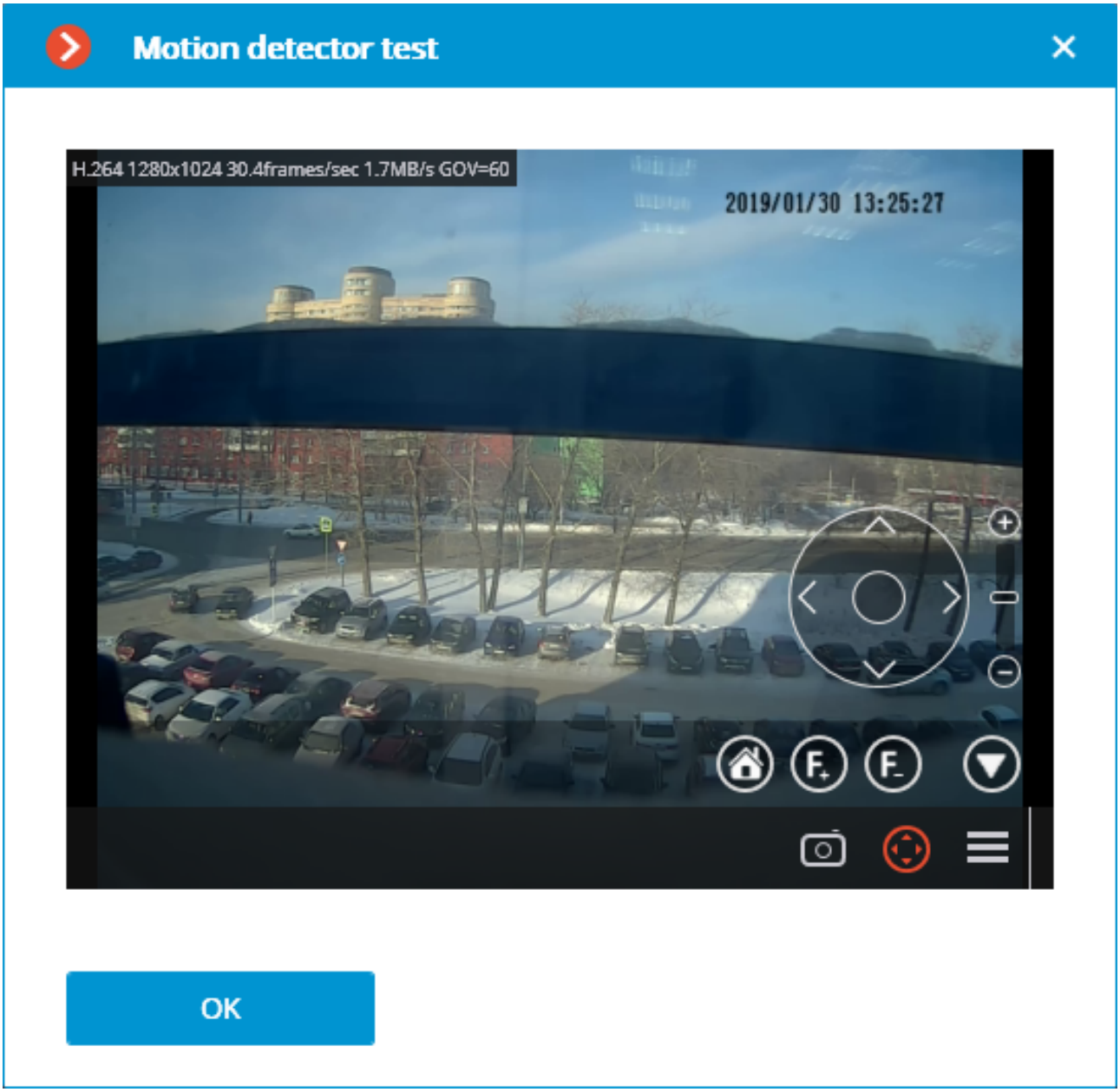
The following settings are available in the **Additional** group of settings.

Sound reception: enables the reception of sound from the camera.

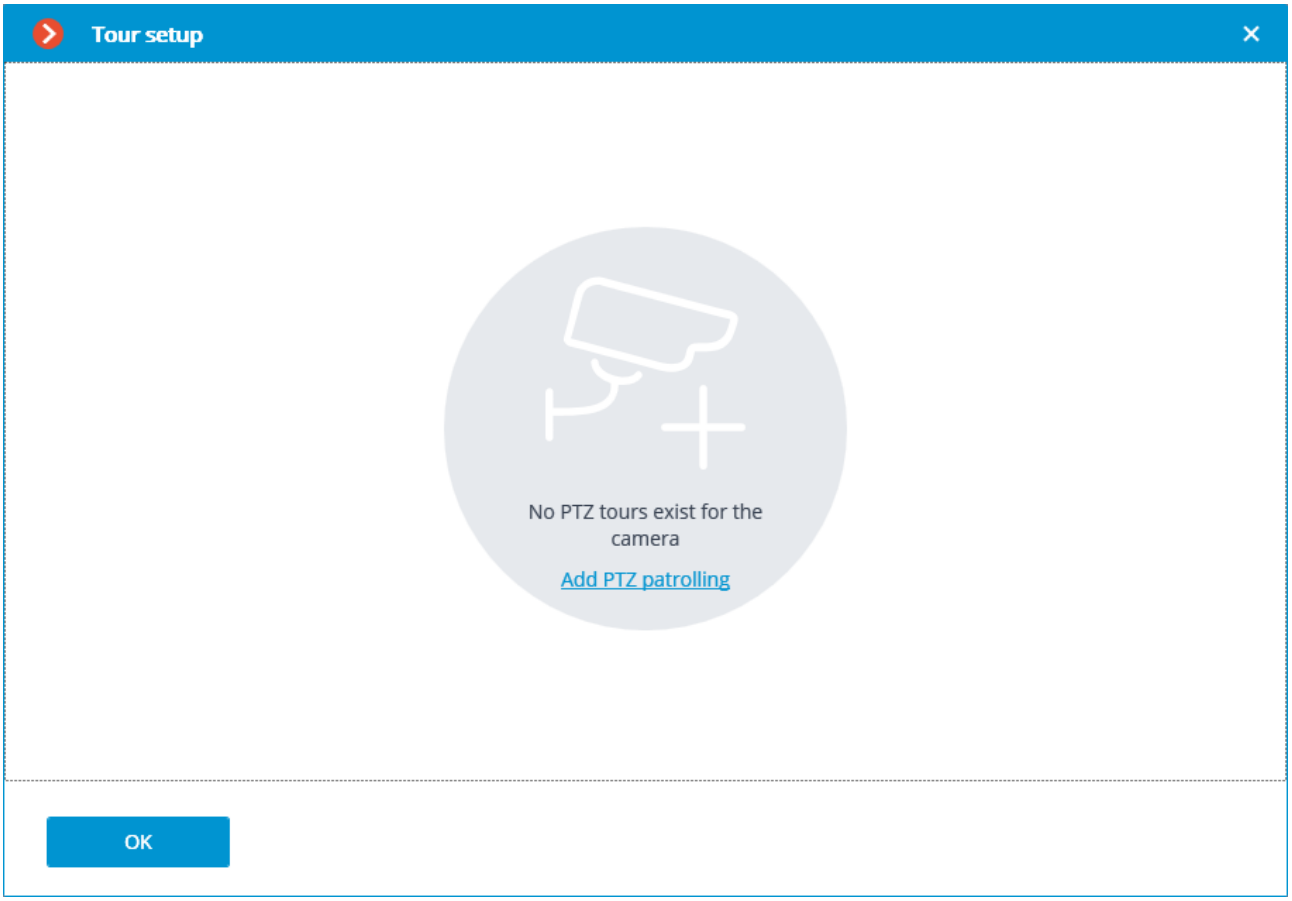
Sound transmission: it enables the transmission of sound to the camera. With the push of the button, the microphone connected to a computer is switched on, allowing to test the sound transmission. The choice of a particular sound device (driver) is made following the Select microphone link.

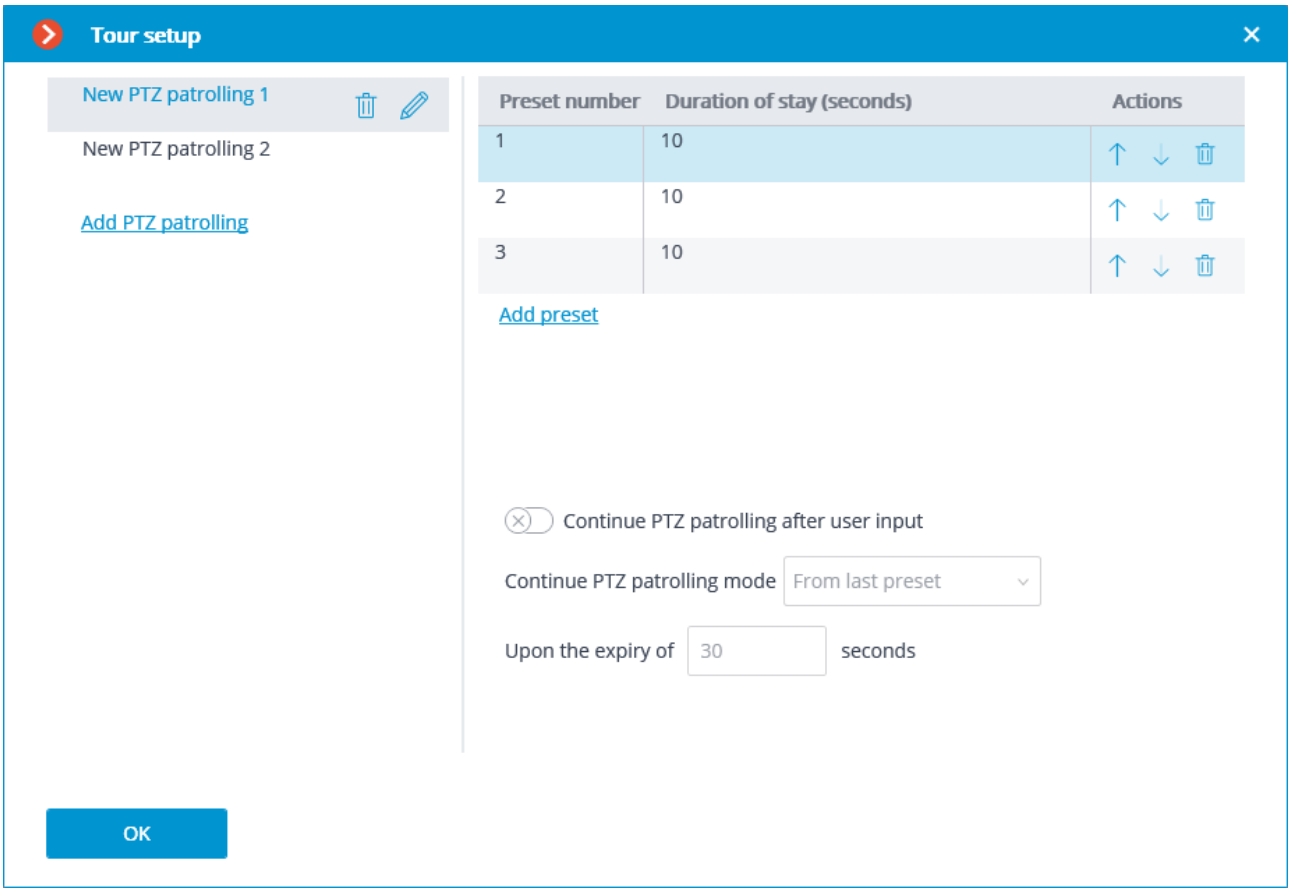
PTZ capabilities enables the camera control features.

Test link opens the window with the test video broadcasting which contains PTZ controls.



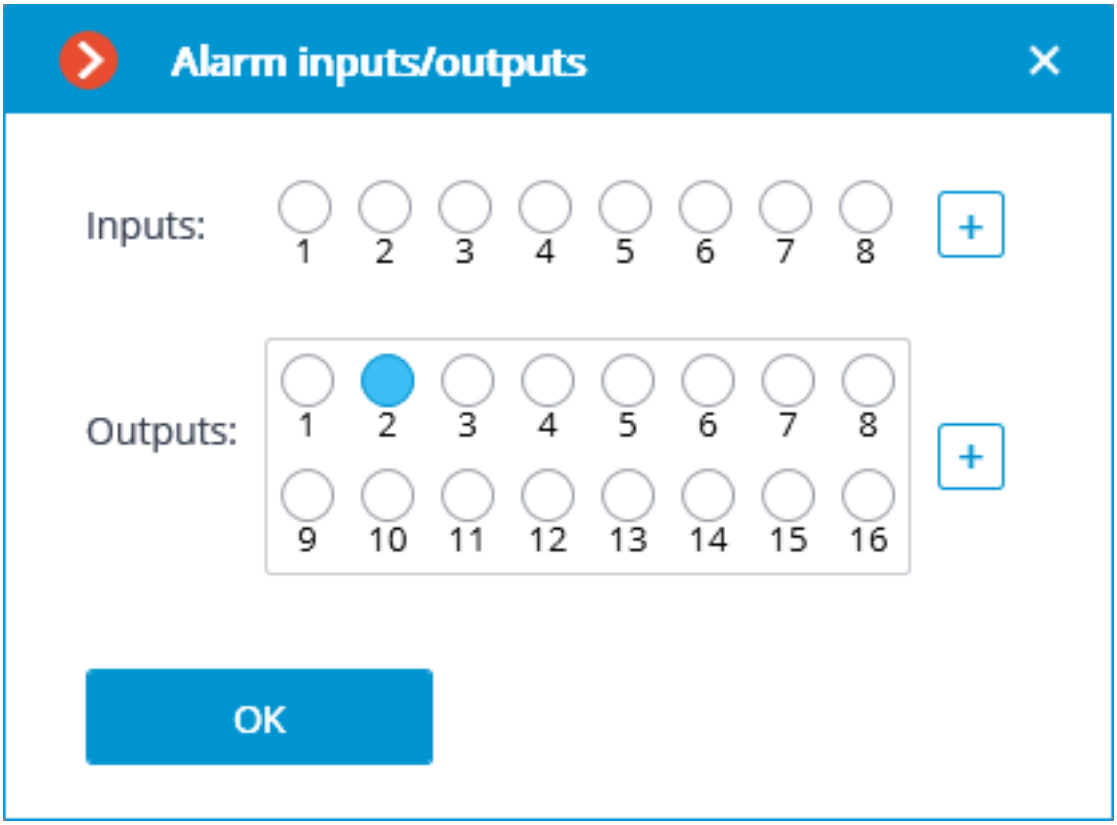
The button opens the Tour setup (automatic patrolling) — the sequences of toggling camera presets.





Alarm inputs/outputs enables signal recording from the inputs and sending signals to the camera outputs.

The **Test** link opens the camera inputs and outputs window. When signals are sent to the inputs, the corresponding indicators will be highlighted in the **Inputs** line. For sending signals to the inputs it is required to click on the corresponding indicator in the **Outputs** line. By default, 8 input and output indicators are displayed; to have more inputs or outputs displayed, press **[+]** located to the right of the corresponding indicator block.



PTZ capabilities: allows to select the display modes available for the particular model.

If a position is selected in the **Model** field that corresponds not to a particular camera model but to a model range, the **PTZ capabilities** option will be available on the condition that the PTZ camera feature support is implemented for at least one model from the selected range. That is why the **PTZ capabilities** option is to be switched on only if the connected camera really is a PTZ one.

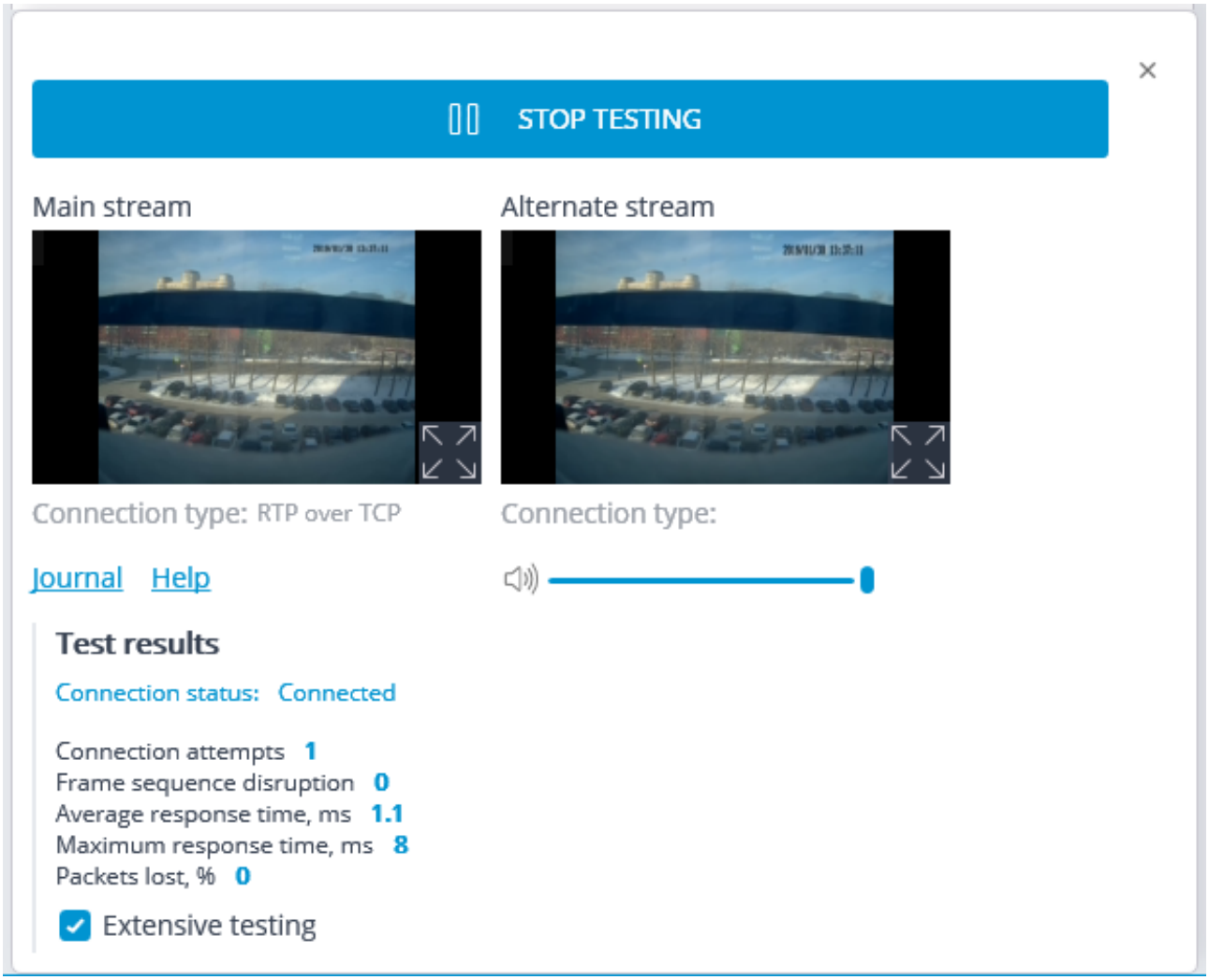
Narrow bandwidth camera: enabling this option will increase the time of waiting for the camera signal.

Connection via server: when this option is enabled, the video streams to the client workplaces will be transmitted thru the server.

Some cameras have a limitation of the quantity of simultaneous connections, or they lower the frame transmission frequency when several simultaneous connections are in place. Thus, the connection thru server ensures only one connection to the camera for any quantity of the client workplaces.

Pressing the **Test camera** button initiates an attempt to connect to the camera with the current parameters.

The connection status will be displayed in the test window. The test connection events are available in the log at the corresponding link.



Camera connection features

The list of cameras supported by **Eocortex** grouped by their manufacturers can be found on eocortex.com, Support / Supported Cameras page.

The adjustments of the connection of cameras to the **Eocortex** server is made via **Eocortex Configurator** application, on the **Cameras** / Connection tab.

If a camera manufacturer is not present in the **Brand** dropdown list, it is recommended to do the following:

Press the **Automatic search** button. If the camera appears in the list of detected cameras and **ONVIF** is available for it, it is required to mark the camera, enable the **Automatic setup** option and

press the **Add device** button. The camera will be added to the list and automatically set up. If after doing the above the image from the camera is not received, enter the login and the password and perform the setup manually.

If the camera has not been found by the automatic search, try to connect it using the standard protocols, selecting one of the standards in the **Brand** field (**Model** field will be filled in automatically).

- If the camera supports **ONVIF** or **PSIA** standards, it is required to manually indicate its address, login/password, select its manufacturer and set other parameters.
- If the camera supports **HTTP** connection for receiving **Motion JPEG**, or **RTSP**/**RTP** connection for receiving MJPEG, it is required to select **HTTP (MJPEG) device** or **RTSP/RTP device**, correspondingly, in the **Brand** field, and set a connection string in the **Address (IP address or URL)** field. The connection string depends on the camera model and is usually indicated in the documentation or on the manufacturer's web site. Login and password are set in the connection string or in the corresponding fields (depending on the connection method implemented in the particular model).

  If the manufacturer of the camera is in the **Brand** dropdown list, but the camera model is not in the **Model** dropdown list, try to connect to the camera using other models of the same manufacturer. For some manufacturers, the model ranges, series, or generations of cameras are indicated rather than camera models. For some manufacturers there is only one position in the list – that means that all the models use the same driver, or only a certain series/model of the manufacturer's devices is supported.

  If the above connection method has failed, try to connect the camera choosing one of the standard protocols in the **Brand** field: **ONVIF**, **PSIA**, **HTTP (MJPEG) device** or **RTSP/RTP device**.

Using two streams

The majority of modern IP cameras support broadcasting two or more video streams simultaneously. Using two streams from the camera permits to record frames to the archive in high quality and display lower quality video in client applications, significantly reducing the load on the hardware.

In the **Eocortex** terminology, the first stream broadcast by the camera is called the **main stream**, and the second - the **alternative stream**.

Since due to the usage of two streams the **Eocortex** server writes the main stream to the archive by default and the alternative stream is sent to client applications, it is recommended to set the first stream to high resolution and the second stream to low resolution.

When displaying video from the camera broadcasting two streams in the client application, the stream with the resolution closest to the size of the window in which this stream will be shown is selected for displaying on the screen by default.

For example, a camera broadcasts two streams: 1920x1080 and 640x480. The client computer uses a monitor with a resolution of 1920x1080. Then, in the screen grid of 3x3 cells, the resolution of one cell will be 640x360 (1920/3 = 640; 1080/3 = 360). Therefore, a stream with a resolution of 640x480 will be broadcast in the cell. If the cell is expanded to full screen, the switching to a stream with a resolution of 1920x1080 will be performed.

When using a software motion detector, it is possible to choose which stream will be analyzed. If no other video analytics is used for the camera besides the software motion detector, it is recommended to use a lower resolution stream for analysis since this can significantly reduce the server load.

However, if other video analytics is used for the camera in addition to the software motion detector, in most cases it is recommended to use a high-resolution stream for analysis. This is primarily due to the fact that the resolution of the alternative stream may not be sufficient for analysis. It should also be borne in mind that video analysis modules register the coordinates of objects corresponding to certain parameters of the analysis and record these coordinates in the archive. In this case, the frame aspect ratio of the main and alternate streams may differ. In addition, the streams often do not have accurate synchronization and in some cases desynchronization can reach one second or more. Thus, when recording a high-resolution stream to the archive and performing the analysis on a low-resolution stream, a situation may arise when a frame that does not contain the desired object will be extracted from the archive due to, for example, the desynchronization or differences in frame proportions.

In addition to frame sizes, it is required to select a frame rate and a number of other parameters of the streams that often depend on the capabilities of the camera - codec, compression level, GOV, etc. At that, it is recommended to adjust the frame rate of the main stream based on the "necessary and sufficient" principle. For example, if filming is carried out in an office and the video analytics is not used, 6 fps will be sufficient in most cases for recording to the archive in high resolution (the volume of the archive will be significantly less than at 25 fps); at the same time, the low resolution stream can be configured to have a frequency of 12 or 25 fps for comfortable viewing

ⓘ In the **Eocortex Configurator** application, the stream use parameters can be changed. In particular, it is possible to set the recording of the alternative stream to the archive rather than of the main stream. It is also possible to change the stream broadcasting parameters at a specific workplace in the **Eocortex Client** application settings.

Settings on camera

Despite the fact that **Eocortex** can work with one or two streams from cameras of any resolution, it should be borne in mind that the load on the **Eocortex** server largely depends on the parameters of the streams received from the cameras. It is also important to consider the specifics of setting up and functioning of **Eocortex** applications.

For most cameras, the parameters of the broadcast video and audio streams should be set on the camera itself, using the camera's web interface. An exception is made for certain brands and models of cameras, for which the parameters of video streams are set in the **Eocortex Configurator** application.

The list of terms that can be found in camera settings can be found below.

Stream

First or **Main stream**

Second or **Sub stream**

Compression format, **codec** (**Encoding Mode**, **Codec**)

Eocortex supports the following compression formats: **MJPEG**, **MPEG-4**, **H.264** and **H.265**.

In comparison with other formats, **MJPEG** requires fewer resources for decoding, that means less load on the server and client computers. On the other hand, a video stream in MJPEG format takes up significantly more volume: a video in **MJPEG** format requires several times larger bandwidth, and an **MJPEG** video archive occupies several times more drive space than **H.264** and **MPEG-4** video with the same parameters (resolution and frame rate).

H.264 and **H.265** are the most "economical" formats in terms of volume, but they require more computational costs for decoding as compared to **MJPEG**.

MPEG-4 is similar to **H.264** but has a lower compression ratio (i.e., **MPEG-4** has a bandwidth and archive size greater than that of **H.264**, but much less than that of **MJPEG**. In modern cameras, **MPEG-4** is practically not used: the more advanced **H.264** format is used instead.

Compression ratio

For all formats, such a concept as the compression rate is used: the higher the compression rate, the smaller the video volume. The reduction in volume occurs at the expense of image quality that becomes lower. Depending on the conditions of video surveillance and the hardware features of the camera, the acceptable compression level can be in the range of 30 to 60%, although the options from 0 (minimum compression) to 70% (high compression) may be available. In addition to the percentage, the compression ratio in the camera settings can be specified as a **Compression Level**, for example, from 0 to 12. In addition, such a term as **Quality** or **Quality Level** can be used - the reciprocal value of the compression ratio (simply put, a compression of 10% corresponds to the quality of 90%). The compression ratio should be set based on the analysis of the quality of the resulting image.

Resolution

Frame Rate, **FPS**

In addition to the above mentioned terms, the following ones may be used when describing H.264 stream settings:

Profile: **Baseline Profile**, **Main Profile**, **High Profile**

Bit Rate Type:

VBR, **Variable Bit Rate** is a variable bit rate. It provides the specified parameters of the video stream, while the channel width can be changed. This mode is recommended for use in most cases when there are no problems with network bandwidth.

CBR, **Constant Bit Rate** is a fixed, constant bit rate. It provides a specified channel width. At that, depending on the implementation of this feature in a given camera model, the individual parameters of the video stream and the channel width may change. It is recommended to use this mode only in case of problems with the network bandwidth.

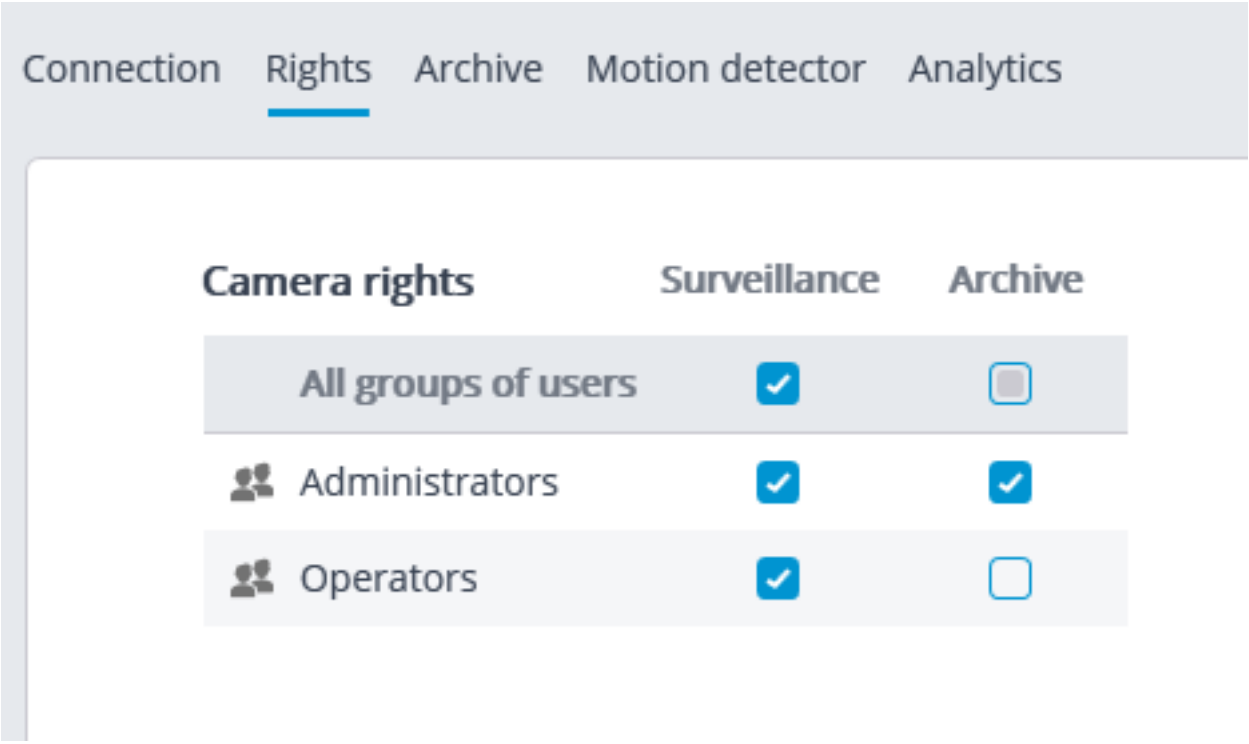
Bit Rate measured in Kbps or Mbps.

GOV (**VOP group**)

It determines the length of the group of frames (distance between anchor frames). For example, with GOV = 50, one anchor frame will fall on 50 transmitted frames (i.e., there will be 49 intermediate frames between the anchor frames); at 25 fps and GOV = 50, one anchor frame will be generated every 2 sec. The higher the GOV, the less the volume of the video stream, but the higher the consumption of RAM and processor time, since it is necessary to store the anchor frame and all subsequent intermediate frames in memory up to the following anchor frame to decode each subsequent frame. With GOV = 1, the H.264 format is essentially no different from MJPEG.

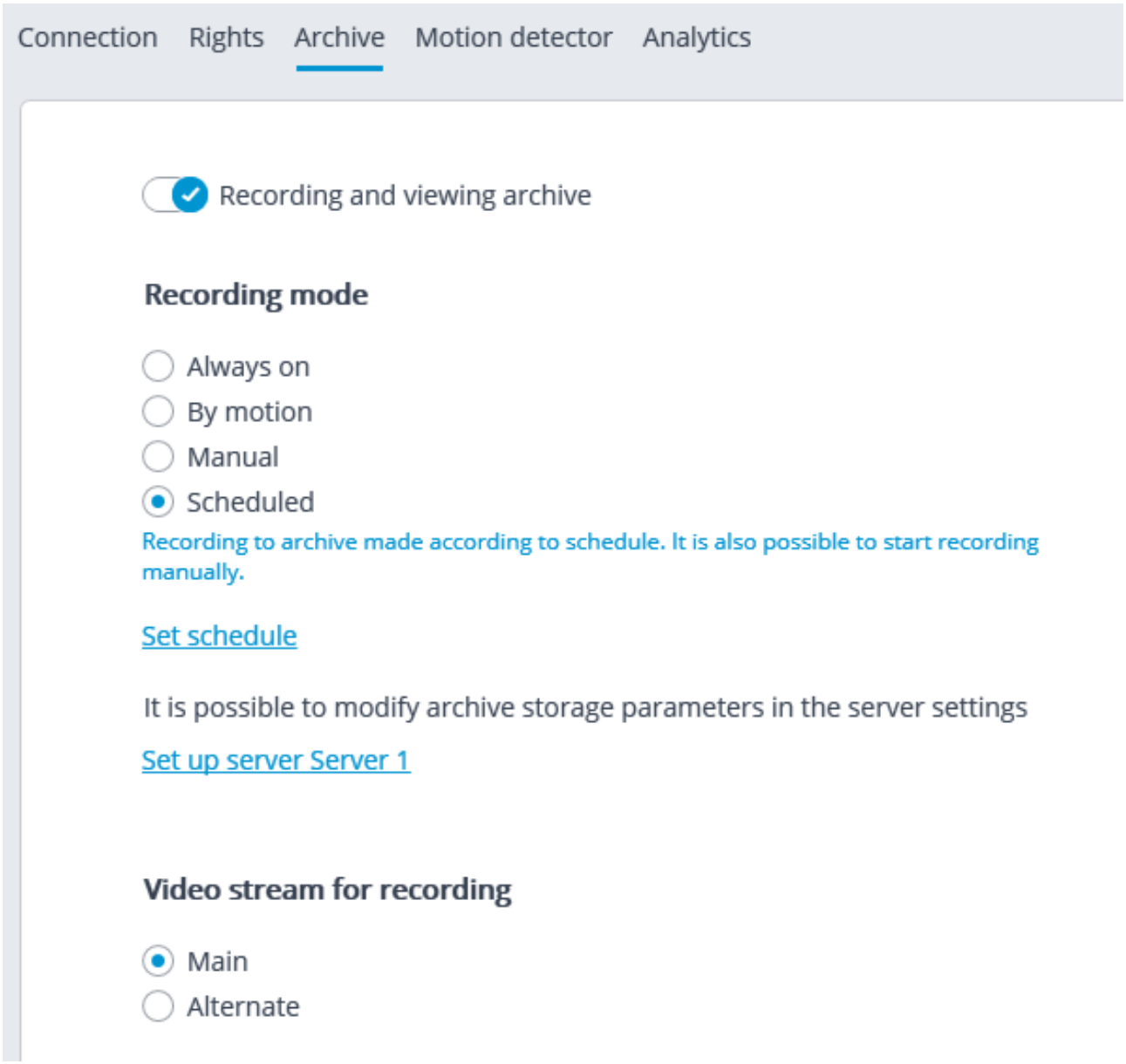
Access rights settings

The **Rights** tab allows to set up camera access rights.



Setting up the archive

On the **Archive** tab you can set up the parameters of writing camera audio and video to archive as well as the parameters of interaction with the archive located on camera.



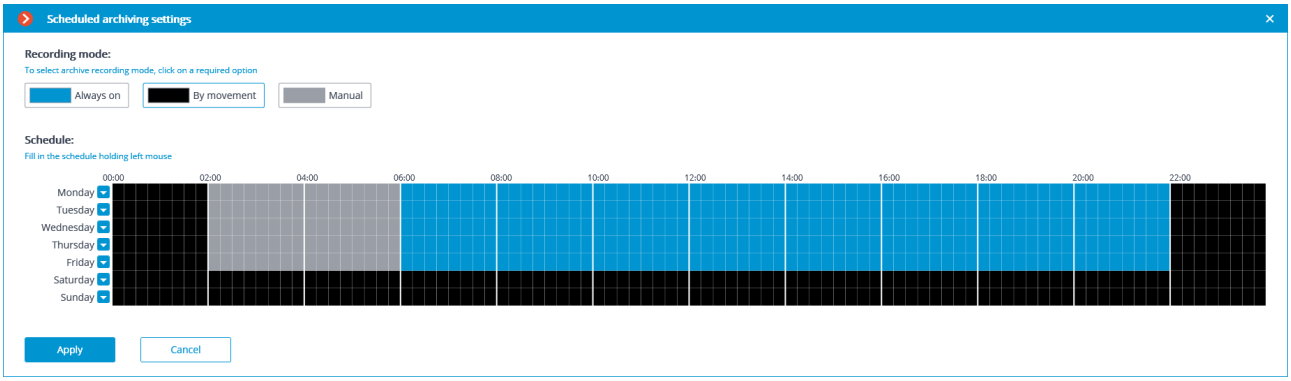
Below you will find a description of controls located on the tab.

Recording and viewing archive: enables recording the video and audio from a camera to archive.

Recording mode: allows to select one of the modes explained below.

- **Always on**: continuous recording to archive is performed.
- **By motion**: recording to archive is performed only when motion is detected in the frame (also when a set sound level is exceeded in case a sound detector is enabled). Moreover, the operator can start the recording to archive forcibly even if there is no motion in the frame.
- **Manual**: enabling and disabling recording to archive is done by the operator only.
- **Scheduled**: allows to flexibly set up modes of recording to archive.

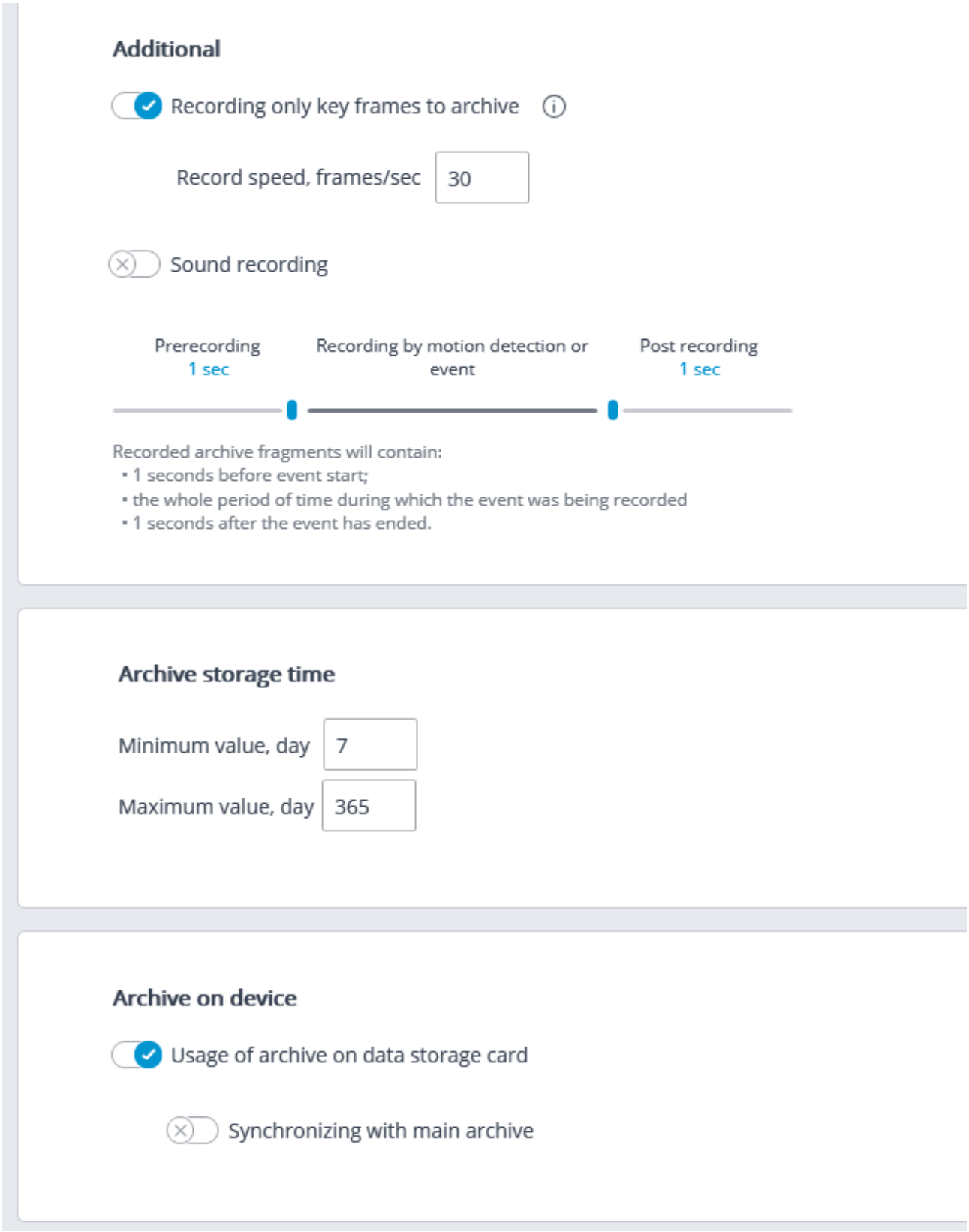
Set schedule: opens the schedule.



In the Schedule window, select one of the modes by clicking the corresponding rectangle in the upper part of the window. Then by holding left mouse button select the periods when the chosen mode will be active. The corresponding periods will be colored accordingly.

For setting a mode for the whole day you can select it in the dropdown list located to the right of the day of the week.

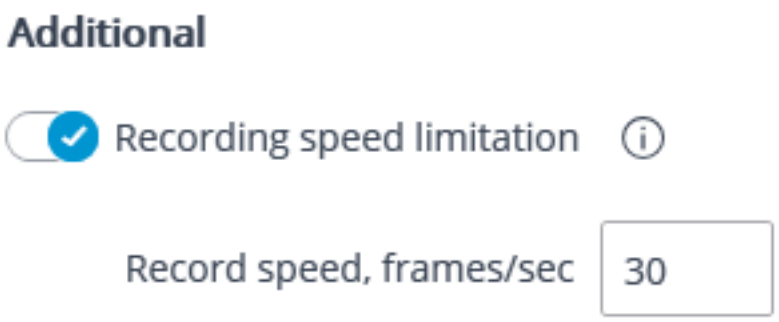
Video stream for recording: allows to choose which stream will be recorded to archive. This setting is available only when receiving two streams from camera is enabled.



Recording only key frames to archive: when this option is enabled for MPEG-4, H.264 and H.265 codecs, only the key frames will be recorded, but for MJPEG codec the required frame rate is stated in the **Record speed** field.

If for MJPEG codec the frame rate of the camera is lower than the one stated in the **Record speed** field, all frames will be recorded to archive.

For MJPEG codec, **Recording speed limitation** option is shown.



Since the sound is not decimated during the recording to archive, it will be available only for the archive recorded without recording speed limitation.

Recording speed limitation influences the quality of video playback from archive and the archive volume: the decimated video recording played back from the archive will be less smooth, but the archive drive space will be saved.

Sometimes there appears a necessity to enable recording without speed limitation only during a specific period of time or as a response to a specific event, and record a decimated video at all other times. In this case, it is required to set up the **Sheduled tasks** or **Tasks by event** using **Disable frame skipping when recording to the archiv**.

Sound recording: enables recording sound to archive.

In order to have sound recorded to archive, enable **Sound recording** on the **Connection** tab.

Prerecording and **Post recording**: using these sliders, you can set short periods of time during which the recording to archive will be performed before the start of the event that triggers the recording and after the start of the event that triggers stops the recording, accordingly. For example, **Prerecording** is performed when movement or exceeding of a preset sound level is detected, and **Post recording** is made after the motion has stopped and the sound level drops below the preset level.

Archive storage time: in this group of settings you can set minimum and maximum archive storage time.

Generally, the minimum and maximum set archive storage time for each camera assigned to server is analyzed, and an attempt is made to provide for the limitations indicated in the

settings. In case it turns out to be impossible, the older recordings from all the cameras will be erased to make room for the archive.

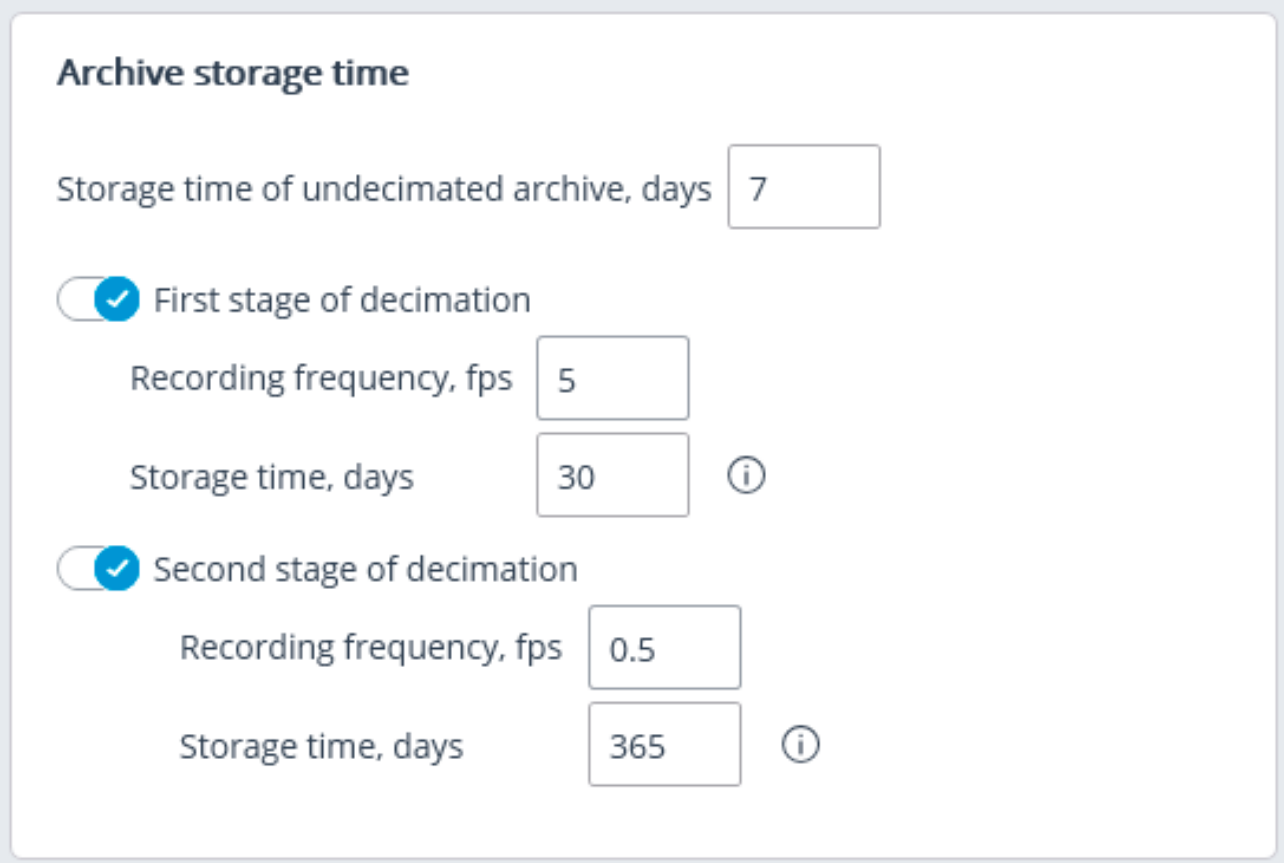
Usage of archive on data storage card: enables access of **Eocortex** applications to the data storage card on the camera.

Synchronizing with main archive: if this option is enabled, the archive from camera will be downloaded to **Eocortex** server, but only of those periods when no connection with camera was available or the server was down.

⚠ The archive for a required period may be absent on the camera's memory card. It happens, for example, when there is no motion, if a motion detector on the camera is used for recording. In this case the archive on the server will be empty.

For **Ultra** and **Enterprise** licenses, the Archive Decimation with Time Setting feature is available, which allows you to reduce the size of the archive after a specified interval.

The archive decimation operation can be executed in one or two stages: for example, recording is performed with an original frequency of 30 fps; in 7 days it is resampled down to 5 fps; and in 30 days - down to 0.5 fps (1 frame per 2 seconds).



⚠ When enabling archive decimation with time setting, all the archived recordings whose depth exceeds the depth of the undecimated archive specified in the settings will be deleted. The same will happen when the depth of the undecimated archive is modified.

⚠ E.g.: initially, the archive decimation with time setting is disabled; the specified maximum time of archive storage is 180 days.

If the first decimation stage is enabled and the time of storage of the undecimated archive is set to 30 days, the archive with the depth of more than 30 days will be deleted at the moment the settings are applied.

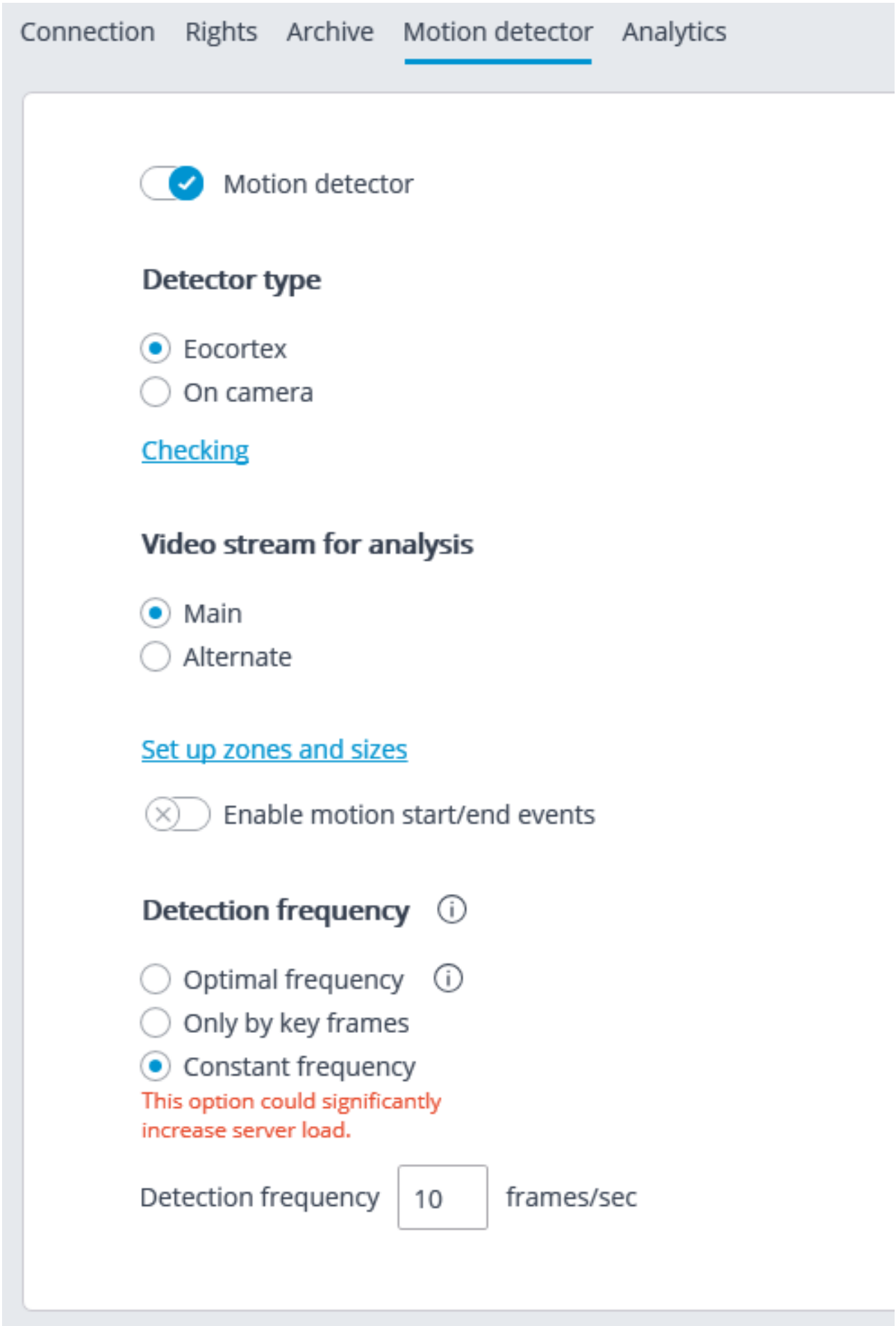
If subsequently the depth of the undecimated archive is set to 7 days, the archive with the depth of more than 7 days will be deleted at the moment the settings are applied.

ⓘ For the MPEG-4, H.264 and H.265 codecs, only the reference frames will be recorded.

In case of playback of the archive in **Eocortex Client**, archive fragments, which have been decimated with time, will be displayed by the shaded area on the timeline.

Motion detector setup

Motion detector parameters can be set up on the **Motion detector** tab.


Connection
Rights
Archive
Motion detector
Analytics
Motion detector
Detector type
Eocortex
On camera
Checking
Video stream for analysis
Main
Alternate
Set up zones and sizes
Enable motion start/end events
Detection frequency
Optimal frequency
Only by key frames
Constant frequency
This option could significantly increase server load.
Detection frequency
10
frames/sec

Below is the description of controls located on the tab.

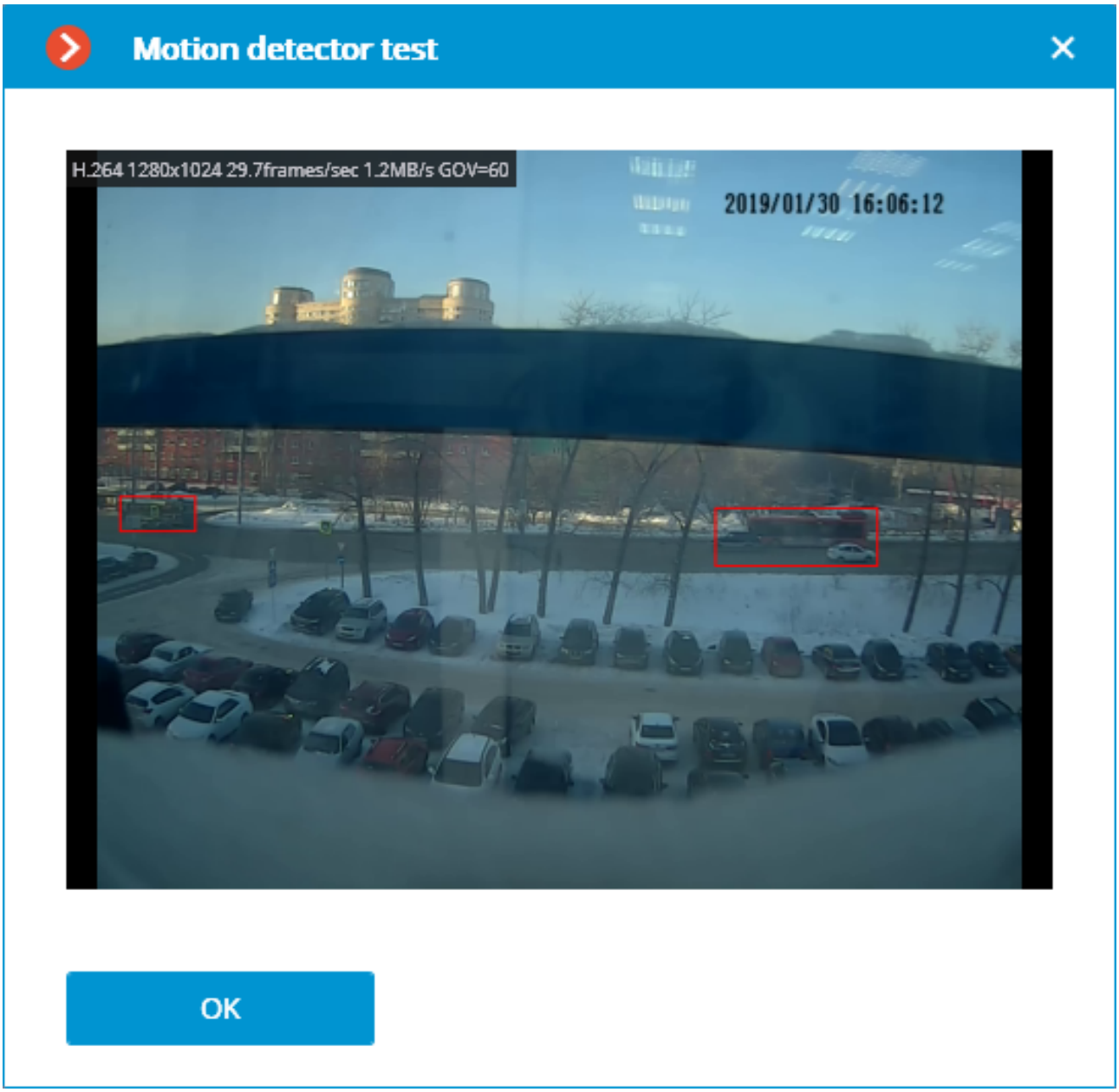
Motion detector: enables motion detector support.

Detector type: determines which motion detector will be used:

- **Eocortex**: software motion detector on **Eocortex** server.
- **On camera**: camera inbuilt motion detector.

⚠ When using the motion detector built into the camera, the **Eocortex** video analytics becomes unavailable.

The **Test** link opens the window of motion detector check.



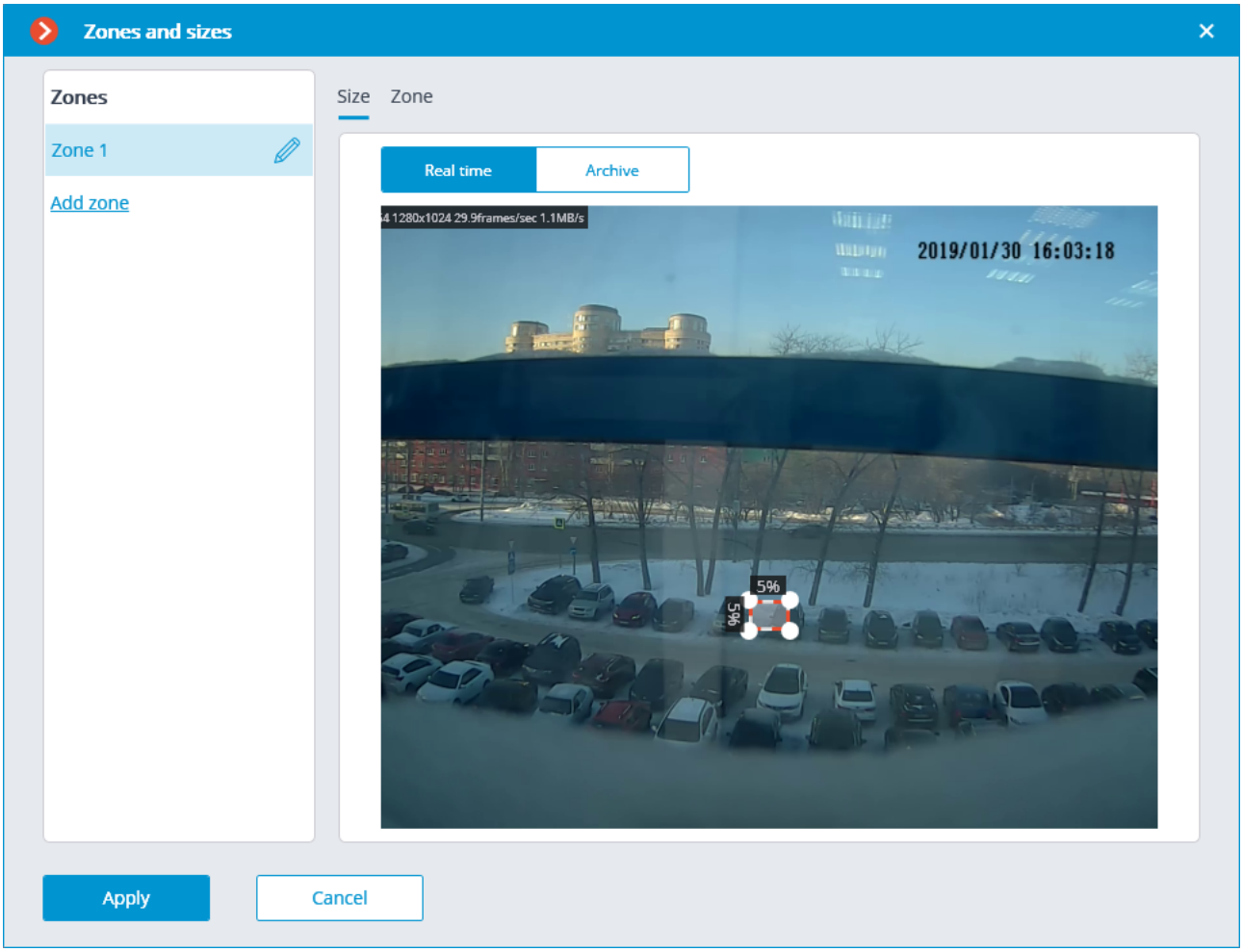
Video stream for analysis: determines which stream will be used for software motion detection on **Eocortex** server.

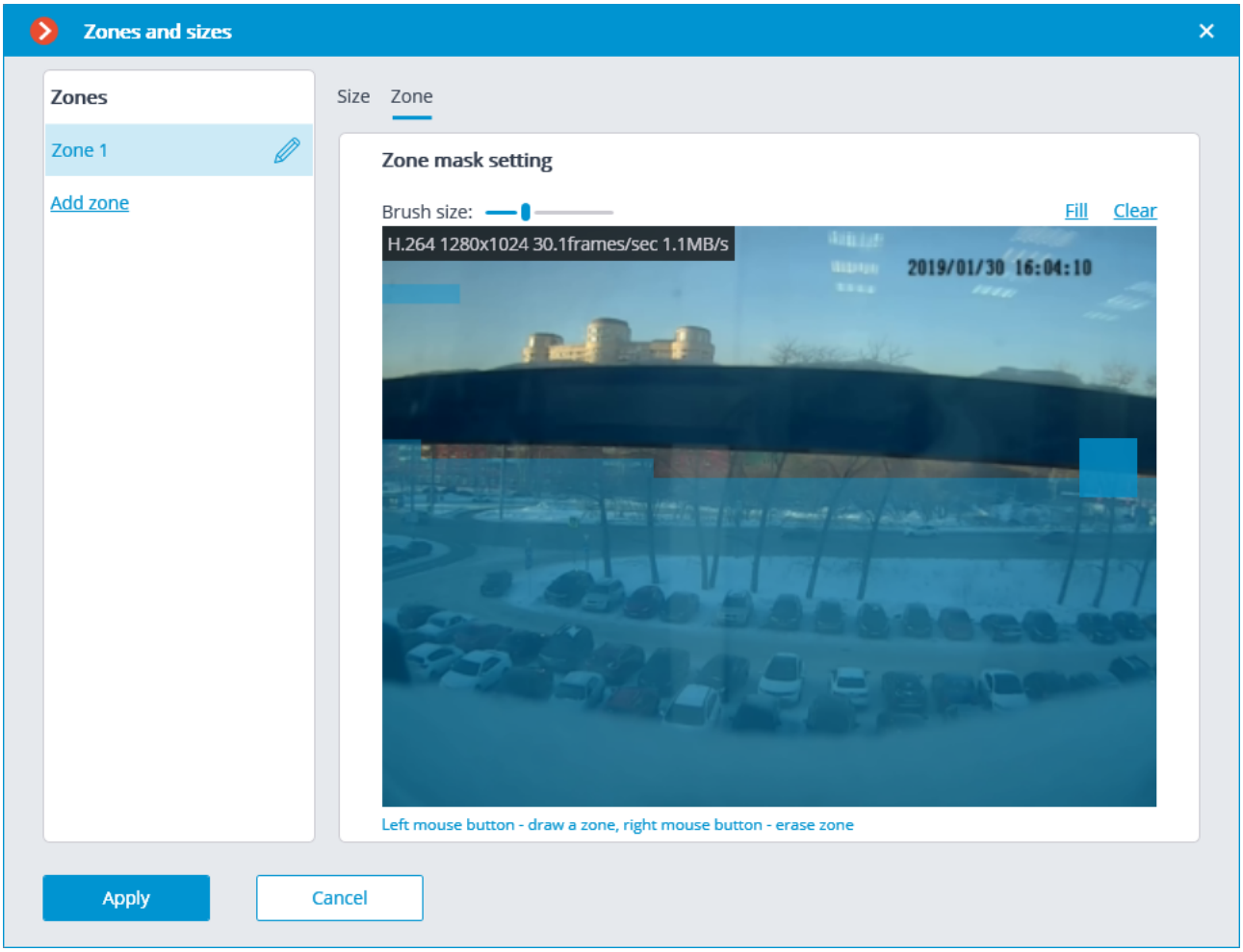
Recommendations for choosing a stream for analysis, on a condition that the main stream has higher resolution than the alternative one; for example, the resolution of the main one is 1920x1080, the alternative - 640x480:

Alternative: no intelligent modules are used apart from the **Eocortex** software detector.

Main: at least one additional video analytics module, including the external ones, is used in addition to the **Eocortex** software detector.

The **Set up zones and sizes** link will open the window of setting up detection zones and minimum sizes of the objects to be detected.





Generate motion start/end events: enables generation of the corresponding events, for example, for using them in scenarios.

Detection frequency: determines the frequency of video stream analysis for detecting motion in the frame:

- **Optimal frequency**: video stream analysis and motion detection will be performed with the frequency set automatically in accordance with the following rules:
- If at least one video analysis module is enabled on the camera, the analysis will be performed with the frequency of 10 fps;
- If no video analysis module is enabled on the camera, the analysis will be performed with the frequency of 5 fps for MJPEG, and for H.264, H.265 and MPEG-4 the frequency will be chosen automatically within the range of 0.4 - 5 fps.
- **Only by key frames**: only the key frames will be analyzed for H.264, H.265 and MPEG-4 codecs.
- **Constant frequency**: the analysis will be performed with the set frequency.

Motion detector setup recommendations

The software motion detector analyzes the video stream received from the camera and, in case of detecting motion, generates the corresponding system event, based on which, for example, a recording to archive is started.

The motion detector consumes certain system resources of the server: loads up the processor, uses the RAM memory. At that, it can be estimated that the consumption of system resources is proportional to the resolution and frame rate. For example, for a video stream with a resolution of 1920x1080 with the use of motion detector, the processor load is approximately 6 times higher than for the 640x480 video stream. Likewise, when the analysis is performed with the frequency of 25 fps, the consumption of system resources is 4 times higher than when the analysis is performed with the frequency of 6 fps.

At the same time, triggering the recording by the motion detector allows to reduce the archive volume because the recording is performed only when there is motion in the frame.

To avoid the situation when the software motion detector is triggered by such insignificant movements as those of leaves, birds etc. it is possible to set it up for detecting the movement of the objects bigger that the preset size.

Since the software motion detector is used in the operation of all video analysis modules, it must be enabled always when the modules are used.

Many cameras have their own, inbuilt motion detectors (in **Eocortex** terms – Camera motion detector). When the camera motion detector is used, the system resources of the server are practically not consumed.

If it is planned for the camera to perform continuous recording to archive and it is not planned to use video analytics modules, the use of the software motion detector is not recommended. Instead, it is sufficient to select the mode of continuous recording to archive. Such situation is possible when, for example, there is motion that happens 24/7: during the continuous manufacturing process, at a large railway station etc.

If the camera is equipped with the inbuilt motion detector and it is not planned to use video analysis modules, it is recommended to enable the camera motion detector. It allows to lower the server load and reduce disk space usage at the same time.

That said, in some situations it is preferable to use software motion detector, for example, when there are many cameras of the same type and when setting up a motion detector on each camera would be too time-consuming. In such a case it is easier and faster to enable the software motion detector for a group of cameras, or set up one camera and copy its settings many times, changing only the network address.

In **Eocortex**, it is also possible to set up the combined mode of recording to archive (in **Eocortex** terms, the **Scheduled mode**). For example, there is constant movement at the entrance of a shopping mall from 10:00 to 22:00, but at other times there should be no movement. In such a case, it is possible to set up the recording as follows: from 10:00 to 22:00 – continuous recording (this will reduce server load); from 22:00 to 10:00 – motion detection-triggered recording (this will save dick space).

By default, the frequency of checking video stream for the presence of motion in the frame, which is called detection frequency, does not match the frame rate of the video stream: most of the time, the detection frequency is lower than the video stream frame rate. It is done to reduce the consumption of resources by **Eocortex** server. This mode is called detection with optimal frequency.

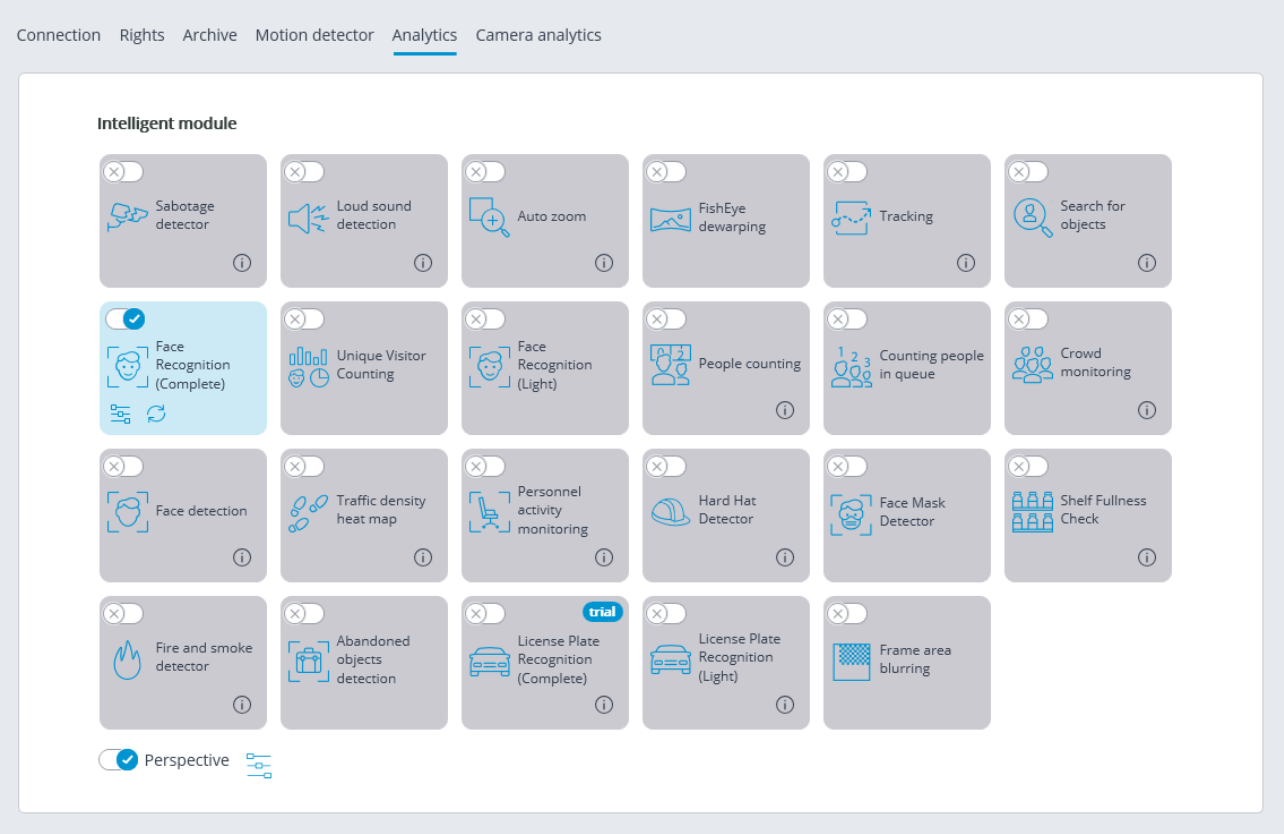
At the same time, it is possible to set constant detection frequency in the software motion detector settings in the **Eocortex Configurator** application. It is advisable to use this mode when the optimal detection frequency is a priori lower or higher than the one required and sufficient for analysis, or when it is necessary to set the fixed frequency for H.264, H.265 or MPEG-4 formats. The analysis frequencies recommended for a particular video analytics module are stated in the documentation for each module.

When two streams from a camera are used, the motion is by default detected on the alternative stream. At the same time, in the software motion detector settings of **Eocortex Configurator** application it is

possible to select which stream will be used for analysis on the camera. If no other video analytics modules are used except for the software motion detector, it is recommended to use lower resolution stream for detection because it allows to decrease server load significantly.

Video analytics setup

On the **Analytics** tab the video analysis modules are set up.



On this tab, the settings of all the existing **Eocortex** video analysis modules are displayed, regardless of the presence of licenses for particular modules on the present server.

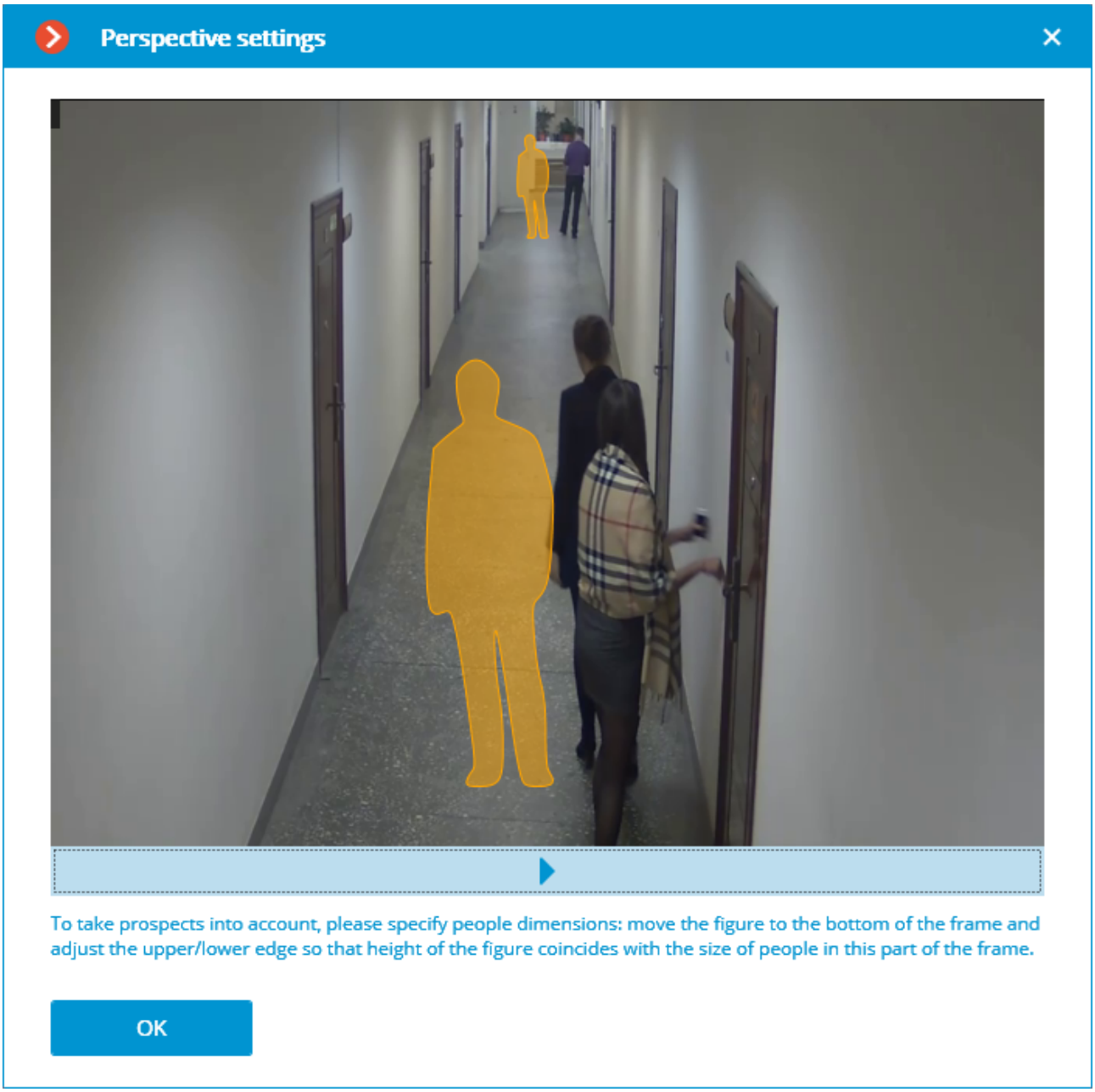
For enabling or disabling a video analytics module that analyzes the video stream set in the settings of the motion detector it is required to enable or disable the corresponding switch.

By the press of the button the hint appears stating which capabilities must be enabled or disabled for activation and proper functioning of the module.

If the module is on, then by the press of the button the module settings window is opened. The button resets the settings to the default values. If these buttons are not displayed, the module requires no additional adjustment.

The settings of each module are described in the Video analytics section.

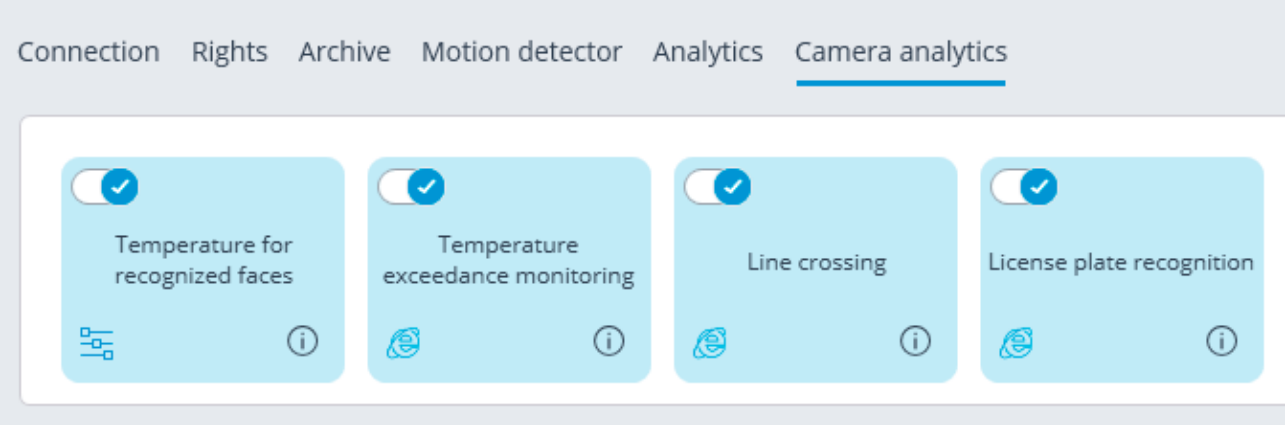
For the operation of some of the video analysis modules it is required to enable and set up the perspective first. The button located to the right of the **Perspective** switch opens the perspective settings window.



The perspective is set using two scale forms which are dragged with the mouse to the corresponding area of the frame and adjusted in a way that the height of the form matches the height of the persons in the given area of the frame. In order to change the size of the form it is necessary to click on the upper or lower edge of the form and, holding the mouse button, move the pointer up or down.

Camera analytics

The video analytics built into a camera can be set up on the **Camera analytics** tab.



This tab contains blocks of settings of all the video analytics built into the camera that is available in **Eocortex**.

The video analytics is enabled using the toggle switch .

The button opens the prompt for video analytics.

If the analytics is set up in the **Eocortex Configurator** application, the settings window of this video analytics can be opened upon clicking on the button .

If the analytics is set up directly on the camera, the camera's web interface can be opened by clicking the button .

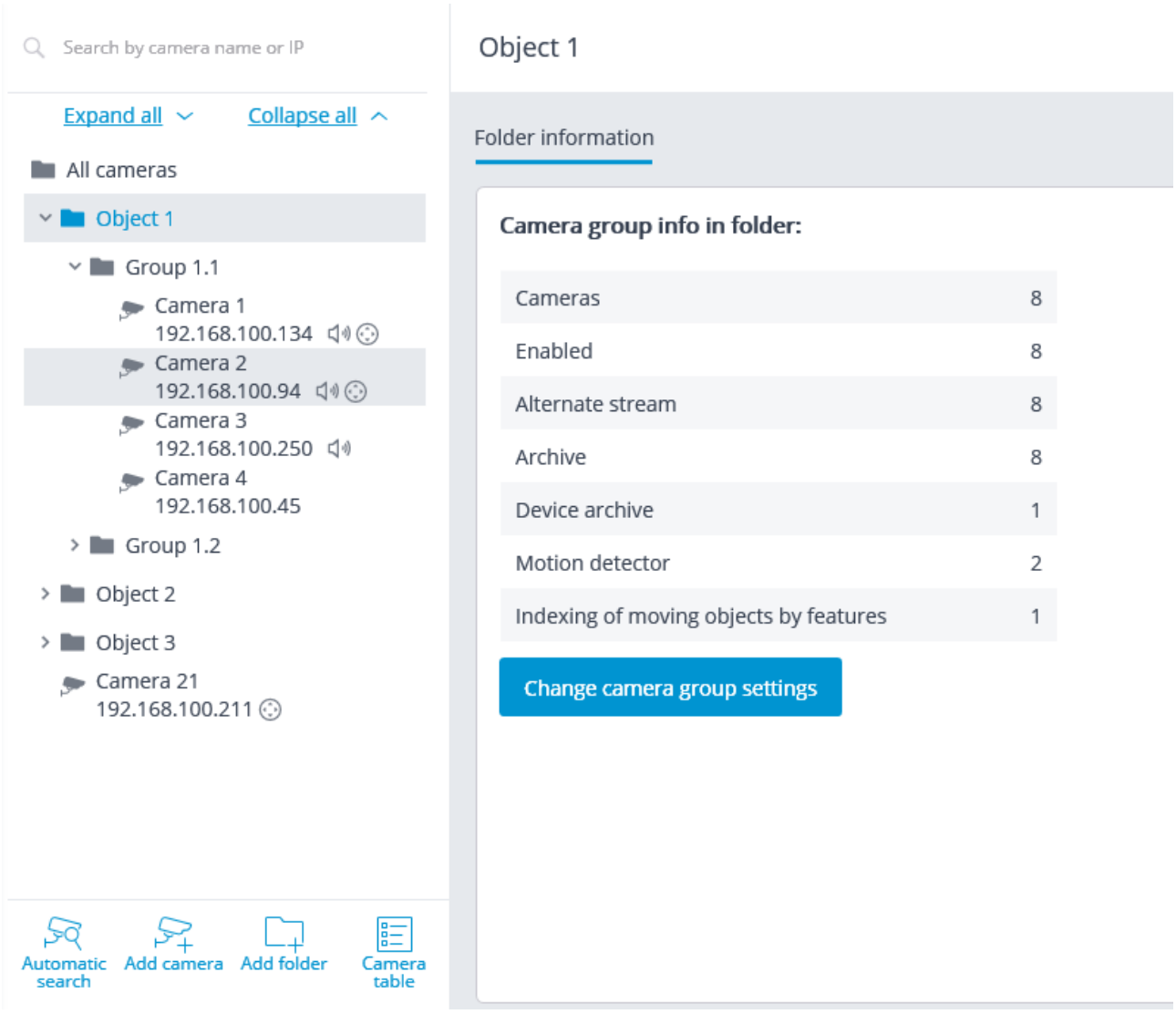
Settings and requirements:

Temperature for recognized faces

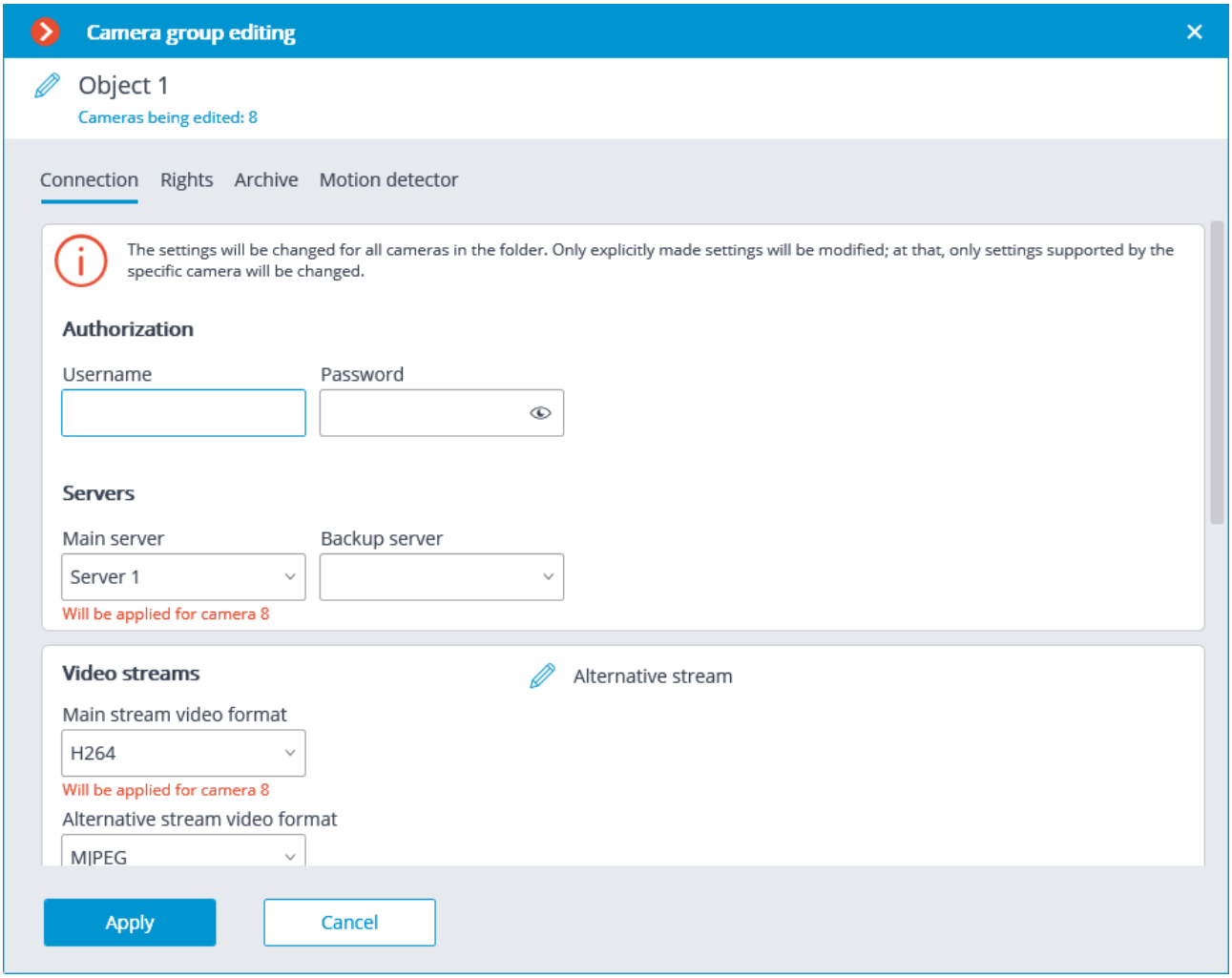
Modifying camera groups

To facilitate the setup of a large number of cameras with similar parameters there exists a possibility to set the parameters for all the cameras at once, or for the cameras contained in the same folder, including its subfolders and the cameras and folders in it.

To set the parameters of a group of channels, select the corresponding folder and press **Change camera group settings** button.



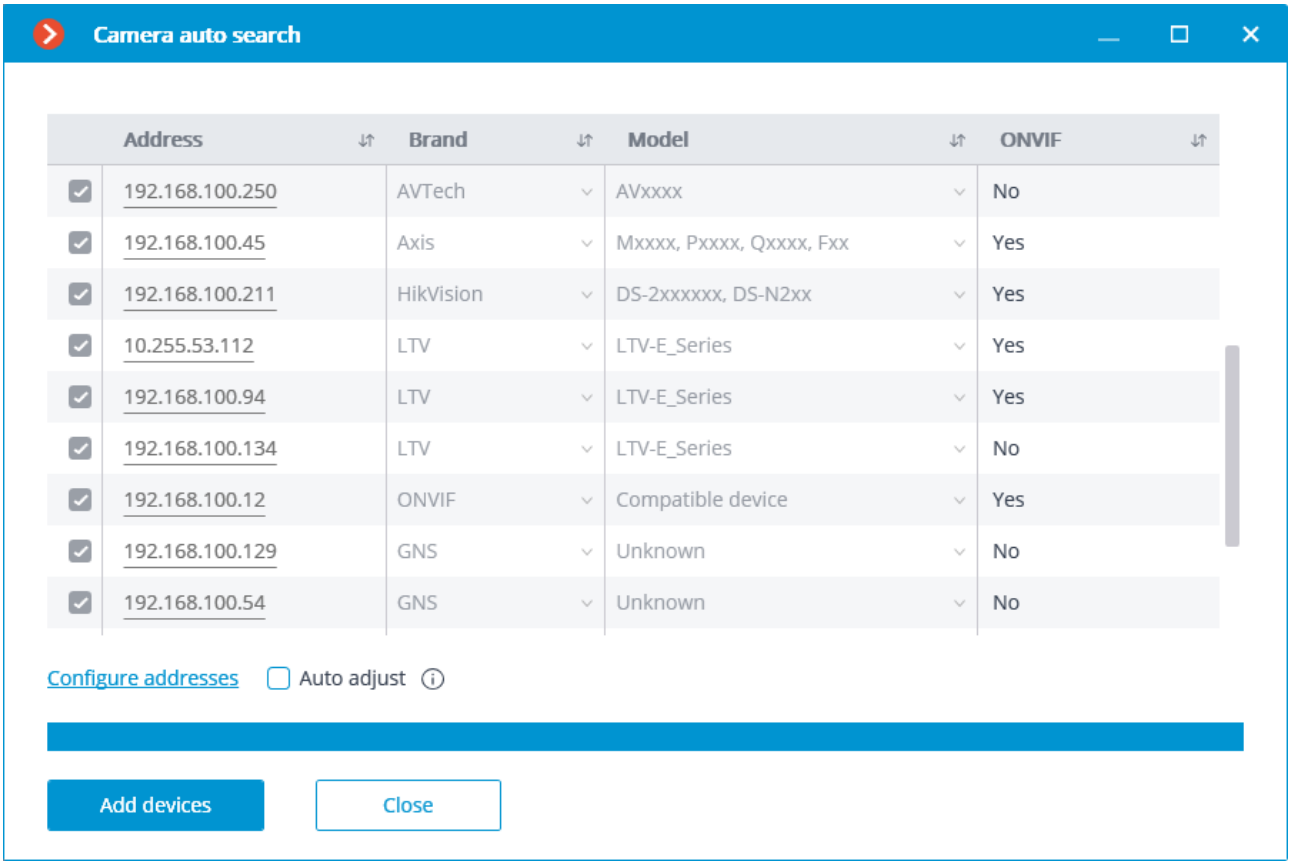
Set the required parameters similar to those of an individual camera in the opened editing window and press **Apply**.



To come into effect, the changes need to be applied.

Automatic search and connection of cameras

For automatic searching for cameras in the local network and for adding them to the system it is required to press the **Automatic search** button; after that, in the **Camera auto search** window, mark the cameras to be added and press the **Add devices** button.



In order to return to the main window of **Eocortex Configurator** press the **Close** button.

Not all of the cameras support features that allow to automatically locate them in the local network.

After automatically adding the cameras, in many cases it is necessary to manually enter the login and password of the camera administrator and select the video format in data stream settings.

In the course of the automatic adding, some cameras are defined as the cameras of other manufacturers or other models. In such a case it may be required to manually select the corresponding make or model after adding the cameras.

Configure addresses link opens the window of setting up the IP addresses of the cameras, which allows to modify the IP address from **Eocortex Configurator** without having to open the web interface of the camera. This feature is available for certain camera models only.

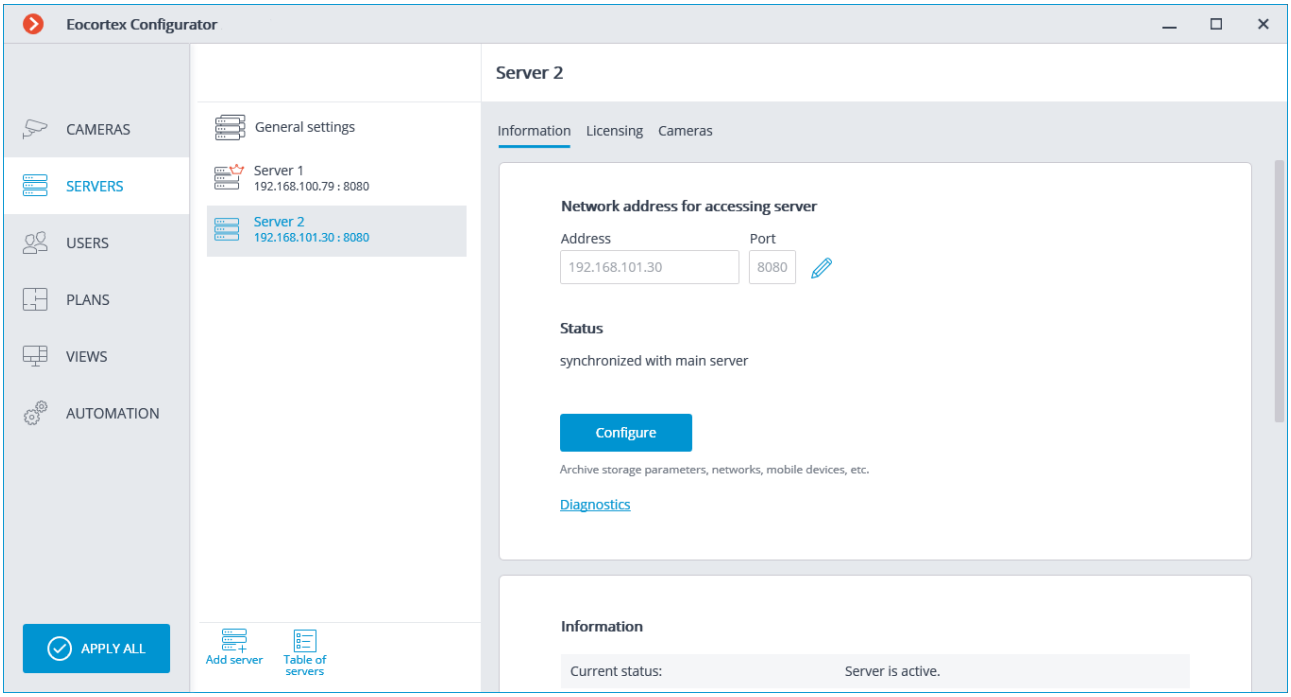
The **Automatic setup** option permits to automate the process of setting up channels, if the devices support the **ONVIF** standard (preferably, **ONVIF Profile S**). For the correct operation of this feature, it is recommended to disable the **ONVIF authorization** on the device, if it is provided in the camera's settings.

When using the automatic channel setup by **ONVIF**, do the following:

- If two streams are enabled on the camera, enable **Use two streams** option;
- If the camera supports PTZ, enable **PTZ camera** option;
- If the camera supports sound reception, enable **Sound reception** option.

SERVERS

For setting up servers in the **Eocortex Configurator** application, go to the **SERVERS** tab



The list of servers is shown in the left part of the **SERVERS** tab. To the right of the list you can find the page with the tabs of settings related to the position selected in the list. Moreover, some settings for the selected position are called from the context menu.

The list of servers contains the records of three types marked by the corresponding icons:

- **Main settings** contain the following settings tabs:
- Update: Server update settings.
- Cameras: Settings of camera distribution among servers.
- Archive bookmarks Setting of archive bookmarks' categories.
- Network settings: adjusting multicasting and interaction between servers.
- Security: Setting up secure connection to servers.

- **Main server**: the main server of the multi-server system. In the single-server system the server is always “main”.
- **Subordinate server** is a subordinate server in a multi-server system.

For the main and subordinate servers, their names and addresses are stated to the right of the icons.

Server name is not a unique feature, that is why a system may contain various servers with the same name. To rename a server it is required to double click on its name or open a context menu and select **Rename**, then enter a new name and press **Enter**.

If the **Eocortex Configurator** application cannot access the server, such server is marked by the icon.

The servers which encounter problems are marked by icon.

The pages of the settings of the main and the subordinate servers contain the following tabs:

- Information: main settings and server info.
- Licensing: setup of server licenses.
- Cameras: information regarding cameras connected to the server.

Server settings context menu items:

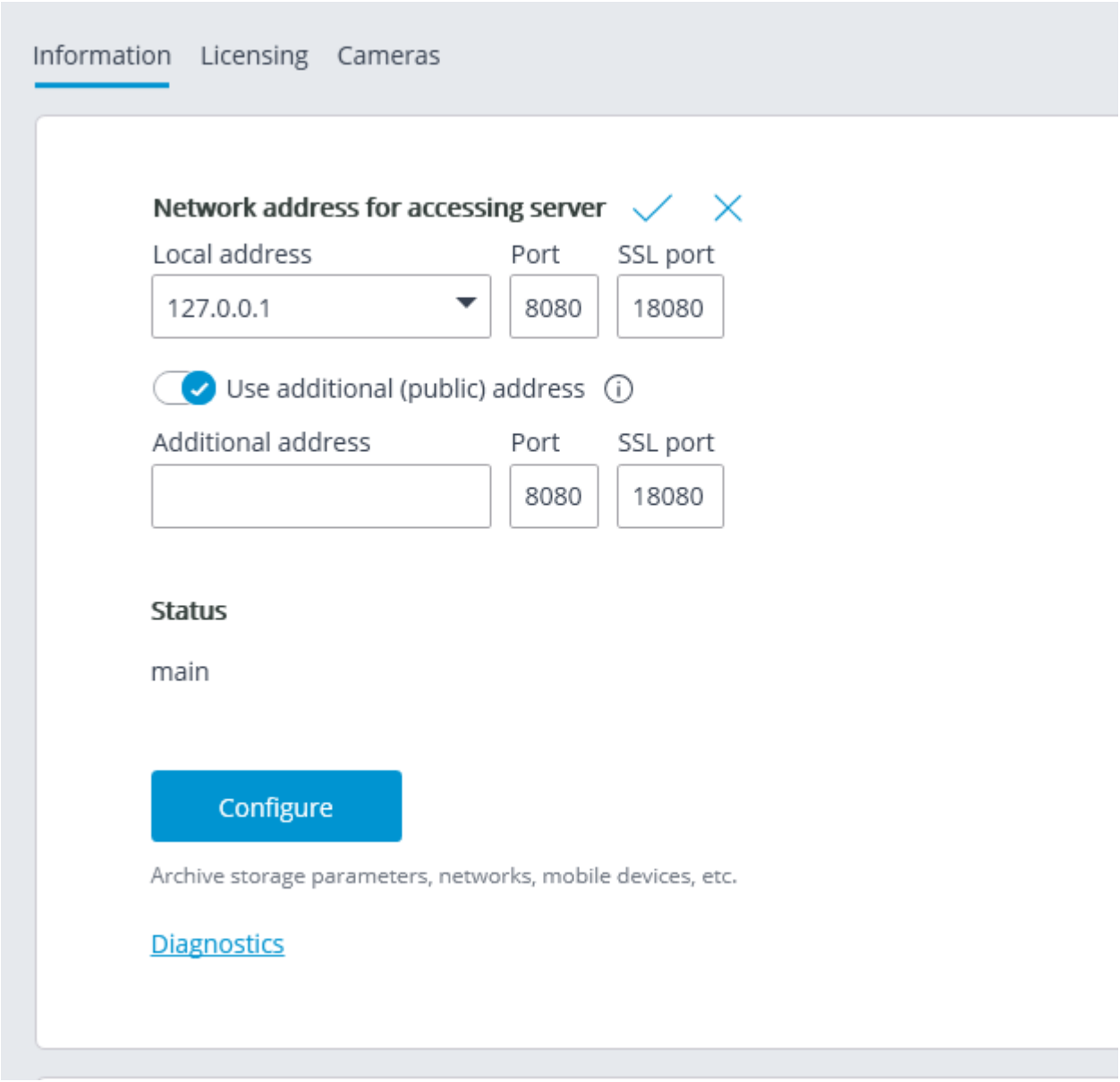
- **Rename**: renaming server.
- **Configure: special server settings.**
- **Disconnect: disconnection of the server from system.**
- **Make main**: making the server main in the system.

Buttons under the list of servers:

- **Add server**: connection of the server to system.
- **Server table**: the list of all the servers in system.

Basic settings and server information

In the **Eocortex Configurator** application, on the **Servers** tab on the page of server settings, in the **Information** tab the following settings and info can be found:



Local address and **Additional address** display network addresses and ports for accessing the server. To modify a port or an address, it is required to press the button , enter the required values and then press .

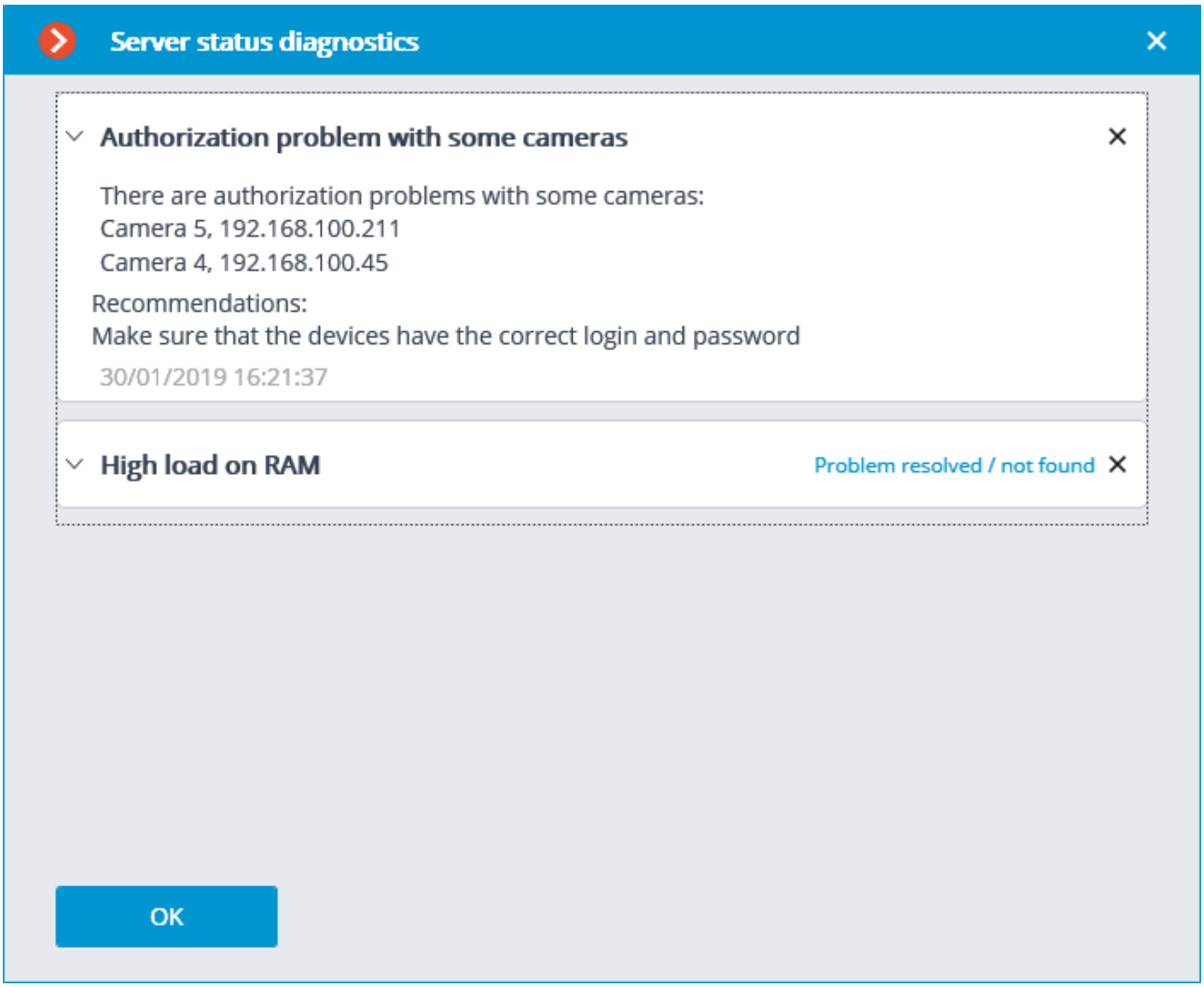
⚠ Changing the network address and port in the **Eocortex Configurator** application does not result in their actual change on the server. That is why it is recommended to first change the address and/or port using the operation system tools and then modify them in **Eocortex Configurator**.

In contrast, changing the network port in the **Eocortex Configurator** will result in its change on the server. In this case, depending on the state of the settings, the server will be restarted either immediately after changing the port in the application, or in the process of applying the settings.

Status: displays current server status.

Configure: opens special server settings window.

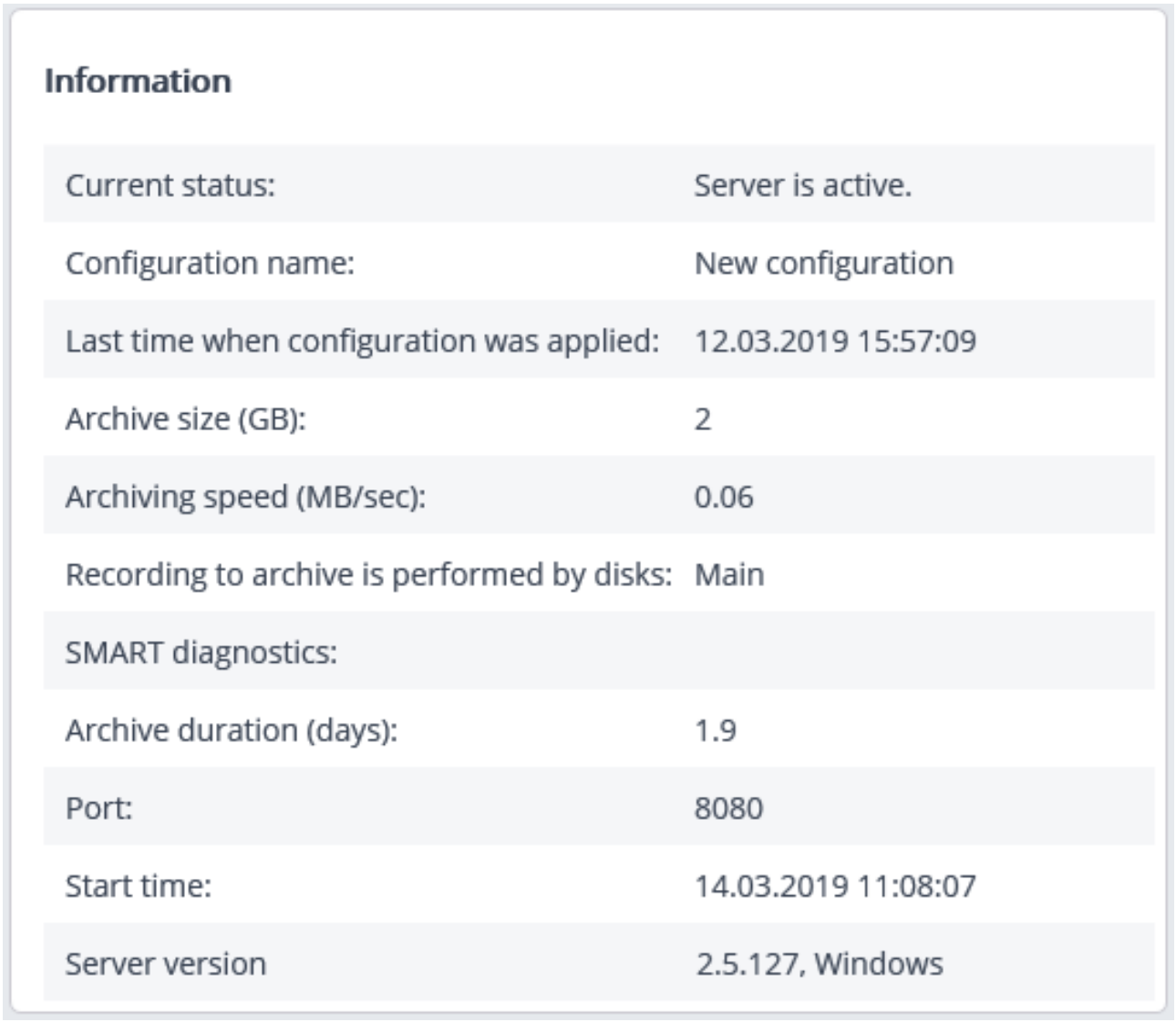
Diagnostics: opens server status diagnostics window.



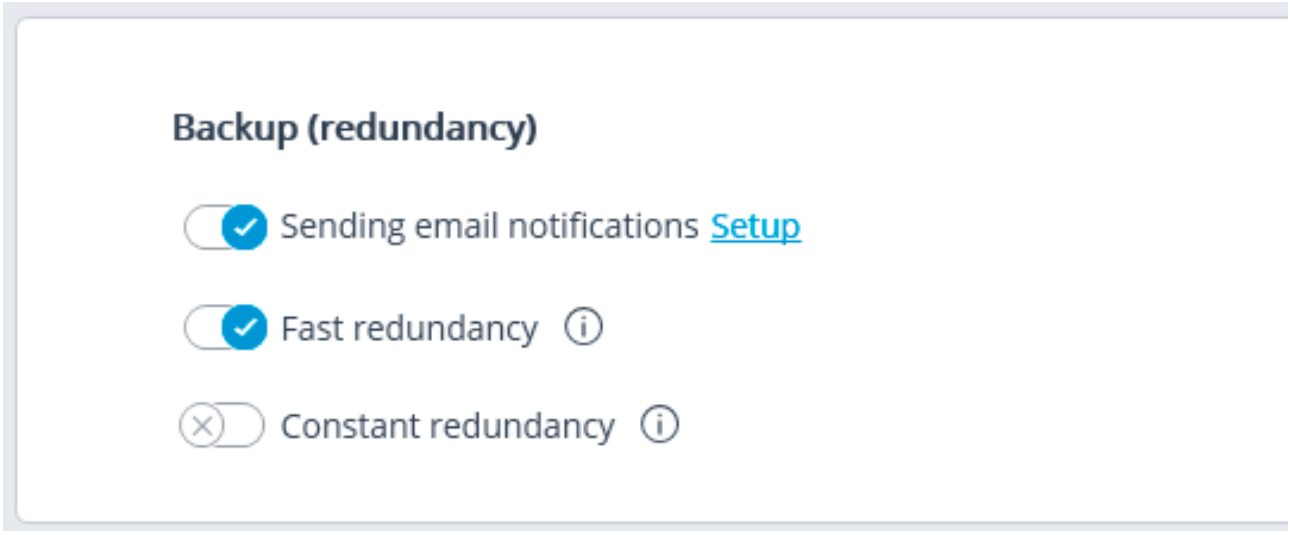
In this window the list of detected problems is displayed, both current and those already resolved.

By clicking on the line with a problem you can obtain its detailed description and the recommendations on its solution.

To remove a line from the list, press the ✕ button.



Information: current information about the server.



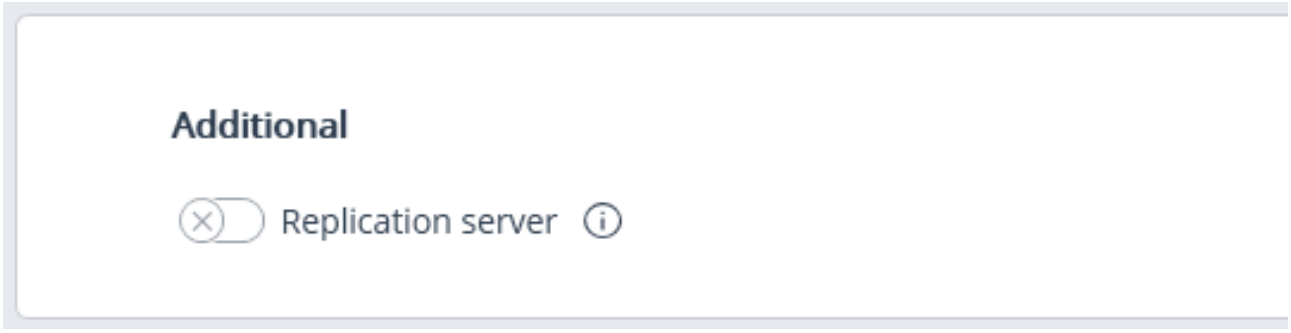
Fast redundancy: when this option in on, fast redundancy will be applied to the main channels assigned to server, meaning that the redundancy will be activated not later than in 10 seconds after a loss of camera connection.

⚠ In the systems where periodical, including short-term, disruptions of camera connection are possible, enabling the fast redundancy may result in false redundancy responses.

Constant redundancy enables the constant redundancy mode. In this mode, all the cameras for which the server has been assigned as a redundant server will be constantly backed up independent of the condition of those servers that have been assigned as main servers for the backed-up cameras.

⚠ It is required to bear in mind that, in case of normal operation of the system, the cameras with constant redundancy will have two connections: one from the main and the other from the redundant servers. Thus, depending on the design of the cameras, the bandwidth may increase and/or the framerate may decrease.

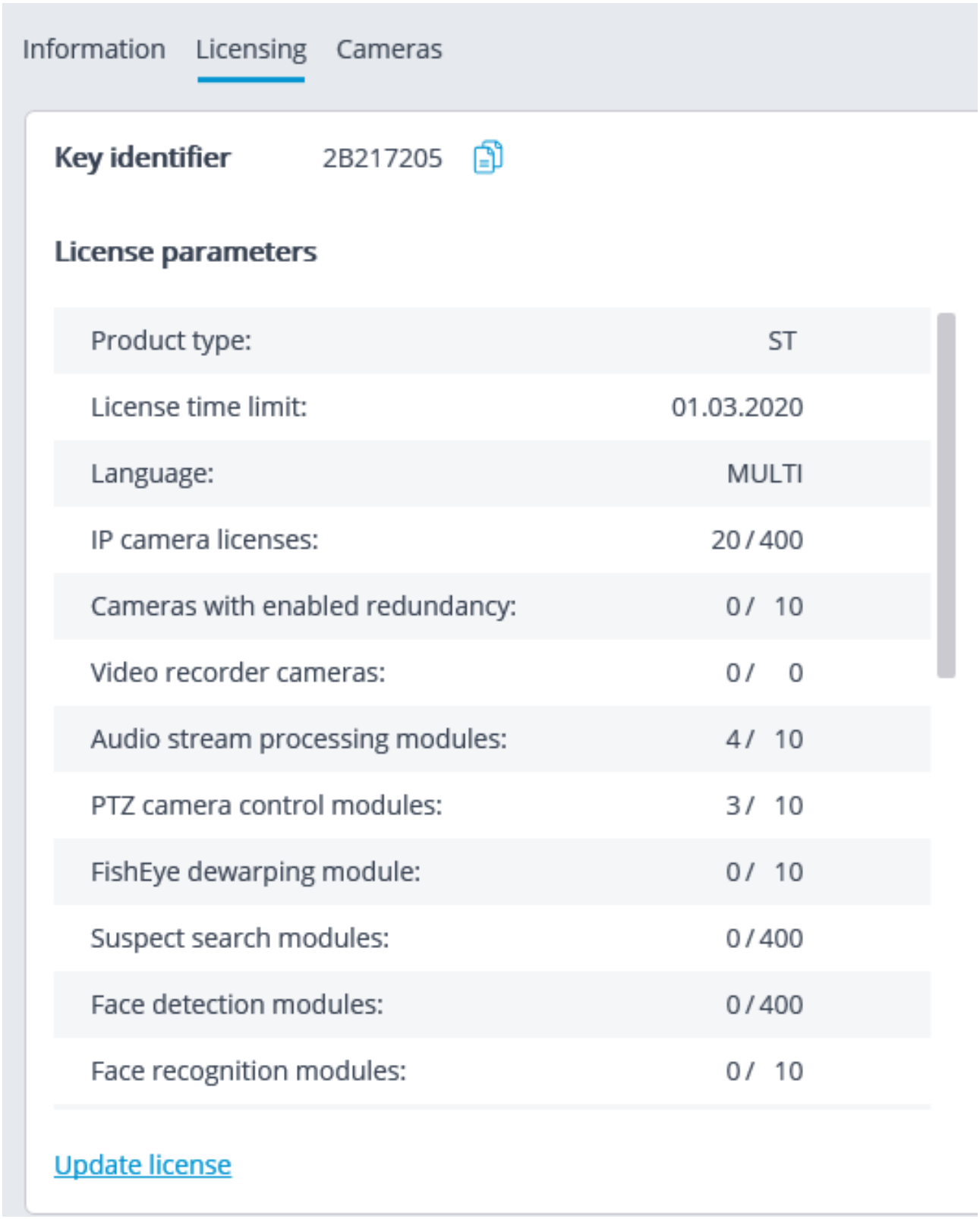
ⓘ The **Fast redundancy** and **Constant redundancy** modes are mutually exclusive. Likewise, when the constant redundancy mode is on, notifications regarding the activation of redundancy (backup) will be switched off.



Replication server: when this option is enabled, the server is assigned as a [replication server]. button is used to open the replication settings window.

Server licenses

The following settings are located on the **Servers** tab on the page of server settings on the **Licensing** tab in the Eocortex Configurator application: The following settings are located on the page of **Servers** on the **Licensing** tab in the **Eocortex Configurator** application:



Key identifier: the identifier of the active software or hardware **Eocortex** protection key.

License parameters: the parameters of the active **Eocortex** protection key license..

Update license: launching the Install license wizard.

Settings of the server's cameras

The following information regarding the cameras assigned to the server is located at the **Servers** tab on the server settings page at the **Cameras** tab in the **Eocortex Configurator** application:

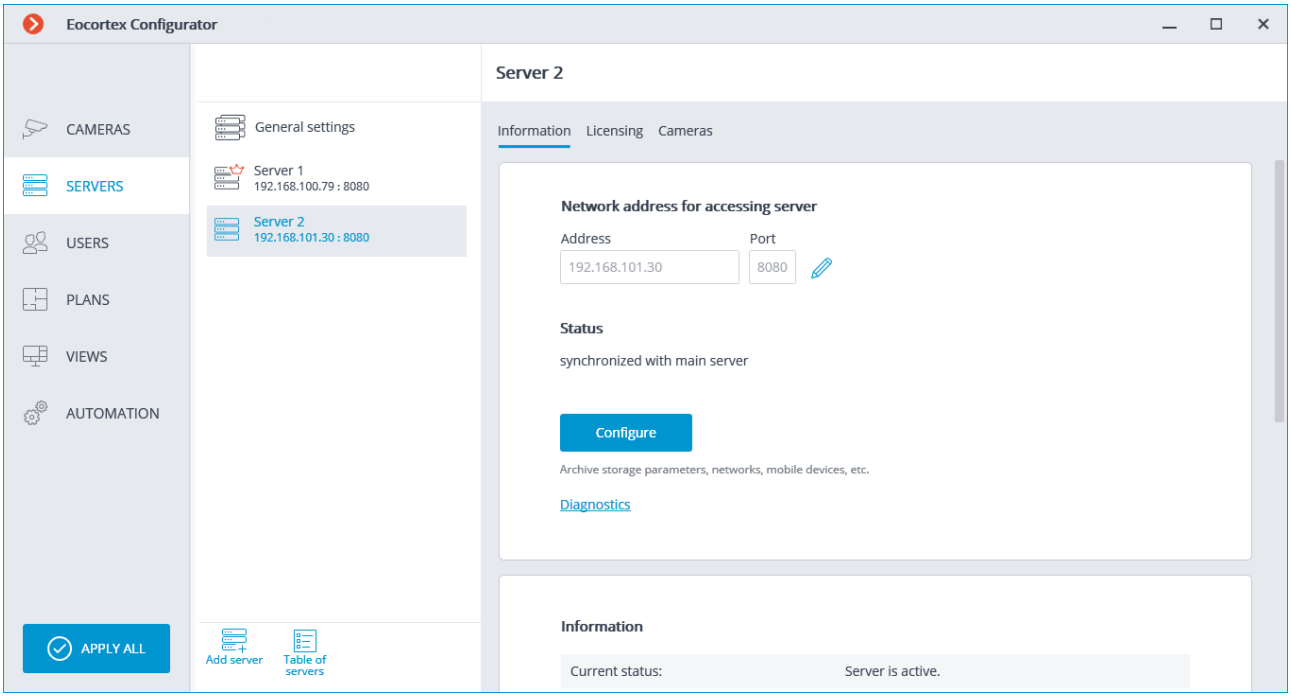
The button displayed to the right of the camera name when the camera is marked serves for jumping to camera settings.

Additional server settings

The additional server settings are as follows:

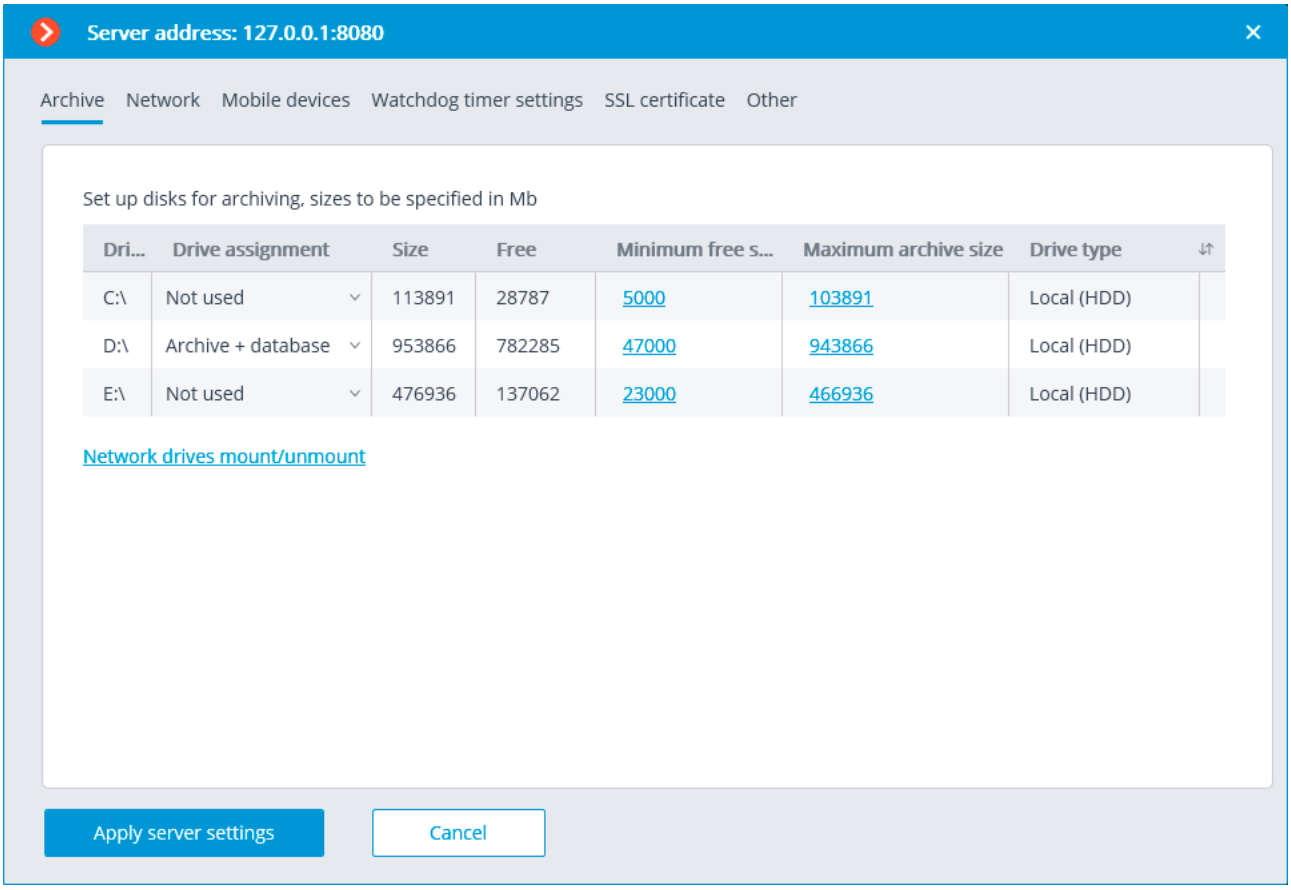
- Archive allocation settings;
- Mobile and web connection settings;
- Settings of client application updates;
- Watchdog timer settings;
- Part of the network settings;
- Part of the archive replication settings (only for replication servers).

For opening the window of additional server settings, it is required to select the server in the list on the **Servers** tab in the **Eocortex Configurator** application, then select **Configure** in the context menu, or press **Configure** on the server settings page at the **Information** tab.



⚠ To save the changes made it is required to press the **Apply server settings** button.

Archive



Drive: logical name of a drive.

Drive assignment: indication of the usage of the drive. The following options are available:

Option	Main or redundant	Video archive	Event database
Not used	—	—	—
Archive only	main	yes	—
Archive + DB	main	yes	yes
Redundant archive	redundant	yes	—
Redundant archive + DB	redundant for archive; main for DB	yes	yes
Duplicate Archive (only for **Ultra** and **Enterprise**)	Duplicate archive and database	yes	yes

Size: total drive size (Mb).

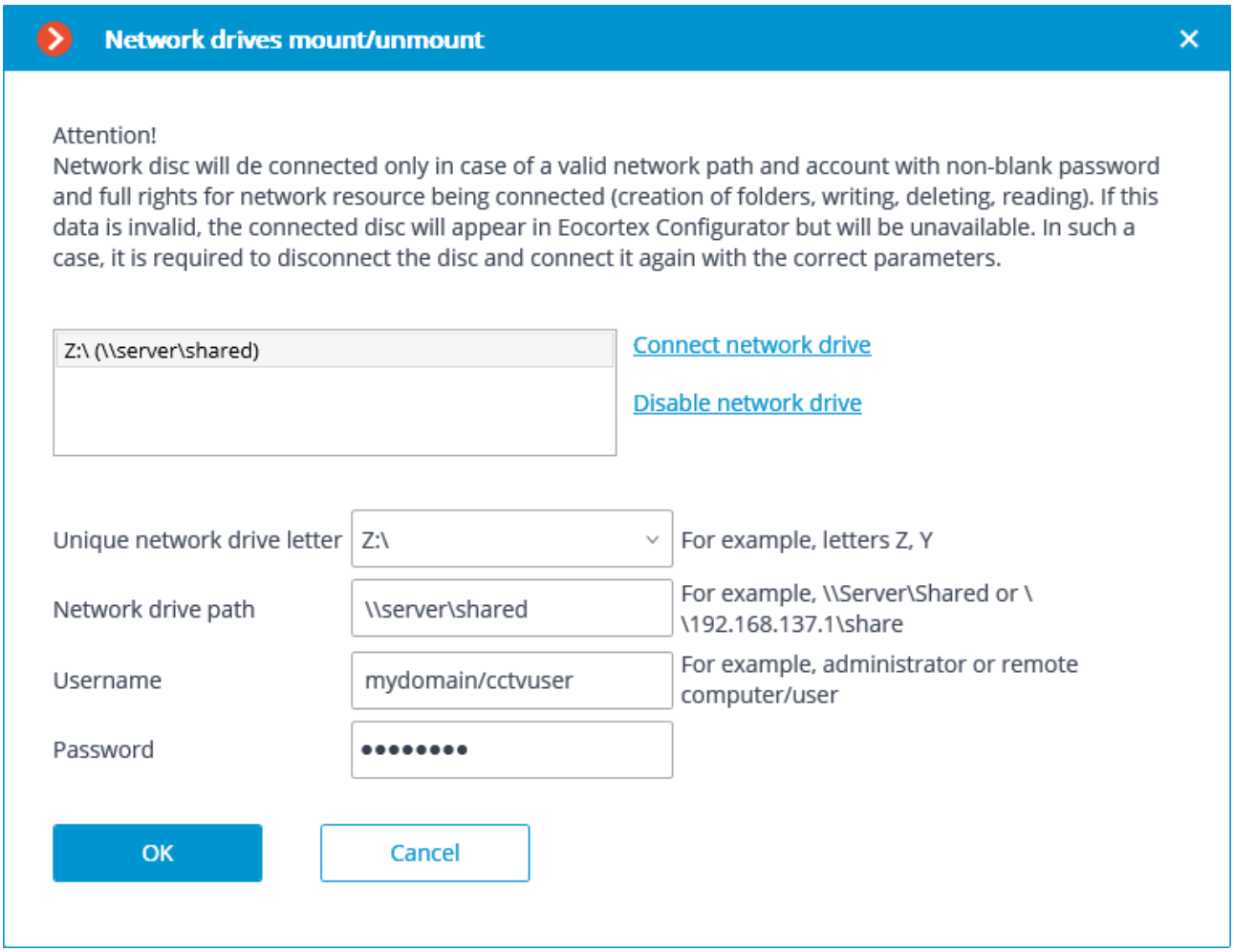
Free: currently remaining free space on drive (Mb).

Minimum free space: minimum drive space that is required to remain free when recording the archive (Mb). In order to set the value of this parameter, double click on the current value, enter the new one and press **Enter**.

Maximum archive size: maximum size of the archive in Mb. In order to set the value of this parameter, double click on the current value, enter the new one and press **Enter**.

Drive type: information regarding the type of drive - **Local (HDD)** or **Network**.

Connecting network drives: this link opens network drive connection window.



To connect a network drive, select a letter that will be used to designate the network drive being added in the **Connecting/disconnecting network drives** window, indicate a path to the network drive in the corresponding fields, and enter the user name and password of the user who has access to reading, writing and creating files and folders on this path; then click on the **Connect network drive** link and press the **OK** button.

After pressing the **OK** button, the server will restart and all the network drives listed will be added to the list of drives displayed in the **Archive** tab. After that, you will be able to configure the network drives in the same way as the local drives.

For disconnecting a network drive it is required to select the drive to be disconnected in the list of drives in the **Connecting/disconnecting network drives** window, then press the **Disable network drive** link, and then the **OK** button.

After you press the **OK** button, the server will restart and all the network drives not in the list will be excluded from the list of drives displayed on the **Archive** tab.

At the first start of the server its default settings are created automatically. **C:** drive is connected to the archive. During the initial setup it is recommended to assign other drives for archive allocation, because the placement of the archive on the same physical drive with the **Windows** operation system may lead to the reduction of productivity or system errors.

It is not recommended to allocate database on the network drives.

The archive is stored on the server with the indication of the **Coordinated Universal Time (UTC)**. At that, in the client applications the local time of the device used for viewing the archive is displayed (with account for the time zone).

Example:

On the server with the time zone settings of **(UTC+03:00) Moscow** a fragment of the archive from 12:00 to 12:05 Moscow time is recorded.

This fragment launched directly on server in the **Eocortex Client** will be displayed with the time of 12:00 12:05.

If this same fragment is displayed on the computer with the time zone settings of **(UTC+05:00) Ekaterinburg**, the fragment's time will be from 14:00 to 14:05.

If the fragment is displayed on the computer with the time zone settings of **(UTC+01:00) Paris**, its time will be from 10:00 to 10:05.

Archive data:

The archive of each server stores the video recordings of only those channels that are assigned to this particular server.

The archive has a cyclic structure. If the space designated for the archive is full, the new archive files begin to replace the oldest ones, taking into consideration the archive depth parameters set for each channel.

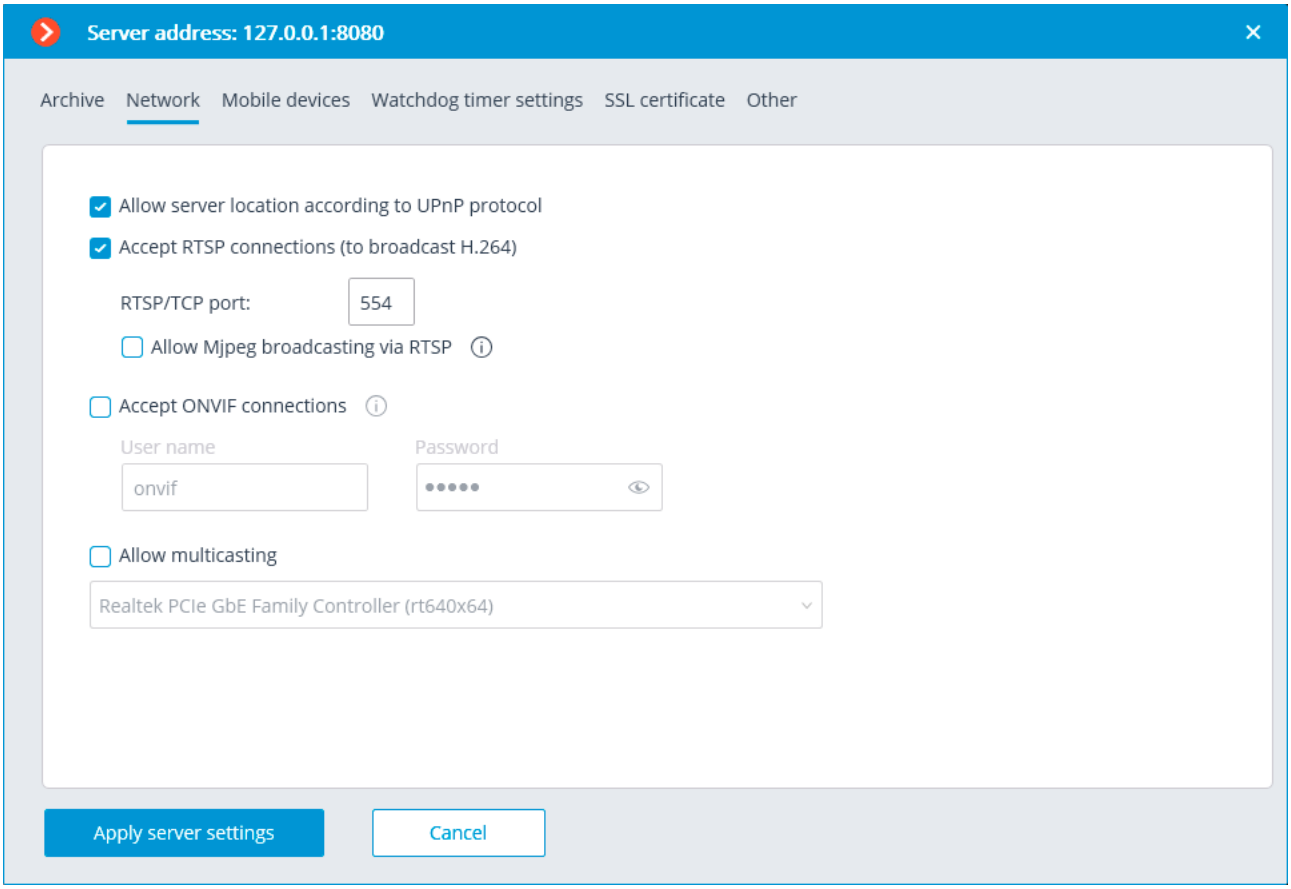
When several drives are used, the recording to archive is performed simultaneously to all the available drives. If one of the drives becomes unavailable, the recording to it stops and the data is redistributed to the available drives. Likewise, if the unavailable drive becomes available again, the recording of data to it resumes.

One or more drives may be assigned as redundant. The recording of the new data to the redundancy drives starts only when all the main drives become unavailable; when a main drive becomes available again, the recording to the redundancy drives stops.

The archive is located in the **EocortexArchive** folder in the root directory of each drive used for archive storage.

One or more disks can be assigned as duplicates. New data is recorded on the duplicating discs in parallel with the recording on the main or backup discs.

Network



Allow server location according to UPnP protocol: enables the **UPnP** protocol for the video surveillance server that allows to locate the server in the network using the stated protocol.

Accept RTSP connections (to broadcast H.264 and MJPEG): allows to receive video stream and operational information using direct requests to server via **RTSP** protocol.

RTSP port (for TCP or HTTP connections): port for client connections to server using **RTSP** protocol.

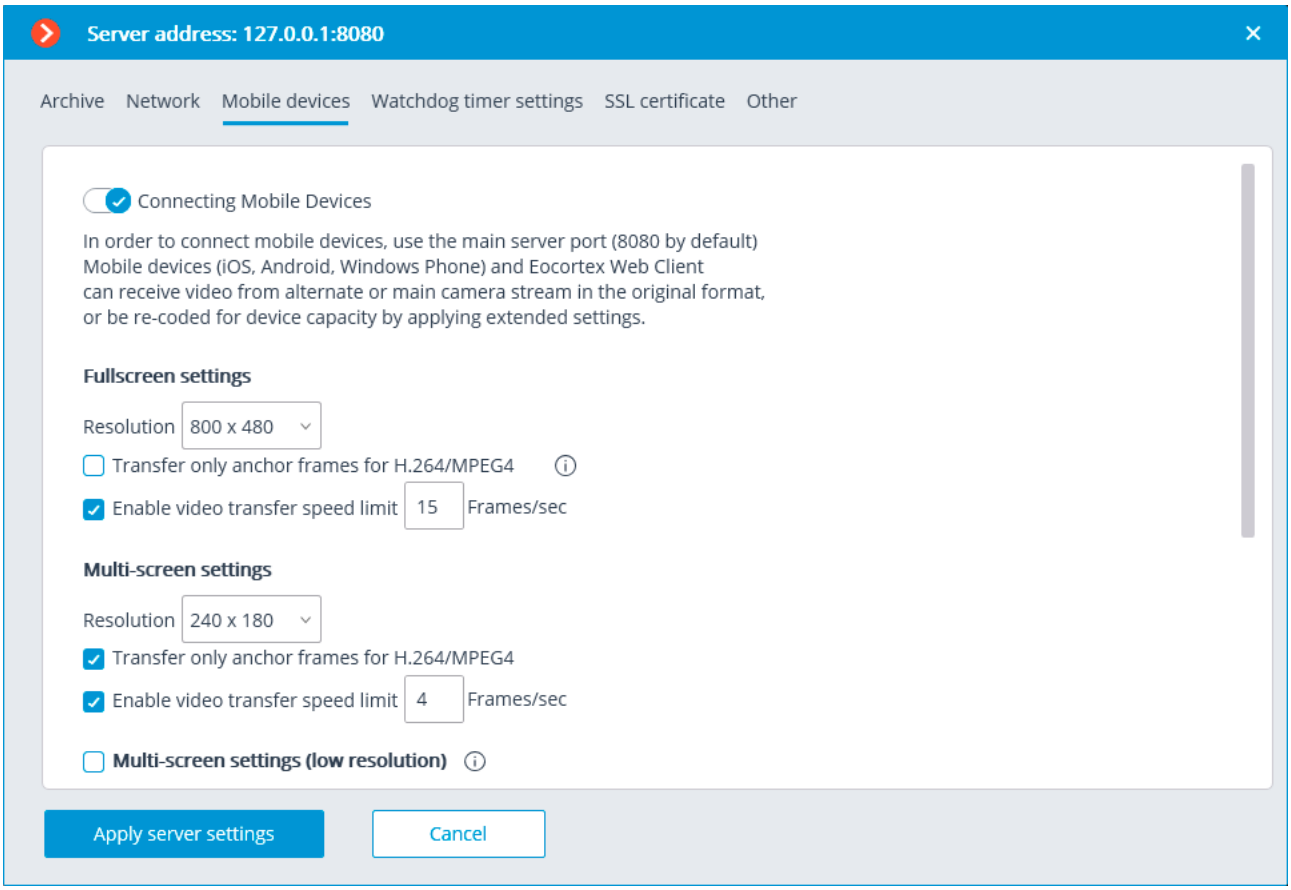
Allow MJPEG broadcasting via RTSP: enables **MJPEG** broadcasting via **RTSP** protocols.

Since **RTSP** protocol only supports **MJPEG** frames encoded in the base (**Baseline**) encoding mode, for broadcasting video streams encoded in other modes their recoding will be required. It will increase server load. Moreover, in the course of **MJPEG** recoding the framerate can be reduced (in comparison with the framerate transmitted directly by camera).

Accept ONVIF connections: enables client connections to video surveillance server via **ONVIF**. By default, username is **onvif**, password - **onvif**. It is recommended to change password when enabling this option. Username cannot be modified.

Allow multicasting: enables multicasting from the server for those channels that have this option on. If there is more than one network adapter installed on the computer, it will be possible to choose the adapter for multicasting in the dropdown list that appears upon enabling this option.

Mobile devices



Allow connecting mobile devices to server: activates the service of broadcasting video streams for mobile devices and web clients built in the **Eocortex** server application.

This service is also used for arranging broadcasting to site.

Depending on the resolution of the connected mobile device or web browser, the service can broadcast video streams in two or three modes:

Good quality (high resolution): used for full-screen mode.

Medium quality (medium resolution): used for multiscreen mode.

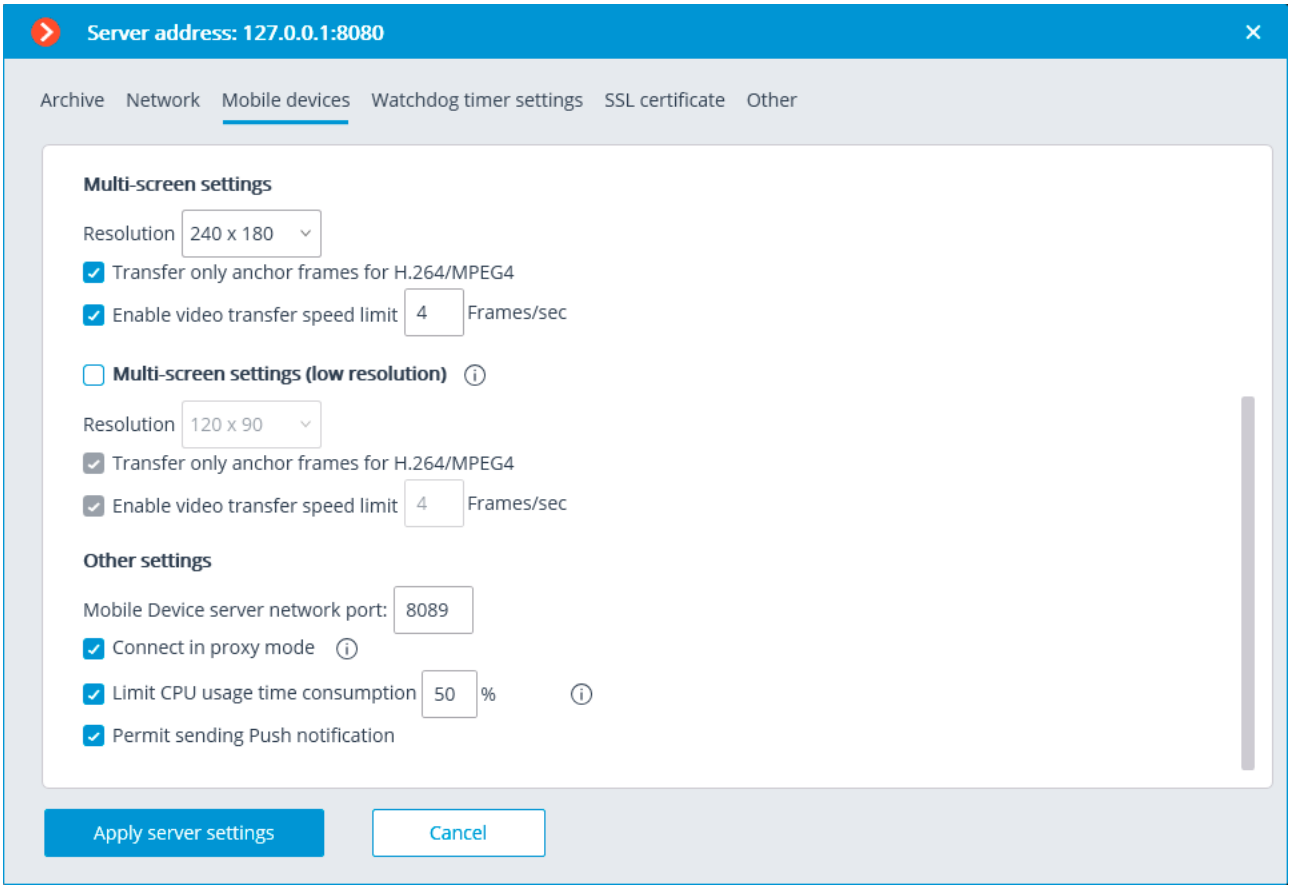
Low quality (low resolution): used for low resolution multiscreen mode. This mode is off by default.

It is possible to set the following for each of the modes:

Resolution that will be broadcast by default for each of the channels.

Transfer only anchor frames for H.264/MPEG-4: for these codecs, only anchor (key) frames will be broadcast; this setting allows to reduce the amount of data transferred in the networks with limited bandwidth.

Enable video transfer speed limit: the framerate of the frames being transferred will be limited to the set value; this setting permits to reduce the amount of data transferred in the networks with limited bandwidth.



Other settings:

Mobile device server network port: allows to set the port thru which the connection to the video stream broadcasting service will be available.

Connect in proxy mode: enables broadcasting in proxy mode. When the proxy mode is activated in multi-server configurations, the broadcasting of video streams from all the servers to the mobile devices connected to the server will be performed thru this server. When the proxy mode is disabled in multi-server configurations, the mobile device will automatically connect to the servers to which the requested cameras are assigned.

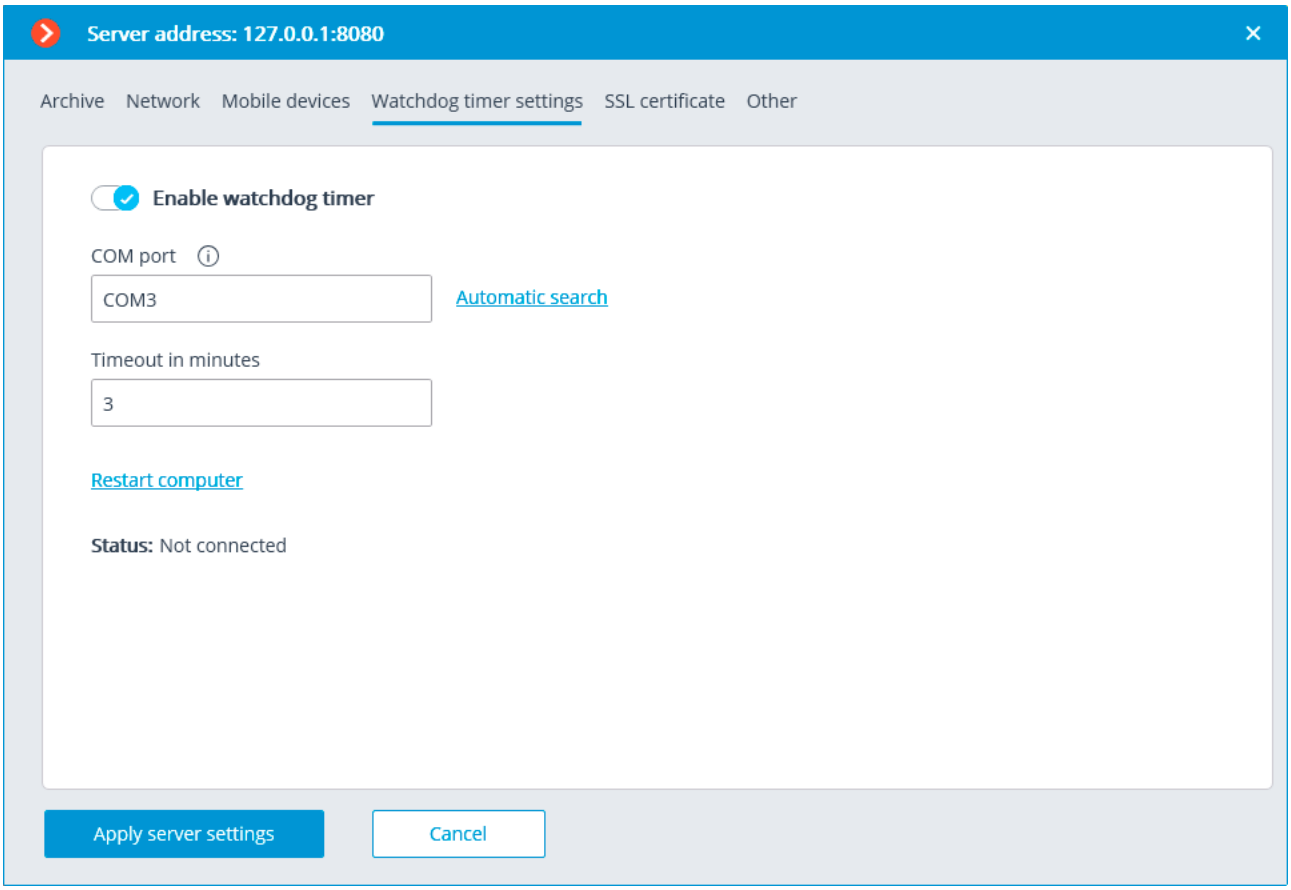
Limit CPU usage time consumption: allows to limit the consumption of CPU time by the mobile connections service.

Process all video streams on this server: when this option is enabled, all video streams sent from this server to mobile applications will be reencoded on this server; if the option is disabled, the streams will be reencoded on those servers to which the cameras are connected, and already reencoded streams will be sent to this server.

This feature appeared in **Eocortex** version 3.4. The servers upgraded from earlier versions will have this option enabled. The option is disabled by default for new servers.

Permit sending Push notification: enables the possibility of sending various Push notifications from the server to mobile devices.

Watchdog timer settings



Enable watchdog timer: activates interaction with the watchdog timer.

COM port: assigns a COM port to which the watchdog timer is connected.

Automatic search: performs automatic search for a connected watchdog timer.

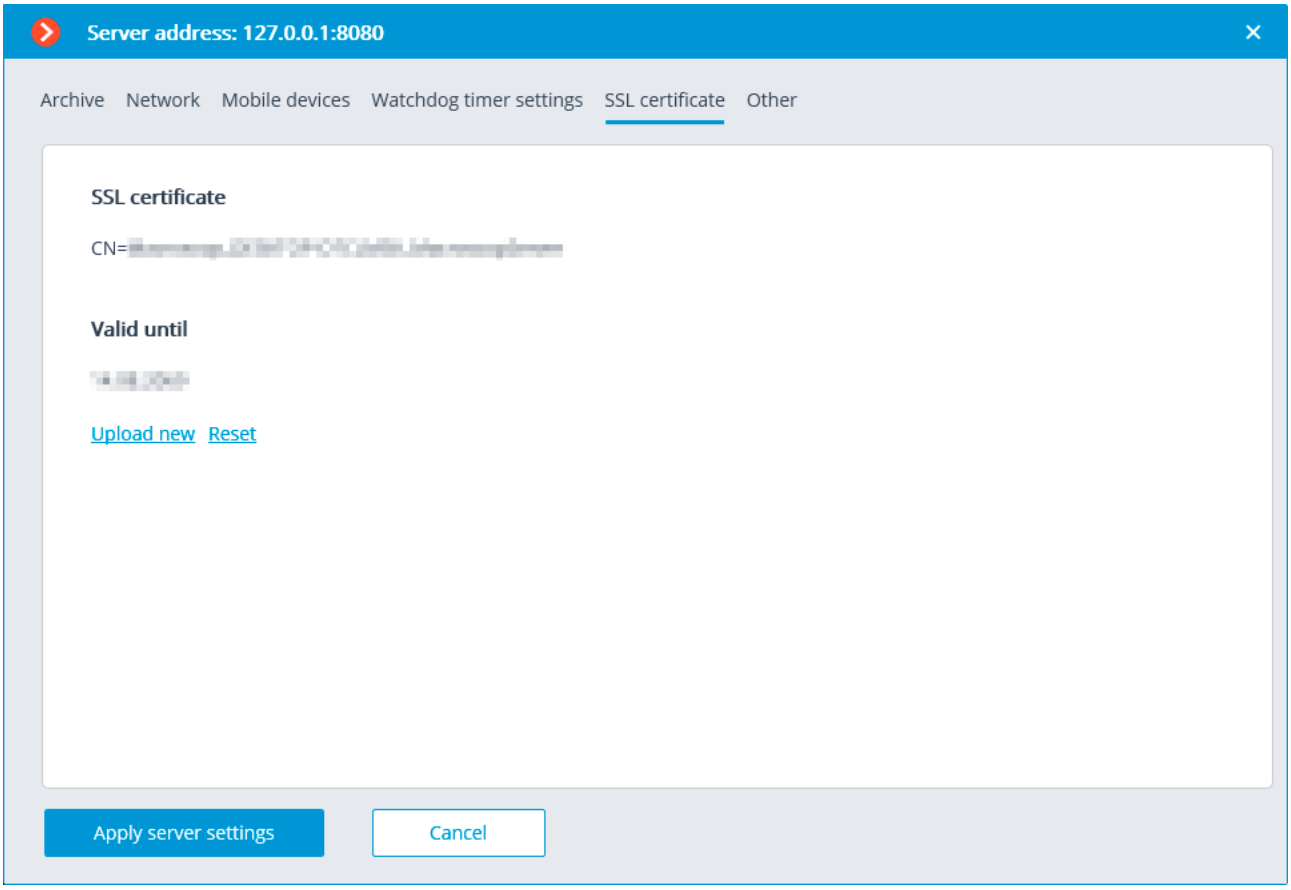
Timeout in minutes: sets a period after which the watchdog timer is triggered.

Restart computer: restarts the computer being set up.

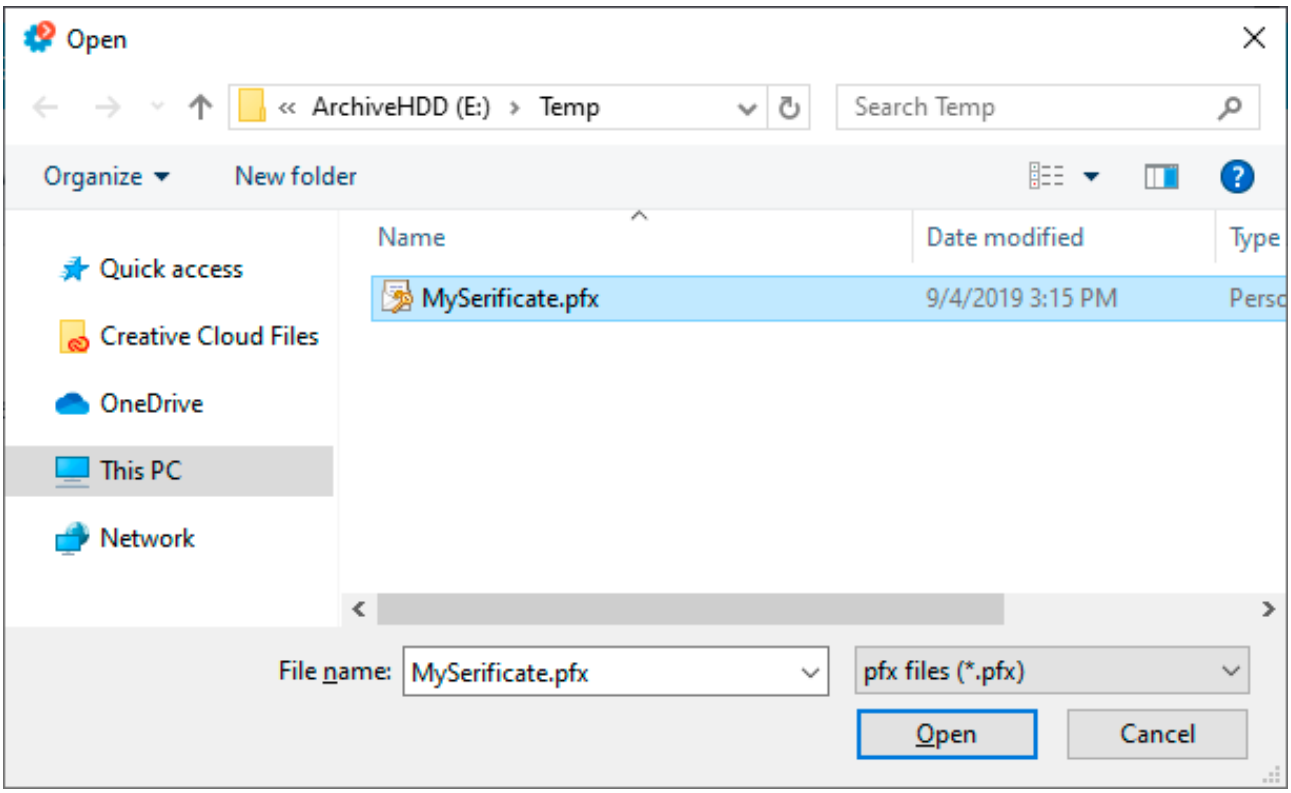
Status: displays the current watchdog status.

Firmware version: displays the current version of watchdog firmware.

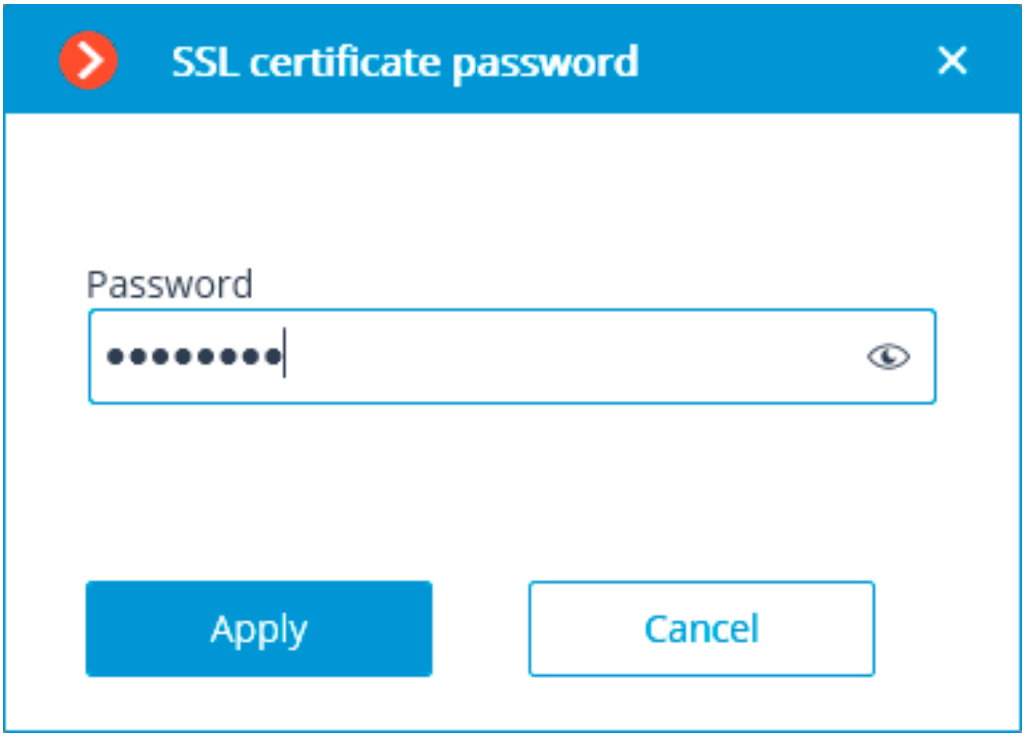
SSL certificate



This tab shows the parameters of the certificate installed on the server. Likewise, it is possible to install a new certificate instead of the current one using the **Upload new** link.



When installing the certificate, it could be required to enter the password assigned to the certificate.



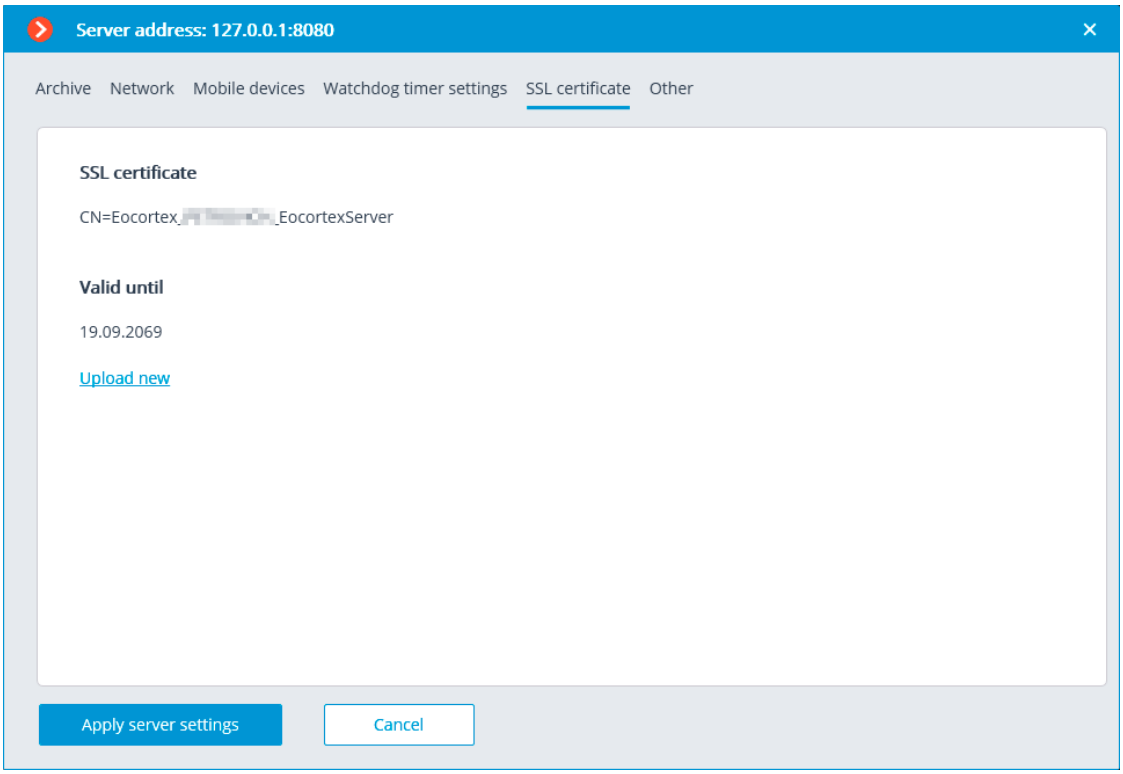
The uploaded certificate will be used for encrypting the secure connections only after the server settings are applied.

All the information regarding the modification and usage of the certificate is recorded in the event log.

If a third-party security certificate for the server is not installed or it has been impossible to load it during the launch of the server, the self-signed TLS certificate will be used for establishing secure connections with the server. Such certificate is generated on the server in the process of creating a new configuration of the video surveillance system. The self-signed TLS certificate has the following disadvantages:

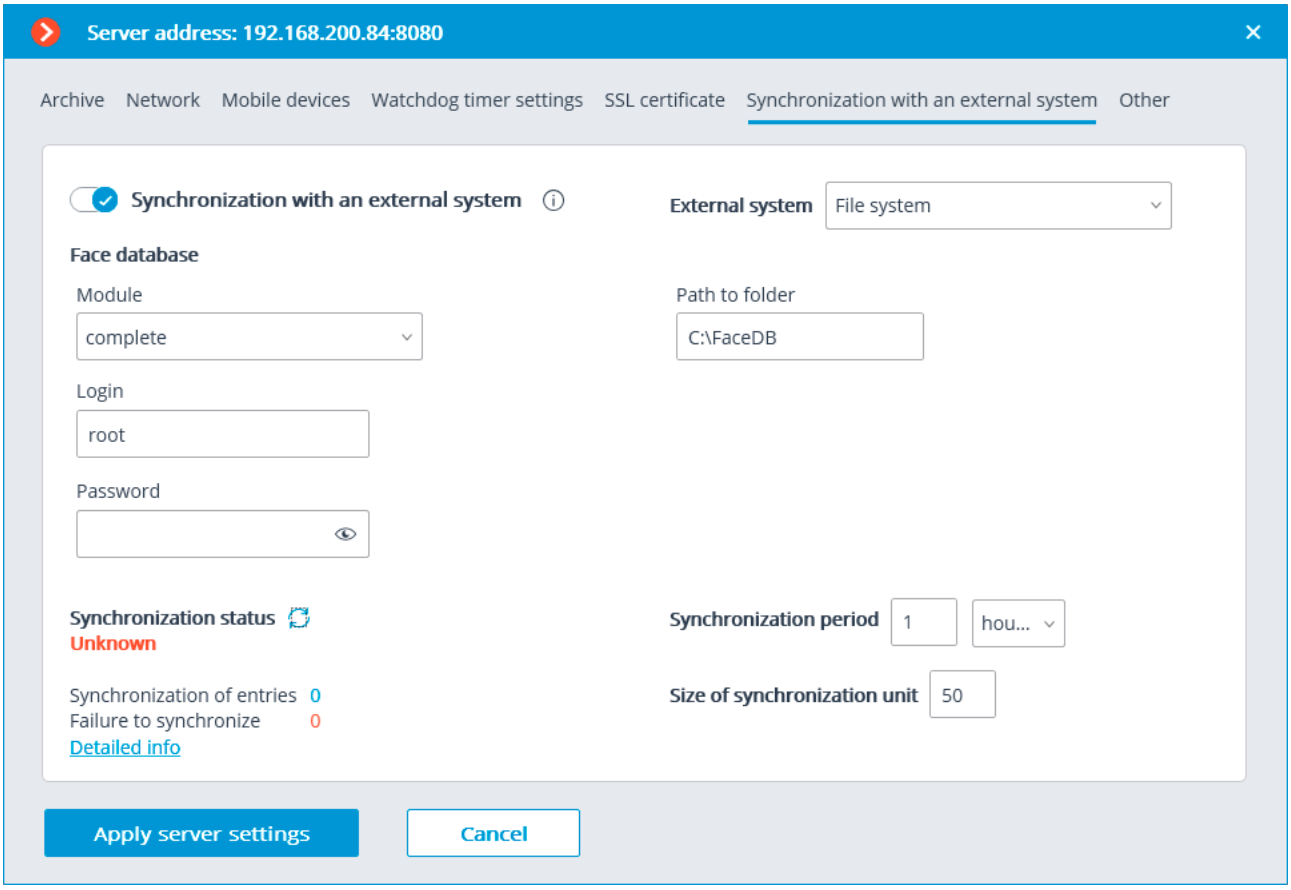
- The certificate can be replaced by an insecure one within the network; the user may not even notice that, confirming the insecure connection.
- The users of the web application will have to confirm the insecure connection every time; it may lead to the distrust of the users.

The absence of the **Reset** link proves that the self-signed certificate is being used.



Synchronization with an external system

On this tab, it is possible to enable and set up the import of a face database used by one of the **Eocortex** face recognition modules from files located in a folder on the drive.



To perform setup, it is required to select **File system** as a type of external system and indicate a folder on the drive where the data will be uploaded from. The periodicity and the size of a data block are also set here, as well as the current synchronization status.

⚠ Only those entries of employees that contain photos suitable for use by the **Eocortex** face recognition module will be imported from the file system.

The entries imported from the file system are rerecorded during each synchronization session. Thus, if such entry is modified in **Eocortex**, the modifications will be lost during the subsequent synchronization session.

The image files will be uploaded from the server folder specified in the settings, and the full names will be derived from the filename; for that end, the words in the filename must be separated by spaces.

The synchronization can be enabled only for one of the face recognition modules.

For the synchronization to work, it is required that at least one camera assigned to the server with the synchronization set up had a synchronized face recognition module enabled.

In a multiserver system, the synchronization can be enabled only on one **Eocortex** server.

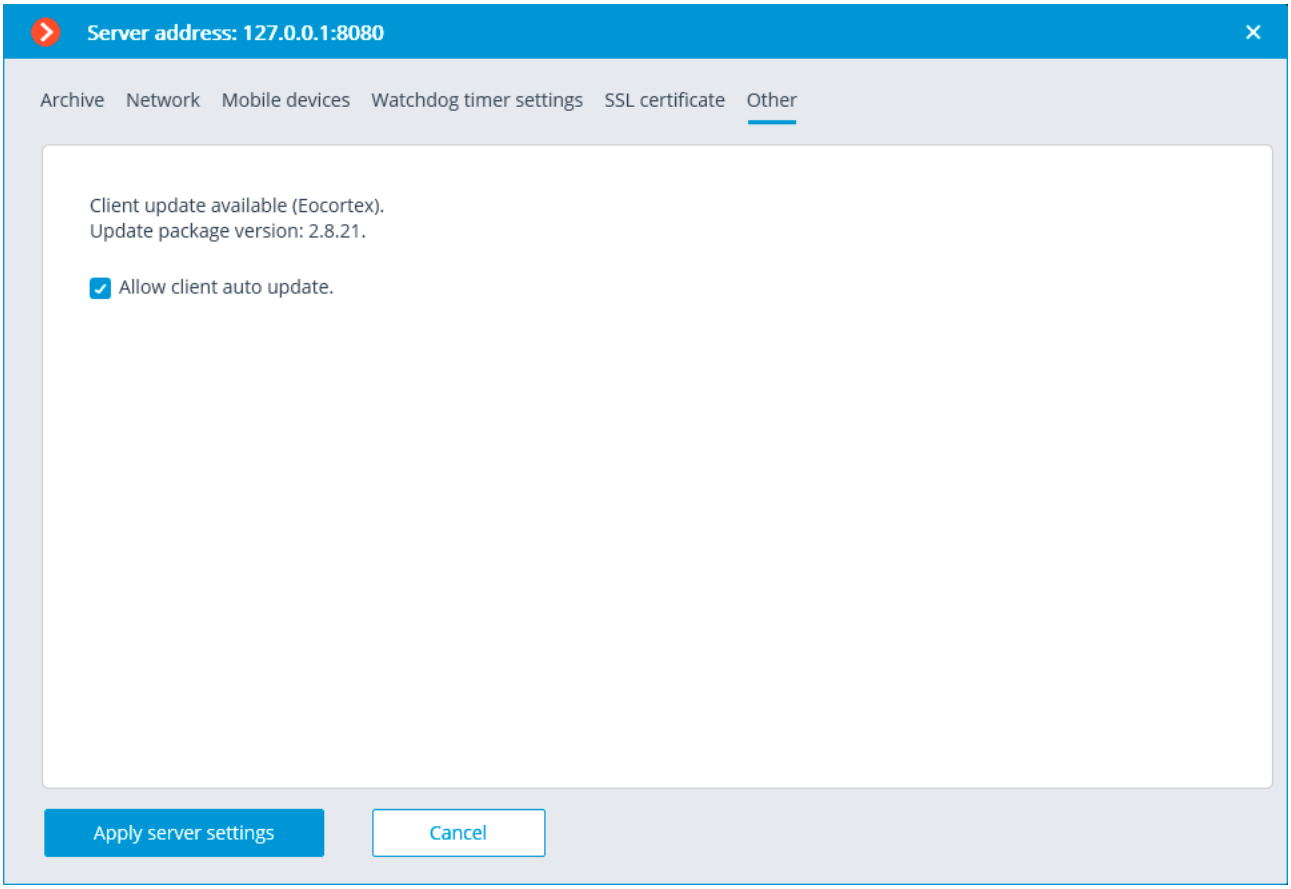
To connect to the Eocortex server, it is required to have a login and a password of the user with the rights to edit face and license plate databases in the **Eocortex** system.

In the course of the first synchronization session, all the entries of employees that meet the requirements (those with photos suitable for recognition) will be imported into **Eocortex**. However, those entries that have been added to the **Eocortex** face recognition module's database manually will not be affected in any way by the process of synchronization. During the subsequent synchronization sessions, only those entries that were modified, added or deleted in the file system after the previous synchronization session will be imported.

The synchronization period can be set in the range of 1 minute to 40 days.

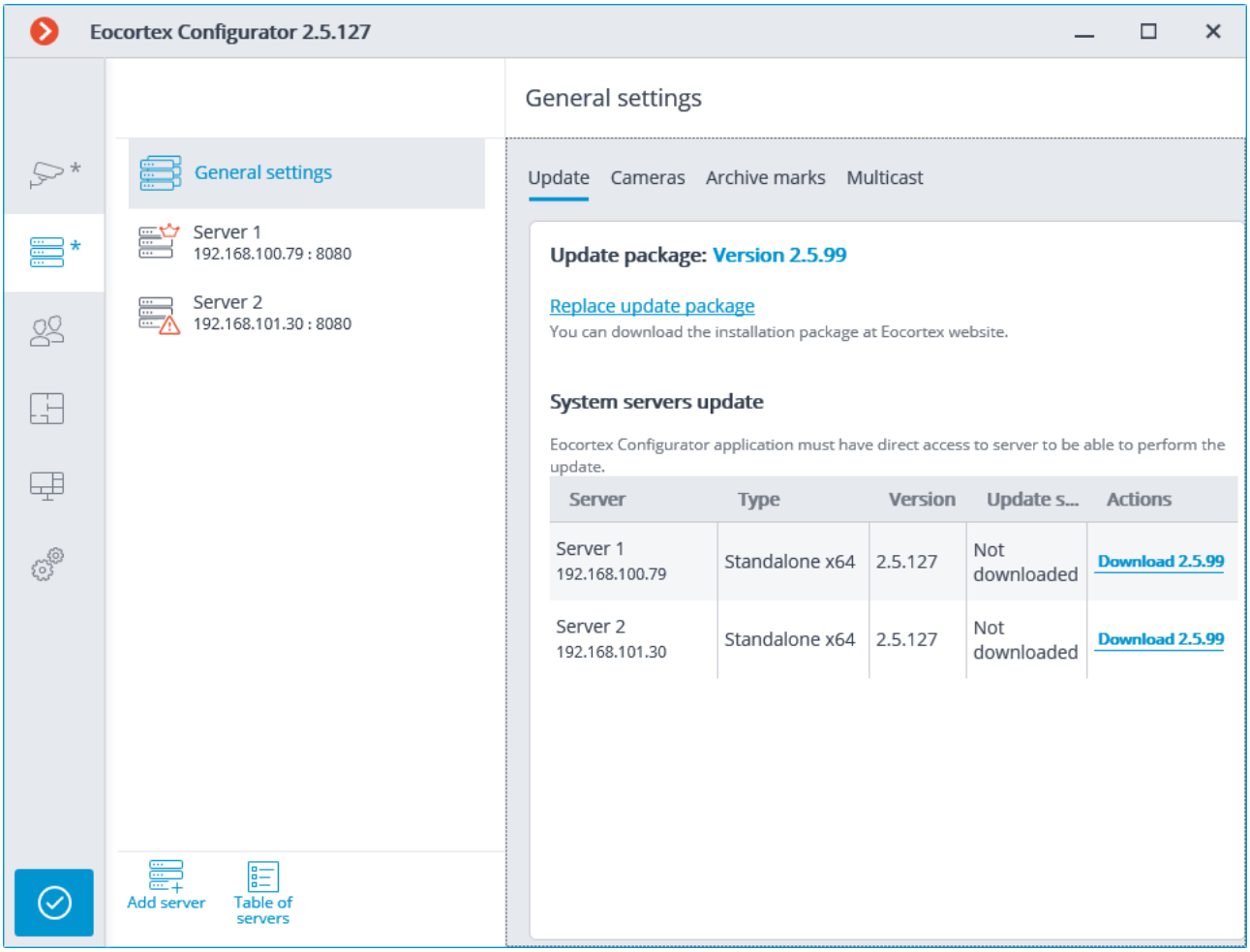
Each entry of the **Eocortex** face database imported from the file system will have a corresponding note.

Other



Centralized server update

In the **Eocortex Configurator** application, on the **Servers** tab, **under General settings** item in the **Update** tab the centralized server update tools are located.



Before updating the server applications, it is required to upload the update package to the **Eocortex Configurator** application on the computer. The package can be downloaded following the **Download update package** link, or **Replace update package** in case the update package of another version has already been downloaded. It is required to download the file of the complete distribution package: **EocortexMainCommon Installer.exe**.

The most up-to-date version of **Eocortex** can be downloaded at eocortex.com: The distribution packages can be found at Support / Software Installation Packages Supported.

To update the server, it is required to perform the following procedure on the server in the System servers update table:

- For the servers with the **Not downloaded** status: perform the **Download** action.
- For the servers with the **Downloaded** status: perform the **Install** action.

Update package: Version 2.5.99

Replace update package

You can download the installation package at Eocortex website.

System servers update

Eocortex Configurator application must have direct access to server to be able to perform the update.

Server	Type	Version	Update status	Actions
Server 1 192.168.100.79	Standalone x64	2.5.127	Not downloaded	Download 2.5.99
Server 2 192.168.101.30	Standalone x64	2.5.127	Downloading: 18%	Break

Update package: Version 2.5.99

Replace update package

You can download the installation package at Eocortex website.

System servers update

Eocortex Configurator application must have direct access to server to be able to perform the update.

Server	Type	Version	Update status	Actions
Server 1 192.168.100.79	Standalone x64	2.5.127	Not downloaded	Download 2.5.99
Server 2 192.168.101.30	Standalone x64	2.5.127	Installation (2-10 minutes)...	

Update package: Version 2.5.99

Replace update package

You can download the installation package at Eocortex website.

System servers update

Eocortex Configurator application must have direct access to server to be able to perform the update.

Server	Type	Version	Update status	Actions

For the server with the **Installed** status the **Roll back** action is available, allowing to roll the server back to the previous version. In this case all the server settings go back to the values existing before the update.

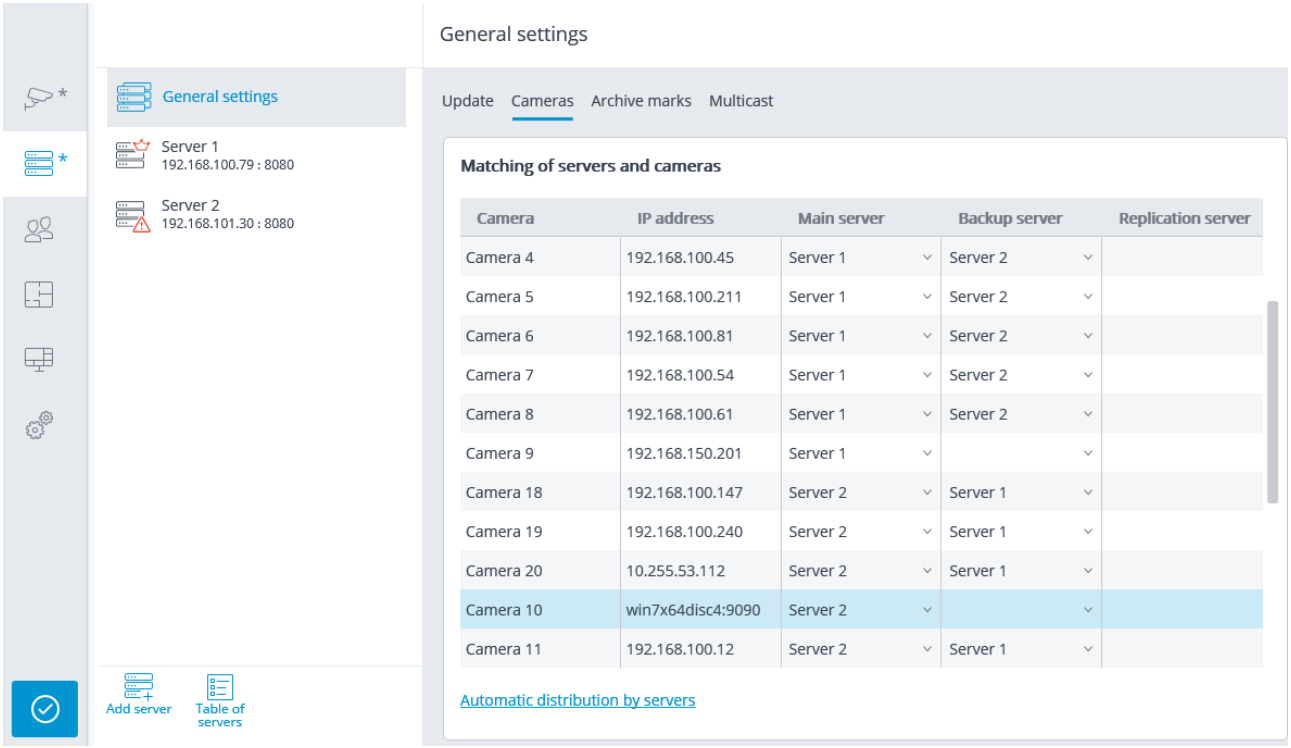
If the server was updated using the centralized update procedure more than once, it is possible to roll back to any previous version in the opposite order, step by step.

The centralized update is available only for the **Eocortex Server** and **Eocortex Standalone** applications. For the **Eocortex NVR** application the centralized update is not available.

The **Eocortex** server applications can be updated not only to the newer versions, but also to the older ones, provided that the first two digits of the version number are the same.

Distribution of cameras among servers

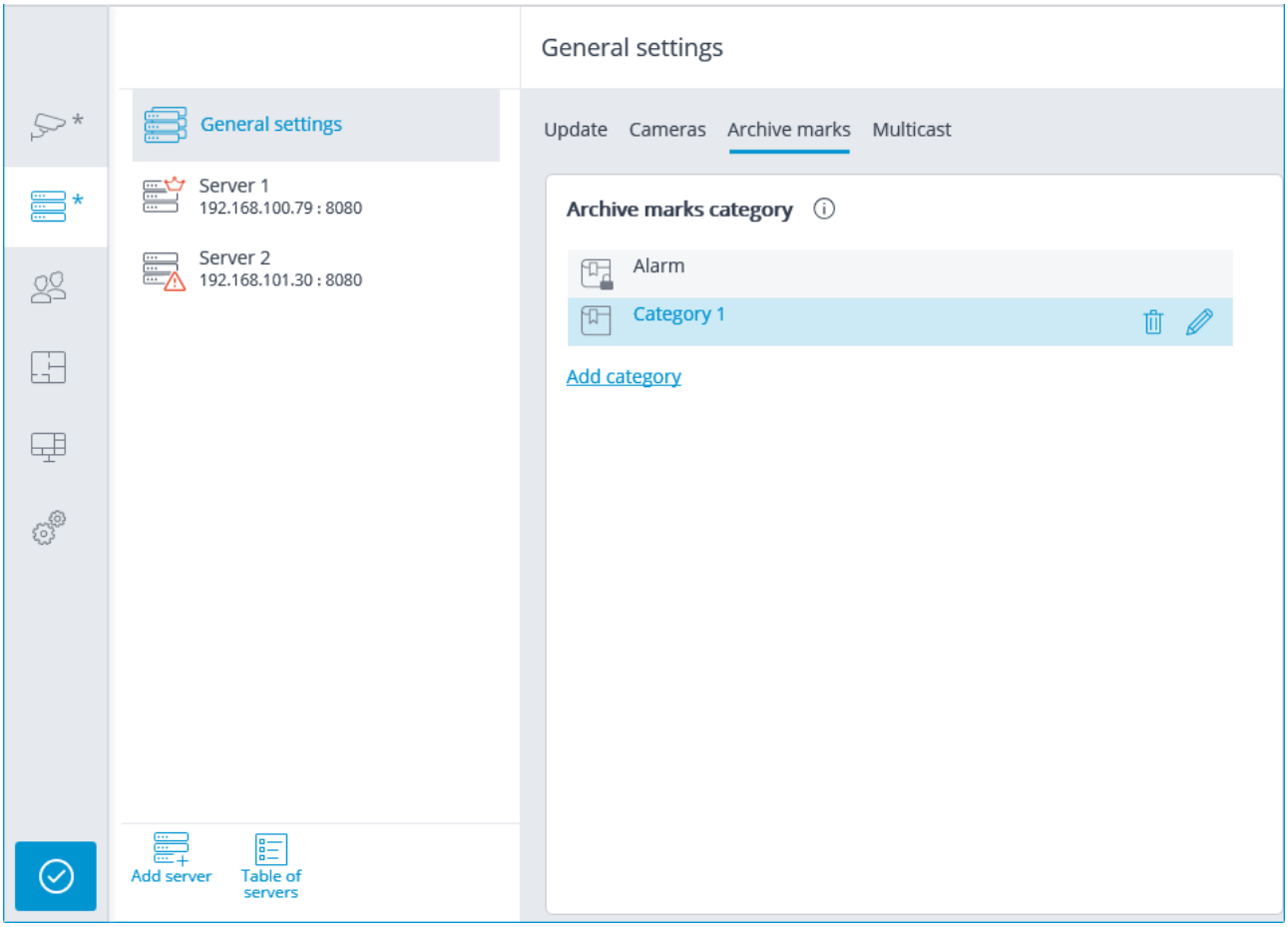
In the **Eocortex Configurator** application, on **Servers** tab, the table of camera distribution among servers appears upon selecting the **General settings** item.



The changes made to the assignment of cameras to servers will take effect only after the changes are saved.

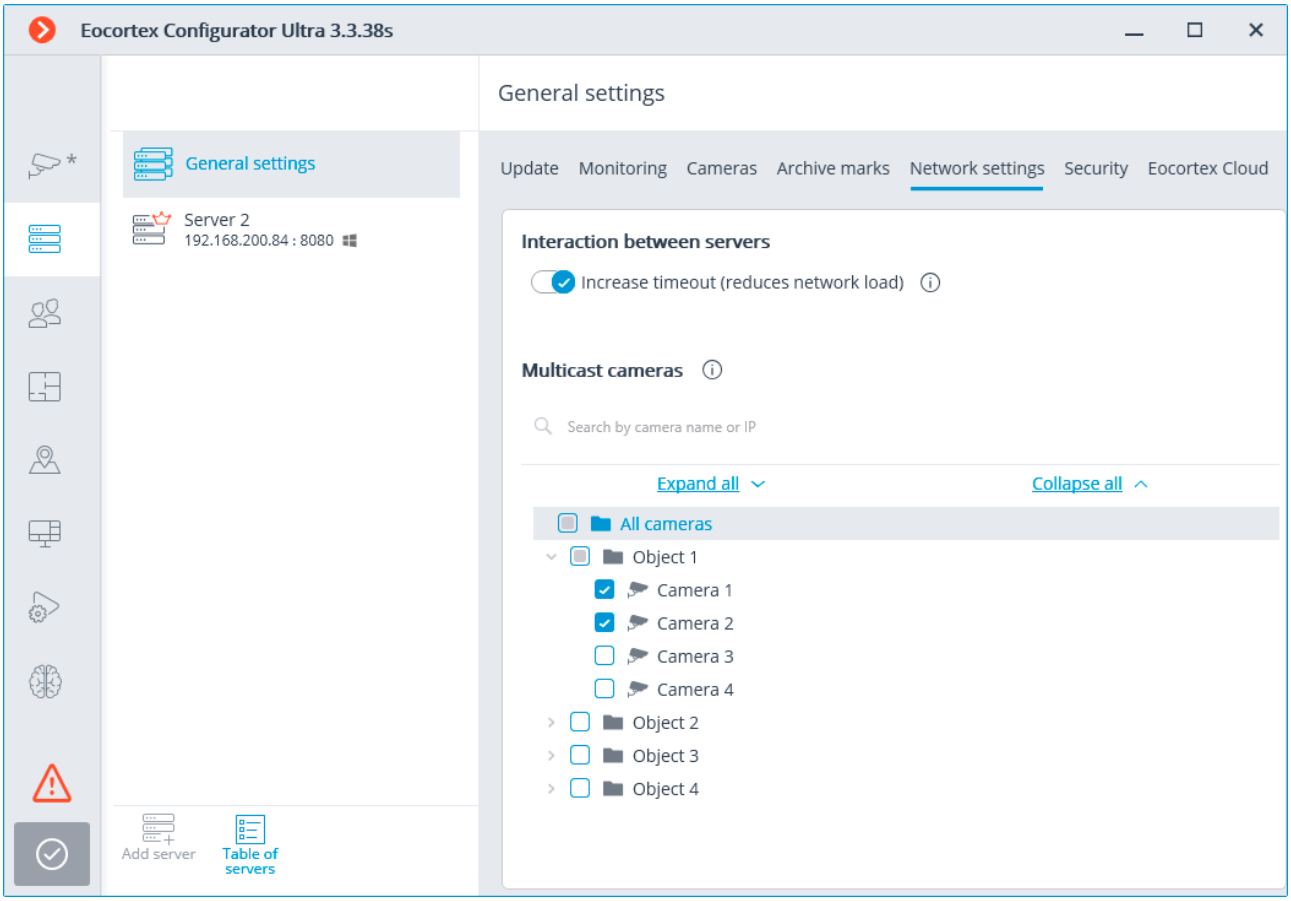
Archive bookmark category setup

In **Eocortex Configurator**, on the **Servers** tab, the list of archive bookmark categories appears on the **Archive bookmarks** tab when selecting the **General settings** item.



General settings: Network settings

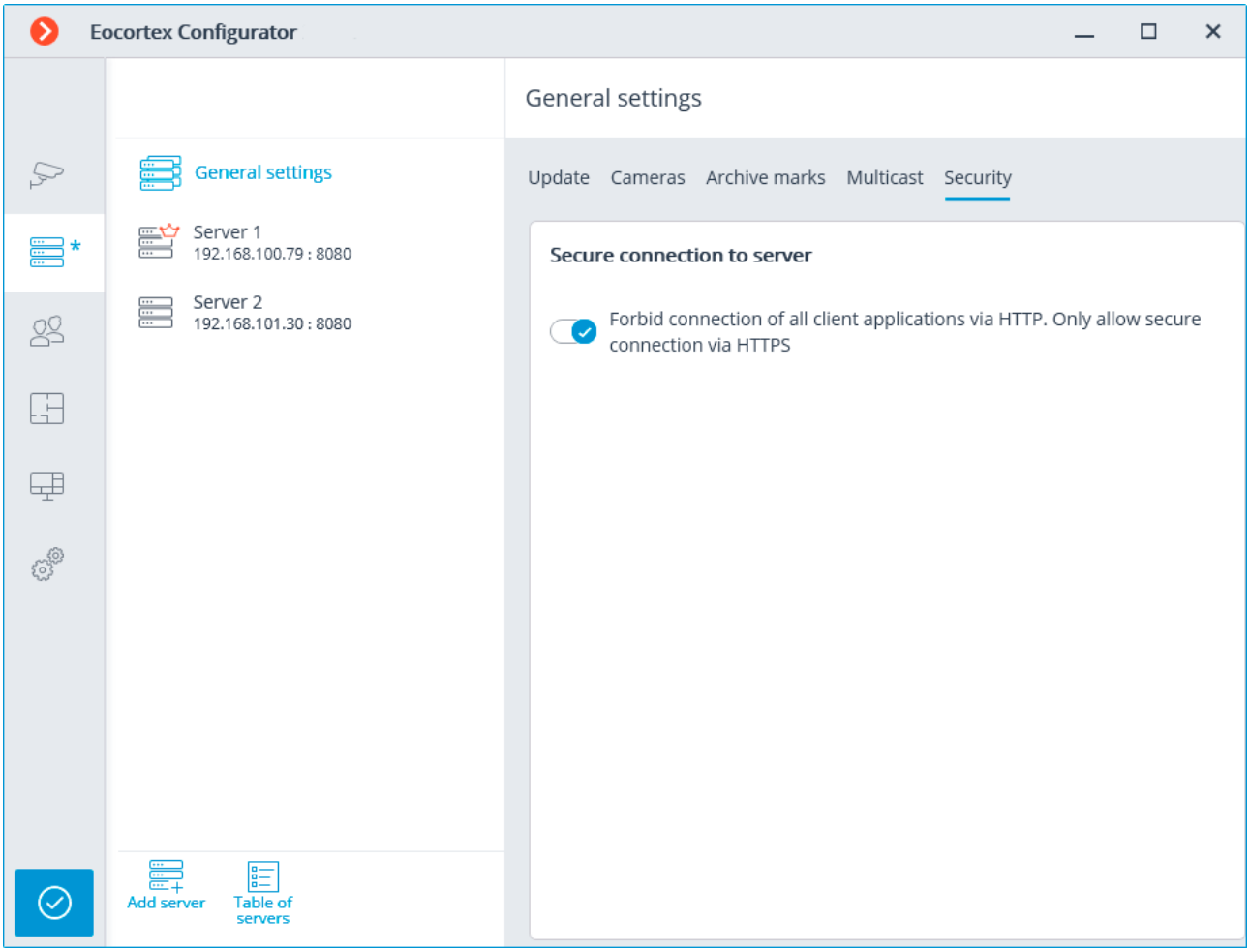
The settings of interaction between servers can be found in the **Eocortex Configurator** application, on the **SERVERS** page. The camera tree with the possibility to enable multicasting from a server appears on the **Multicast** tab upon selecting the **General settings** item.



When the **Increase timeout (reduces network load)** option is enabled, the period of data exchange between the main and the subordinate servers increases from several seconds to 1 minute.

General settings: Security

The insecure connections (via HTTP) will be forbidden when enabling the **Forbid connection of all client applications via HTTP. Only allow secure connection via HTTPS** option for all the system servers in the **Eocortex Configurator** application on the **SERVERS** page, at highlighting the **General settings** item on the **Security** tab.



When applying the settings after enabling this option, the **Eocortex Client** and **Eocortex Web-client** applications connected to the servers will be automatically restarted using the secure connection. At the same time, the **Mobile client for Android** and **Mobile client for iOS** applications will not be restarted in this situation. Later on, the prohibition of the insecure connections to servers will be valid for all new connections from the **Eocortex Client**, **Eocortex Web-client**, **Mobile client for Android** and **Mobile client for iOS** applications. At that, the **Eocortex Client** application will be connected using the secure connection even in case of an attempt to use the insecure connection.

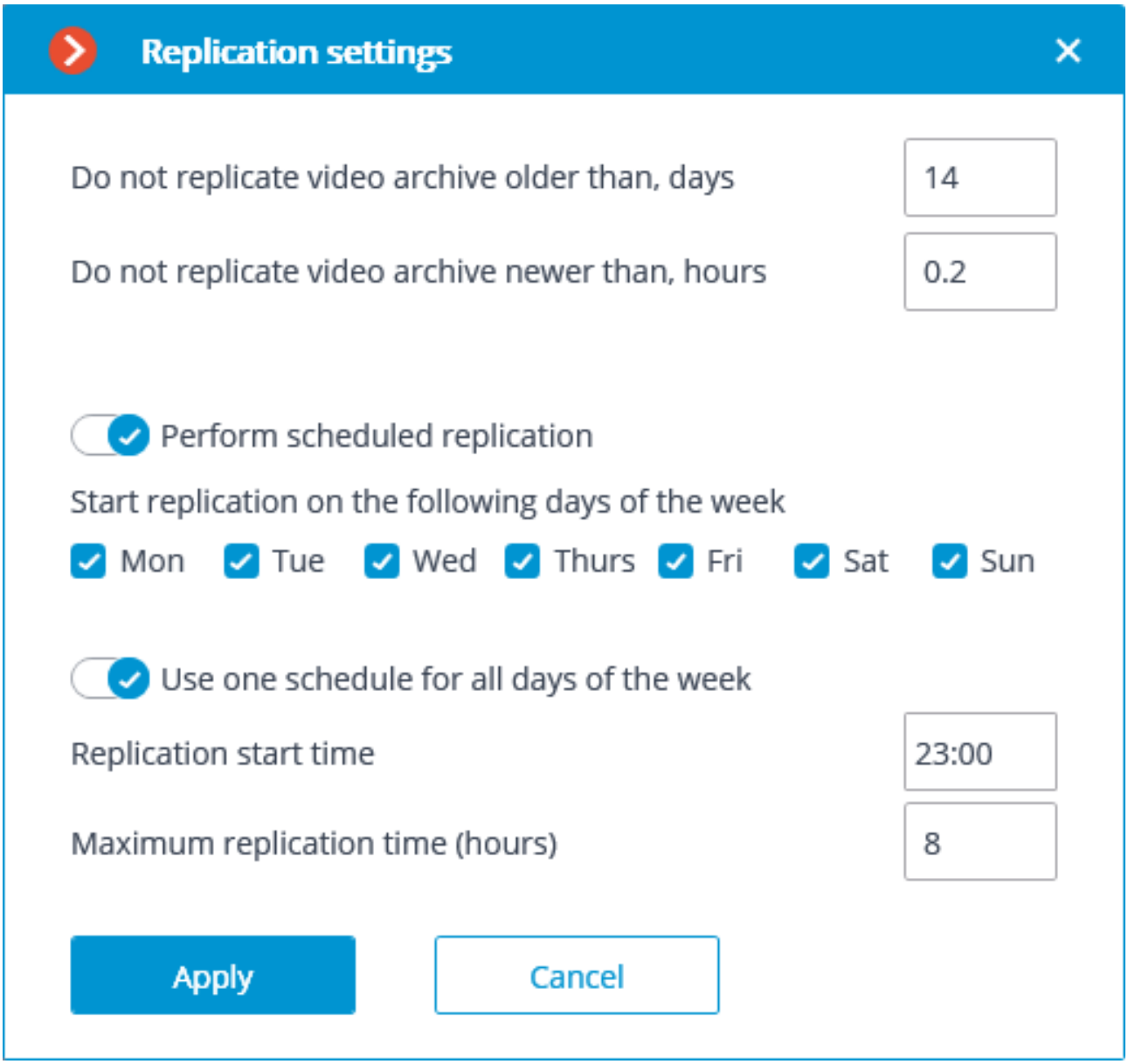
Replication server

The **Replication server** is the server that stores backup copies of the archives from the other servers. The role of a replication server can be assigned to one or several servers in the system.

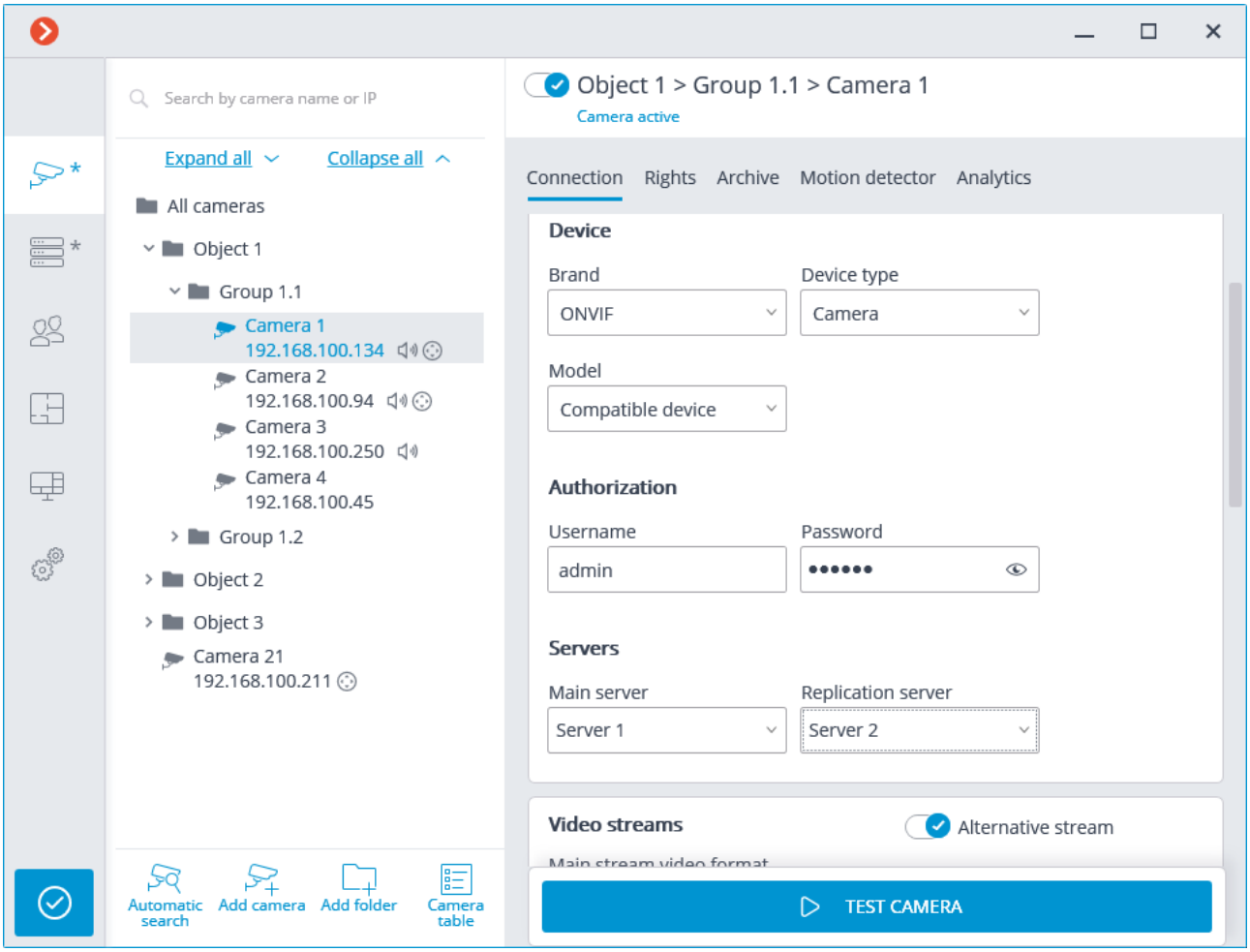
The replication server cannot be assigned as main or redundancy server for the cameras.

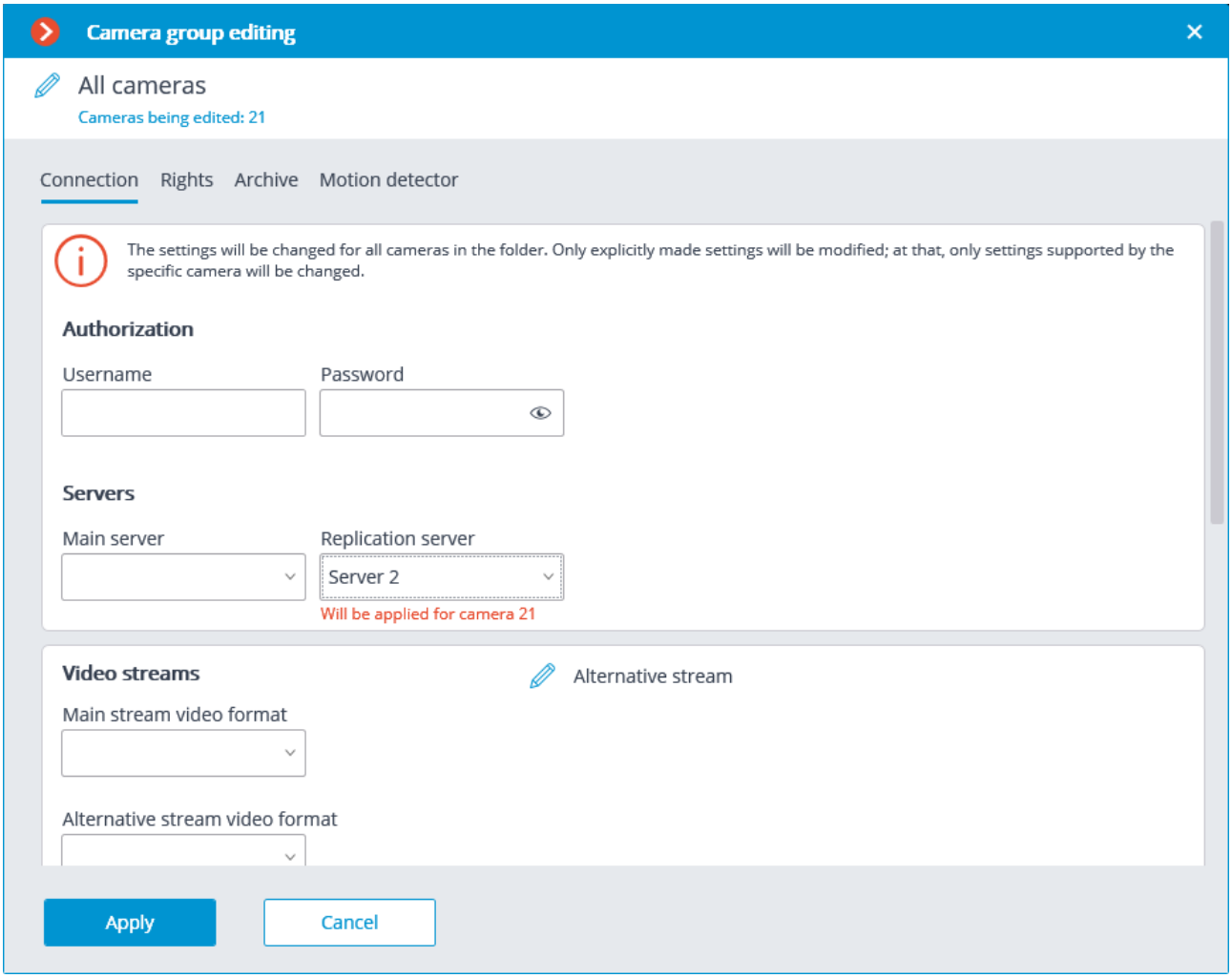
For using a server as the replication one, it is required to enable the **Replication server** option in the **Eocortex Configurator** application, on the **Servers** tab, on the **Information** tab of the server settings page.

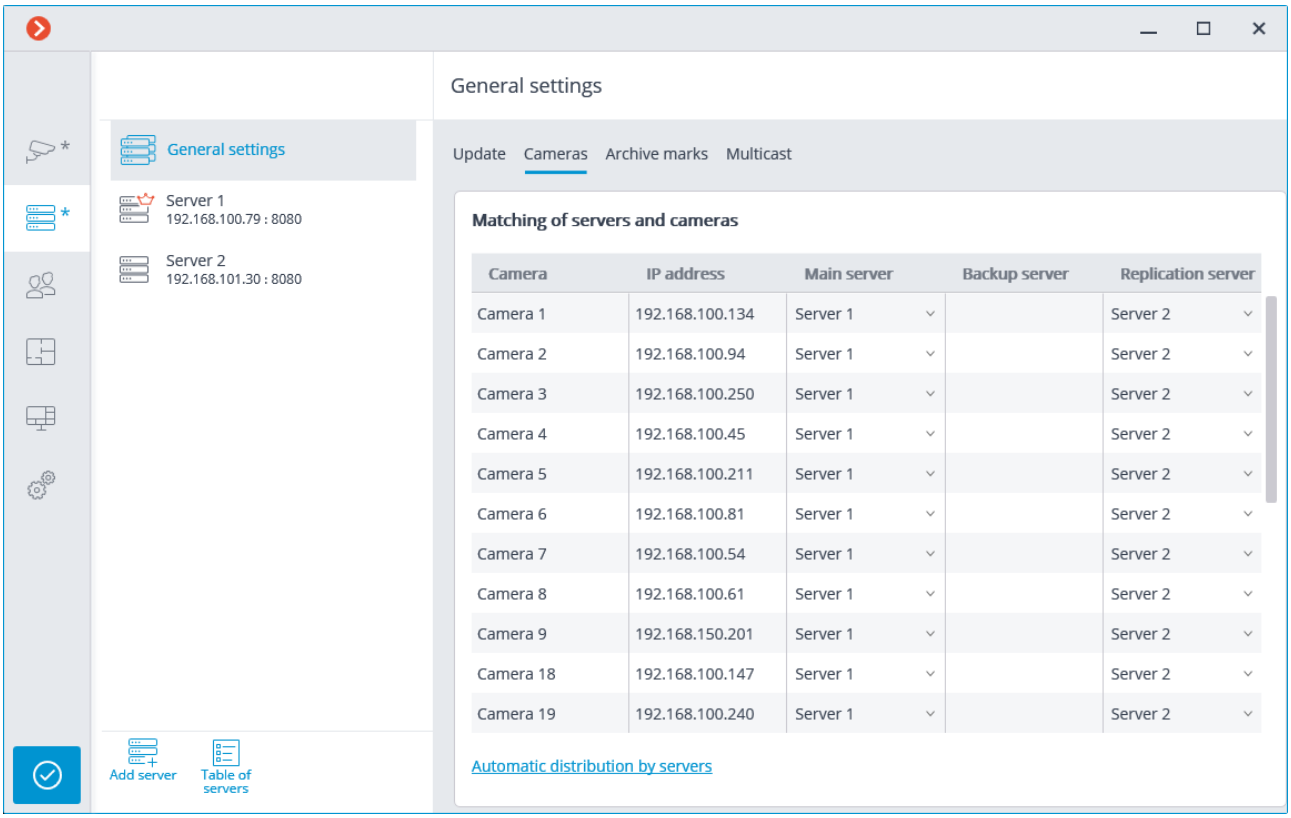
Then, by clicking the button, open the **Replication settings** window, set the replication depth limits and schedule, and select channels that will be replicated on this server.



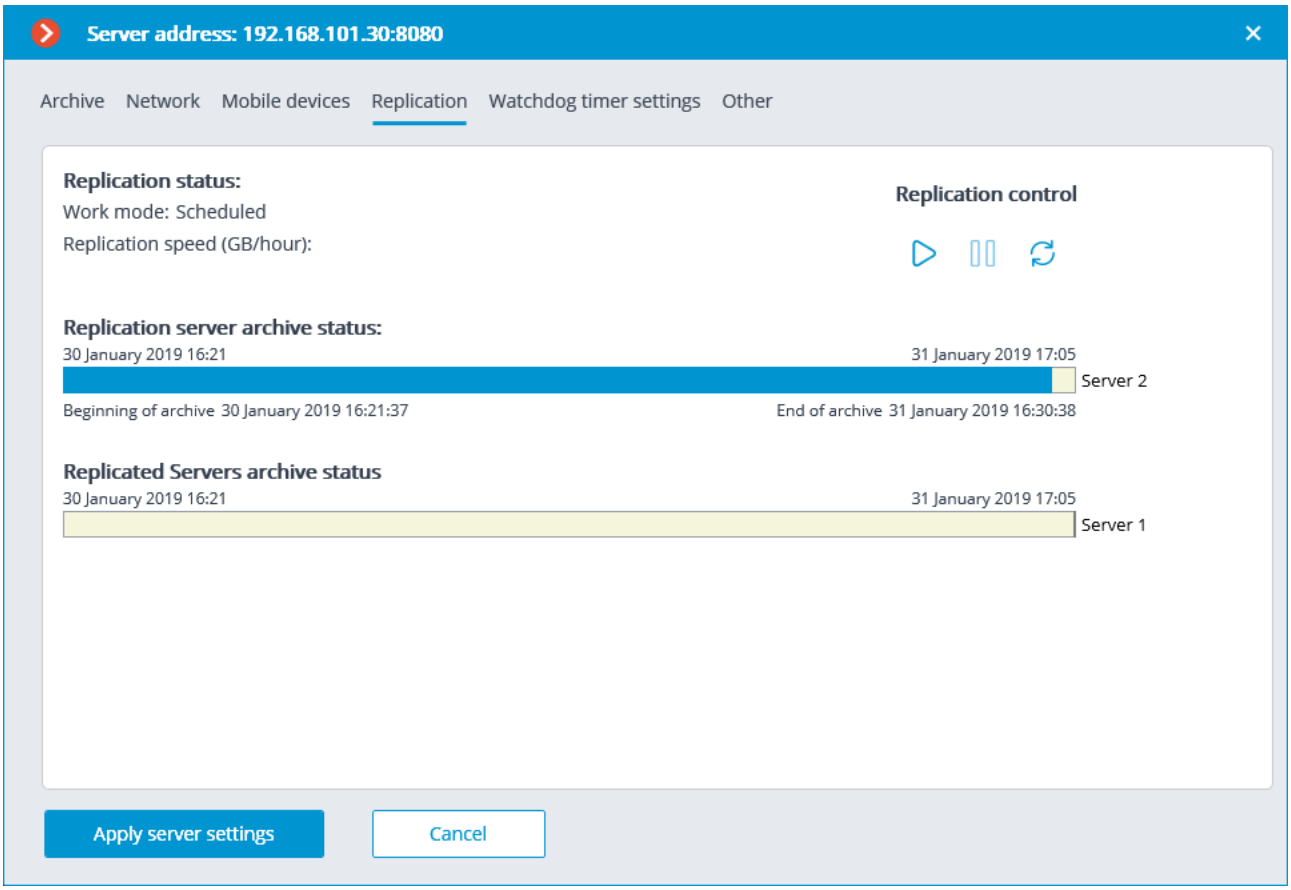
Then using one of the methods (thru camera settings, camera group settings, or camera distribution among servers settings) indicate the cameras the archives of which will be replicated.


Search by camera name or IP
Expand all
Collapse all
All cameras
Object 1
Group 1.1
Camera 1
192.168.100.134
Camera 2
192.168.100.94
Camera 3
192.168.100.250
Camera 4
192.168.100.45
Group 1.2
Object 2
Object 3
Camera 21
192.168.100.211
Automatic search
Add camera
Add folder
Camera table
Object 1 > Group 1.1 > Camera 1
Camera active
Connection
Rights
Archive
Motion detector
Analytics
Device
Brand
ONVIF
Device type
Camera
Model
Compatible device
Authorization
Username
admin
Password
Servers
Main server
Server 1
Replication server
Server 2
Video streams
Alternative stream
TEST CAMERA


Camera group editing
All cameras
Cameras being edited: 21
Connection
Rights
Archive
Motion detector
The settings will be changed for all cameras in the folder. Only explicitly made settings will be modified; at that, only settings supported by the specific camera will be changed.
Authorization
Username
Password
Servers
Main server
Replication server
Server 2
Will be applied for camera 21
Video streams
Alternative stream
Main stream video format
Alternative stream video format
Apply
Cancel


General settings
General settings
Server 1
192.168.100.79 : 8080
Server 2
192.168.101.30 : 8080
Update
Cameras
Archive marks
Multicast
Matching of servers and cameras
Camera
IP address
Main server
Backup server
Replication server
Camera 1 192.168.100.134 Server 1 Server 2
Camera 2 192.168.100.94 Server 1 Server 2
Camera 3 192.168.100.250 Server 1 Server 2
Camera 4 192.168.100.45 Server 1 Server 2
Camera 5 192.168.100.211 Server 1 Server 2
Camera 6 192.168.100.81 Server 1 Server 2
Camera 7 192.168.100.54 Server 1 Server 2
Camera 8 192.168.100.61 Server 1 Server 2
Camera 9 192.168.150.201 Server 1 Server 2
Camera 18 192.168.100.147 Server 1 Server 2
Camera 19 192.168.100.240 Server 1 Server 2
Automatic distribution by servers
Add server
Table of servers

The current replication status is displayed on the **Servers** tab of the **Eocortex Configurator** application, on the **Replication** tab of the server settings item. On this tab you can also manually start or stop the replication process.

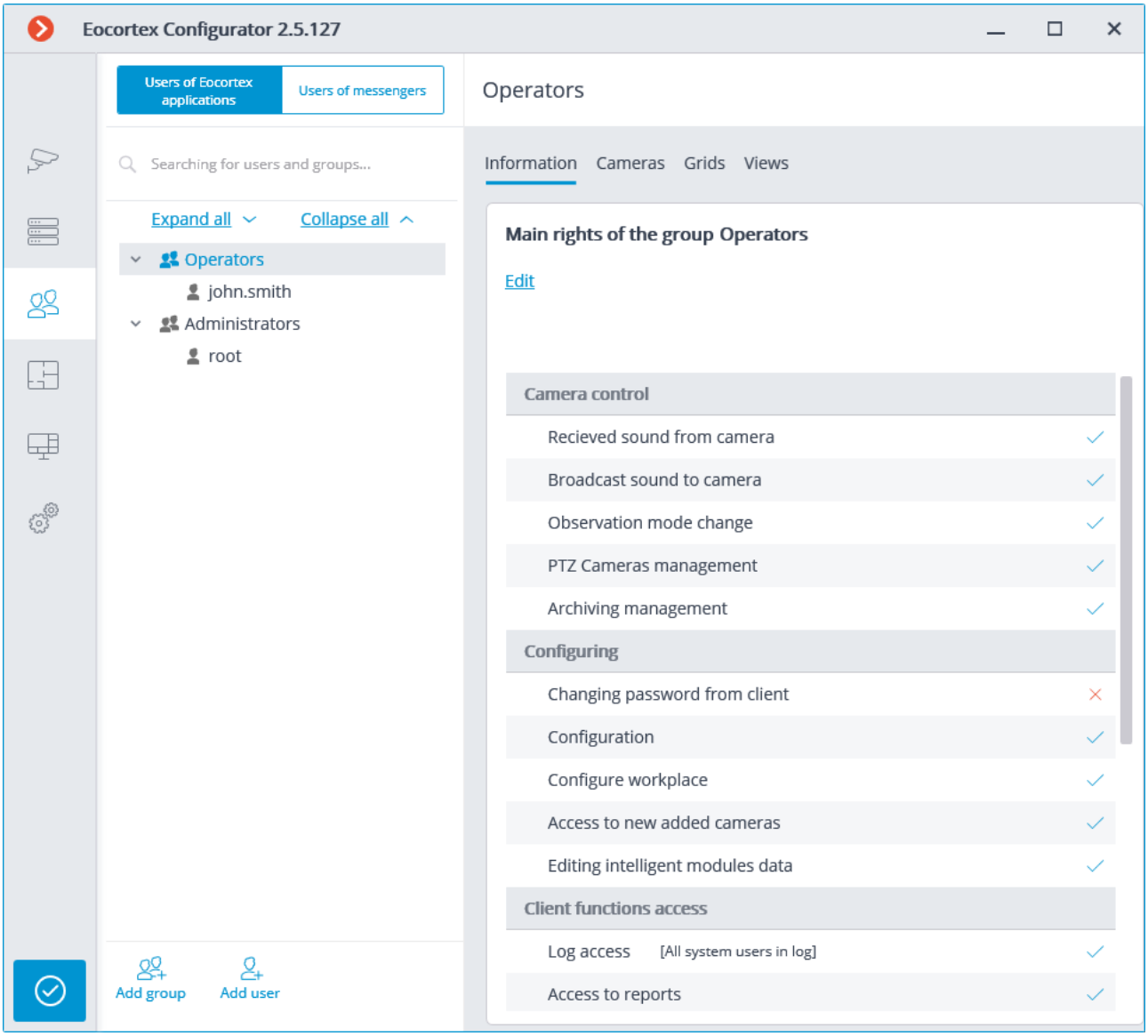


Users

The **Eocortex Configurator** application allows you to configure the rights of various categories of users of the video surveillance system.

Users of Eocortex applications

To set up the user rights of **Eocortex** in the **Eocortex Configurator** application it is required to go to the **Users** tab and press **Users of Eocortex applications**.



[The tree of the groups and the users]

[Adding, viewing and modifying user group]

[Adding, viewing and modifying user]

The tree of the groups and the users

In the left part of the tab will display the tree of the groups and the users of the CCTV system who belong to them. In order to set up a particular group or user, it is required to select it in the list. At that, the page with the settings of the selected user or group will appear in the right part of the window.

To search for cameras and folders in the tree, use the search field located above the list.

Particularities and limitations of user rights:

- The rights are provided only to the groups of users and are extended to all the users of the group. Individual users cannot de granted any rights that differ from the rights of the group.

- A single user can belong to only one group. There can be no users who do not belong to any group.
- Every user is assigned a unique password.
- A user can be moved from one group to another, maintaining its password, and its rights are modified according to those of its current group.

Below you will find the commands available when setting up user rights. These commands can be opened from the context menu, using buttons under the list of groups and users, or by clicking on the links on the group or user information page. Individual commands can be opened using several means, including hot keys.

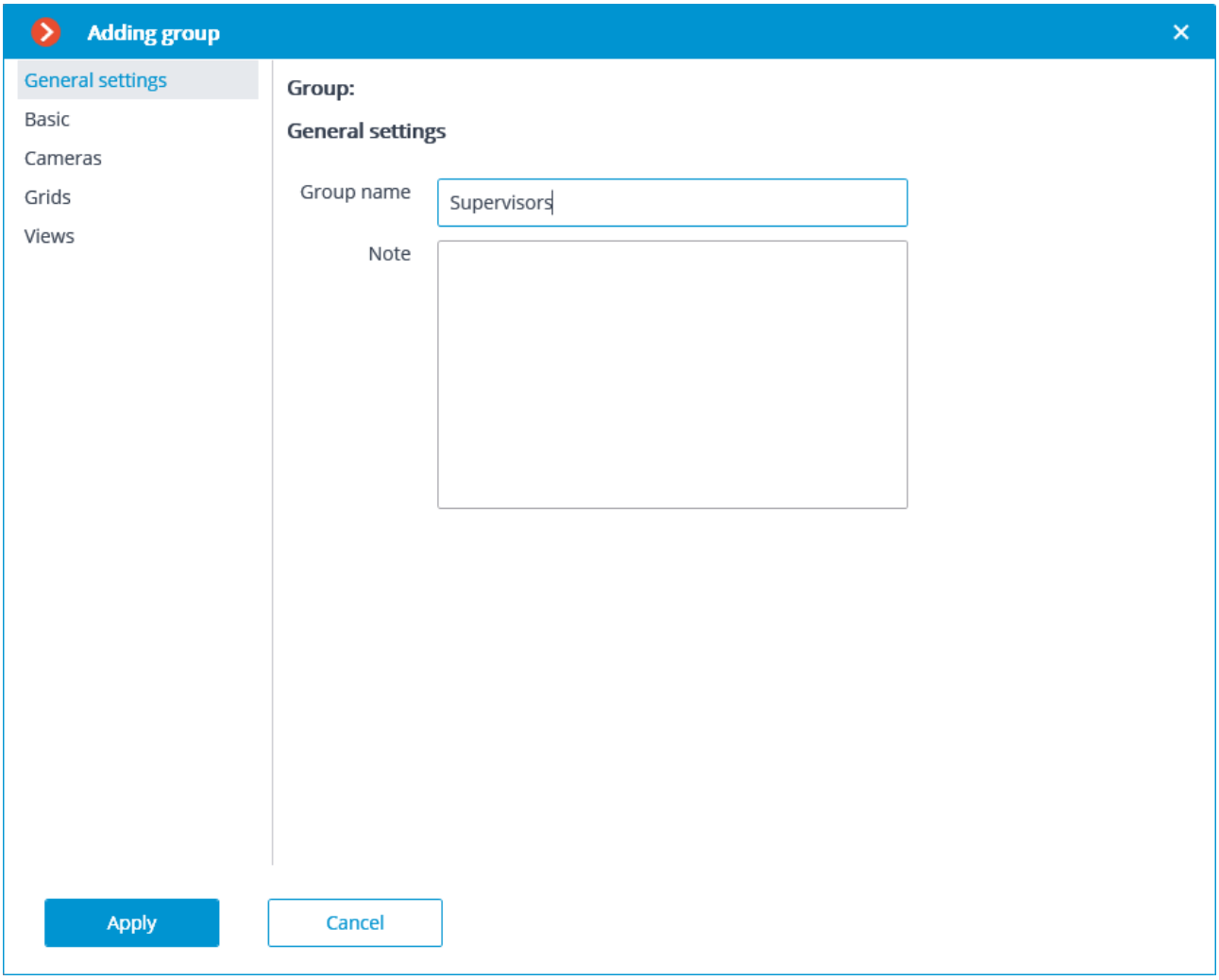
To search for cameras and folders in the tree, use the search field located above the list.

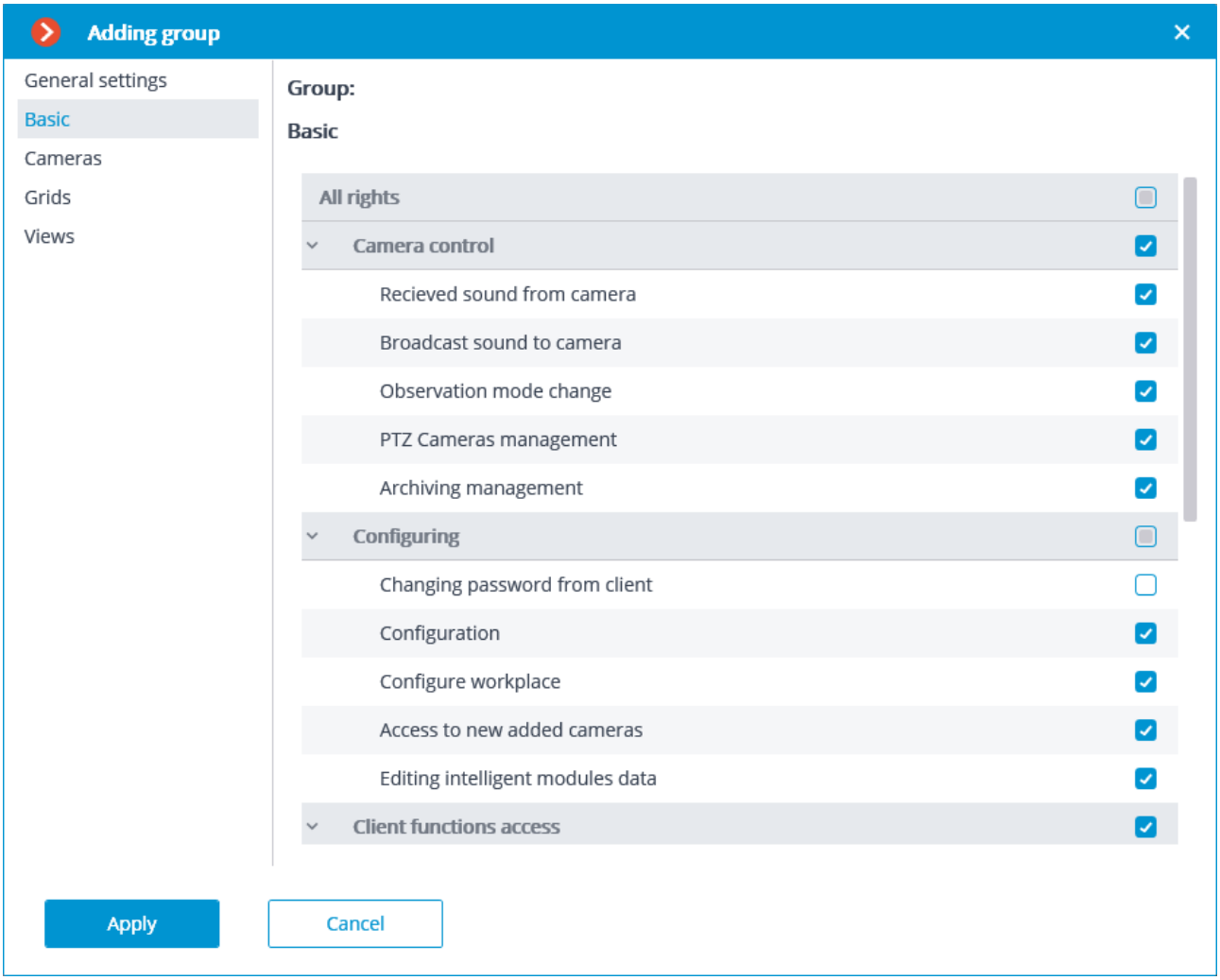
- Add group opens the window of adding a group.
- Add user opens the window of adding a user to the selected group.
- Add group based on the selected one adds a new group with the rights identical to those of the selected group.
- Edit opens the editing window for the selected group or user.
- Delete removes the selected group or user.

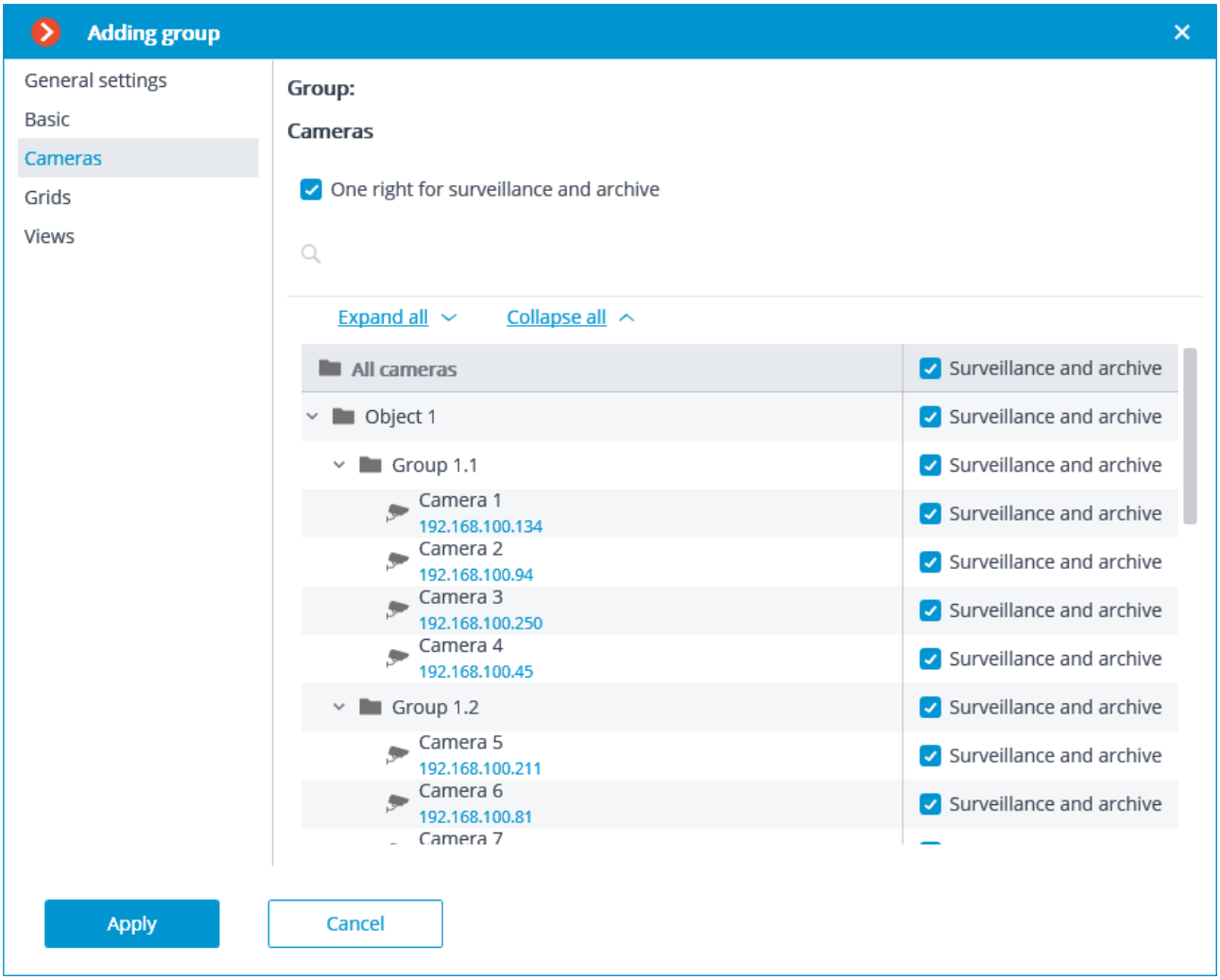
To come into effect, the changes need to be applied.

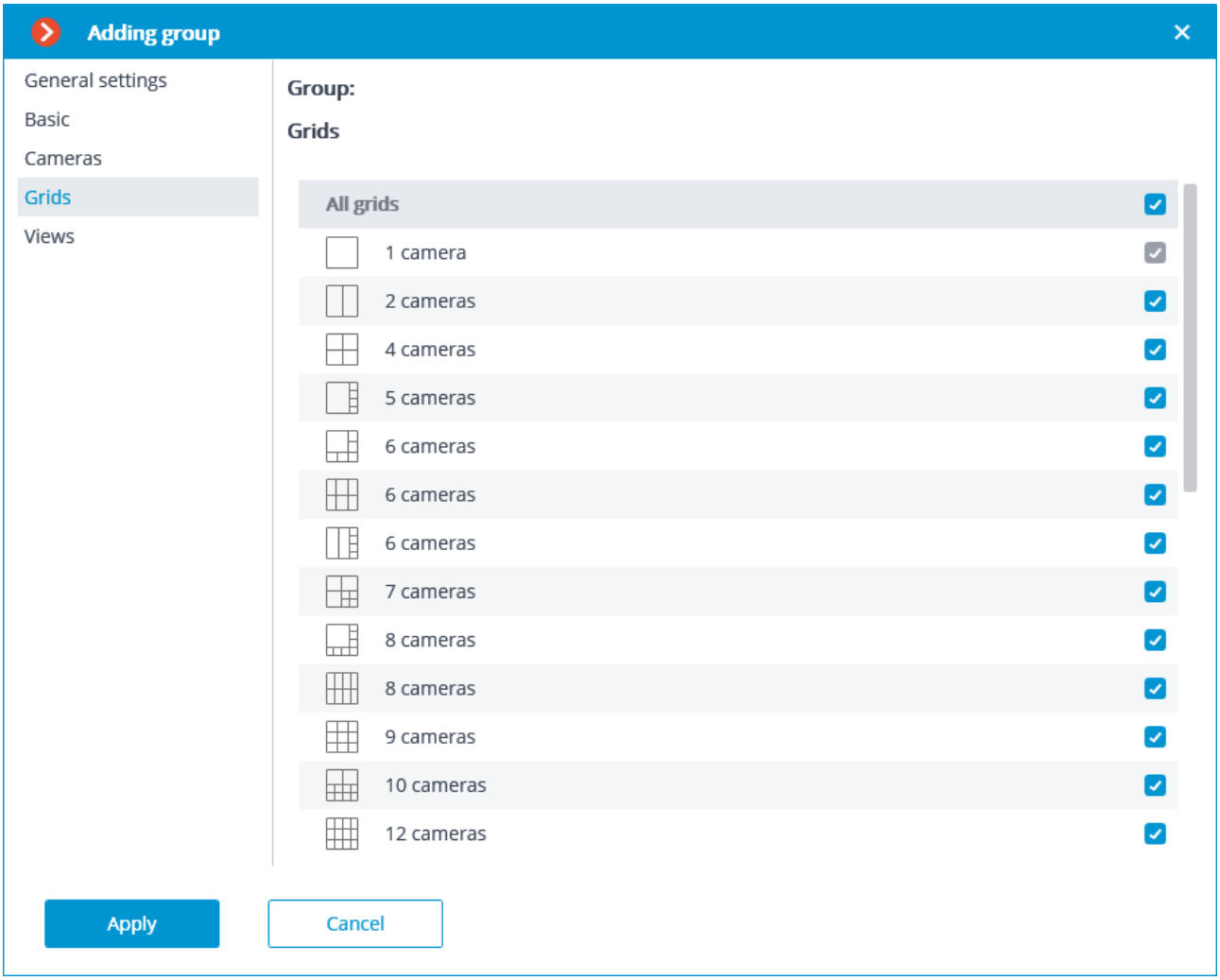
Adding, viewing and modifying user group

Adding:

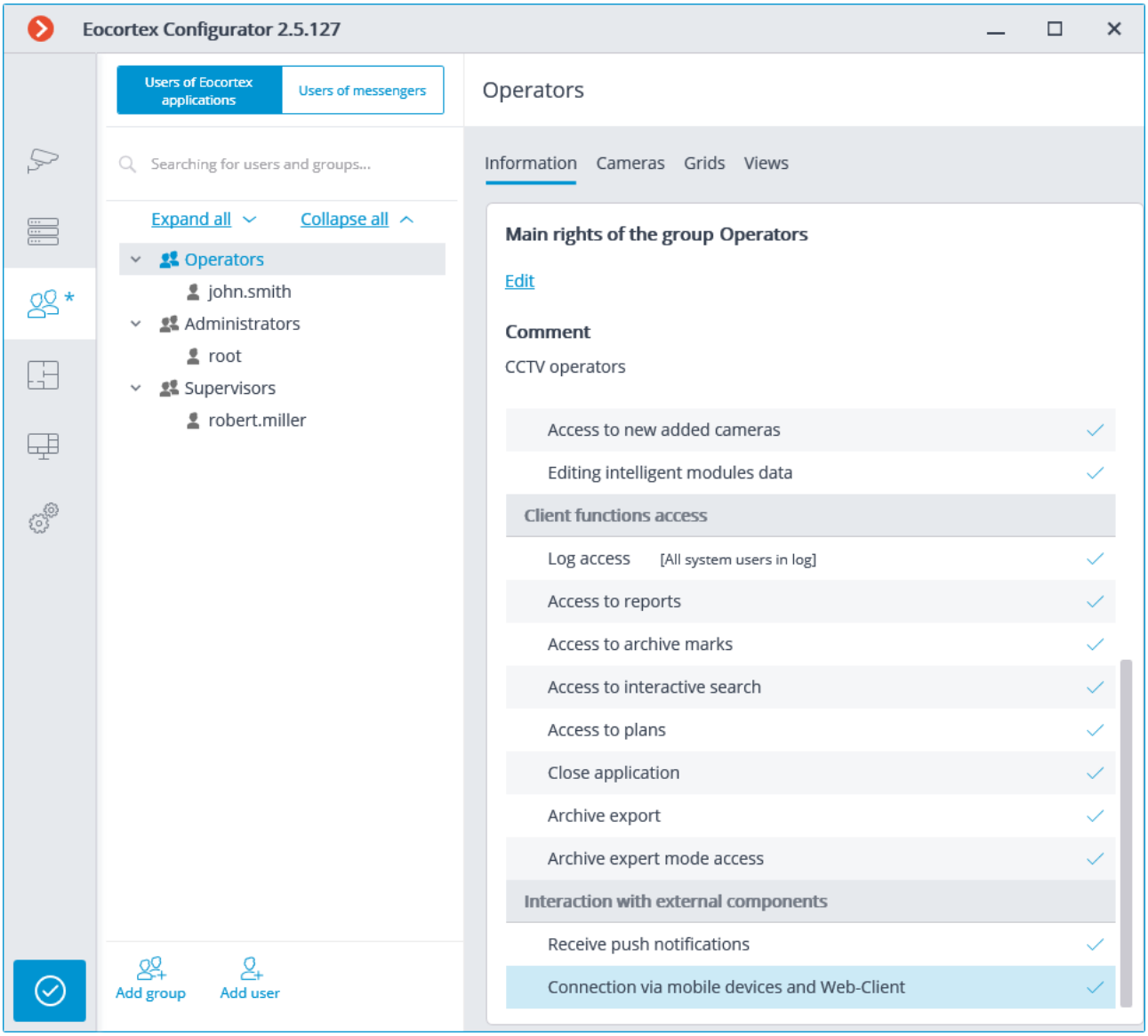

Adding group
General settings
Basic
Cameras
Grids
Views
Group:
General settings
Group name
Supervisors
Note
Apply
Cancel

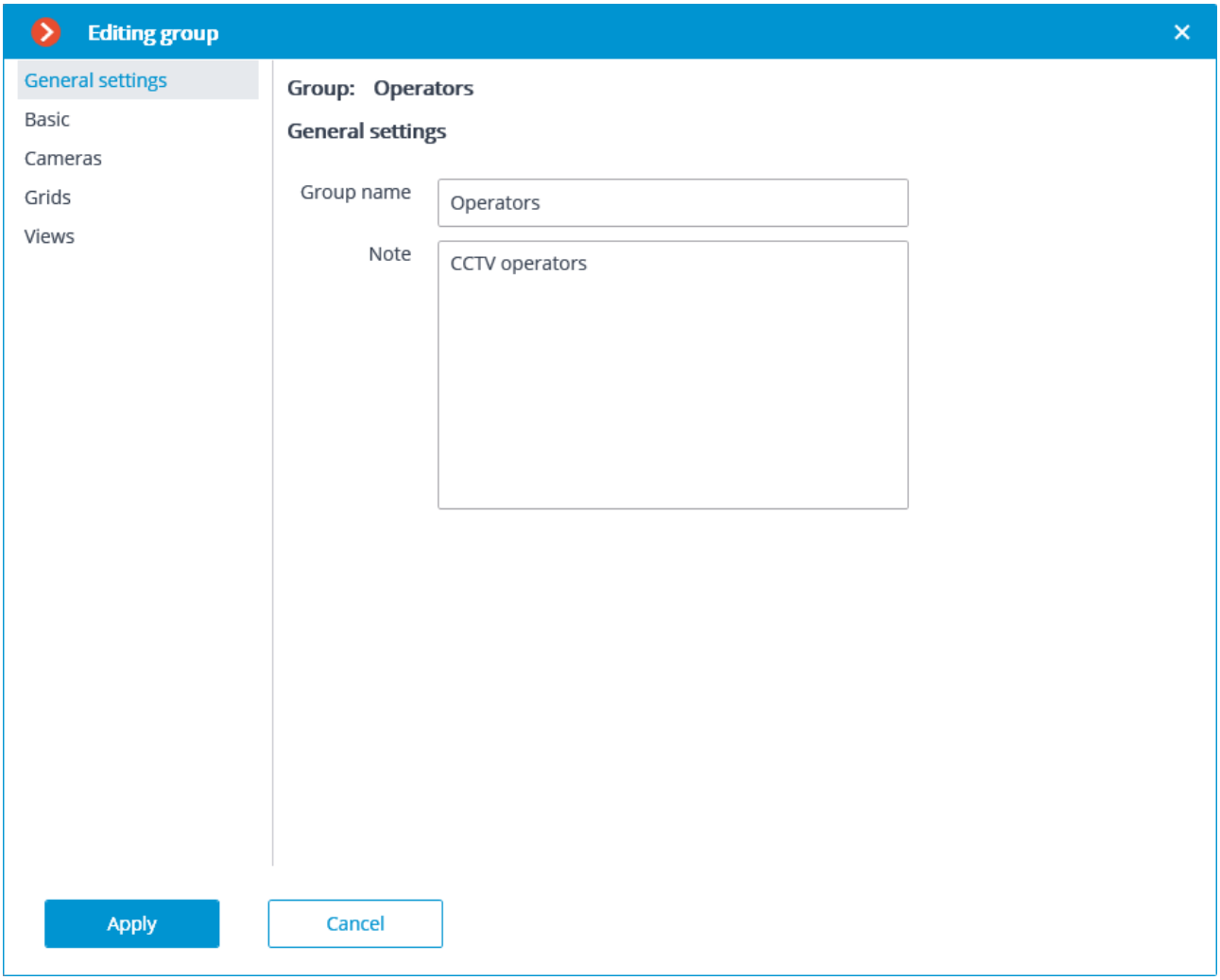

Adding group
General settings
Basic
Cameras
Grids
Views
Group:
Basic
All rights
Camera control
Recieved sound from camera
Broadcast sound to camera
Observation mode change
PTZ Cameras management
Archiving management
Configuring
Changing password from client
Configuration
Configure workplace
Access to new added cameras
Editing intelligent modules data
Client functions access
Apply
Cancel

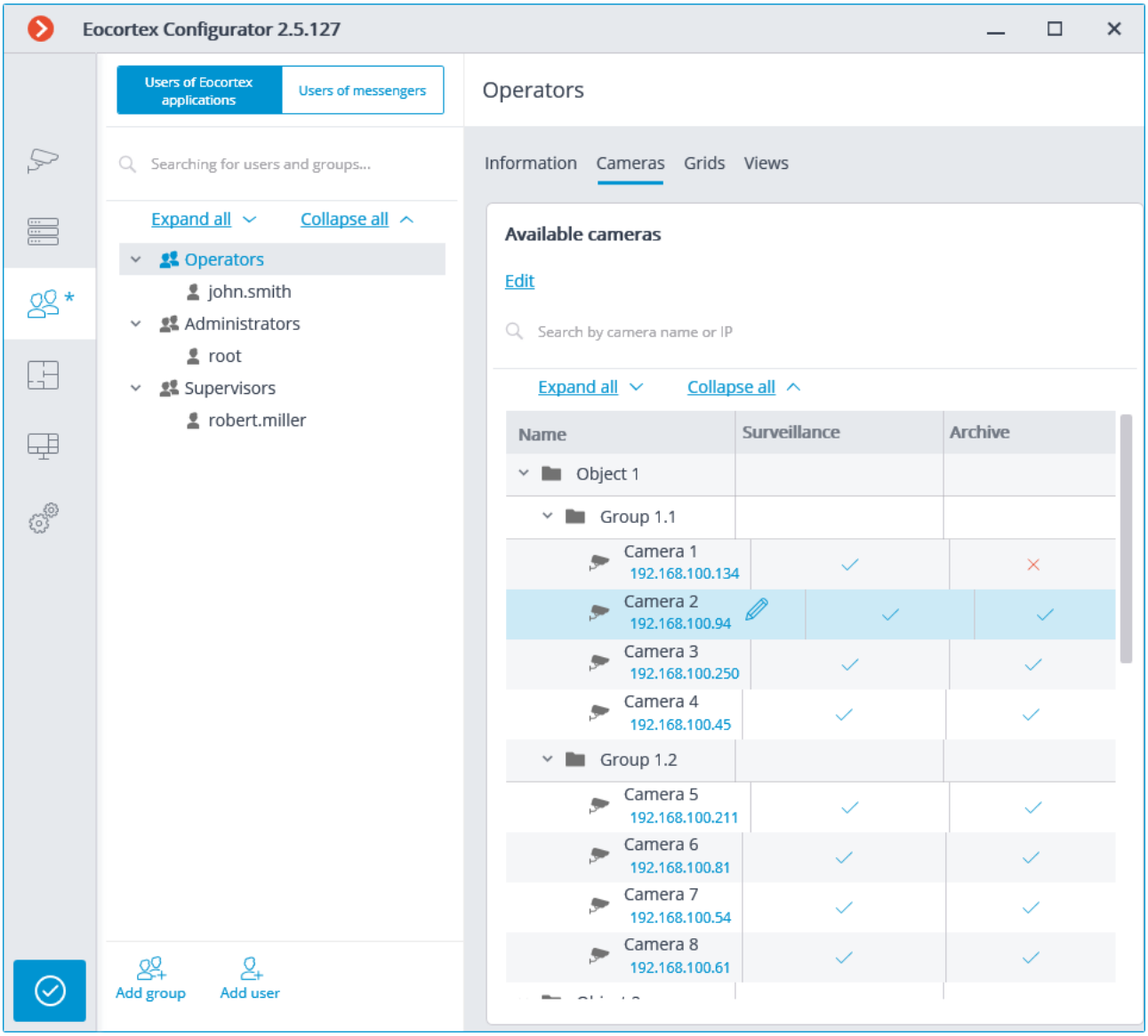

Adding group
General settings
Basic
Cameras
Grids
Views
Group:
Cameras
One right for surveillance and archive
Expand all
Collapse all
All cameras
Surveillance and archive
Object 1
Group 1.1
Camera 1
192.168.100.134
Camera 2
192.168.100.94
Camera 3
192.168.100.250
Camera 4
192.168.100.45
Group 1.2
Camera 5
192.168.100.211
Camera 6
192.168.100.81
Camera 7
Apply
Cancel

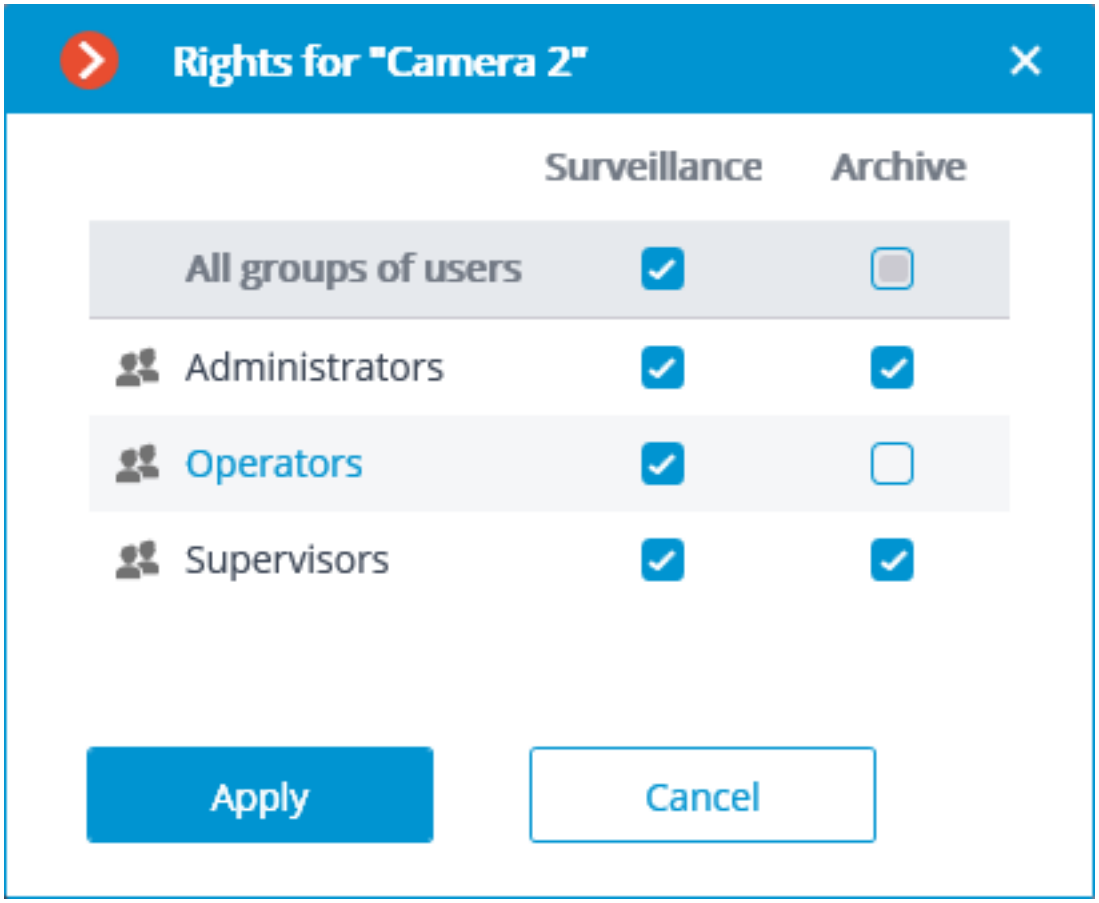


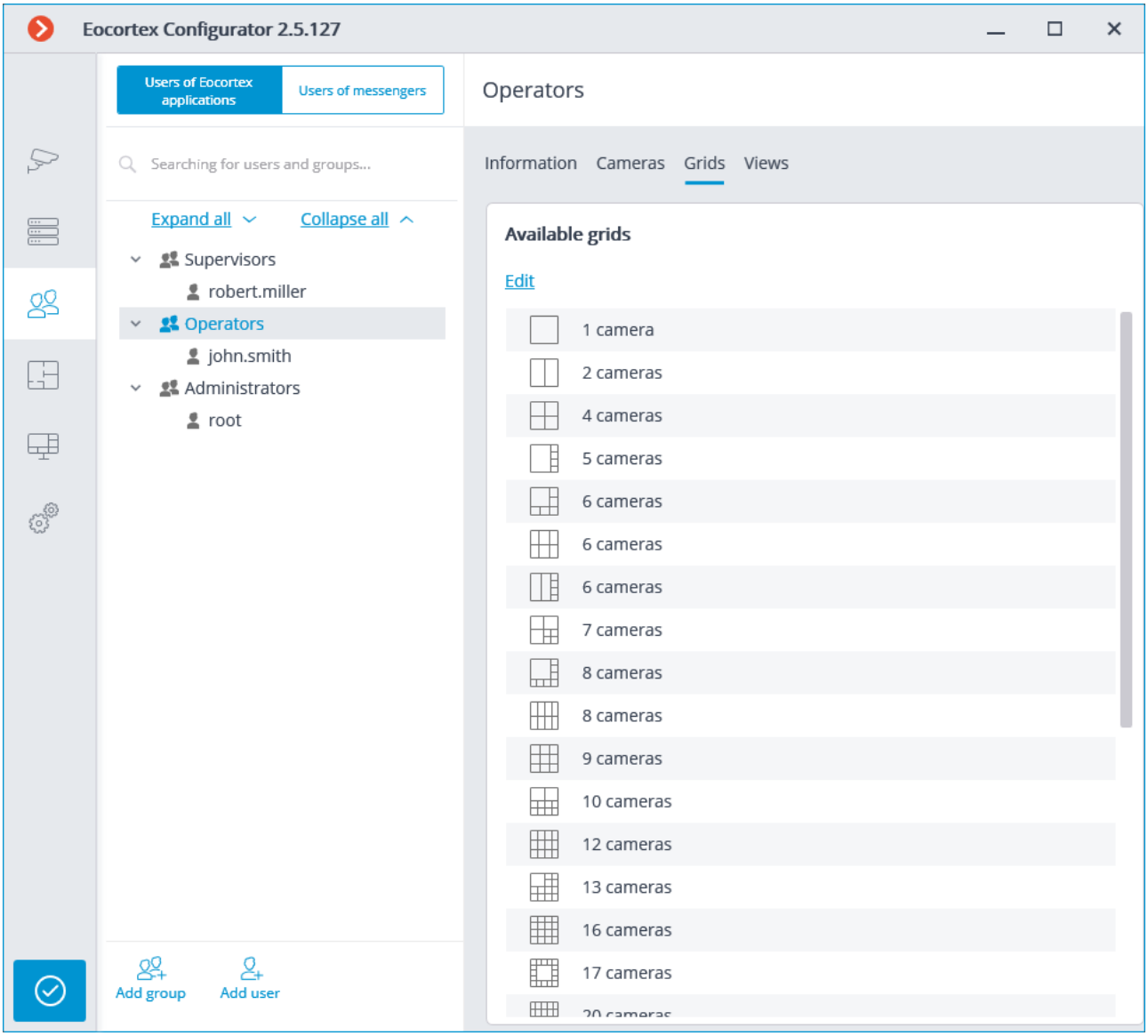
Viewing and modifying:

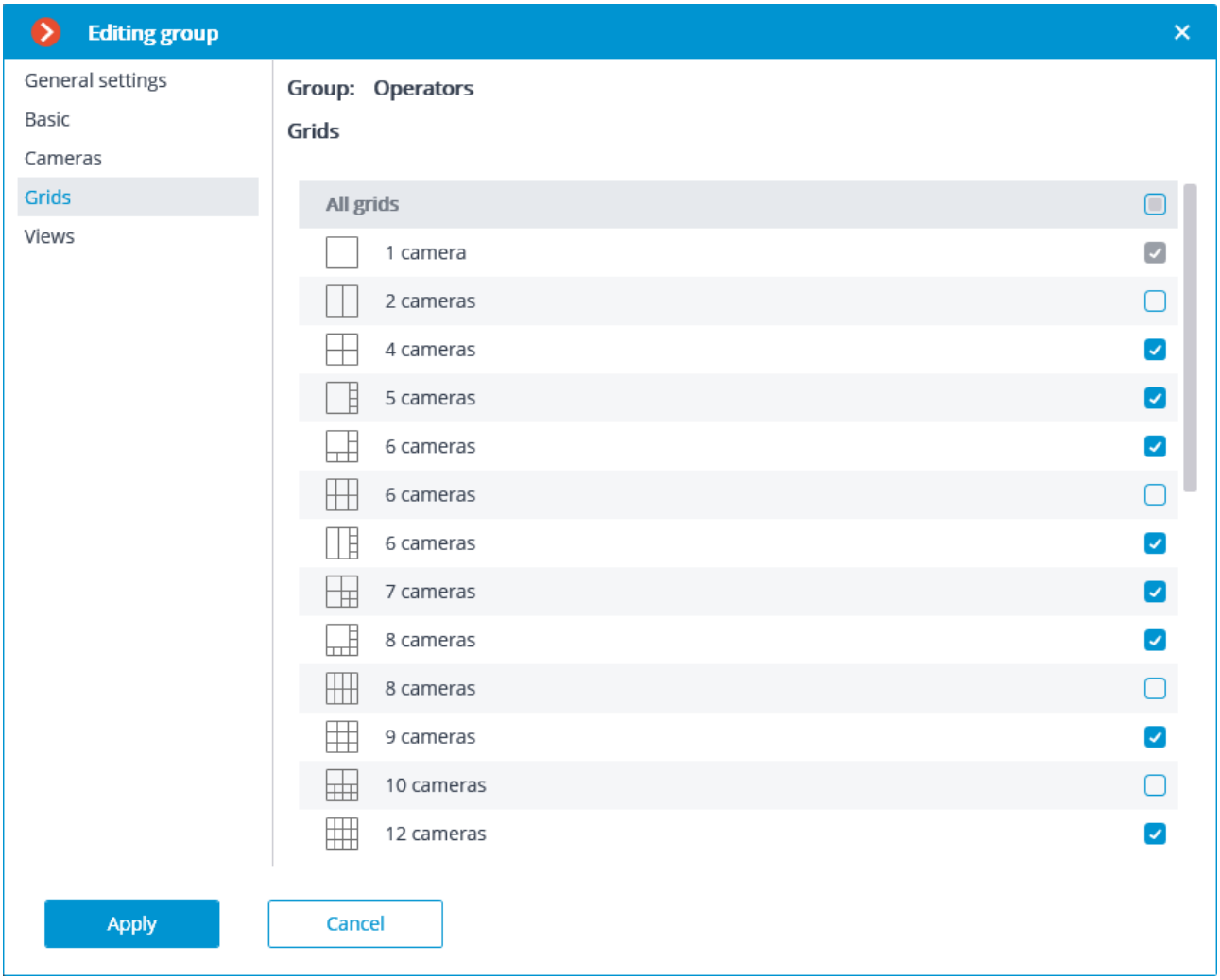

Eocortex Configurator 2.5.127
Users of Eocortex applications
Users of messengers
Operators
Searching for users and groups...
Information
Cameras
Grids
Views
Expand all
Collapse all
Operators
john.smith
Administrators
root
Supervisors
robert.miller
Main rights of the group Operators
Edit
Comment
CCTV operators
Access to new added cameras
Editing intelligent modules data
Client functions access
Log access [All system users in log]
Access to reports
Access to archive marks
Access to interactive search
Access to plans
Close application
Archive export
Archive expert mode access
Interaction with external components
Receive push notifications
Connection via mobile devices and Web-Client
Add group
Add user


Editing group
General settings
Basic
Cameras
Grids
Views
Group: Operators
General settings
Group name
Operators
Note
CCTV operators
Apply
Cancel


Eocortex Configurator 2.5.127
Users of Eocortex applications
Users of messengers
Operators
Searching for users and groups...
Expand all
Collapse all
Operators
john.smith
Administrators
root
Supervisors
robert.miller
Add group
Add user
Information
Cameras
Grids
Views
Available cameras
Edit
Search by camera name or IP
Expand all
Collapse all
Name
Surveillance
Archive
Object 1
Group 1.1
Camera 1
192.168.100.134
Camera 2
192.168.100.94
Camera 3
192.168.100.250
Camera 4
192.168.100.45
Group 1.2
Camera 5
192.168.100.211
Camera 6
192.168.100.81
Camera 7
192.168.100.54
Camera 8
192.168.100.61

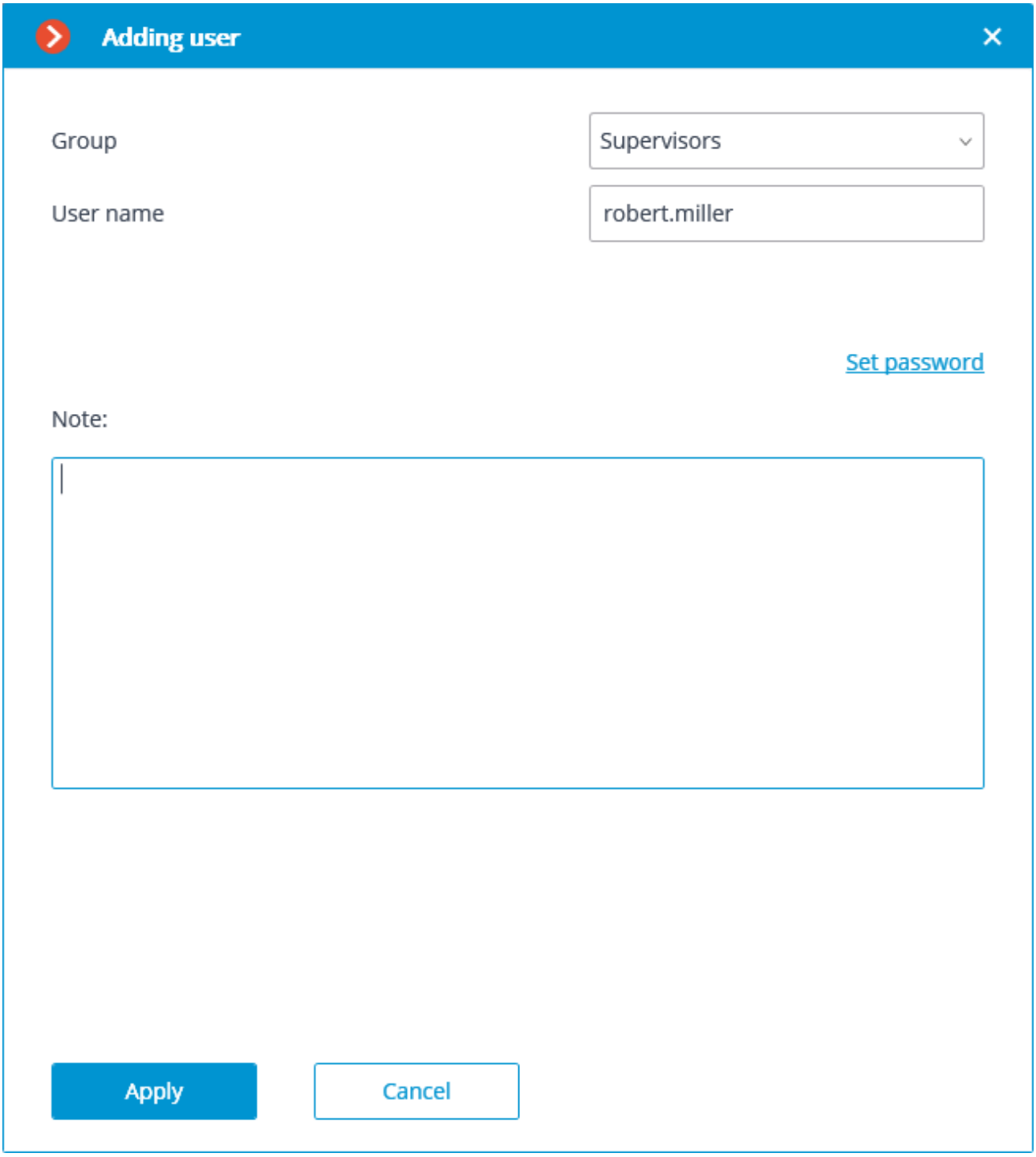

Rights for "Camera 2"
Surveillance
Archive
All groups of users
Administrators
Operators
Supervisors
Apply
Cancel

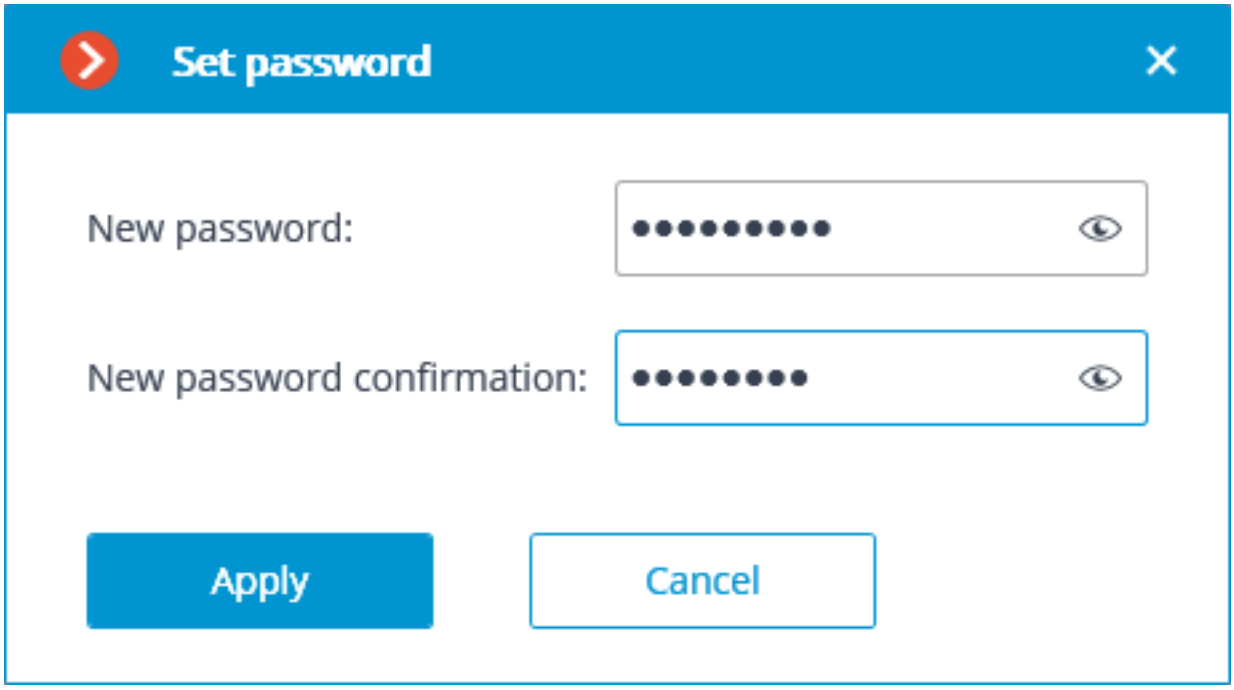

Eocortex Configurator 2.5.127
Users of Eocortex applications
Users of messengers
Operators
Searching for users and groups...
Information
Cameras
Grids
Views
Expand all
Collapse all
Supervisors
robert.miller
Operators
john.smith
Administrators
root
Available grids
Edit
1 camera
2 cameras
4 cameras
5 cameras
6 cameras
6 cameras
6 cameras
7 cameras
8 cameras
8 cameras
9 cameras
10 cameras
12 cameras
13 cameras
16 cameras
17 cameras
Add group
Add user



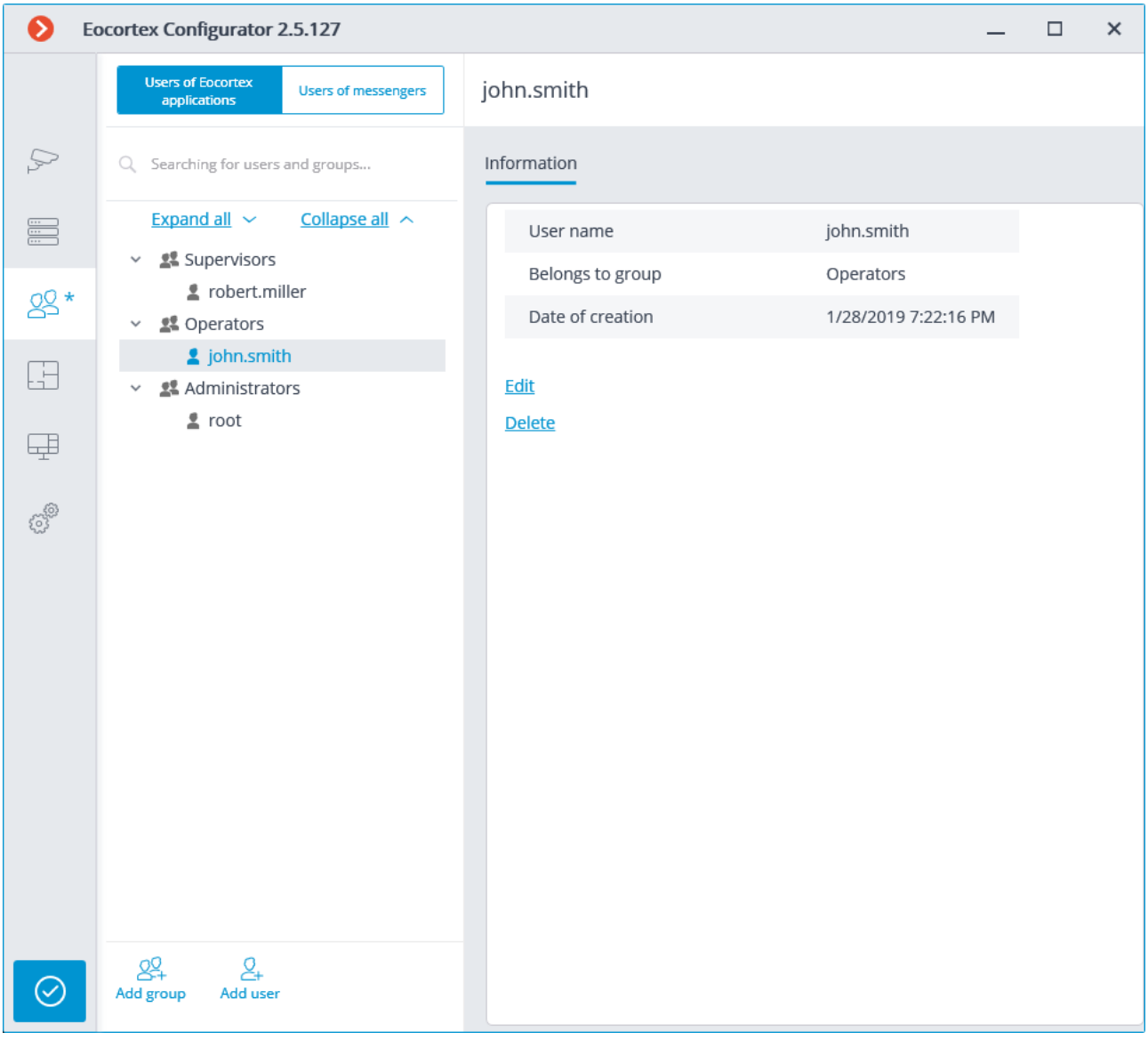
Adding, viewing and modifying user

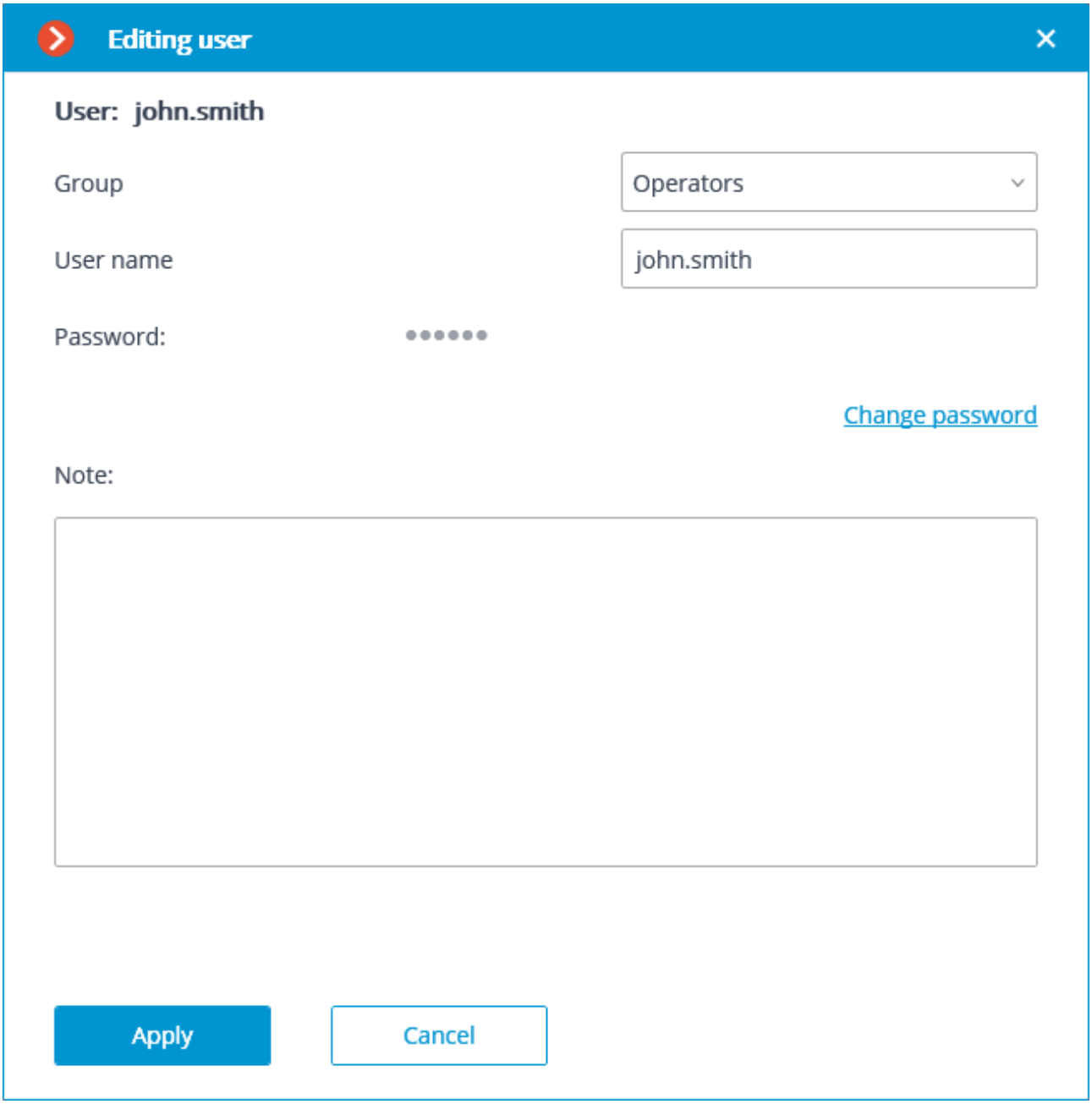
Adding:

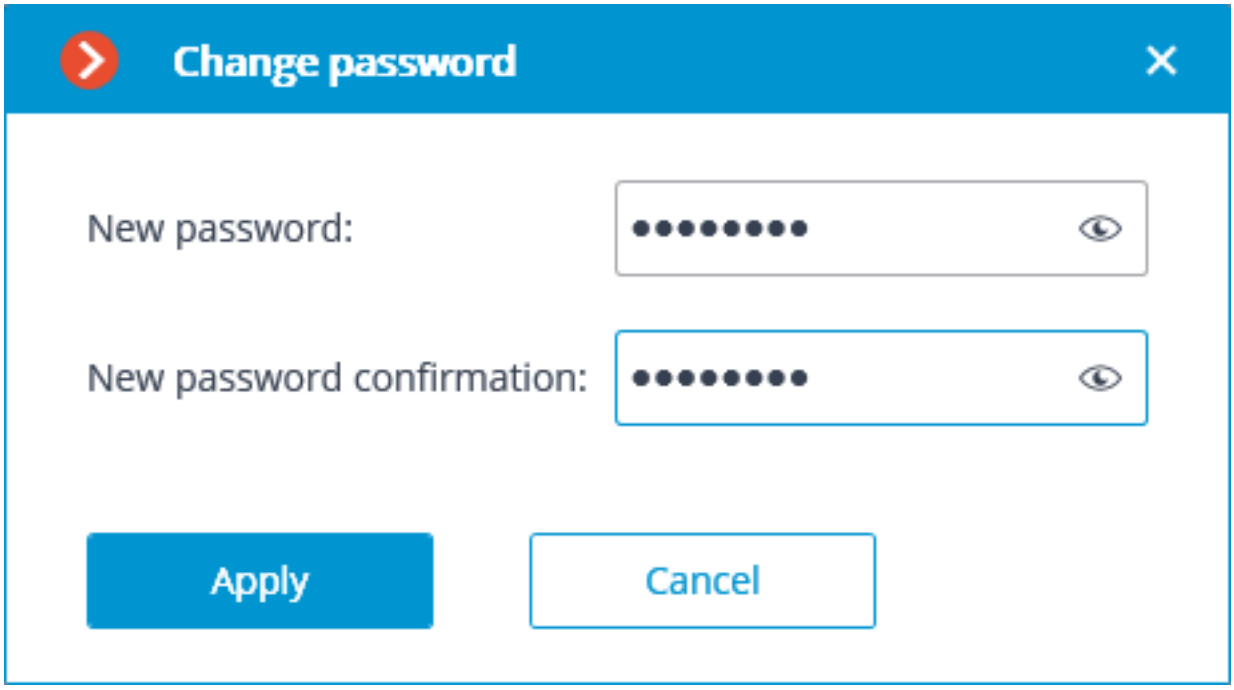

Adding user
Group
Supervisors
User name
robert.miller
Set password
Note:
Apply
Cancel



Viewing and modifying:

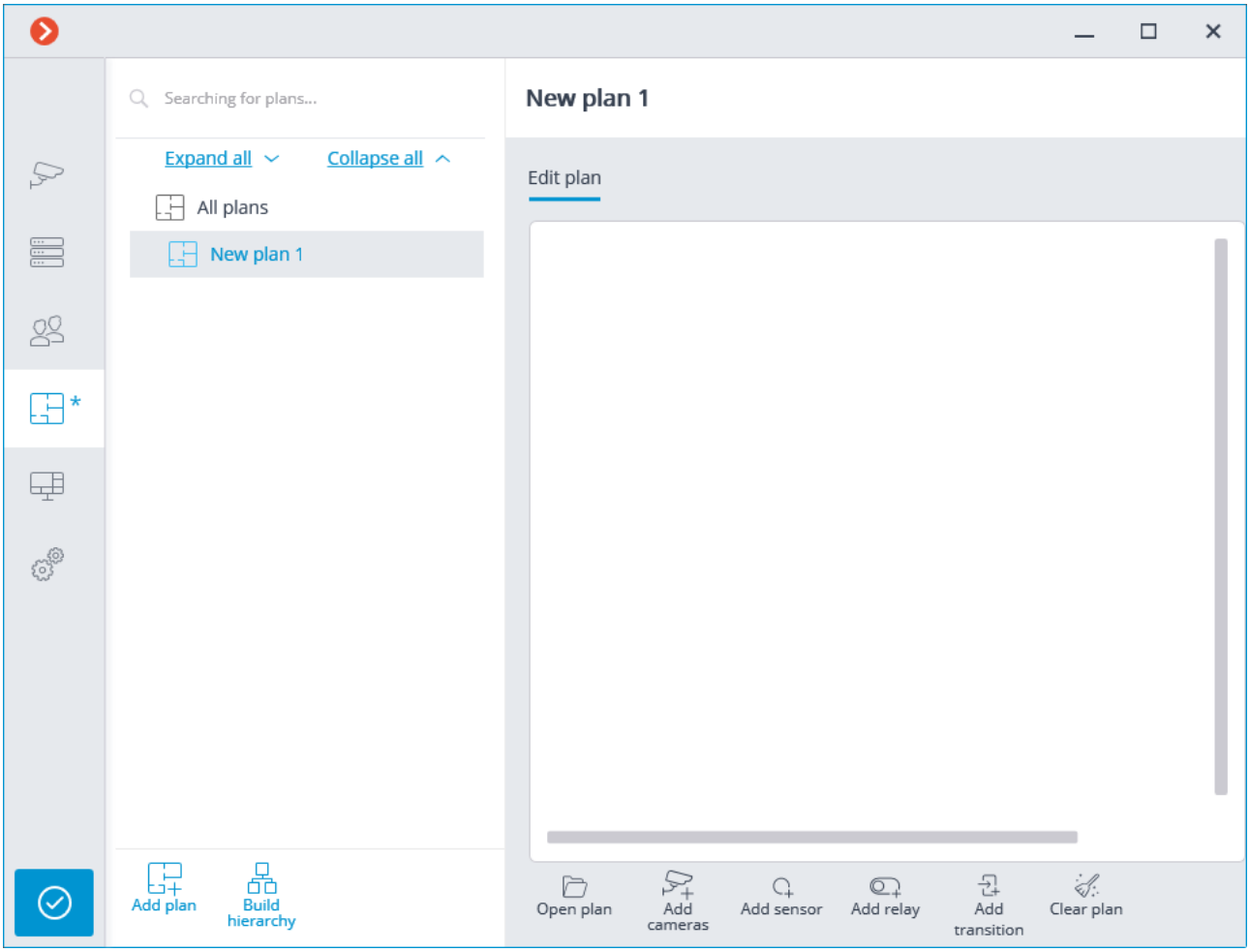



Editing user
User: john.smith
Group
Operators
User name
john.smith
Password:
Change password
Note:
Apply
Cancel



PLANS

To set up camera layout in the **Eocortex Configurator** application, go to **PLANS** tab.



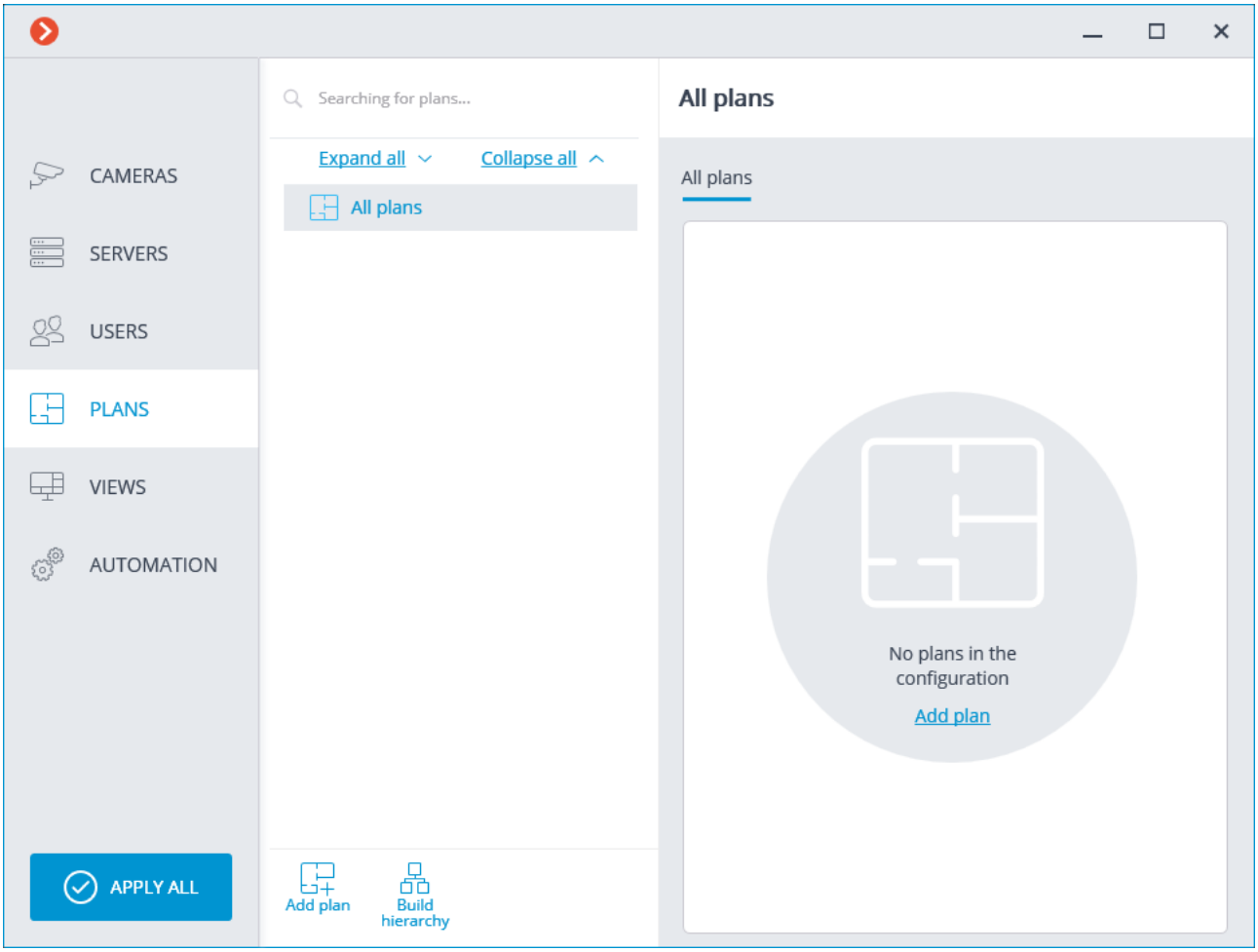
Site plans and cameras, sensors, relays, as well as camera fields of view and transition points between the plans located on them are shown on this tab.

Plan tree can be found on the left part of the tab. To set up a plan it is required to select it in the list. The downloaded plan will appear on the right part of the window. The empty page will appear if the plan has not been downloaded.

Listed below are the commands available when setting up camera layouts. These commands can be opened from the context menu or using the links on the empty page of the plan. Individual commands can be opened using various means, including hot keys.

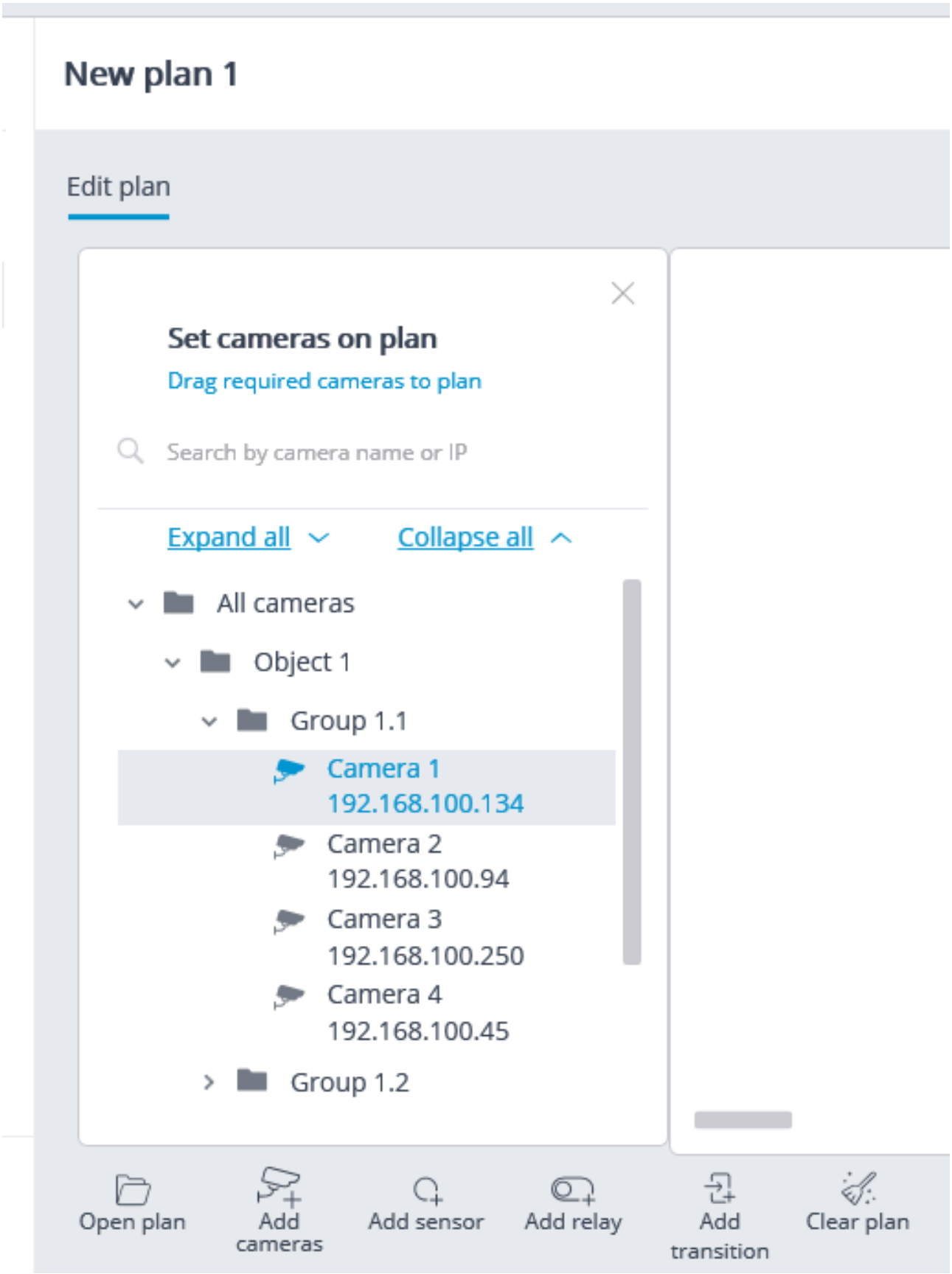
- **Add plan** adds a new plan subordinate to the one currently selected.
- **Create tree** builds a hierarchy of plans based on the tree of folders with cameras.

> After adding a new plan including the one made as a result of creating a hierarchy, the image of the plan itself is not yet uploaded.

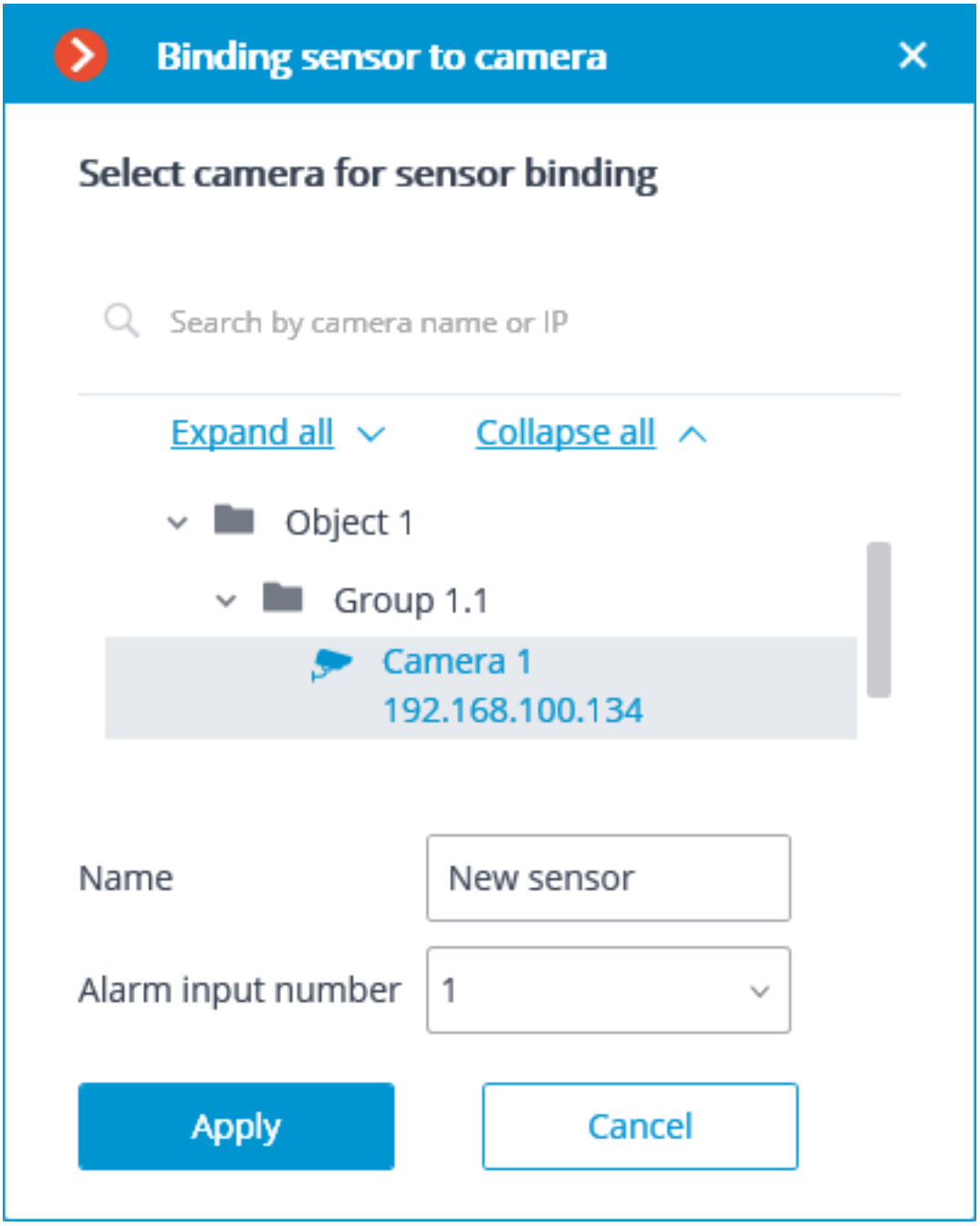


- **Open plan** uploads an image file in PNG, JPEG, BMP format. If there already is an image uploaded to the plan and it contains cameras, sensors, relays and transition points, they will be cleared before uploading the new image.

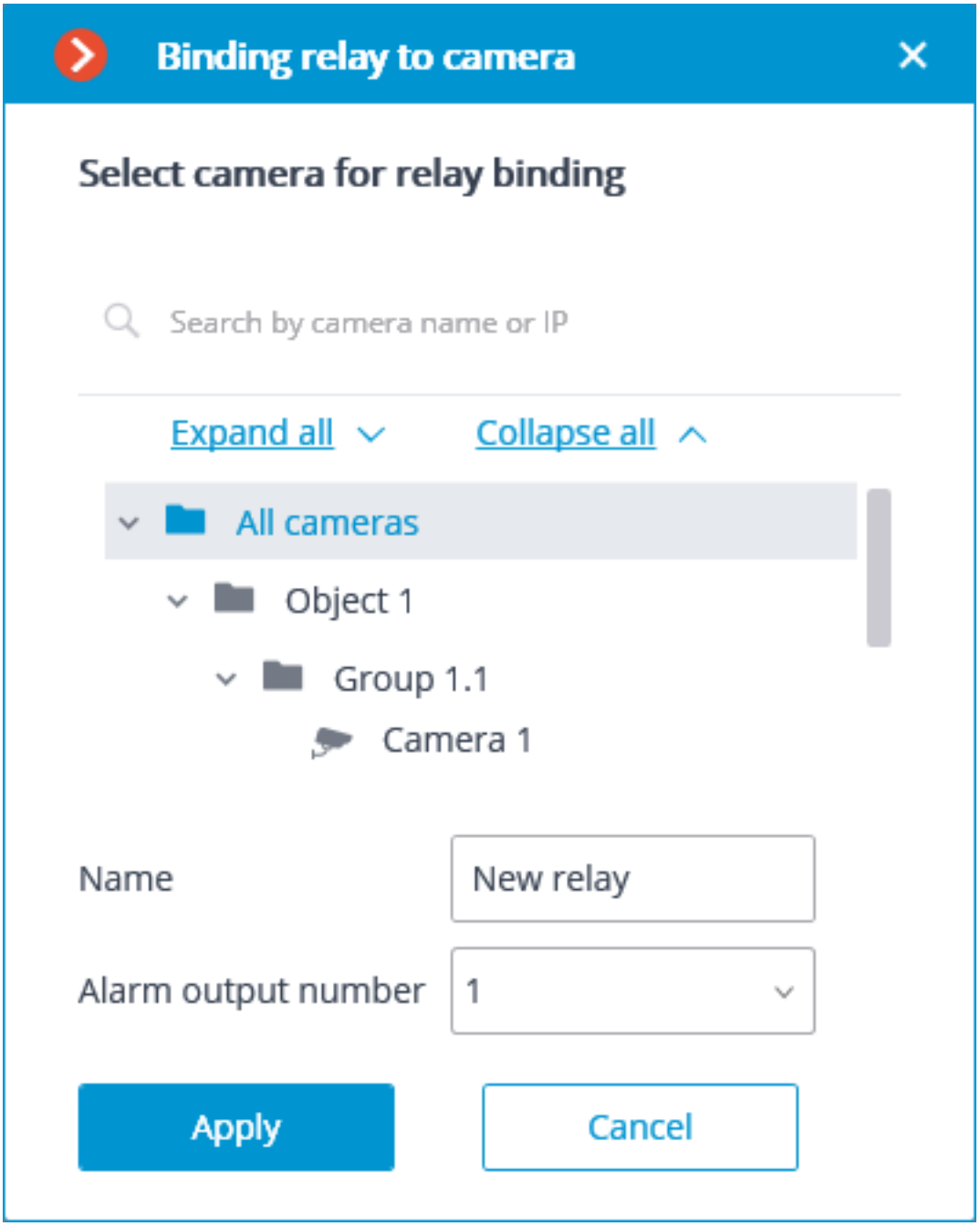
- **Add cameras** opens the camera tree. To add cameras to the plan it is required to drag it to the image in the right part of the page.



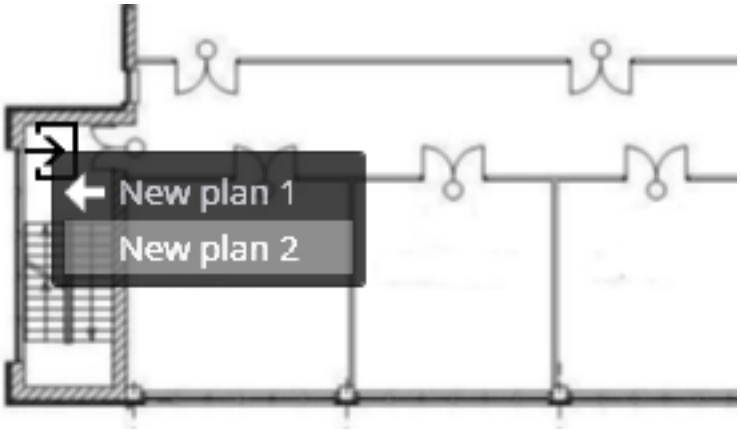
- **Add sensor** adds a sensor. When adding a sensor, it is required to indicate a camera and the number of its signal input to which the sensor is connected.

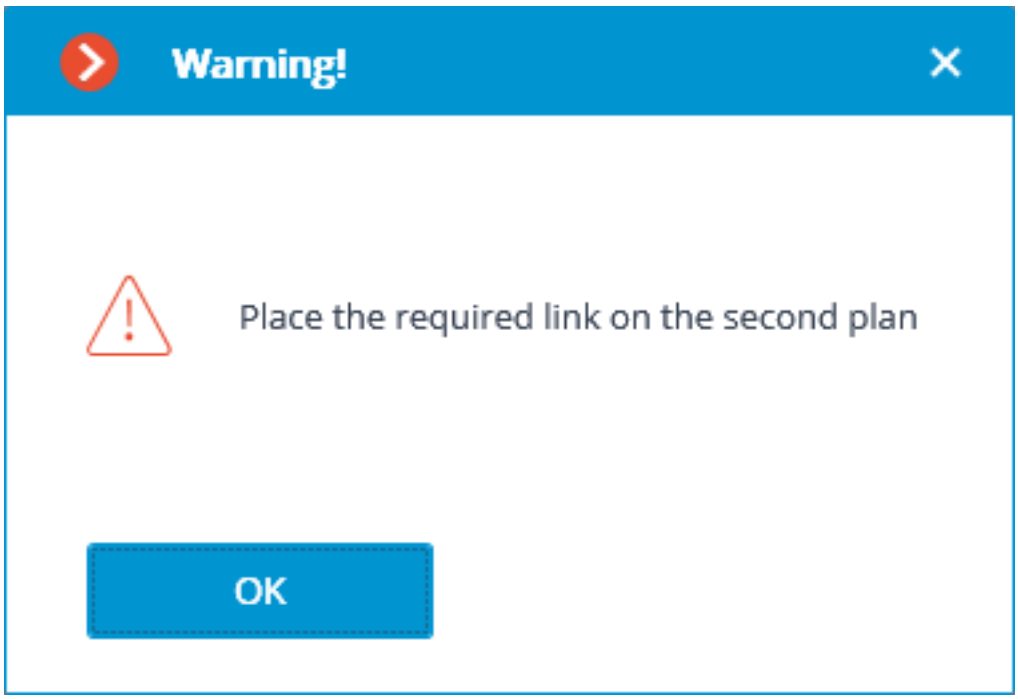


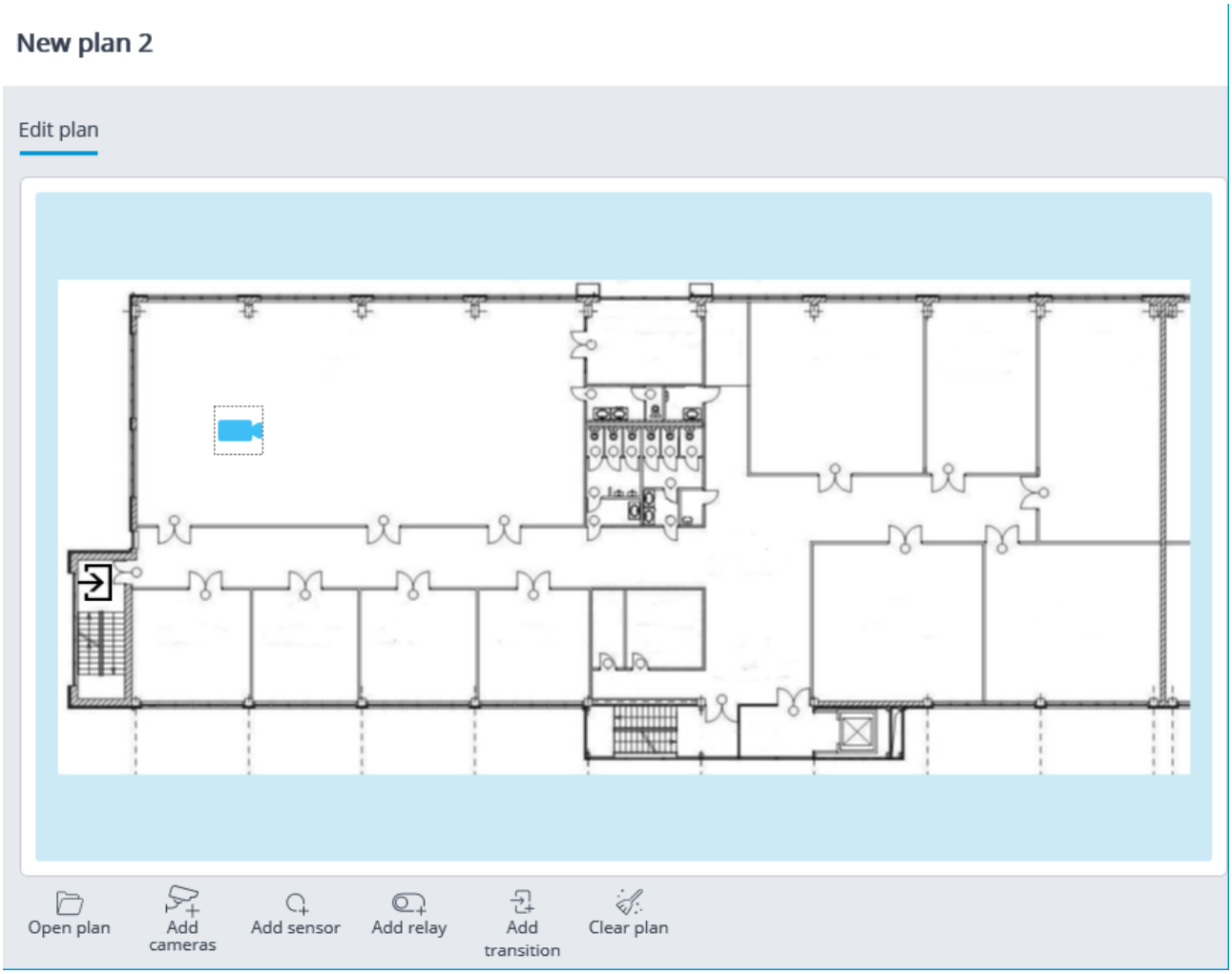
- **Add relay** adds a relay. When adding a relay, it is required to indicate a camera and the number of its signal input to which the sensor is connected.

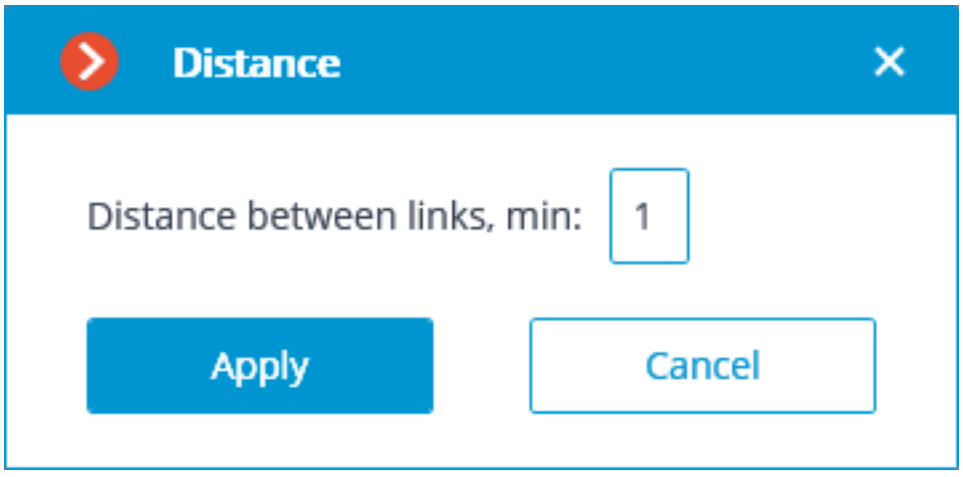


- **Add transition** adds a point of transition between the plans. When adding a transition, it is required to indicate the plan to which the transition will be made, then indicate the transition point on the target plan, as well as the minimum time of movement of the objects between these two points.


New plan 1
New plan 2


Warning!
Place the required link on the second plan
OK



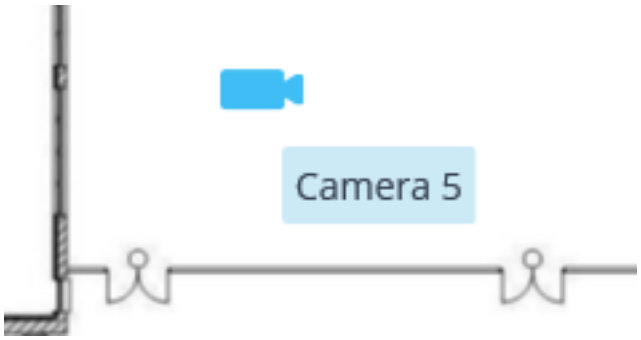


- **Clear plan** removes all the cameras, sensors, relays and transition points from the plan.

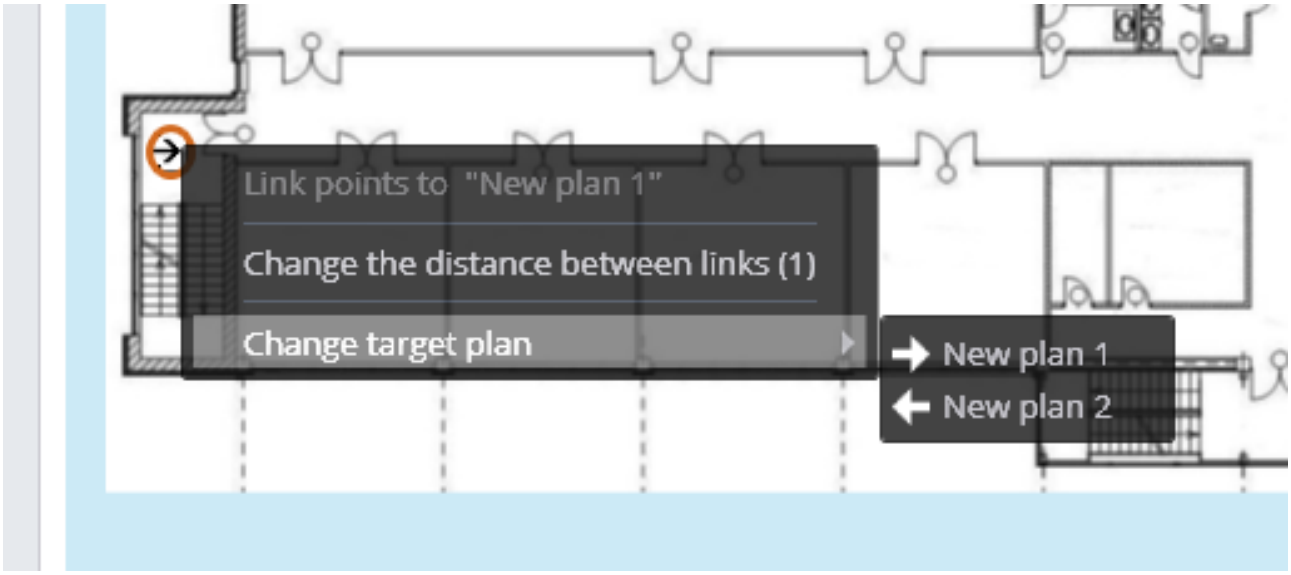
When selecting a plan in the tree, the context menu becomes available with the following commands:

- **Rename** modifies the name of a plan.
- **Save image** saves the image file with a plan with the cameras, sensors, relays and transition points located on it.
- **Delete** removes a plan.

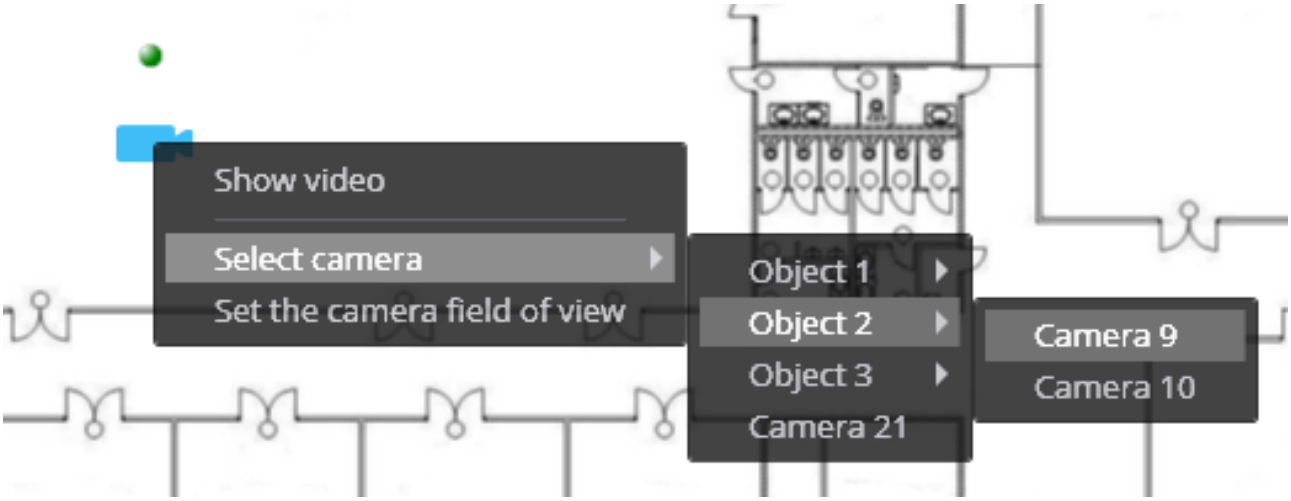
When a mouse pointer hovers above the camera, its name is displayed.



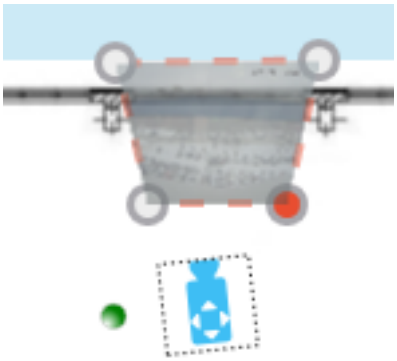
You can move the cameras, sensors, relays and transition points on the plan using the mouse; the cameras can also be rotated on a plane. You can delete an object by selecting it on the plan and pressing **Del**. You can also modify the settings using the context menu.



For a camera, it is possible to open a pop-up window of real-time video broadcasting, set the field of view, modify the camera's binding to the selected icon.



Camera field of view is a free-form rectangle. In the **Eocortex Client** application, when viewing a plan with the set fields of view, the image from the camera stretched to fit the rectangle is displayed in these fields; also, video analysis data superimposed on the field of view is shown subject to the appropriate settings.



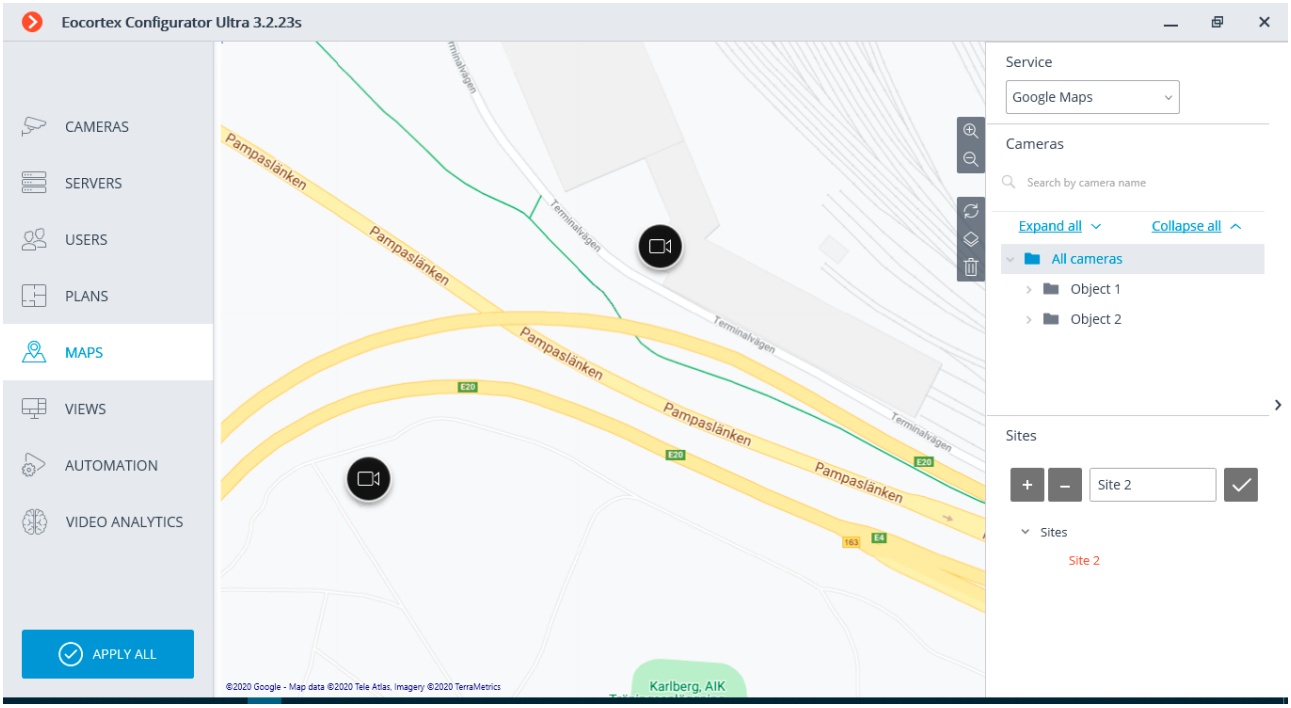
Sensors are the devices connected to the signal inputs of cameras. When a sensor is triggered, the CCTV system receives a signal from the camera connected to this sensor.

Relays are the devices connected to the signal outputs of cameras. The relays allow operator to send signals to the external devices connected to these relays.

Only those cameras that have the **Event processing (I/O)** option enabled in the settings are available for connection with sensors and relays.

MAPS

To place cameras on the geographical maps provided by the cartographic services, it is required to go to the **MAPS** tab in the **Eocortex Configurator** application.



This tab displays a geographical map with the cameras, sensors and relays placed on it.

A bar with the following buttons is placed on the right side of the map:

Zoom in: scales up the map.

Zoom out: scales down the map.

Discard site changes: returns the current site to its position at the moment of opening the tab or the last application of settings.

Change layer: modifies the current map layer.

Delete all: deletes all the cameras, sensors and relays added to the map earlier.

On the right side of the window there is a sliding bar with the following elements:

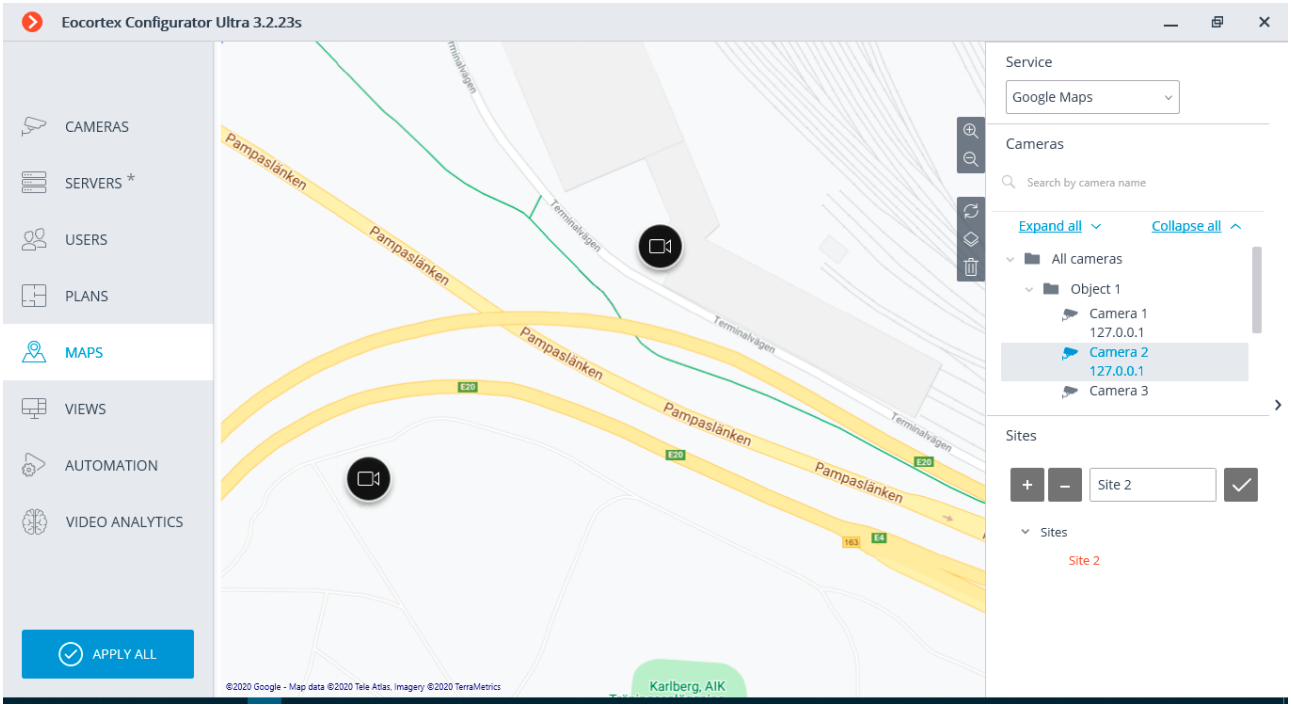
Service: allows to choose a map provider. The current location does not change with the change of the provider.

The maps of the following providers can be used:

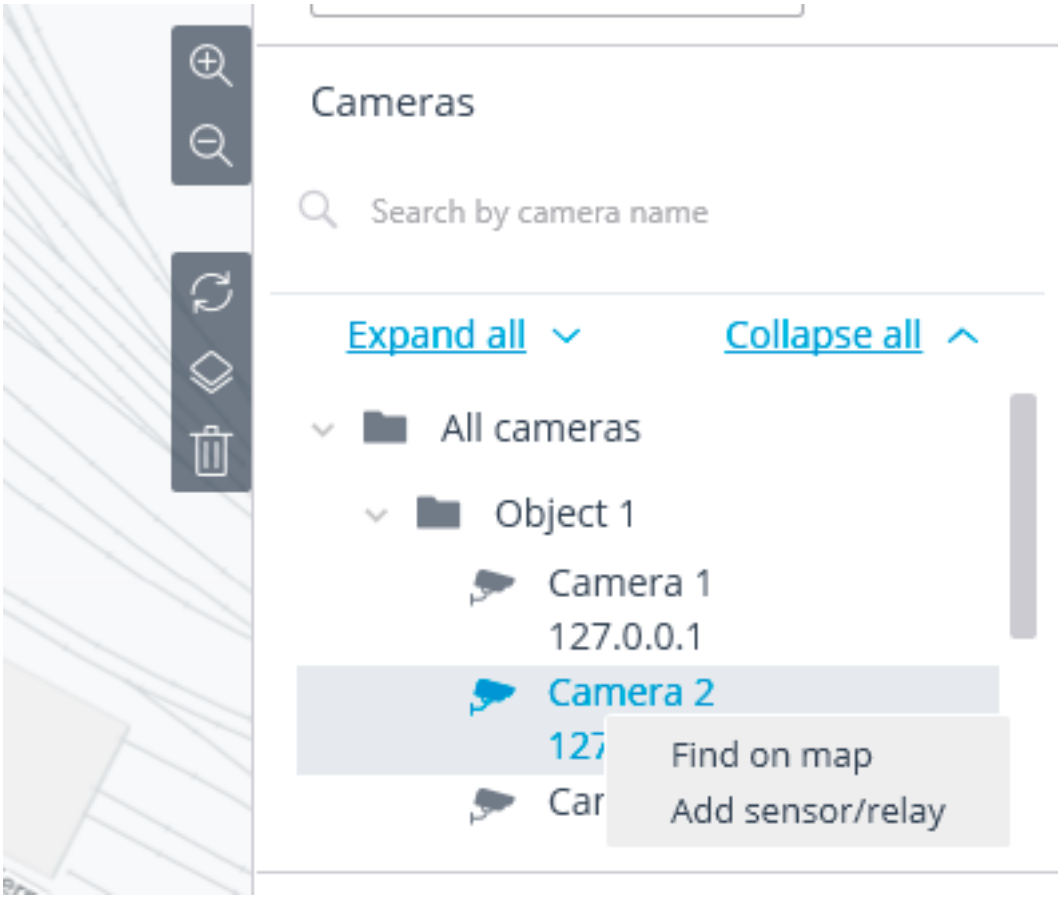
- **Google Maps**. Available layers: **Maps**; **Satellite**.
- **OpenStreetMap**. Available layers: **OpenStreetMap**; **OpenCycleMap**; **OpenCycleLandscapeMap**.

Cameras.

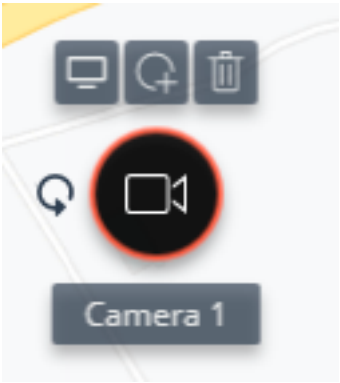
To add a camera to the map, drag it from the list to a required point on the site.



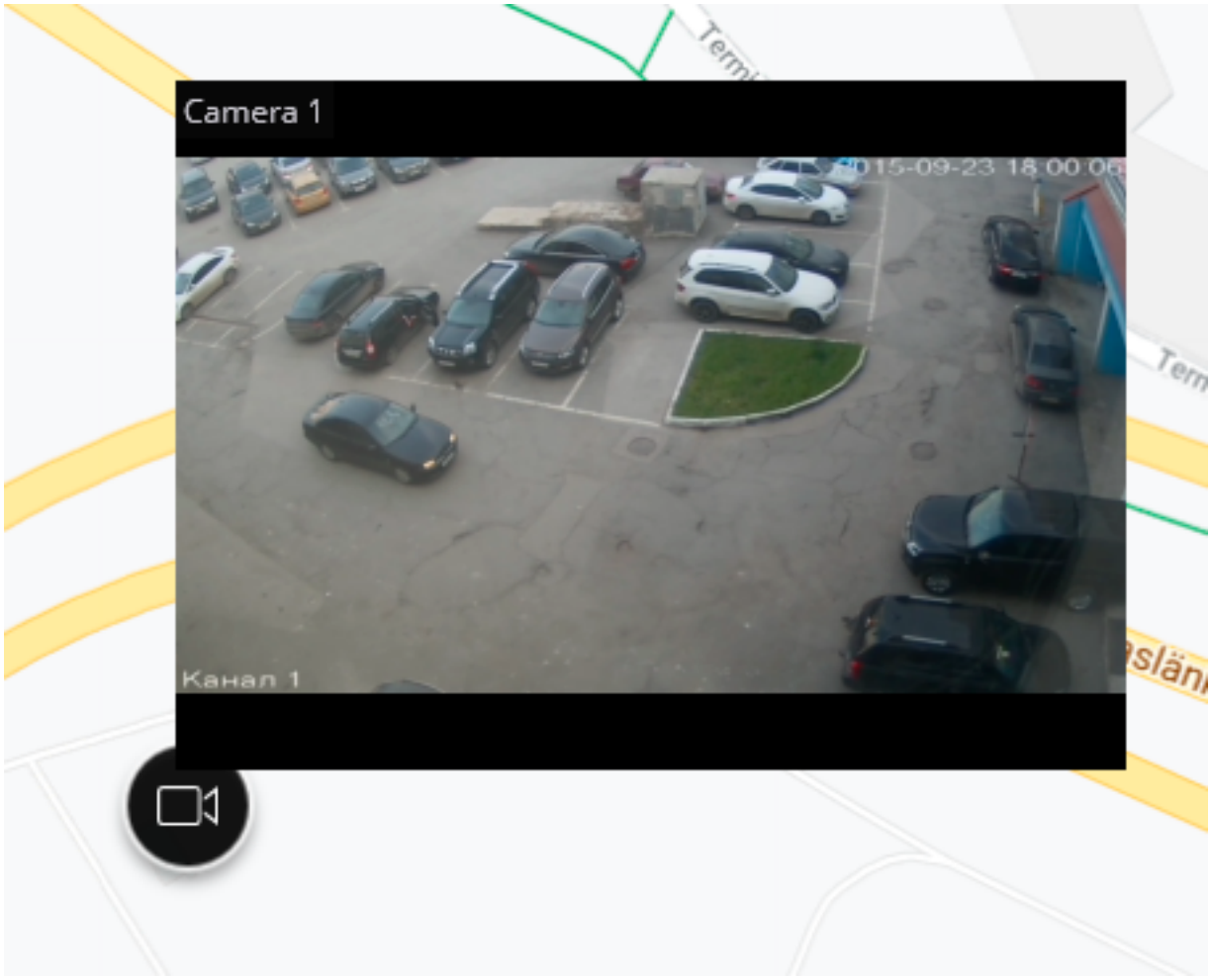
To quickly go to the camera placed on the map, select it in the list and choose the **Find on map** item in the context menu. The same method works for the sensors and relays located on the map.



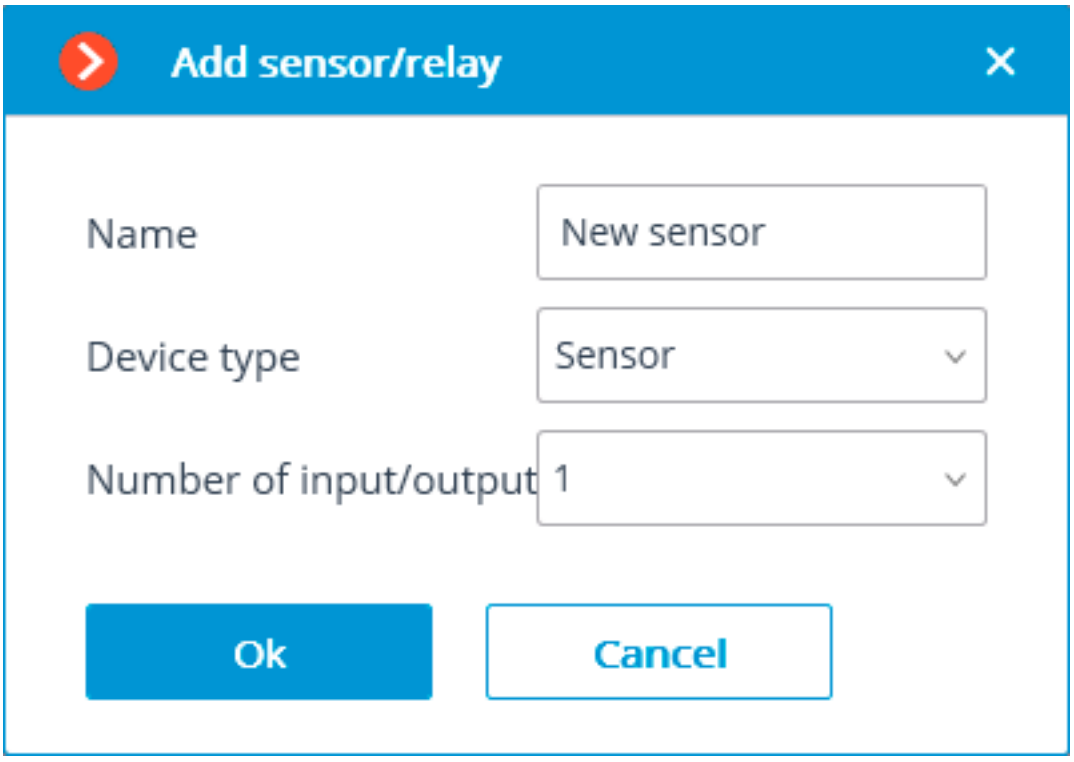
The following actions are available when selecting a camera on the map:

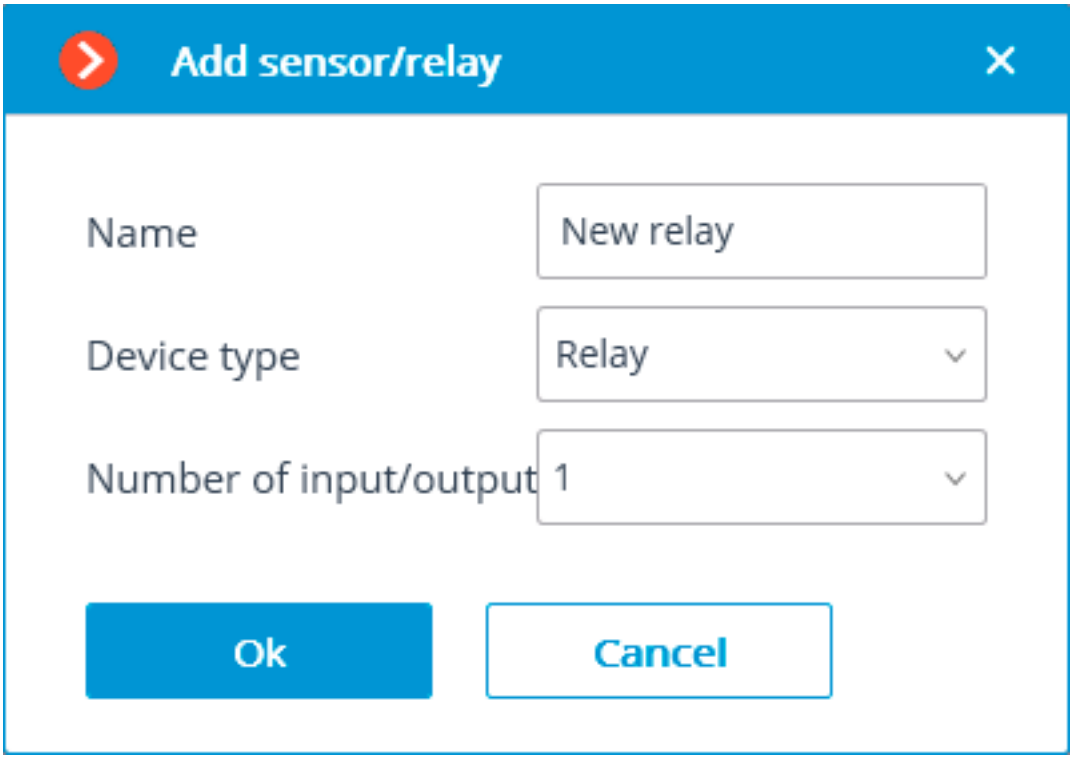


Viewing: opens the camera preview window. The preview window also opens when the mouse pointer is hovered over the camera.

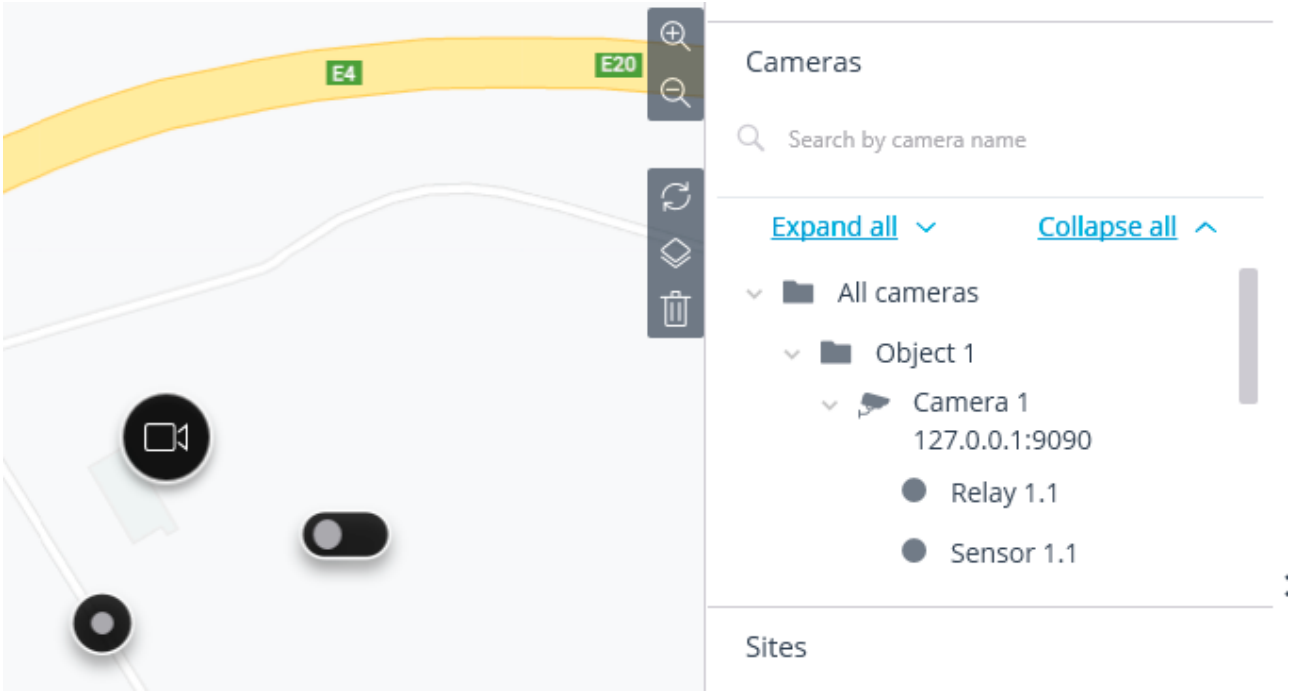


Add sensor/relay: adds a sensor or a relay connected to the signal connectors of the camera.



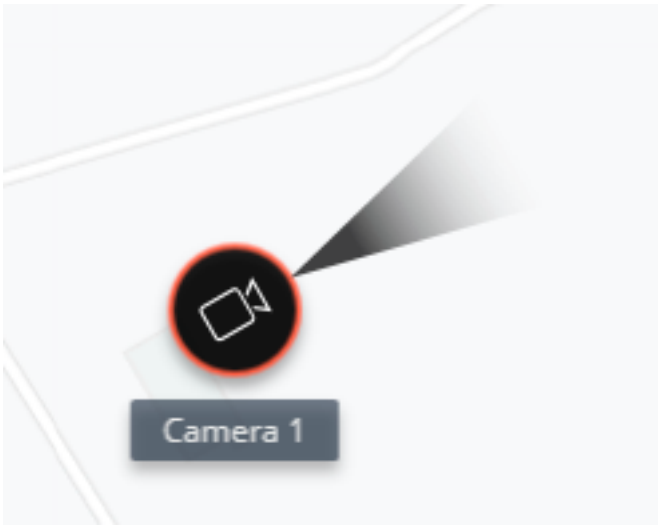


The sensors and relays will appear in the list of cameras after being added to the map.



Delete: removes a camera from the map.

Turn: enables the mode of turning a camera's icon.



Sites.

Here it is possible to set up sites that allow users to quickly go to the required locations on the map in the preset scale.

VIEWS

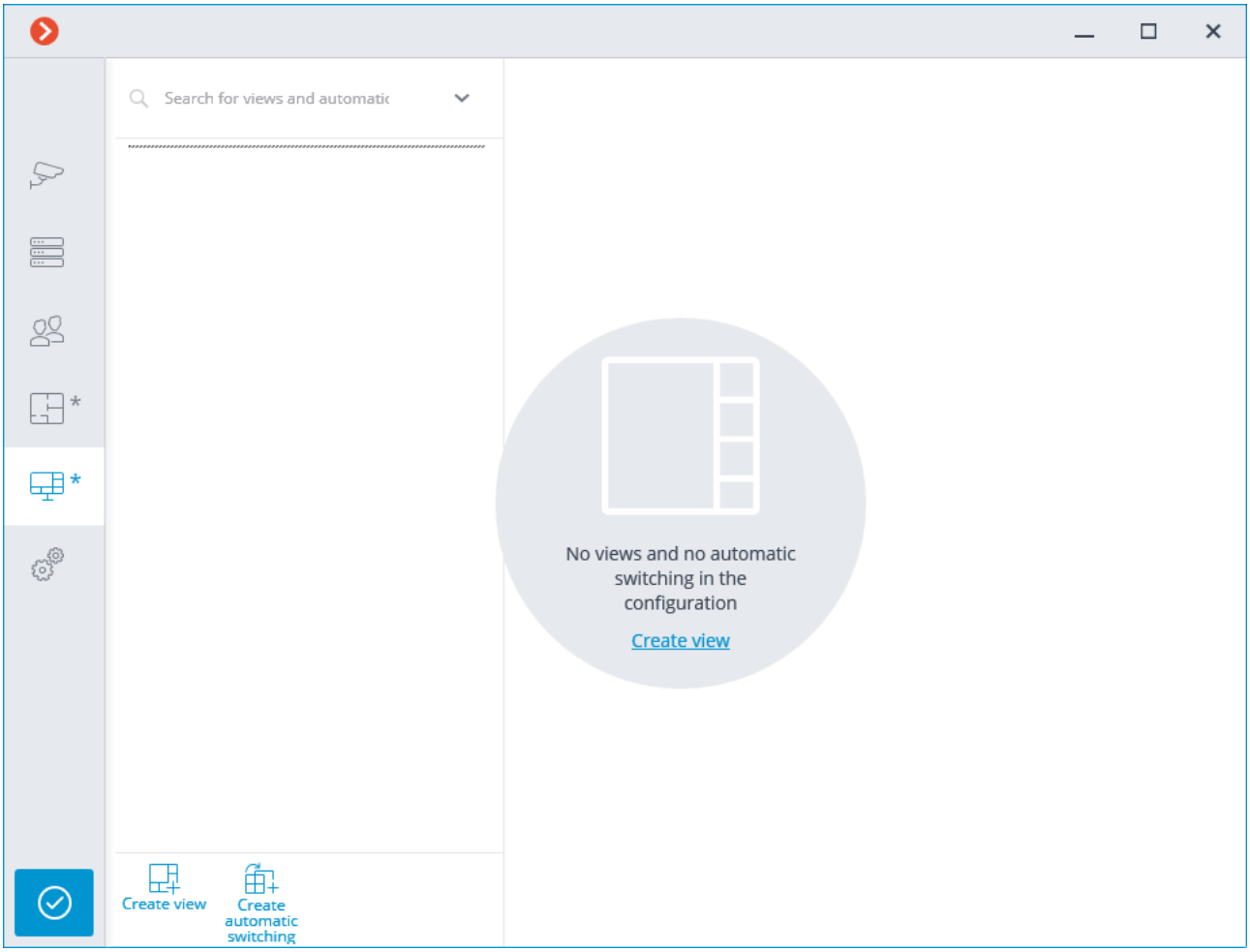
To display the images from the cameras on the screen in the client applications, **Eocortex** uses **Views** – grids with the images from the cameras shown in the cells. There are two types of views: Server and Client ones.

- **Server View** is a view created by a video surveillance system administrator in **Eocortex Configurator**. The server views are available in the **Eocortex Client** application as well as in the mobile client applications working under Android and iOS. In a multi-server system, the server views are available when connecting to any server of the system via the client application. At that, the server view is added to the client application at the moment of launching it. Thus, if you create or modify a server view, the changes will appear only after the restart of the application.
- **Client View** is a view created by a user in the client application. The client views are available only on a particular device or computer on which they were created, and only for the particular user who created them. Upon the termination of a session of working with the client application, all the client views that contain no cameras are deleted.

⚠ The server views that contain no cameras will not be added to the client application when it is launched.

In addition to views, automatic switching can be used. **Automatic switching** is a sequence of views that replace one another automatically. It is intended to change the views automatically with the preset periodicity so that the user would not have to do it manually.

To set up server views and automatic switching in the **Eocortex Configurator** application, go to the **Views** tab.

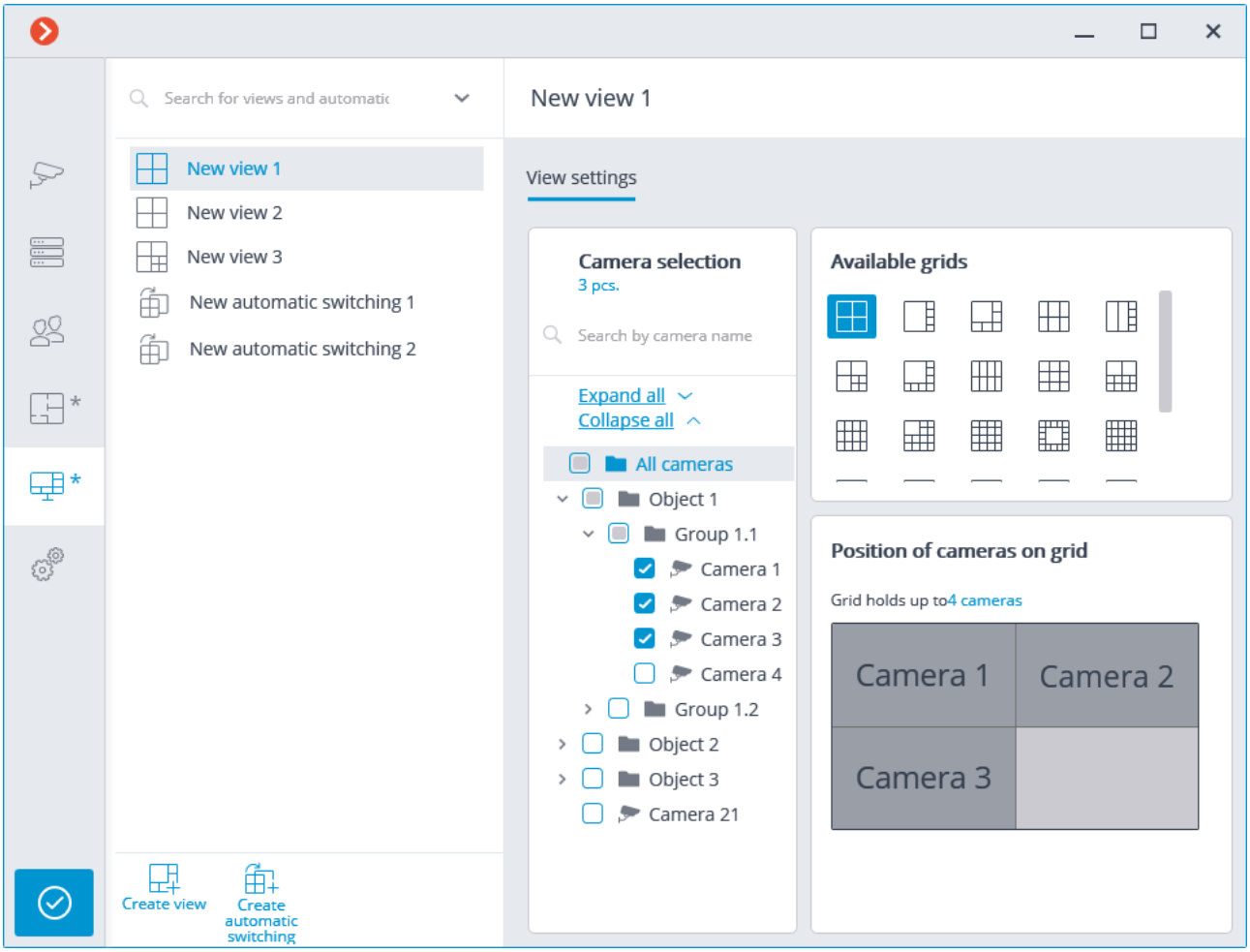


Below are the commands available in the course of setting up views and automatic switching. These commands can be opened from the context menu, by using the buttons at the bottom of the page, or by clicking the links on the page of the views and automatic switching. Some commands can be opened using various methods, including hot keys.

- **Create view**
- **Create automatic switching**
- **Rename**
- **Delete**

Selecting a view or a switching in the right part of the tab makes their settings available.

Server view settings

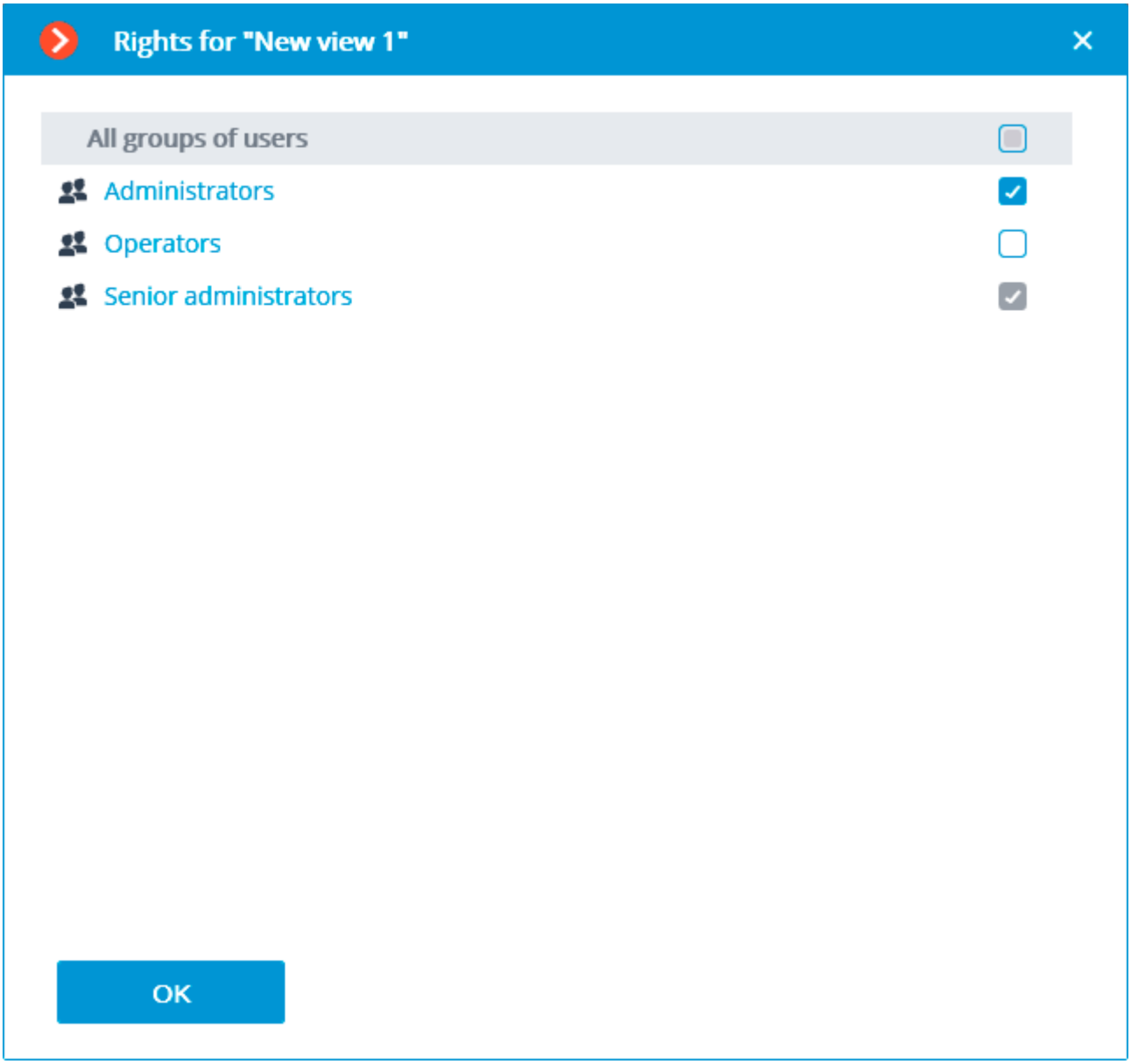


The view can be configured using various methods:

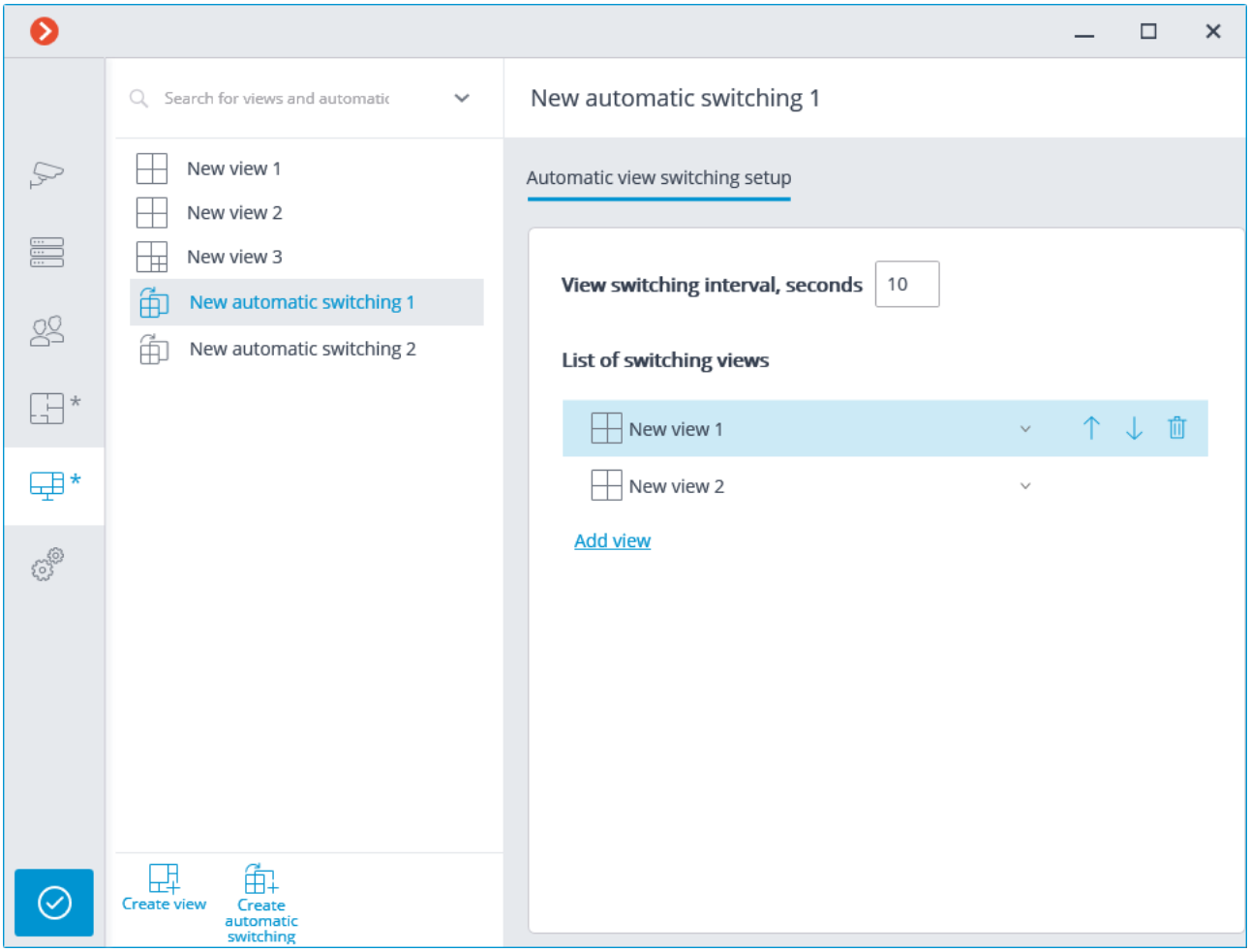
- Mark cameras and folders in **Camera selection** tree, then choose one of the grids in the **Available grids** section. The cameras will be automatically placed in the grid cells.
- Select one of the available grids in the **Available grids** section, place cameras on the grid dragging them from the **Camera selection** tree to the grid.

  You can modify the layout of cameras on the grid by dragging them between the cells with your mouse.

  In certain types of licenses, the access rights are set for each view.



Automatic switching settings



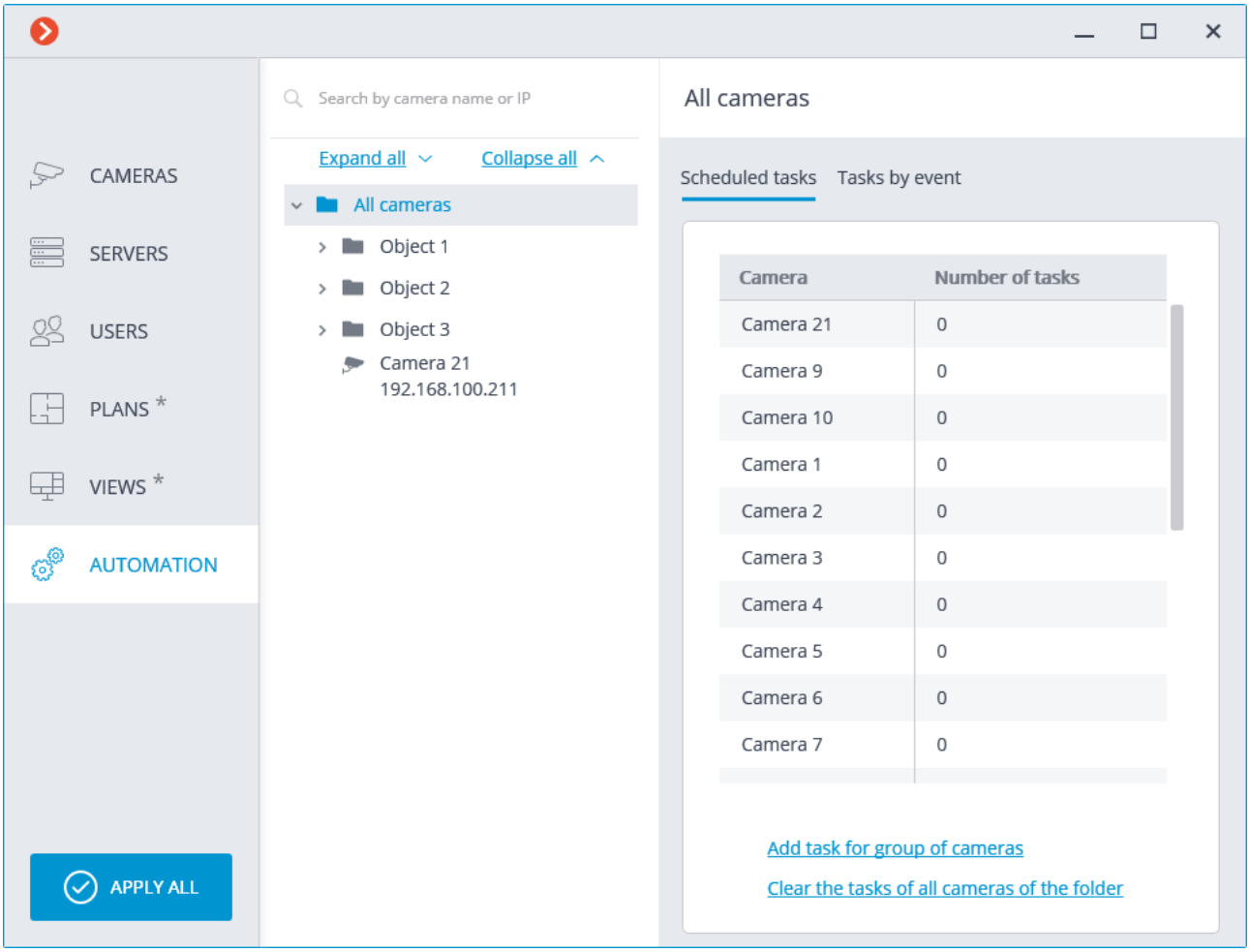
To set up the automatic switching, it is required to set the time of displaying each view in the **View switching interval, seconds** field and add the desired views to the **List of switching views** using the **Add view** command.

When adding a view to the list, the first available view is always added by default. To modify the added view, use the buttons located to the right of its name:

- view selection/modification;
- moving the view up the list;
- moving the view down the list;
- deleting the view.

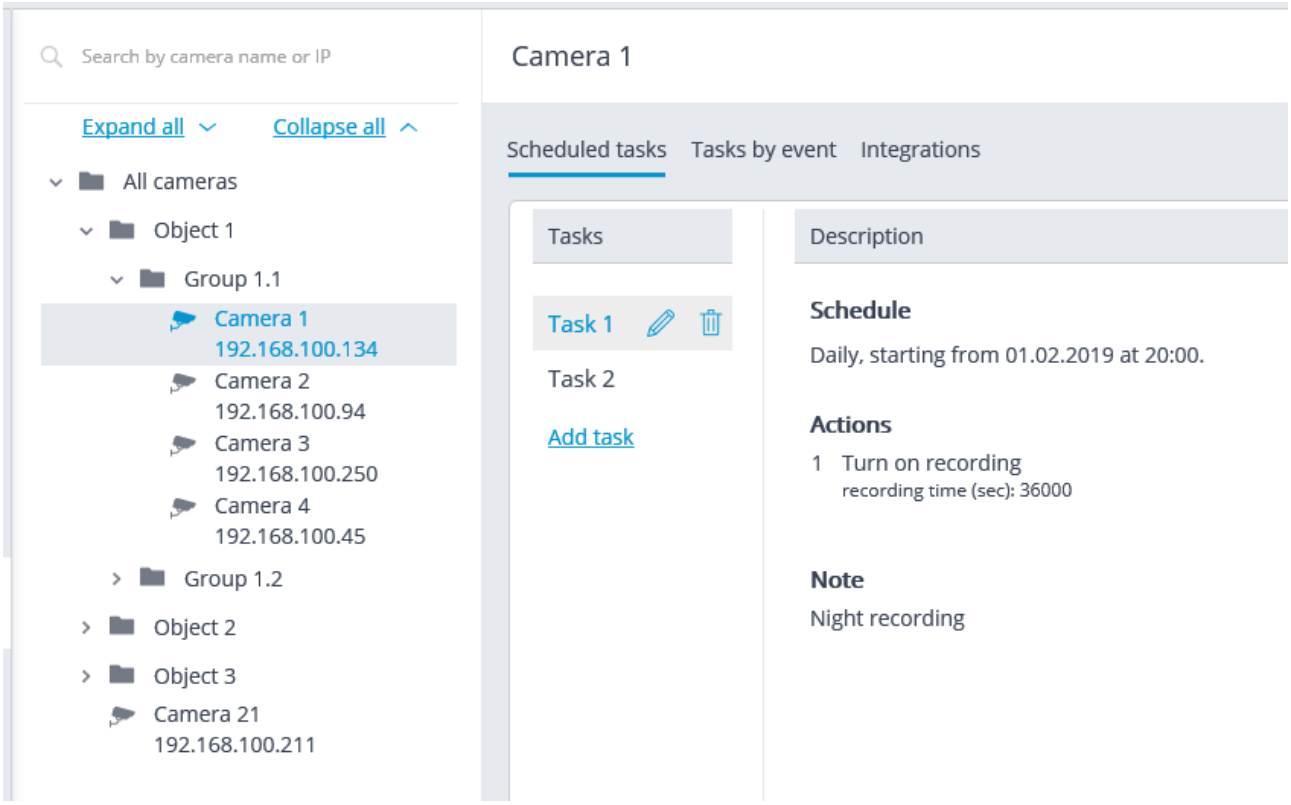
AUTOMATION

To set up actions to be performed on schedule or in response to certain events, as well as for adjusting the interaction with the external systems, it is required to go to the **AUTOMATION** tab in the **Eocortex Configurator** application.

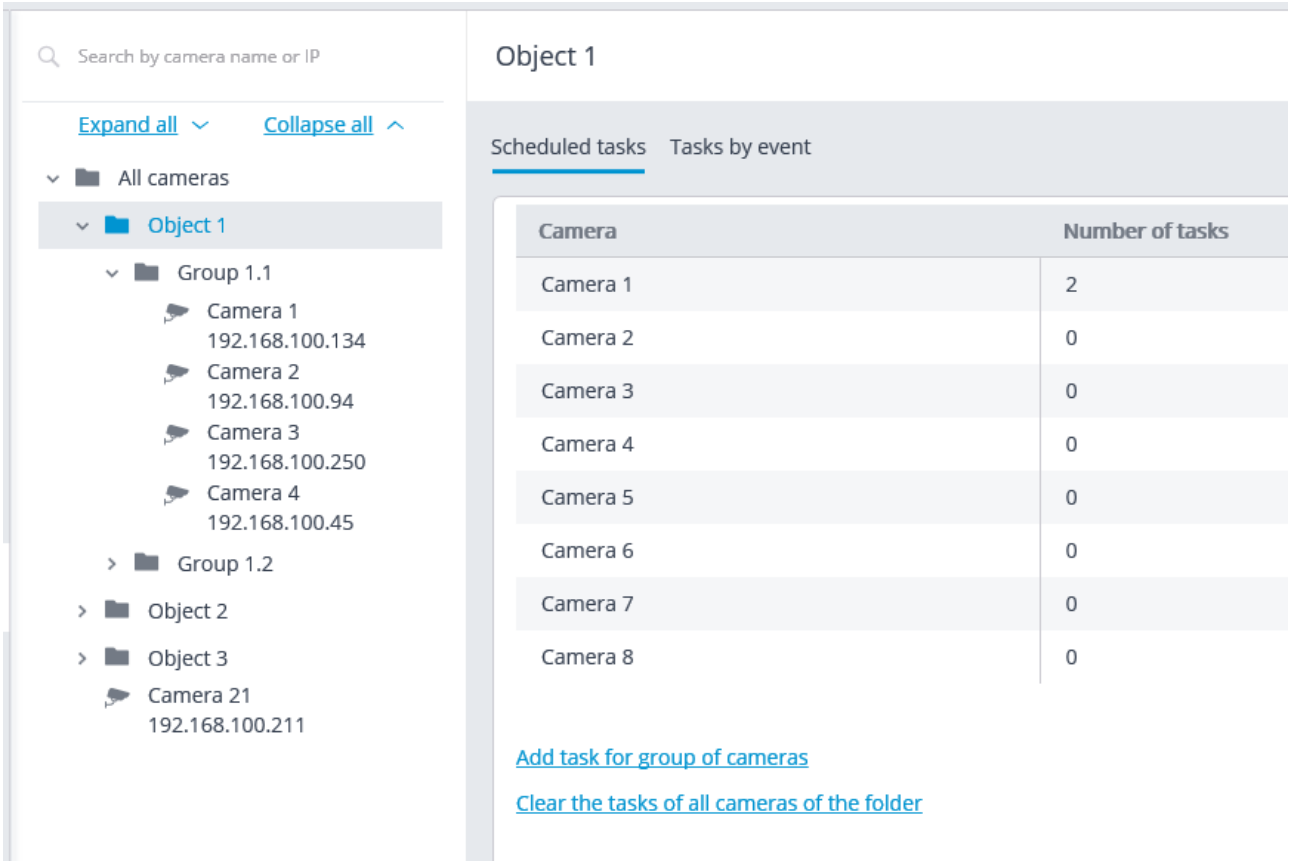


In the left part of the tab there is a camera tree, and in the right one – a page of automation settings for the camera or folder currently selected. The tabs for cameras differ from the tabs for folders.

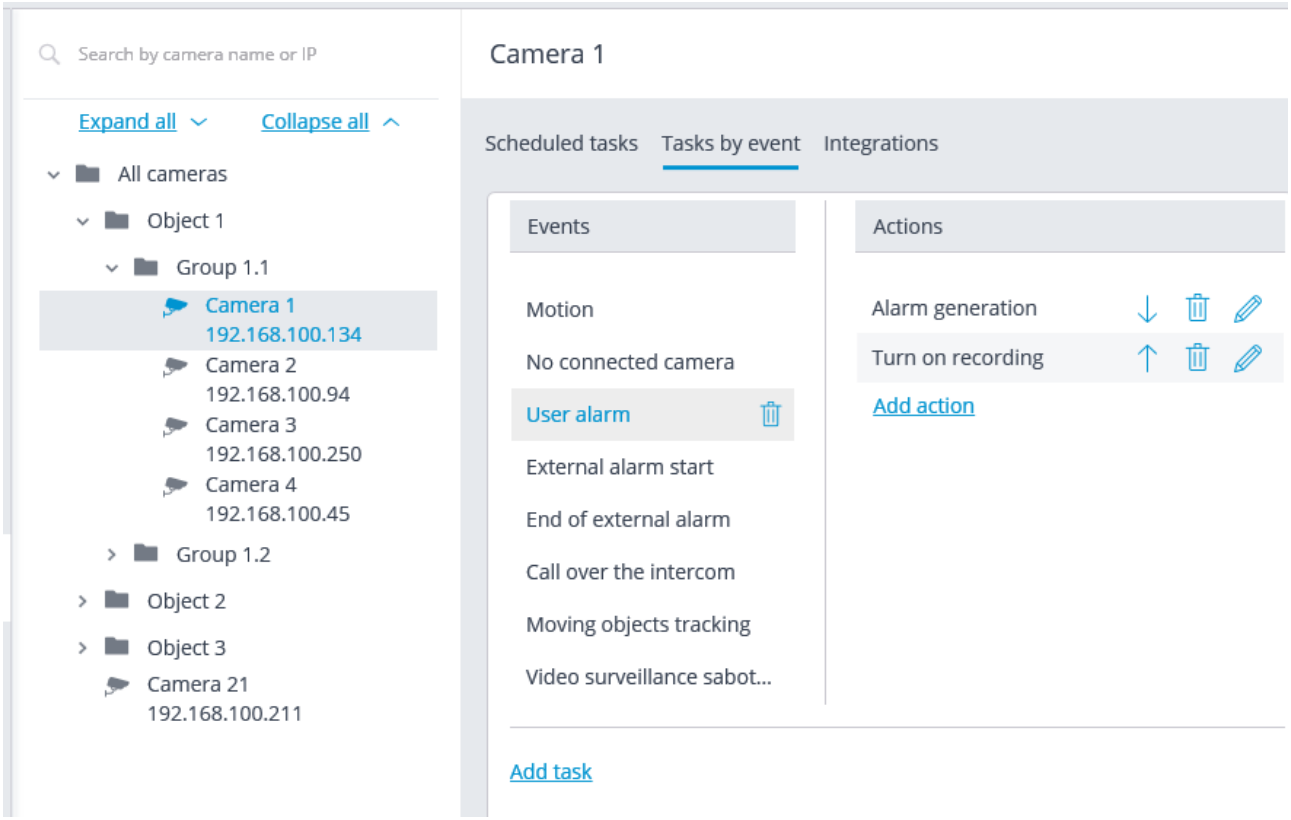
On the Sheduled tasks tabs you can add, modify and delete scheduled tasks for the selected camera.



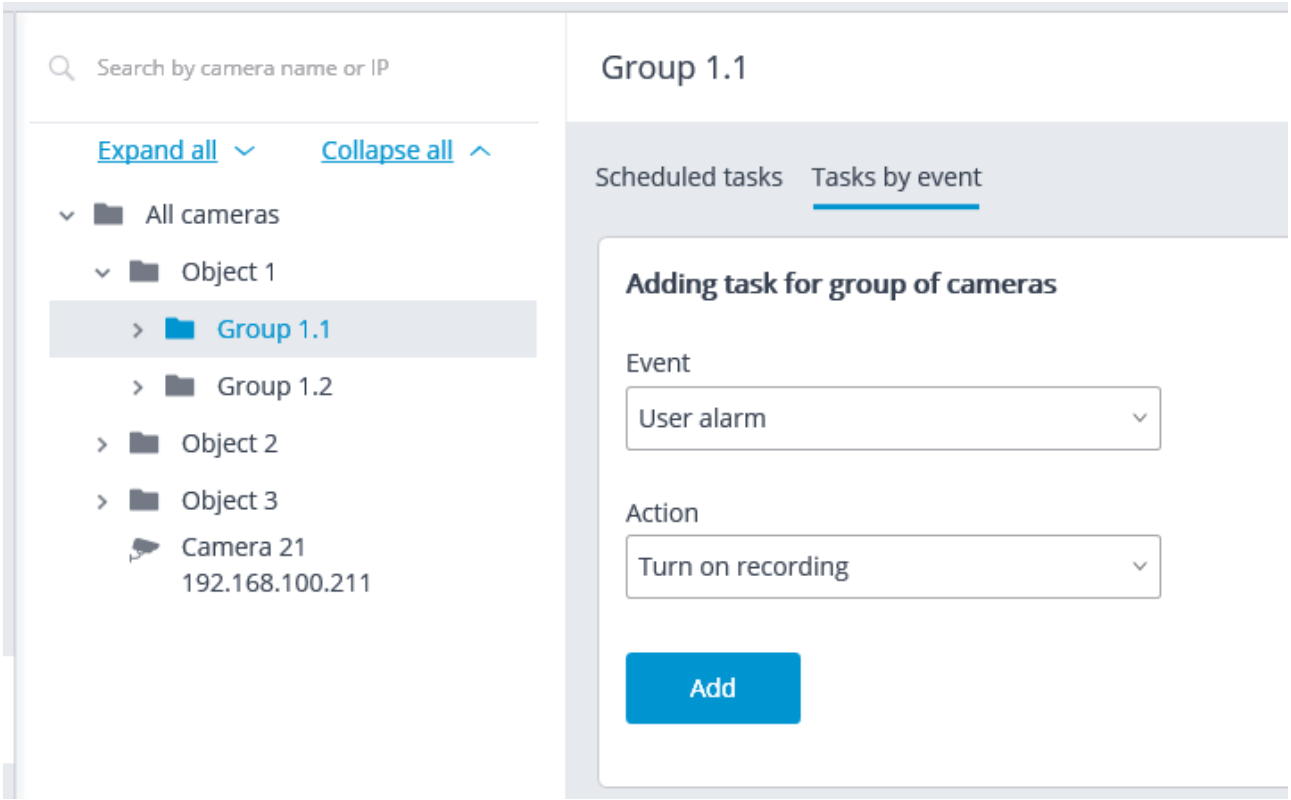
For a folder on the Sheduled tasks tab, it is possible to add scheduled tasks for all cameras contained in the selected folder, as well as to delete all the tasks of these cameras.



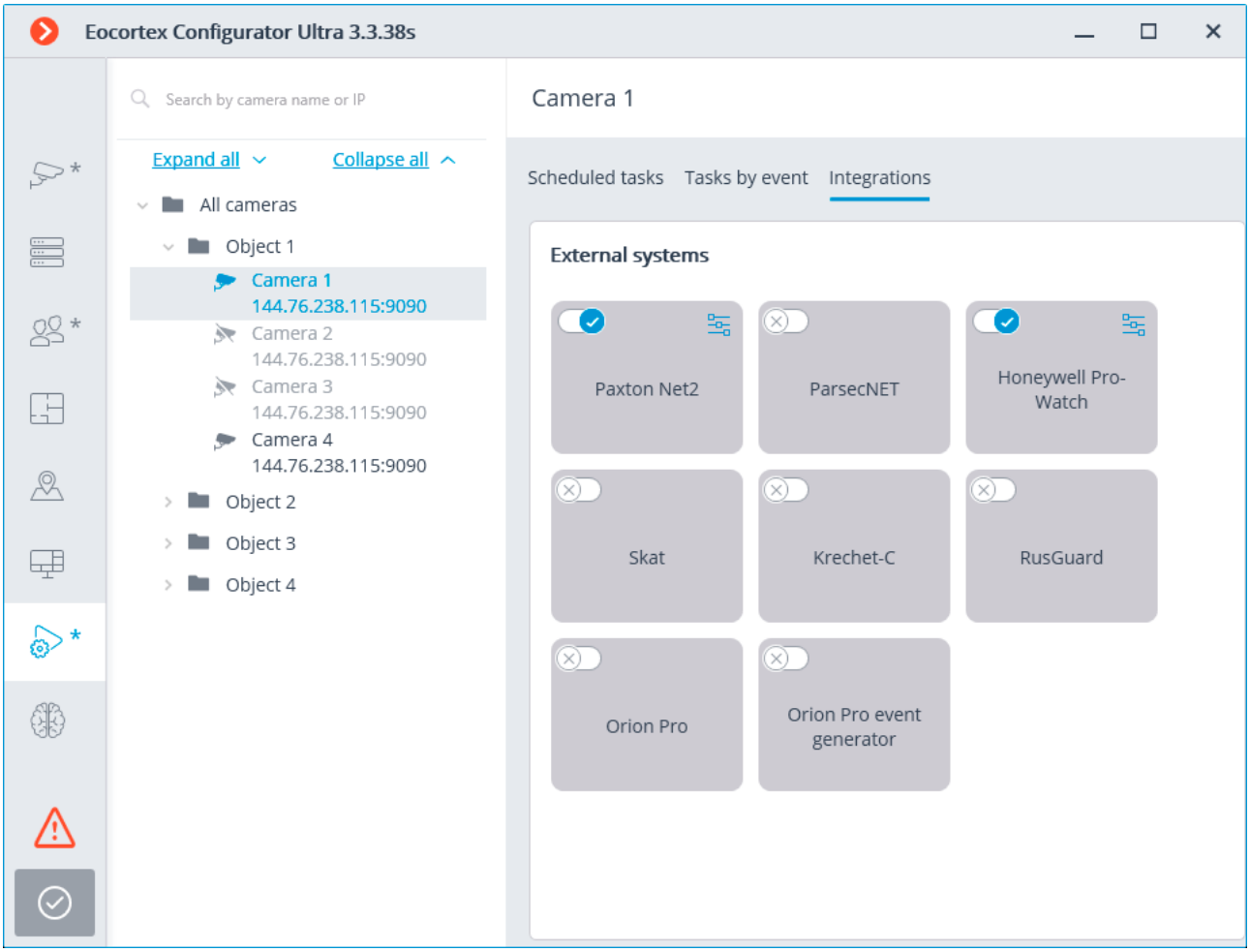
For the individual camera on the Tasks by event tab, it is possible to add, modify and delete event-based tasks and user tasks of the selected camera.



For the folder on the Tasks by event tab, it is possible to add tasks by event for all cameras contained in the selected folder.



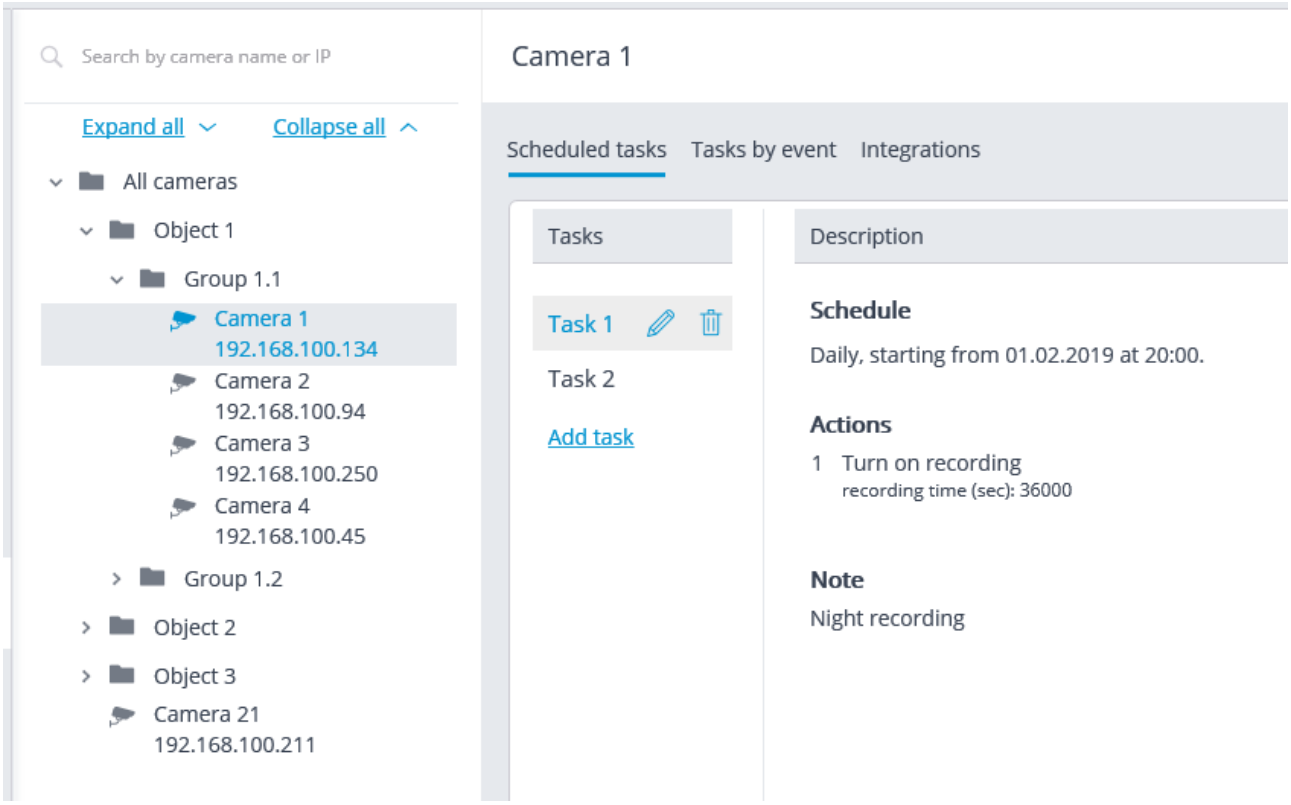
For the individual camera on the Integrations tab, it is possible to add, modify and delete the settings of the integration of the selected camera with the external systems.



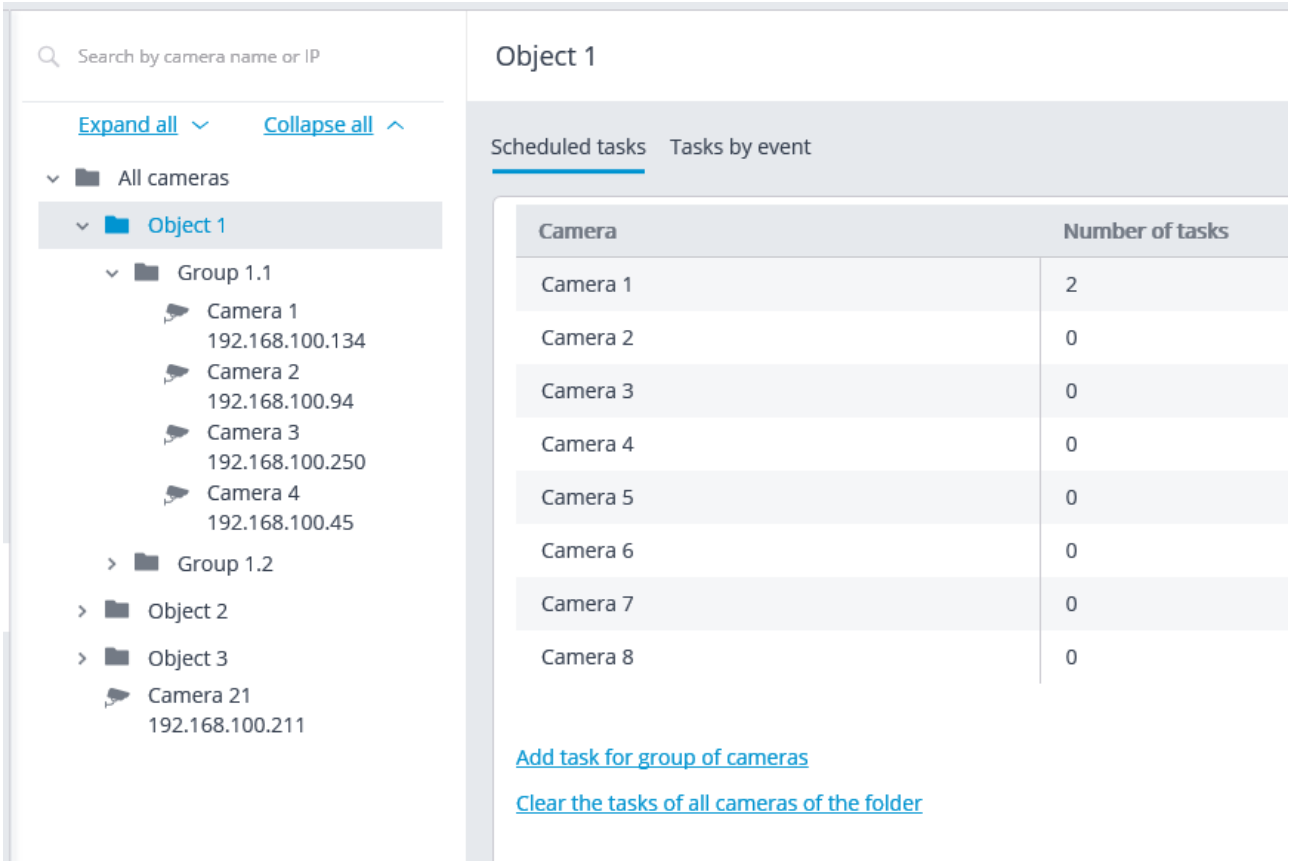
Sheduled tasks

To set up actions to be performed on schedule, it is required to go to the **Automation** tab in **Eocortex Configurator**, select a camera or a folder in the tree, then, on the opened page, go to the **Sheduled tasks** tab.

It is possible to add, modify and delete the scheduled tasks for the specific selected camera.



For the folder, it is possible to add tasks to be run on schedule for all cameras in the selected folder, as well as to delete all the tasks of these cameras. .

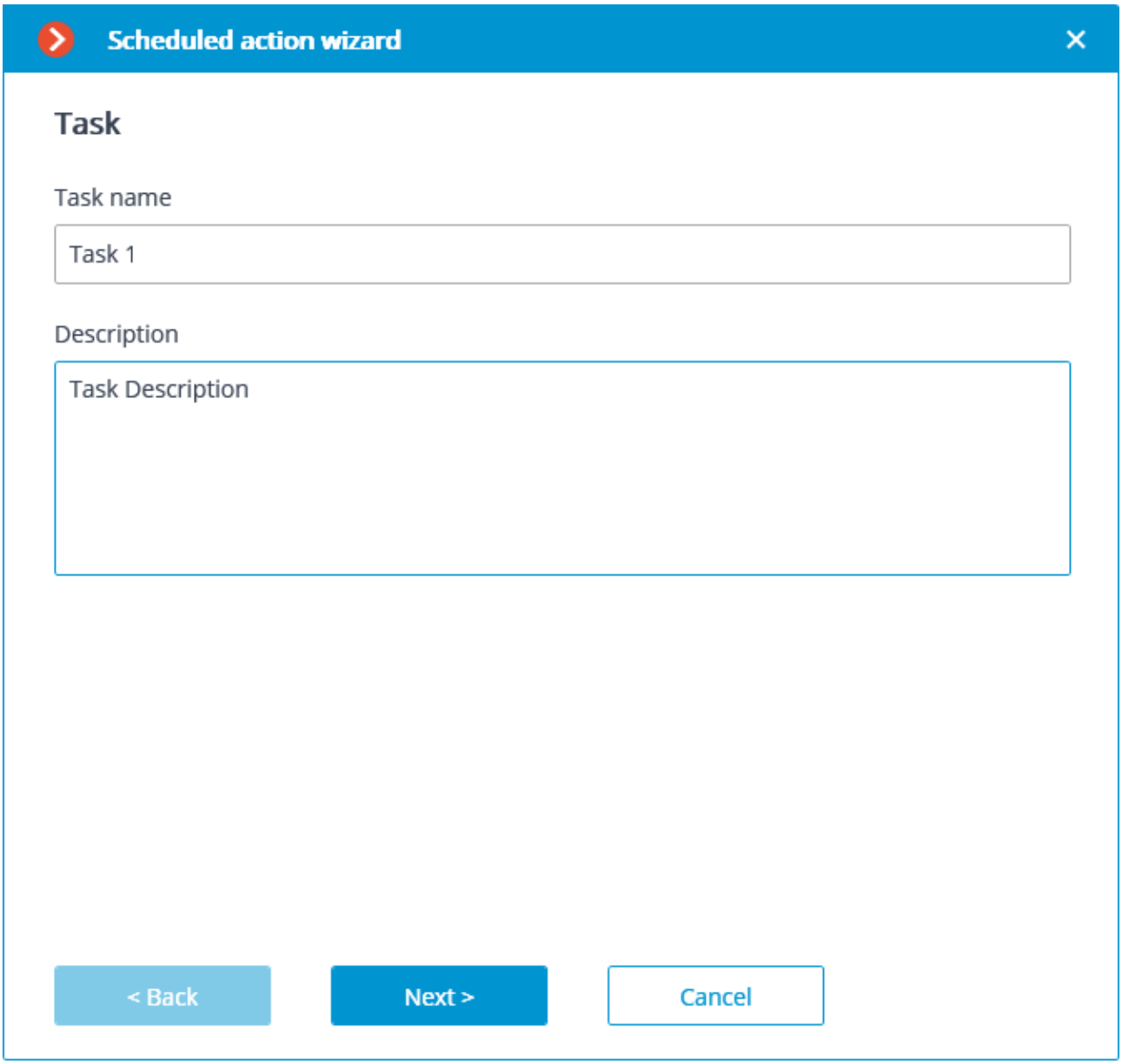


In order to add tasks to be run on schedule it is required to click on the Add task link. The scheduled task wizard will open.

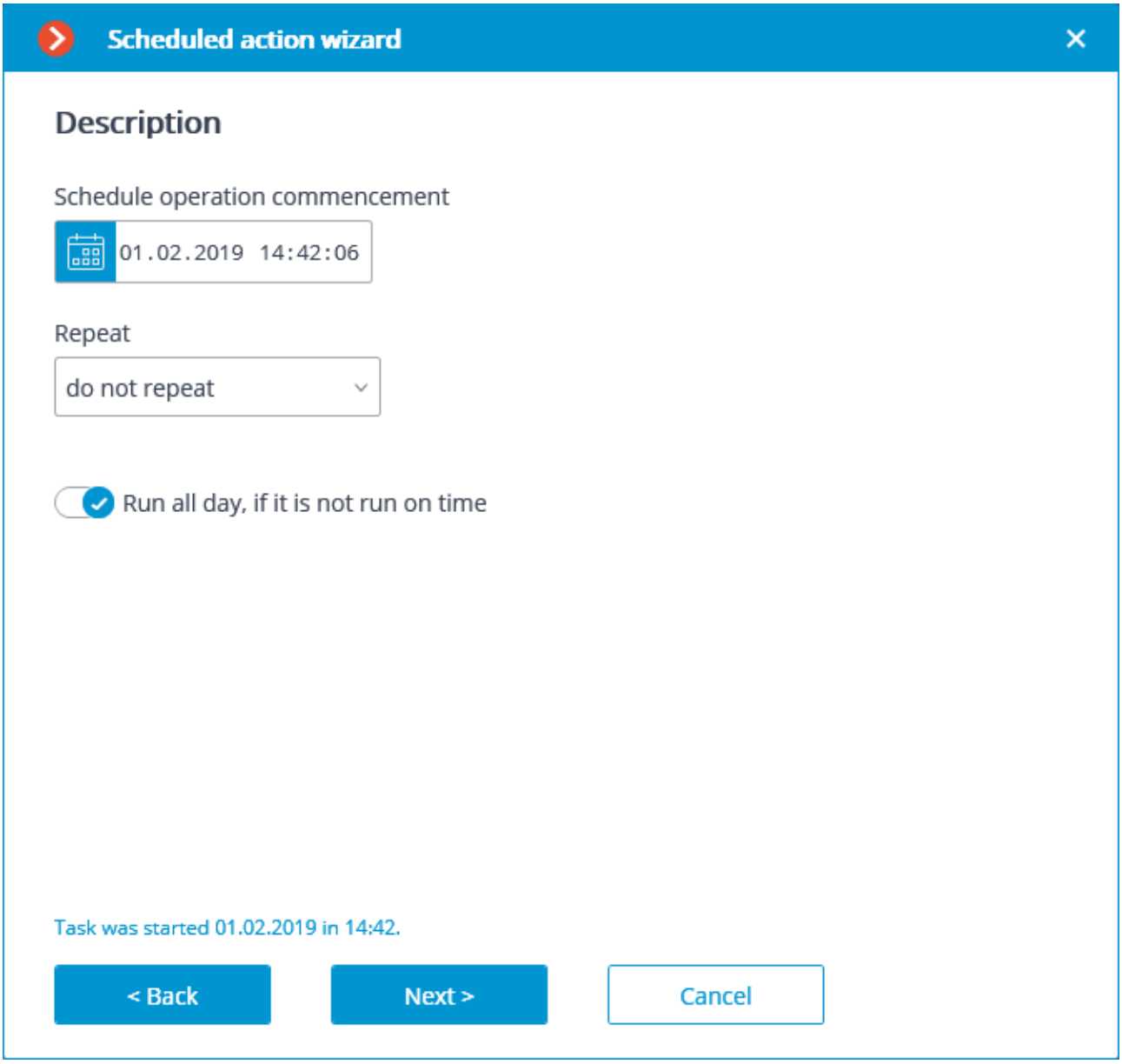
The adding procedures for the individual selected camera and for the folder are identical. The only difference is whether they will be applied to one or several cameras.

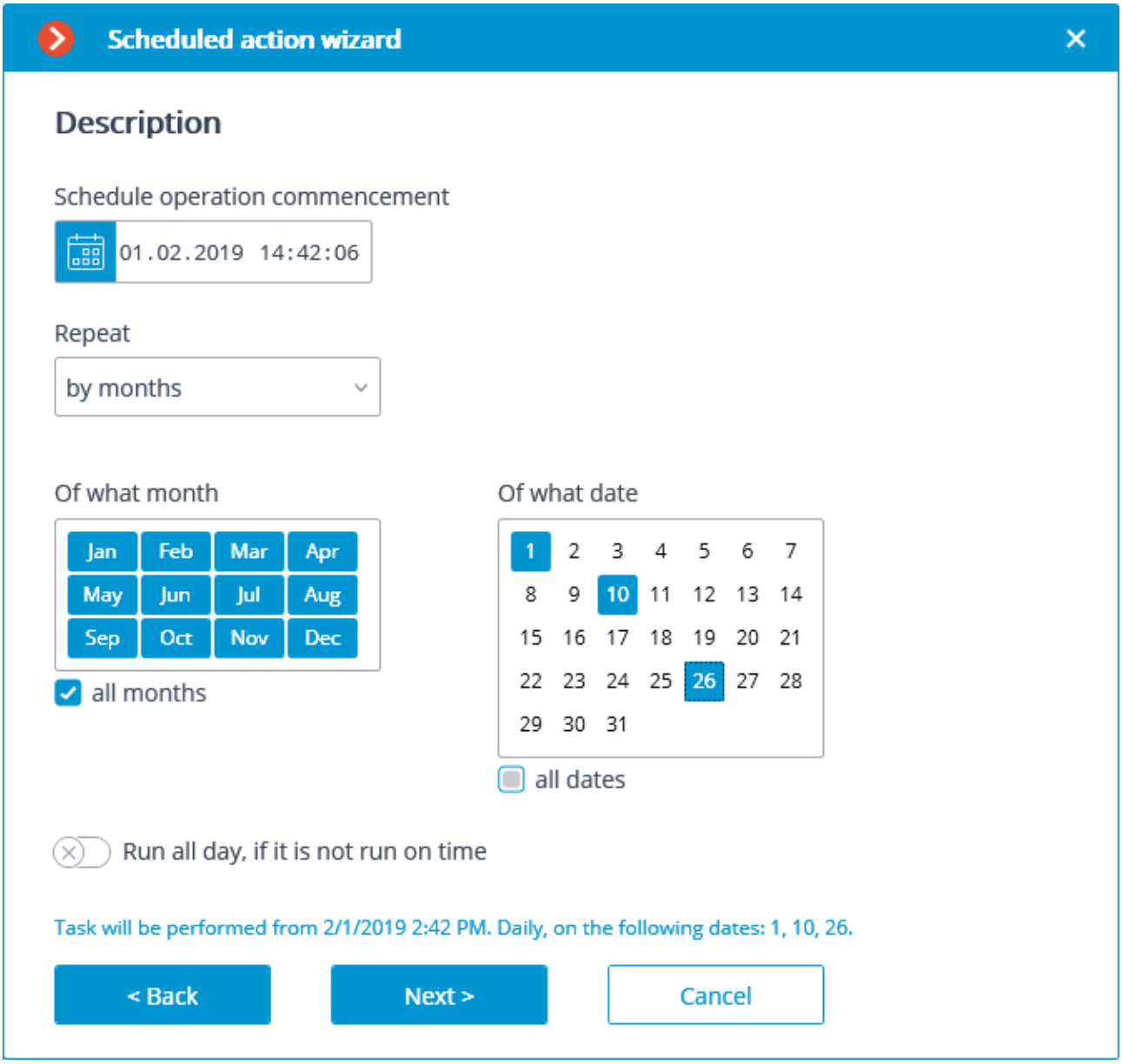
The interface of the scheduled task modification wizard is identical to the interface of the wizard for adding such a task.

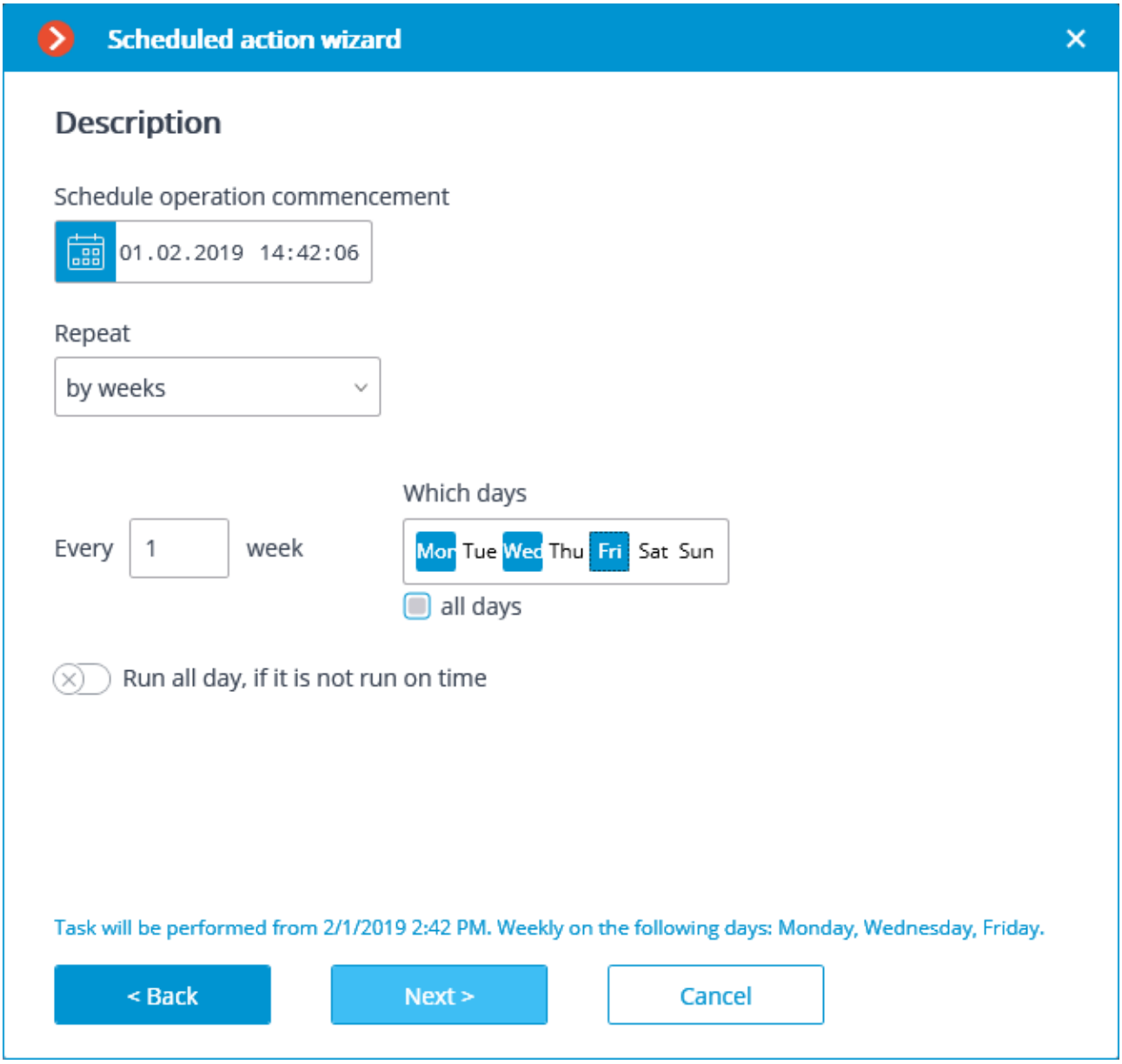
In the wizard's start screen it is required to set the **Task name** and, optionally, enter its In the wizard's start screen it is required to set the Task name and, optionally, enter its Description, then press **Next**.

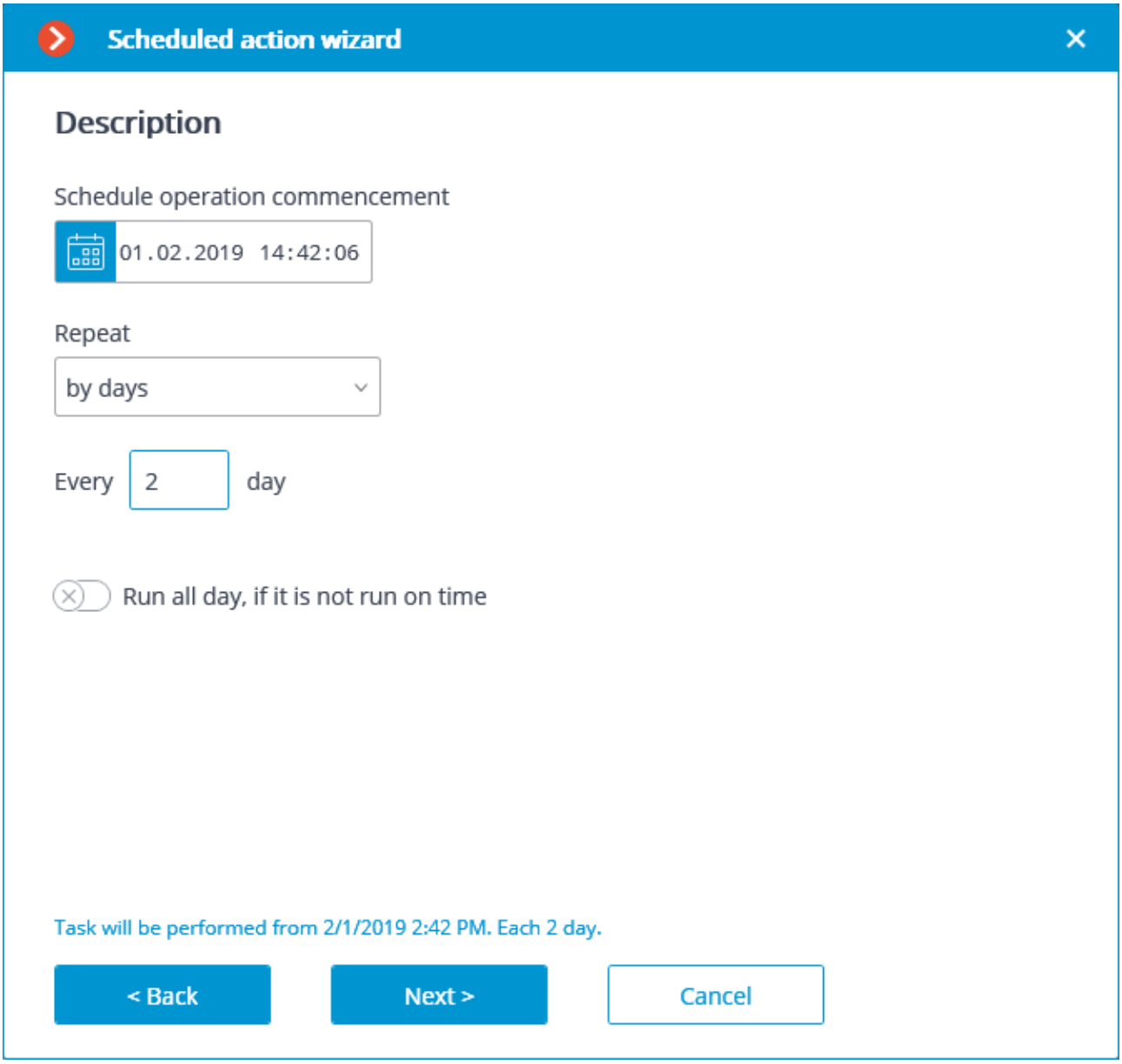


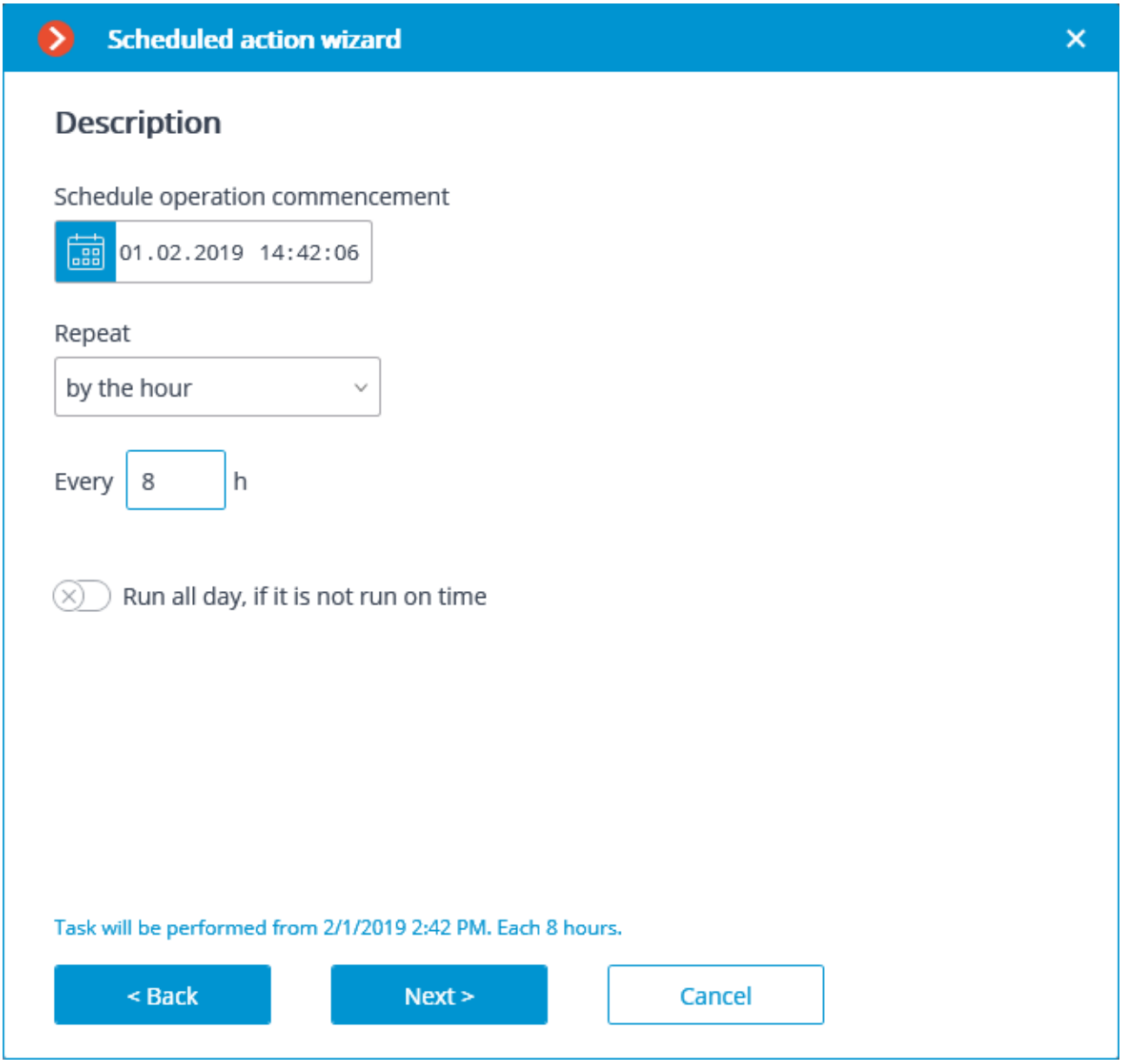
At the following step the schedule is set. At that, the interface does not depend on the selected period set in the **Repeat** dropdown list.

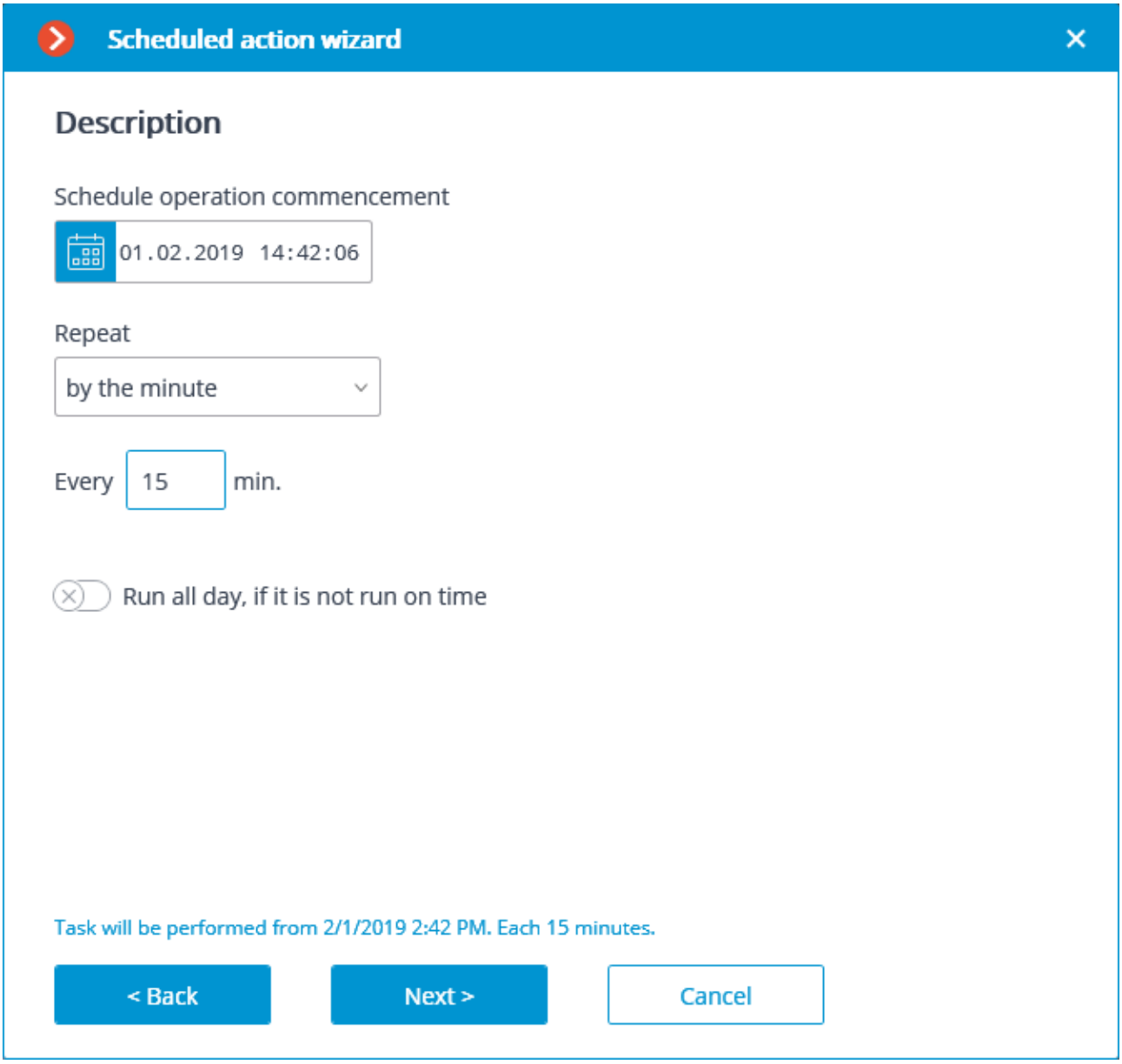

Scheduled action wizard
Description
Schedule operation commencement
01.02.2019 14:42:06
Repeat
do not repeat
Run all day, if it is not run on time
Task was started 01.02.2019 in 14:42.
< Back
Next >
Cancel

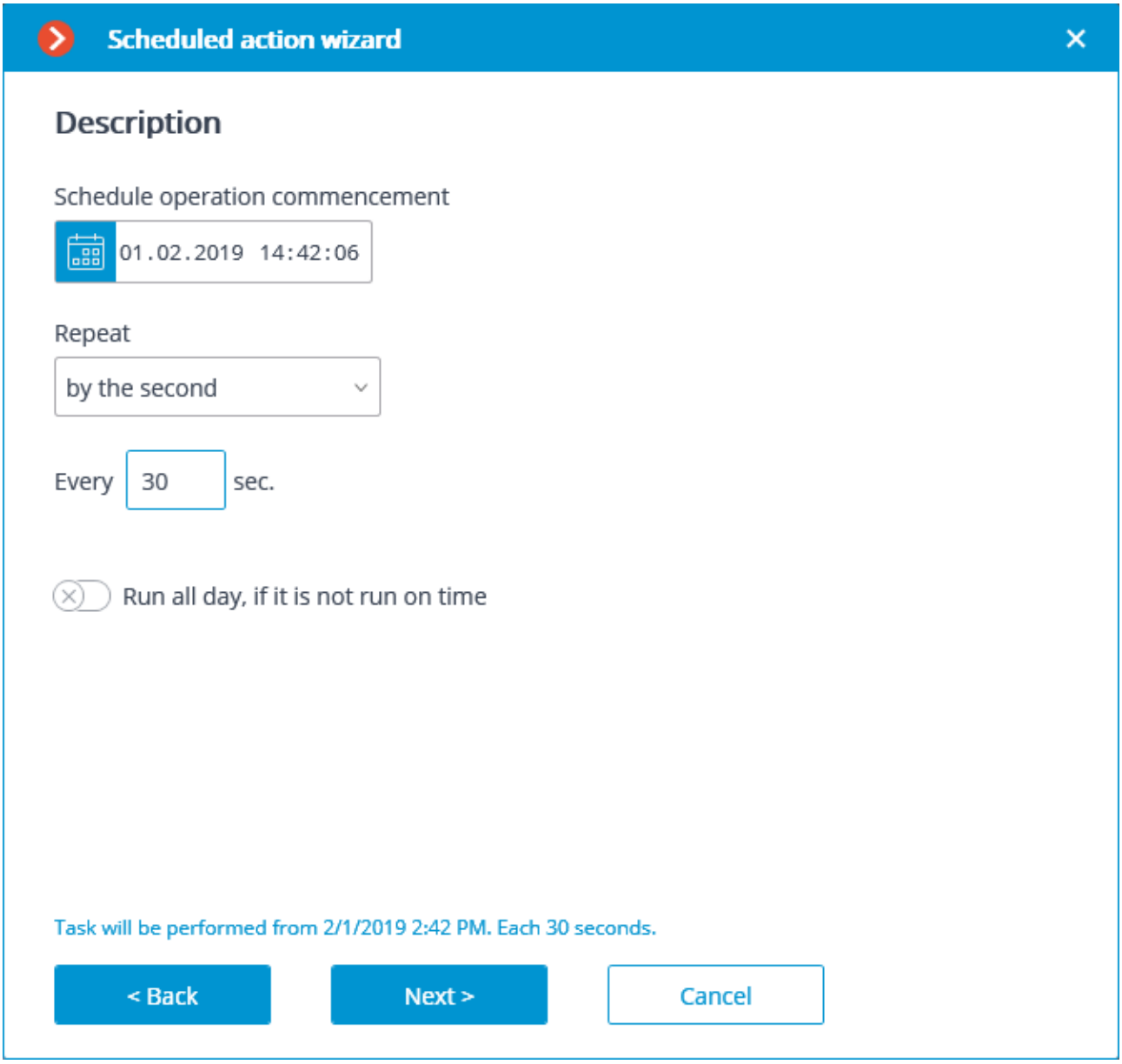

Scheduled action wizard
Description
Schedule operation commencement
01.02.2019 14:42:06
Repeat
by months
Of what month
Jan Feb Mar Apr
May Jun Jul Aug
Sep Oct Nov Dec
all months
Of what date
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31
all dates
Run all day, if it is not run on time
Task will be performed from 2/1/2019 2:42 PM. Daily, on the following dates: 1, 10, 26.
< Back
Next >
Cancel


Scheduled action wizard
Description
Schedule operation commencement
01.02.2019 14:42:06
Repeat
by weeks
Every 1 week
Which days
Mon Tue Wed Thu Fri Sat Sun
all days
Run all day, if it is not run on time
Task will be performed from 2/1/2019 2:42 PM. Weekly on the following days: Monday, Wednesday, Friday.
< Back
Next >
Cancel

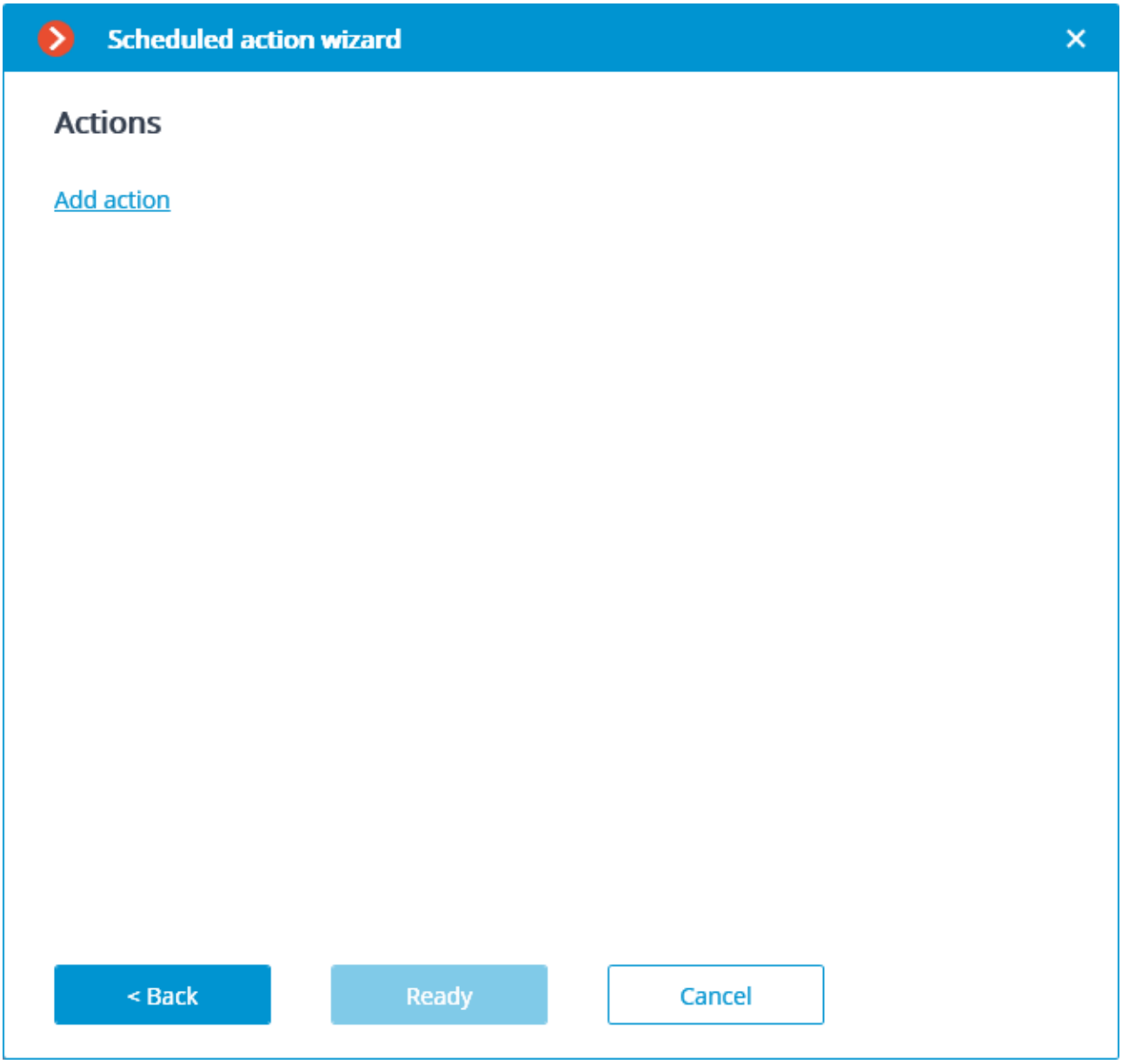

Scheduled action wizard
Description
Schedule operation commencement
01.02.2019 14:42:06
Repeat
by days
Every 2 day
Run all day, if it is not run on time
Task will be performed from 2/1/2019 2:42 PM. Each 2 day.
< Back
Next >
Cancel

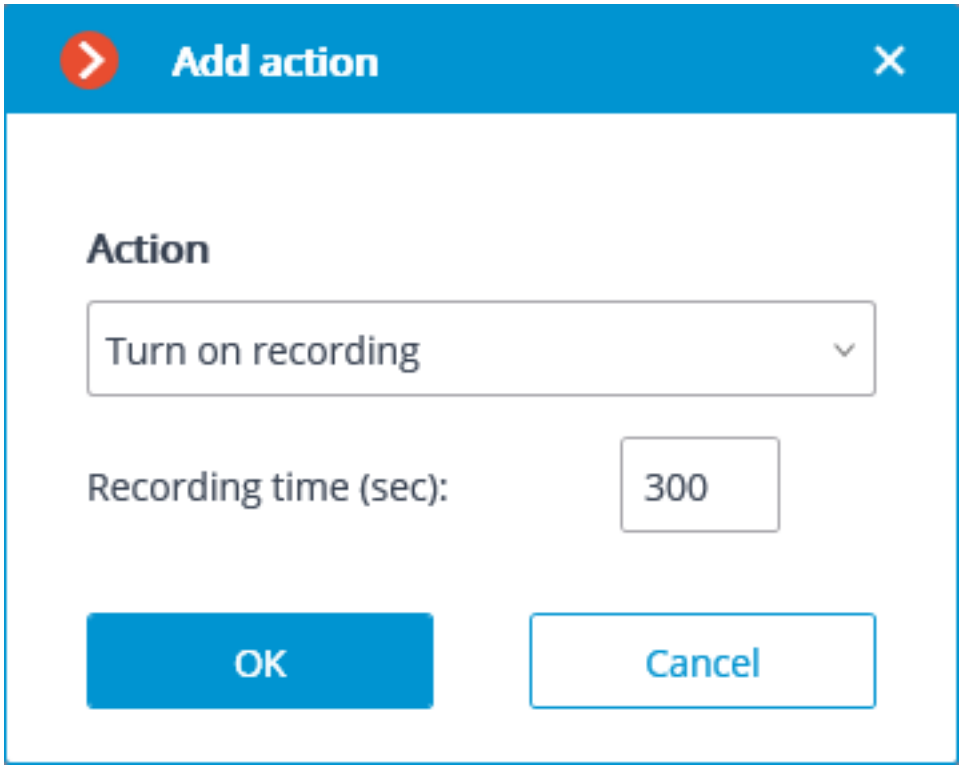

Scheduled action wizard
Description
Schedule operation commencement
01.02.2019 14:42:06
Repeat
by the hour
Every 8 h
Run all day, if it is not run on time
Task will be performed from 2/1/2019 2:42 PM. Each 8 hours.
< Back
Next >
Cancel

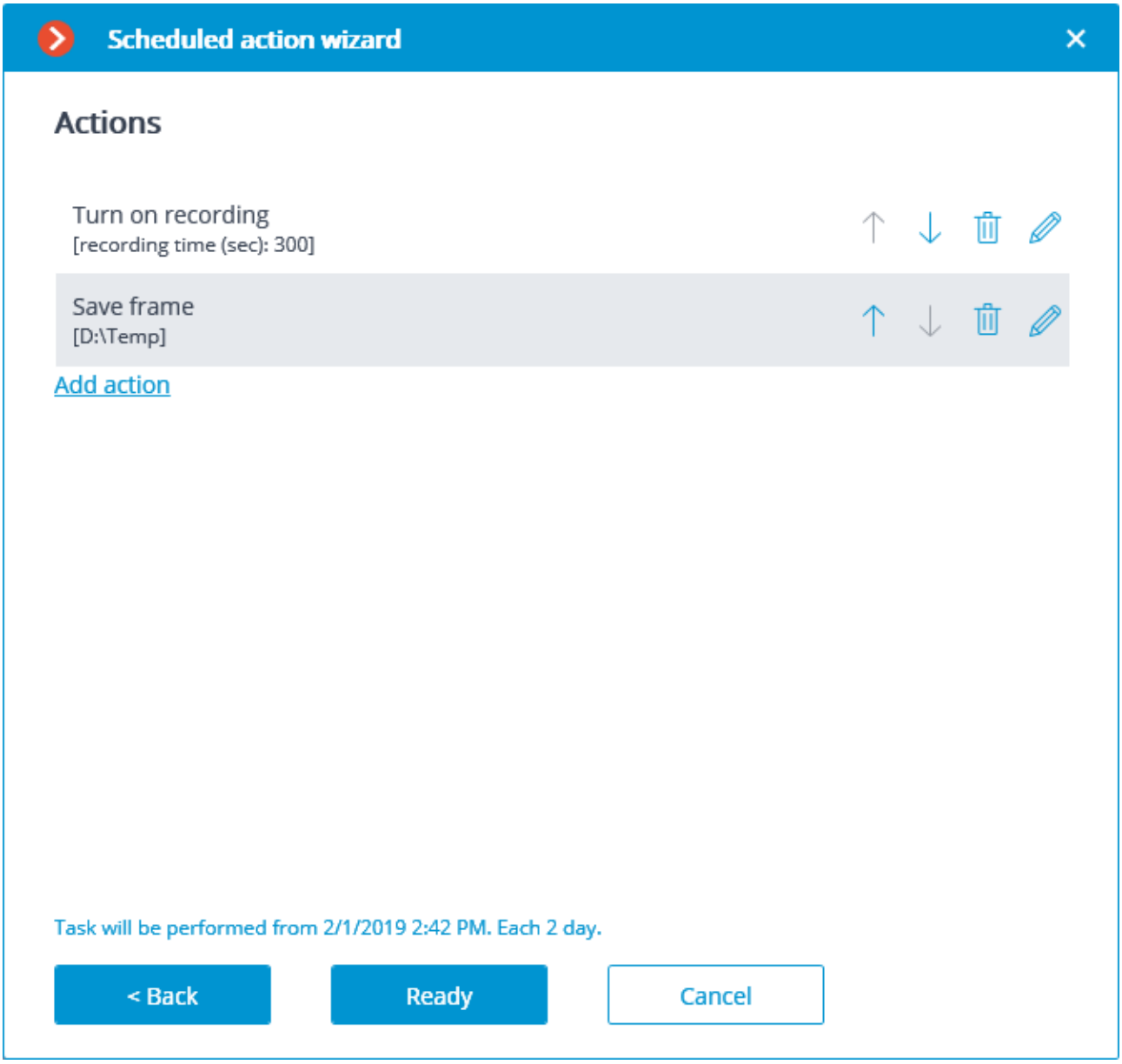

Scheduled action wizard
Description
Schedule operation commencement
01.02.2019 14:42:06
Repeat
by the minute
Every 15 min.
Run all day, if it is not run on time
Task will be performed from 2/1/2019 2:42 PM. Each 15 minutes.
< Back
Next >
Cancel



At the next step it is required to add and arrange the tasks that will be performed according to the set schedule in the corresponding order, then press **Ready**.


Scheduled action wizard
Actions
Add action
< Back
Ready
Cancel


Add action
Action
Turn on recording
Recording time (sec):
300
OK
Cancel



The list and description of the available actions can be found in the Actions section.

Actions

Turn on recording
Turn on washer
Turn on Autofocus mode
Disable recording
Alarm generation
Add an event to intercom log
Run external application on server
Set main stream for archiving
Disable frame skipping when recording to the archiv
Open door Paxton Net2

Send HTTP request

Send Push notifications to mobile devices

Send to messenger

Send report by email

Send notification by email

Send notification by SMS

Pause

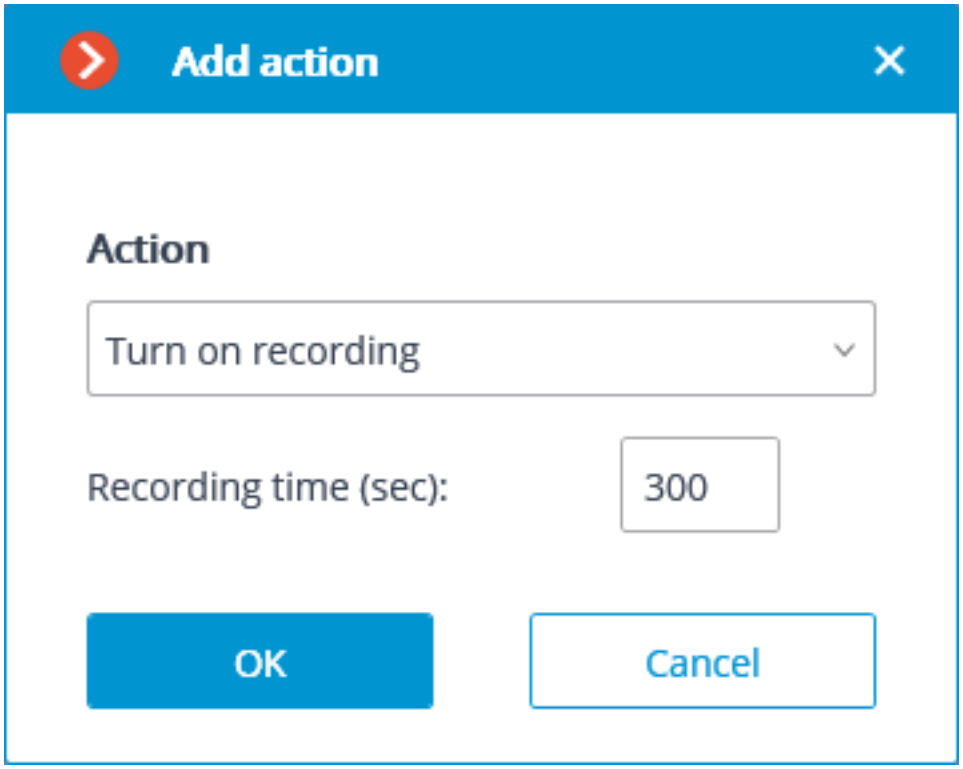
Send signal to Camera output

Save frame

Set camera position

Turn on recording

Turns on the recording to archive.



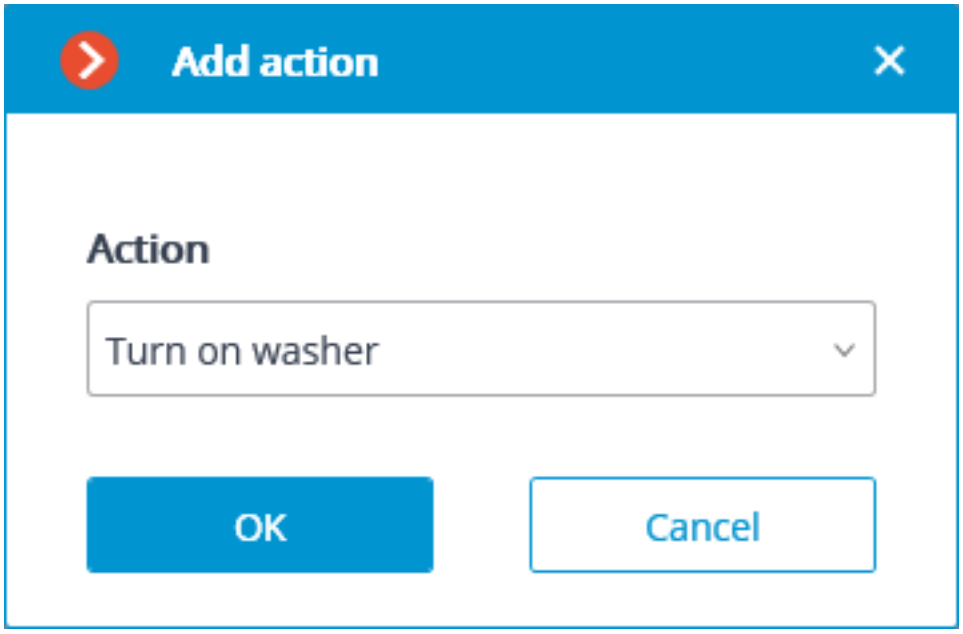
Action parameters:

Recording time (seconds): sets the recording time during which the recording to archive will be performed.

⚠ This action will not be performed if the continuous recording to archive is in progress on the channel, or if the continuous recording mode has been set.

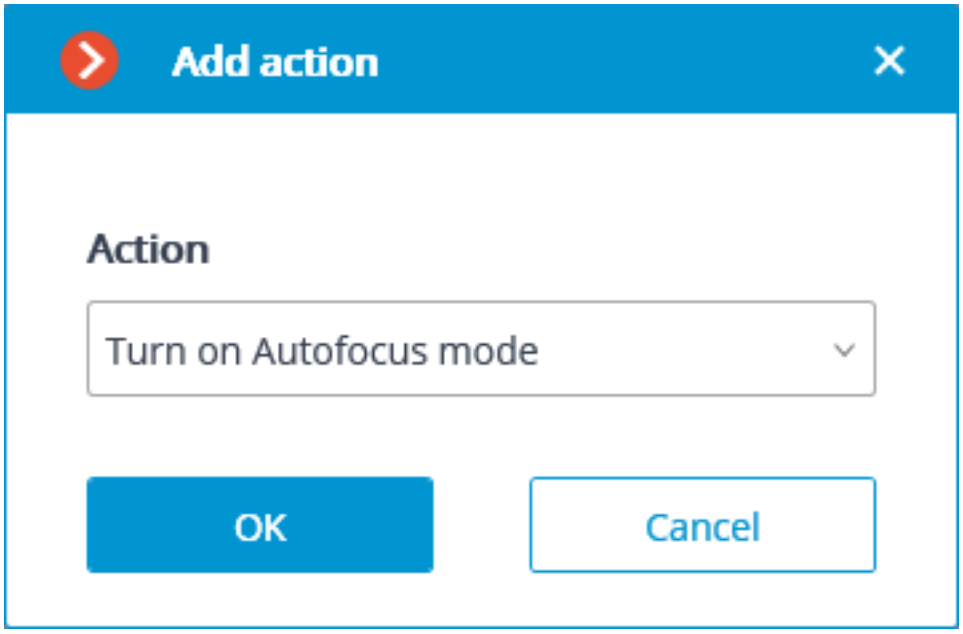
Turn on washer

Activates camera washer.



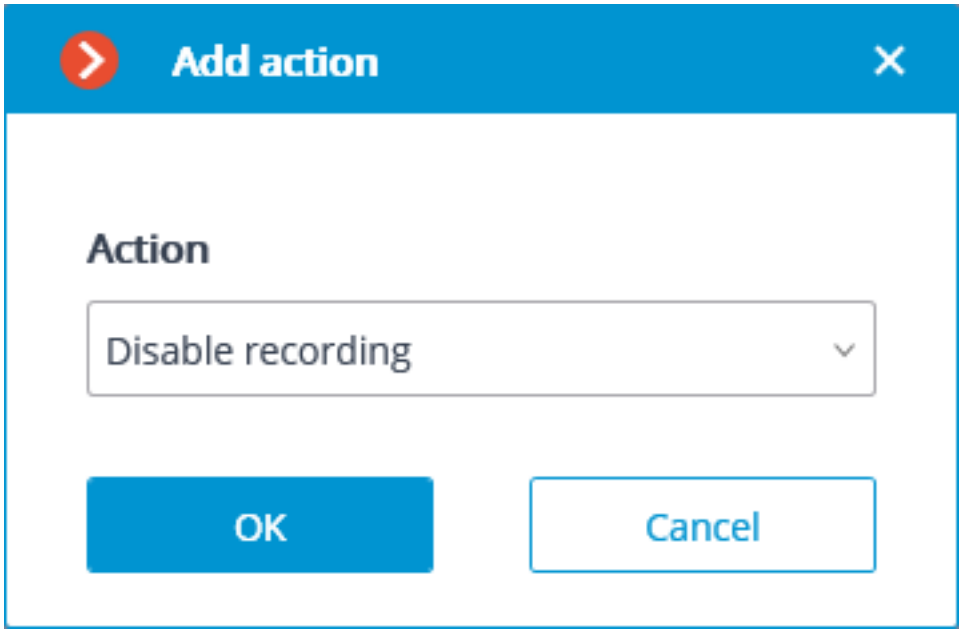
Turn on Autofocus mode

Activates camera autofocus.



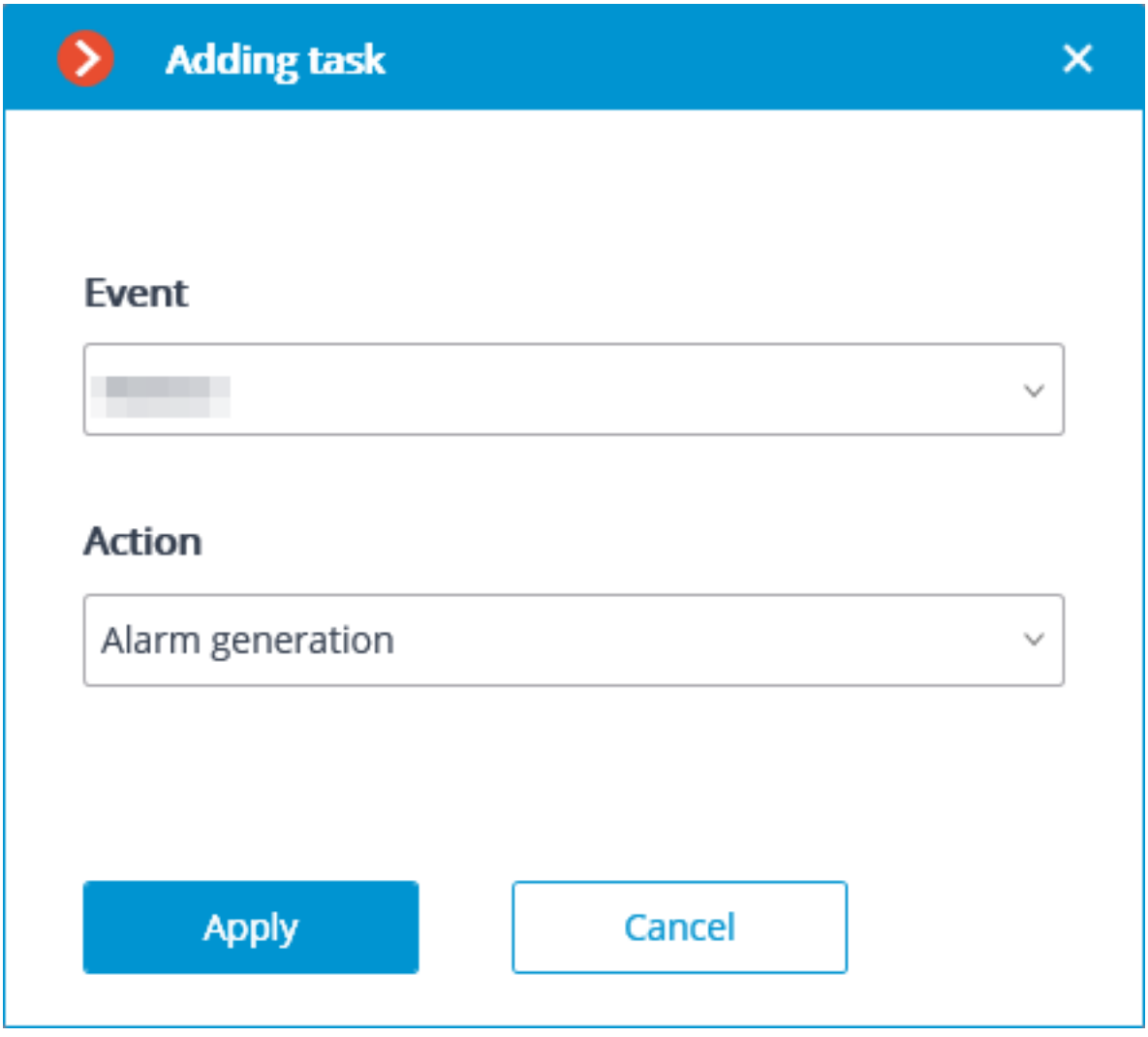
Disable recording

Disables recording to archive.



Alarm generation

Generates alarm for the camera.

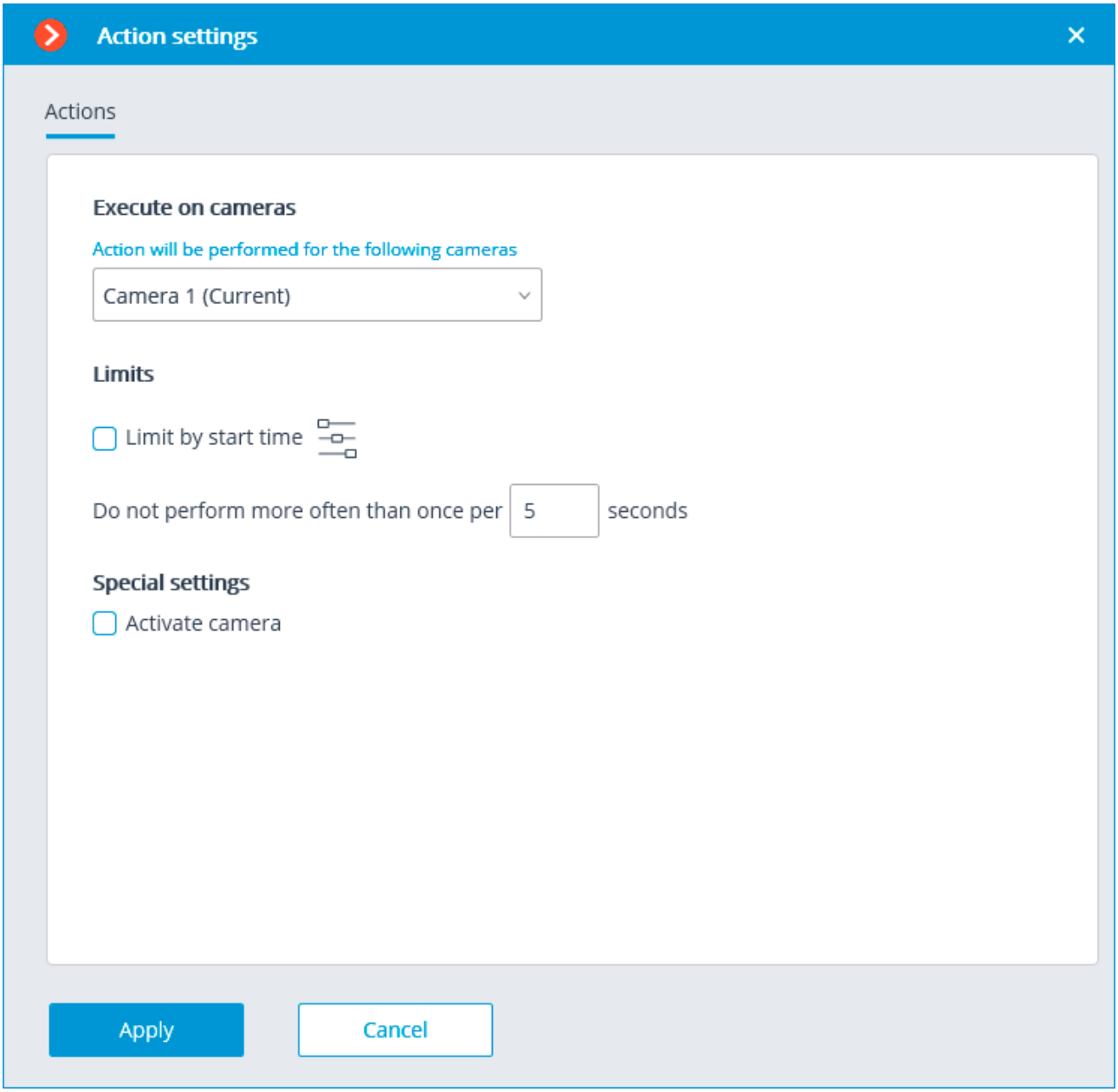


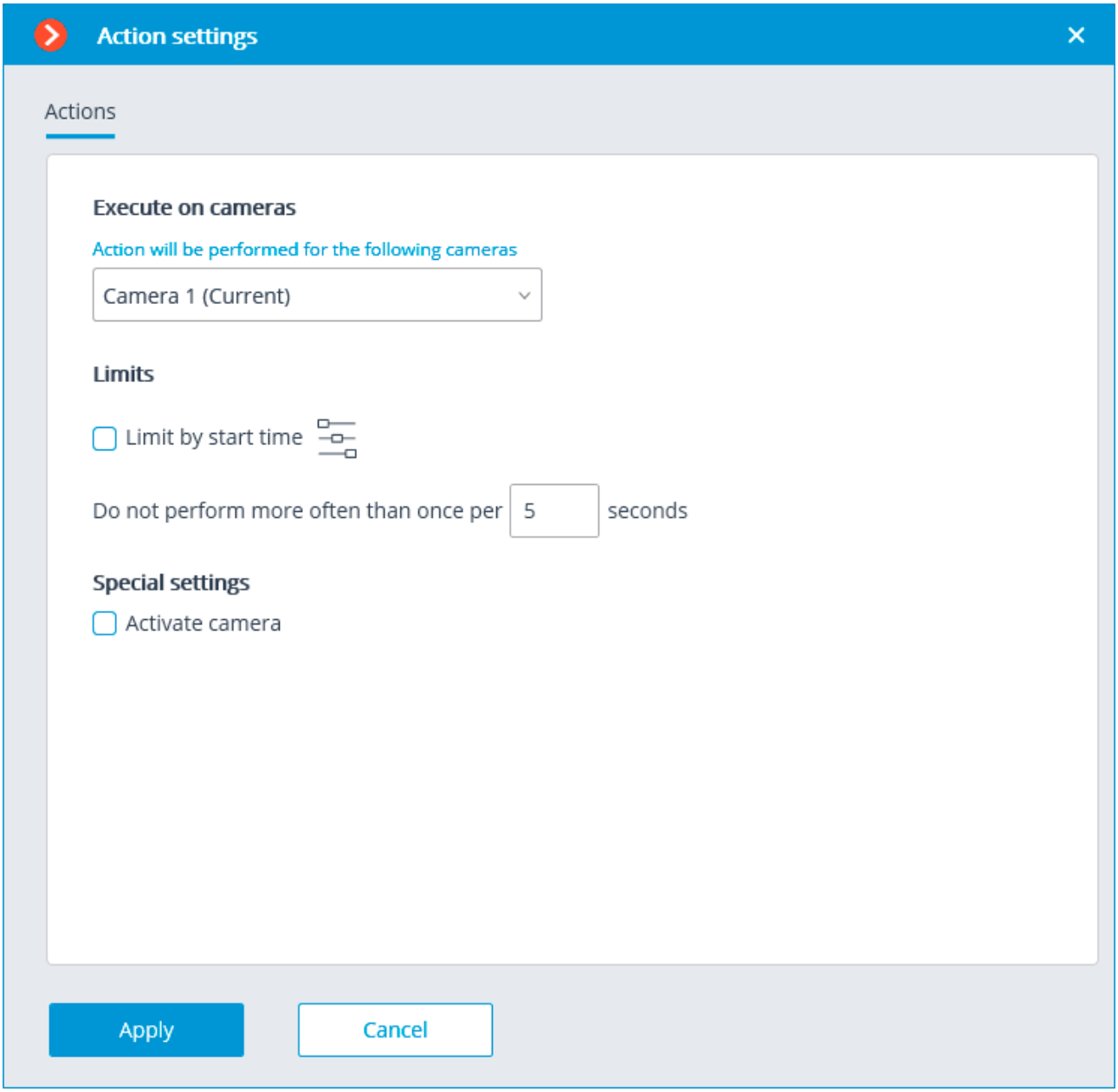
Action parameters:

Activate camera: if the camera is displayed on screen in the **Eocortex Client** application in the real time mode, the cell with the camera is active.

Open real time video: When a camera in the alarm monitor is opened, it will open in the real-time viewing mode.

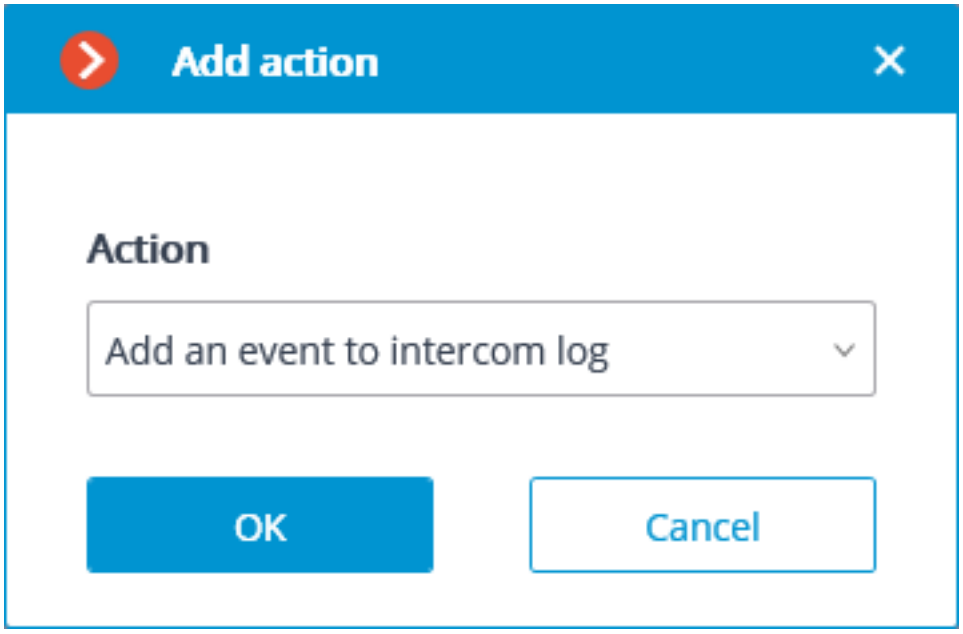
Open archive: When the camera is opened in the alarm monitor, it will open in the archive playback mode. In this case, the video will be played from an earlier moment, with an offset specified by the **Time shift when opening archive, sec** parameter.





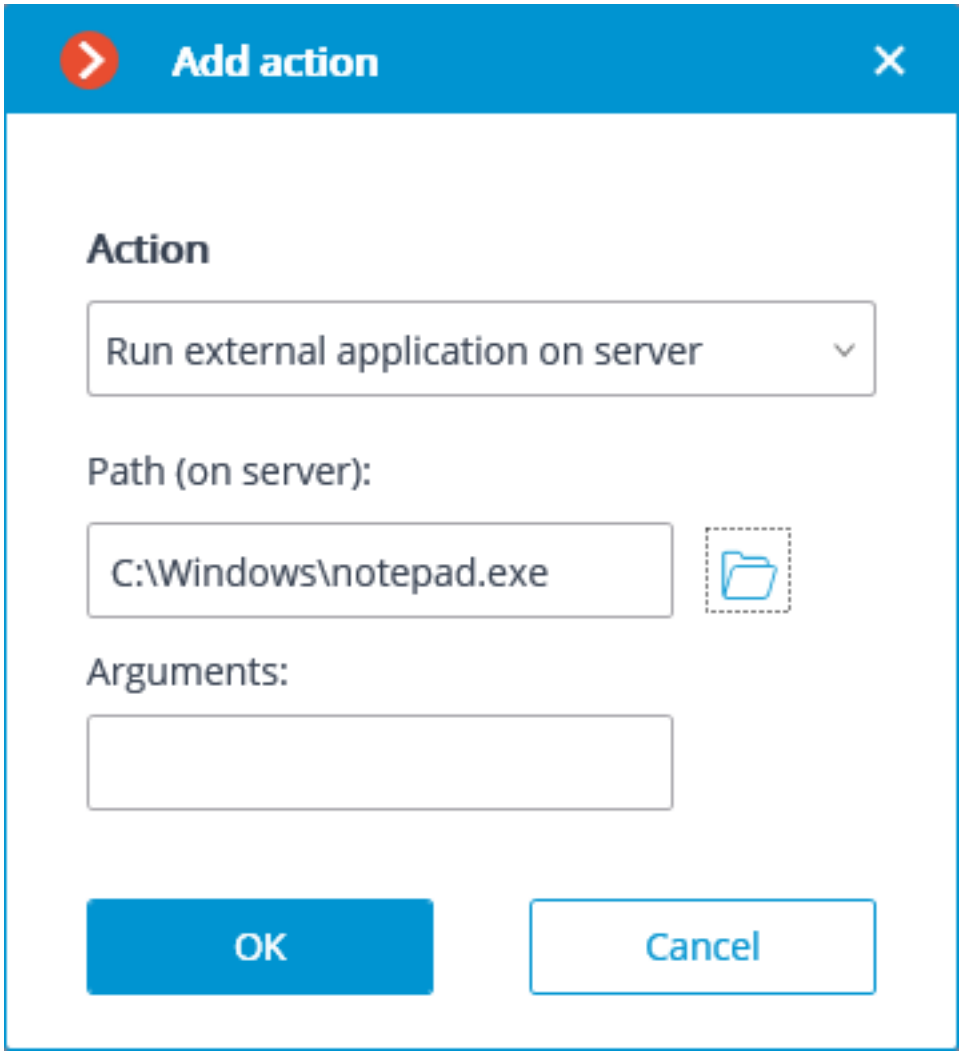
Add an event to intercom log

Add the current door phone event to the **Event log**.



Run external application on server

Launches an external application on the server.



⚠ The Windows operating system does not allow the background services to launch the applications with graphical user interfaces. That is why such applications will not be launched from **Eocortex Server** using this action. At the same time, a record regarding the launch of the application will be made in the **Eocortex Server** event log, because the operating system prevents the independent execution of the application when attempted.

Action parameters:

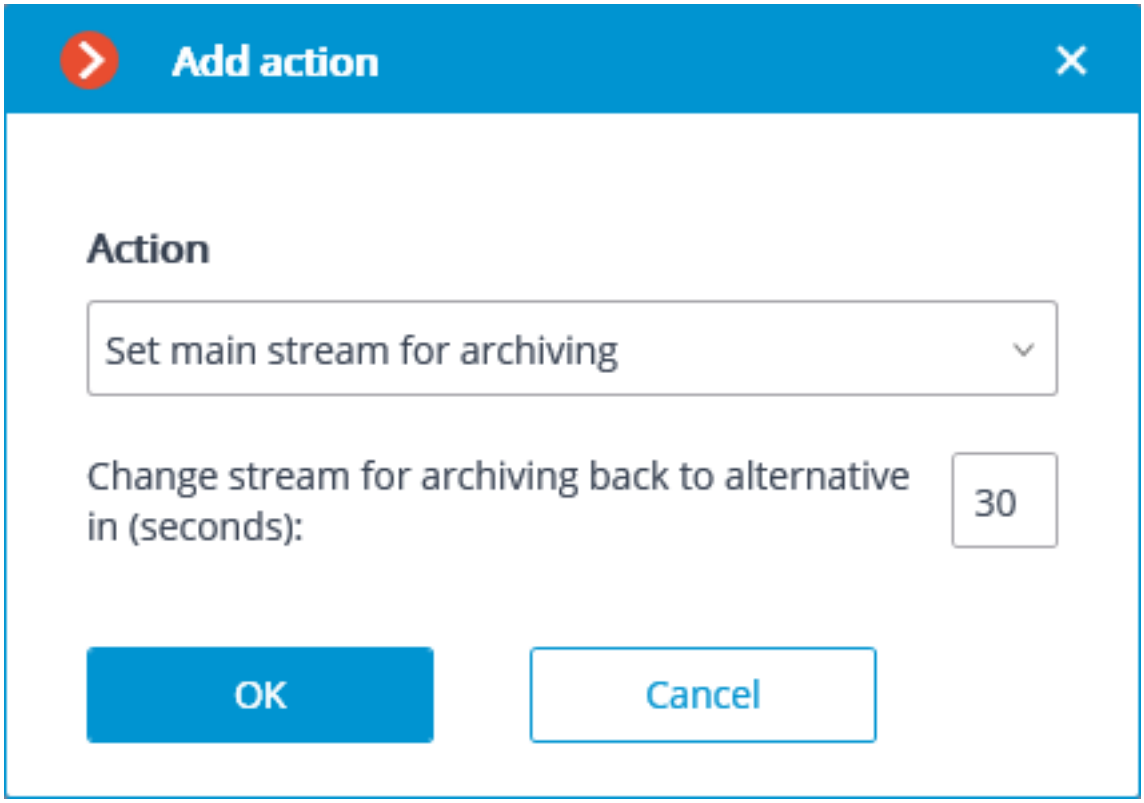
Path:: sets the path to the application located on server.

⚠ The application to be launched must be located in the **Scripts**subfolder in the startup folder of **Eocortex** application. The application will not start if located in any other folder.

Arguments: to launch an application with the command line arguments, these arguments are to be entered in this field.

Set main stream for archiving

Enables the mode of recording the main stream of the set time interval to archive. It is used in the case when the recording of alternative stream to archive has been set for the camera.

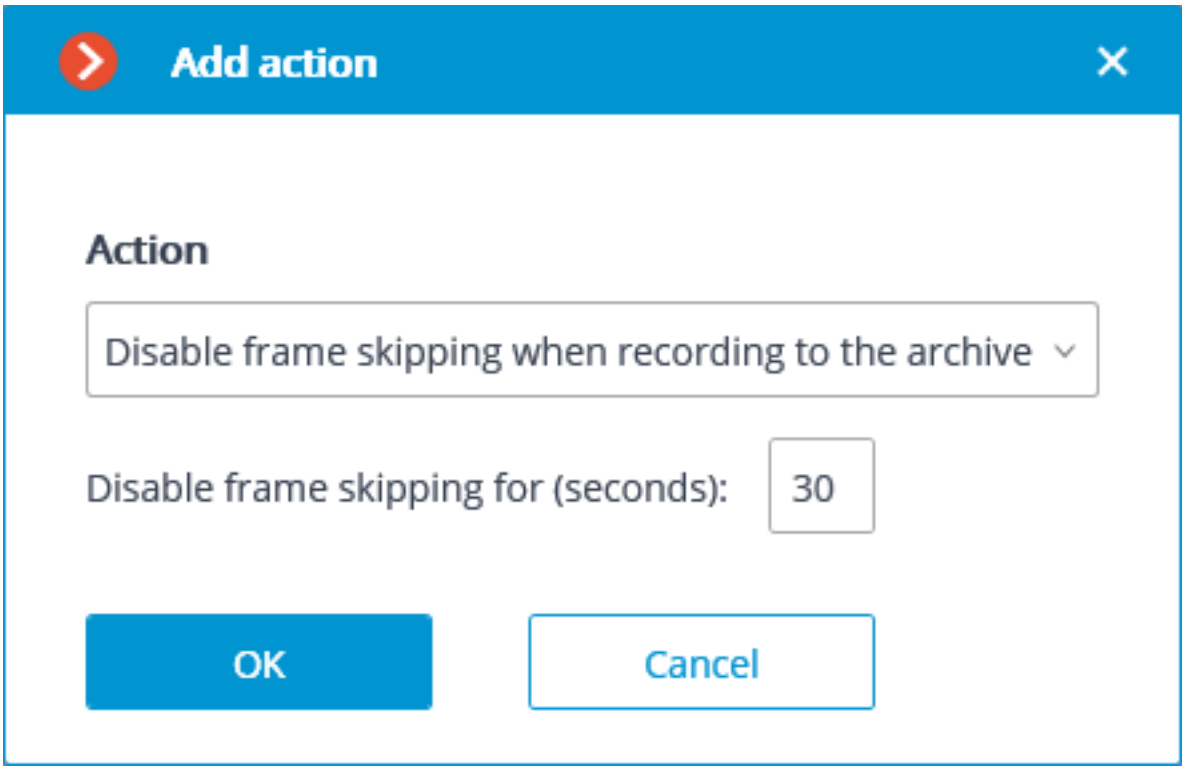


Action parameters:

Change stream for archiving back to alternative in (seconds): sets the period of time for which the recording of the main stream to archive will be enabled.

Disable frame skipping when recording to the archiv

Disables frame skipping when performing the recording of the preset time interval to archive.

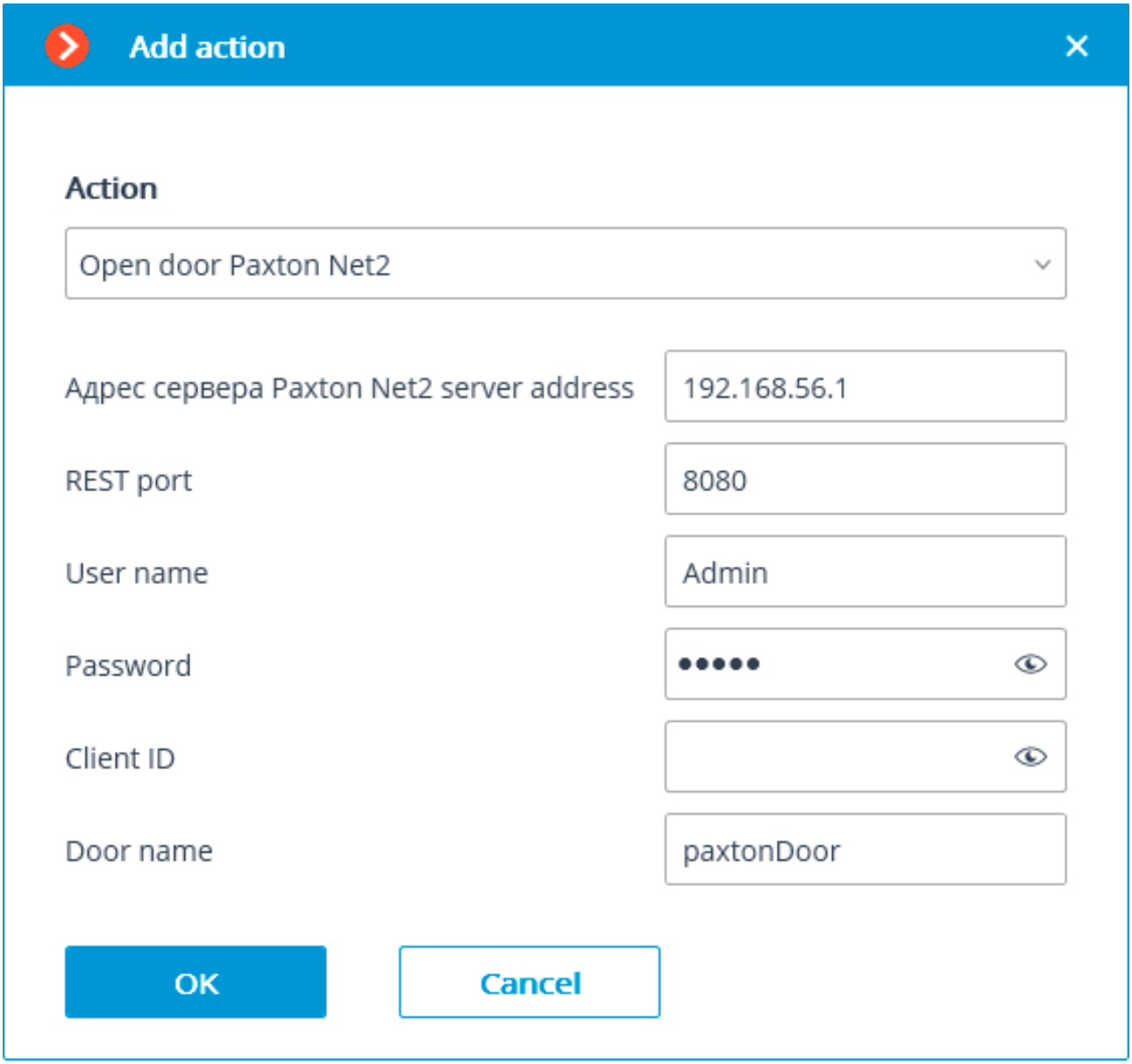


Action parameters:

Disable frame skipping for (seconds): sets a time interval for which the frame skipping will be disabled while recording to archive.

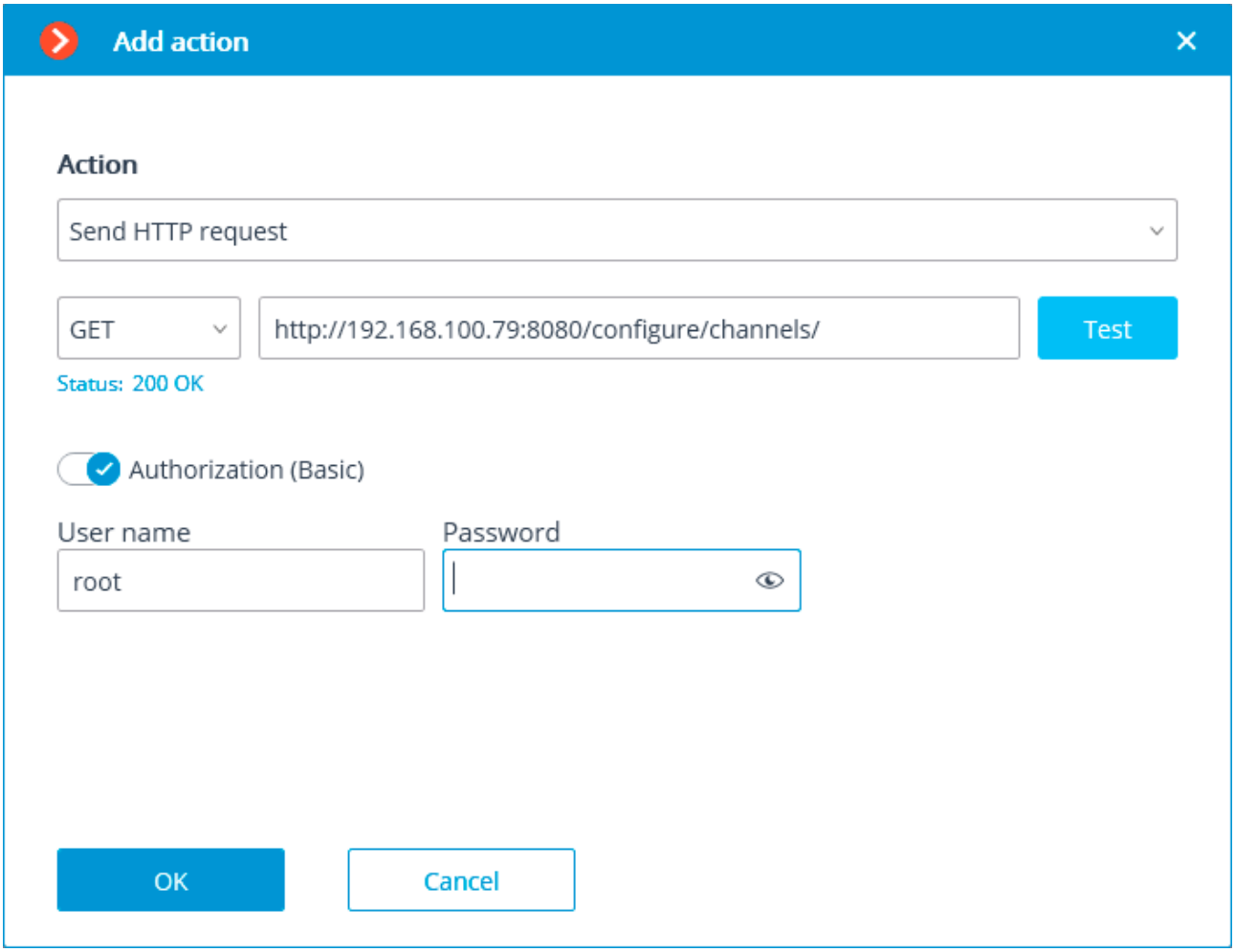
Open door Paxton Net2

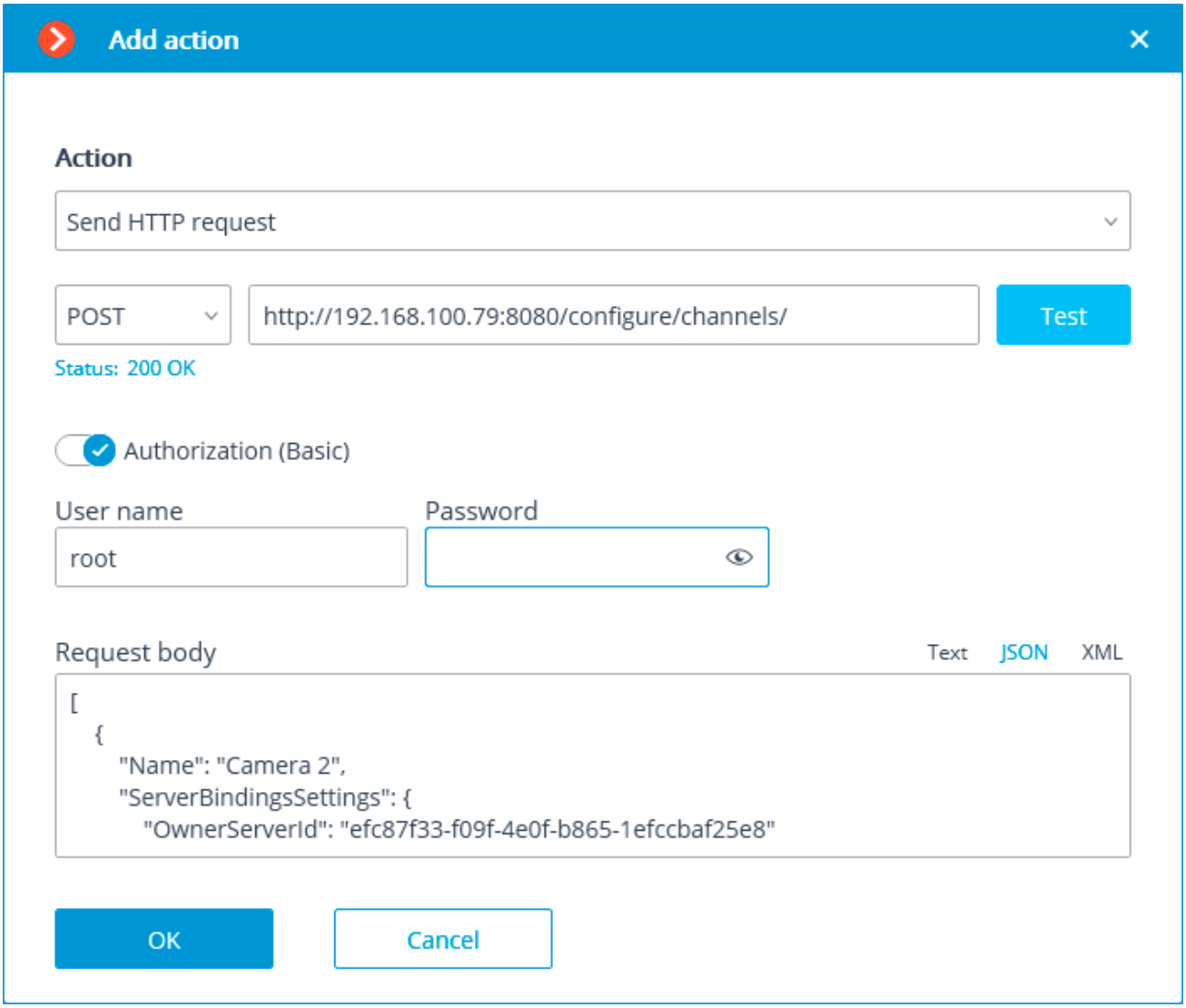
Sends a door opening command to **Paxton Net2** access control system (ACS).



Send HTTP request

Sends an HTTP or HTTPS request to an external system with HTTP API.


Add action
Action
Send HTTP request
GET
http://192.168.100.79:8080/configure/channels/
Test
Status: 200 OK
Authorization (Basic)
User name
root
Password
OK
Cancel



Action parameters:

The dropdown list allowing to select a request type: **GET**, **POST**, **PUT** or **DELETE**.

The field for entering the text of a request.

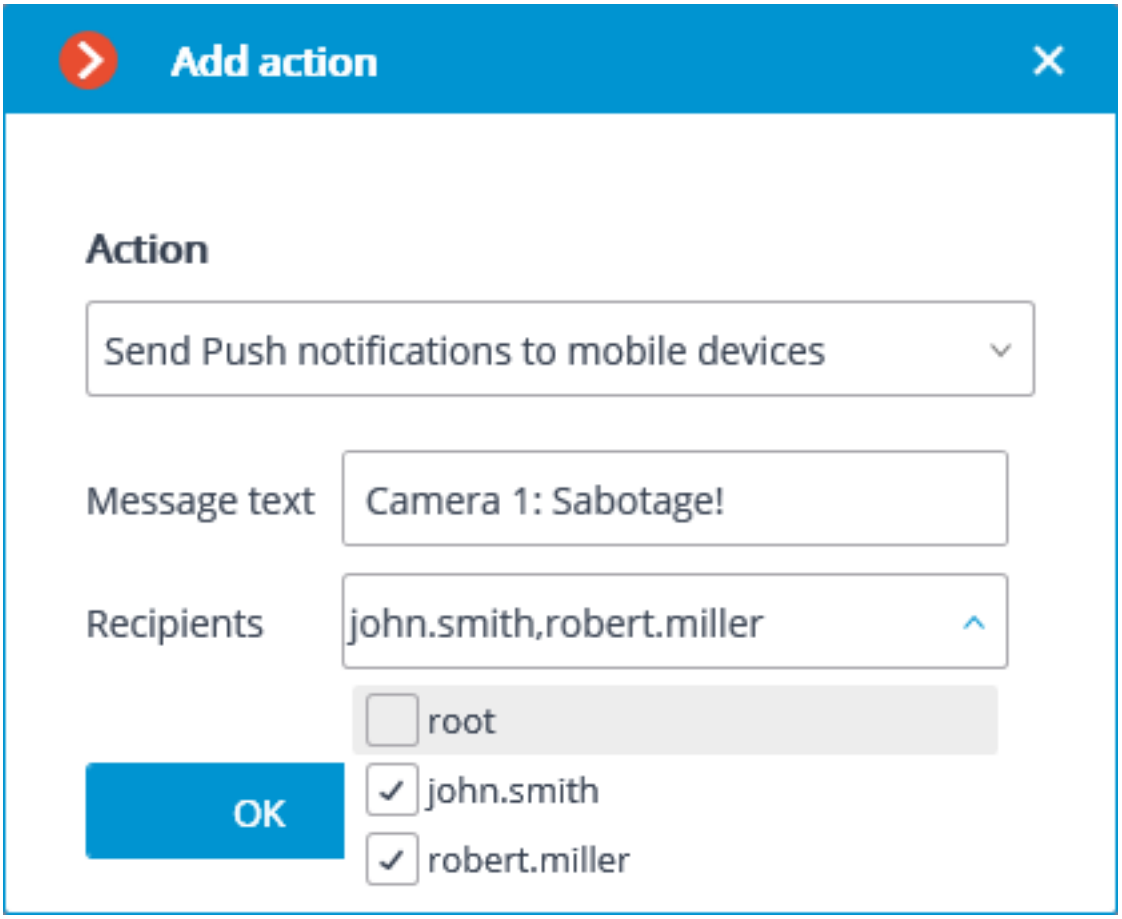
The **Test** button sends a request. The status of implementation of the test request is shown under the field with the text of the request.

The activation of the **Authorization (Basic)** option allows to specify the username and password for sending the request using Basic authorization.

The field for entering the body of a request.

Send Push notifications to mobile devices

Sends Push notifications with the preset text to the mobile clients connected to servers.



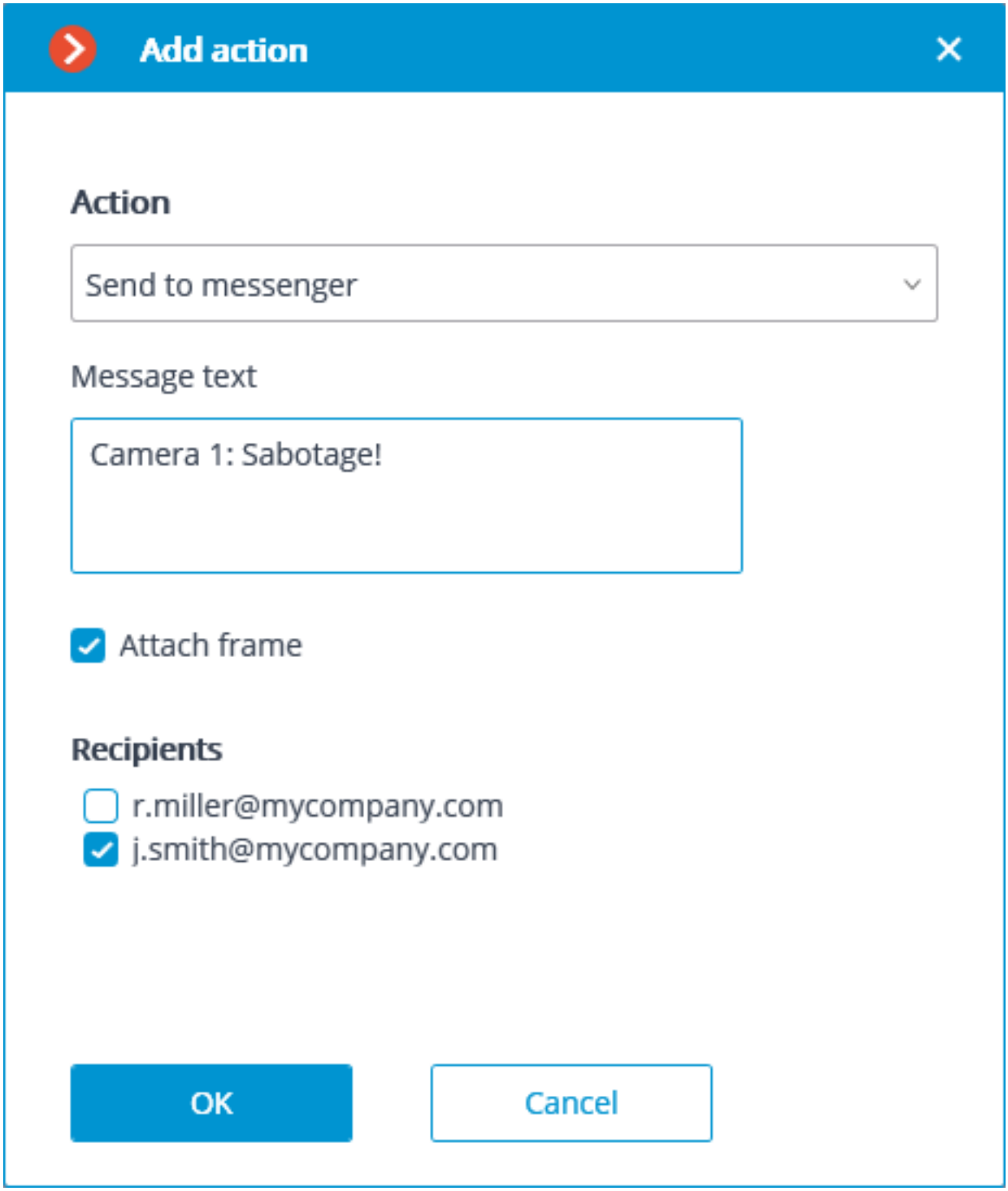
Action parameters:

Message text: sets the text of a message to be sent.

Recipients: the recipients of the message are set.

Send to messenger

Sends a message thru the connected messengers.



Action parameters:

Message text: the text of the message to be sent via messengers.

Attach frame: attaches the current frame.

Use frame from archive: a frame from the archive is attached.

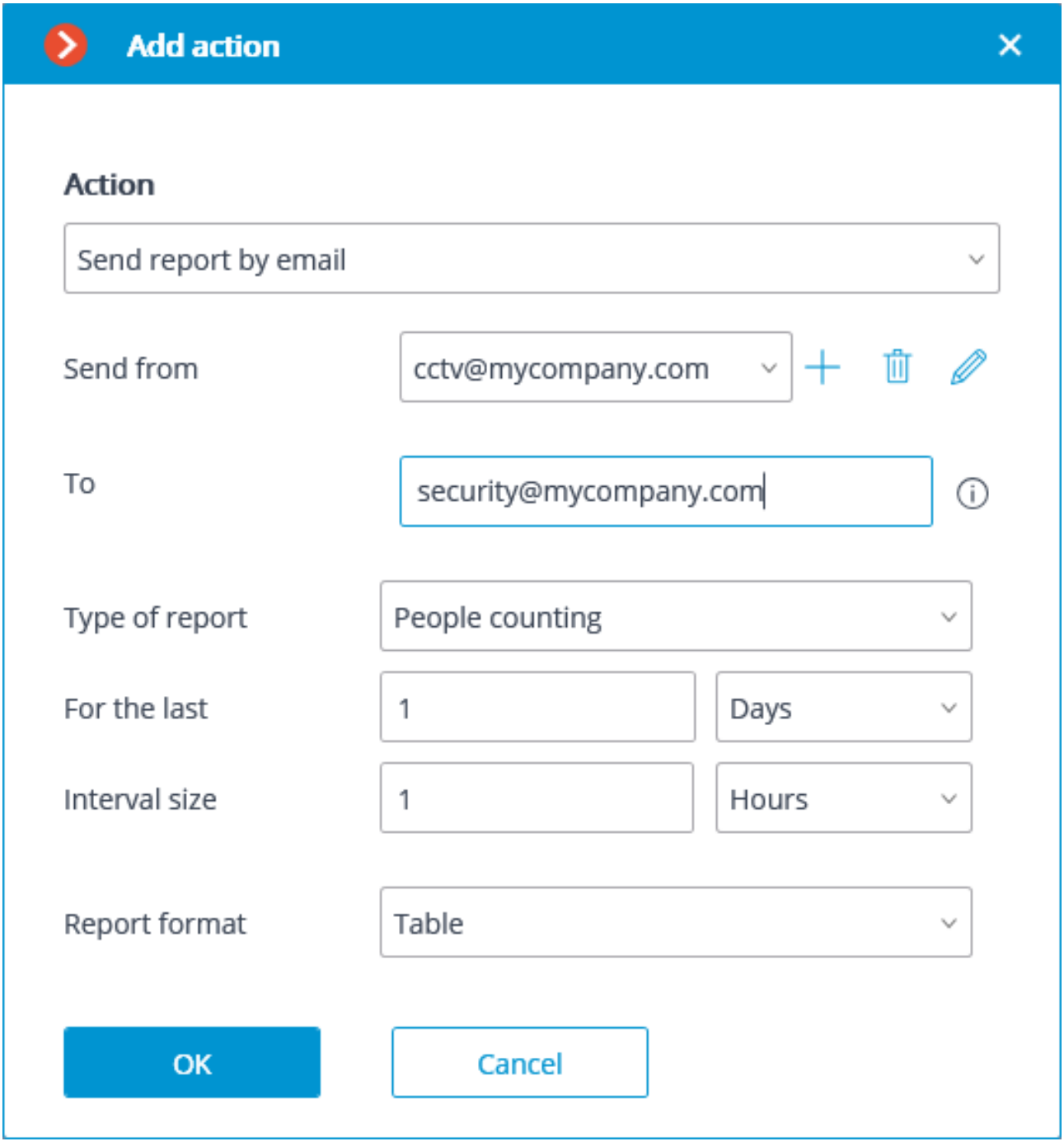
Recipients: the list of messenger users in which it is required to mark the recipients of the message.

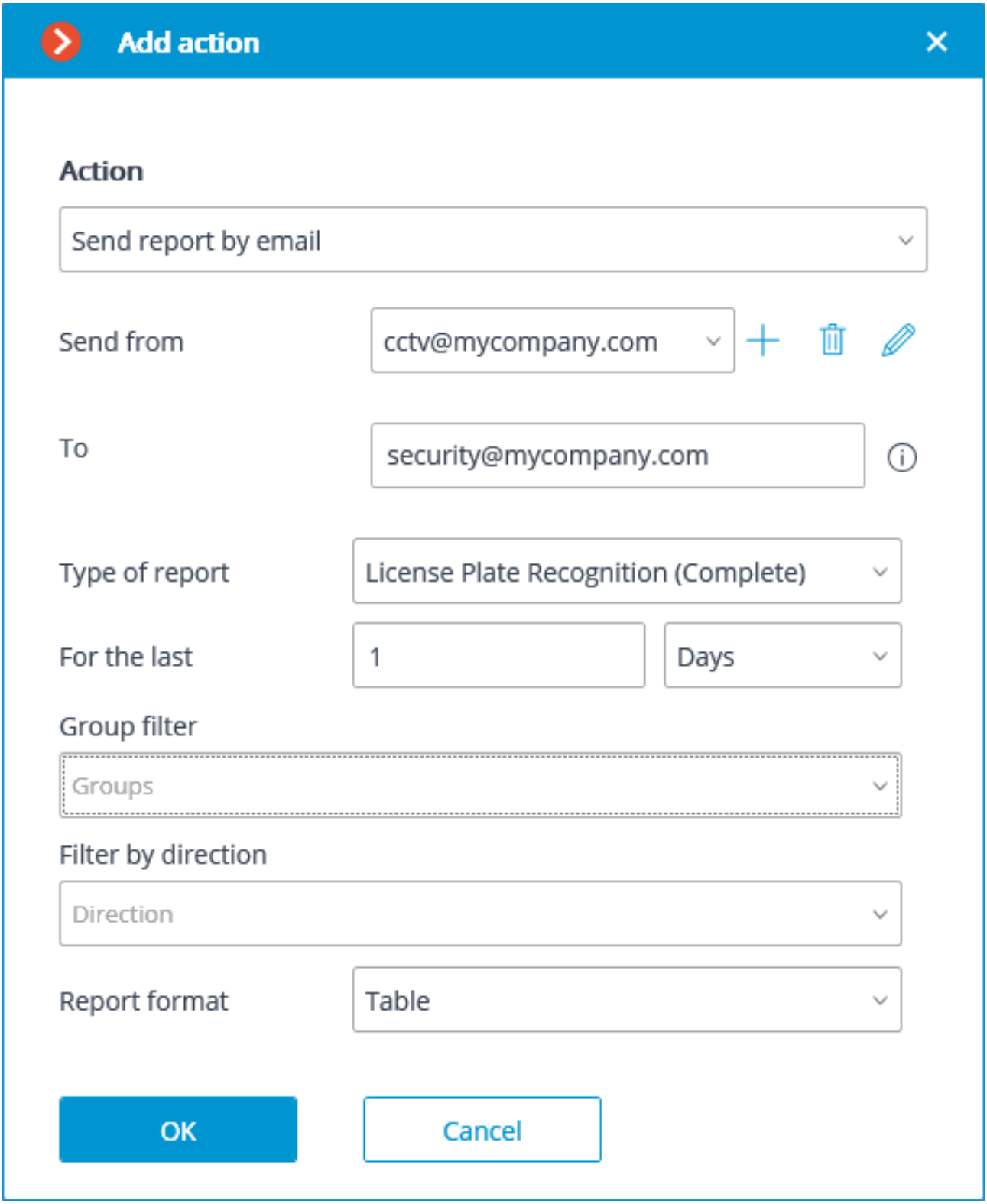
When sending messages created by the **Face recognized** event to the messengers, the image of a face from the archive at the moment of recognition will be attached to the message, and the reference image from the database will also be attached for comparison.

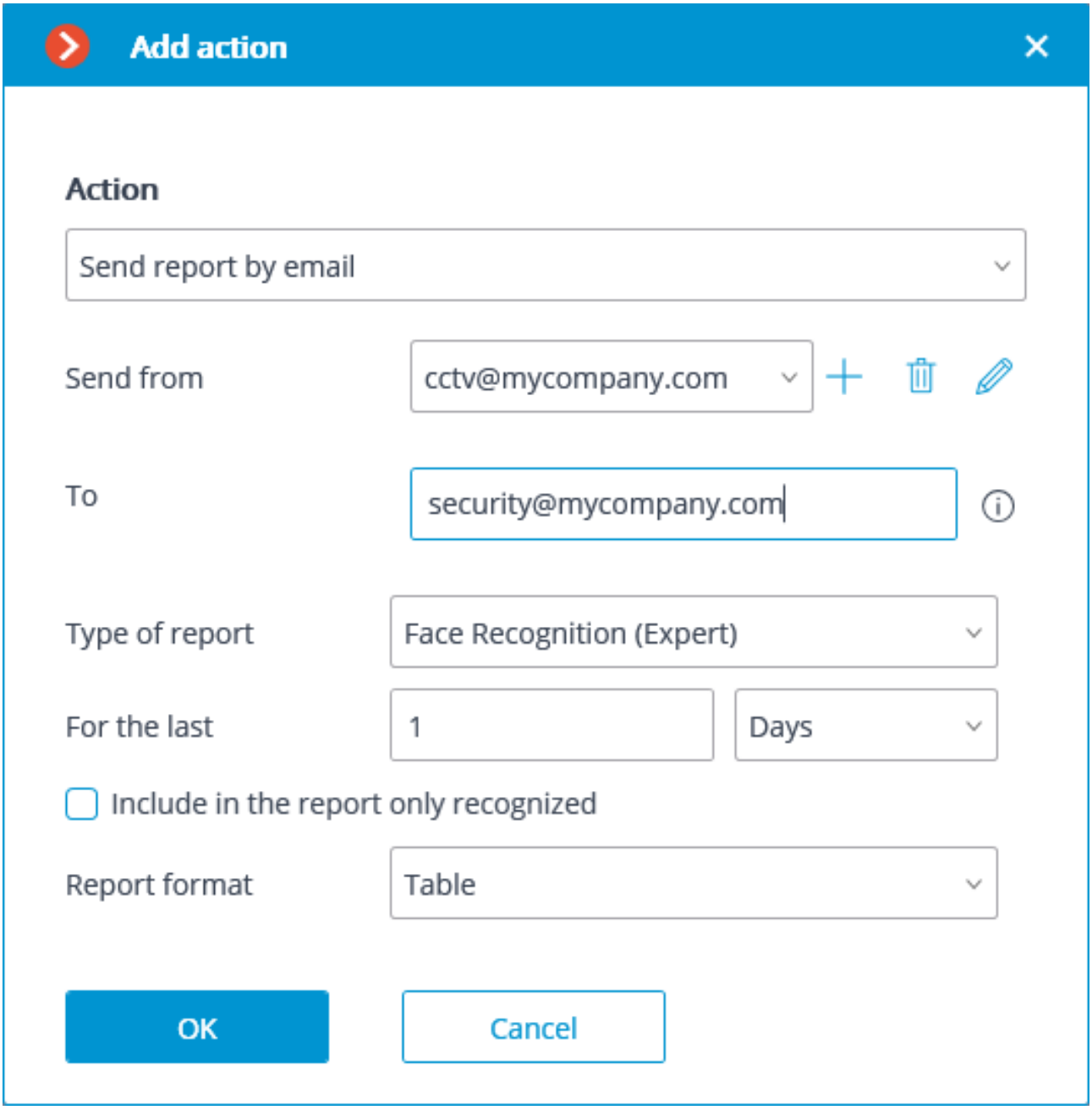
Whereby, regardless of whether the **Use frame from archive** option is enabled or disabled, the archived image will be attached. At the same time, the message will not contain the image of the face if there was no corresponding image in the archive at the moment of recognition. Moreover, the message will be sent only in case the settings of the conditions of the execution of action by event contain **Identified** | **Equal** | **Yes** setting.

Send report by email

Draws up a report and sends it by email.




Add action
Action
Send report by email
Send from
cctv@mycompany.com
To
security@mycompany.com
Type of report
License Plate Recognition (Complete)
For the last
1
Days
Group filter
Groups
Filter by direction
Direction
Report format
Table
OK
Cancel



Action parameters:

Send from: email address from which the messages will be sent. The forms of adding the email server and sender address can be found in the description of Send notification by email action.

To: email address to which the messages will be sent.

Type of report: a report is selected on one of the following analysis modules:

- People counting module;
- Unique Visitor Counting;
- Licence plate recognition (Complete);
- Licence plate recognition (Light);
- Face Recognition (Complete);
- Face Recognition (Light).

For the last (...) days: the period for which the report is required to be drawn up.

Report format: one of the formats available for the report is chosen. In the general cases the reports will be drawn up in the following formats:

- **Table**: Microsoft Excel spreadsheet.
- **.csv file**: CSV file with tabular data
- **Graph**: image file with graph.

Additionally, the parameters depending on the type of report are used for generating reports.

For the report regarding visitor quantity:

Size of interval: individual interval value is set.

For the report regarding the recognized vehicle license plate numbers:

Filter by groups: the groups are indicated whose data will be shown in the report.

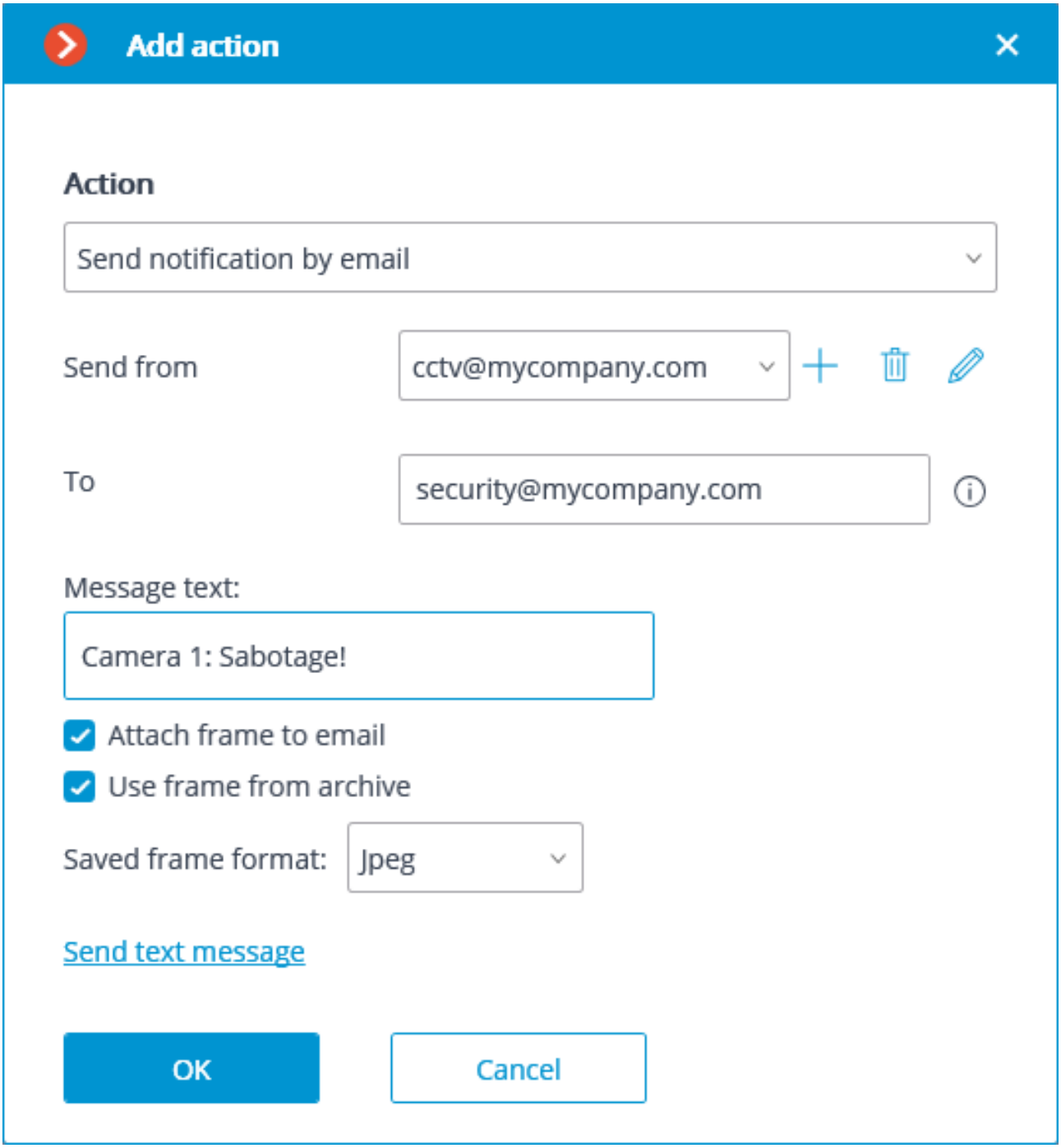
Filter by direction: the direction of travel of the vehicles whose data will be shown in the report is indicated.

For the report regarding the recognized persons:

I**nclude only those recognized**: when this option is on, only those persons who have been recognized using the database will be included into the report; of this option is off, all the persons detected by the module will be included in to the report.

Send notification by email

Sends an email notification from the server to the indicated address.



Action parameters:

Send from: email address to be used for sending messages. In a general case, it will be the same as the user name in the mail server settings window.

To: email address to which the messages will be sent

Message text: the text of the message to be sent to the indicated address.

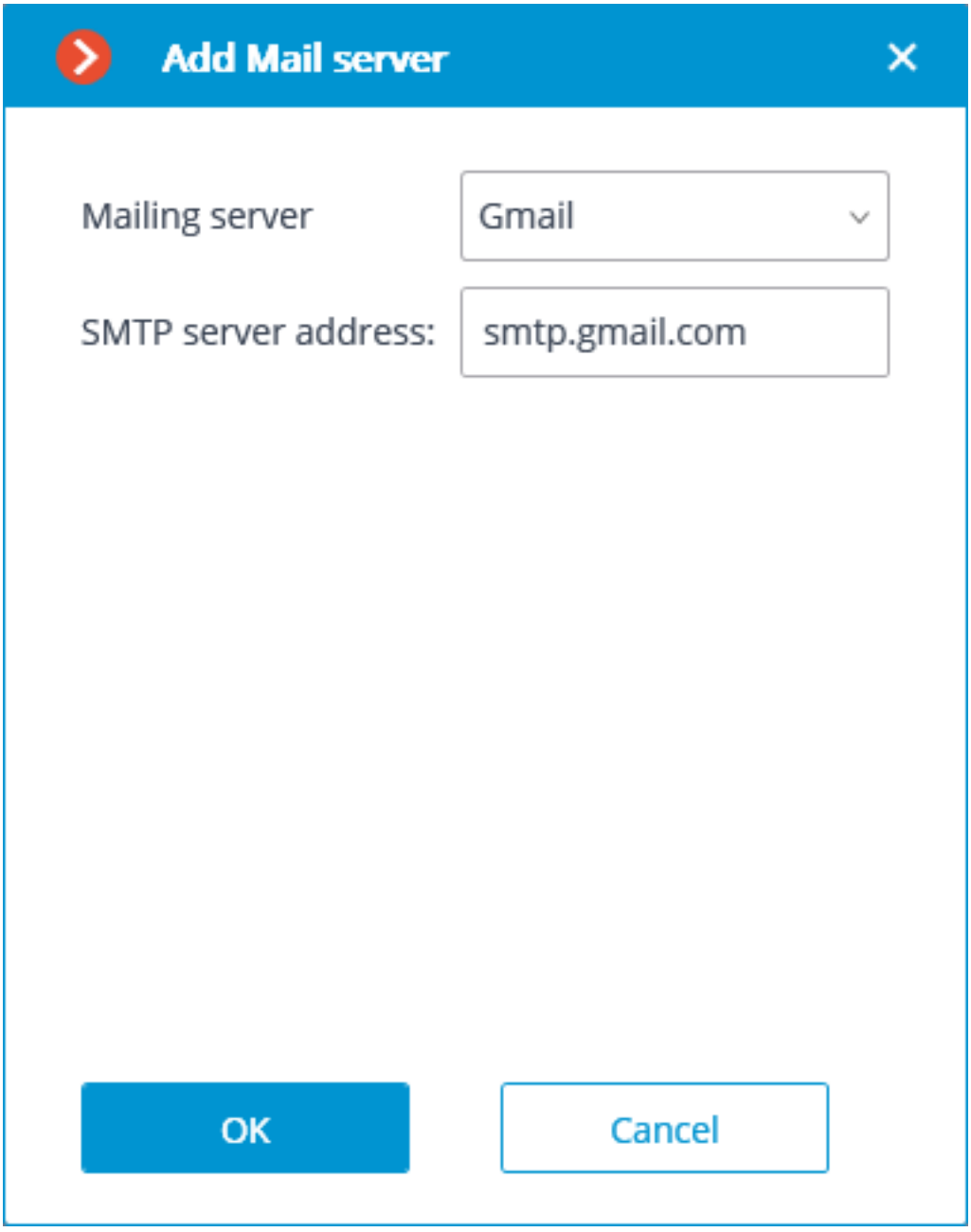
Attach frame to email: allows to add a frame from the channel taken at the moment of sending the message. The frame file format must be set: **JPEG**, **PNG** or **BMP**.

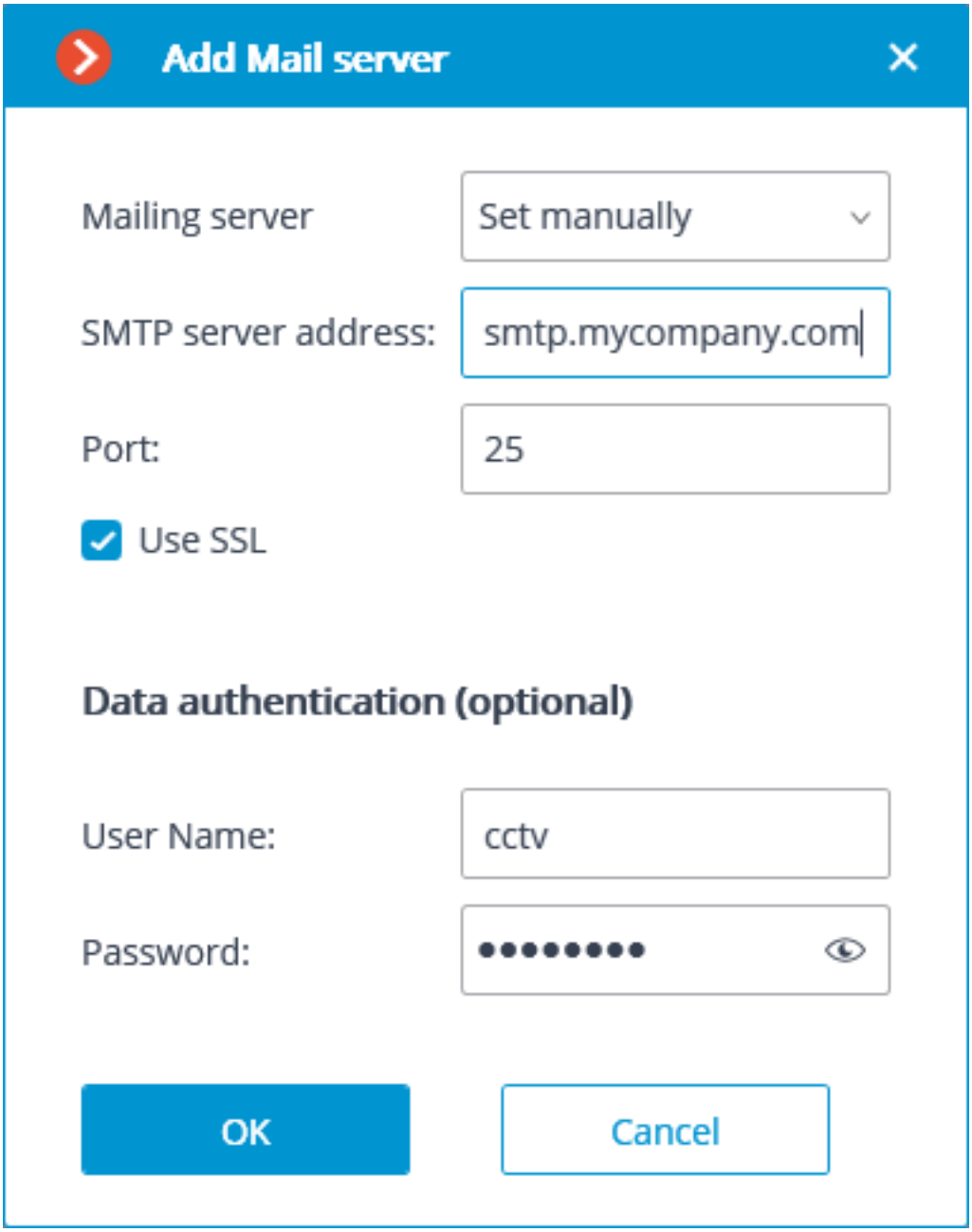
Use frame from archive: the frame saved in the archive is used for sending. It allows to send more event-synchronized visual data, but leads to additional server hardware load.

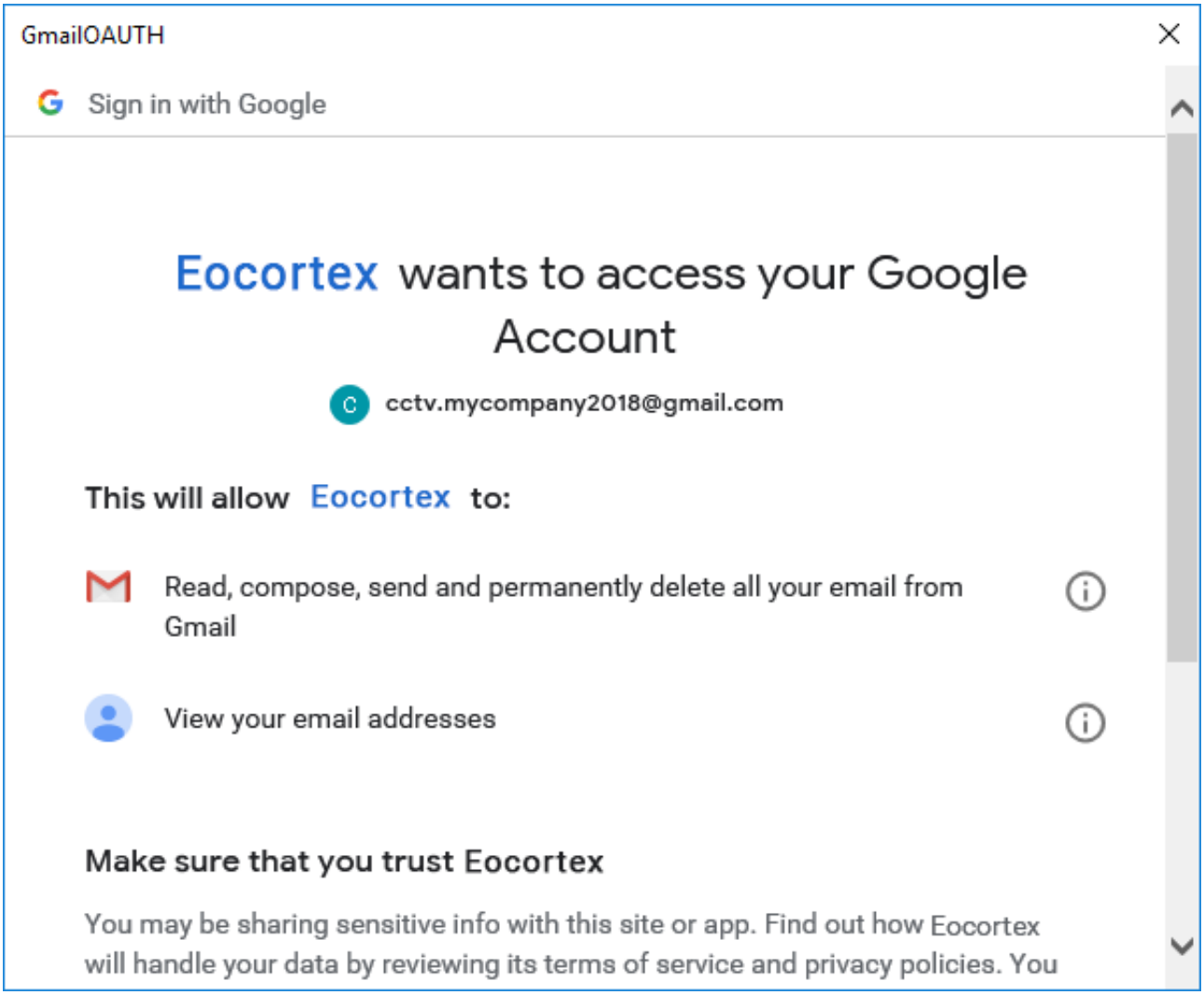
Clicking on the **Send text message** link will attempt to send the message. Depending on the result, a window with a message confirming a successful transmission or an error will appear.

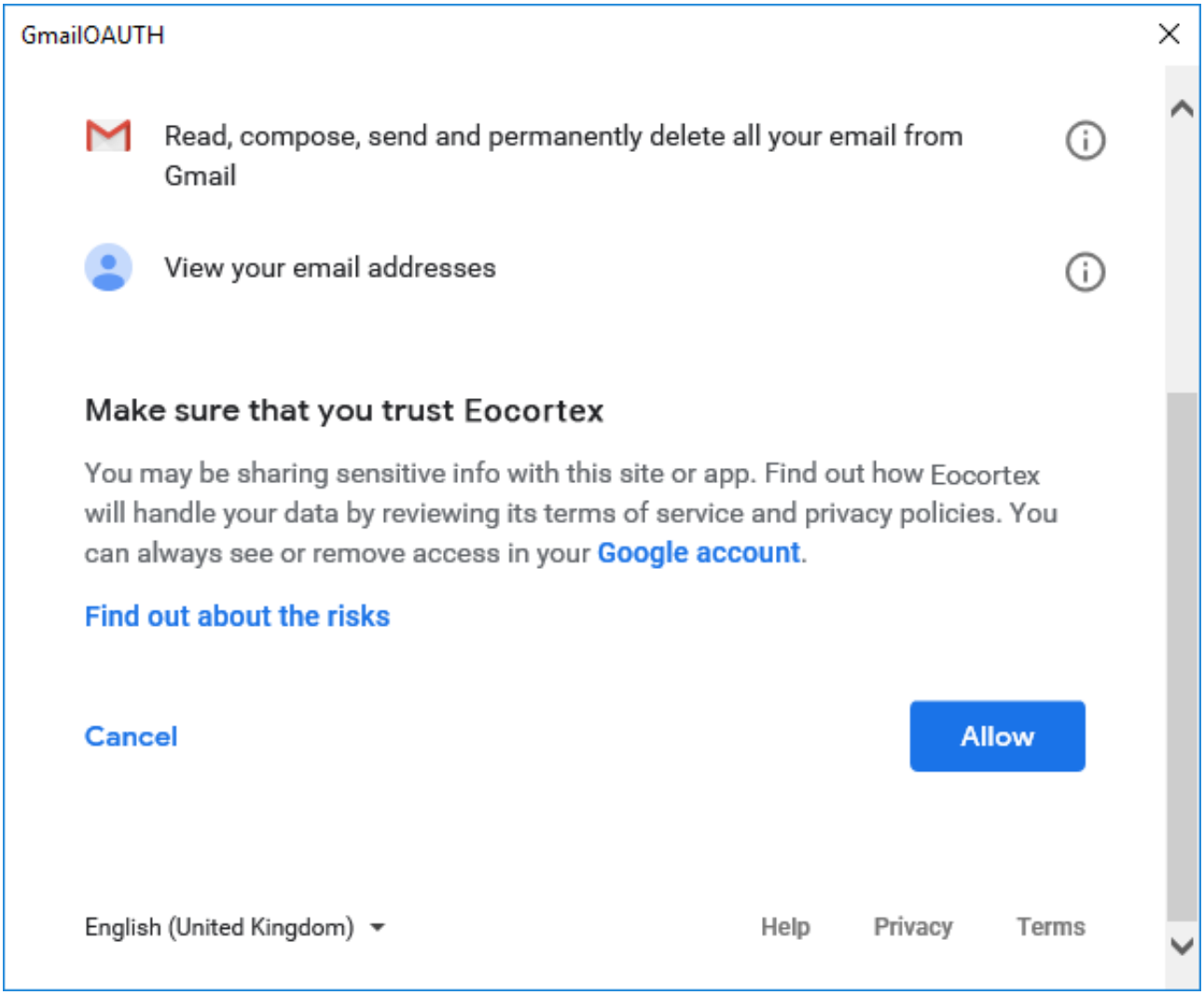
Below are the forms for adding a mail server and sender address, depending on the mail server type: **Set manually** or **Gmail**.

The forms of editing the mail server and sender address are similar to the forms used for adding.



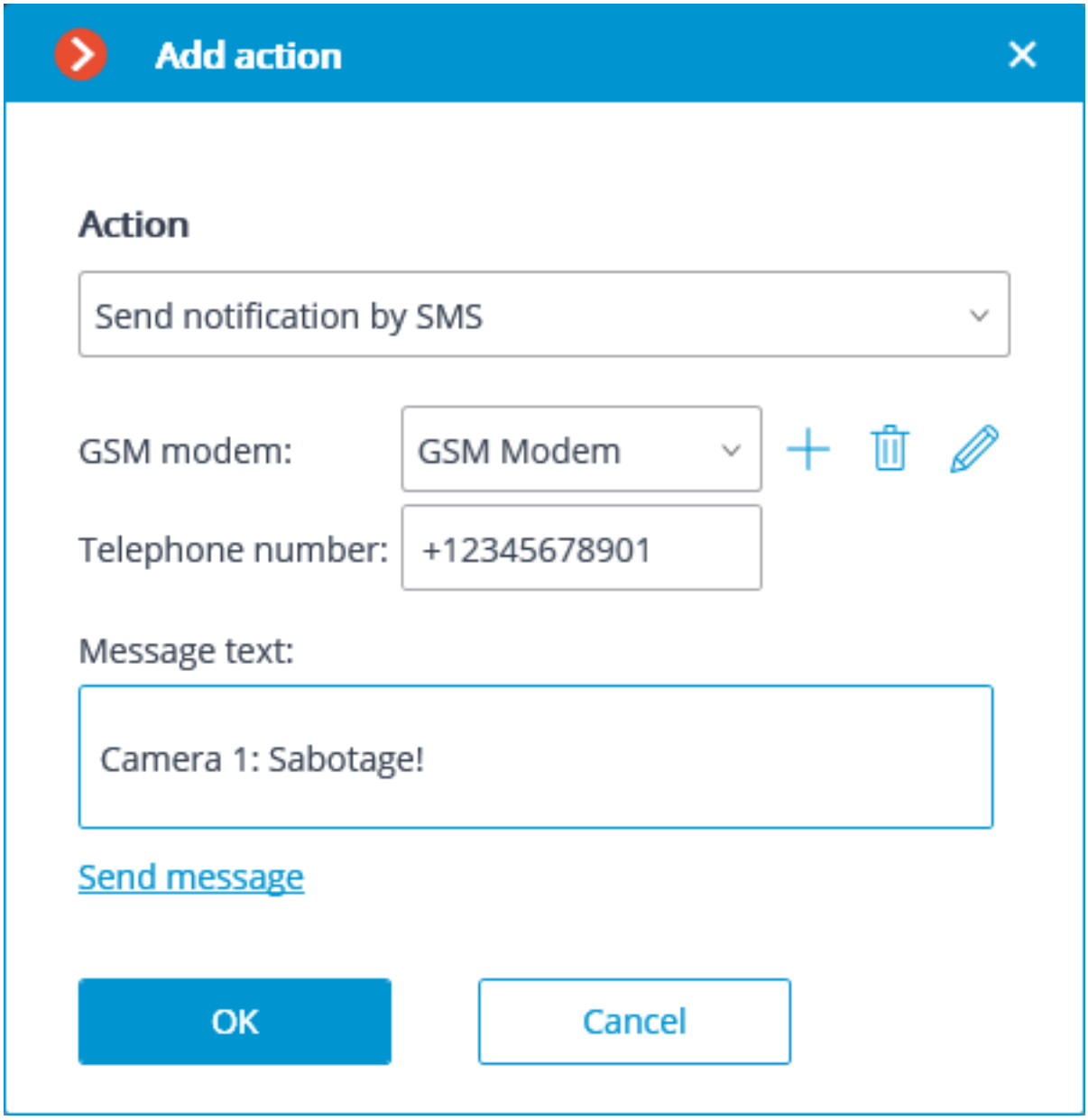

Add Mail server
Mailing server
Set manually
SMTP server address:
smtp.mycompany.com
Port:
25
Use SSL
Data authentication (optional)
User Name:
cctv
Password:
OK
Cancel


GmailOAUTH
Sign in with Google
Eocortex wants to access your Google Account
cctv.mycompany2018@gmail.com
This will allow Eocortex to:
Read, compose, send and permanently delete all your email from Gmail
View your email addresses
Make sure that you trust Eocortex
You may be sharing sensitive info with this site or app. Find out how Eocortex will handle your data by reviewing its terms of service and privacy policies. You



Send notification by SMS

Sends an SMS notification using the GSM modem plugged into a USB port of the server to the indicated address.



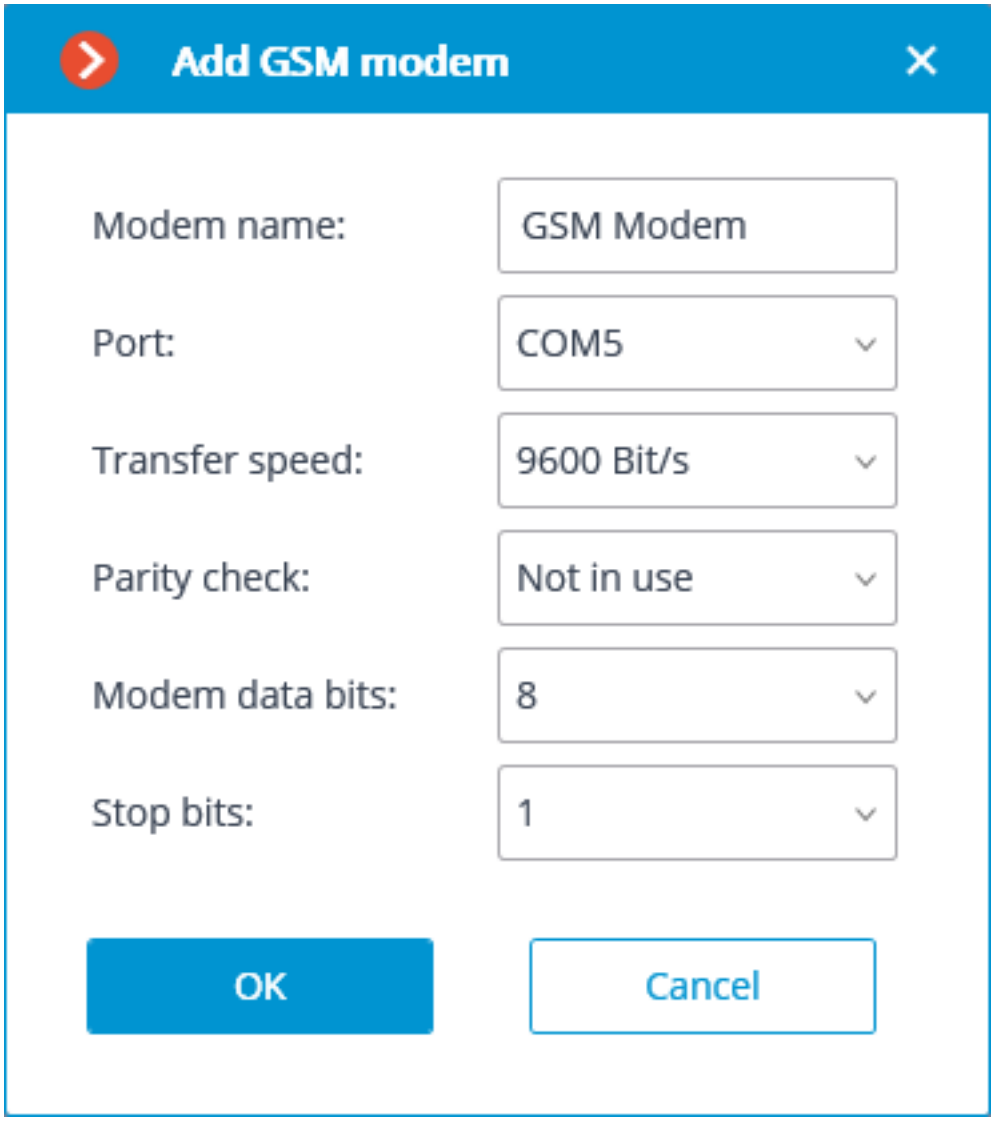
Before using the GSM modem on the server, it is required to install the drivers supplied with the modem, then check the modem's operability by sending a test message either with the software provided with the modem or using the operating system's means. After checking the modem's operability, it is required to close or stop the software used for working with the modem – otherwise the modem may become unavailable for use with the CCTV system.

The number of the COM port to which the GSM is connected may be found in the Windows Device Manager or in the software provided with the modem.

Action parameters:

GSM modem: sets the modem to be used for sending SMS messages.

Below you will find the form with the modem's settings. It is required to indicate actual values there. These values are usually set in the native software of a modem.



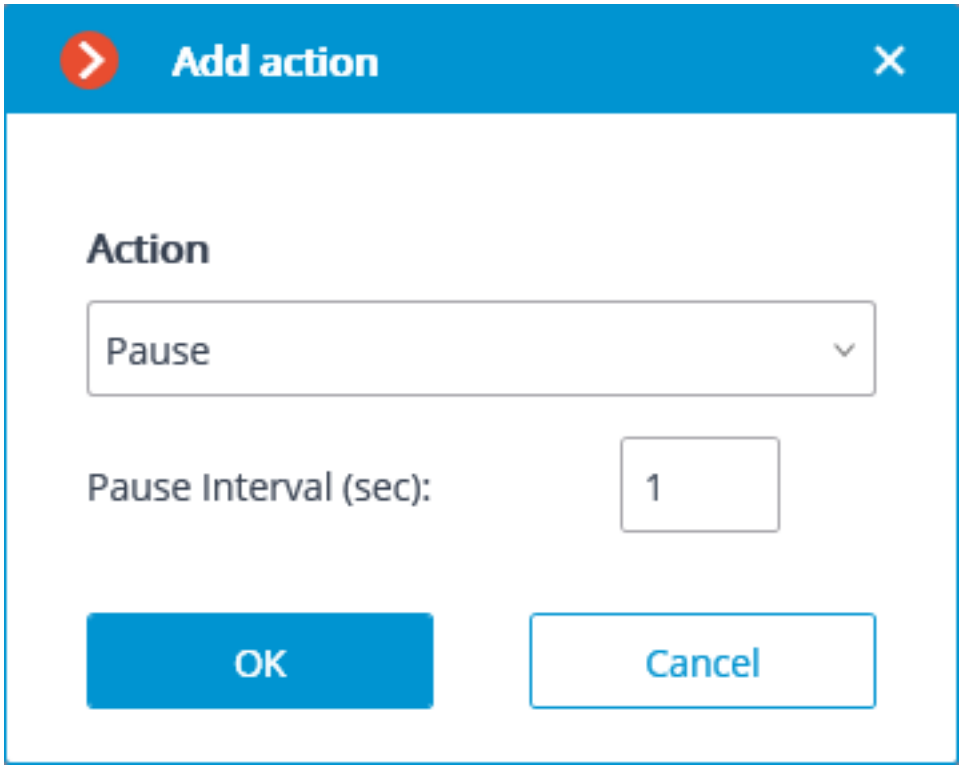
Telephone number: the number of the phone to which the SMS messages will be sent.

Message text: the text of the message to be sent to the specified number.

Clicking on the **Send message** link will attempt to send the SMS message. Depending on the result, a window with a message confirming a successful transmission or an error will appear.

Pause

Allows to set a pause between the actions.



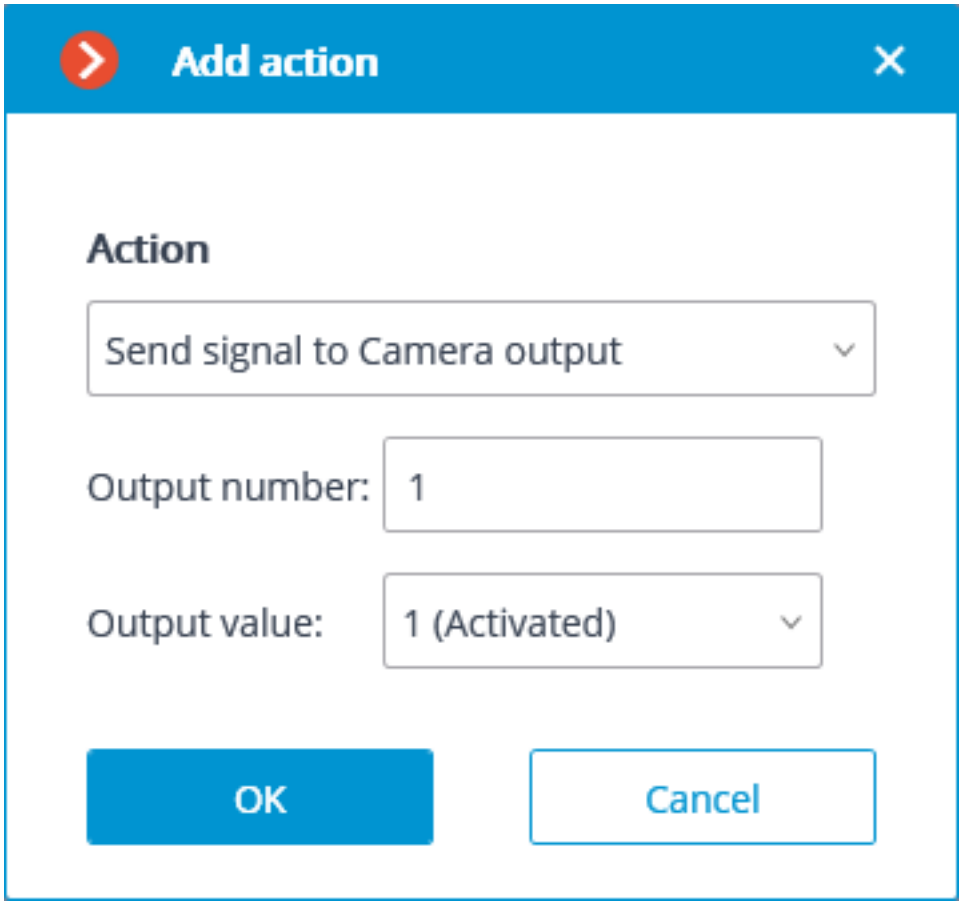
Action parameters:

Pause interval (sec) sets the pause duration.

Send signal to Camera output

The electrical signal is sent to the IP camera's signal output.

To perform this action, it is required that the support of the signal outputs for this particular IP camera model is implemented in the **Eocortex** software. Contact **Eocortex** technical support team for further details.



Action parameters:

Output number: sets the number of camera signal output.

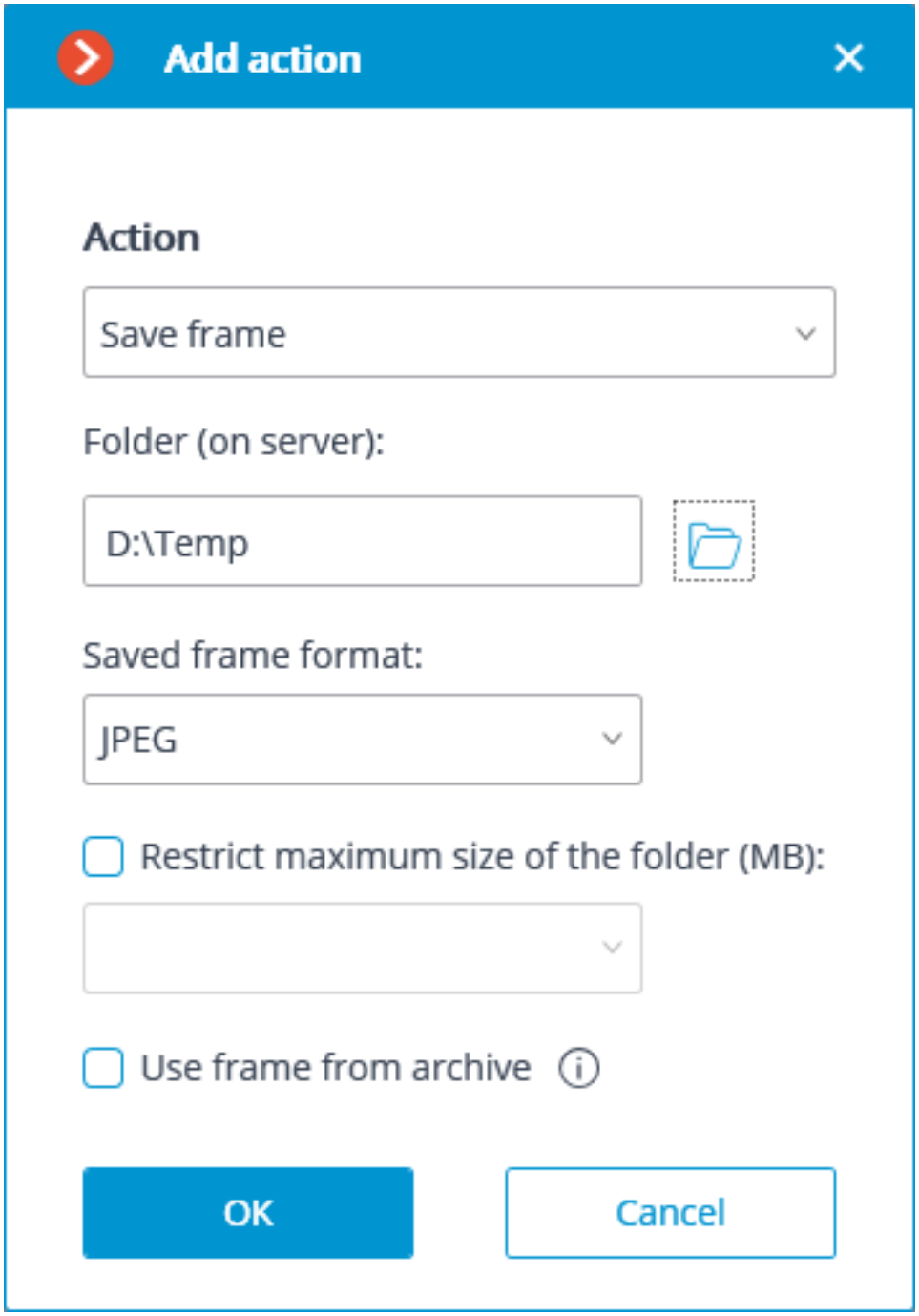
Value 0 or 1 is used for most cameras with one output.

Output value: sets the alarm output status: 1 (Activated) / 0 (Deactivated).

Depending on the circuitry employed, different physical statuses of the contacts may correspond to the activation/deactivation of the signal output: circuit closed or opened, voltage present or absent etc. As a rule, the information on the wiring can be found in the engineering documentation for the cameras.

Save frame

Saves a frame on the server.



Action parameters:

Folder (on server): sets the path to the folder where the frames will be stored.

Saved frame format: image file format (JPEG or PNG).

Restrict maximum size of the folder (Mb): allows to set folder size limit. Old files will be deleted when the maximum folder size is reached.

Filenames will be formed as follows:

ChannelName DD_MM_YYYY hh.mm.ss.ttt.ext, where:

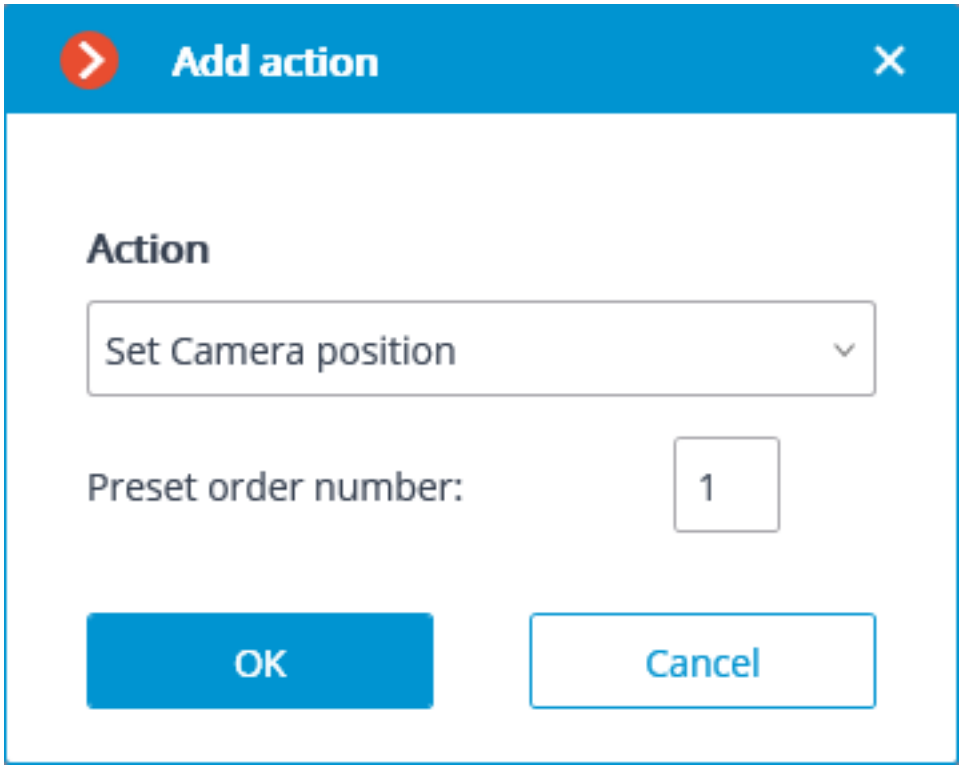
DD_MM_YYYY: day, month, year;

hh.mm.ss.ttt: hours, minutes, seconds, milliseconds

ext: jpg, png.

Set camera position

Puts a PTZ camera into a preset position. The particular preset position must be preliminarily set in the camera own settings.

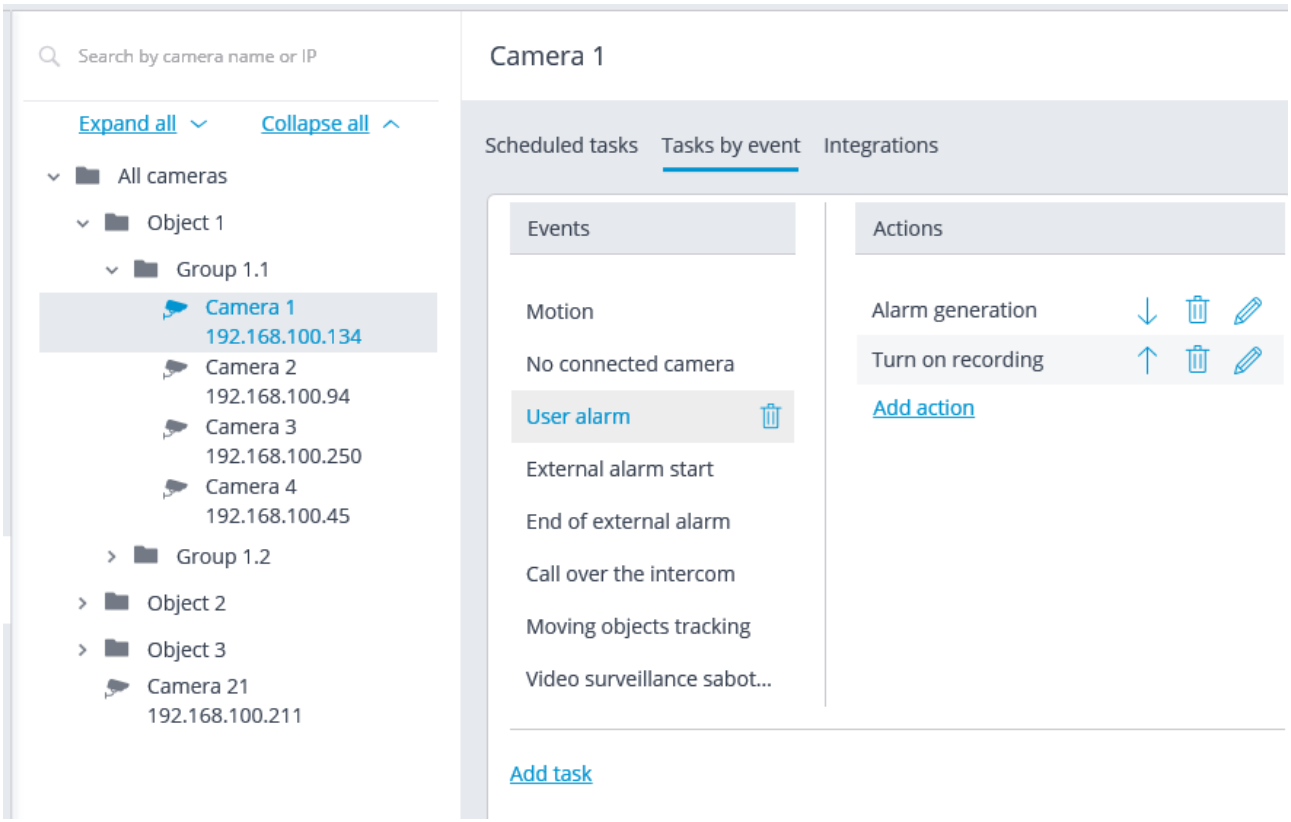


Action parameters:

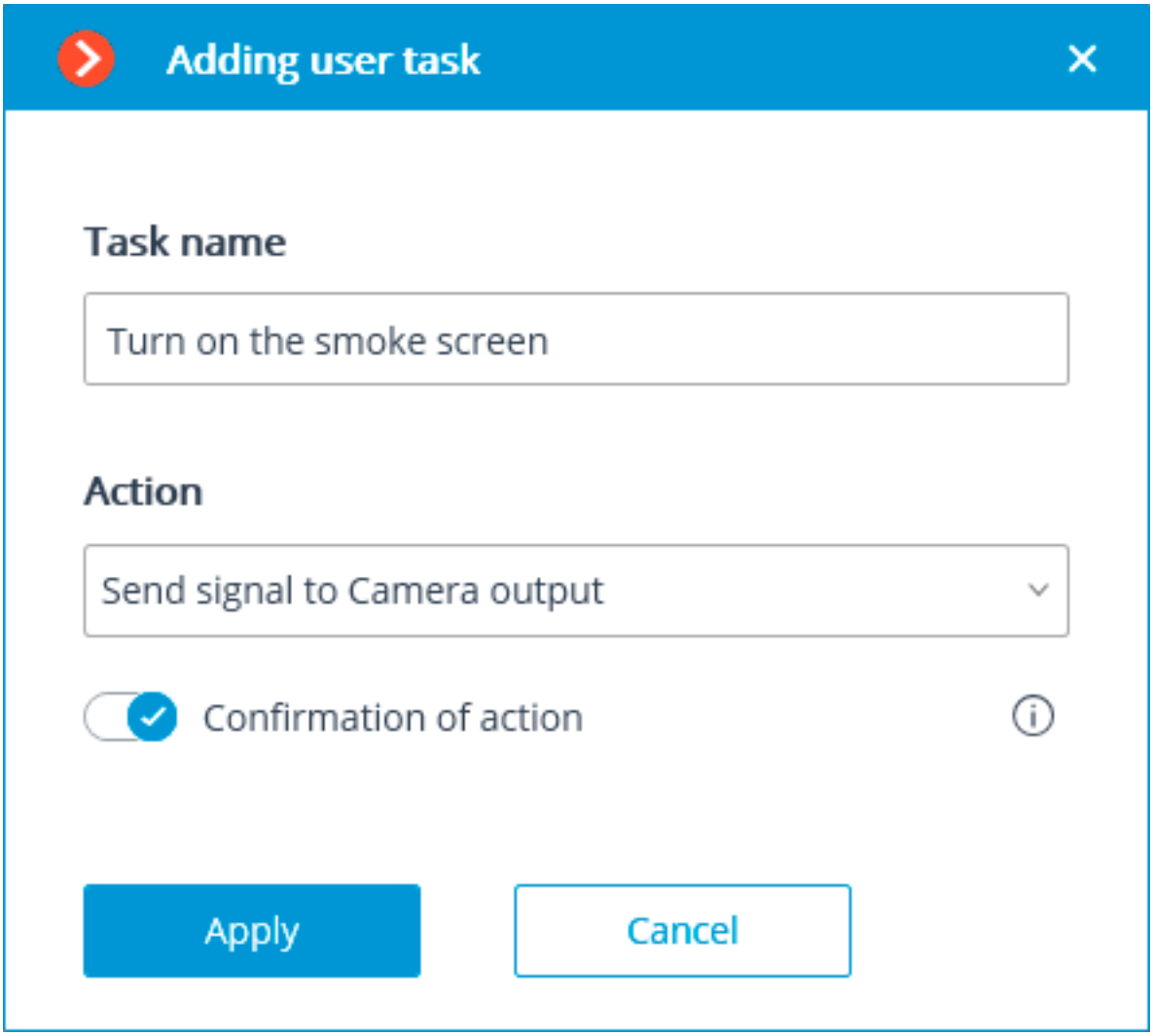
Preset order number: sequential number of a preset is set.

User tasks

For setting up actions to be performed by command of the user of the client application, go to the **AUTOMATION** tab in the **Eocortex Configurator** application, select an individual camera in the tree, then go to the **Tasks by event** tab in the opened window.



In order to add a user task, select the camera in the list and click the + button on the right of the **User tasks** header. The task by event wizard will open.



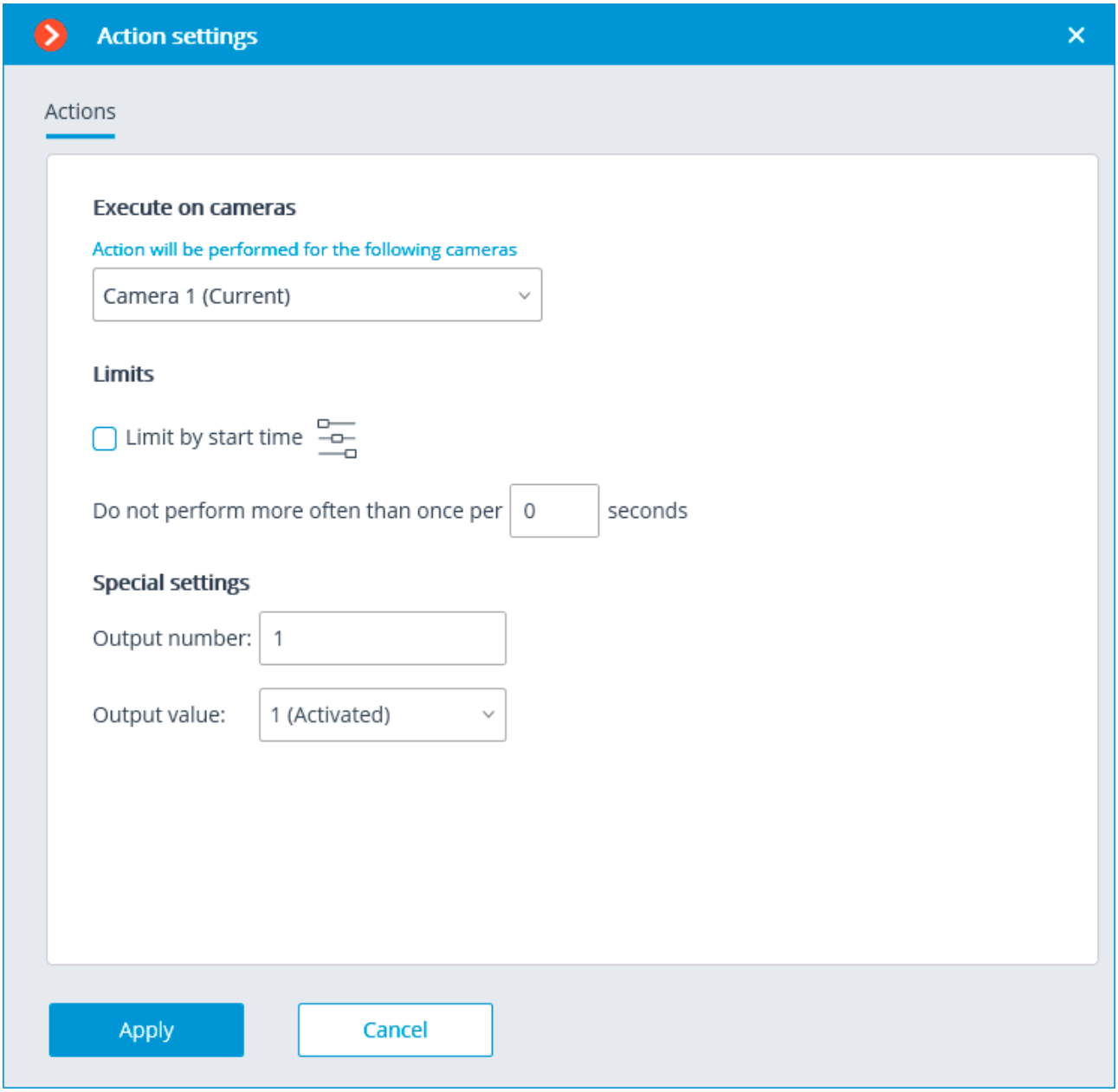
In the start screen of the wizard, it is required to enter the task name and to select an action in the dropdown list that will be executed when the task is launched. If the task launch confirmation is required, the **Confirmation of action** must be enabled.

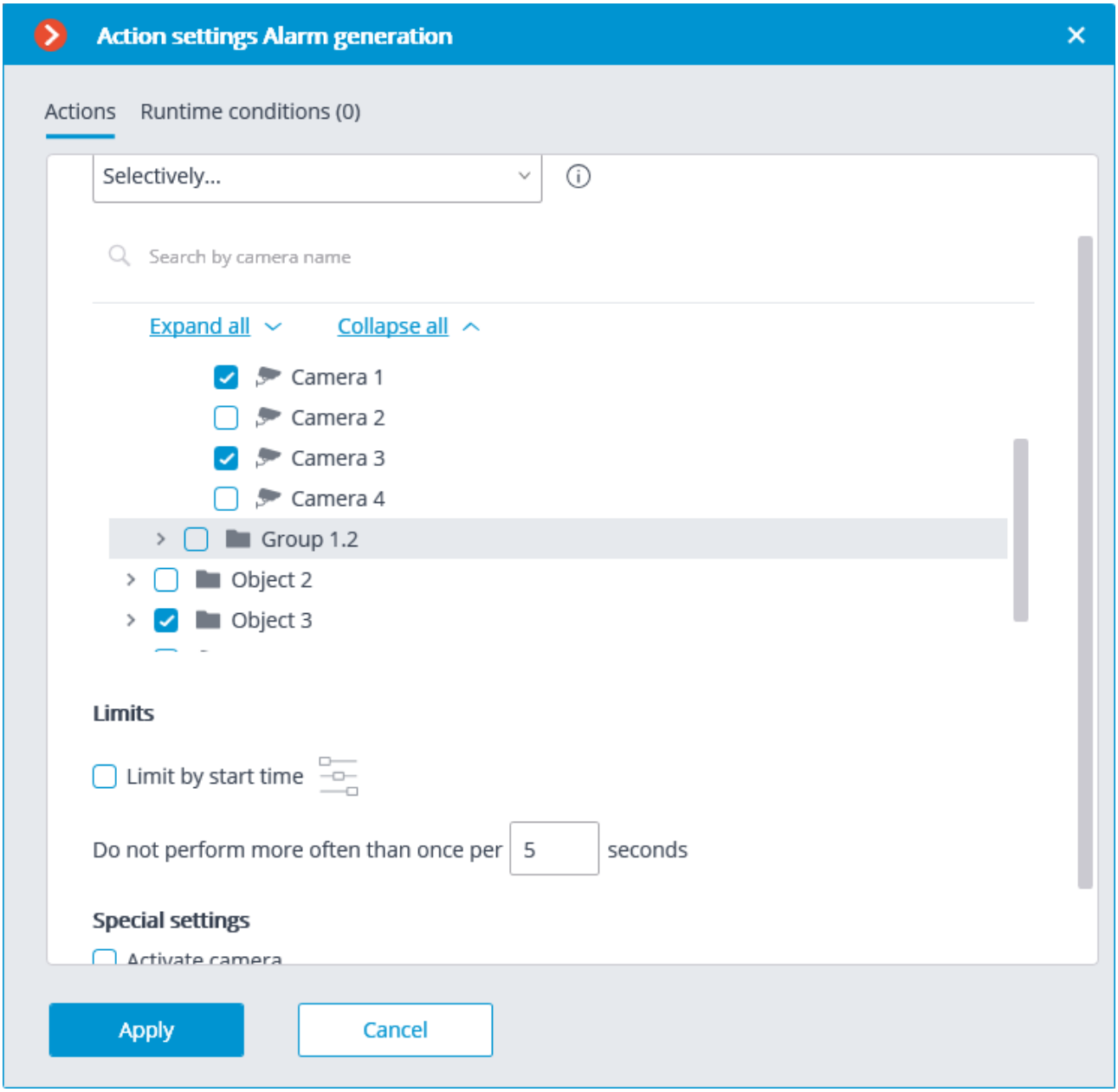
The list and description of the available actions can be found in the Actions.

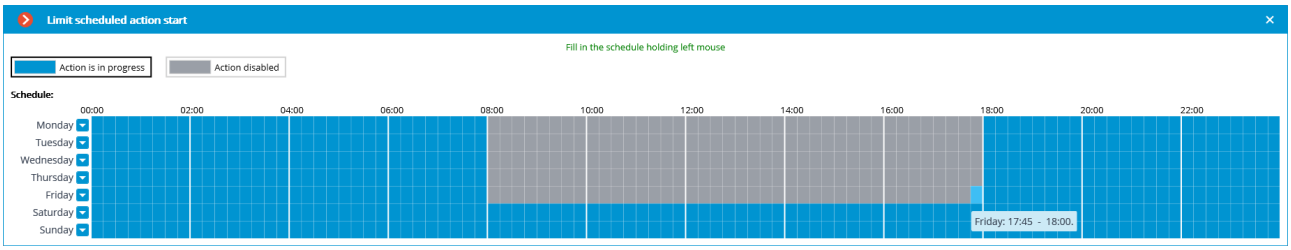
At the next step, on the **Actions** tab, it is possible to set the cameras on which a task will be completed. The options are as follows: on a single camera, on all cameras, or on a user-defined list of cameras.

When performing actions on the group of cameras, these actions will be carried out only on the cameras bound to the same server to which the camera whose event has initiated the actions is bound. The actions on the initiating camera will be performed in all cases.

On this tab you can also set the limitations by execution time, including limitations on the schedule that opens when pressing the button. Also, on this tab you may adjust the **Special settings** that depend upon a selected event.


Action settings
Actions
Execute on cameras
Action will be performed for the following cameras
Camera 1 (Current)
Limits
Limit by start time
Do not perform more often than once per
0
seconds
Special settings
Output number:
1
Output value:
1 (Activated)
Apply
Cancel



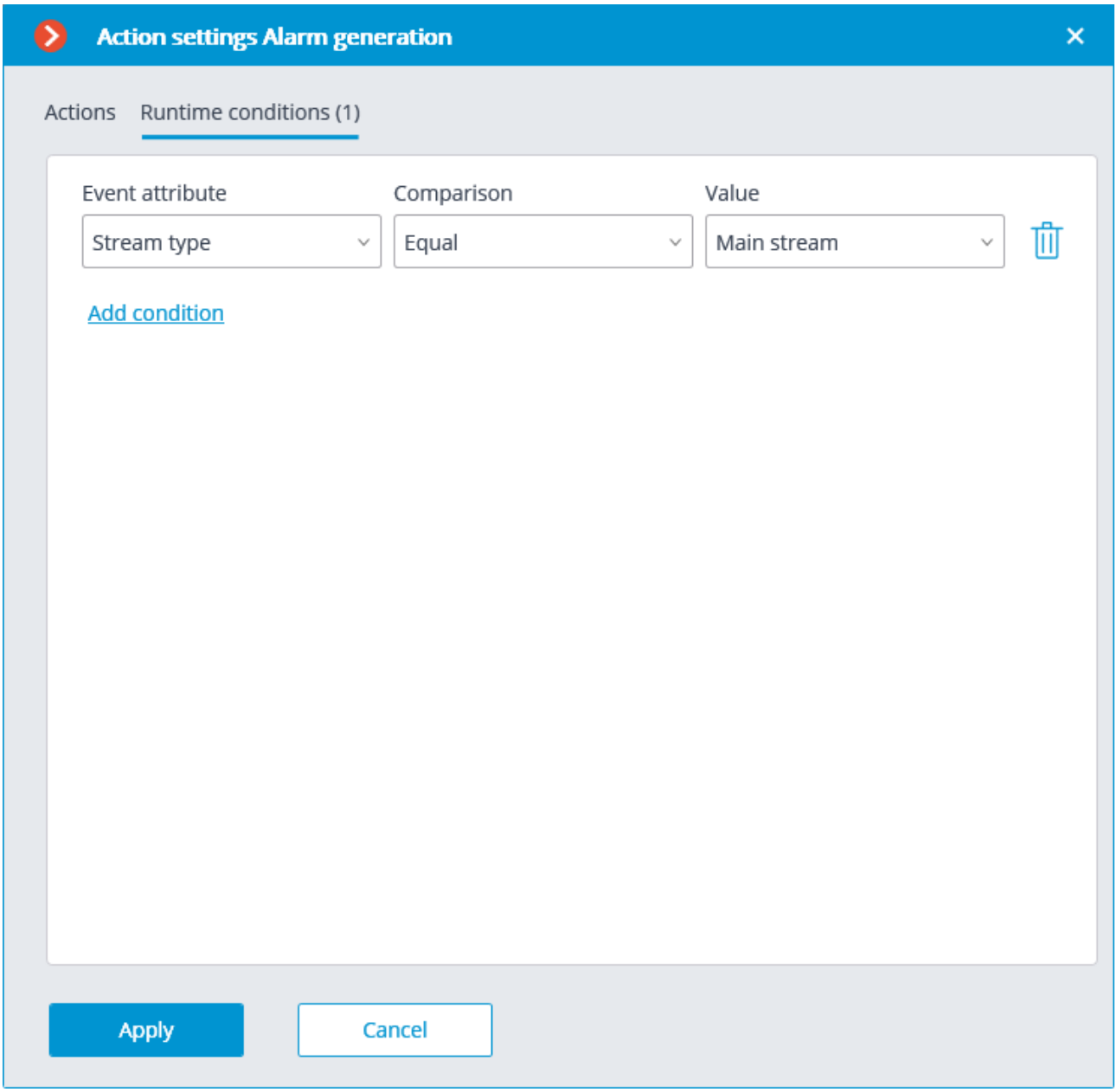


On the **Runtime conditions** tab, it is possible to set the conditions for an action to be performed.

⚠ When adding several conditions, it is required to take into consideration that all the conditions are combined by the AND logical operator. Consequently, there can be a situation when, with certain settings, the action will never be executed.

For example, if two different zones were set for the movement event in the conditions, the action will be performed only in case that the movement is registered in the part of the

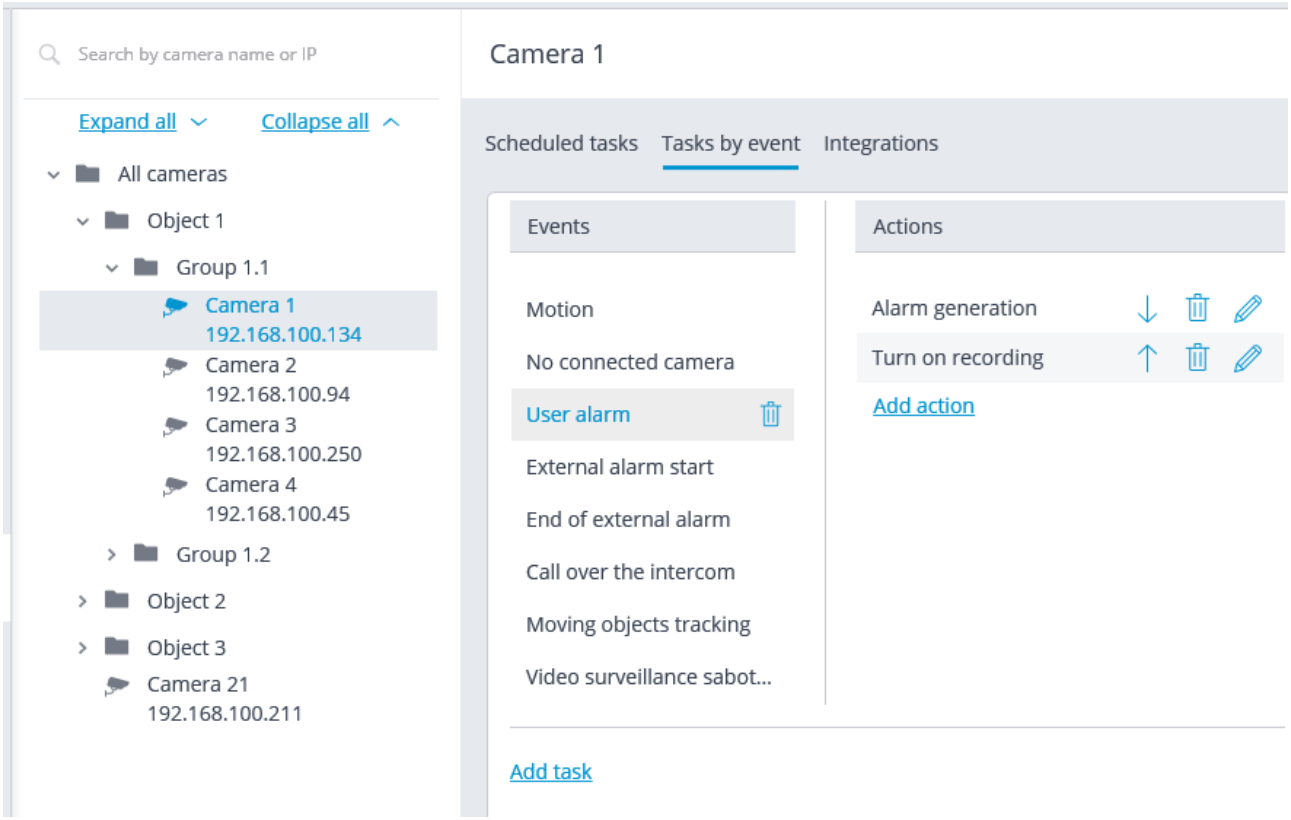
⚠ frame where these zones overlap. If the zones do not overlap, the action will never be performed.



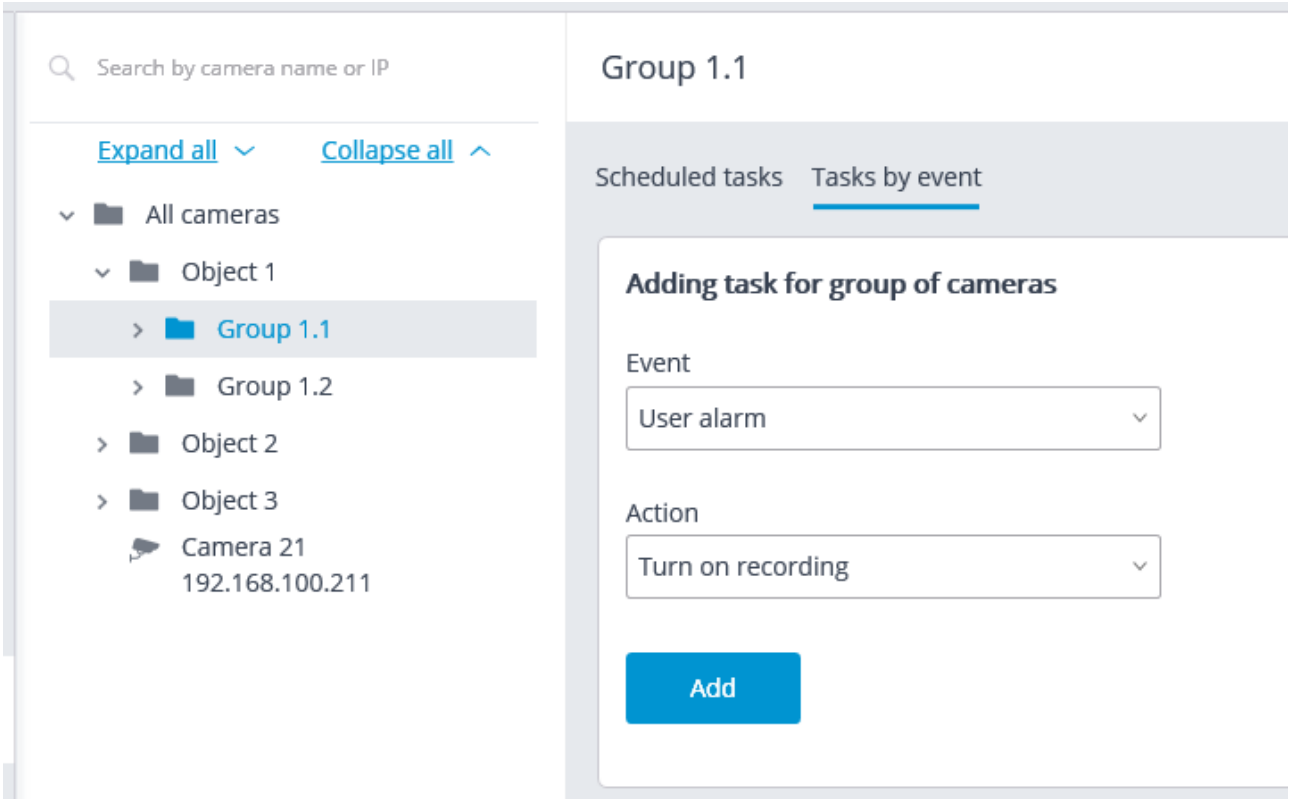
Tasks by event

For setting up actions to be performed in response to events happening in the CCTV system, go to the **Automation** tab in the **Eocortex Configurator** application, select an individual camera or folder in the tree, then go to the **Tasks by event** tab in the opened window.

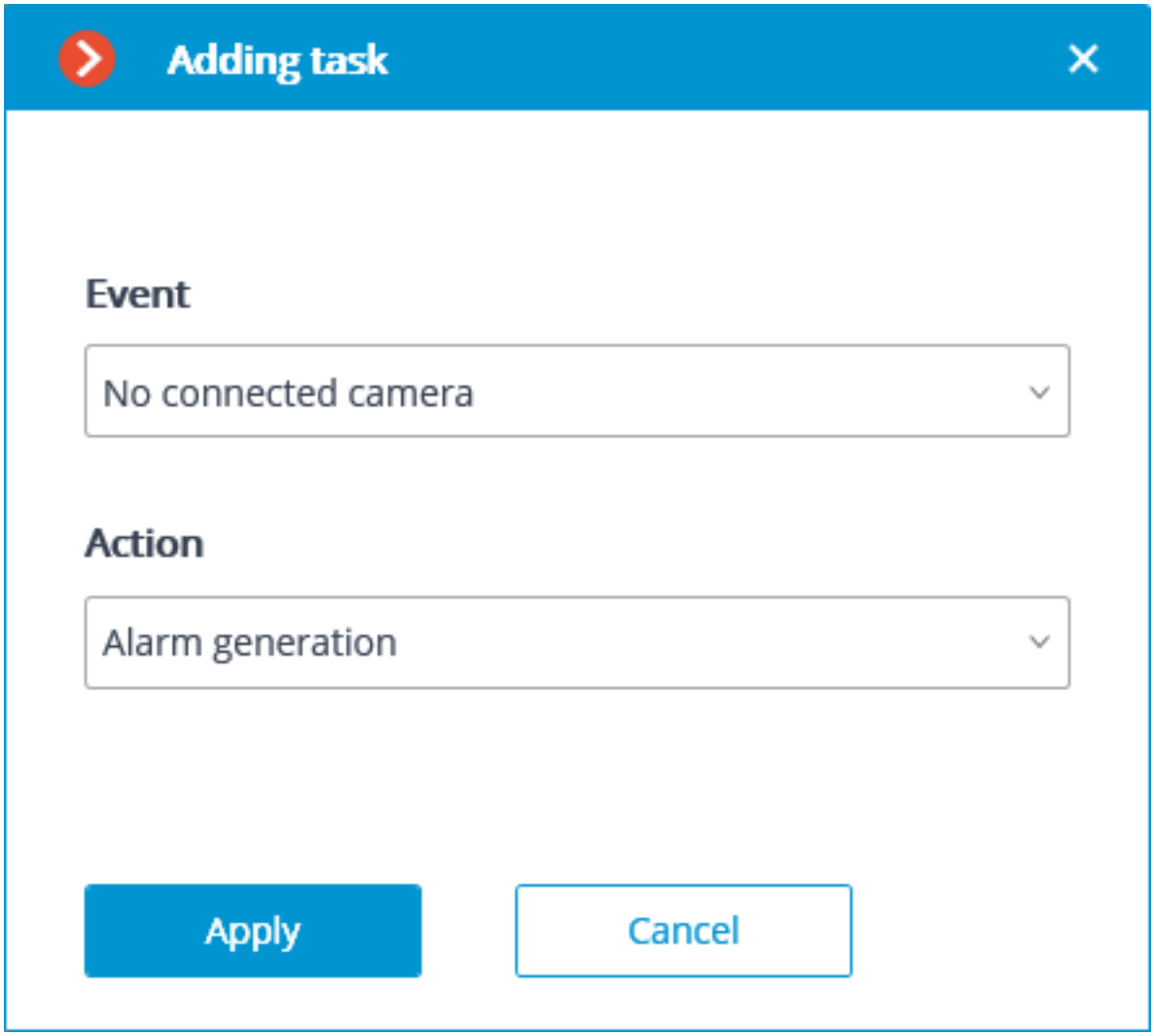
You can add, modify and delete the tasks to be performed by event.



It is possible to add only one action to be performed in response to an event for a folder or a user-defined list of cameras.



In order to add a task to be performed in response to an event, select the camera in the list and click the **Add task** link. The task by event wizard will open.



In the wizard launch screen, choose Event and Action that will be performed in response to the specified event, then click **Add**.

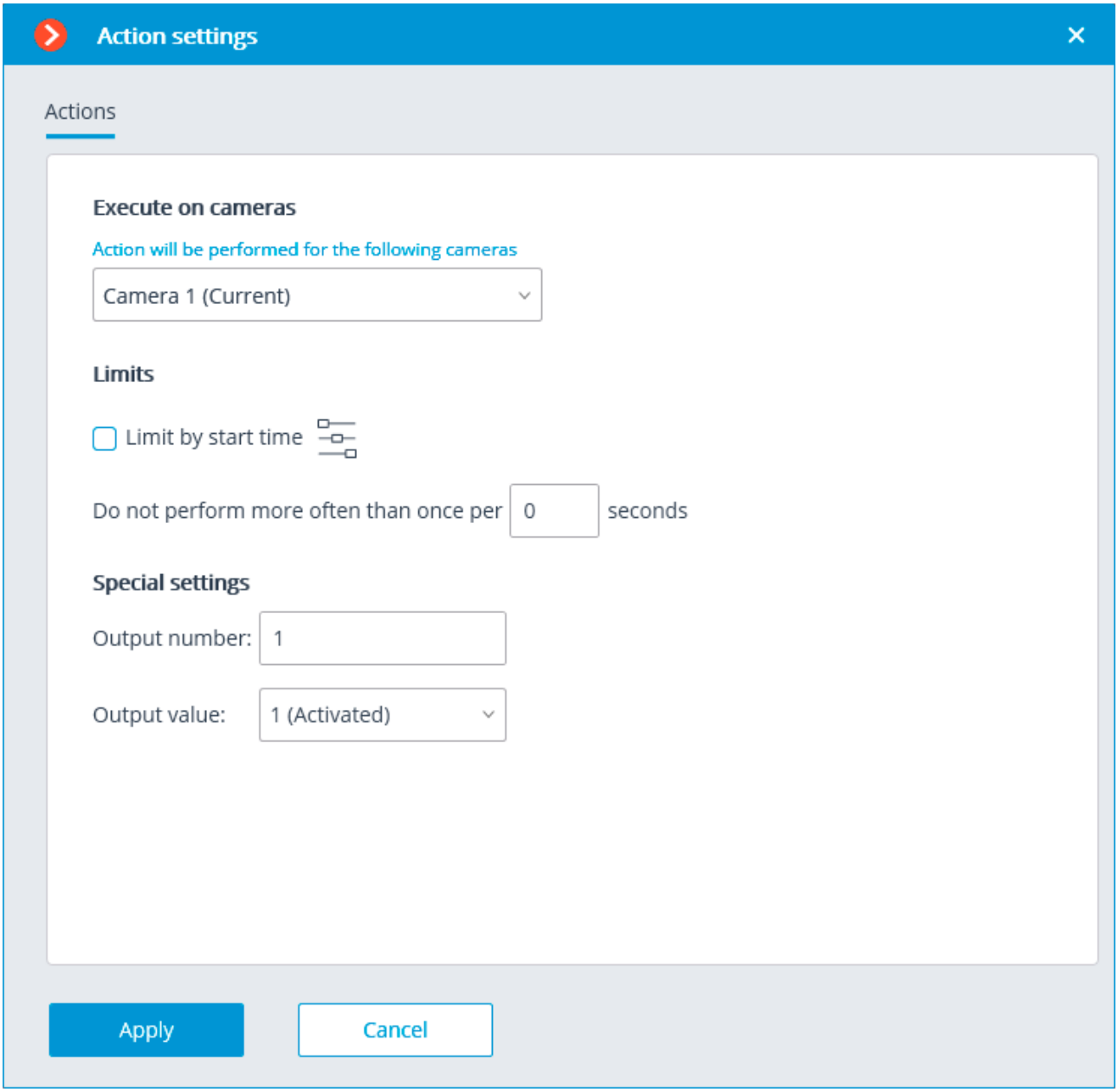
The list and description of the available events can be found in the Events section.

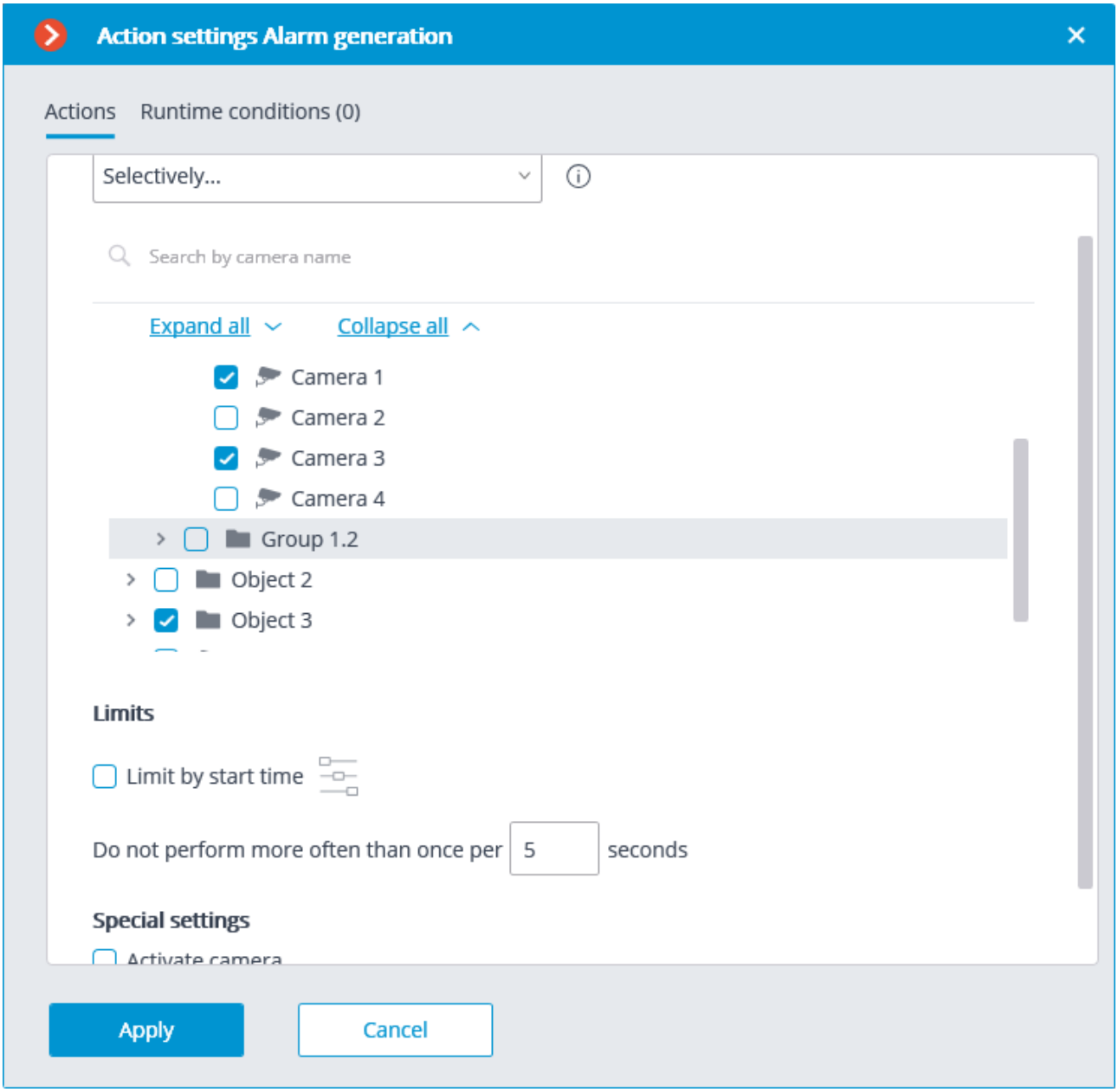
The list and description of the available actions can be found in the Actions.

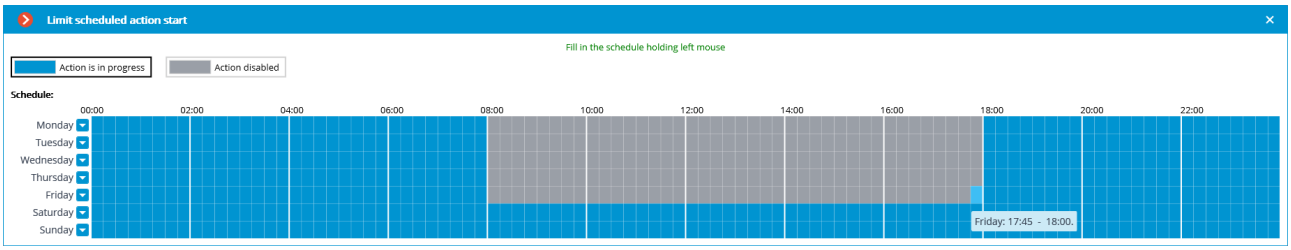
At the next step, on the **Actions** tab, it is possible to set the cameras on which a task will be completed. The options are as follows: on a single camera, on all cameras, or on a user-defined list of cameras.

When performing actions on the group of cameras, these actions will be carried out only on the cameras bound to the same server to which the camera whose event has initiated the actions is bound. The actions on the initiating camera will be performed in all cases.

On this tab you can also set the limitations by execution time, including limitations on the schedule that opens when pressing the button. Also, on this tab you may adjust the **Special settings** that depend upon a selected event.


Action settings
Actions
Execute on cameras
Action will be performed for the following cameras
Camera 1 (Current)
Limits
Limit by start time
Do not perform more often than once per
0
seconds
Special settings
Output number:
1
Output value:
1 (Activated)
Apply
Cancel



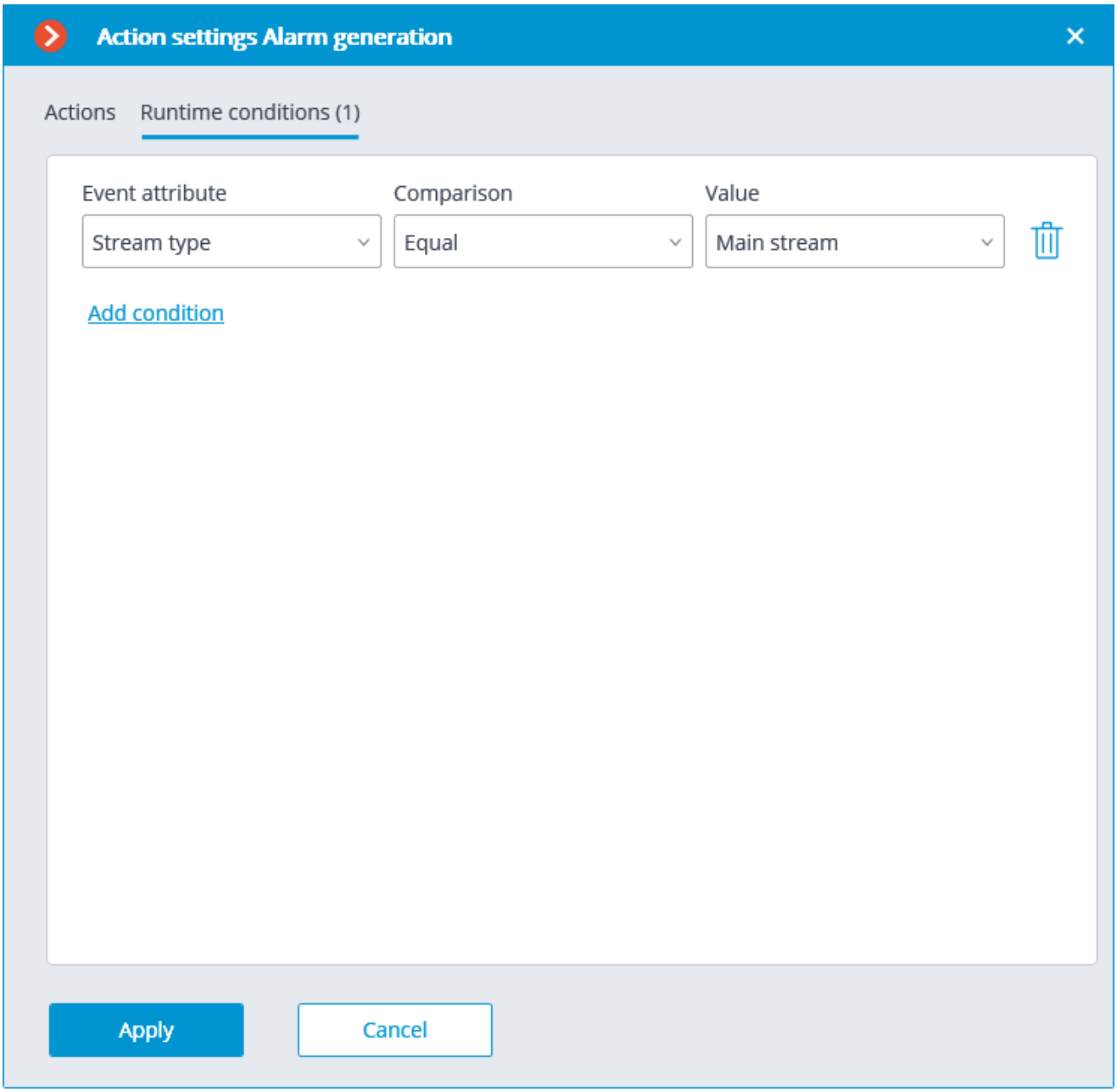


On the **Runtime conditions** tab, it is possible to set the conditions for an action to be performed.

⚠ When adding several conditions, it is required to take into consideration that all the conditions are combined by the AND logical operator. Consequently, there can be a situation when, with certain settings, the action will never be executed.

For example, if two different zones were set for the movement event in the conditions, the action will be performed only in case that the movement is registered in the part of the

⚠ frame where these zones overlap. If the zones do not overlap, the action will never be performed.



The procedure of adding a task by event to a group of cameras is similar to the procedure for a single camera, with the exception that the adjustment of the attributes is not available.

Events

Large number of people in the queue

Large crowd of people

Fire

Call over the intercom

Loud sound

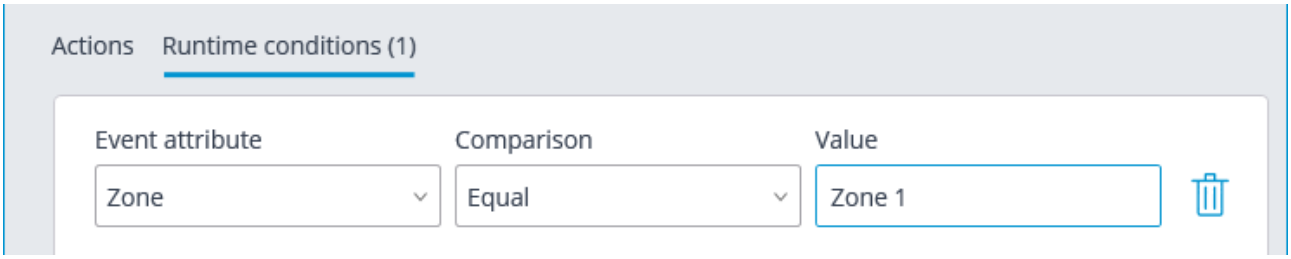
Motion

Smoke
External alarm start
Motion started
Inactive zone
Recognized license plates
Face Detection
Face recognized
Analog camera connection fail
No connection with camera
End of external alarm
Motion stopped
Abandoned object
Tracking event
No connected camera
No hat
Shelf empty
Users alarm
Video suveillance sabotage
Camera input signal
Honeywell Pro-Watch event
Paxton Net2 event
Siemens DMS8000 event
External event
Request to close gate
Request to open gate
Connecting to analog camera
Established connection with camera

Large number of people in the queue

This event is generated when the **People counting in queue module** module is enabled on the camera in the event that the quantity of people in the queue has exceeded the preset limit.

The **Zone** condition can be set for this event, indicating the zone name from the module settings. If this condition is not set, the action will be performed for any zone, in accordance with the settings of that zone.

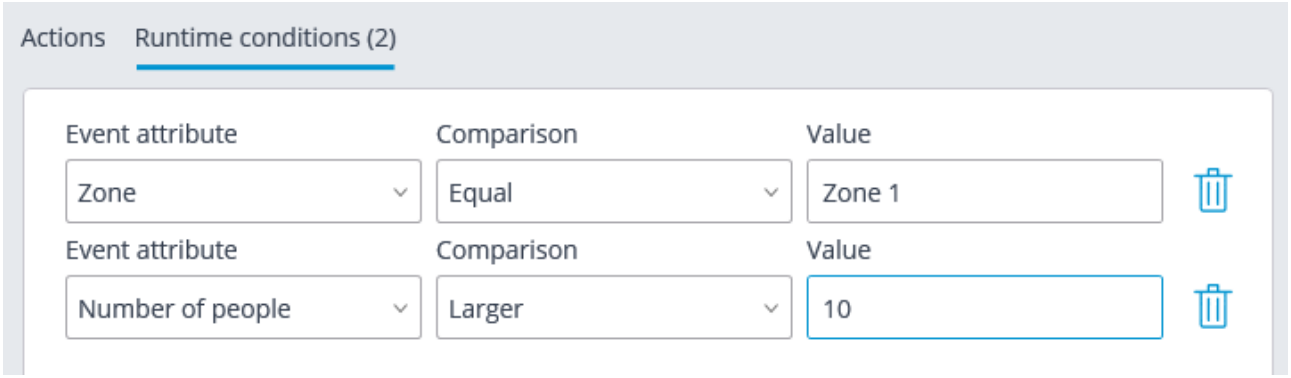


Large crowd of people

This event is generated when the **Crowd counting module** module is enabled on the camera, in case the number of people reached or exceeded the maximum set limit.

You can set the **Zone** attribute for the event, indicating the name of the zone using the module settings. If this attribute has not been set, the action will be performed for any zone in accordance with its settings.

Additionally, it is possible to set the **Number of people** attribute which surpasses the similar parameter in the module's settings.



Fire

This event is generated when the **Fire and smoke detection** module is enabled on the camera and a fire is detected.

Call over the intercom

This event is generated when a door phone (intercom) signal is received.

The event will be generated only for those door phone models that are supported by **Eocortex**.

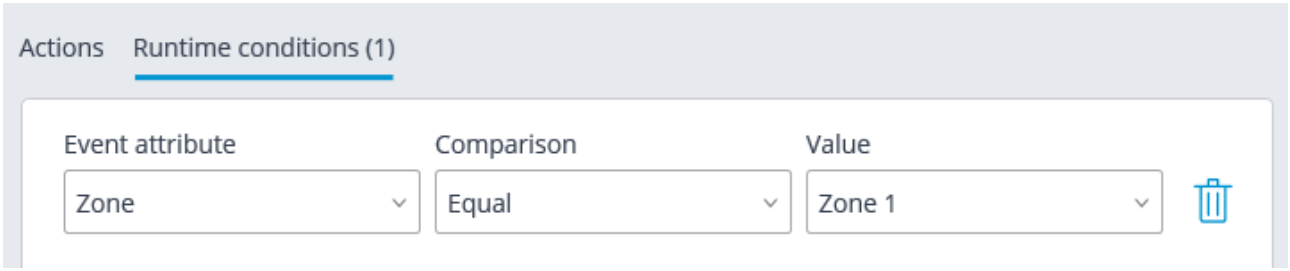
Loud sound

This event is generated when the **Loud sound detection** module registers the exceedance of the preset sound level by the sound picked up by the camera microphone.

Motion

This event is generated when the software motion detector registers a motion in the frame.

It is possible to set the **Zone** attribute for this event, selecting a zone set in the motion detector settings. If this attribute has not been set, the action will be performed for any zone



Smoke

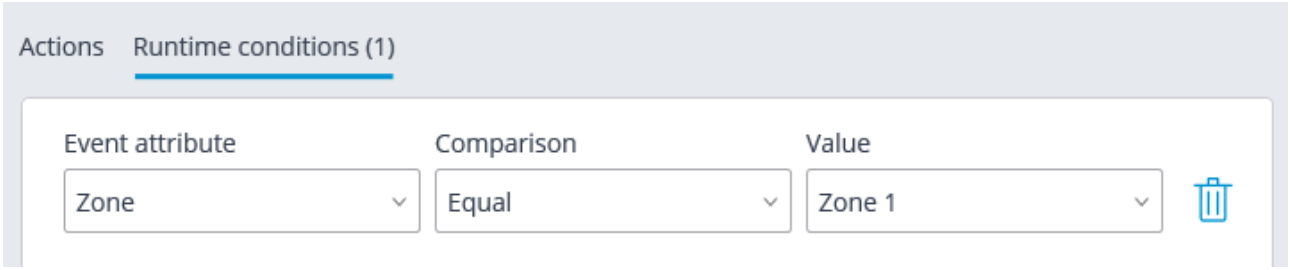
This event is generated when the **Fire and smoke detection** module is enabled on the camera and smoke is detected.

External alarm start

This event is generated when the **External alarm start** event comes from an external system. It is used for the integration of the external systems with **Eocortex**.

Motion started

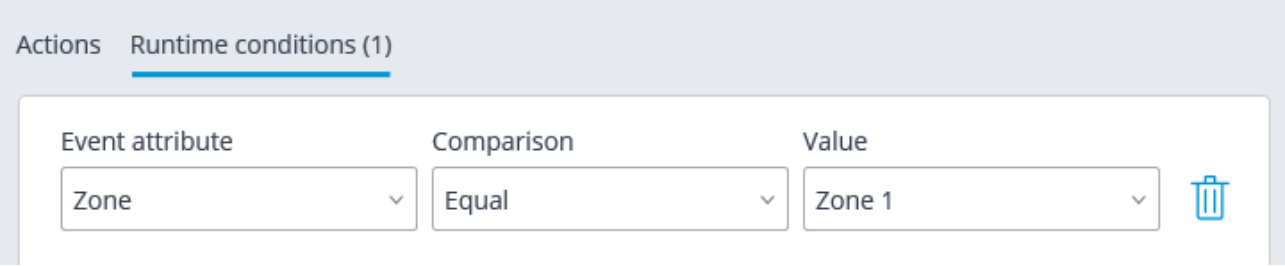
This event is generated when the software motion detector registers the start of a motion in the frame. The **Zone** attribute can be set for this event by selecting a zone set in the motion detector settings. If this attribute is not set, the action will be performed for any zone.



Inactive zone

This event is generated when the Personnel monitoring module is enabled on the camera and there is no activity in the controlled zone.

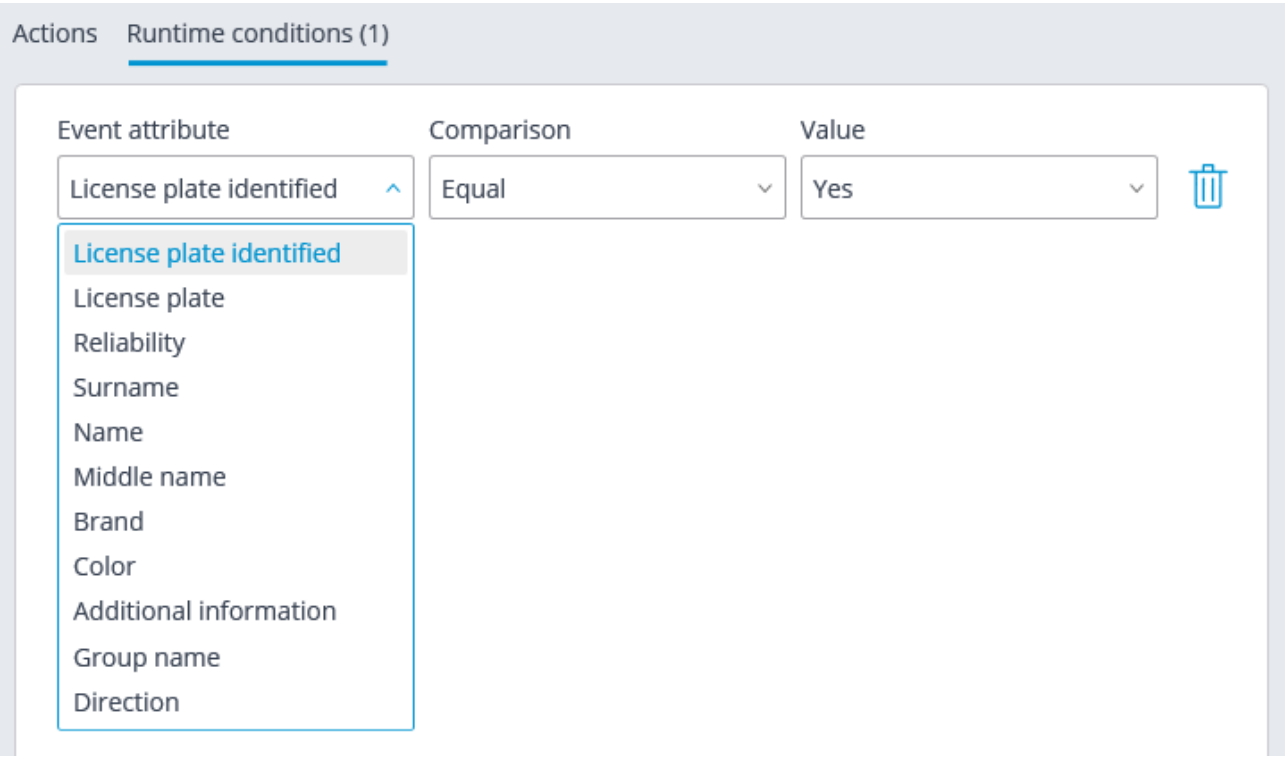
The **Zone** attribute can be set for this event by selecting a zone set in the motion detector settings. If this attribute is not set, the action will be performed for any zone.



Recognized license plates

`This event is generated when the **Licence plate recognition** module is enabled on the camera and a vehicle license plate number is recognized.

Different attributes can be set for this event. For example, if the **License plate identified** attribute equals **Yes**, the action will be performed when any license plate that is in the database is recognized. If several attributes are set, the action will be performed only when all the attributes are fulfilled. If no attribute is set, the action will be performed when any number is recognized.



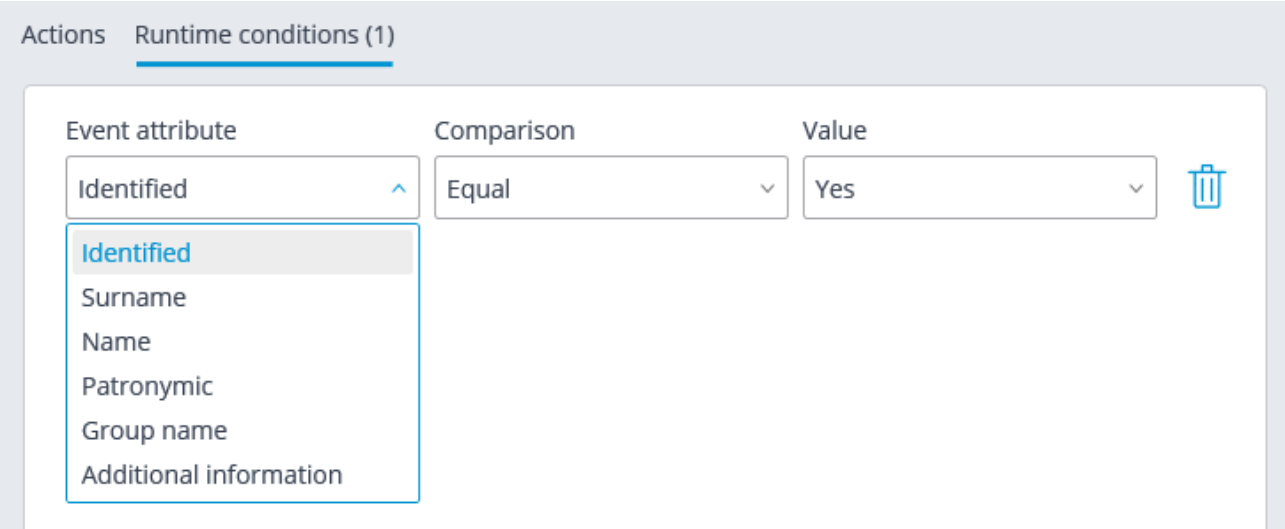
Face Detection

Face Detection This event is generated when the **Face detection** module is enabled on the camera and a face is detected in the frame.

Face recognized

This event is generated when the **Face recognition** module is enabled on the camera and a face is recognized.

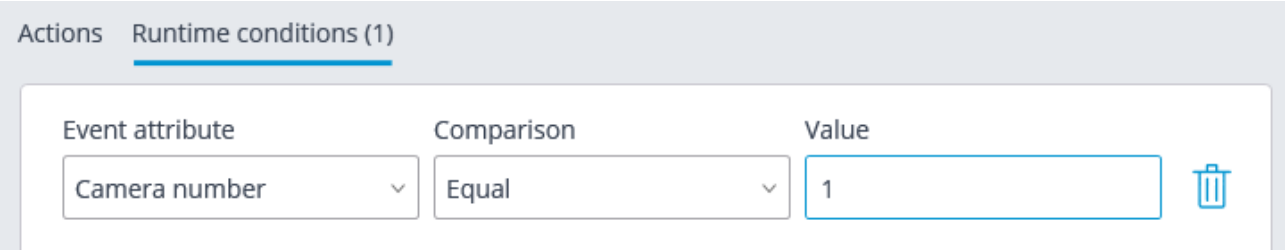
Different attributes can be set for this event. For example, if the **Identified** attribute = **Yes** is set, the action will be performed when any face that exists in the database is recognized. If several attributes have been set, the action will be performed only when all the attributes are fulfilled. If no attribute is set, the action will be performed when any face is recognized.



Analog camera connection fail

This event is generated when the connection with the analog camera that is bound to this channel is lost on the channel of the hybrid video recorder or decoder.

Camera number attribute is obligatory for this event.



No connection with camera

This event is generated when there is a disruption of communication with the camera.

Instead of this event, it is recommended to use the **No connected camera** event, because due to such issues with the networks or network interfaces as their congestion, low throughput, or bad signal quality the short-term disruptions and reconnections of cameras may happen, leading to the generation of many **No connection with camera** events.

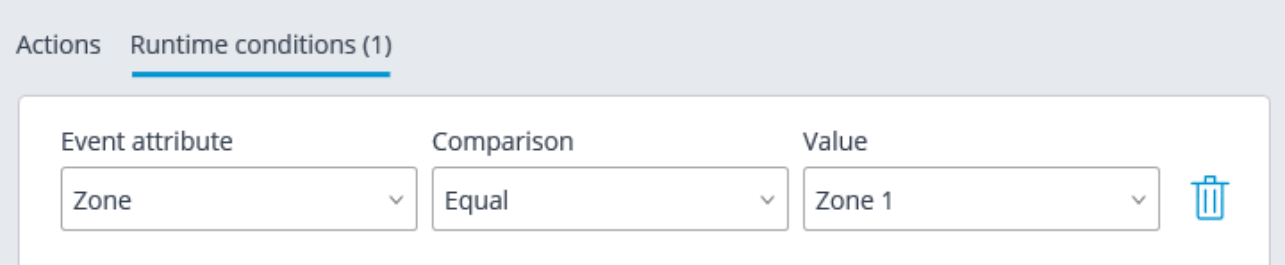
End of external alarm

This event is generated when the **End of external alarm** event comes from an external system. It is used for integration of **Eocortex** with the external systems.

Motion stopped

This event is generated when the software motion detector stops registering movement in the frame.

It is possible to set the **Zone** attribute for this event, selecting a zone set in the motion detector settings. If this attribute is not set, the action will be performed for any zone.



Abandoned object

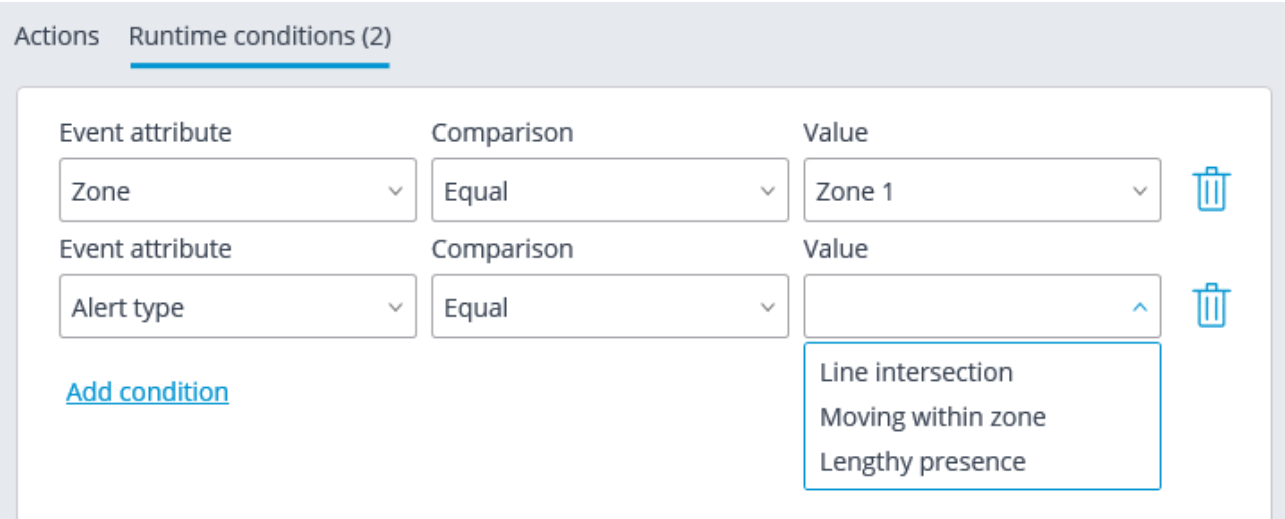
This event is generated when the **Abandoned object detection module** module is enabled on the camera and the abandoned object which has remained in the frame for a longer period of time than the one specified in the settings is detected.

Tracking event

This event is generated when the **Tracking** module is enabled on the camera in the following cases:

- Crossing of the preset line by an object;
- Intrusion into the preset zone by an object;
- Long term presence of an object in the preset zone.

It is possible to set the **Zone** and **Alert type** attributes for the event. If the attribute is not set, the action will be performed for any zone and any alert type correspondingly.



No connected camera

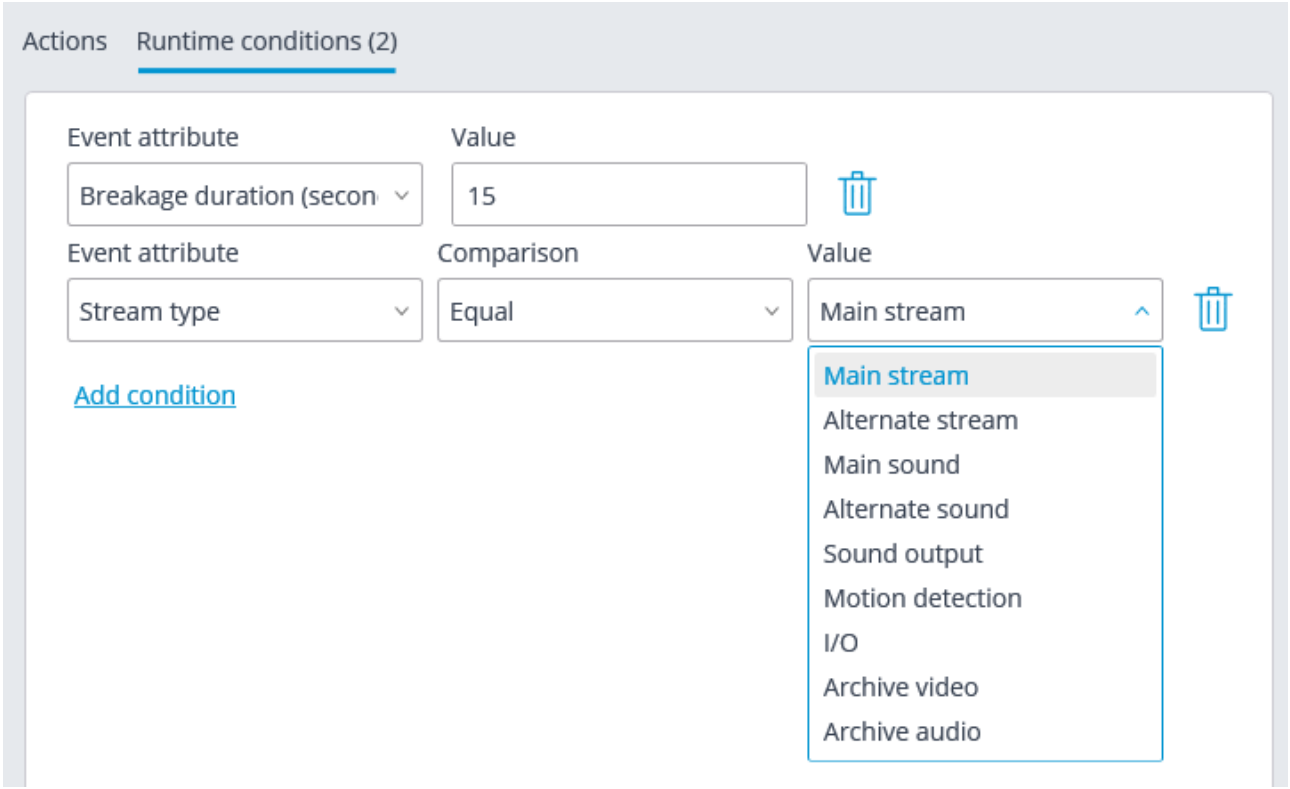
This event is generated when the communication with the camera the connection with which was lost has not resumed after the set time.

It is required to set the **Breakage duration (seconds)** obligatory attribute for this event.

It is also possible to set the **Stream type** attribute that may have one of the following values:

- **Main stream**: no main video stream.
- **Alternate video**: no alternate video stream.
- **Main sound**: no main sound stream.
- **Alternate sound**: no alternate sound stream.
- **Sound output**: no channel for sound output to camera.
- **Motion detection**: no channel for receiving information from camera motion detector
- **I/O**: no channel for communication with signal inputs/outputs of the camera.
- **Archive video**: no channel for communicating with camera video archive.
- **Archive audio**: no channel for communicating with camera audio archive.

If no **Stream type** attribute is specified, the lack of communication will be registered on any of the stream types.



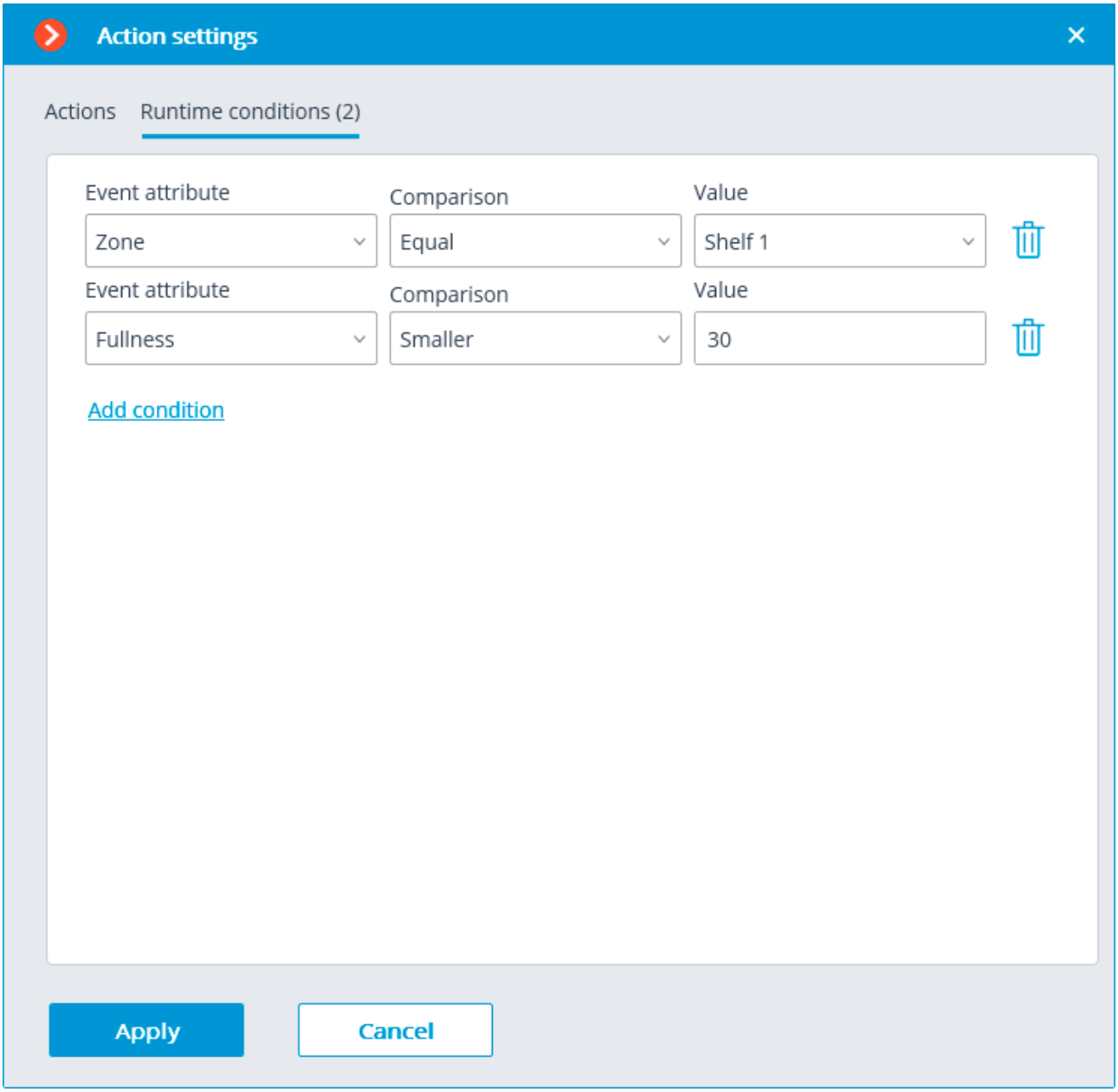
No hat

This event is generated when the **Hard Hat detector** module is enabled on the camera and a person not wearing a hat is detected in the frame.

Shelf empty

This event occurs on a camera with the enabled **Shelf Fullness Check** module when a shelf becomes empty.

For this event, it is possible to set up the **Zone** condition by selecting a zone specified in the module's settings. If this condition is not specified, the action will be performed for any zone. Apart from the zone, it is possible to set up sending of the condition in dependence to the level of fullness of a shelf.



Users alarm

This event is generated when the user of the **Eocortex Client** application presses the **Alarm** button. The event is generated only for the cameras set on the **User alarm** tab in the **Application settings**.

Video suveillance sabotage

This event is generated when the **Sabotage detector** module is enabled on the camera in one of the following cases:

- Video camera is defocused;
- Camera is turned away;
- Camera flaring;
- Camera blocking.

Camera input signal

his event is generated when an electrical signal is sent to the signal input of the camera.

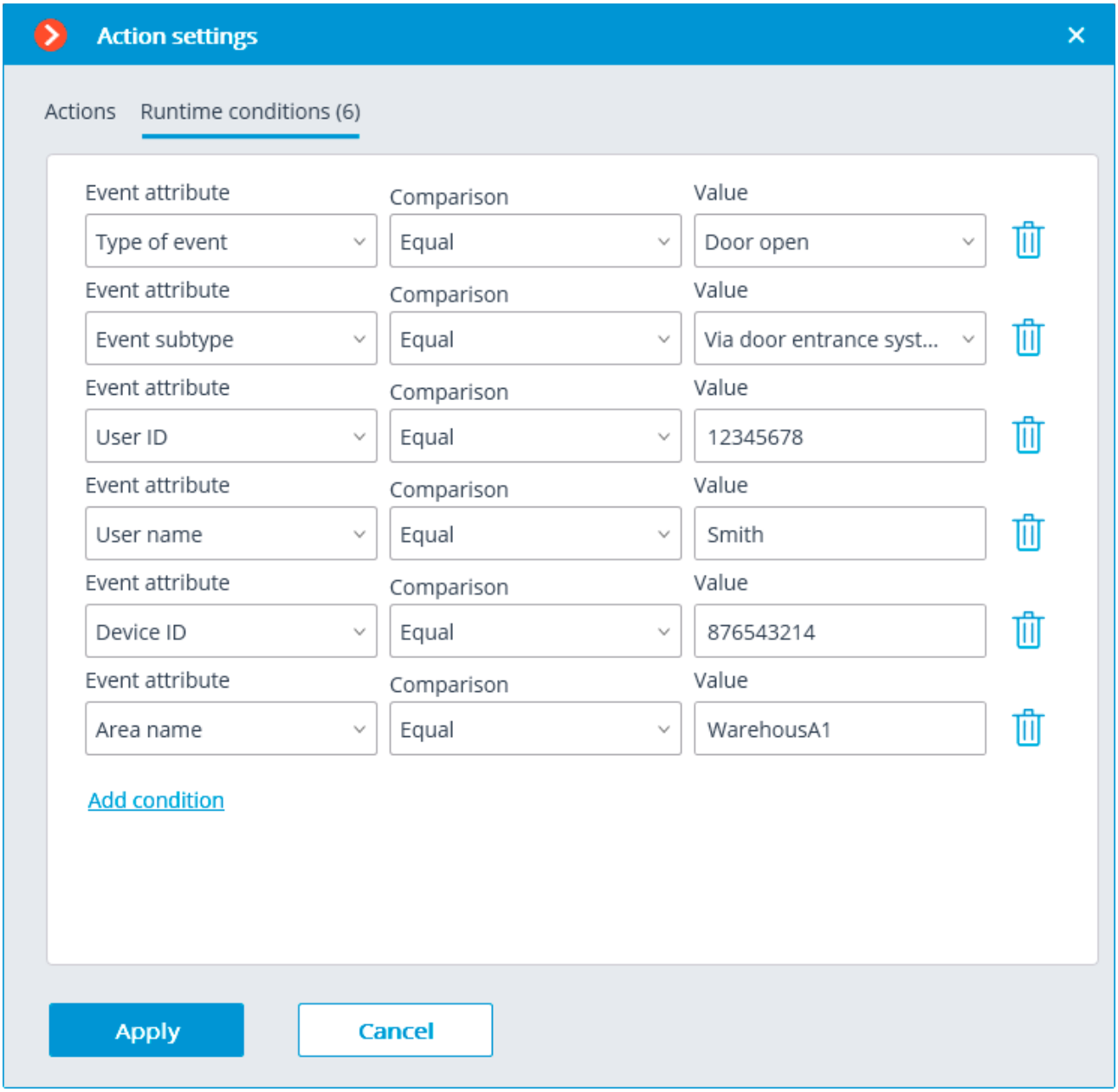
It is also required that the signal input support is implemented in **Eocortex** for the particular IP camera model. Contact **Eocortex** technical support service for more information.

It is required to set the **Input number** and **Signal availability** obligatory attributes for this event.

Paxton Net2 event

This event is generated upon receiving an event from **Paxton Net2** ACS.

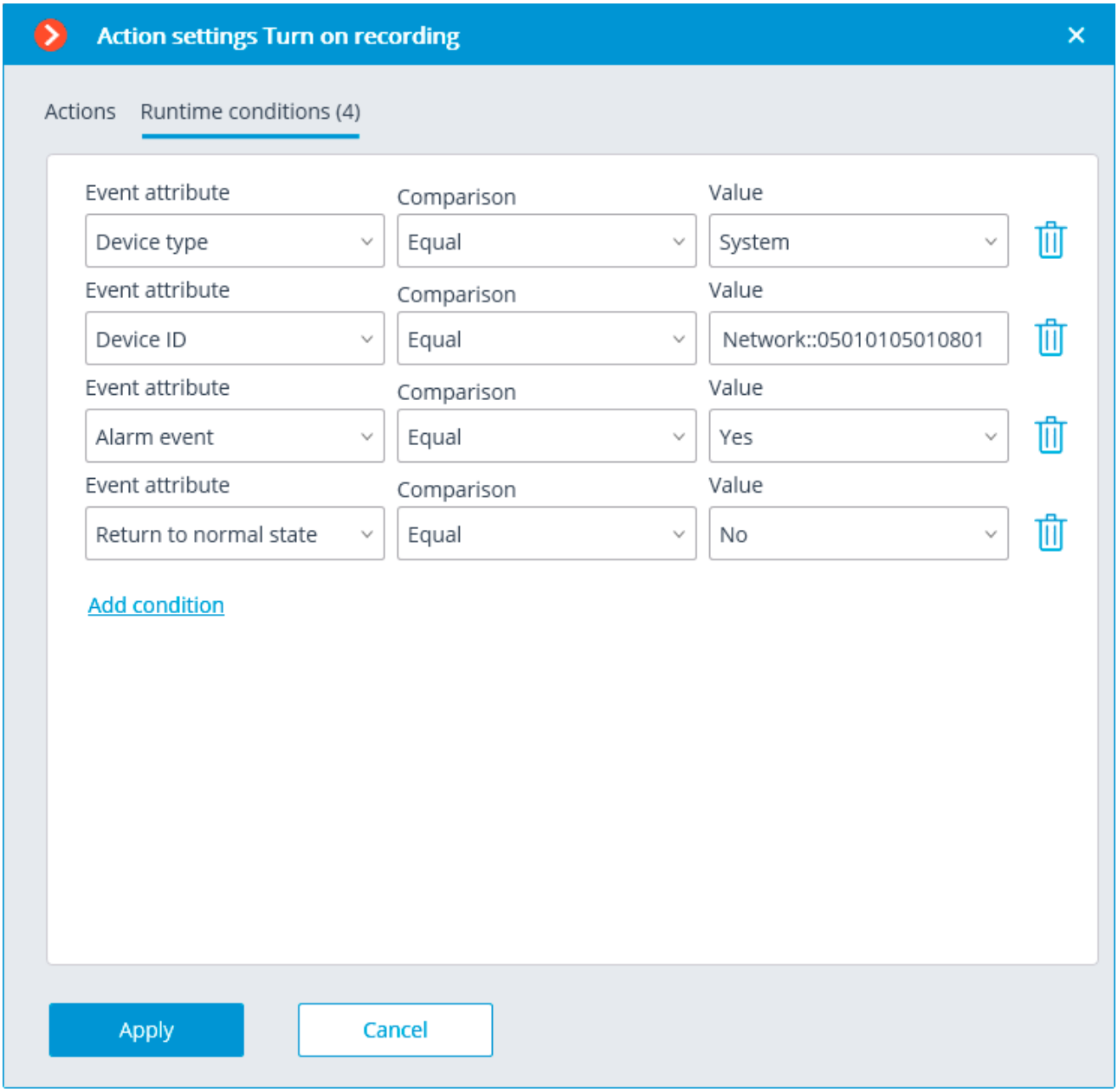
Various conditions can be set for this event. If several conditions are set, the action will be performed only when all these conditions are fulfilled. If no condition is set, the action will be performed upon receiving any event from **Paxton Net2**.



Honeywell Pro-Watch event

This event is generated at receiving an event from the **Honeywell's Pro-Watch®** system. Various conditions can be set for the event. If a condition is not used for event generating, there is no need to add it.

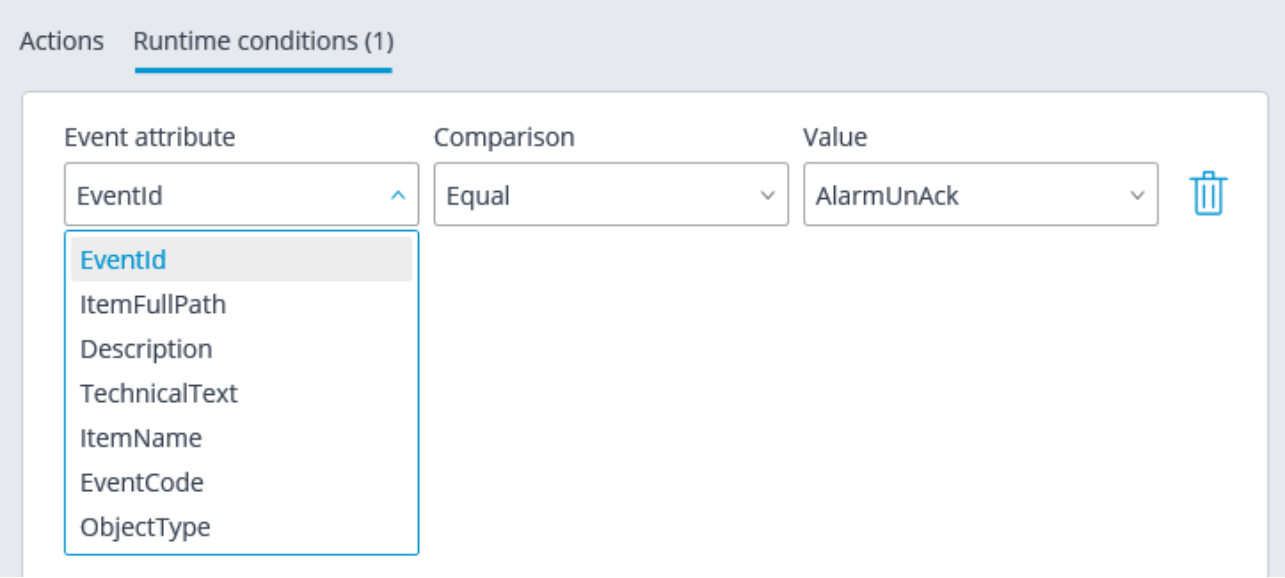
Various conditions can be set for the event. When several conditions have been added, the action will be performed only if all of these conditions are fulfilled. If no condition is set, the action will be performed at receiving any **Honeywell's Pro-Watch®** event.



Siemens DMS8000 event

This event is generated when an event comes from the **Siemens DMS8000** system.

Different attributes can be set for this event. If no attribute is used for generating the event, then it is not required to add such an attribute.

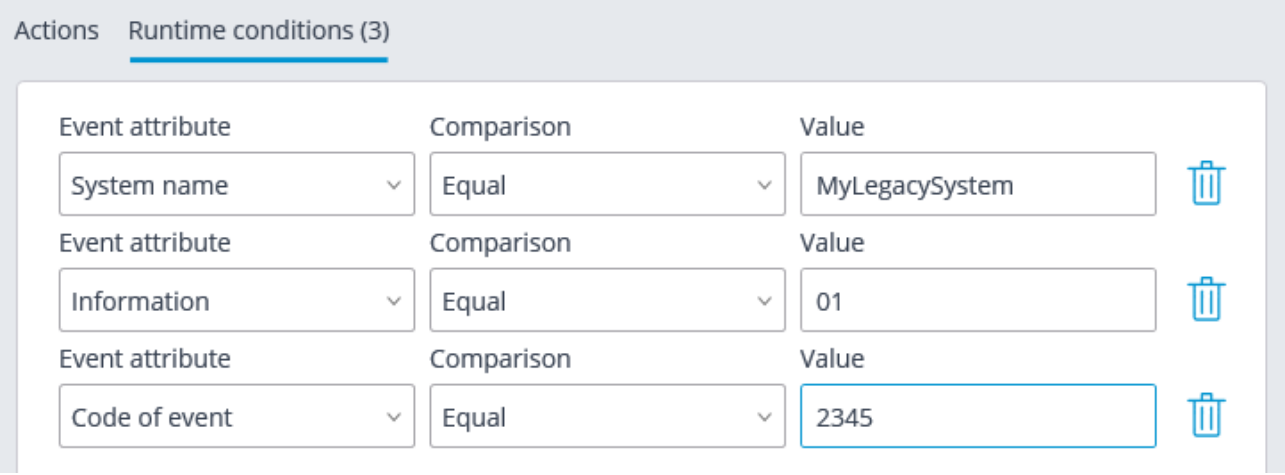


External event

This event is generated when an External system event comes from the external system. It is used to integrate the external systems with **Eocortex**.

The external system events are transmitted to the **Eocortex** server using **Eocortex API** HTTP requests.

Different attributes can be set for this event. If no attribute is used for generating the event, then it is not required to add such an attribute.



Request to close gate

This event is generated in the following situations:

- The user pressed the Close rising arm barrier on-screen button in the **Eocortex Client** application.

- The license plate number entered into the database and included into the group with the enabled **Close rising arm barrier** option is recognized, provided that in the module's settings in the **Rising arm barrier control** tab the **License plate recognition action**: **Open and close** action is selected.

Request to open gate

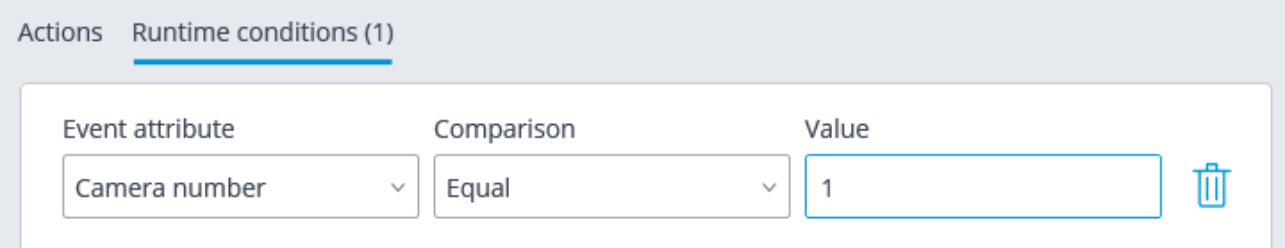
This event is generated in the following situations:

- The user pressed the Open rising arm barrier on-screen button in the **Eocortex Client** application.
- The license plate number entered into the database and included into the group with the enabled **Open rising arm barrier** option is recognized.

Connecting to analog camera

This event is generated when the communication with the analog camera bound to this channel is established on the hybrid video recorder or decoder channel.

It is required to set the **Camera number** attribute for this event.



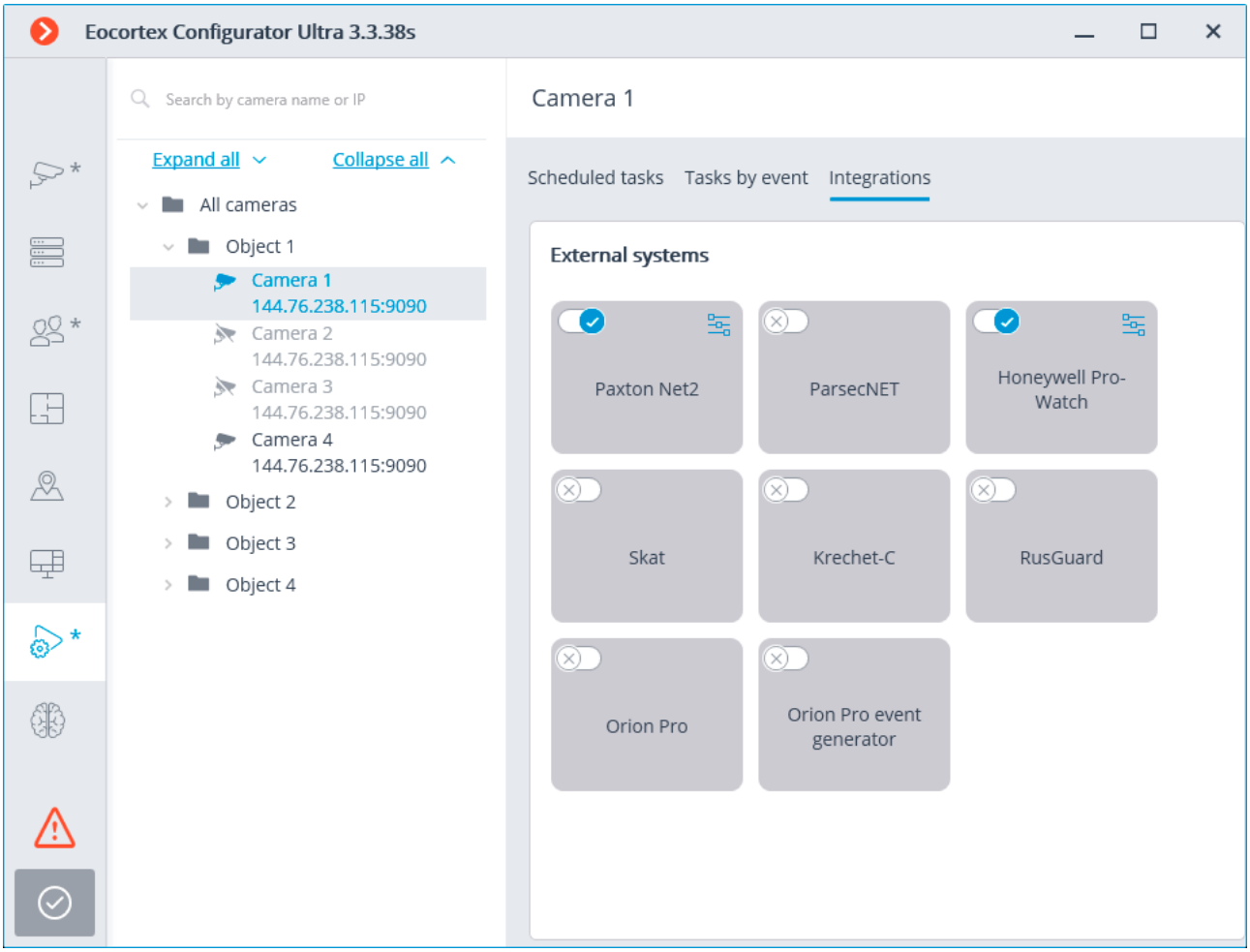
Established connection with camera

This event is generated when the communication with the camera is reestablished after a disruption.

> Instead of this event, it is recommended to use the **No connected camera** event, because due to such issues with the networks or network interfaces as their congestion, low throughput, or bad signal quality the short-term disruptions and reconnections of cameras may happen, leading to the generation of many **Established connection with camera** events.

Integrations

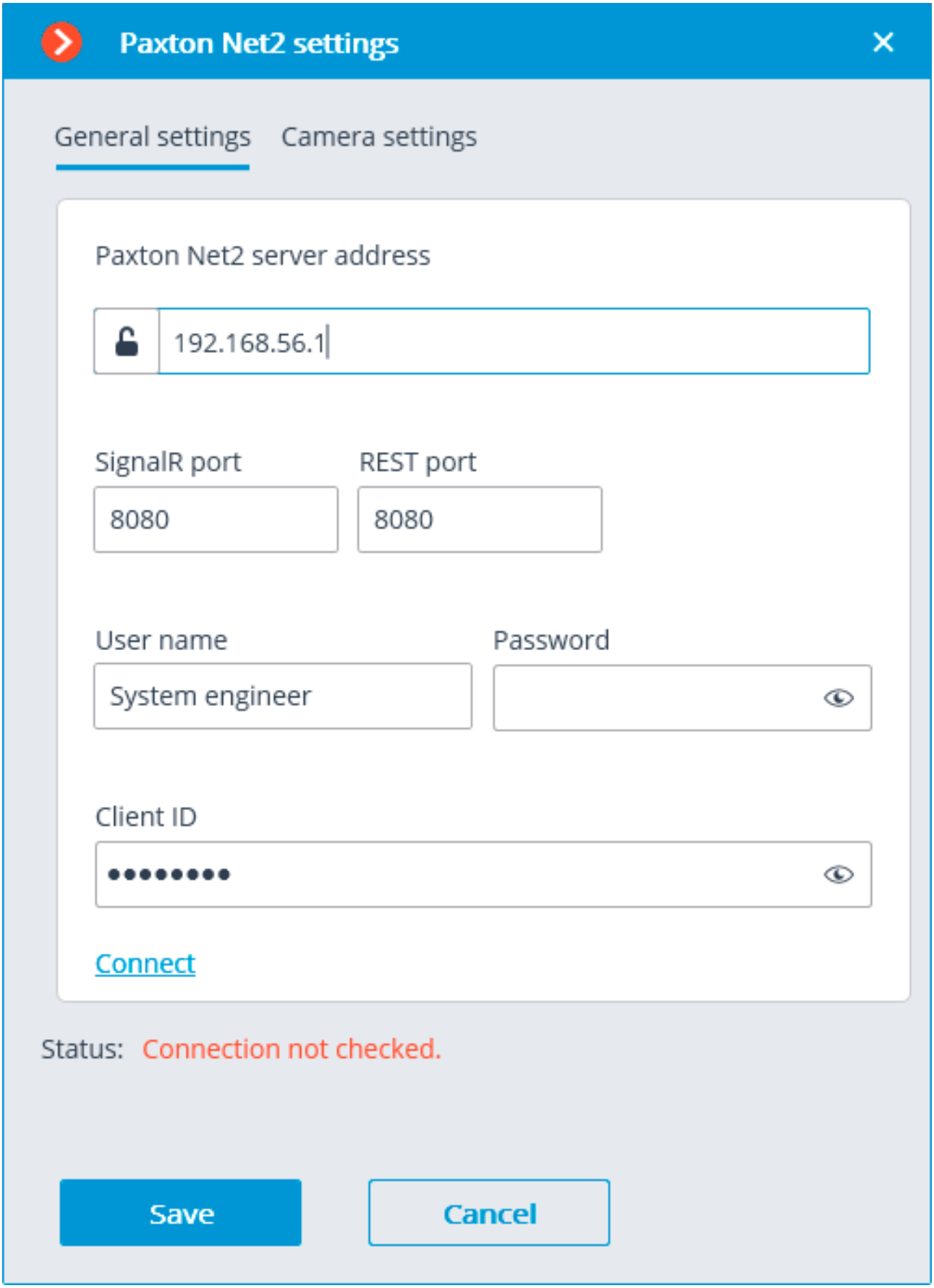
To set up the integration of **Eocortex** video surveillance system with the external systems, it is required to go to the **AUTOMATION** tab in the **Eocortex Configurator** application, select an individual camera in the camera tree, then, on the opened page, go to the **Integrations** tab.



On the tab, it is required to enable the integration with the required system using the switch, then set up the integration by pressing the button.

Paxton Net2

A connection to the **Paxton Net2** ACS server is set up on the **General settings** tab.

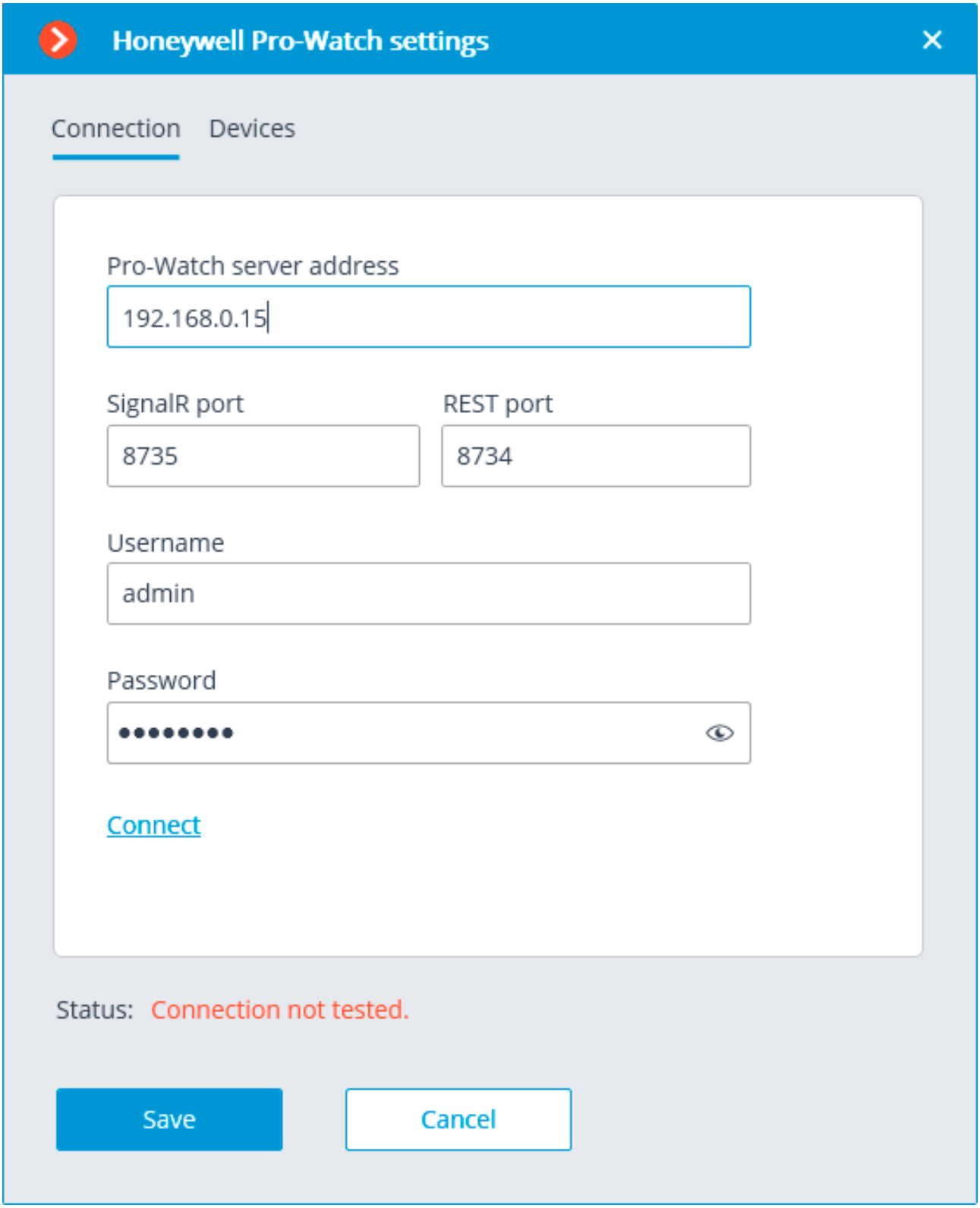


To enable filtering of **Paxton Net2** events, it is required to check the connection using the **Connect** link. Then, in case of a successful connection, go to the **Camera settings** tab, enable the **Receive events**

from selected objects only: option and specify the objects whose events are to be registered in **Eocortex**.

Honeywell Pro-Watch

The connection to the **Honeywell's Pro-Watch®** comprehensive security platform can be adjusted on the **Connection** tab.



The connection setup parameters:

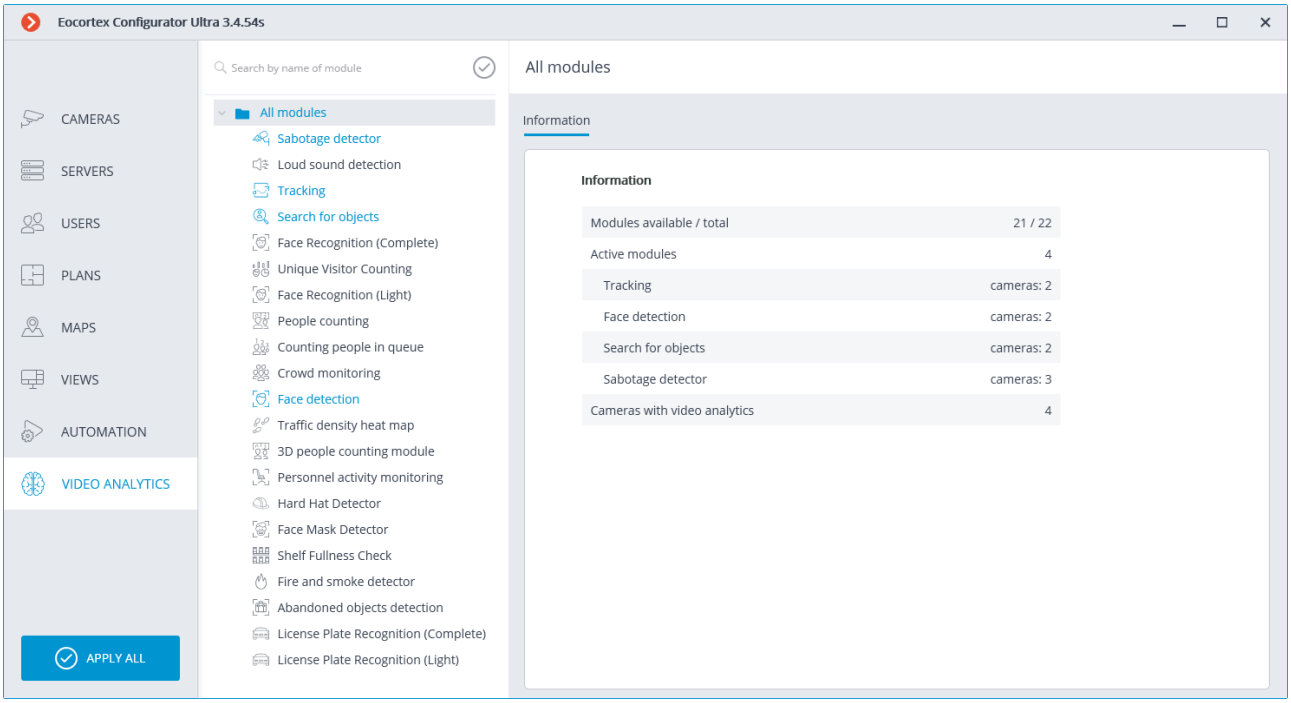
- **Pro-Watch server address**: the IP address of **Honeywell's Pro-Watch®** server.
- **SignalR port** and **REST port** are the ports that are used to provide **Honeywell's Pro-Watch®** API. The default parameters of these ports correspond to the default parameters of **Honeywell's Pro-Watch®**.
- **Username** and **Password** are the name and **Web password** of the **Honeywell's Pro-Watch®** user for whom the access to the **Honeywell's Pro-Watch®** API service has been set.

After setting up the connection, it is required to test it by clicking on the **Connect** link. In case of a successful test connection, the list of **Honeywell's Pro-Watch®** system devices will become available on the **Devices** tab.

In this list, it is required to mark the devices whose events will be displayed and registered in **Eocortex**.

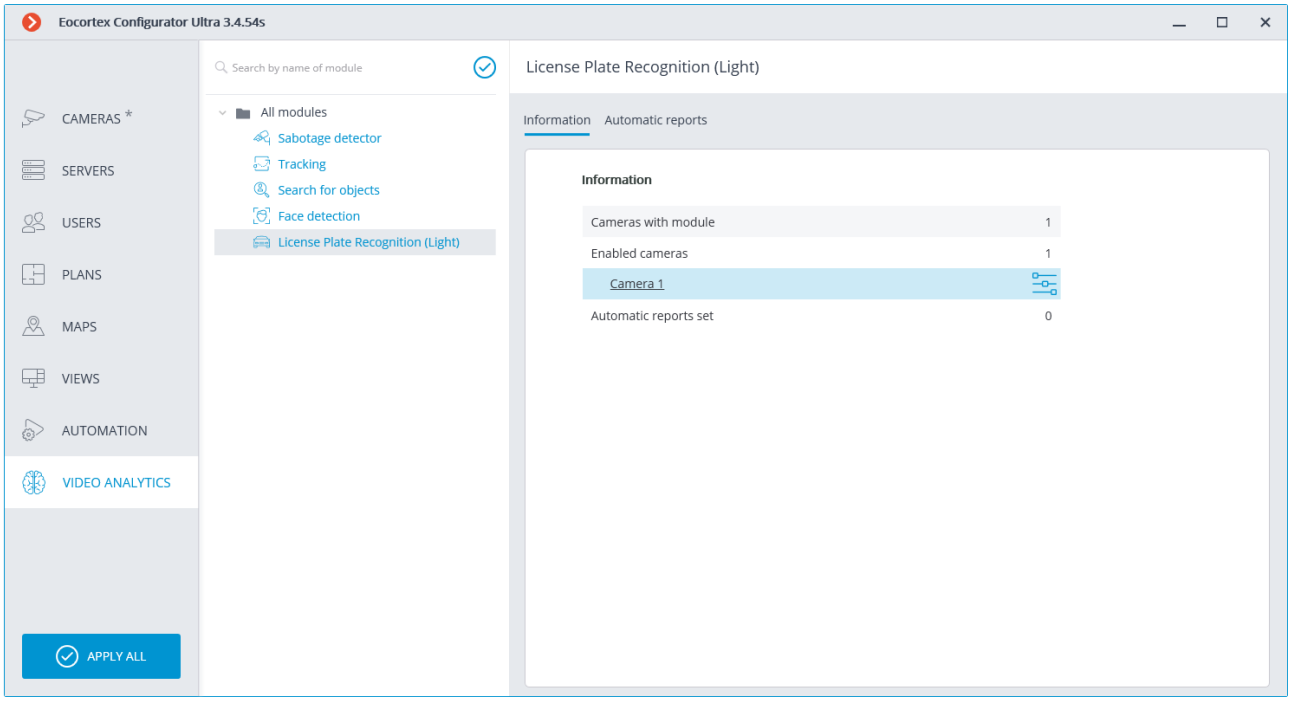
Video analytics

The information regarding the available and activated video analytics in the system is shown in the **Eocortex Configurator** application, on the **Video analytics** page. Also, it is possible to set up the video analysis modules already in use on the cameras as well as the automatic sending and saving of the reports for some of the modules.



The list of all the video analysis modules is shown on the left side of the page. Using the button, it is possible to hide or display the unused modules.

The information regarding the use of the video analytics in the system is shown on the right side of the page, in the **Information** tab.



When a video analysis module is selected, the list of all cameras where this module is activated is displayed, among other things. When clicking on the line of a camera, the connection settings page of this camera appears.

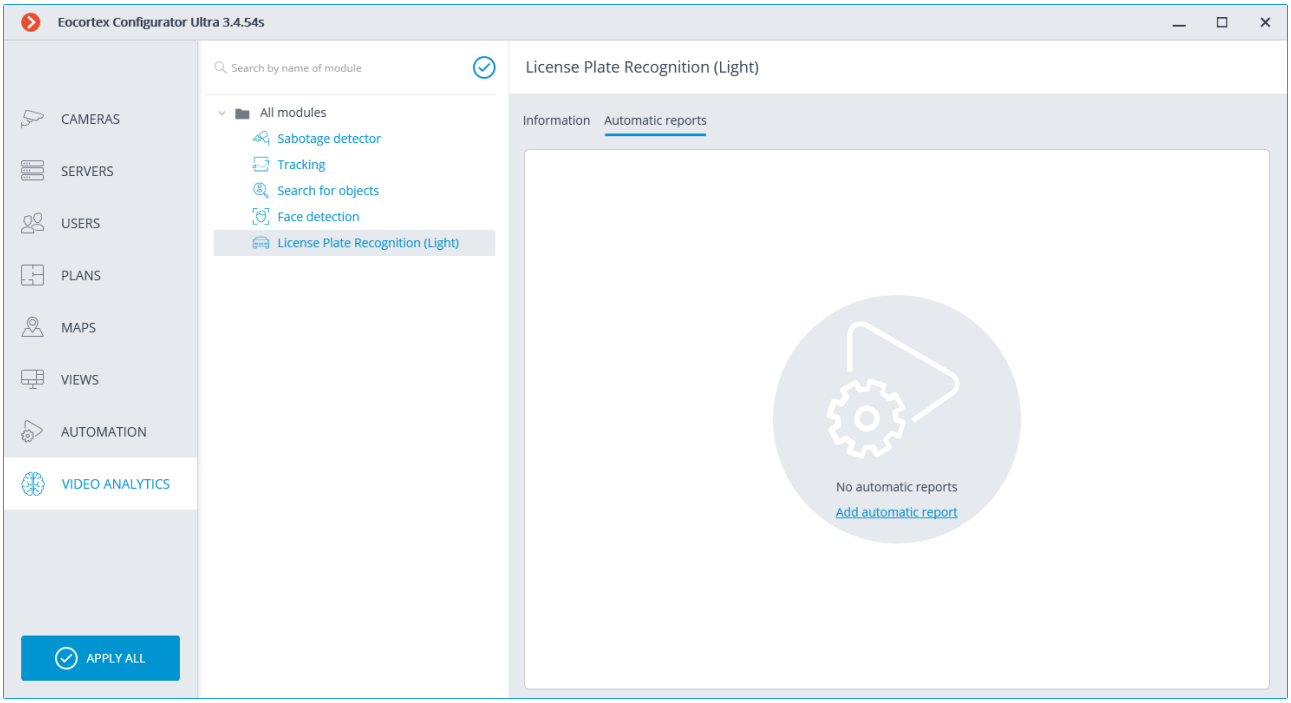
Hovering over the line of a camera in the right side of the line shows the button. Pressing this button opens the pages of the module's settings for this camera..

For some video analysis modules, the **Automatic reports** tab is available. It allows to set up regular sending or saving the reports with the data generated by the module. Moreover, this tab displays the information about each report created.

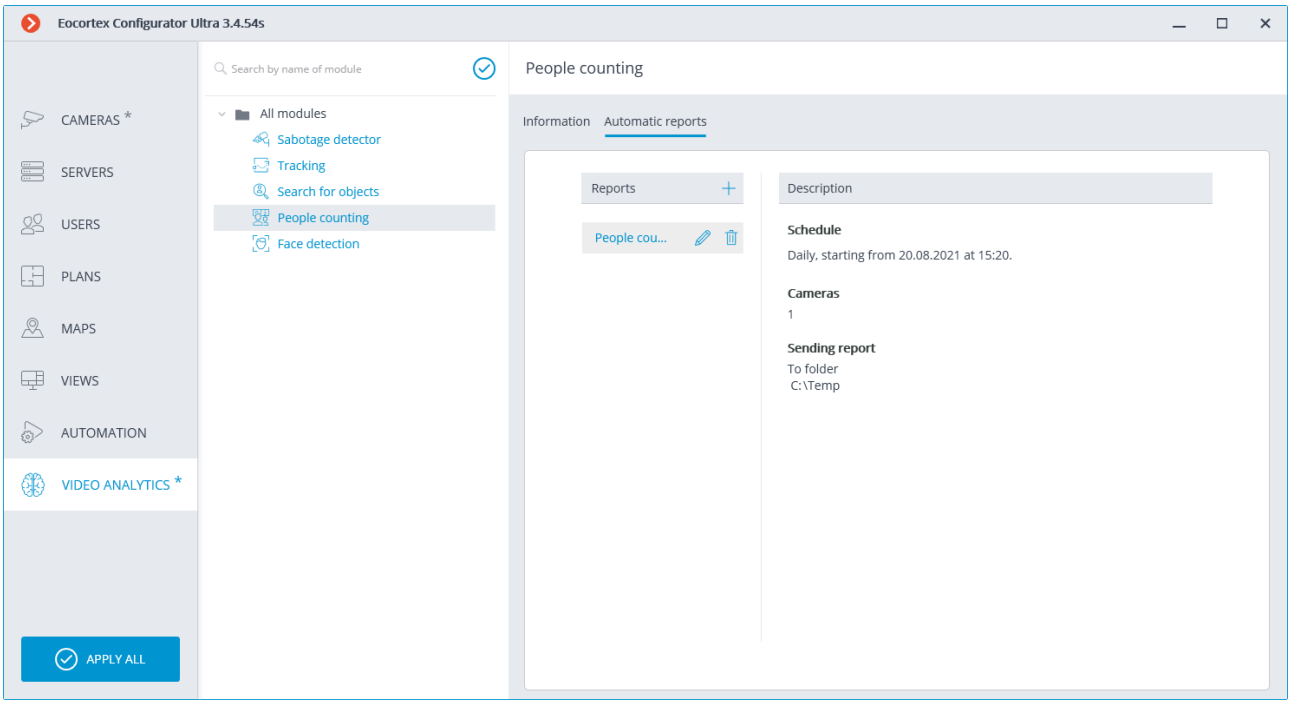
The automatic reports are available for the following video analysis modules:

- Personnel activity monitoring
- People counting
- License Plate Recognition (Complete)
- License Plate Recognition (Light)
- Face Recognition (Complete)
- Face Recognition (Light)

If no automatic report has been created, the tab will be empty. In such a case, it is required to use the **Add automatic report** link.

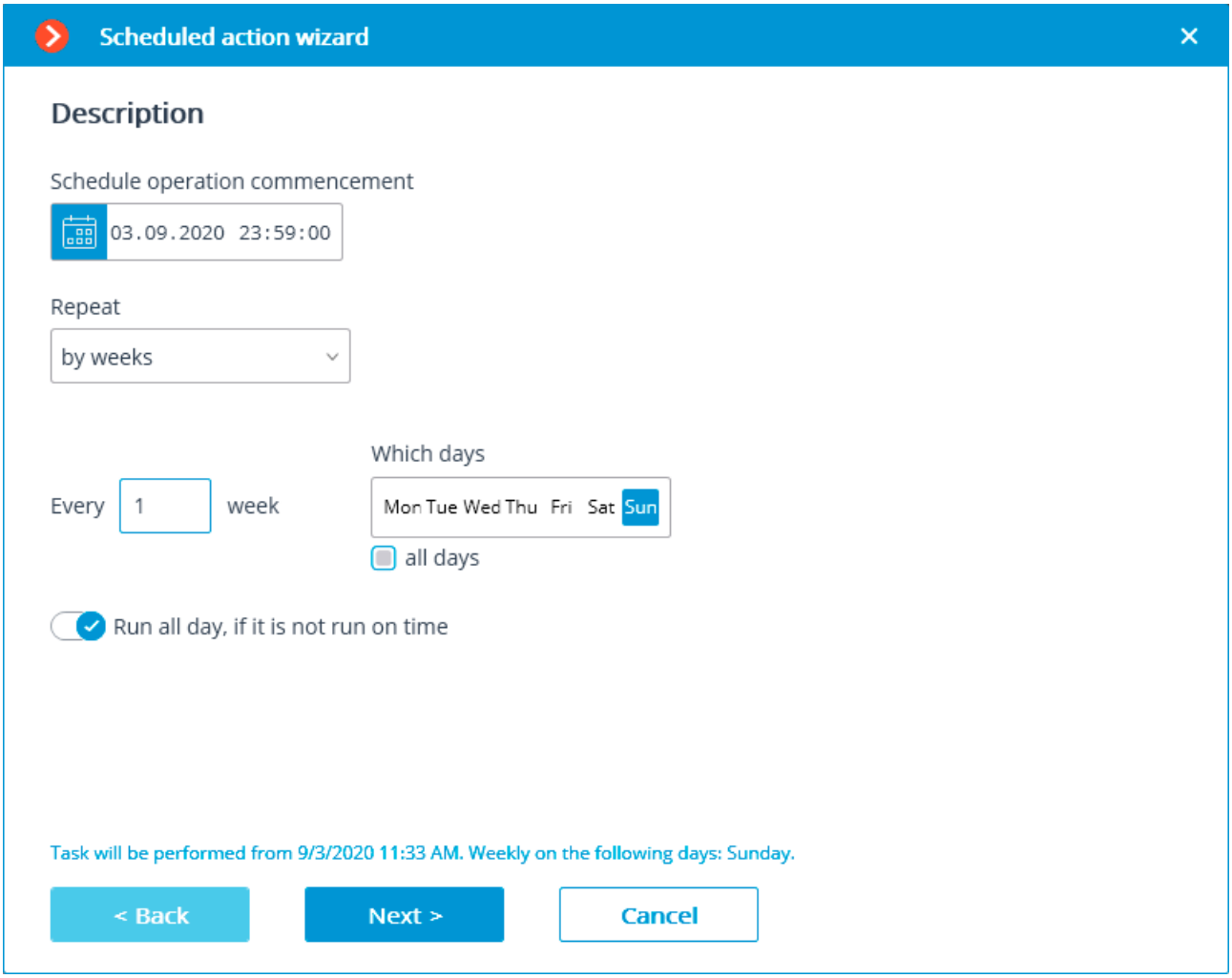


If at least one automatic report has been created, a list of all the automatic reports generated will be shown on the left side of the tab, and the right tab will contain the information regarding the report selected at the moment.

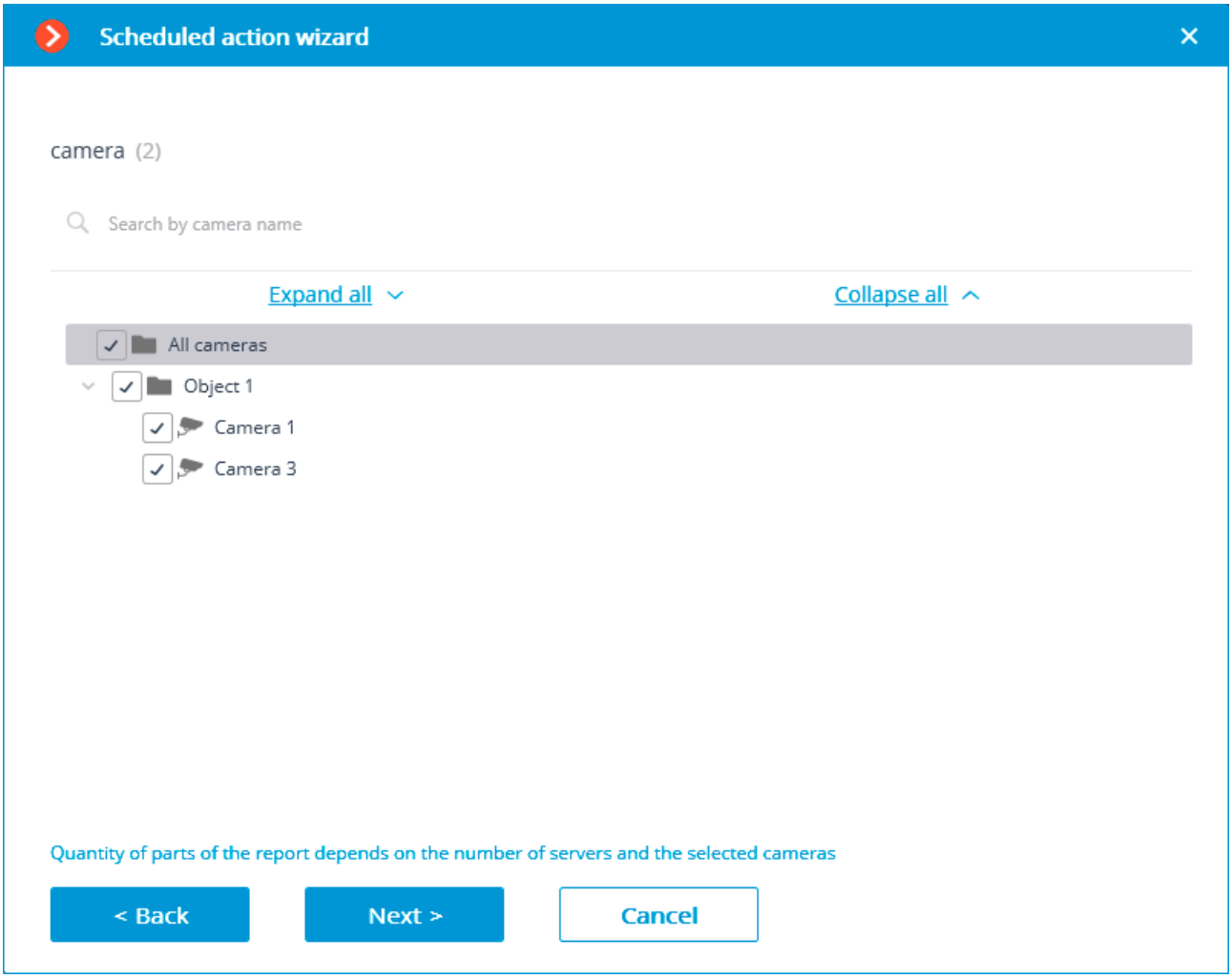


Renaming a report can be done by double clicking on its name in the list. Changing settings or deleting is performed by clicking a corresponding button to the right of the name of a report.

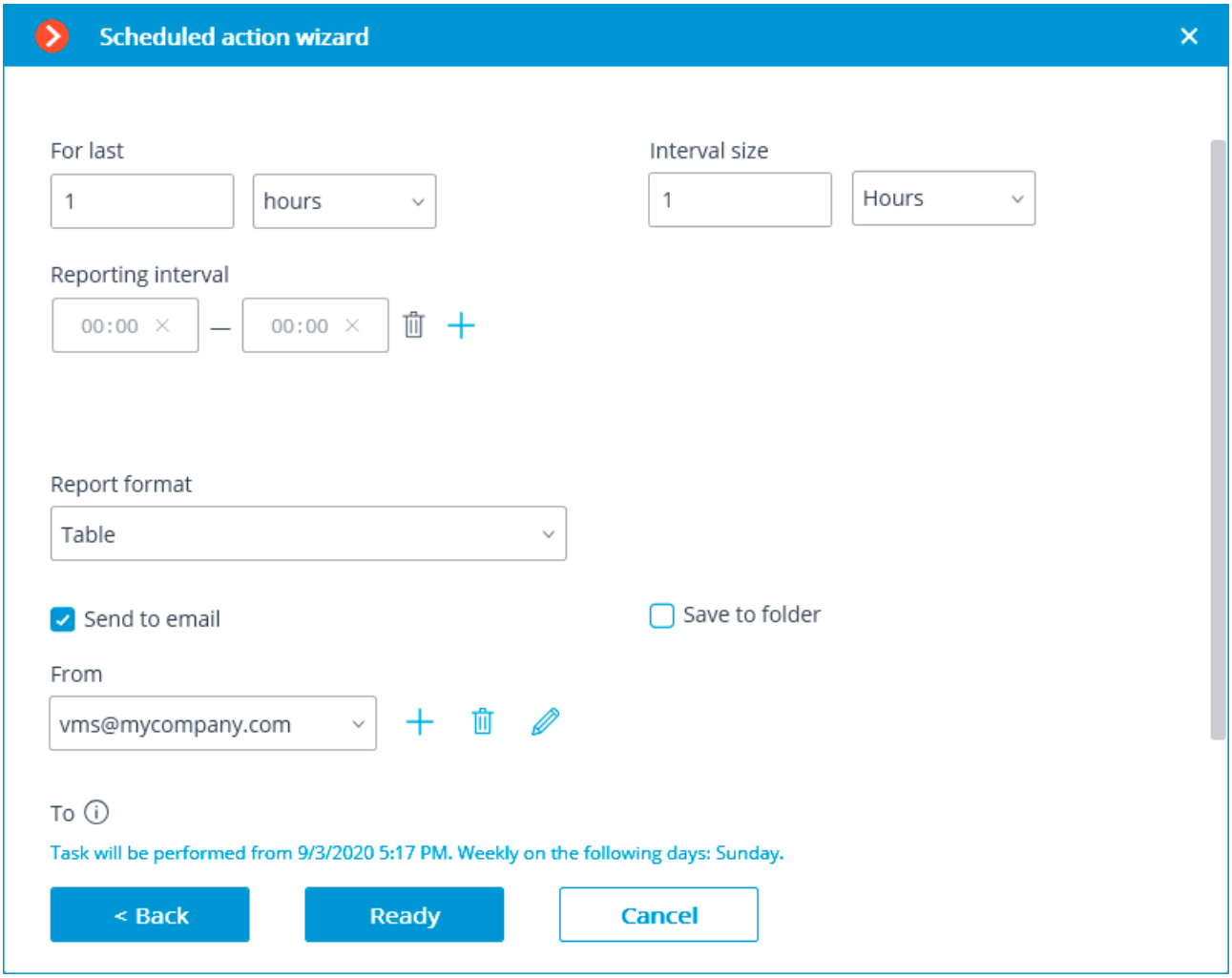
For adding a new automatic report, it is required to press the + button in the list header. It will open the first page of the task adding wizard where it is required to set the time and periodicity of the report's creation. This page is similar to the page of the wizard of adding the scheduled tasks.

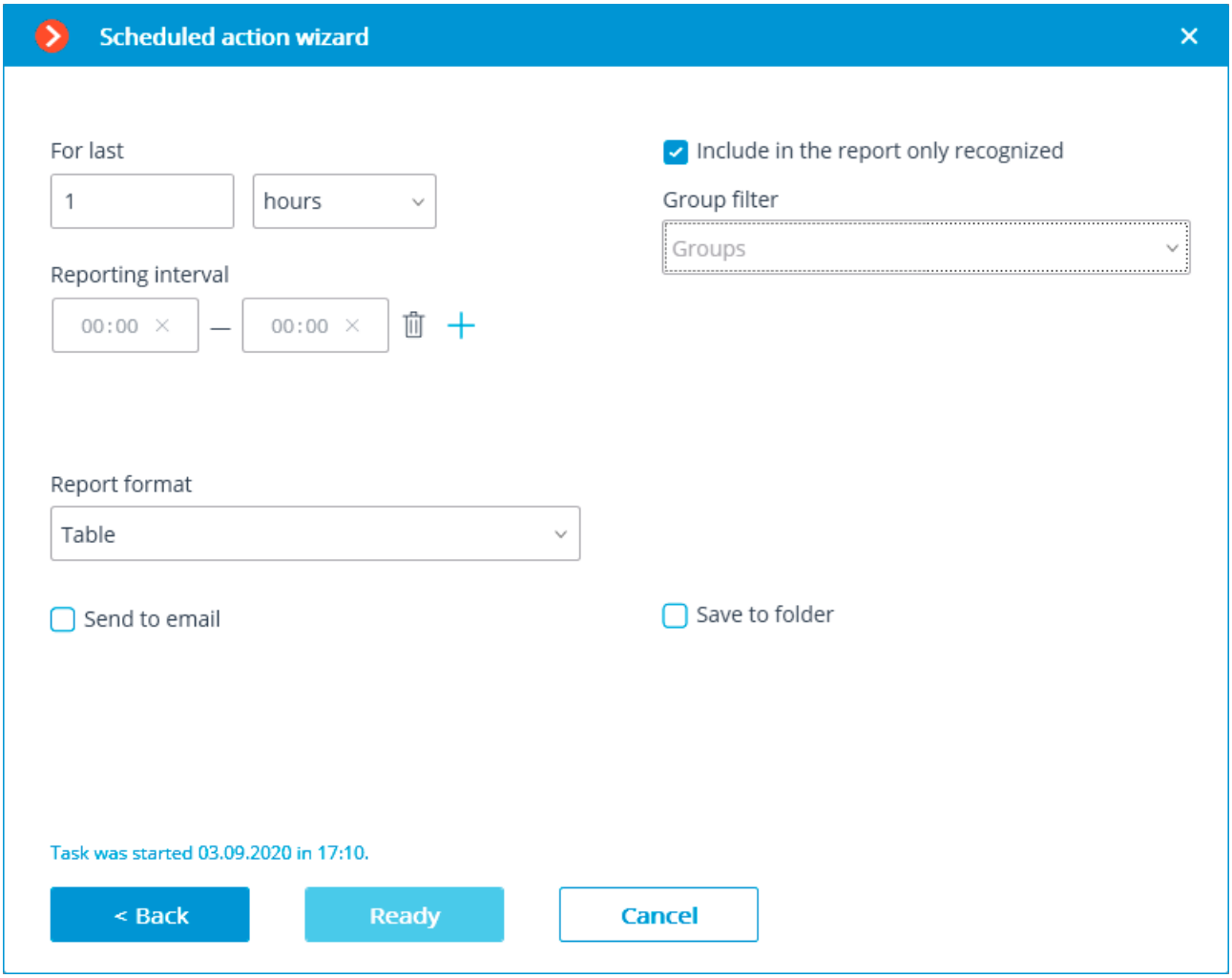


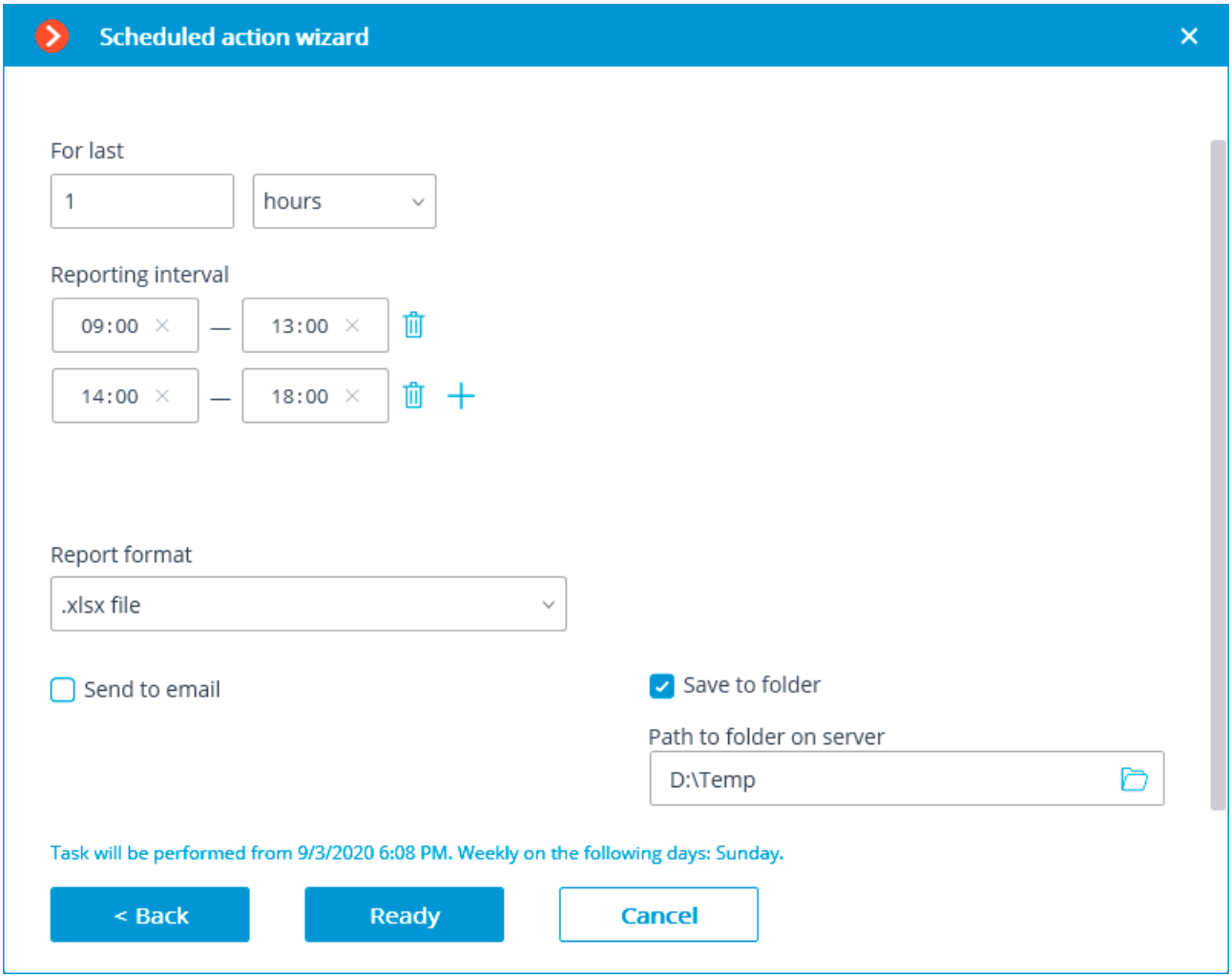
At the next step, it is required to choose the cameras for which the report will be generated.



At the final step, it is necessary to set the parameters of creating and sending the report. At that, some of the parameters are common for all the video analysis modules, and some are specific to each individual type of the modules.


Scheduled action wizard
For last
1
hours
Interval size
1
Hours
Reporting interval
00:00
00:00
Report format
Table
Send to email
Save to folder
From
vms@mycompany.com
To
Task will be performed from 9/3/2020 5:17 PM. Weekly on the following days: Sunday.
< Back
Ready
Cancel


Scheduled action wizard
For last
1
hours
Reporting interval
00:00
00:00
Include in the report only recognized
Group filter
Groups
Report format
Table
Send to email
Save to folder
Task was started 03.09.2020 in 17:10.
< Back
Ready
Cancel



General parameters:

For last: the period for which the report will be created.

Reporting interval: the intervals within a twenty-four-hour period whose data will be used for creating the report. The intervals can be added and deleted.

Report format: allows to choose one of the formats available for the report. In general, the reports can be generated in the following formats: a Microsoft Excel spreadsheet; a CSV file with tabular data; an image file containing a chart.

Send to email: the parameters for sending the report by email. The forms of adding a mail server and a sender's address are shown in the description of the Send notification by email action.

Save to folder: the path to a folder on the server where the report will be stored.

To report on the number of visitors:

Interval size: the size of the unit interval in the report.

To report on recognized license plates:

Group filter: groups for which data will be displayed in the report.

Filter by direction: the direction of movement of vehicles, according to which the data will be displayed in the report.

For face recognition reports:

Include only recognized faces in the report: when this option is enabled, the report will only include those faces that were identified using a database; when this option is off, all the faces detected by the module will be included into the report.

Group filter: groups whose data will be included into the report.

Deployment

Guidelines for choosing and configurating hardware platform

You can calculate the minimum hardware platform requirements online on eocortex.com, on the Software for IP Cameras / Calculator page.

While selecting the hardware platform consider, if necessary, the potential increase (near future expansion plan) in the number of channels.

The drive subsystem must comply with the design load. It is recommended to use RAID to increase system speed and reliability; take into account the performance in case of drive failure. The server drive subsystem must also provide a certain reserve bandwidth (read rate) to allow convenient archive search.

It is recommended to install two network interface controllers (NIC); configure one of them for camera subnet and another for **Eocortex Client** requests. Benefits: camera isolation, reduces network traffic in a public network.

If network storages (NAS, SAN) are used to store archives, we recommend installing an additional NIC for these purposes.

Provide reserve computer resources in the amount of 3% of CPU load per connected client for fast client request serving. The server drive subsystem must also provide a certain reserve bandwidth (read rate) to allow convenient archive search.

When using the hot backup function consider that in case of failure of one of the servers, its load is distributed on the others. For example, if there are only 2 servers, they work together and "backup" each other; each must have a capacity sufficient to handle all video streams from all cameras.

To achieve maximum performance disable processor power-saving technologies before installing the OS: Cool'n'Quiet for AMD and SpeedStep or EIST for Intel (configured in BIOS, usually in Advanced / CPU.) If you use SATA-drives, do not forget to set AHCI value for SATA Mode (configured in BIOS, usually in Advanced / SATA; only for controllers that support this mode.)

Windows-based applications

Guidelines for Windows settings

The computer must use one of **Microsoft Windows** operating systems provided in specification:

- Windows 7 ServicePack 1
- Windows 8
- Windows 8.1
- Windows 10

- Windows Server 2008 R2 SP1
- Windows Server 2012
- Windows Server 2012 R2
- Windows Server 2016
- Windows Server Windows Embedded for Intel x86 and x64 with the full functionality of abovementioned Windows versions

  It is recommended to install a 64-bit version of the operating system, since this version allows you to fully and effectively use the capabilities of modern hardware platforms.

⚠ Some intelligent modules are not designed to work in a 32-bit operating system or with 32-bit versions of **Eocortex** applications.

Before installing **Eocortex** applications, you must configure the operating system:

Install all Windows updates and then turn off Auto-update.

Select the appropriate server time zone, specify the exact time in this time zone.

Guidelines on Windows settings (for Windows 7):

Control Panel / Power Options: High Performance.

Control Panel / User Accounts / User Account Control Settings: Never notify.

Control Panel / Network / Web→ Networking / Adapter Properties: Disable IPv6(This recommendation for earlier versions.

We recommend disabling the firewall on your computer. If the security policy does not allow disabling the firewall, open a network port 8080 and — for camera connection — 80 (if RTSP video stream is used — open port 554.)

⚠ Some cameras can receive control commands and transmit video streams using other ports — in this case open the appropriate ports.

Installed anti-virus should not scan HTTP and RTSP traffic, including input video streams from IP cameras, as this significantly reduces the system performance. Add Eocortex module executable files to the list of trusted applications of anti-virus and firewall, as video stream checking requires significant computing resources.

⚠ Some anti-virus software (such as NOD32) blocks video streams even when disabled, since they "embed" their own components at the level of system drivers when installed. Thus, to ensure correct operation and performance we recommend removing anti-virus software from Eocortex video servers, if possible.

Installing Eocortex software from a common installer

The most up-to-date version of **Eocortex** can be downloaded at eocortex.com: The distribution packages can be found at Support / Software Installation Packages Supported.

Eocortex applications are installed from a common installer (**EocortexMainCommon Installer.exe**). This installer allows installation of the following applications:

- **Eocortex Server** is server software for a network video surveillance system used to receive, analyze, process and archive video data from IP cameras. It is installed on a single machine, where the data is processed and the archive is stored. **Eocortex Server** is a Windows service; it is launched at computer startup and runs in the background.
- **Eocortex Client** is network client of a video surveillance system that allows viewing video in real time and from the archive, controlling cameras, audio and intelligent modules by using Configurator. It is installed on the computers of operators, security chief and other surveillance system users. Eocortex Client does not require a USB-key and a license file for operation.
- **Eocortex Standalone** is software that combines the functions of a video surveillance system server and client. It is installed on a single machine, where the data is processed, the archive is stored and real-time video streams are viewed. **Eocortex Standalone** is not a Windows service — it is separately launched software with window interface.
- **Eocortex System Health Monitoring** is a subsystem that permits to monitor the status of the video surveillance system components.

  Within one installation procedure, you can install both separate applications and all included in the installer. **Eocortex Server** and **Eocortex Standalone** are mutually exclusive (you can install either **Eocortex Server** or **Eocortex Standalone**).

Before installing **Eocortex Server** or **Eocortex Standalone**, it may be required to fully delete the video server installed earlier because in case of a standard deinstallation of **Eocortex**the setup files are left uninstalled. Their presence may cause conflicts or errors (see Removing Eocortex software).

The complete deinstallation of the video server installed earlier is not required if the server of the same bitness was installed on the PC earlier. In this case, the installation will be considered by the system as updating (see Updating Eocortex software).

During the installation use the account that has full access rights to the local computer on which **Eocortex Server** and **Eocortex Standalone** software is installed.

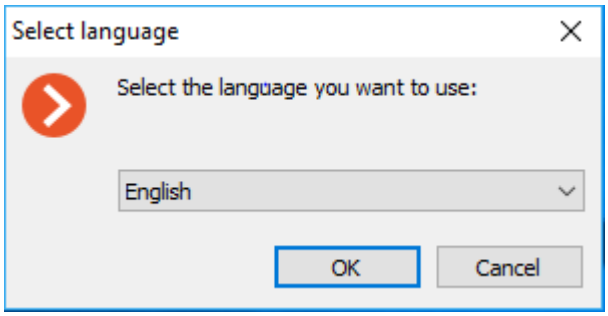
If you use a **Eocortex** USB-key, plug it into a server USB-port.

When using the multiserver configuration the version numbers of merged servers must match.

The bitness of the applications being installed is determined automatically depending on the bitness of **Windows** OS. However, it is possible to choose the installation of 32-bit versions of **Eocortex** on a 64-bit version of **Windows**.

Close all Windows applications before installing **Eocortex** software and run the **EocortexMainCommon Installer.exe** file.

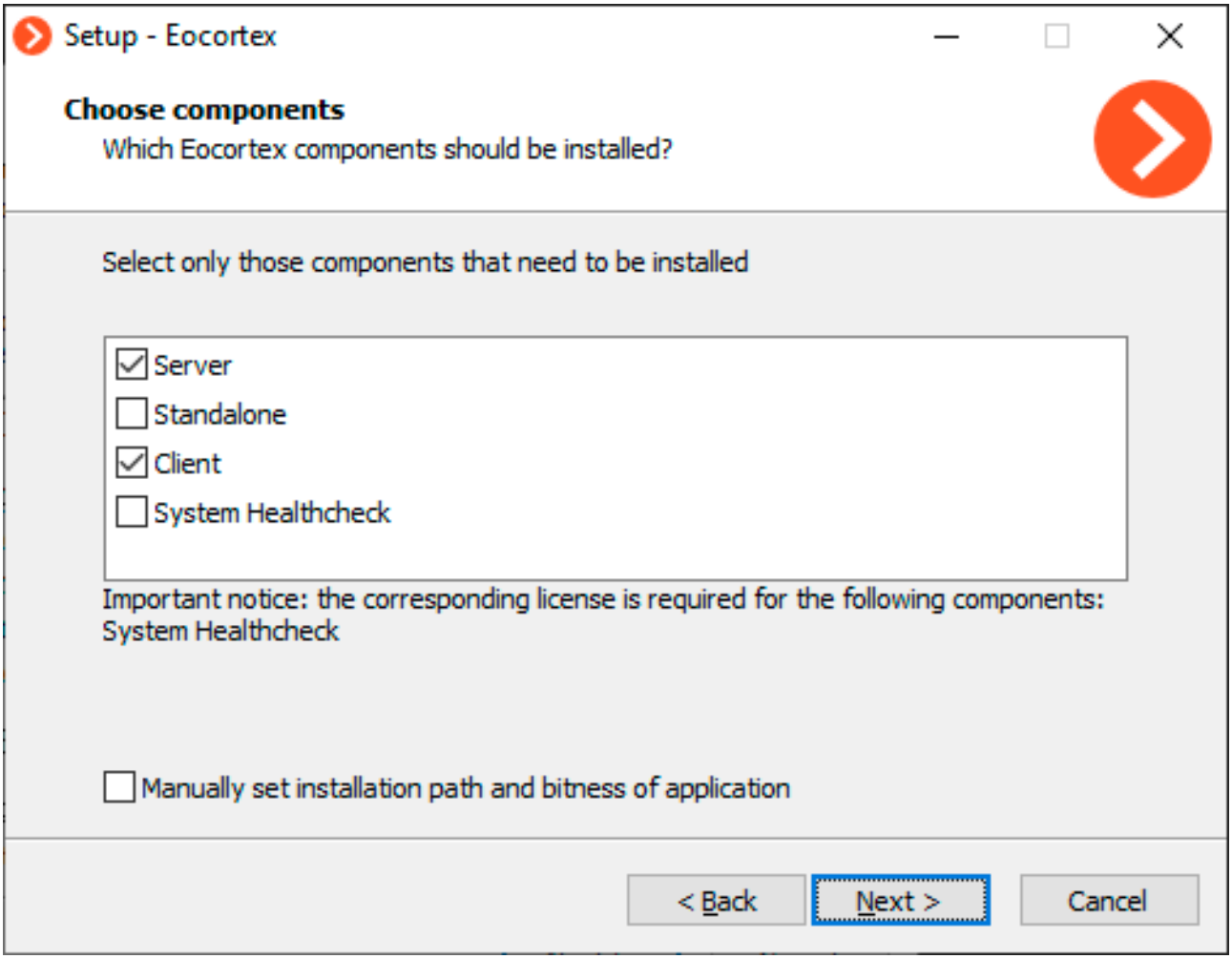
Select the installation language and click **OK**.

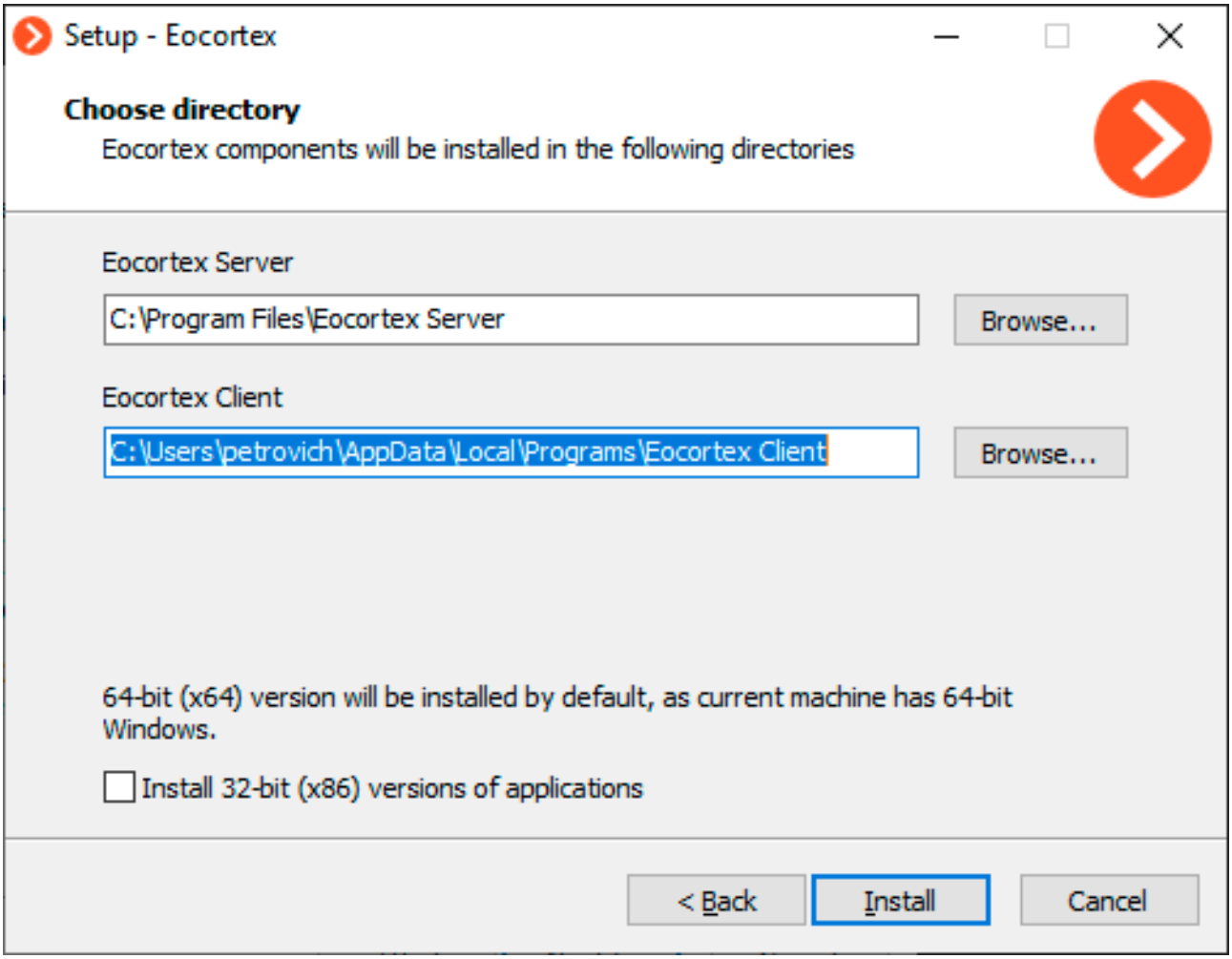


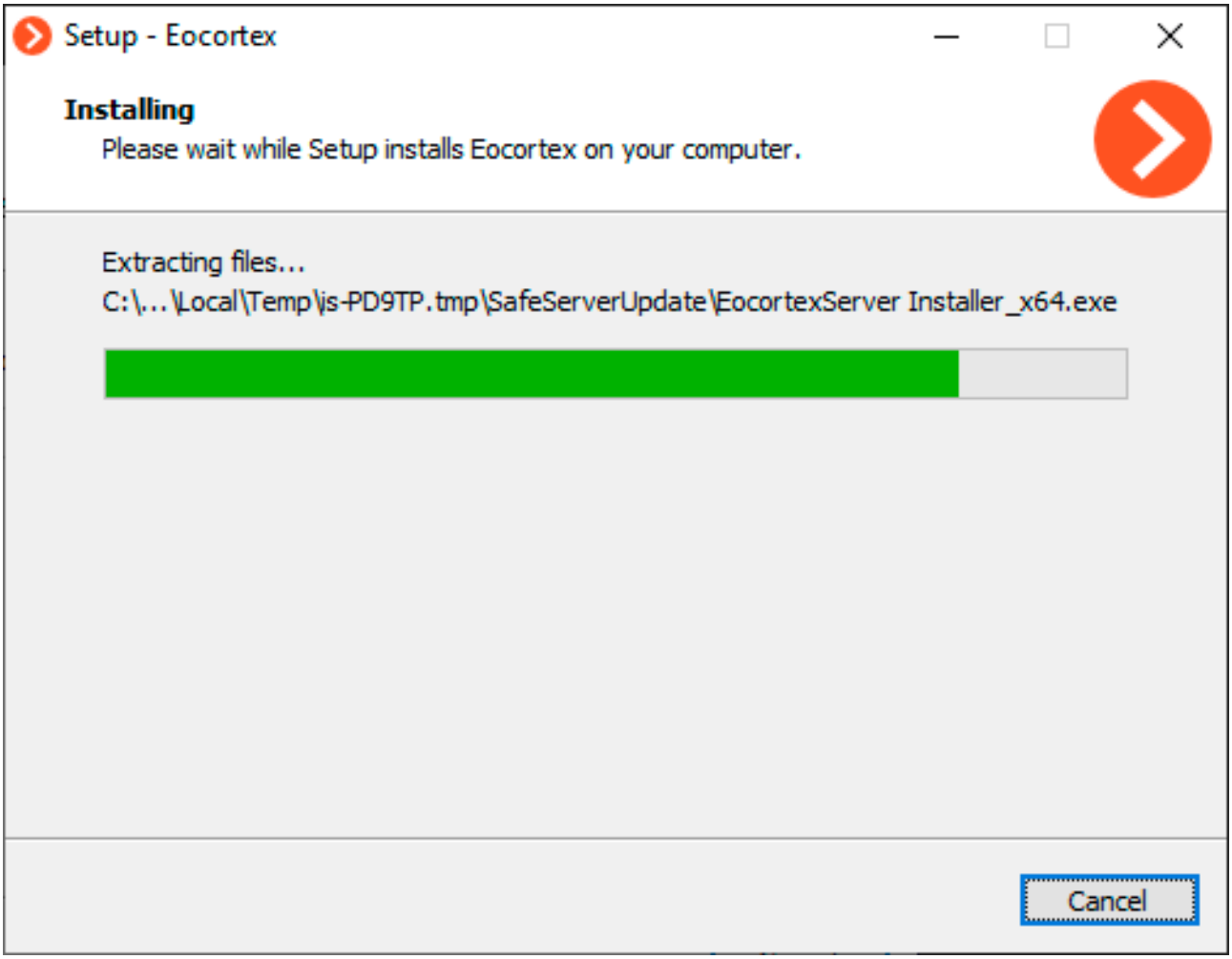
Setup wizard window will open. Follow the instructions:

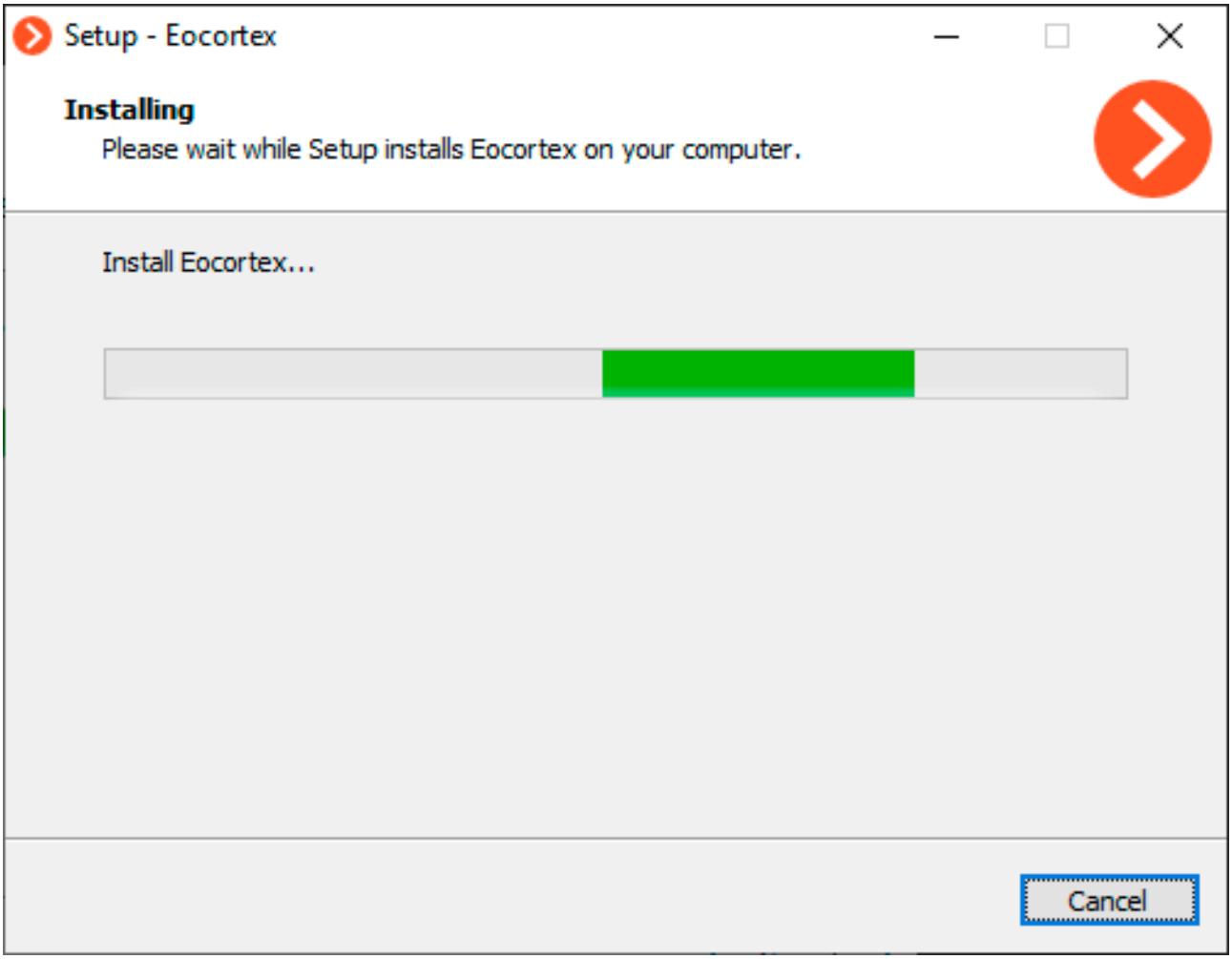
⚠ It is possible to choose **System Heathcheck** only when using **Ultra**; it is also available when this option is included into the **Enterprise** license.

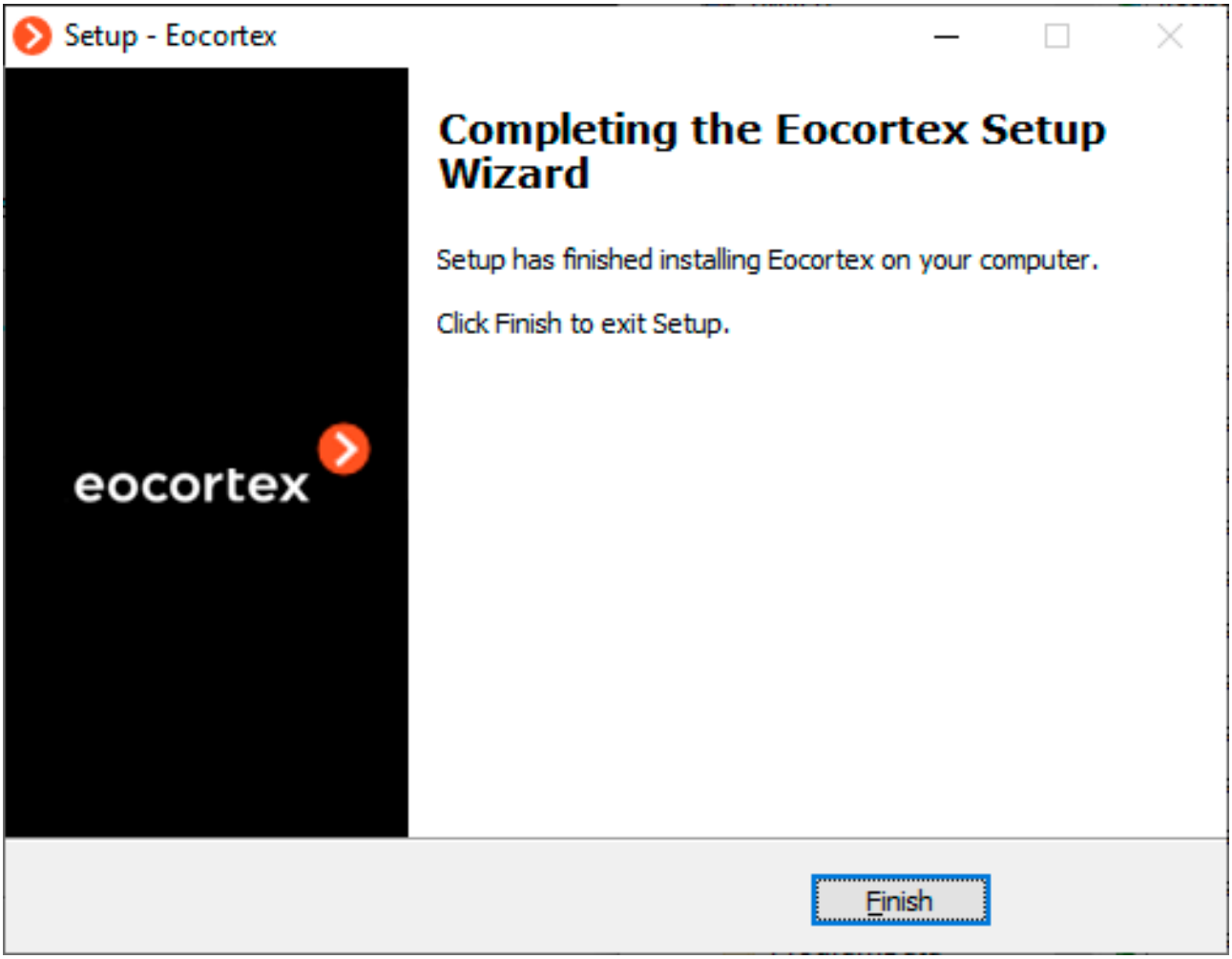
ⓘ Make the selection of application you want to install on the machine. Checking the option **Manually set installation path and bitness of application** will allow you to define absolute paths for each application and bit version that you may install.


Setup - Eocortex
Choose components
Which Eocortex components should be installed?
Select only those components that need to be installed
Server
Standalone
Client
System Healthcheck
Important notice: the corresponding license is required for the following components:
System Healthcheck
Manually set installation path and bitness of application
< Back
Next >
Cancel


Setup - Eocortex
Choose directory
Eocortex components will be installed in the following directories
Eocortex Server
C:\Program Files\Eocortex Server
Browse...
Eocortex Client
C:\Users\petrovich\AppData\Local\Programs\Eocortex Client
Browse...
64-bit (x64) version will be installed by default, as current machine has 64-bit Windows.
Install 32-bit (x86) versions of applications
< Back
Install
Cancel

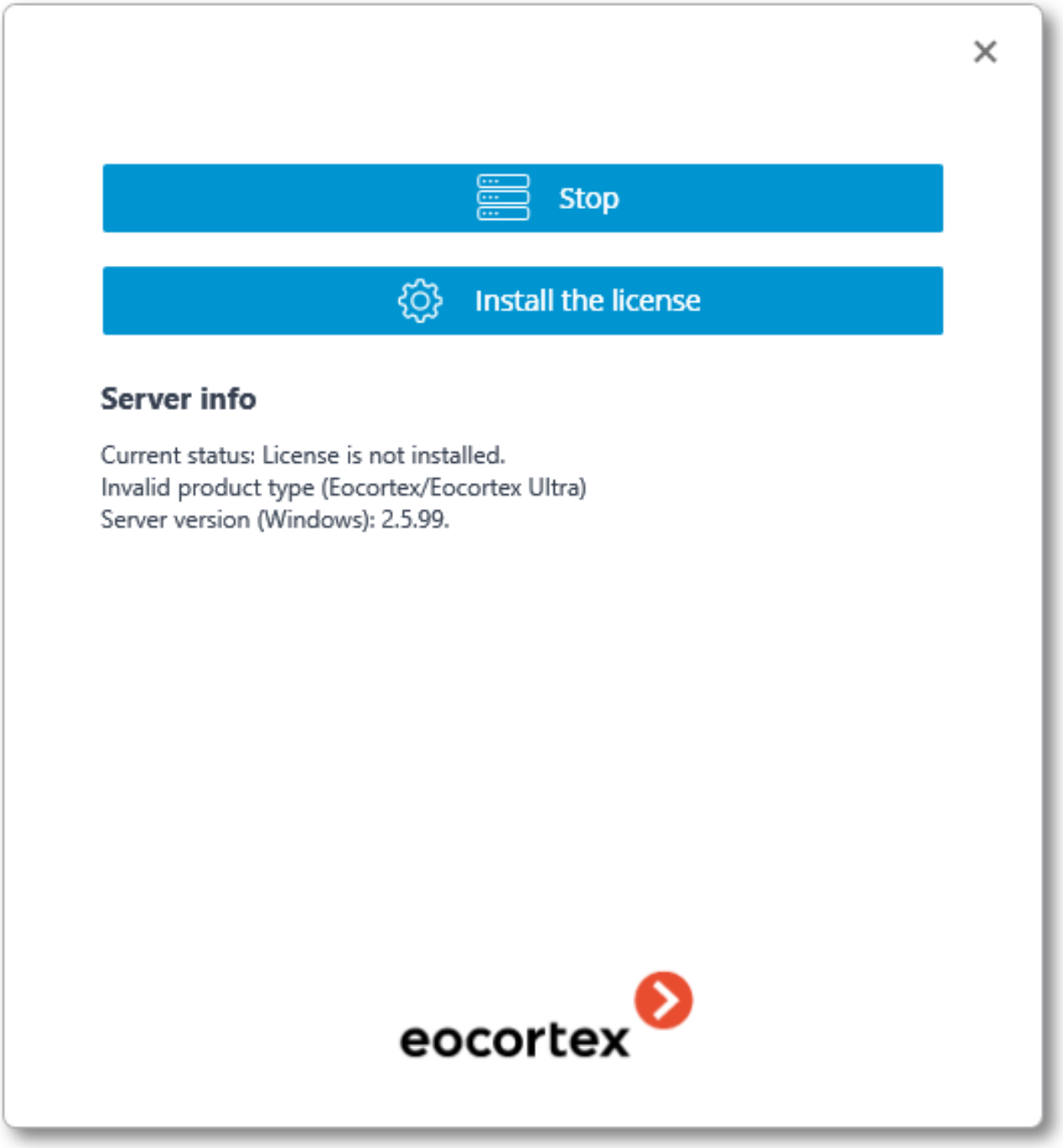

Setup - Eocortex
Installing
Please wait while Setup installs Eocortex on your computer.
Extracting files...
C:\...\Local\Temp\is-PD9TP.tmp\SafeServerUpdate\EocortexServer Installer_x64.exe
Cancel


Setup - Eocortex
Installing
Please wait while Setup installs Eocortex on your computer.
Install Eocortex...
Cancel



When installation of the video server is finished, the application will start automatically: **Eocortex Server** — as a Windows system service, **Eocortex Standalone** - as a console application. At that, a root user with a blank password is created (by default) with full rights (username and password are recommended to be changed).

When setup wizard is closed, **Eocortex Server Info** window opens. When clicking the button **Install the license**, you will be prompted to Installing and updating the license.



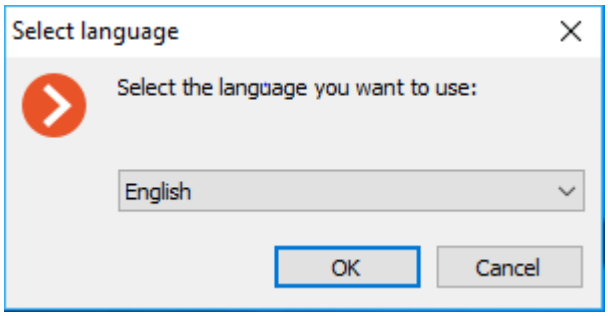
Installing Eocortex Client

The most up-to-date version of **Eocortex** can be downloaded at eocortex.com: The distribution packages can be found at Support / Software Installation Packages Supported.

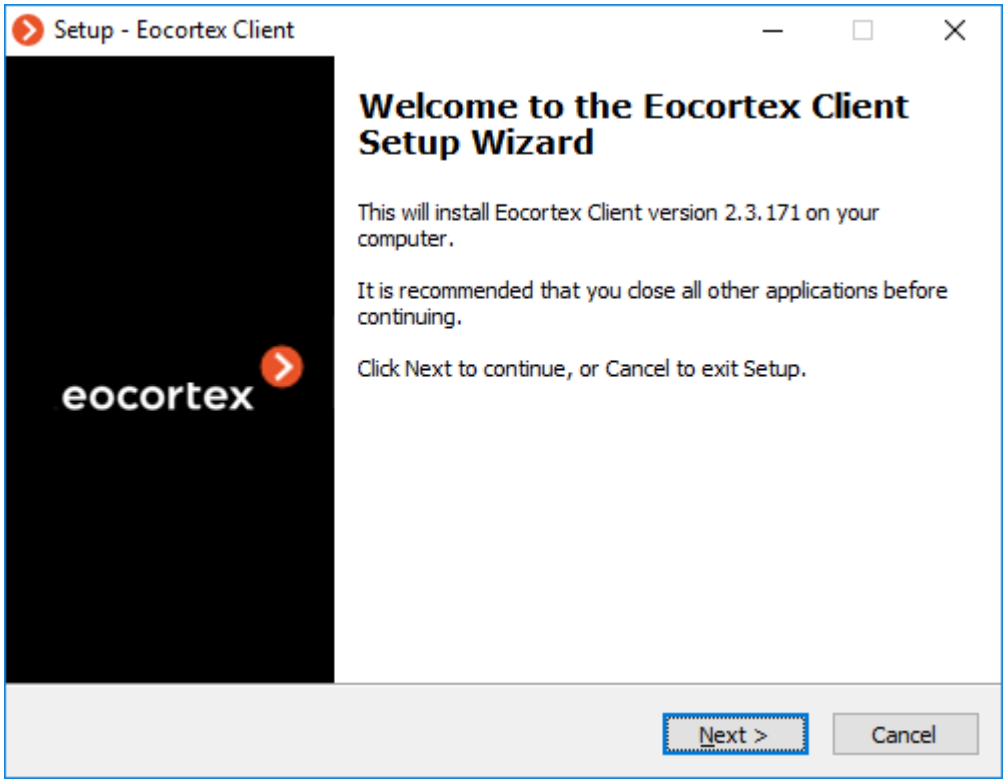
Installation of **Eocortex Client** should be performed via the account of the user by whom this application shall be used. If the application is to be used by several users with different accounts, you should install the application for each of such user.

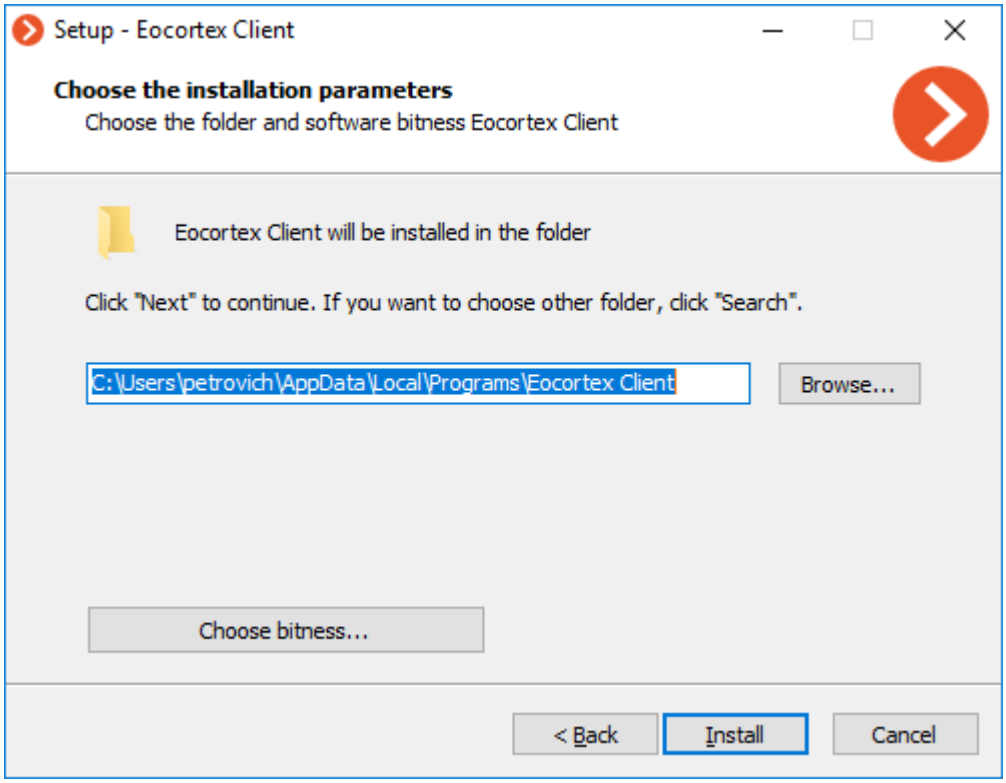
Close all Windows applications before installing **Eocortex Client**; run the **EocortexClientCommon Installer.exe** file located in the installer root folder.

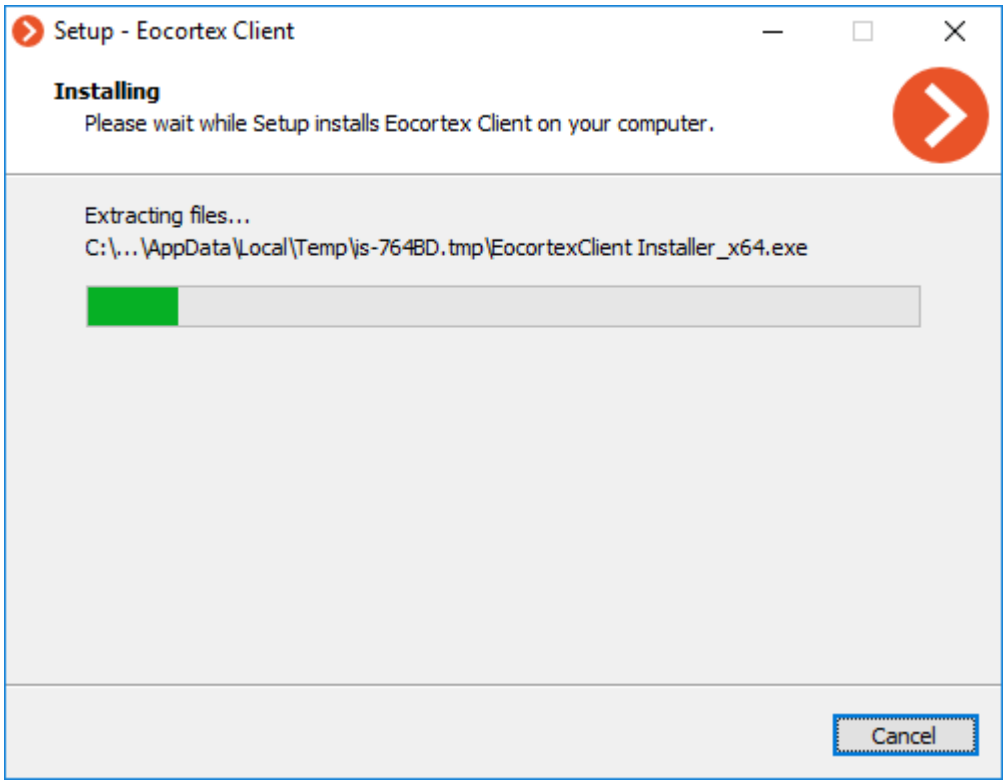
Select the installation language and click **OK**.

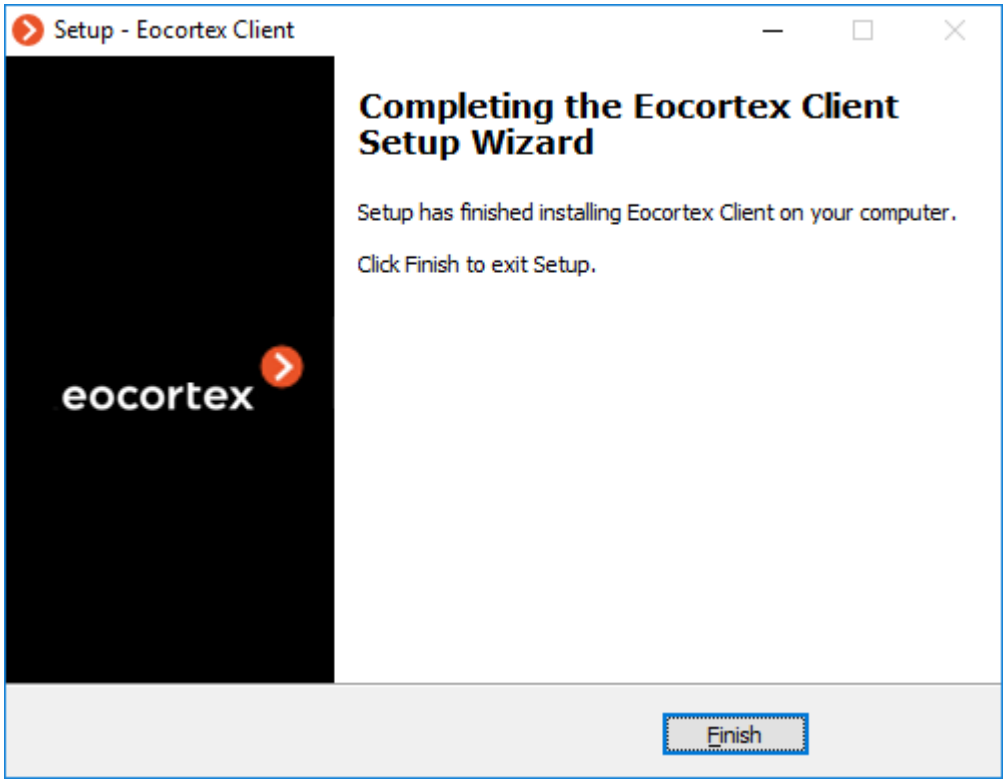


Setup wizard window will open. Follow the instructions:




Setup - Eocortex Client
Choose the installation parameters
Choose the folder and software bitness Eocortex Client
Eocortex Client will be installed in the folder
Click "Next" to continue. If you want to choose other folder, click "Search".
C:\Users\petrovich\AppData\Local\Programs\Eocortex Client
Browse...
Choose bitness...
< Back
Install
Cancel


Setup - Eocortex Client
Installing
Please wait while Setup installs Eocortex Client on your computer.
Extracting files...
C:\...\AppData\Local\Temp\is-764BD.tmp\EocortexClient Installer_x64.exe
Cancel



Updating Eocortex software

Eocortex software is updated by installing the newest version of the product "on top" of an existing one. During the installation program files of the previous version are removed but all settings, the archive and the license are saved. Thus, no additional setup is required after update.

⚠ Only software with the same name and bit depth can be updated. For example, if you previously installed **Eocortex Server (32 bit)**, choose **Eocortex Server (32 bit)** for update.

ⓘ You can configure automatic update for **Eocortex Client**.

ⓘ The most up-to-date version of **Eocortex** can be downloaded at eocortex.com: The distribution packages can be found at Support / Software Installation Packages Supported.

ⓘ If you change the license but the product version and bit depth remain the same, software update is not needed — just install a new license file or software key.

Removing Eocortex software

Depending on the purpose, **Eocortex** software can be removed in one or two steps:

Step 1: **Remove software and save the settings** — only executable files and libraries are removed; all settings, the license and the archive are saved. This procedure is used only if it is planned to install

Eocortex software with the same bit depth later (the same procedure is performed automatically when you update your **Eocortex** software.)

Step 2: **Complete removal of Eocortex products** — all settings and the license are removed. This procedure is used if it is planned to install **Eocortex** server software of another bit depth later or completely remove it from the computer.

Remove software and save the settings

Open the **Programs and Features** in **Control Panel** (**Start** / **Control Panel**.)

Select the **Eocortex** product to be removed and press **Uninstall** button.

Complete removal of Eocortex products

In order to permanently remove the **Eocortex** application, you should delete the installation folder from the disk, as well as all subfolders that start with **Eocortex**, in the **ProgramData** folder on the system disk.

In addition, **EocortexArchive** folders are created on archived disks. If you want to delete the archive, then these folders are deleted.

Linux-based server

Eocortex Server can work under Linux operating system. However, come features will be unavailable. The differences in the functionality of **Eocortex Server** applications based on Windows and Linux are listed in the specification of **Eocortex**.

Below are the Linux installation packages compatible:

- Ubuntu 18.04 LTS, 19.04, 20.04 LTS;
- Astra Linux CE 2.12;
- Debian 9, 10;
- CentOS 7.

Operability on other Linux installation packages has not been tested and is not guaranteed.

Guidelines for Linux settings

Recommended versions of related packages

Requirements to Ubuntu, Debian and Astra Linux components

- Runtime .NET Core (ver. 3.0)
- Firebird (ver. 3.0)

- Nginx (ver. 1.10)
- OpenSSL (ver. 1.1)
- GnuPG (ver. 2.1.18)
- Parted (ver. 3.2)
- libgdiplus (ver. 4.2)
- libvdpau-dev (ver. 1.1.1)
- libc6-dev (ver. 2.24)

Requirements to CentOS components

- Runtime .NET Core (ver. 3.0)
- Firebird (ver. 2.5.9)
- Nginx (ver. 1.12)
- OpenSSL (ver. 1.1)
- GnuPG (ver. 2.0.22)
- Parted (ver. 3.1)
- libgdiplus (ver. 2.10)
- libvdpau-dev (ver. 1.1.1)
- libc6-dev (ver. 2.24)
- glibc-devel (ver. 2.17)
- policycoreutils-python (ver. 2.5)

In case of any issues with **Eocortex Server** stability, it is required to check that the installed versions correspond with those recommended:

In case of a significant discrepancy between the installed and the recommended versions, it is required to install the package dependency of the version indicated in the recommendations.

You can check what version is installed using the following command:

Ubuntu, Debian, Astra Linux

```
sudo apt list --installed | grep package_name
```

CentOS

```
sudo yum list installed | grep package_name
```

Technical features of Linux version

Location of server files

The essential files of the **Eocortex** server are located on the following paths:

- Server folder: **/opt/EocortexServer**
- Server logs: **/opt/EocortexServer/Eocortex/Logs_EocortexServer**
- Server configuration: **/opt/EocortexServer/EocortexConfig**

Automatic drive mounting when launching a server

At startup, the **Eocortex** server automatically mounts all suitable drive partitions to the **/mnt/{uuid}**, folder, where **uuid** is the universal unique identifier of the drive partition. This is done to ensure that when the system is rebooted, the **Eocortex** server can still write the archive even if the partitions have not been mounted by the user beforehand. It is not recommended to mount drive partitions and configure recording of the archive to them independently and without a particular need.

Automatic drive mounting is not performed for system drives, software RAID drives, etc. (that is, drives marked with the **boot**, **esp**, **bios_grub**, **legacy_boot**, **msftres**,**irst**, **root**, **swap**, **raid** flags; the list of flags for a partition can be obtained using the command **parted -l**).

Adding new drives to the system

When manually adding a new drive to the system, it is required to connect the drive, format it and create a partition on it. After that, the **Eocortex** server will automatically mount this disk at startup, as described above.

Description of working with drives using **gnome-disk**.

When adding a drive with an existing partition to the system, nothing extra is required to be done.

The **Eocortex** server only works with drives that have been partitioned. On drives with no partitions but with a file system the correct operation of the application and the archive is not guaranteed. To use such a drive, follow the steps described above, as when adding a new drive to the system. Note that in this case the data on the drive will be erased.

Operating aspects of Firebird database

After installing the **Eocortex** server, a situation may arise when writing to the archive is being performed but the database is absent (that is, the events are not saved in the log). This can happen after the drive for writing the archive to has been mounted in the user's folder. To solve this issue, it is necessary for the operating system user under whose credentials the database is accessed (the user **firebird**) to provide read access at the mounting point of the drive to which the archive is written.

This can be achieved using two methods described below.

- Remounting the drive for writing to the archive in the system folder rather than in the folder of the current user.
- Checking the path from the root (/) to the mounting point of the drive. The user **firebird** must have read access for every directory. It is possible to view directory permissions using the command **sudo ls -l** (the user **firebird** belongs to other users). To give the user **firebird** a permission to read the current directory, use the command **sudo chmod o+r**.

The second method should be used only when it is required to mount the drive in the selected folder, or when it is not permitted to change the mounting point.

Saving frames to drive

Saving frames (according to schedule, in response to a system event, or by user command) is allowed to any drive except the system one. If the frames are not being saved, it is required to make sure that the drive selected for saving is not the system one.

Access to cameras by domain names

By default, **Linux** prioritizes IPv6 addresses when resolving a domain name. Some camera plugins in **Eocortex** may not work with IPv6 addresses.

To solve this issue, it is required to add the following entry to the file **/etc/gai.conf**:

```
precedence ::ffff:0:0/96 100
```

As a result, when resolving all domain names, preference will be given to the IPv4 addresses.

If it is required to set an IPv4 address for a specific name, it is possible to add a corresponding entry to the file **/etc/hosts**. E.g.:

```
192.168.100.1 cam-1.mycompany.com
```

Server shutdown and restart

The commands that control the state of the **Eocortex** server are shown below.

Server shutdown:

```
systemctl stop eocortex.service
```

Server launch:

```
systemctl start eocortex.service
```

Server restart:

```
systemctl restart eocortex.service
```

Server status check (active/inactive):

```
systemctl status eocortex.service
```

Installation of Eocortex Server under Linux

Below are the sequences of commands used depending on the installation method and the Linux installation package used.

After completion of the installation, it is required to connect to the server using the **Eocortex Configurator** application launched on the Windows computer, and activate the license on the server.

The **Eocortex Configurator** application is installed on the Windows computer in the process of installing any of the following applications on the same computer: **Eocortex Client**, **Eocortex Server** or **Eocortex Standalone**.

Installation via Internet

Installation on Ubuntu, Debian, Astra Linux

During installation may be prompt to enter the password for the Firebird database administrator (with login **sysdba** and default password is **masterkey**).

```
sudo wget -O - http://packages.eocortex.com/deb/eocortex.gpg.key | sudo apt-key add -
sudo wget -P /etc/apt/sources.list.d/ http://packages.eocortex.com/deb/eocortex.list
sudo apt-get update
sudo apt-get install eocortex
```

Installation on CentOS 7

```
sudo rpm -Uvh https://packages.microsoft.com/config/rhel/7/packages-microsoft-prod.rpm

sudo yum install -y epel-release
sudo curl -o /etc/yum.repos.d/eocortex.repo
http://packages.eocortex.com/rpm/eocortex.repo
sudo yum install eocortex
```

Installation without Internet access

Installation on Ubuntu, Debian, Astra Linux

Install dependency packages:

- aksusbd, ver. 7.100 or higher;
- gnupg, ver. 2.1.18 or higher;

- parted, ver. 3.2 or higher;
- dotnet-runtime-3.0, ver. 3.0 or higher;
- libc6-dev, ver. 2.24 or higher;
- libgdiplus, ver. 4.2 or higher;
- firebird3.0-server, ver. 3.0.1 or higher;
- libvdpau-dev, ver. 1.1.1 or higher;
- openssl, ver. 1.1 or higher;
- nginx, ver. 1.10 or higher;

The **aksusbd** package can be downloaded from repository: http://packages.eocortex.com/deb/pool/a/aksusbd/aksusbd_7.100-1_amd64.deb.

Download the **eocortex** package from repository: http://packages.eocortex.com/deb/pool/m/eocortex/.

Install the **eocortex** package:

```
dpkg -i the_path_to_eocortex_package
```

Installation on CentOS 7

Install dependency packages:

- aksusbd, ver. 7.100 or higher;
- gnupg2, ver. 2.0.22 or higher;
- parted, ver. 3.1 or higher;
- dotnet-runtime-3.0, ver. 3.0 or higher;
- glibc-devel, ver. 2.17 or higher;
- libgdiplus, ver. 2.10 or higher;
- firebird-superserver, ver. 2.5.9 or higher;
- libvdpau-devel, ver. 1.1.1 or higher;
- openssl, ver. 1.1 or higher;
- nginx, ver. 1.12 or higher;
- policycoreutils-python, ver. 2.5 or higher;

The **aksusbd** package can be downloaded from repository: http://packages.eocortex.com/rpm/aksusbd-7.100-1.x86_64.rpm.

Download the **eocortex** package from repository: http://packages.eocortex.com/rpm/.

Install the **eocortex** package:

```
yum install the_path_to_eocortex_package
```

Silent setup of Eocortex Server under Linux

This feature is available starting from **Eocortex** version 3.4 and only for Debian, Ubuntu and AstraLinux installation packages.

To avoid appearance of redundant questions during the installation, it is required to set up **debconf**. The following command is used for this purpose:

```
dpkg-reconfigure debconf
```

First, it will be suggested to select the interface for interacting with **debconf**.

Then, it will be required to choose the lowest permissible priority of the questions to be displayed.

Later, during the installation process, the system will automatically substitute answers to the lower priority questions, taking these answers from the **debconf** database. The rest of the questions (with the selected and higher priority) the user will have to answer on their own, in an interactive mode.

To select the priority "critical", it is required to execute the following command:

```
echo debconf debconf/priority select critical| debconf-set-selections
```

If it is necessary to turn off duplicate questions, it is possible to clearly tell the system not to ask a question since it has already been seen before. To do this, it is required to manually add the flag "seen" for the desired question in the **/var/cache/debconf/config.dat** file.

```
Name: eocortex/license-agreed
Template: eocortex/license-agreed
Value: true
Owners: eocortex
Flags: seen
```

To install Firebird without questions, it is required to add a database access password for **debconf** by running the following command, substituting **password_value** with an actual password:

```
echo firebird3.0-server shared/firebird/sysdba_password/first_install password
password_value | debconf-set-selections
```

The existing templates and their values can be viewed in the **/var/cache/debconf/config.dat** file.

Eocortex Server upgrade under Linux

Below are the sequences of commands (depending on the method of installation and the Linux installation package used) allowing to update **Eocortex Server** to the latest version via Internet.

Update via Internet

For Ubuntu, Debian, Astra Linux

Update to the latest version:

```
sudo apt-get update
sudo apt-get install eocortex
```

Update to the latest version 3.0:

```
sudo apt-get update
sudo apt-get install eocortex=3.0.*
```

Upgrade to a specific version 3.0.20:

```
sudo apt-get update
sudo apt-get install eocortex=3.0.20
```

For CentOS 7

Update to the latest version:

```
sudo yum update
sudo yum install eocortex
```

Update to the latest version 3.0:

```
sudo yum update
sudo yum install eocortex=3.0.*
```

Upgrade to a specific version 3.0.20:

```
sudo yum update
sudo yum install eocortex=3.0.20
```

Upgrade to a specific package

For Ubuntu, Debian, Astra Linux

```
sudo dpkg -i path_to_eocortex_package
```

For CentOS 7

```
sudo yum install path_to_eocortex_package
```

Uninstalling Eocortex Server under Linux

Below are the commands (depending on the method of installation and the Linux installation package used), allowing to remove **Eocortex Server** from the computer.

For Ubuntu, Debian, Astra Linux

```
sudo apt-get remove eocortex
```

For CentOS 7

```
sudo yum remove eocortex
```

Installation of Eocortex Neural Networks suite

⚠ Starting from version 3.4 of **Eocortex**, certain components use PostgreSQL database management system of version 11 or later. (missing or bad snippet)

⚠ If the **Face Recognition (Complete)**module is used, the face databases will be automatically updated at the first start after updating **Eocortex** and the **Eocortex Neural Networks** package from version 3.3 or lower to version 3.4 or higher. It will take some time.

Installation under Windows OS

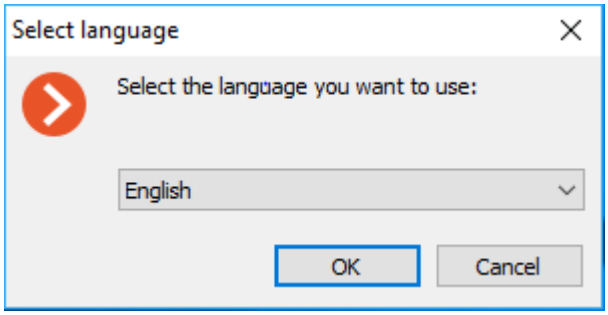
ⓘ The most up-to-date version of **Eocortex** can be downloaded at eocortex.com: The distribution packages can be found at Support / Software Installation Packages Supported.

ⓘ The suite must be only installed on the computer with **Eocortex Server** application. Moreover, this server should be the main one for cameras using neural network modules.

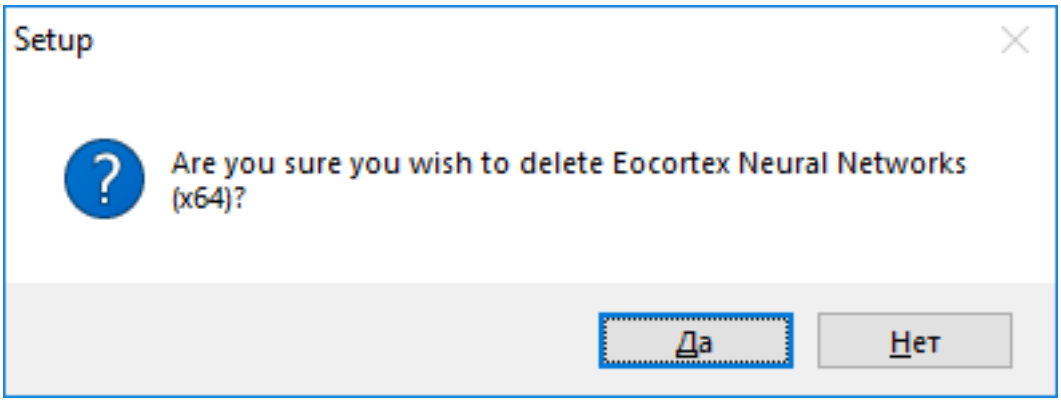
⚠ The installation of the **Eocortex Neural Networks** suite shall be performed under the account of the same user who will operate the application. If the application is to be launched by various users with different accounts, the installation must be performed for each of these users under his/her account.

Before installing the **Eocortex Neural Networks** suite, please close all **Windows** applications, then launch the **EocortexNeuralNetworksCommon Installer.exe** file that is located in the root folder of the distribution package.

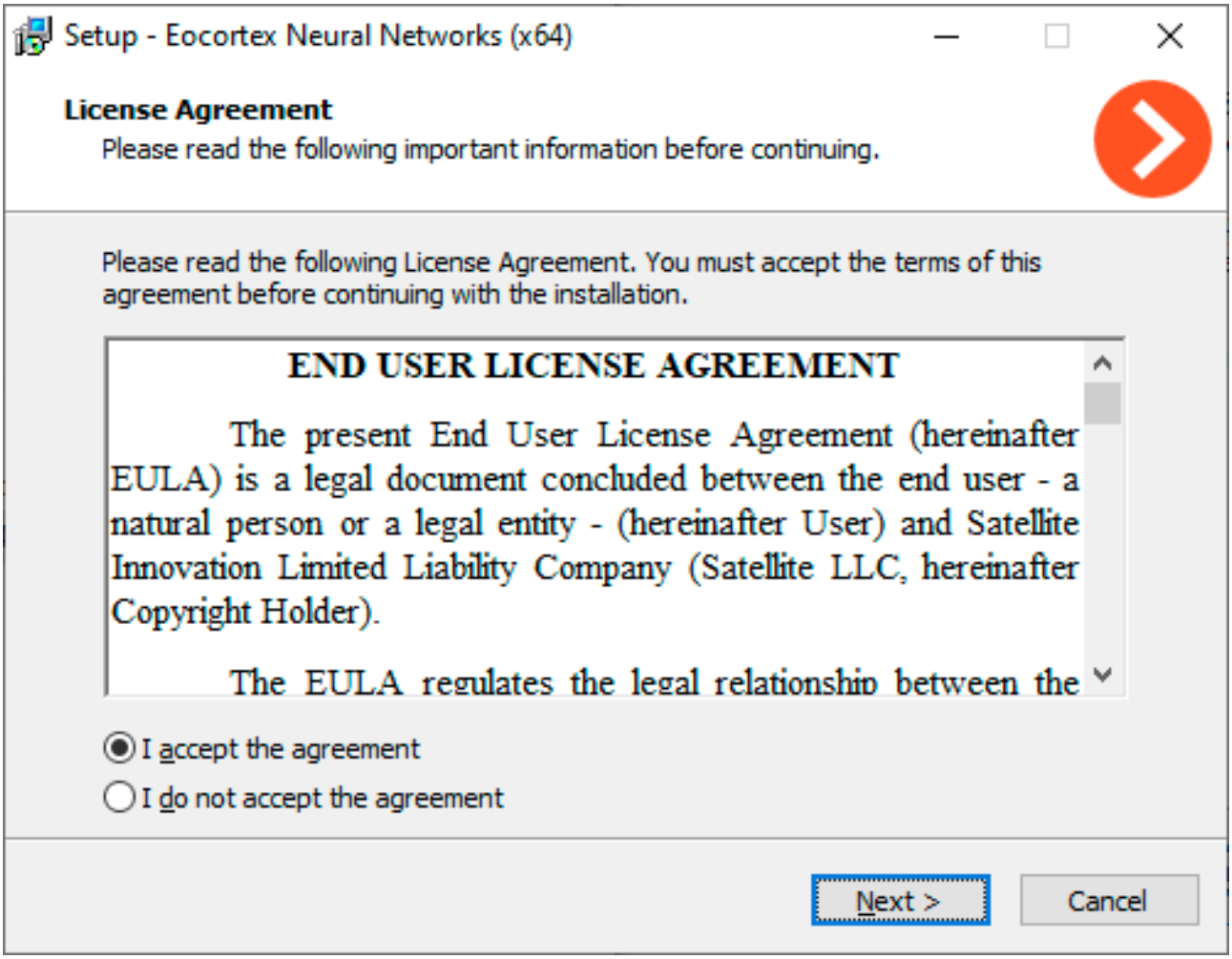
In the **Select language** window, choose the language that will be used during the installation and in the course of operating the software suite on the computer.

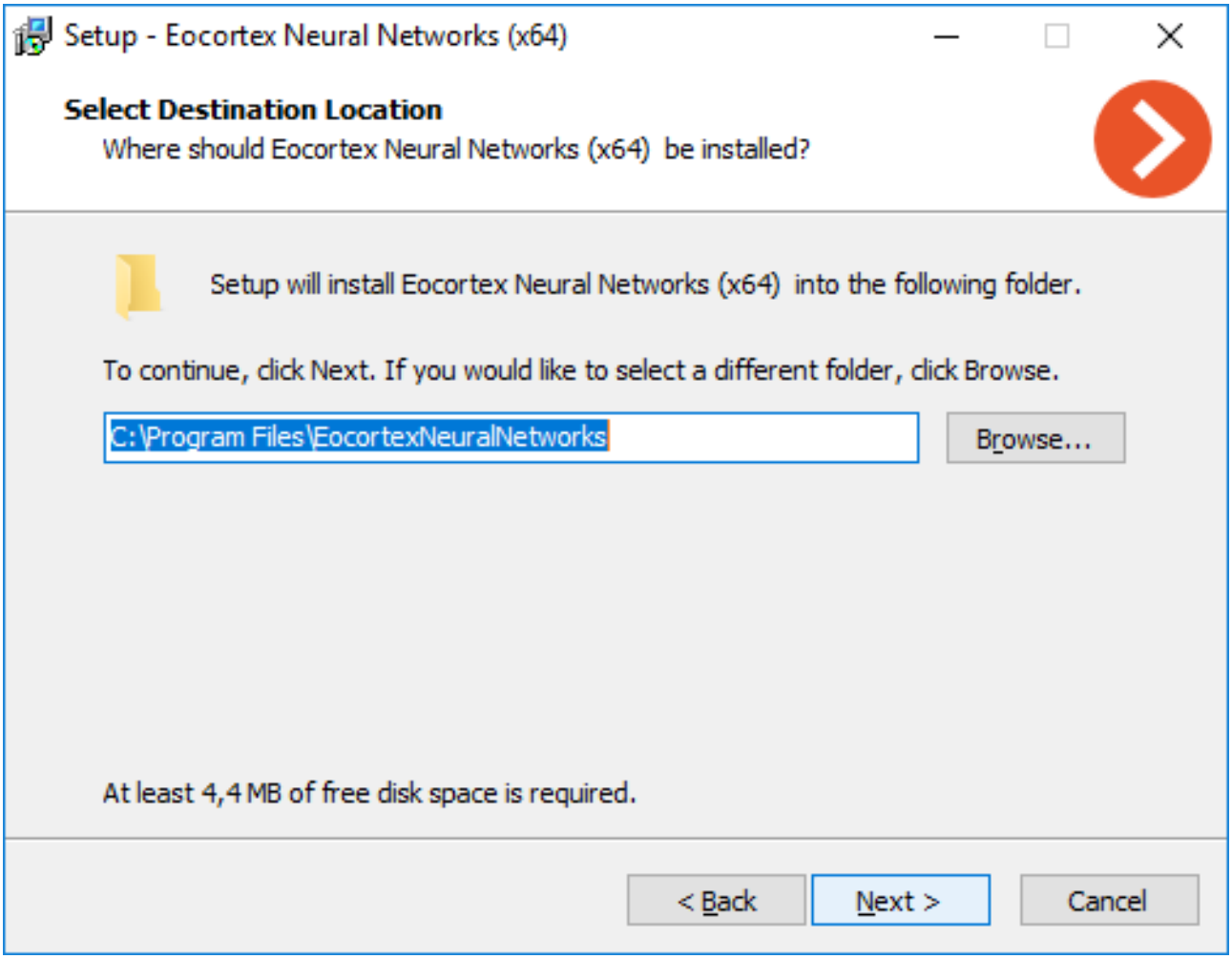


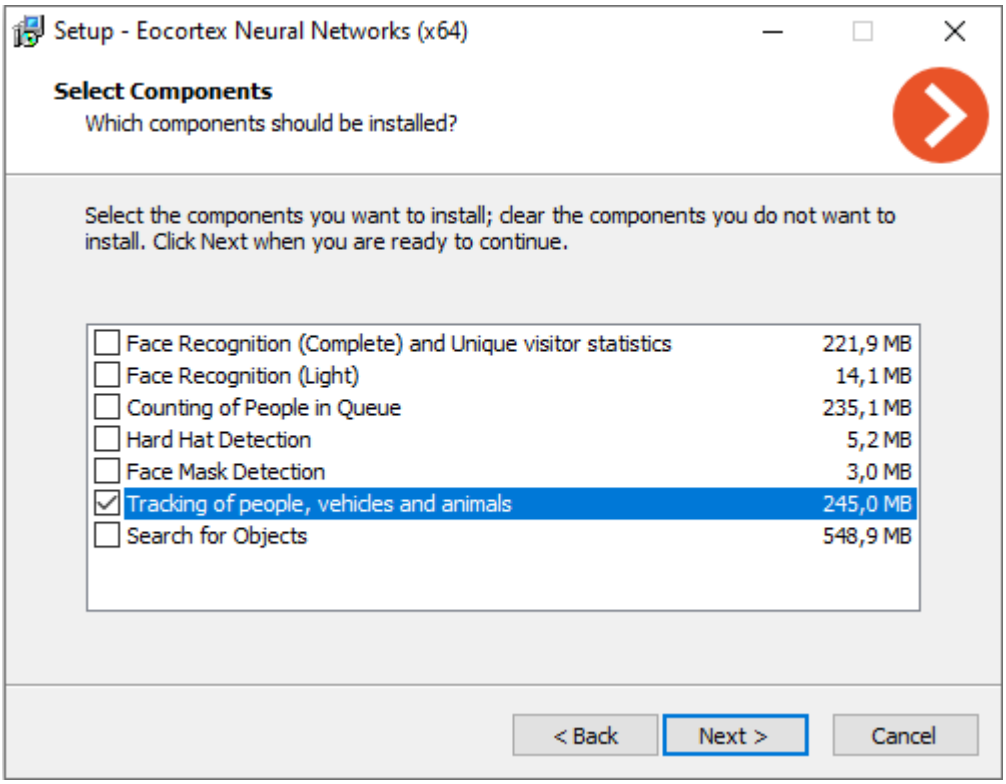
If the **Eocortex Neural Networks** suite has already been installed on this computer, the user will be recommended to remove the previous copy of the software. In case No is pressed, the installation will be aborted and the previous copy will remain. If **Yes** is pressed, the previous copy will be deleted, and the**Eocortex Neural Networks** installation wizard window will open.

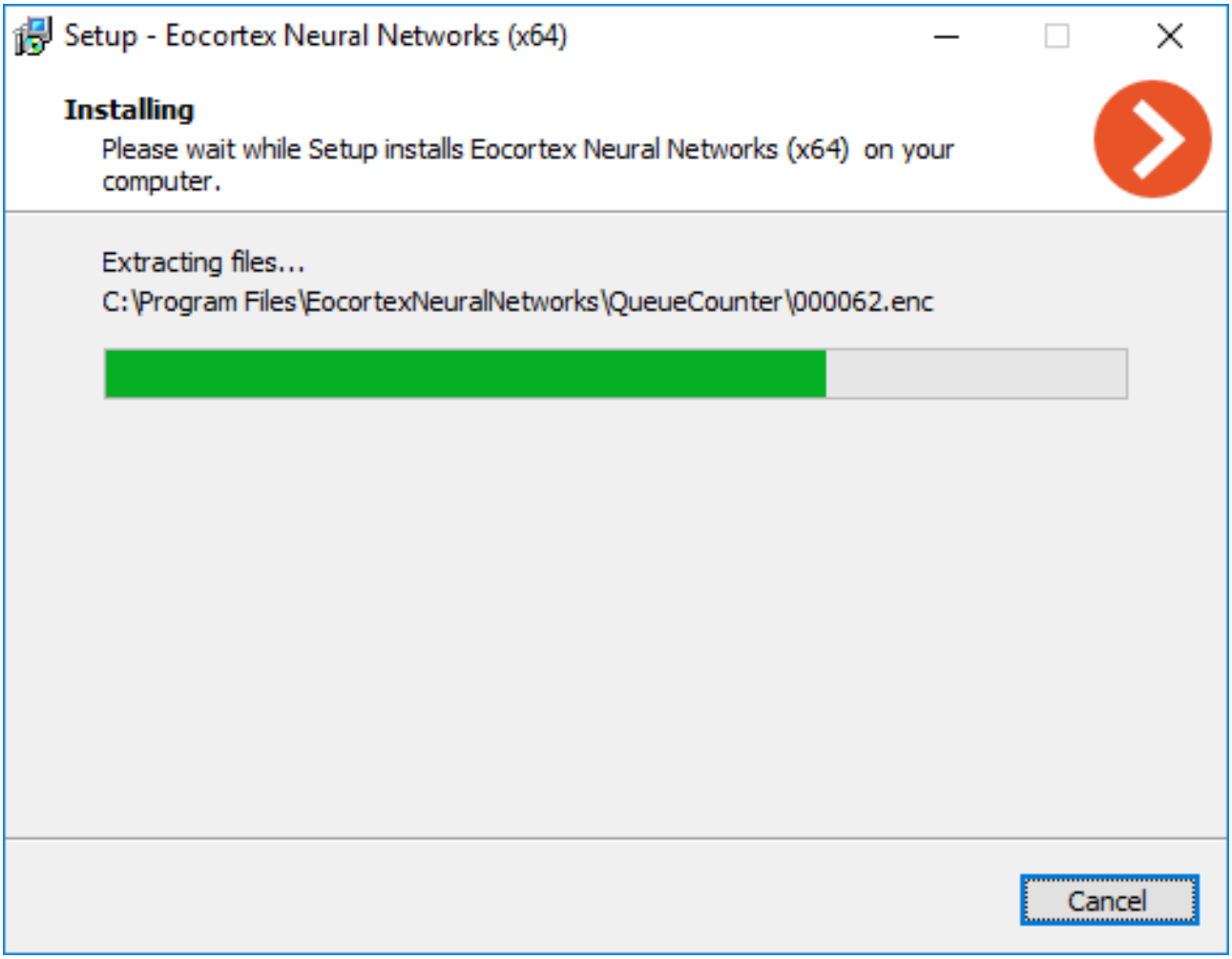


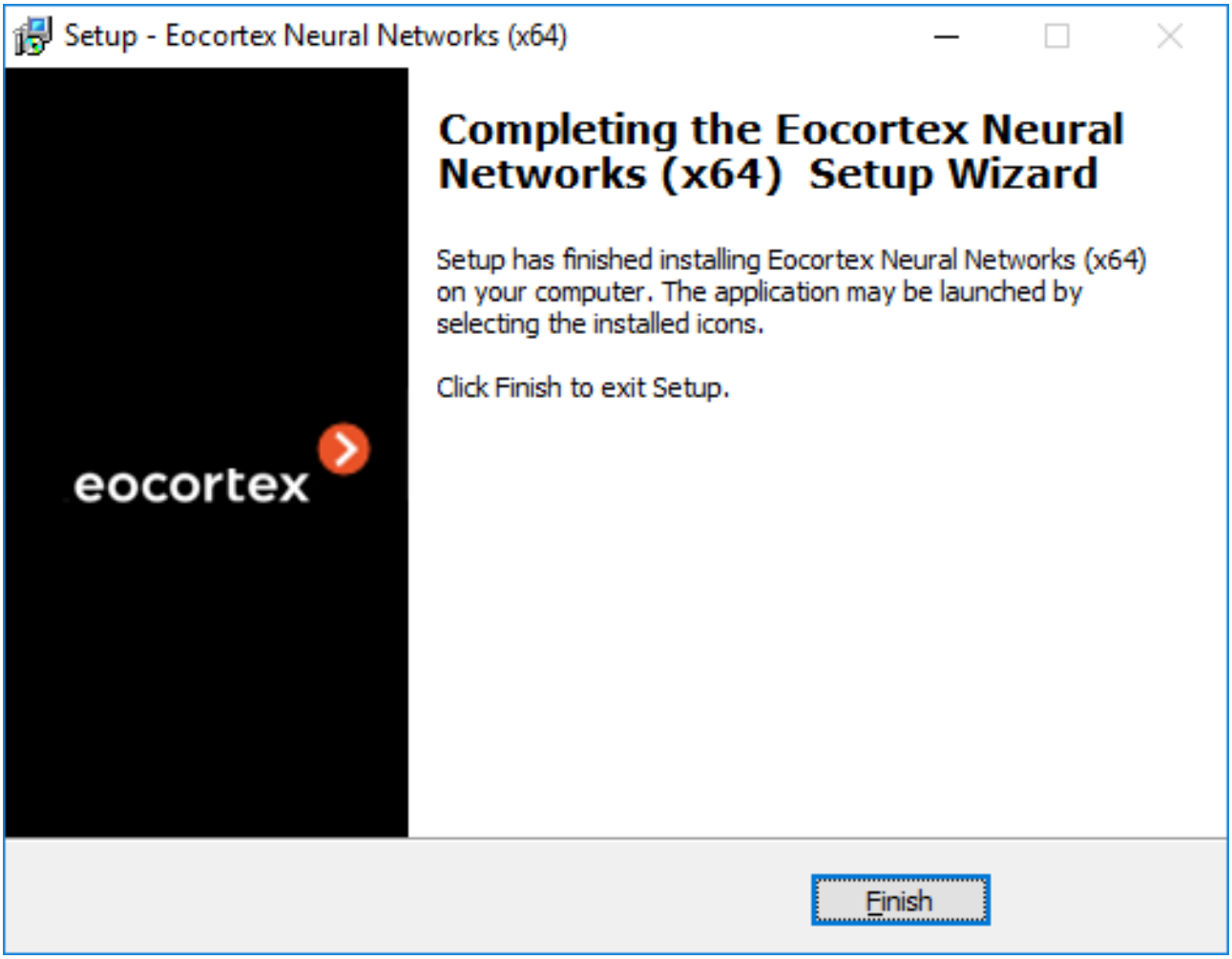
In case the **Eocortex Neural Networks** suite is being installed on the computer for the first time, the **Eocortex Neural Networks** installation wizard will open immediately. The user will need to follow the instructions of the wizard.


Setup - Eocortex Neural Networks (x64)
License Agreement
Please read the following important information before continuing.
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.
END USER LICENSE AGREEMENT
The present End User License Agreement (hereinafter EULA) is a legal document concluded between the end user - a natural person or a legal entity - (hereinafter User) and Satellite Innovation Limited Liability Company (Satellite LLC, hereinafter Copyright Holder).
The EULA regulates the legal relationship between the
I accept the agreement
I do not accept the agreement
Next >
Cancel


Setup - Eocortex Neural Networks (x64)
Select Destination Location
Where should Eocortex Neural Networks (x64) be installed?
Setup will install Eocortex Neural Networks (x64) into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files\EocortexNeuralNetworks
Browse...
At least 4,4 MB of free disk space is required.
< Back
Next >
Cancel


Setup - Eocortex Neural Networks (x64)
Select Components
Which components should be installed?
Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.
Face Recognition (Complete) and Unique visitor statistics 221,9 MB
Face Recognition (Light) 14,1 MB
Counting of People in Queue 235,1 MB
Hard Hat Detection 5,2 MB
Face Mask Detection 3,0 MB
Tracking of people, vehicles and animals 245,0 MB
Search for Objects 548,9 MB
< Back
Next >
Cancel


Setup - Eocortex Neural Networks (x64)
Installing
Please wait while Setup installs Eocortex Neural Networks (x64) on your computer.
Extracting files...
C:\Program Files\EocortexNeuralNetworks\QueueCounter\000062.enc
Cancel



Installation under Linux OS

Below are the Linux installation packages compatible:

- Ubuntu 18.04 LTS, 19.04, 20.04 LTS;
- Astra Linux CE 2.12;
- Debian 9, 10;
- CentOS 7.

Operability on other Linux installation packages has not been tested and is not guaranteed.

ⓘ The suite must be only installed on the computer with **Eocortex Server** application. Moreover, this server should be the main one for cameras using neural network modules.

⚠ If a video card will be used in the neural network, then install the NVIDIA video card driver.

Installing the NVIDIA graphics driver

Ubuntu

```
sudo ubuntu-drivers devices # find the recommended driver
 sudo apt install nvidia-driver-[driver_version]
 sudo reboot
 sudo lshw -c video # make sure the drivers are installed
 sudo nvidia-smi # make sure the video card is plugged
```

Debian/Astra

```
sudo apt-get install linux-headers-$(uname -r)
 sudo apt-get install build-essential
 # In the /etc/default/grub file, add the following to the GRUB_CMDLINE_LINUX line:
rd.driver.blacklist=nouveau nouveau.modeset=0
 # Add the following to the end of the file (or create one)
/etc/modprobe.d/blacklist.conf: blacklist nouveau
 sudo update-grub
 sudo update-initramfs -u
 sudo reboot
 # If X server is enabled:
 sudo systemctl isolate multi-user.target
 #
 chmod a+x NVIDIA-Linux-x86_64-[driver_version].run
 sudo ./NVIDIA-Linux-x86_64-[driver_version].run
```

CentOS

```
sudo yum -y install kernel-devel
 sudo yum -y groupinstall "Development Tools"
 # In the /etc/default/grub file, add the following to the GRUB_CMDLINE_LINUX line:
rd.driver.blacklist=nouveau nouveau.modeset=0
 sudo grub2-mkconfig -o /boot/grub2/grub.cfg
 # Add the following to the end of the file (or create one)
/etc/modprobe.d/blacklist.conf: blacklist nouveau
 sudo mv /boot/initramfs-$(uname -r).img /boot/initramfs-$(uname -r)-nouveau.img
 sudo dracut /boot/initramfs-$(uname -r).img $(uname -r)
 # If X server is enabled:
 sudo reboot
 # sudo systemctl isolate multi-user.target
 chmod a+x NVIDIA-Linux-x86_64-[driver_version].run
 sudo ./NVIDIA-Linux-x86_64-[driver_version].run –kernel-source-path=/usr/src/kernels/
{kernel_version}
```

Installation on a server with Internet access

Debian/Ubuntu/Astra

Make sure the server is installed

If only the CPU will be used:

```
sudo apt-get install eocortex-neural-networks-cpu
```

If GPU will be used:

```
sudo apt-get install eocortex-neural-networks-gpu
```

CentOS 7

Make sure the server is installed

If only the CPU will be used:

```
sudo yum install eocortex-neural-networks-cpu
```

If GPU will be used:

```
sudo yum install eocortex-neural-networks-gpu
```

Installation on a server without Internet access

Install dependency packages and video card driver (for GPU version):

- cuda-license-10-0
- cuda-cudart-10-0
- cuda-cublas-10-0
- cuda-cufft-10-0
- cuda-curand-10-0
- cuda-cusolver-10-0
- cuda-cusparse-10-0
- cuda-npp-10-0
- cuda-nvgraph-10-0
- cuda-nvjpeg-10-0
- cuda-nvrtc-10-0
- cuda-libraries-10-0

Install server

Debian/Ubuntu/Astra

Download deb package http://packages.eocortex.com/deb/pool/m/eocortex/

Install deb package

```
dpkg -i path_to_deb-package
```

CentOS 7

Download rpm package http://packages.eocortex.com/rpm/

Install rpm package

```
yum install path_to_rpm-package
```

Installing and updating the license

To license an **Eocortex** server, it is required to activate a license bound to a software key or a USB key.

The license can be local or floating:

- A **local license** is bound to the local key installed directly on the computer with the licensed server application of **Eocortex**. The features specified in the license will be only available for the cameras bound to the given server.
- A **floating license** is bound to the network key installed on any of the servers accessible from the licensed computer in the local network. The network licenses provide floating licensing.

To update the license of a previously activated key, activate the procedure for this key again.

When transferring USB key to another computer, install and activate the license on the new computer. For off- line activation, use the existing license file for this key.

Several different types of keys may be installed on the server - both multiple hardware (USB) keys and one software key. Only one key can be activated. If you need to use a license for another key on the server, you should run the license installation procedure and activate that key.

When installing and upgrading the license, it's preferable to provide Internet connection to the server, as the most convenient way of key activation its automatic activation via the Internet. Generally, key installation and activation requires the performance of the sequence of steps, offered by the wizard, which are predefined by default.

The total number of cameras, modules and other licensed features are shown in the floating license. The administrator of a video surveillance system can distribute the cameras among servers at his/her discretion. However, it is not required to distribute the licenses among servers because the system core does it automatically. Whereby, upon binding the cameras to another server, the corresponding licenses will be moved accordingly.

Only one license can be activated on a single server, irrespective of whether this license is local or floating.

The network key must be installed on a computer where the **Eocortex** server is installed.

The network keys can only be used on the **Eocortex** servers of versions 3.1 and later. It is not possible to use the network keys on the earlier versions of the software, even as local keys.

In order to ensure access to a network key, it is required to allow the outgoing TCP and UDP traffic for the 1947 port both on the server where the key is installed and on the servers that use this key.

A single network key can be used in several **Eocortex** video surveillance systems. In such a case, the parameters of the key will not be shown correctly in the **Eocortex Configurator** application of each system because the systems have no information regarding the usage of licenses by other systems.

A network key is to be installed on any **Eocortex** server of the same local network or VPN where the servers using that key are located.

Several network and local keys can be installed in the same **Eocortex** video surveillance system. However, the number of local keys is limited by the quantity of **Eocortex** servers, but the number of network keys is unlimited.

The floating licenses can be used on any HASP keys, be it software or USB ones.

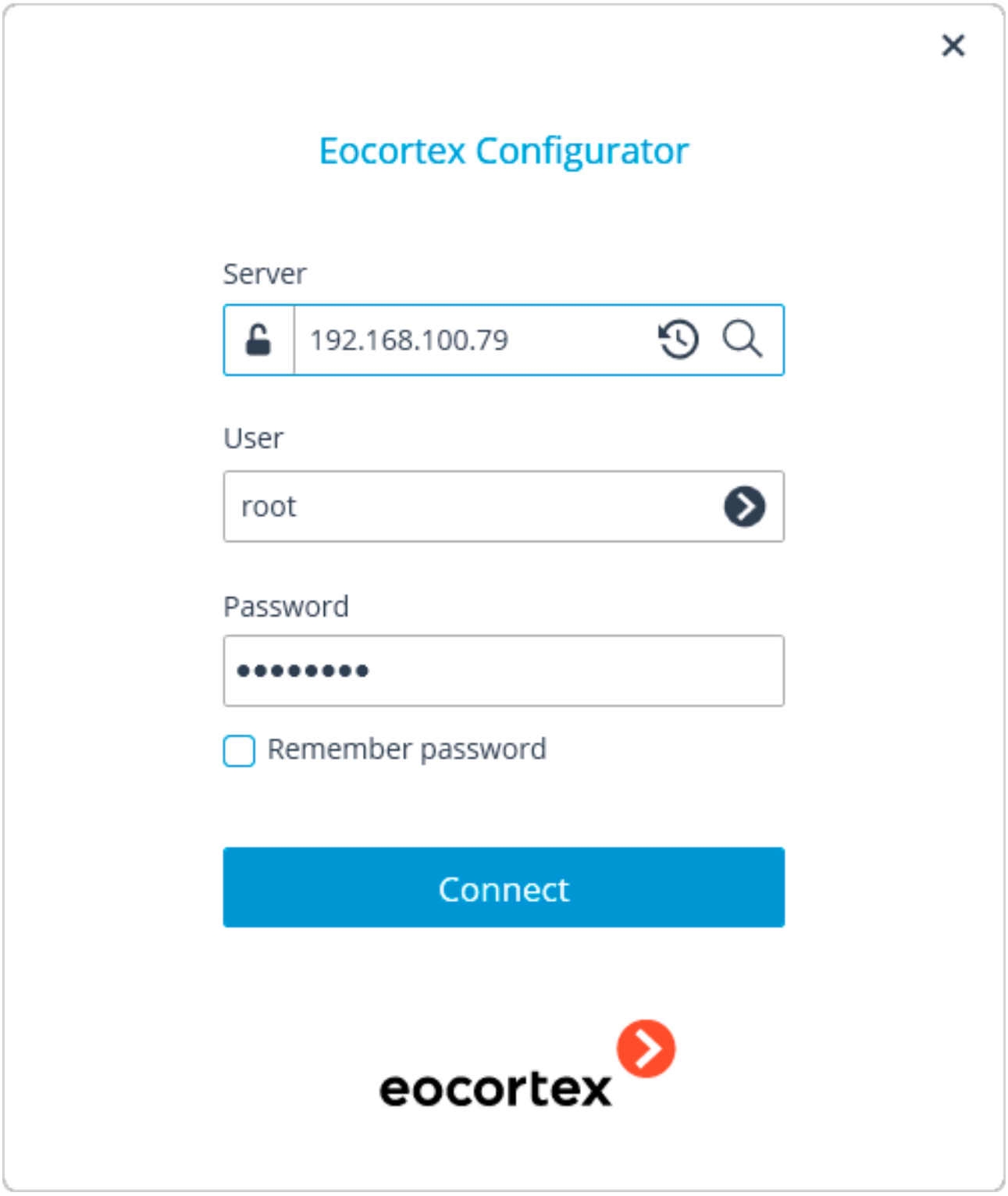
USB key online activation

In order to install and activate a USB key, the user has to obtain an activation code, which looks like **XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX**, where **X** can be hex digit (i.e., 0123456789abcdef). Here's an example of the activation code: **a46a6d3e-17f6-416c-9da2-10cb4b80574e**.

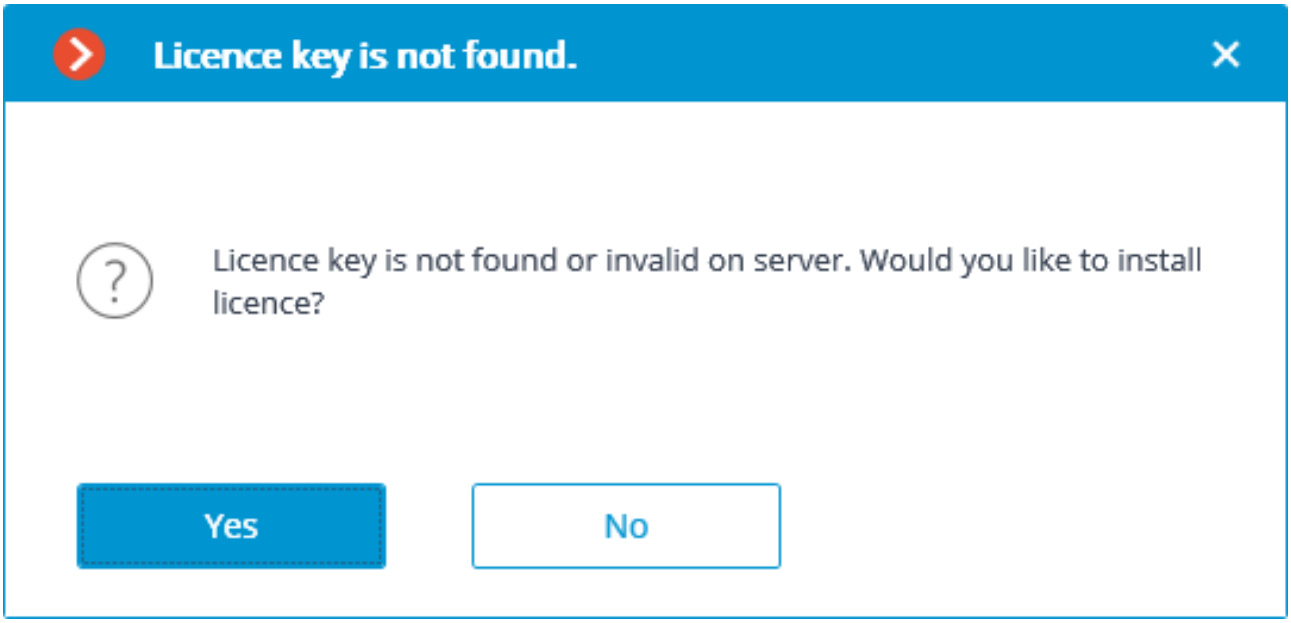
In order to install and activate a USB key, the **Eocortex Configurator** has to be launched on the server where the **Eocortex Server** (or **Eocortex Standalone**) application is installed.

For online activation of the key installed on the server, it is required that this server has access to the Internet.

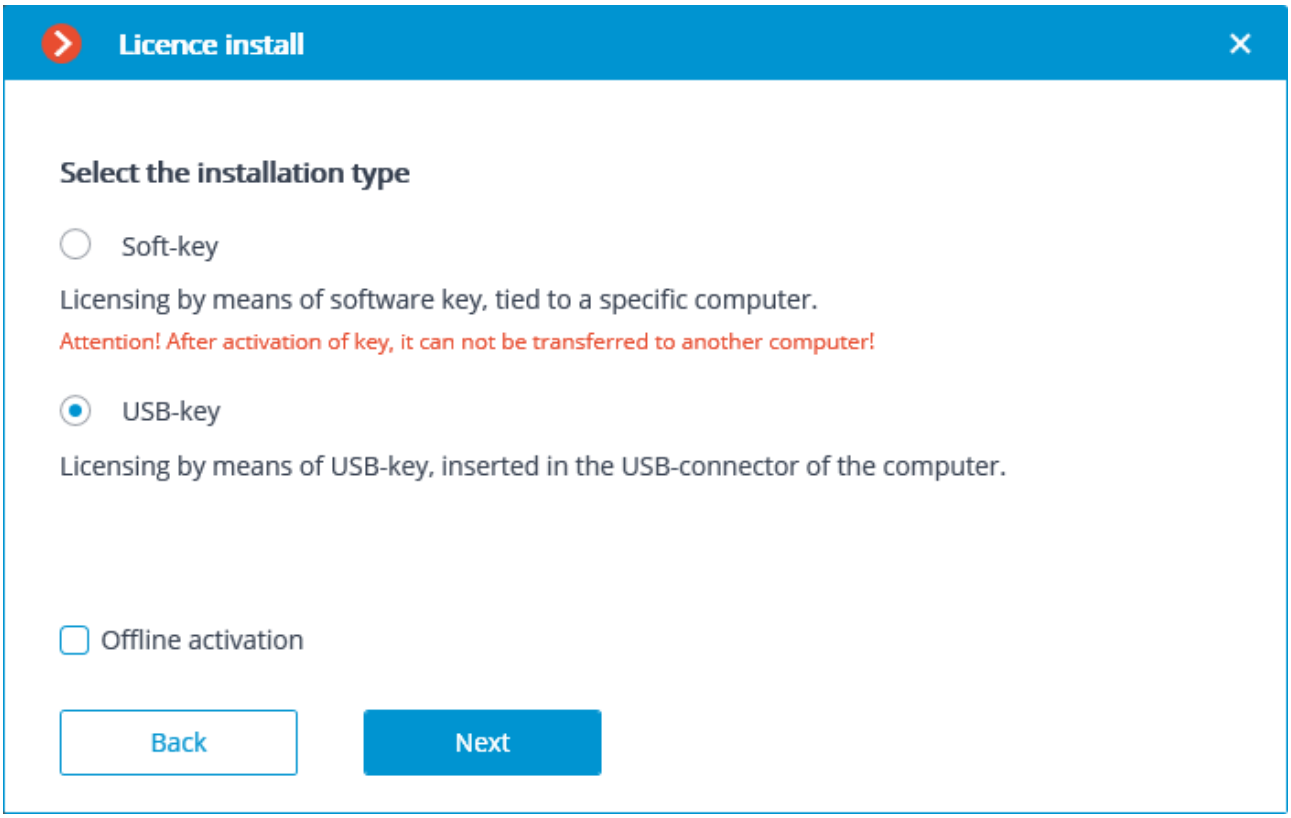
To install, activate, or update a license, you must run the **Eocortex Configurator**. In the opened authorization window, select the server, specify the account type, enter the user name and password with configuration rights, then click **Connect**.



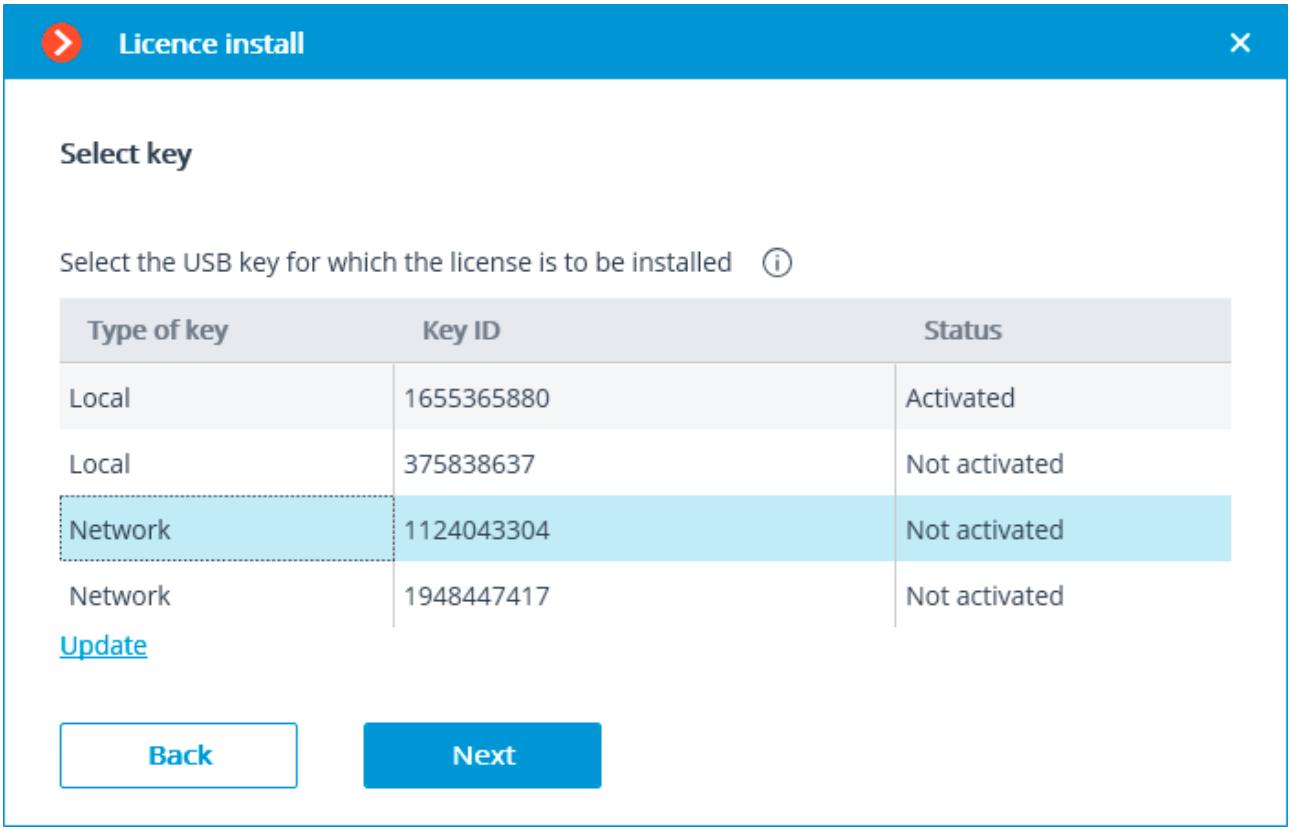
If no license is installed and activated on the server, you will be prompted to install the license. If accepted, the **License Installation** wizard will be launched.



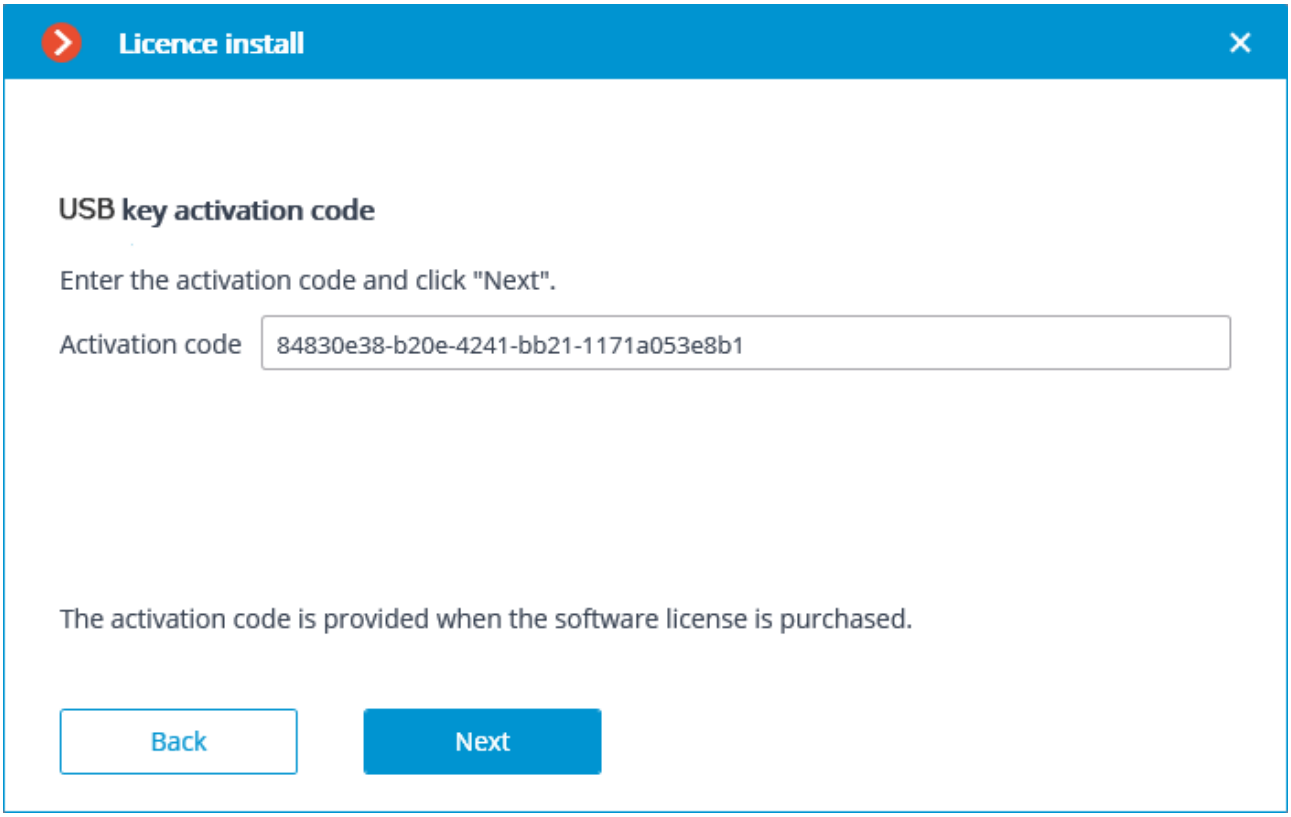
In order to install a USB key, it's required to choose the corresponding option on the **Select the installation type** page and press **Next**.



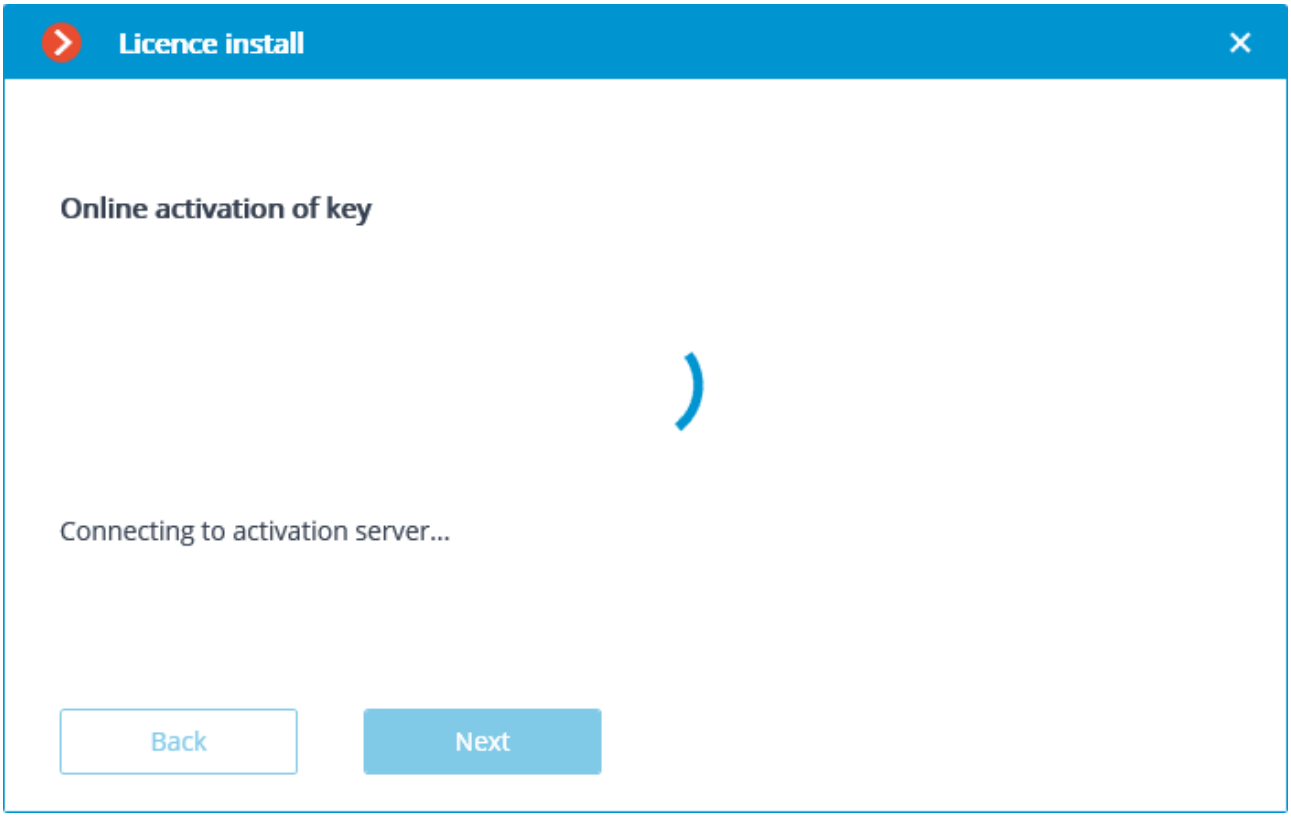
The **Select key** page will appear, showing the list of USB keys connected to the server and available network keys (network keys are available for some of the licenses only). To continue the installation process, the user has to choose the required key and press **Next**.



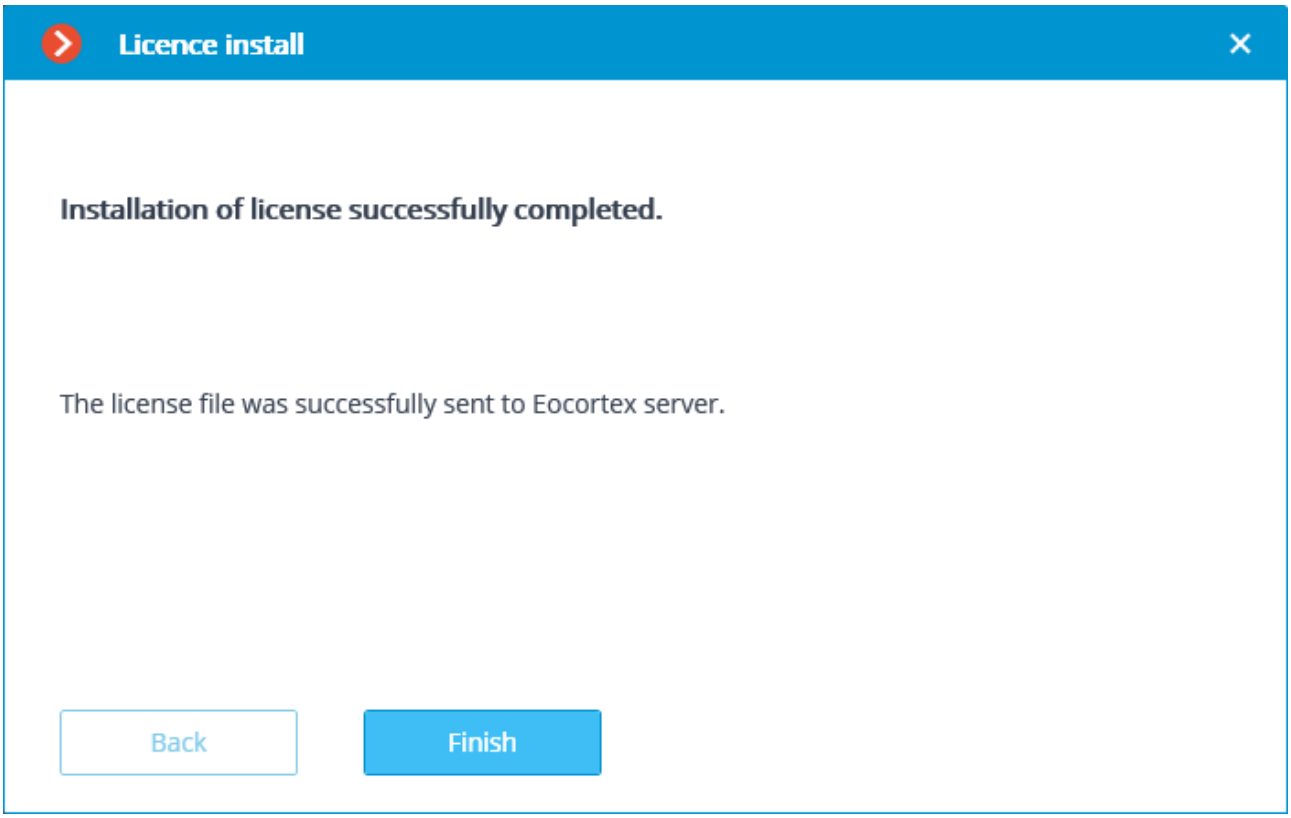
The following step, i.e. key activation, depends on the availability of the internet connection. If the connection is not available, please see the USB key offline activation. If the internet connection is available, the Eocortex server will connect to a remote license activation server and try to activate the key in automatic mode in accordance with the licenses assigned to the key. If the key is being activated for the first time, the **USB key activation code** will be requested.



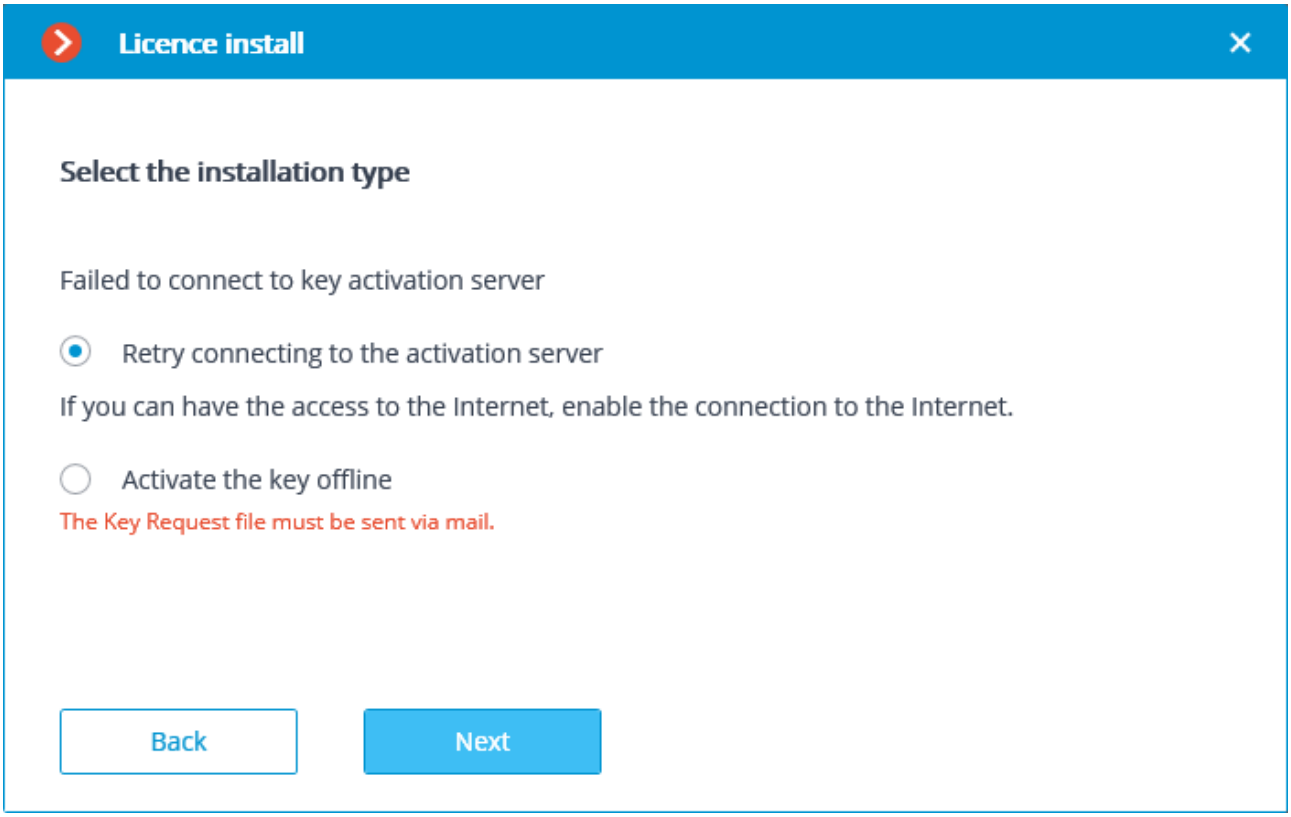
The online key activation page will be shown during the activation process.



In case of successful activation, the **License has been successfully installed** window will appear. In order to exit the license installation wizard, press **Finish**.



If an error occurs during activation, the user will see the **Failed to install the license** page. It will be required to finish the license installation process (press **Finish**), resolve the problem and start the license installation process from the beginning.



Possible online activation errors:

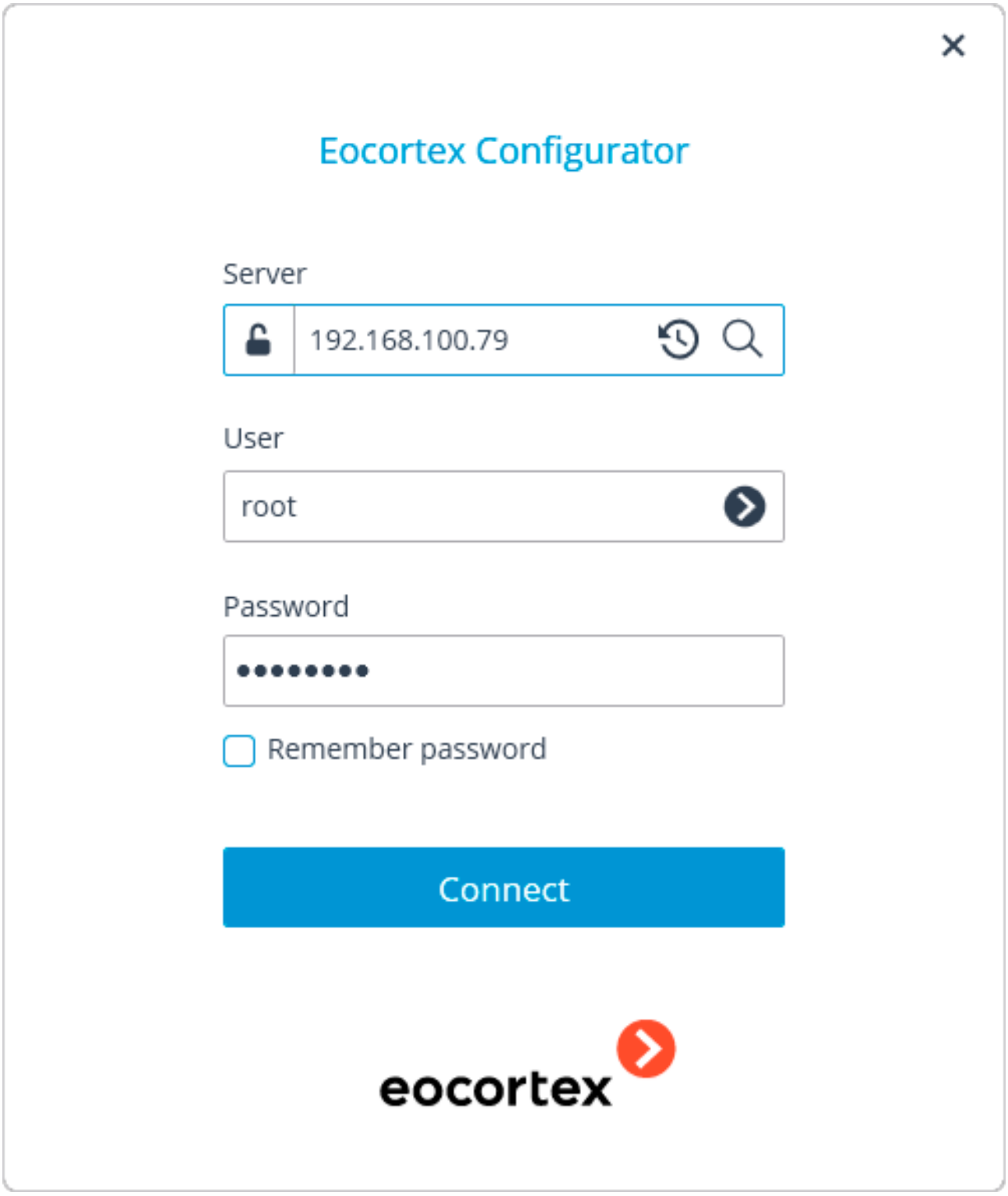
- connection with the activation server was interrupted during the activation process; e.g. due to a connection problem, low connection speed, or due to a problem with one of the route elements;
- the selected key has no assigned licenses. In such a situation, the user has to contact the license supplier (seller).

USB key offline activation

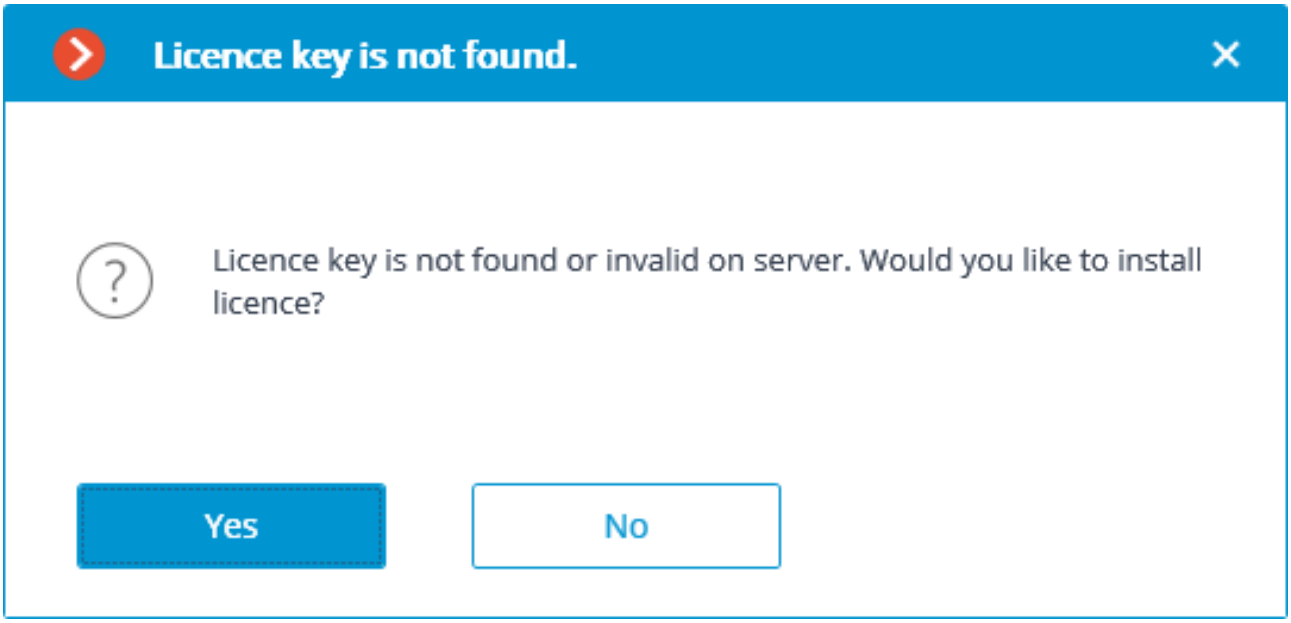
In order to install and activate a USB key, the user has to obtain an activation code, which looks like **XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX**, where **X** can be hex digit (i.e., 0123456789abcdef). Here's an example of the activation code: **a46a6d3e-17f6-416c-9da2-10cb4b80574e**.

In order to install and activate a USB key, the **Eocortex Configurator** has to be launched on the server where the **Eocortex Server** (or **Eocortex Standalone**) application is installed.

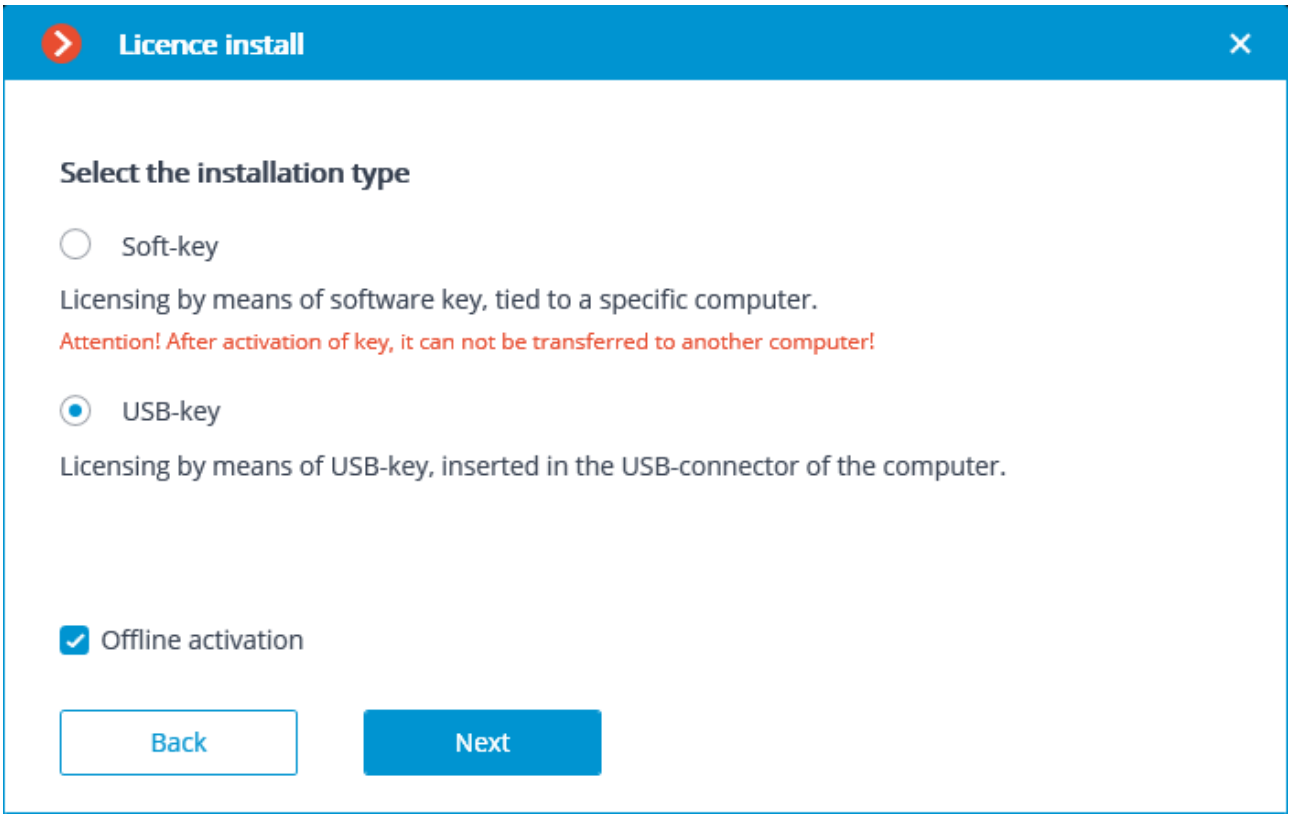
To install, activate, or update a license, you must run the **Eocortex Configurator**. In the opened authorization window, select the server, specify the account type, enter the user name and password with configuration rights, then click **Connect**.



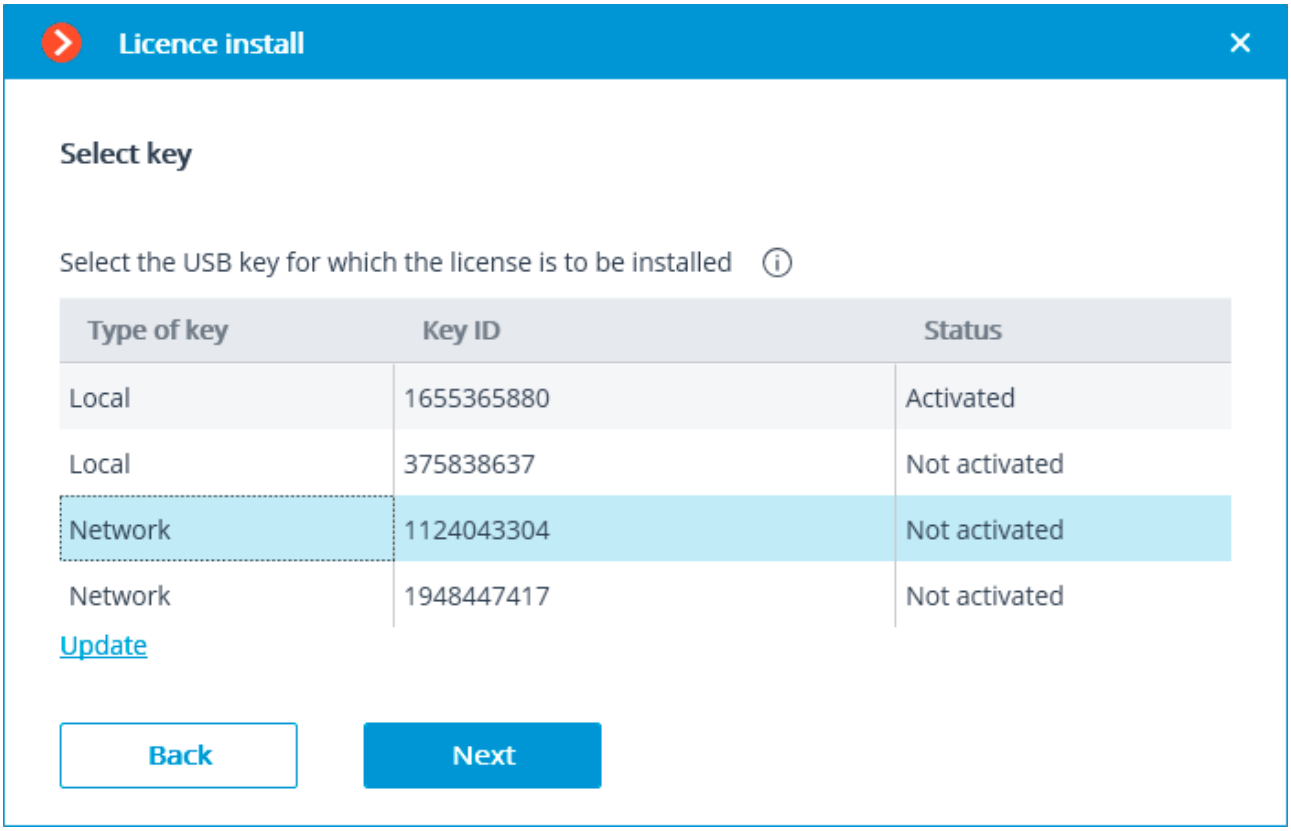
If no license is installed and activated on the server, you will be prompted to install the license. If accepted, the **License Installation** wizard will be launched.



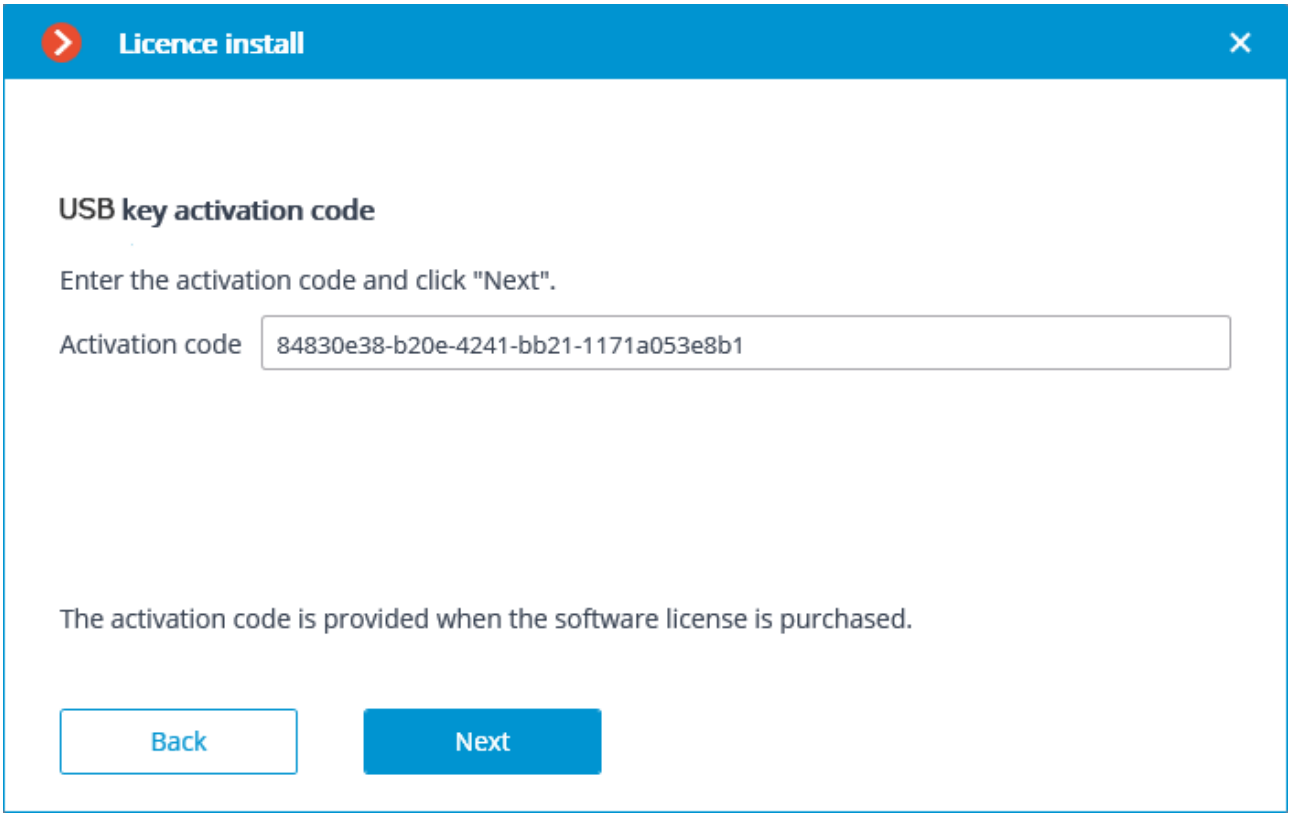
In order to install a USB key, it's required to choose the corresponding option on the **Select the installation type** page, tick the **Offline activation** checkbox and press **Next**.



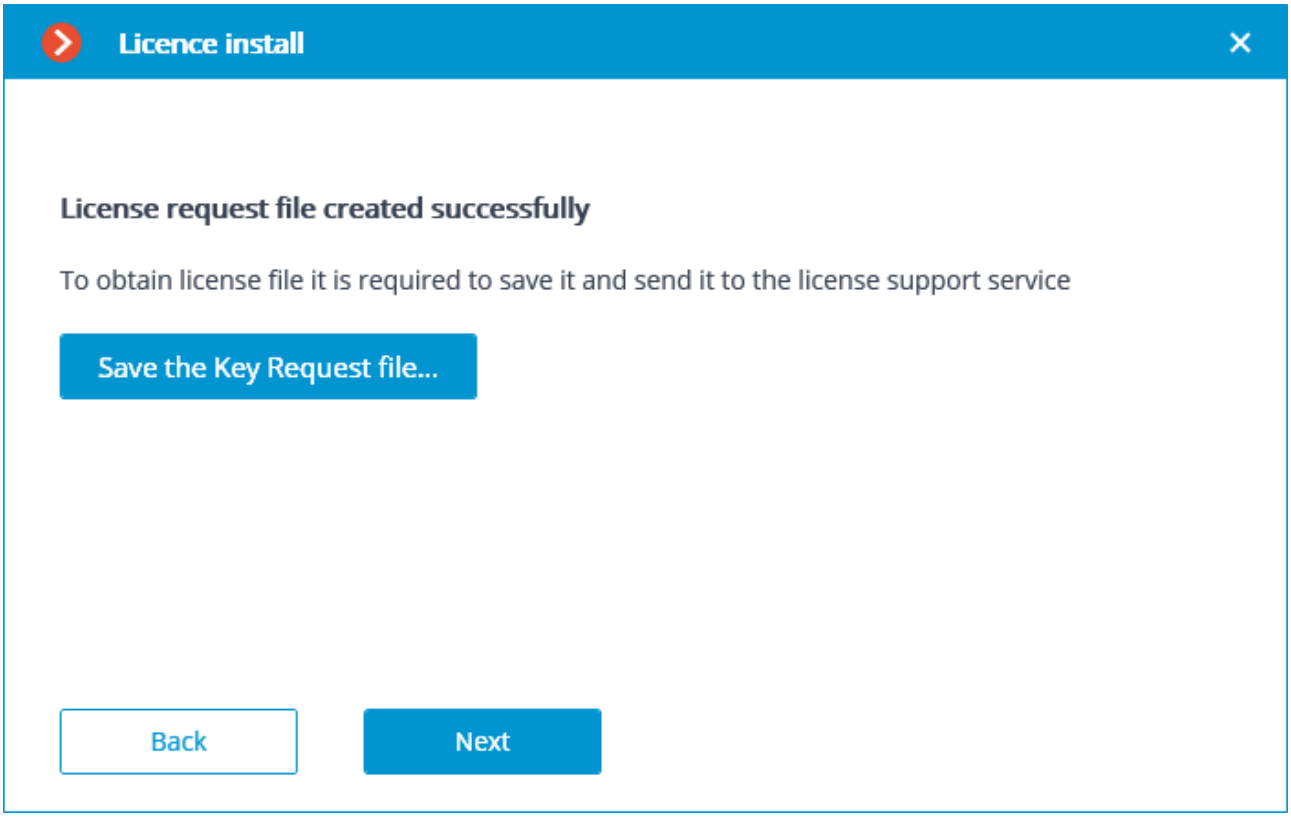
The **Select key** page will appear, showing the list of USB keys connected to the server and available network keys (network keys are available for some of the licenses only). To continue the installation process, the user has to choose the required key and press **Next**.



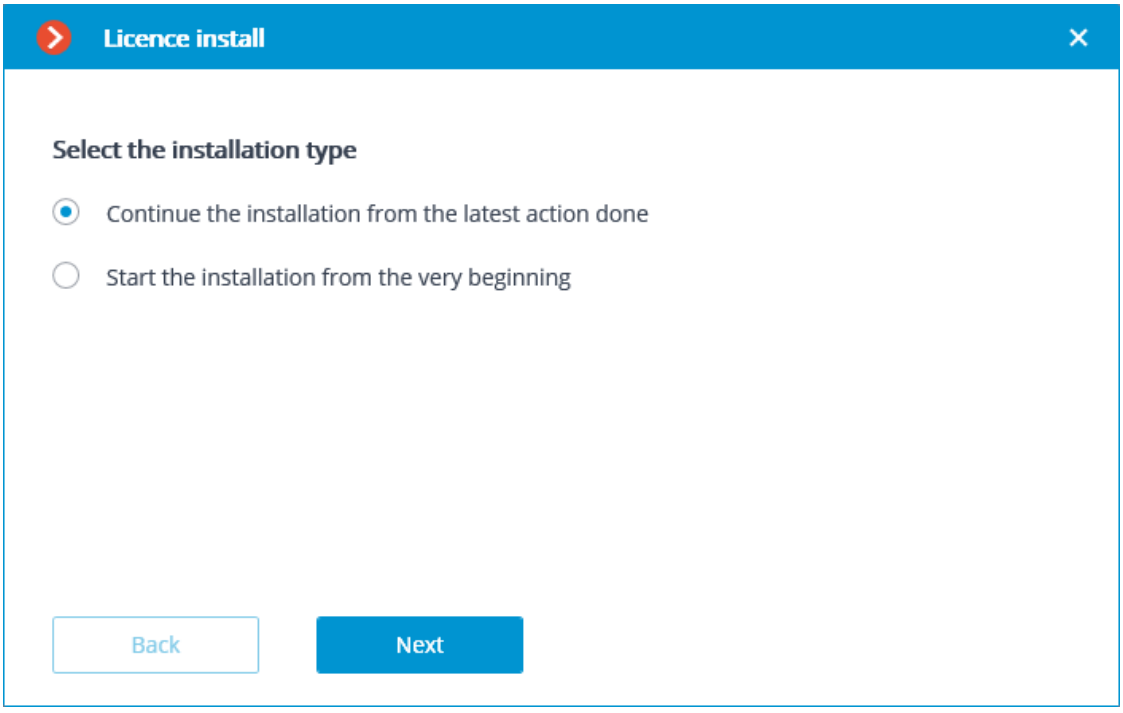
If the key is activated for the first time, the **USB key activation code** will be requested.



License request file created successfully window will be opened, where you should **Save the Key Request file...** and press **Next**.



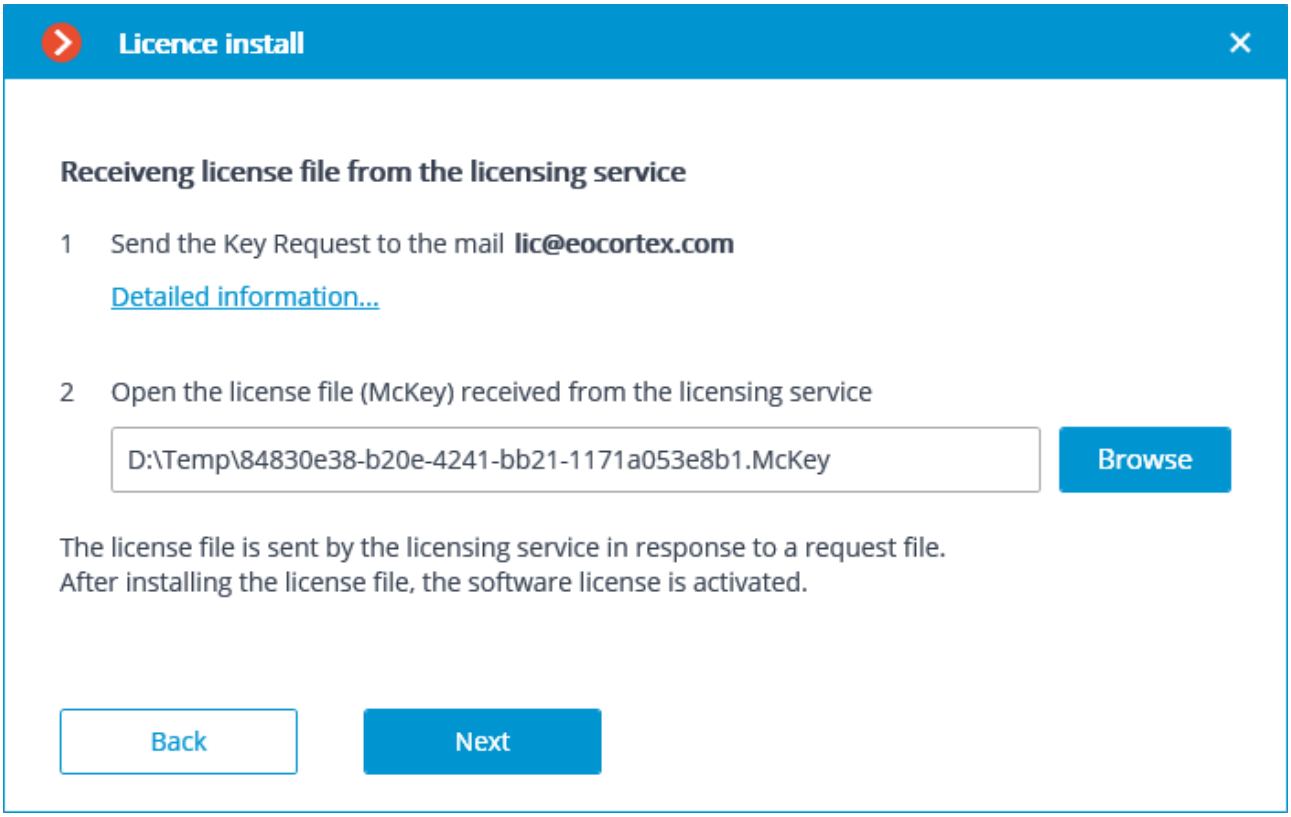
You may close the wizard after this step. At the next launch you will be prompted to continue the installation from the step at which it was interrupted.



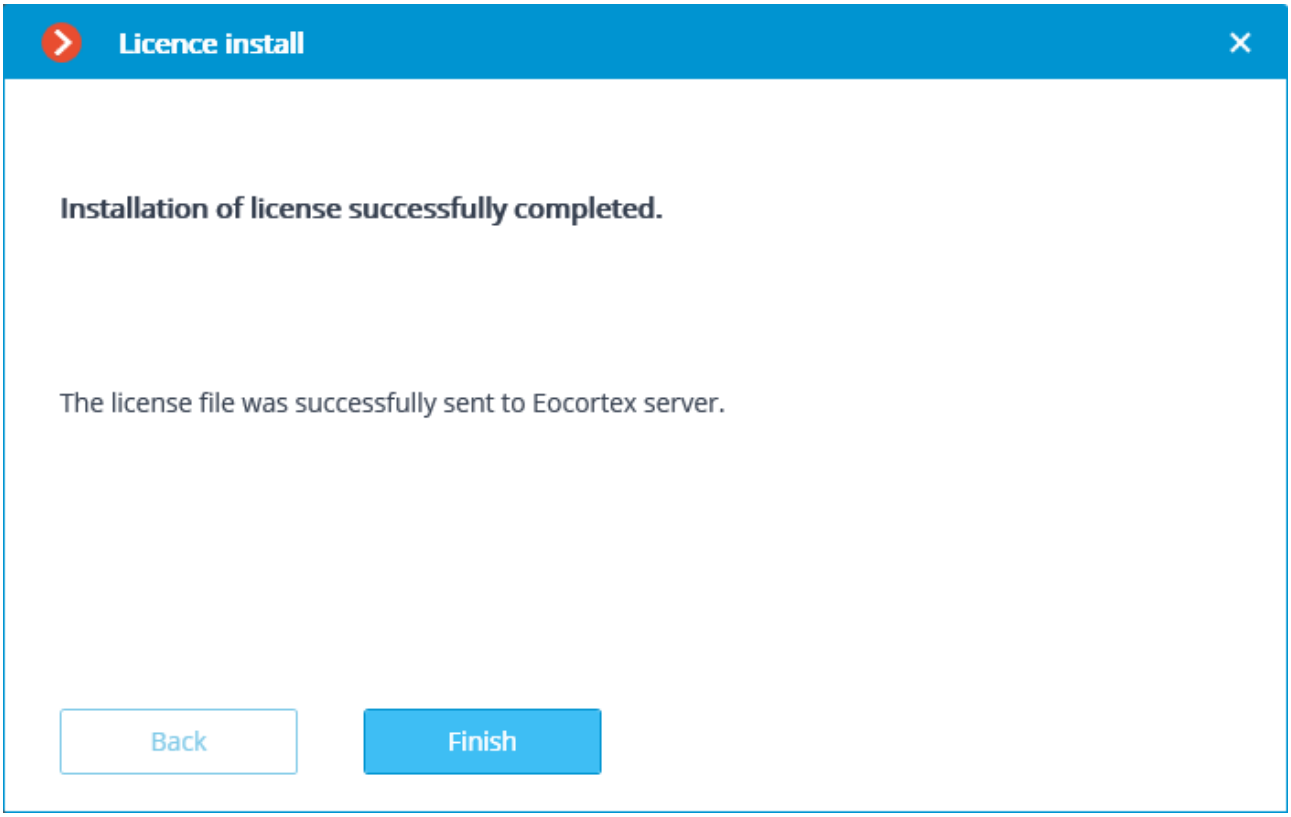
The created license request file (with ***.McKeyRequest** extension) has to be attached to an e-mail and sent to lic@eocortex.com. An e-mail with a ***.McKey** license file will be sent in response (keeping in mind that all answers are sent by the activation server in automatic mode, waiting after sending the license request file will take minimum time).

After receiving the license file, you must continue installation from the step at which the license file is installed (with the extension ***.McKey**). Select the license file the **Browse...** button, then press **Next**.

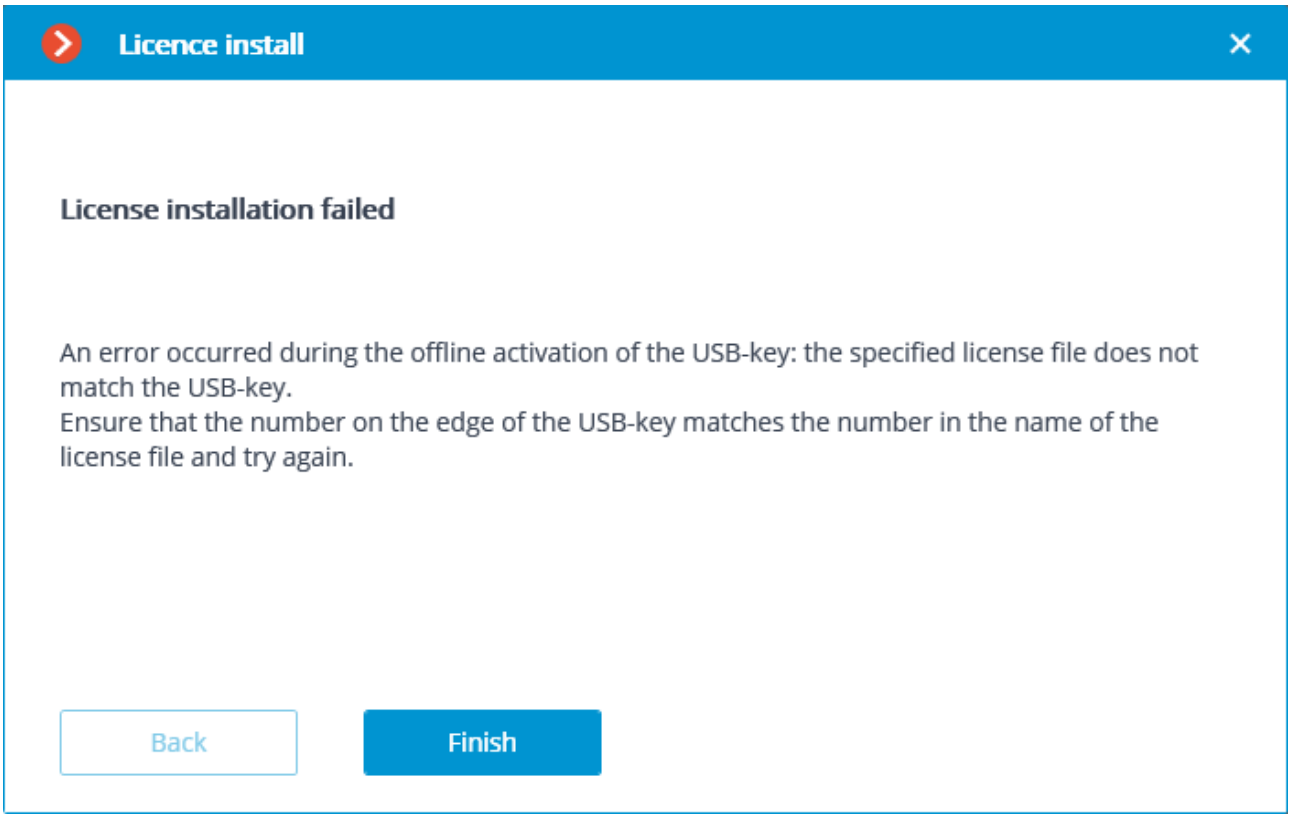
If the key has already been activated before, the license installation wizard will proceed to this step immediately after the key selection.



In case of successful activation the **Installation of license successfully completed** page will appear. Press **Finish** to exit the licensing wizard.



In case an error occurs during activation, the user will see the **Failed to install the license** page. It will be required to finish the license installation process (press **Finish**), resolve the problem and start the license installation process from the beginning.



The most probable cause of the offline activation error is the inconsistency between the license file and the USB key.

Software key online activation

In order to install and activate a software key, the user has to obtain an activation code, which looks like **XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX**, where **X** can be hex digit (i.e., 0123456789abcdef). Here's an example of the activation code: **a46a6d3e-17f6-416c-9da2-10cb4b80574e**.

The license software key can't be transferred to any other computer, because it's linked to the computer during the activation process.

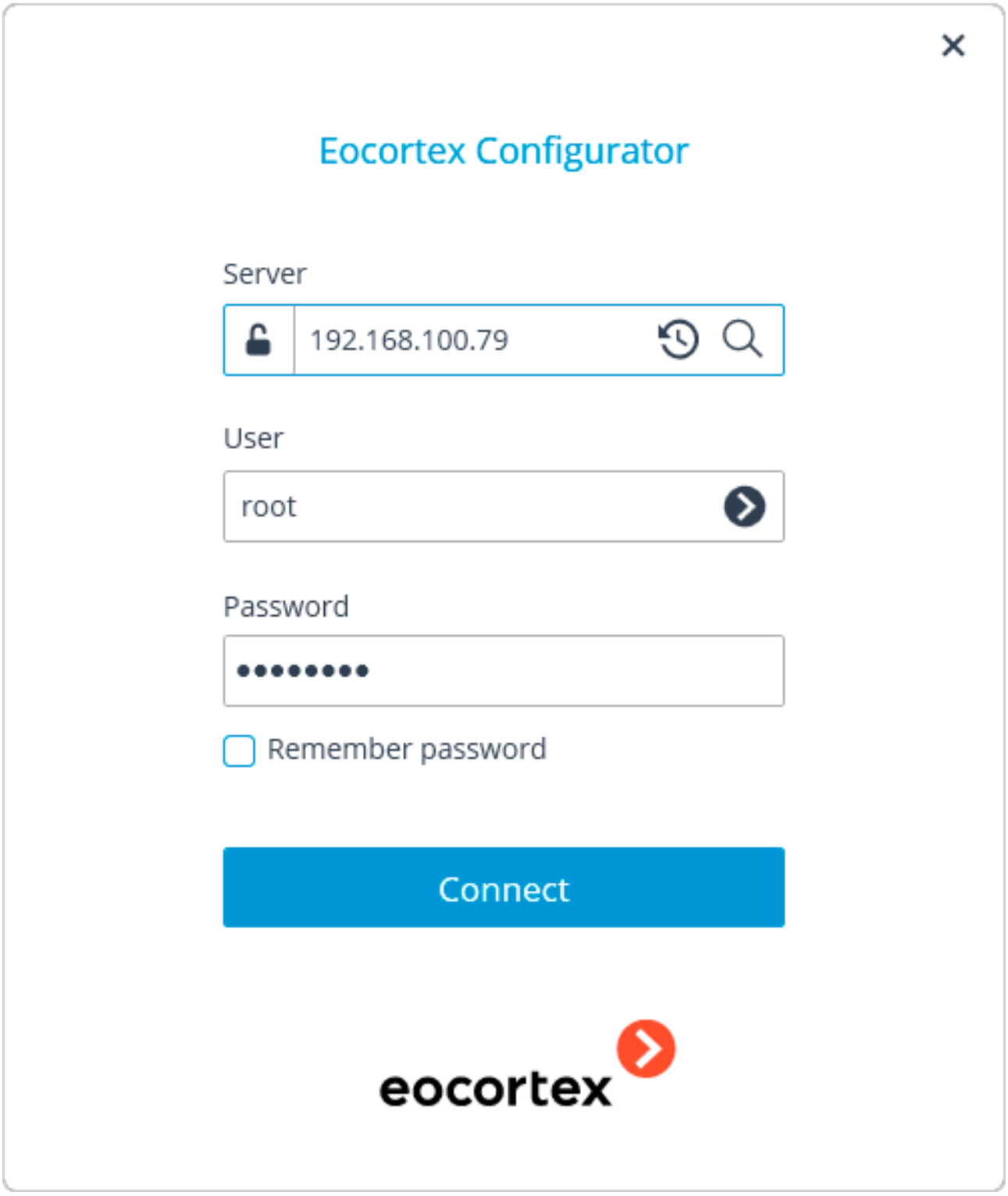
It is prohibited to install more than one **Eocortex** software key on the server!

If you have installed another **Eocortex** software key on the server previously, you should delete its certificate and restart Windows before installation.

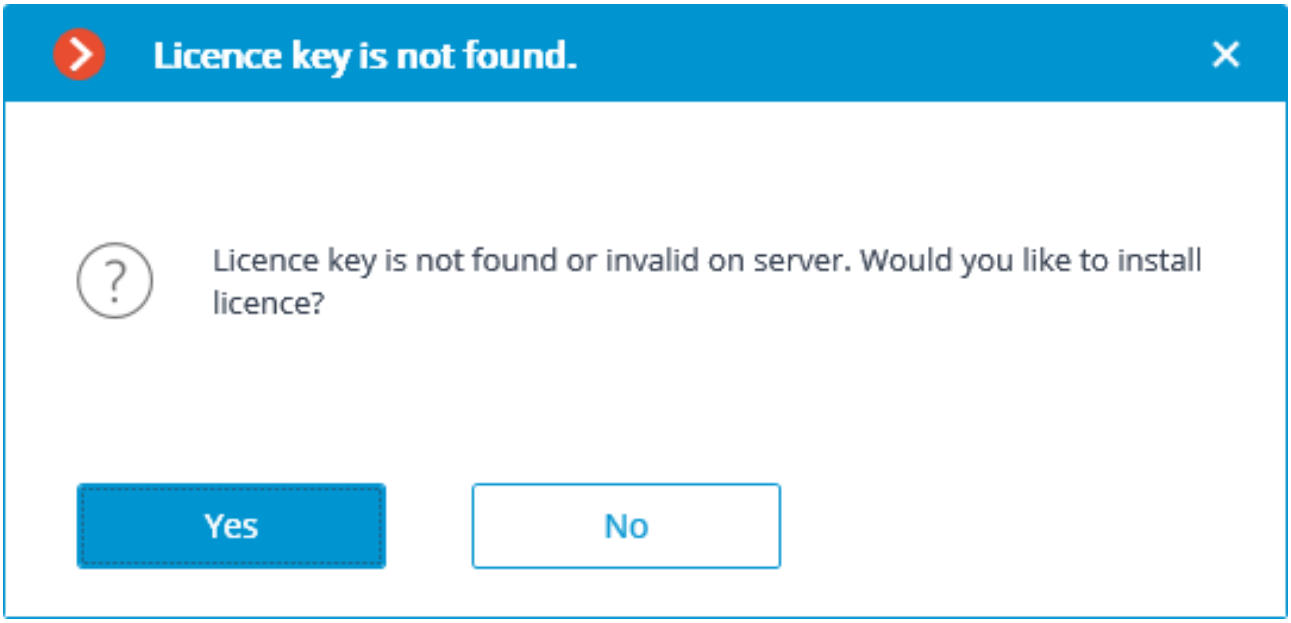
In order to install and activate a software key, the **Eocortex Configurator** has to be launched on the server, where the **Eocortex Server** (or **Eocortex Standalone**) application is installed.

For online activation of the key installed on the server, it is necessary that this server has access to the Internet. If such connection is not available, please see the Software key offline activation.

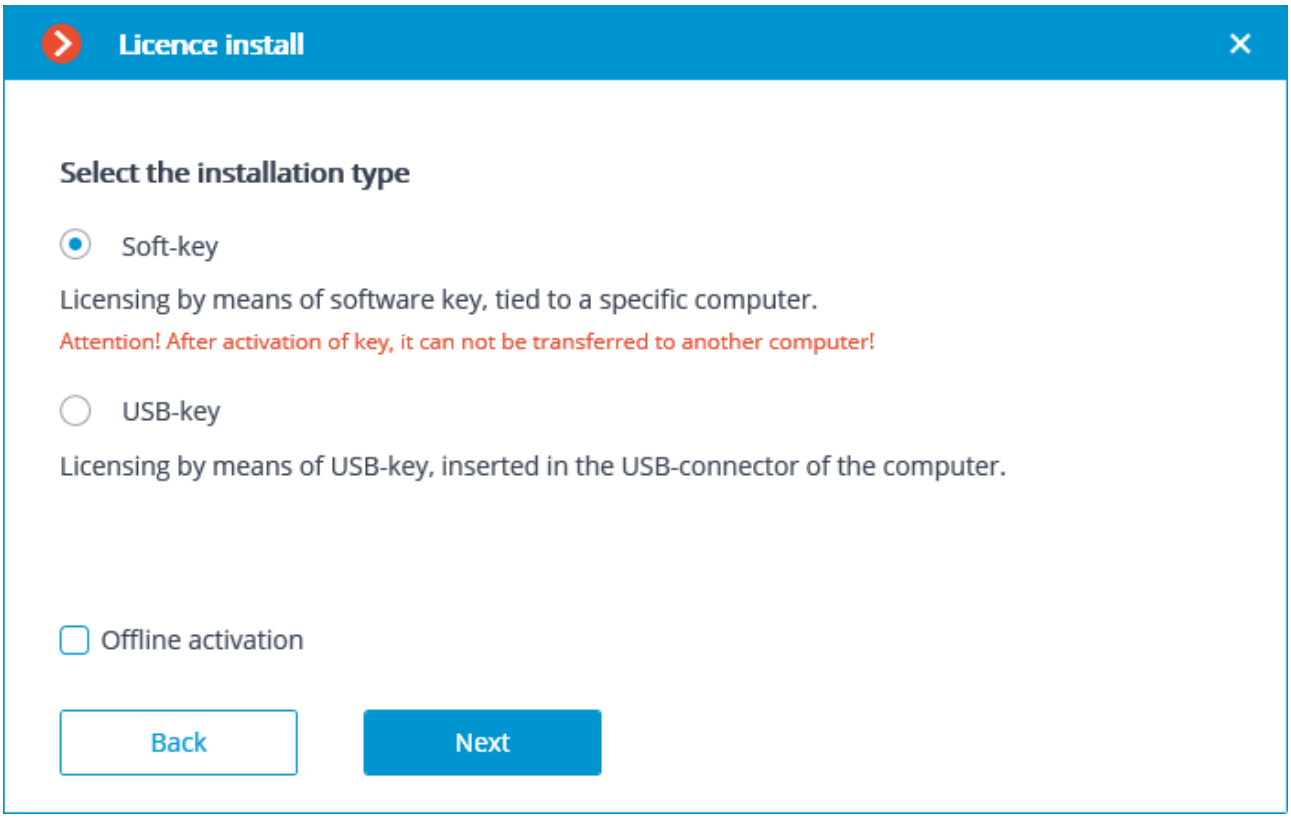
To install, activate, or update a license, you must run the **Eocortex Configurator**. In the opened authorization window, select the server, specify the account type, enter the user name and password with configuration rights, then click **Connect**.



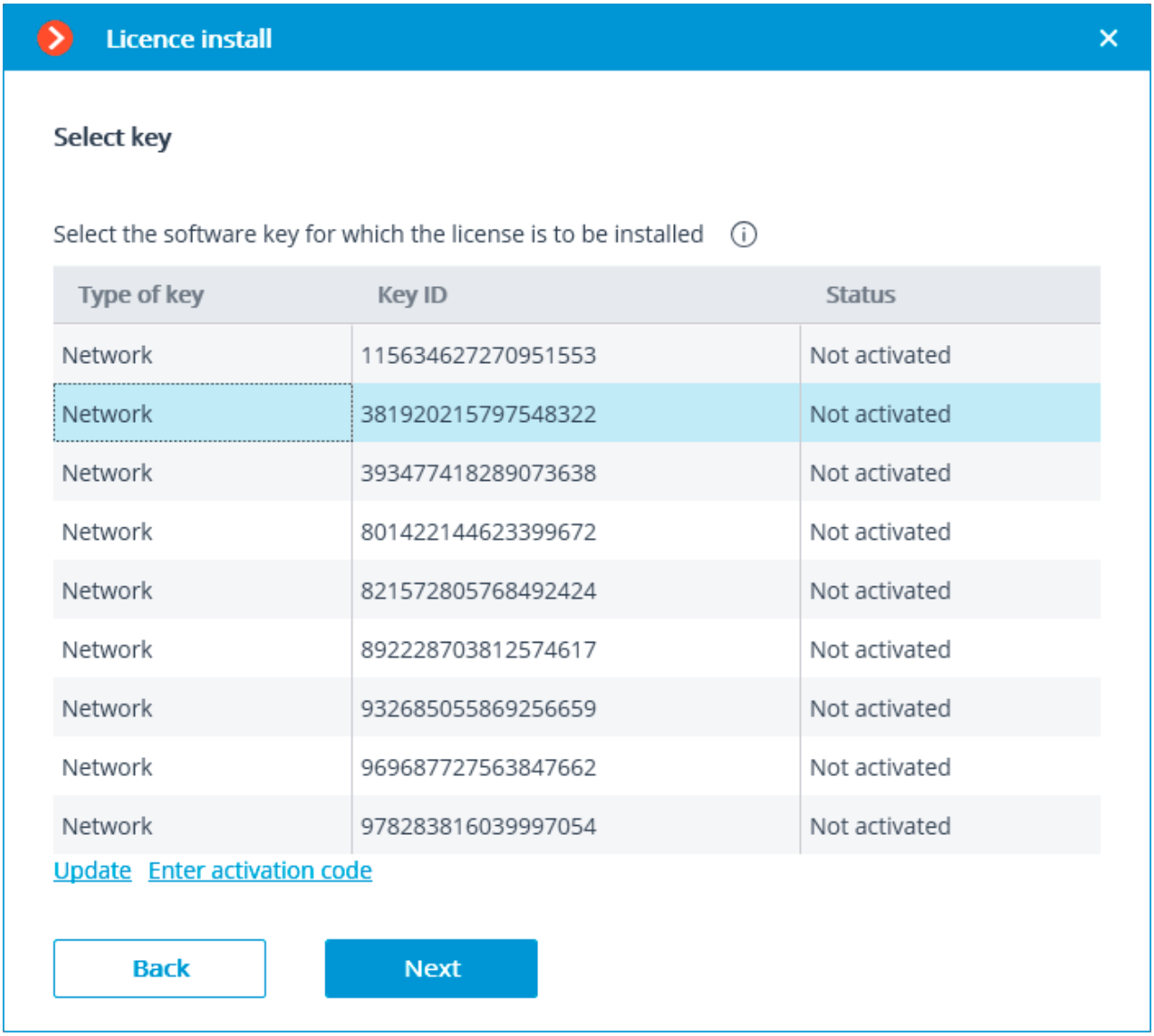
If no license is installed and activated on the server, you will be prompted to install the license. If accepted, the **License Installation** wizard will be launched.



In order to install the license software key, the user has to select the corresponding menu item on the **Select the installation type** page and press **Next**.

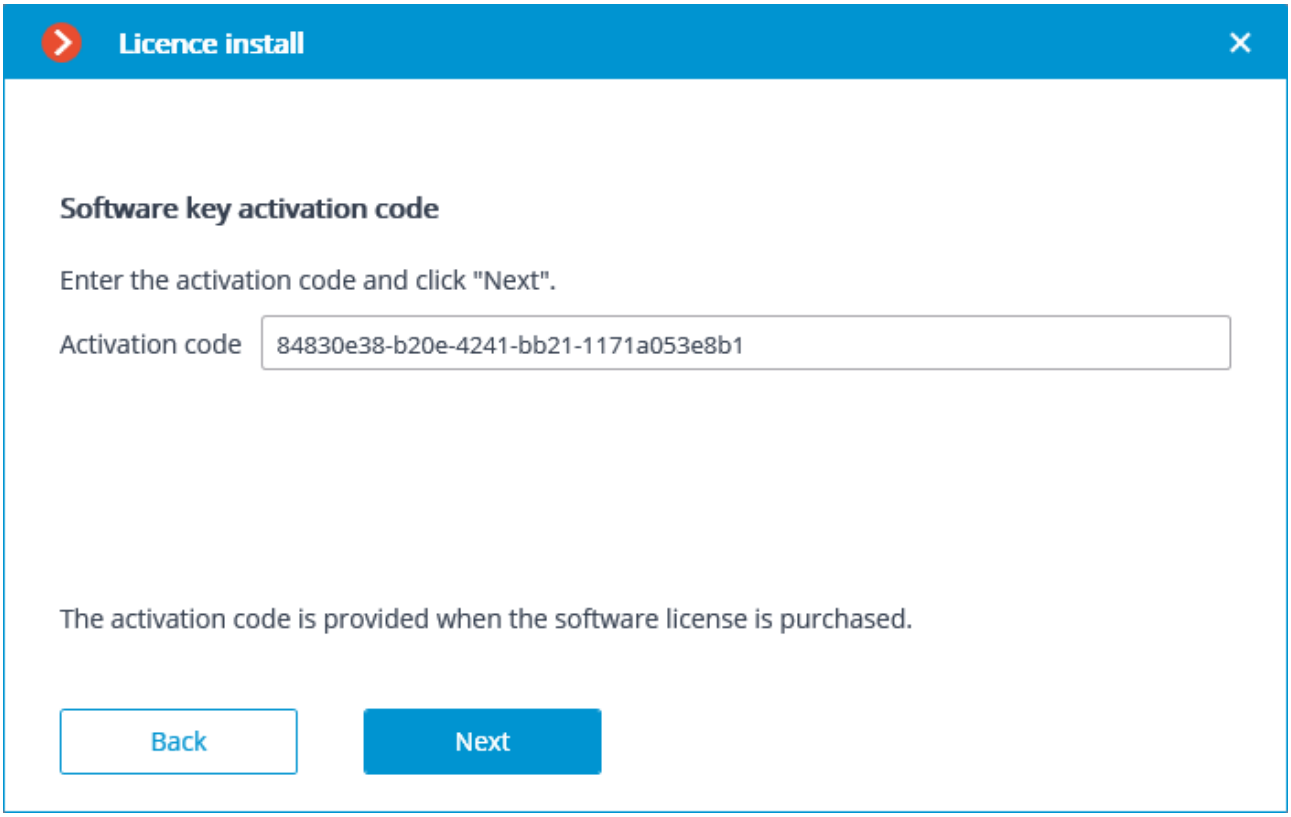


The **Select key** page will appear, showing the list of available software and network keys (network keys are available for some of the licenses only). To continue the installation process, the user has to choose the required key and press **Next**.

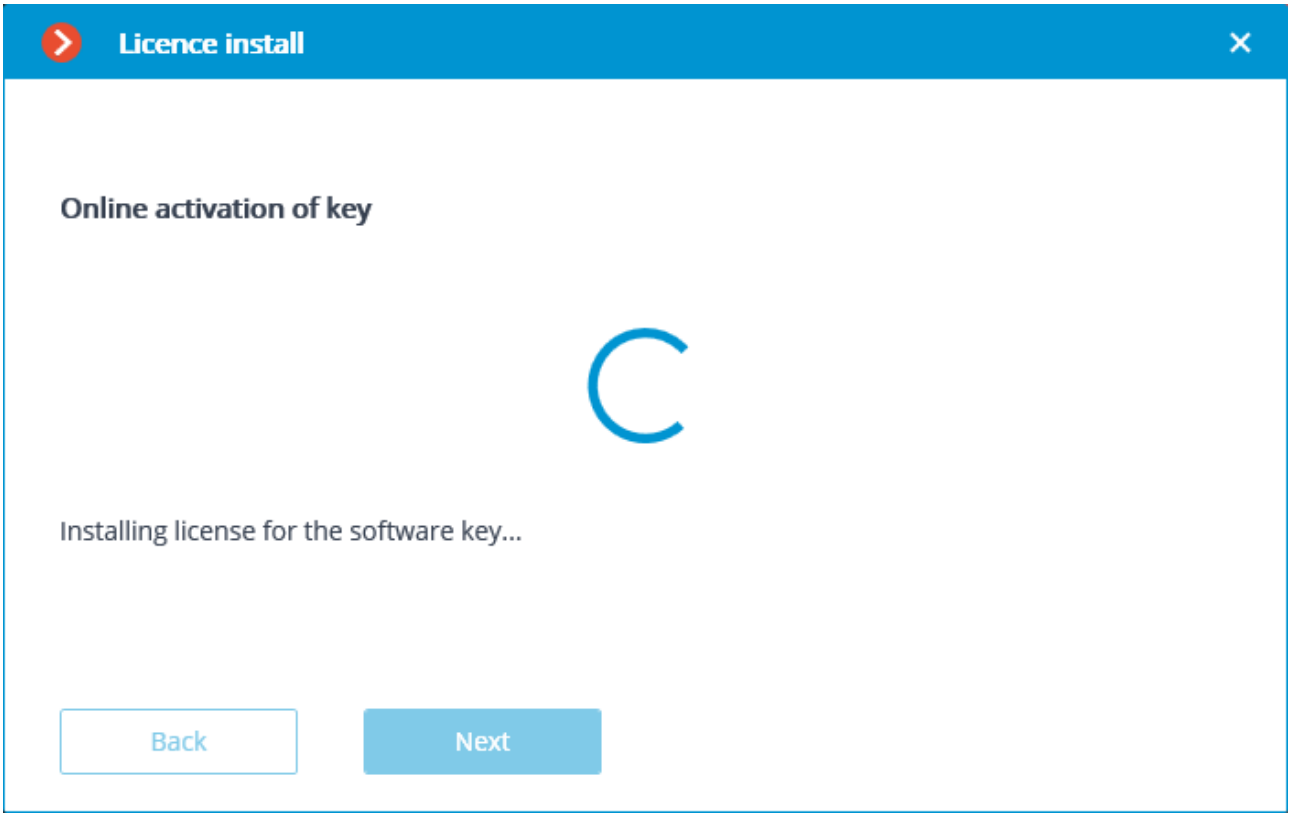


⚠ After pressing **Next**, the software key is being linked to the computer, thus it's going to be impossible to transfer it to any other machine. If the activation process was launched mistakenly, the user has to press **Back** and close the **License installation** window.

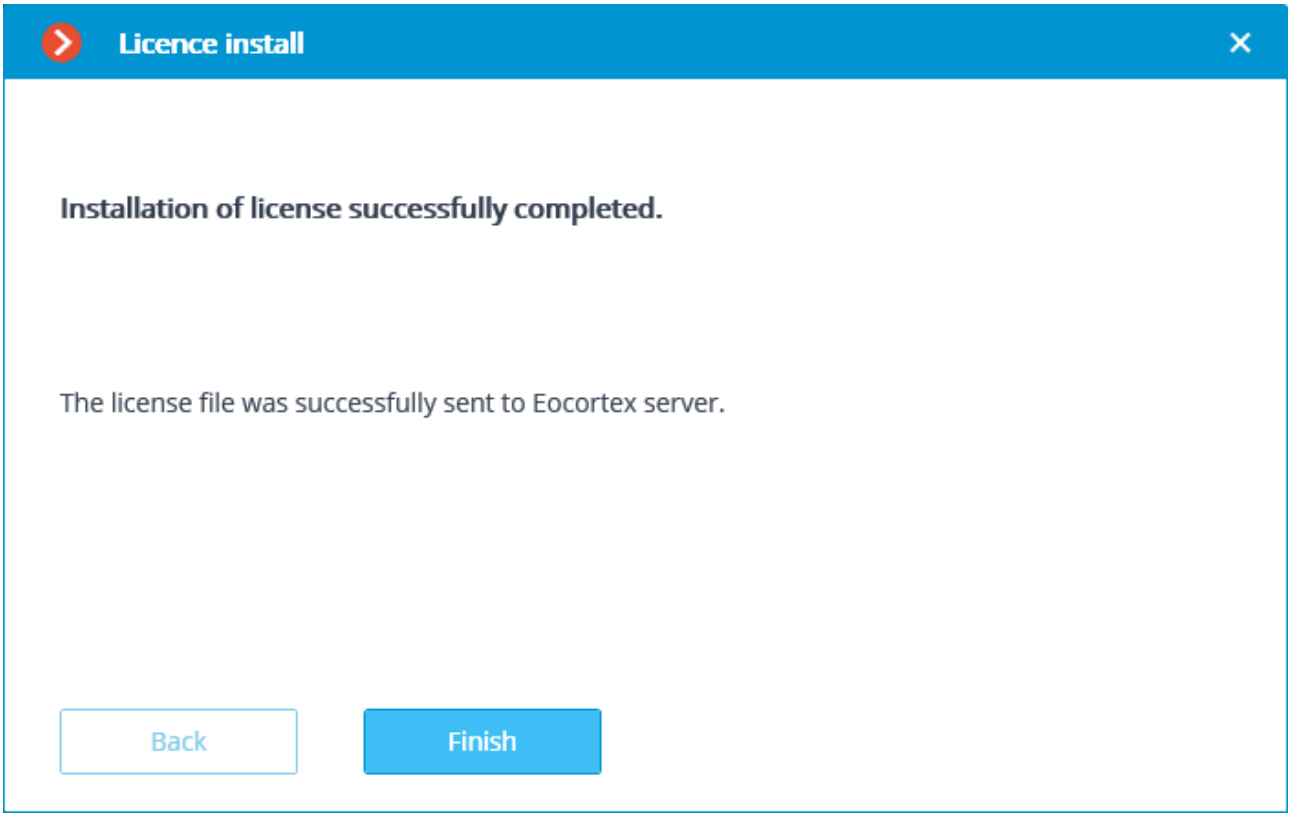
Next, the key activation code will be requested.



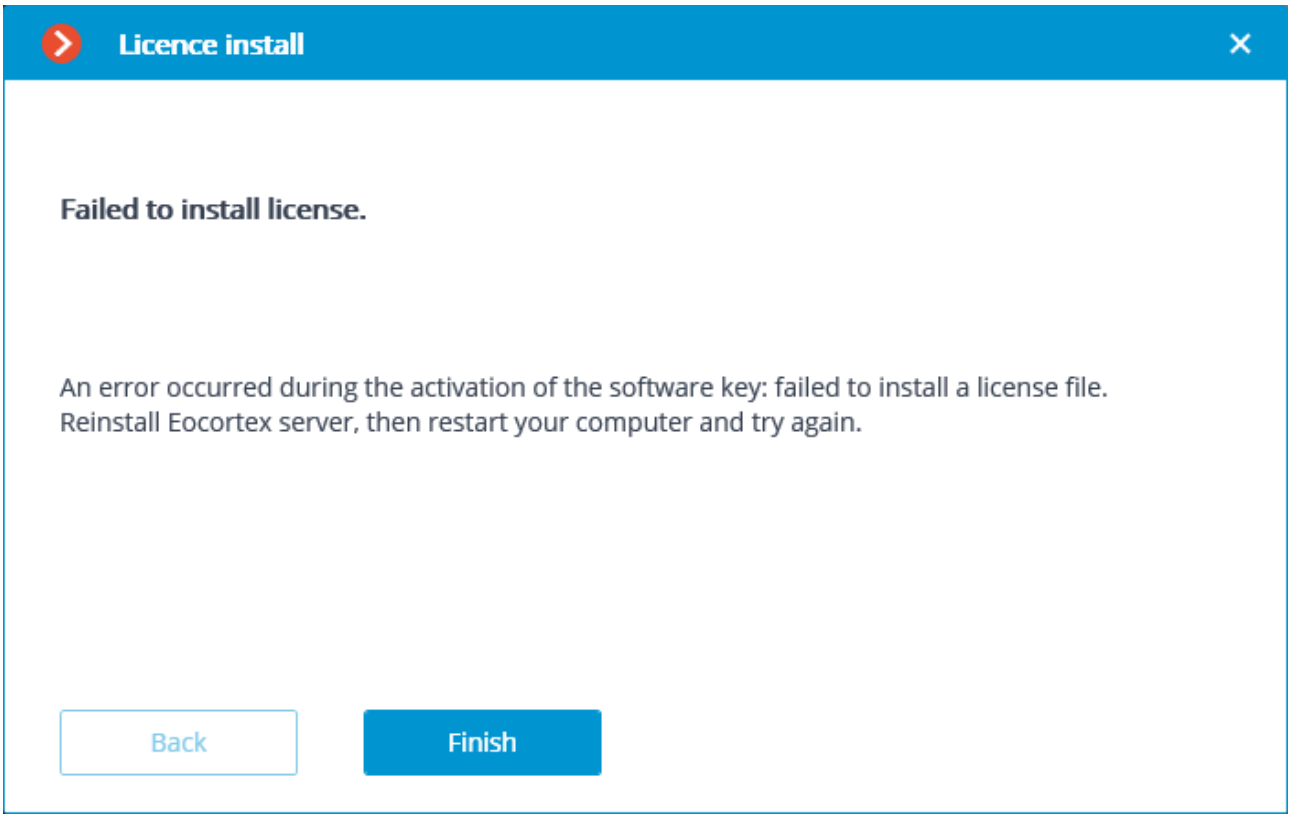
The next step is key activation. In case of an existing internet connection, after entering the code and pressing **Next**, the **Eocortex** server will connect to a remote license activation server and will try to perform automatic key activation in accordance with the licenses assigned to such key. The online activation of key page will be shown during the activation process.



In case of successful activation, the **Installation of license successfully completed** window will appear. In order to exit the licensing wizard, the user has to press **Finish**.



In case if an error occurs during activation, the user will see the **Failed to install license** page. It's required to finish the license installation process (press **Finish**), resolve the problem and start the license installation process from the very beginning.



Possible online activation errors:

- connection with the license activation server was interrupted during the activation process; e.g. due to a connection problem, low speed of connection or due to a problem with one of route elements
- the selected key has no assigned licenses. In such situation the user has to contact the license supplier (seller)

Software key offline activation

In order to install and activate a software key, the user has to obtain an activation code, which looks like **XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX**, where **X** can be hex digit (i.e., 0123456789abcdef). Here's an example of the activation code: **a46a6d3e-17f6-416c-9da2-10cb4b80574e**.

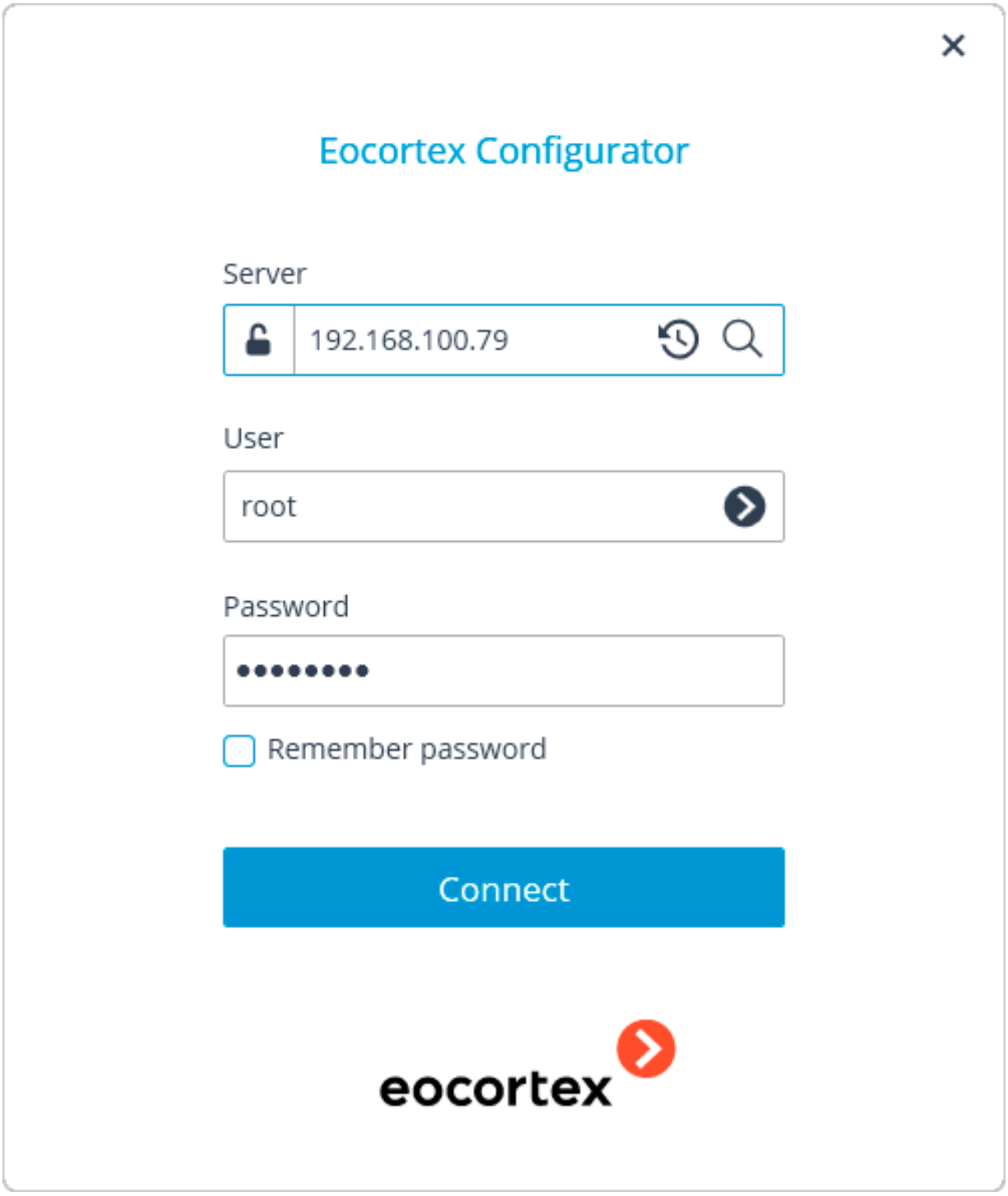
The license software key can't be transferred to any other computer, because it's linked to the computer during the activation process.

It is prohibited to install more than one **Eocortex** software key on the server!

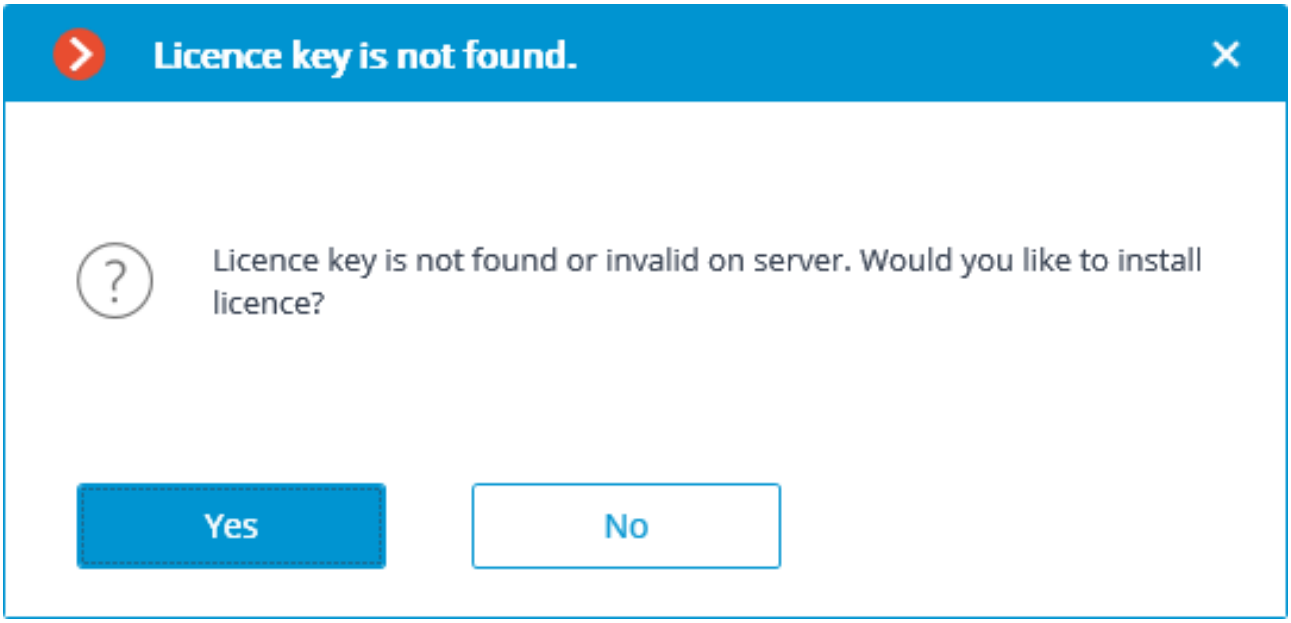
If you have installed another **Eocortex** software key on the server previously, you should delete its certificate and restart Windows before installation.

In order to install and activate a software key, the **Eocortex Configurator** has to be launched on the server, where the **Eocortex Server** (or **Eocortex Standalone**) application is installed.

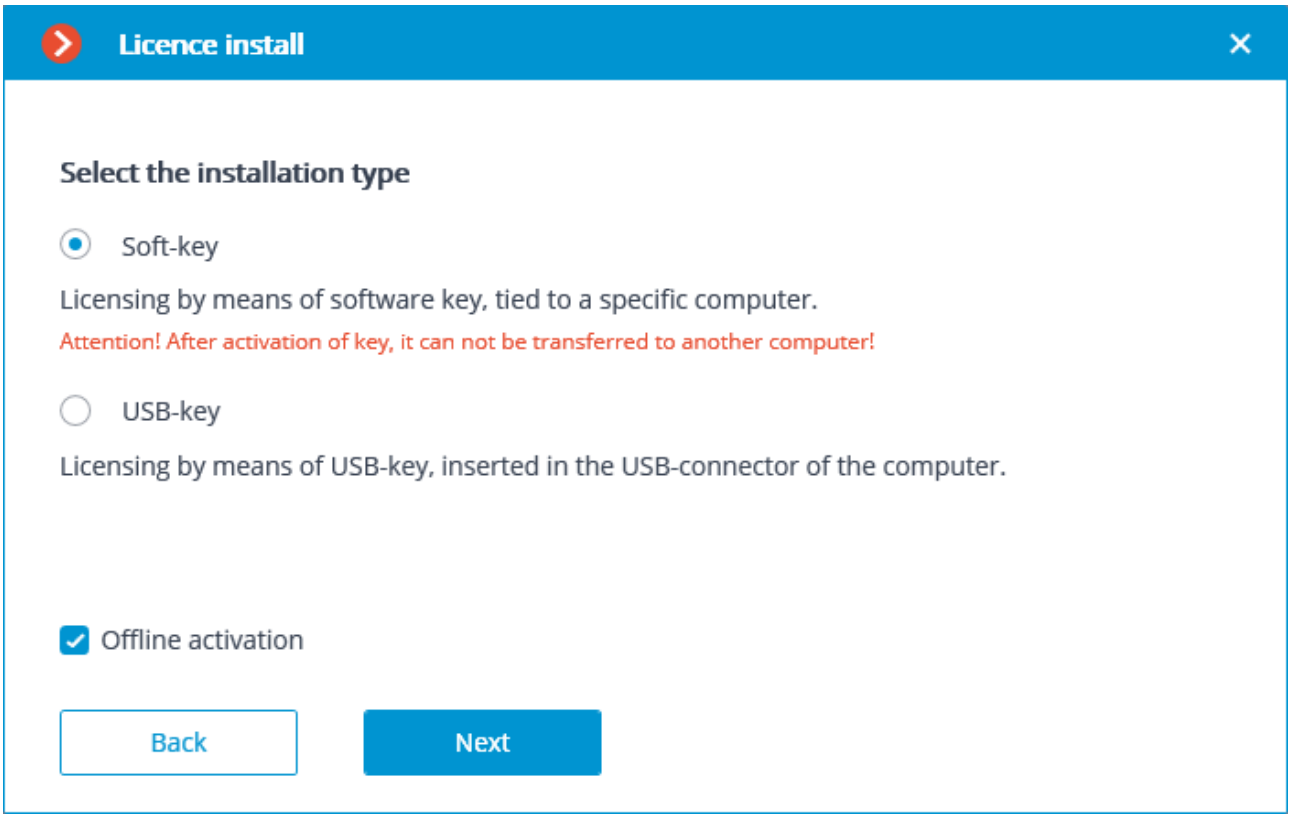
To install, activate, or update a license, you must run the **Eocortex Configurator**. In the opened authorization window, select the server, specify the account type, enter the user name and password with configuration rights, then click **Connect**.



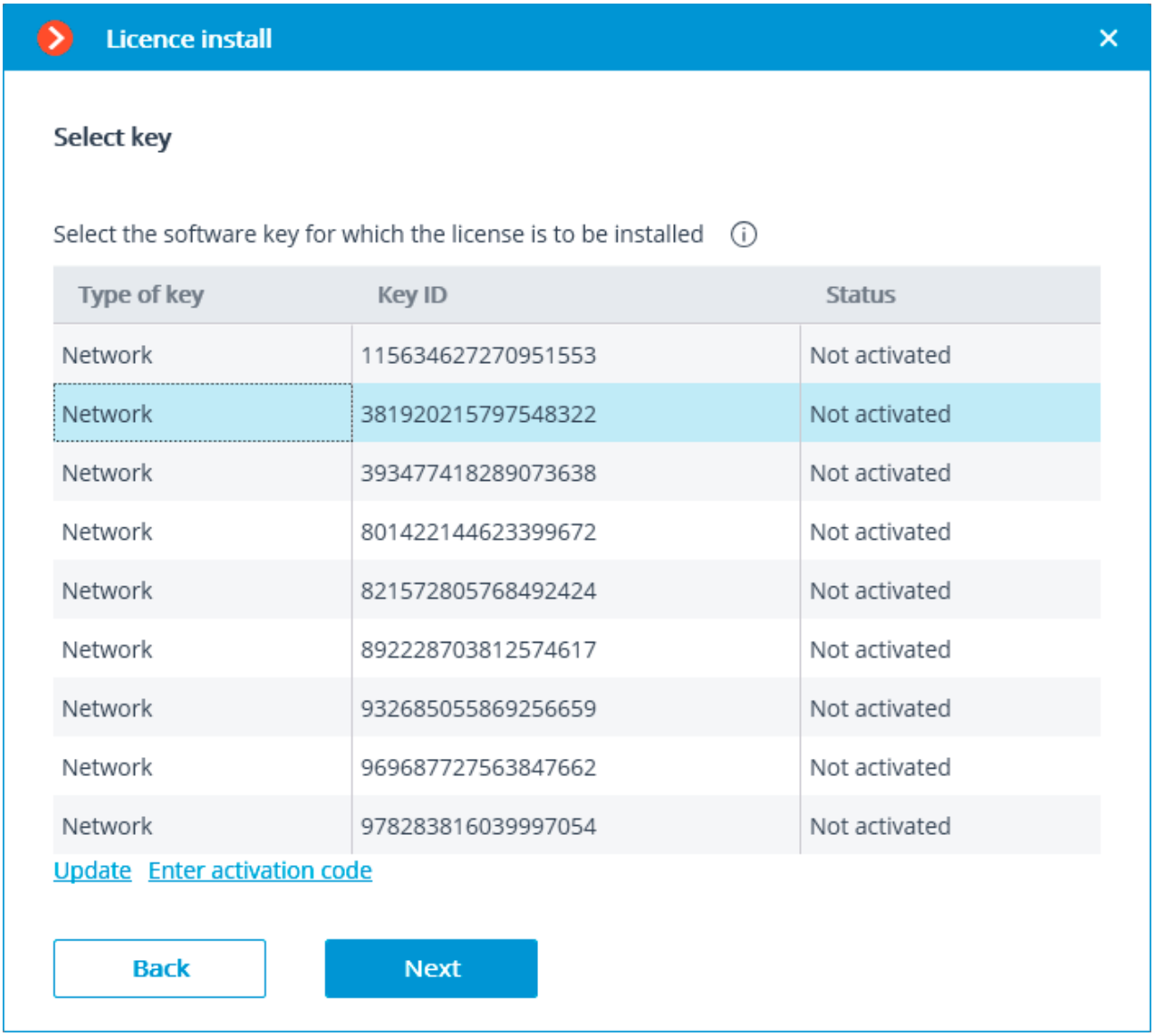
If no license is installed and activated on the server, you will be prompted to install the license. If accepted, the **License Installation** wizard will be launched.



In order to software key offline activation, it's required to choose the corresponding variant on the **Select the installation type** page, turn on the **Offline activation** checkbox and press **Next**.

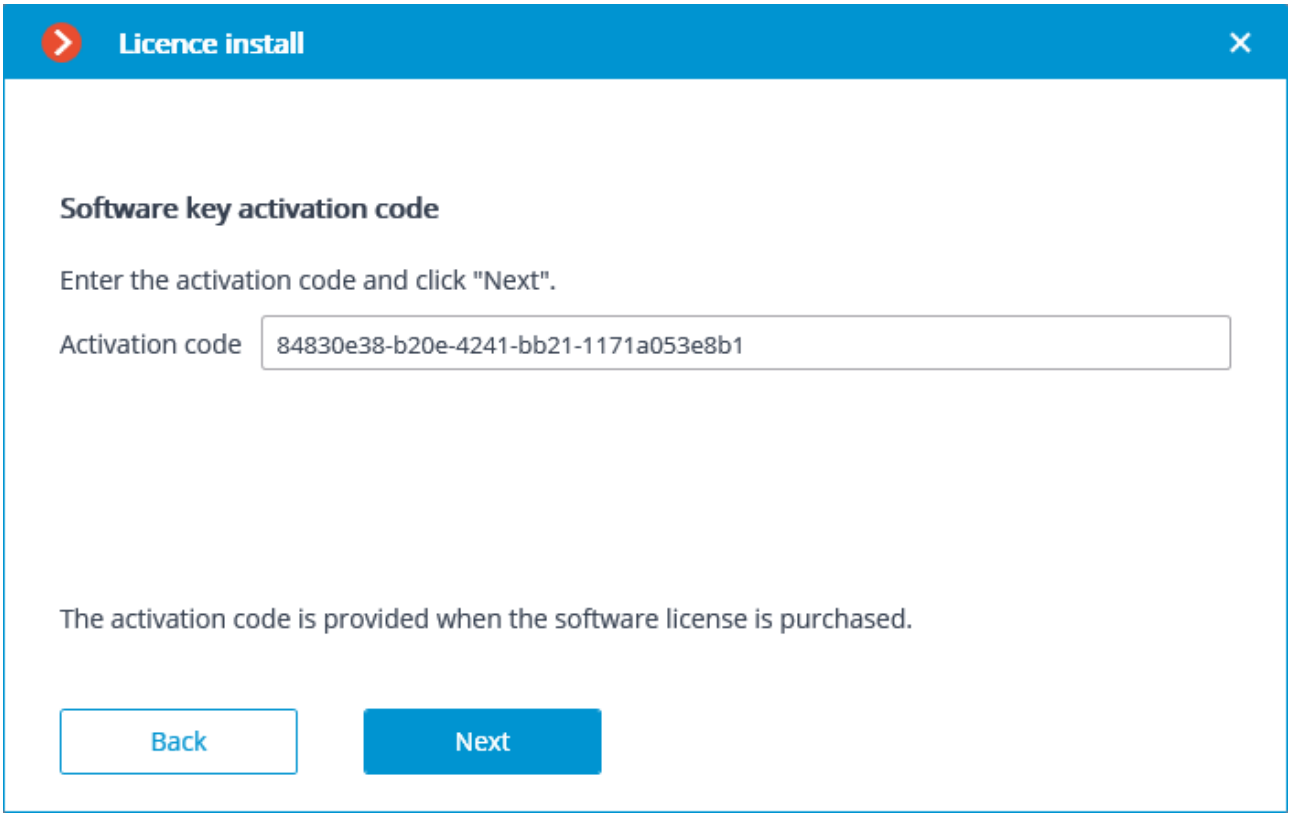


The **Select key** page will appear, showing the list of available software and network keys (network keys are available for some of the licenses only). To continue the installation process, the user has to choose the required key and press **Next**.

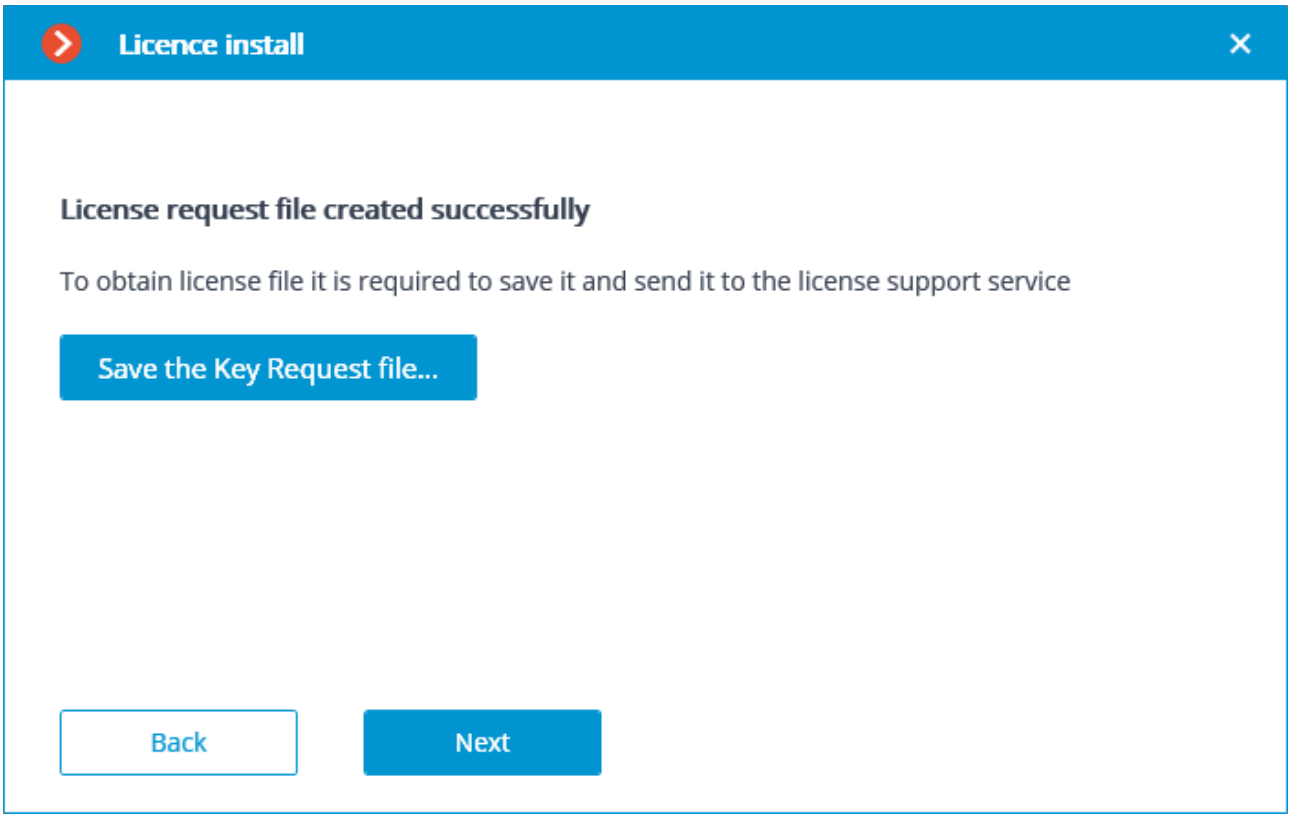


⚠ After pressing **Next**, the software key is being linked to the computer, thus it's going to be impossible to transfer it to any other machine. If the activation process was launched mistakenly, the user has to press **Back** and close the **License installation** window.

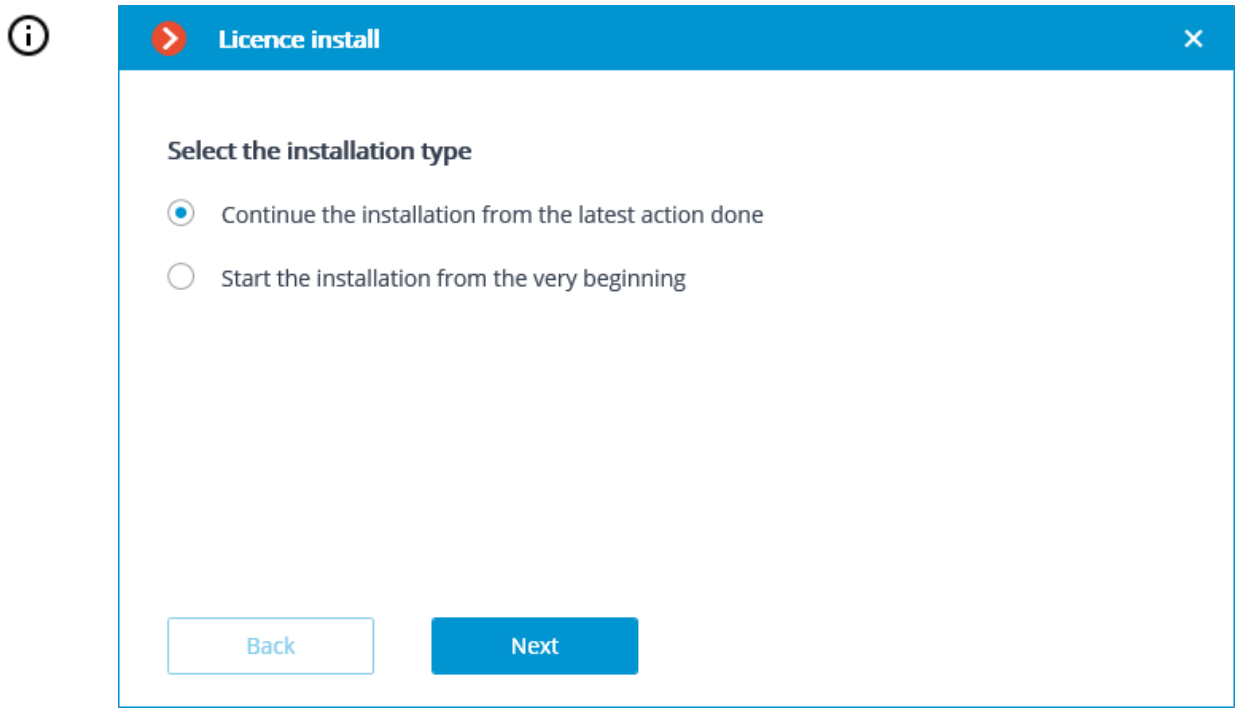
Next, the key activation code will be requested.



License request file created succesfully window will be opened, where you should **Save the Key Request file...** and press **Next**.

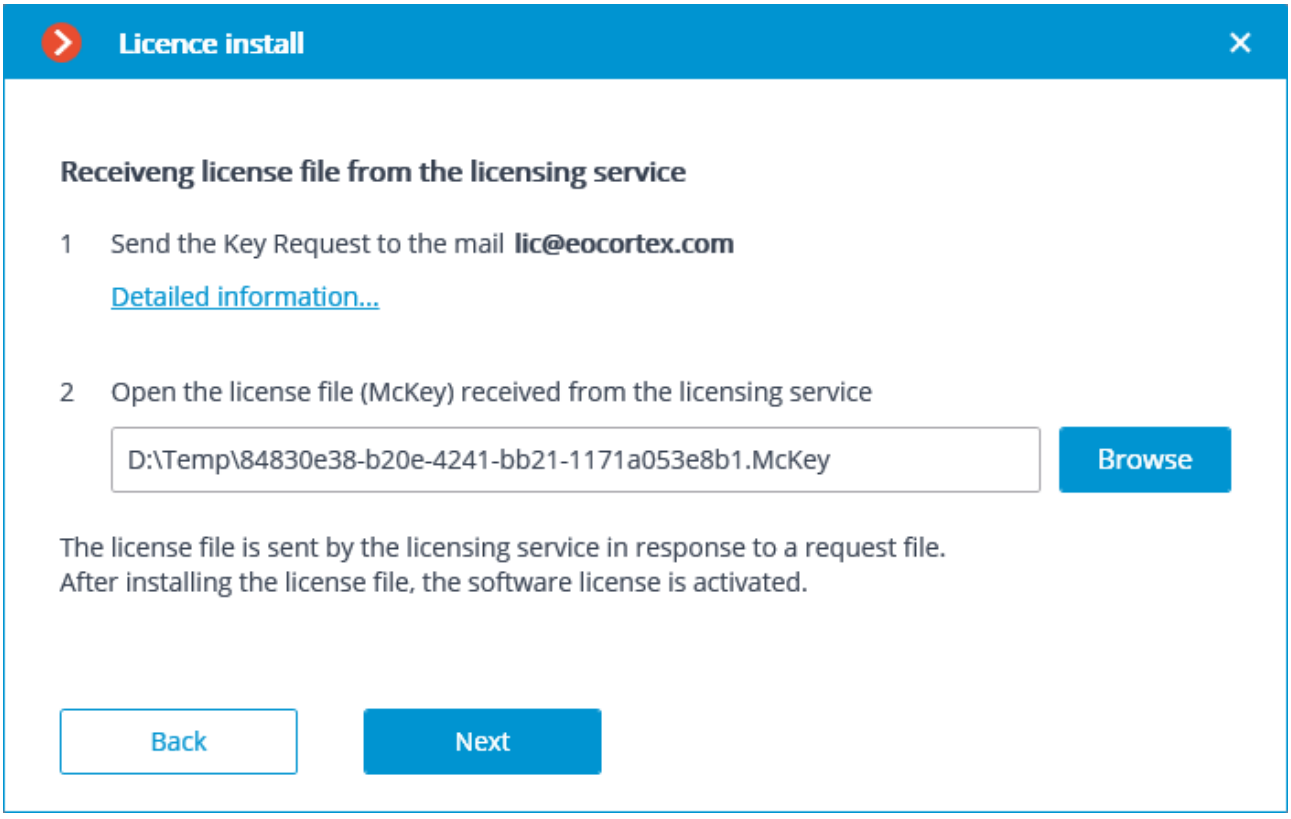


After this step, you can close the wizard. In the course of next running you shall be prompted to continue the installation from the step at which it was interrupted.

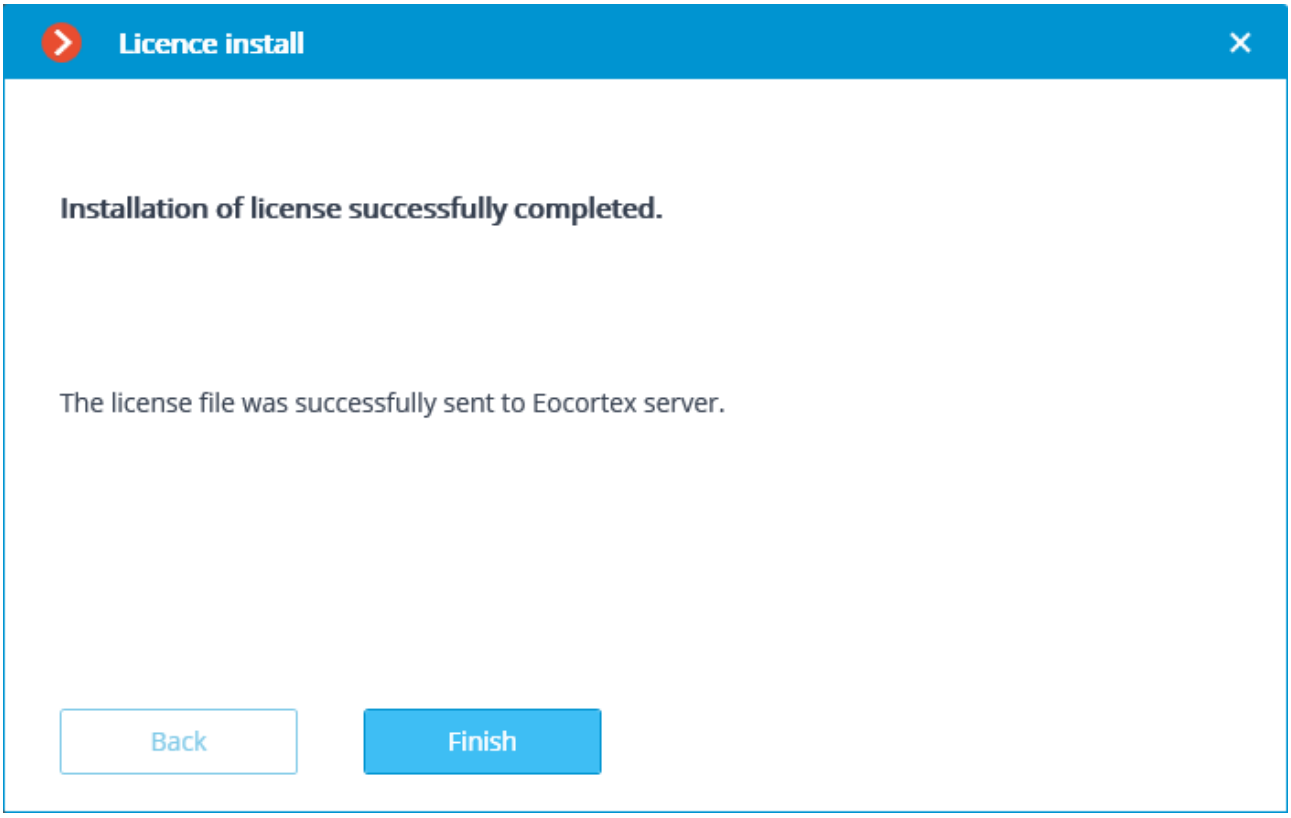


The created license request file (with ***.McKeyRequest** extension) has to be attached to an e-mail and sent to lic@eocortex.com. An e-mail with a ***.McKey** license file will be sent in response (keeping in mind that all answers are sent by the activation server in automatic mode, waiting after sending the license request file will take minimum time).

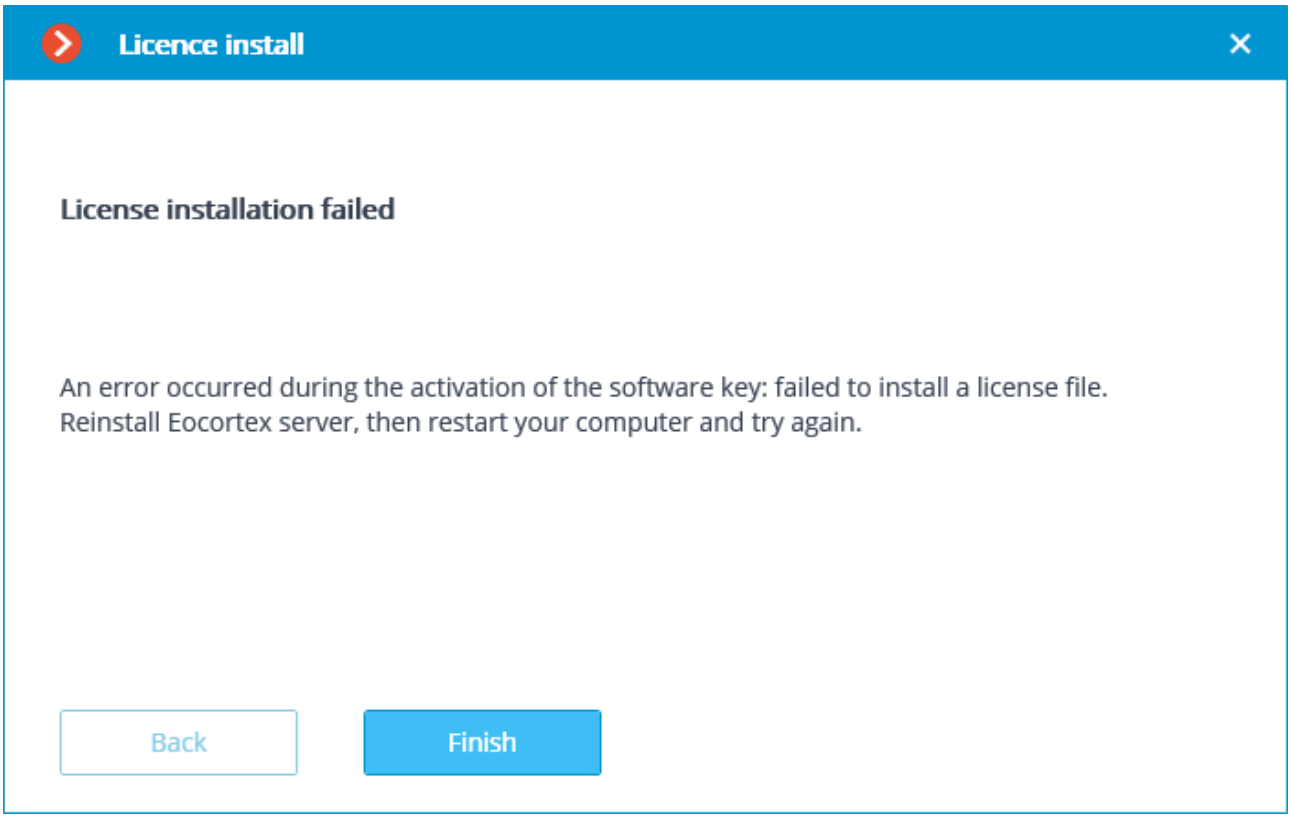
After receiving the license file, you should continue installation from the step, at which the license file is installed (with the extension ***.McKey**). License file is selected using **Browse...** button, and then you should press **Next**.



In case of successful activation, a new installation of **License successfully completed** window will appear. In order to exit the licensing wizard, the user has to press **Finish**.



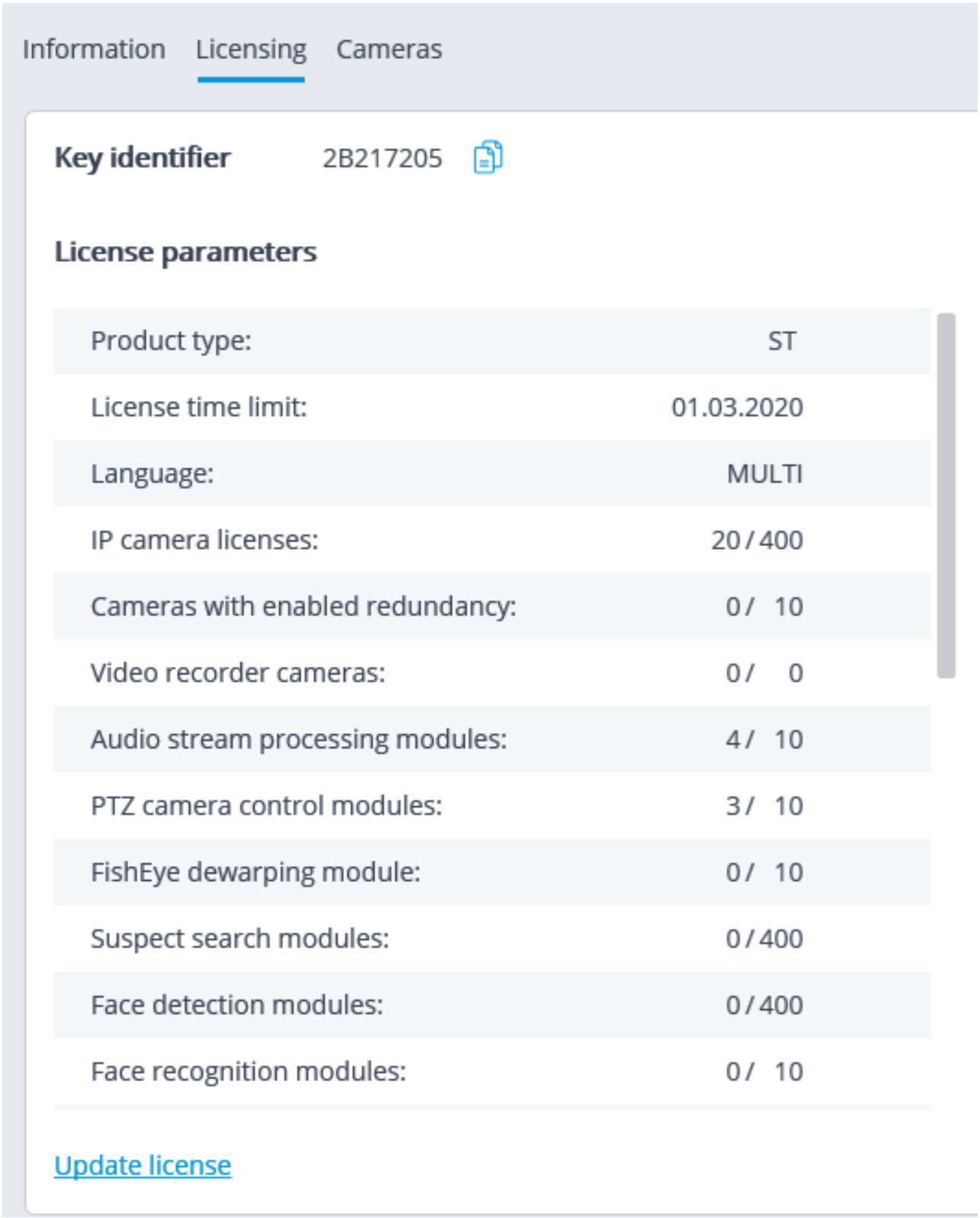
In case if an error occurs during activation, the user will see the **Failed to install the license** page. It's required to finish the license installation process (press Finish), resolve the problem and start the license installation process from the very beginning.



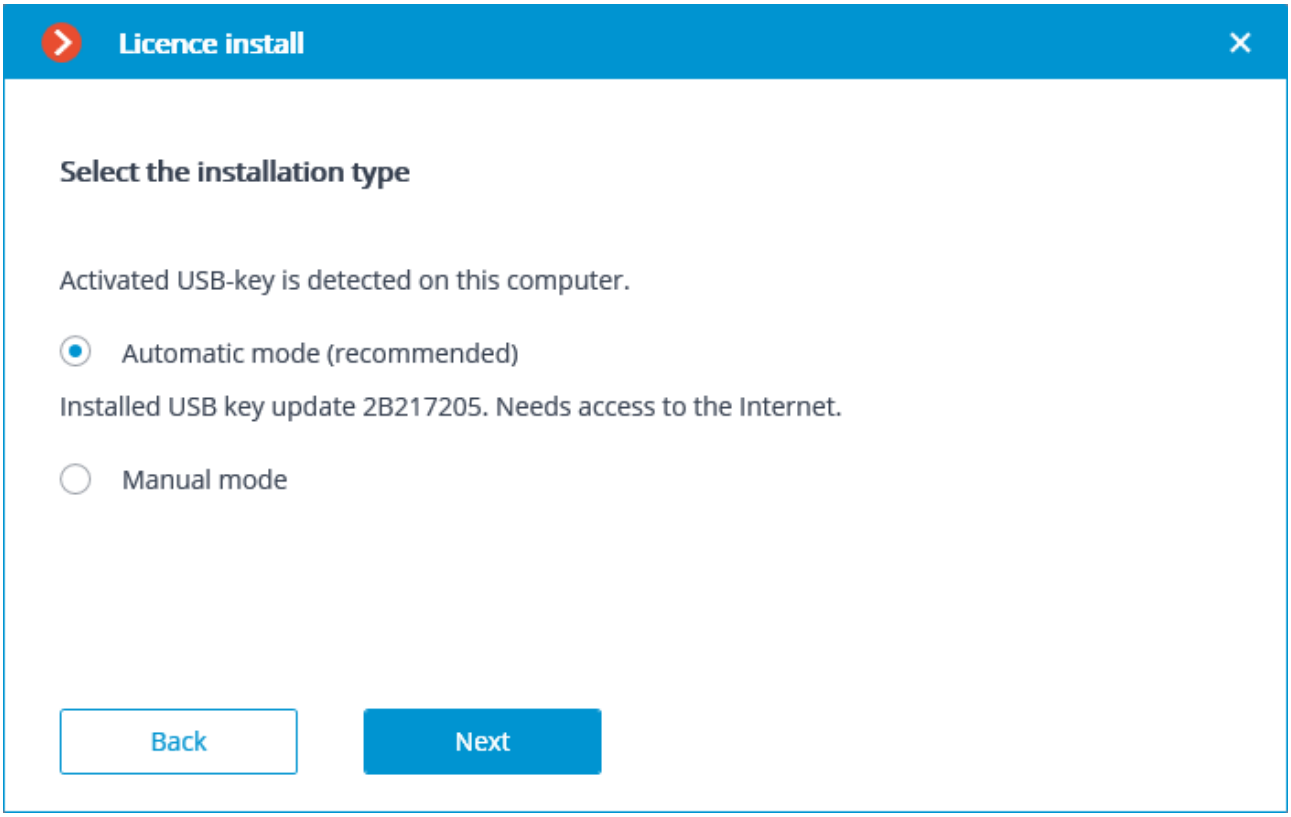
The most probable cause of the offline activation error is the inconsistency between the license file and the computer, which was used to create the request file (i.e. activation on different computer).

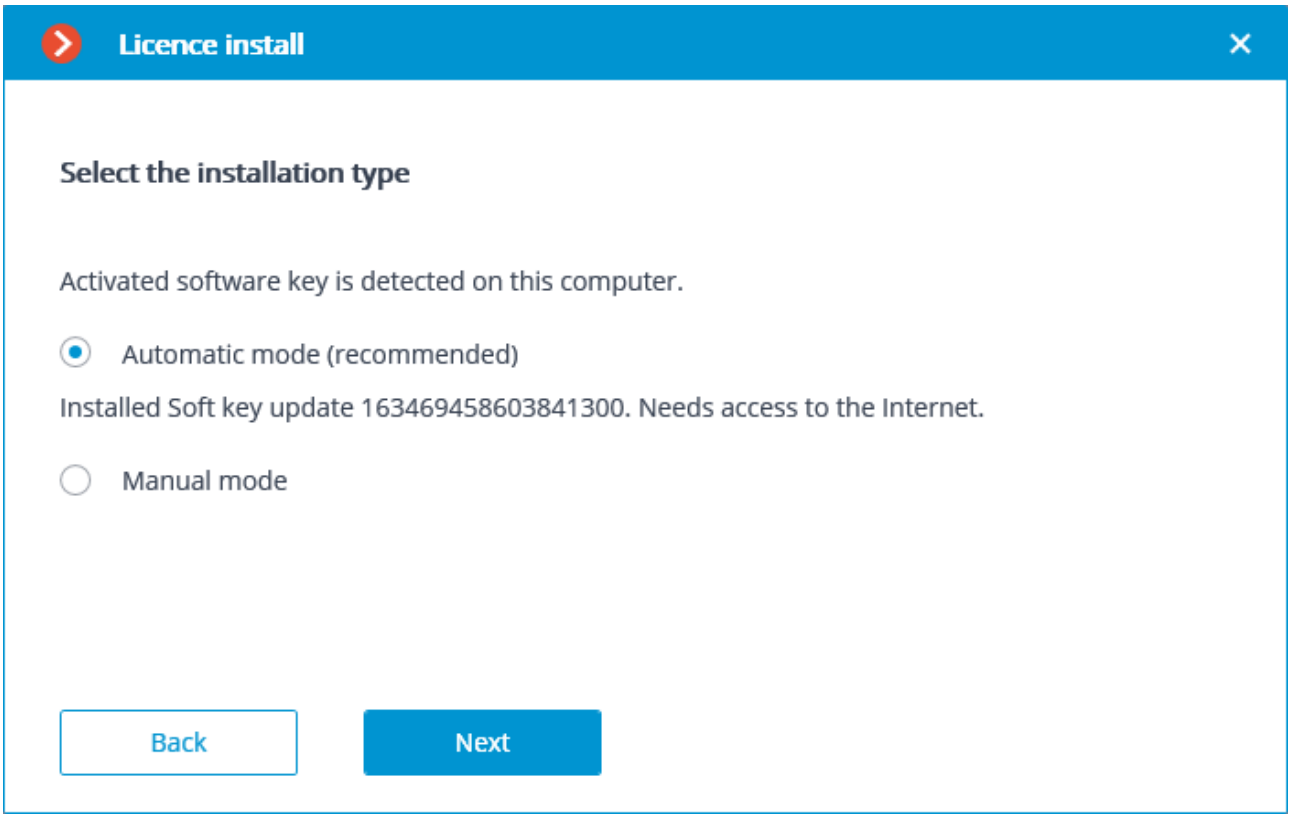
License update

If it is required to update the current license, or install and activate the license for a different key, need in Eocortex Configurator application go to the Servers tab, select a server in the list on the left side of the page, and on the page of server settings, on the **Licensing** tab, press **Update license** button.



License install master window will open, in which, depending on the license used on the server, you shall be offered to update the software or USB key automatically. All actions are similar to those ones, which are used when installing the license.


Licence install
Select the installation type
Activated USB-key is detected on this computer.
Automatic mode (recommended)
Installed USB key update 2B217205. Needs access to the Internet.
Manual mode
Back
Next


Licence install
Select the installation type
Activated software key is detected on this computer.
Automatic mode (recommended)
Installed Soft key update 163469458603841300. Needs access to the Internet.
Manual mode
Back
Next

Additions

Integration with External Systems and Devices

Integration with Honeywell's Pro-Watch®

Eocortex is integrated with the **Honeywell's Pro-Watch®** comprehensive security platform. The integration makes it possible to receive and display the **Honeywell's Pro-Watch®** events, as well as to set up responses to such events.

The integration will work with versions 4.3.5 and later of **Honeywell's Pro-Watch®**.

For the integration to work, it is required to properly set up both **Honeywell's Pro-Watch®** and **Eocortex**.

Honeywell's Pro-Watch® Setup

Eocortex Setup

Honeywell's Pro-Watch® Setup

The information regarding the setup of **Honeywell's Pro-Watch®** for integration purposes is found in the restricted API setup and operation documentation supplied together with the **Honeywell's Pro-Watch®** distribution kit. The brief list of conditions, requirements and actions aimed at ensuring the successful integration of **Honeywell's Pro-Watch®** is shown below.

- The availability of the activated **Pro-Watch Database Transfer Utility** and **Pro-Watch Database Transfer Utility via API** licenses.
- The **Pro-Watch API Service** is activated and launched by the user with the access to **Pro-Watch** database.
- The **REST** and **SignalR** ports (**8734** and **8735** by default, correspondingly) of **Pro-Watch** servers are available.
- There exists a **Pro-Watch** user for whom the **Web password** has been enabled in the user settings of the database. This password will be required to be indicated in the **Eocortex** settings.
- The capability of transferring events between the **Pro-Watch** workstations is enabled.

Eocortex Setup

For setting up the response of the **Eocortex** server to the **Honeywell's Pro-Watch®** events, it is required to launch the **Eocortex Configurator** application, go to **AUTOMATION** tab, and select a camera in the list. Then, in the opened page, go to the **Integrations** tab and set up the connection to the Honeywell's Pro-Watch® server. After that, it is required to go to the **Tasks by event** tab and set up the responses to the Honeywell Pro-Watch event.

Integration with Paxton Net2

Eocortex is integrated with **Paxton Net2** systems.

Eocortex allows to obtain **Paxton Net2** events and register them in the event log, as well as to set up a response to these events in **Eocortex**.

It is also possible to set sending of an **Eocortex** event that initiates the opening of a door to **Paxton Net2**.

The connection of **Eocortex** to **Paxton Net2** can be set up in the **Eocortex Configurator** application on the **AUTOMATION** tab. To do that, it is required to select a camera in the list, go to the **Integrations** tab on the page that opens and set up the connection to the **Paxton Net2** server. There it is also possible to specify the **Paxton Net2** objects whose events will be registered in the **Eocortex** event log.

The responses of the **Eocortex** server to the **Paxton Net2** events and sending of the door opening events to **Paxton Net2** are also set up in the **Eocortex Configurator** application, on the **AUTOMATION** tab. To do that, it is required to use **Paxton Net2 event** and **Open door Paxton Net2 action**.

Eocortex System Health Monitoring

The **Eocortex System Health Monitoring** subsystem monitors the fail-safe and performance of the components of **Eocortex**. video surveillance system

Parameters monitored by **Eocortex System Health Monitoring** are the following:

- Availability of hosts (computers or virtual machines, where which **Eocortex** servers are installed);
- CPU, RAM and network adapters utilization of **Eocortex** servers;
- Availability of cameras connected to **Eocortex** servers;
- State of the subsystems of recording to the archive of **Eocortex** servers;
- Client connections to **Eocortex** servers

Infrastructure of **Eocortex System Health Monitoring**:

- **Monitoring Server** is a service, launching automatically, when operating system is run on the server with installed **Eocortex System Health Monitoring** component.
- **Monitoring Agent** is a service, launching automatically when operating system is run on the server with **Eocortex Server** or **Eocortex Standalone** installed. **Monitoring Agent** provides the **Monitoring Server** with the information concerning the state of both the computer running the agent and the **Eocortex** server and its components installed on this computer.
- **Monitoring Web-client** is the web-application, which is launched in the web-browser and allows to monitor the current state of the components of the **Eocortex** system.

Functionality of the **Monitoring Server**:

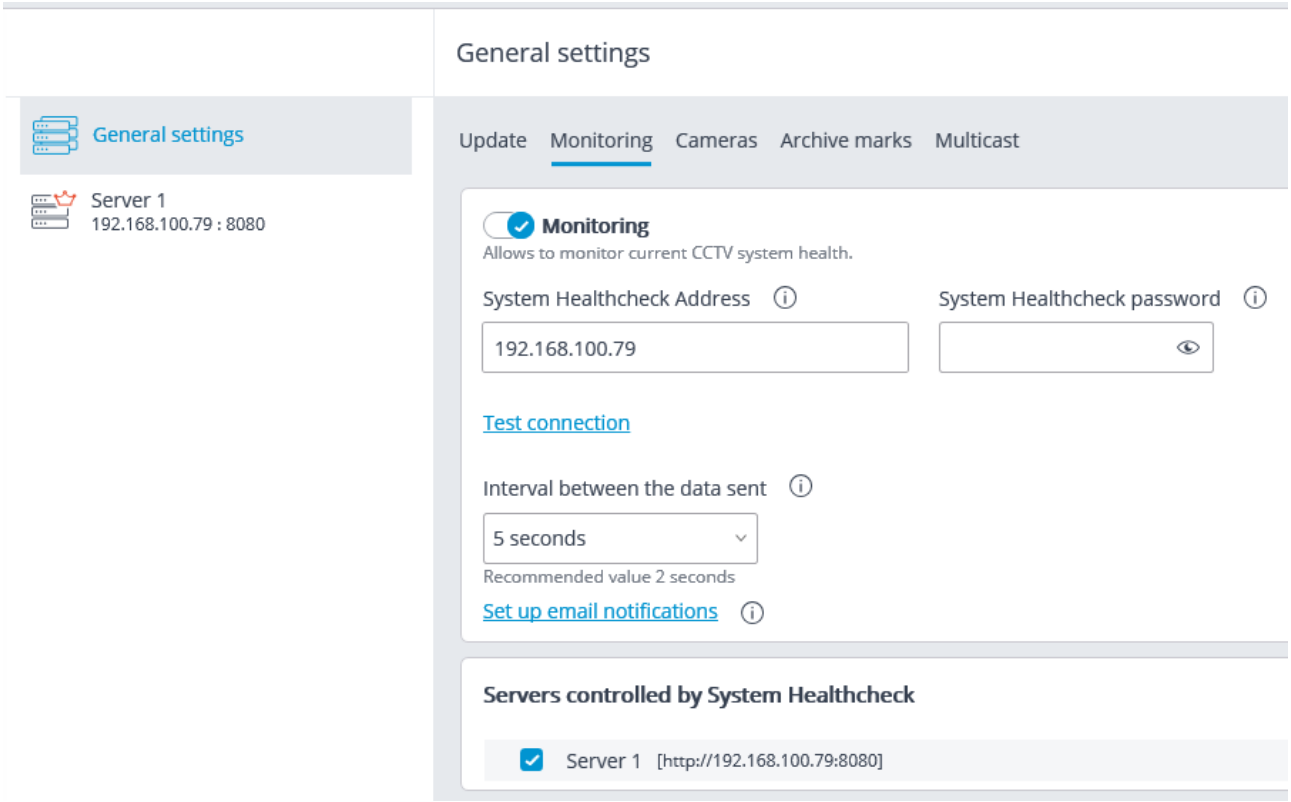
- Collection of information on the status of the system components from the **Monitoring Agents**;
- Web-server, providing interaction with the **Monitoring Web-client**.
- Sending of e-mail notifications about the critical events;

Eocortex System Health Monitoring installing:

- **Monitoring Server** is installed from the **Eocortex** common distributive when choosing the appropriate option. It is possible to install **Eocortex System Health Monitoring** on the computer without installation of **Eocortex** server.
- **Monitoring Agent** is installed from the common installer automatically when installing **Eocortex** server.

Eocortex System Health Monitoring configuration

To configure **Eocortex System Health Monitoring**, need in Eocortex Configurator application go to the Servers tab, select the **General settings** on the left side of the page, on the **Monitoring** tab turn on the **Monitoring**, and specify the settings of **Eocortex System Health Monitoring**.



Description of the settings is specified below:

System Healthcheck address is the IP address or URL of the computer which will be used as a monitoring server.

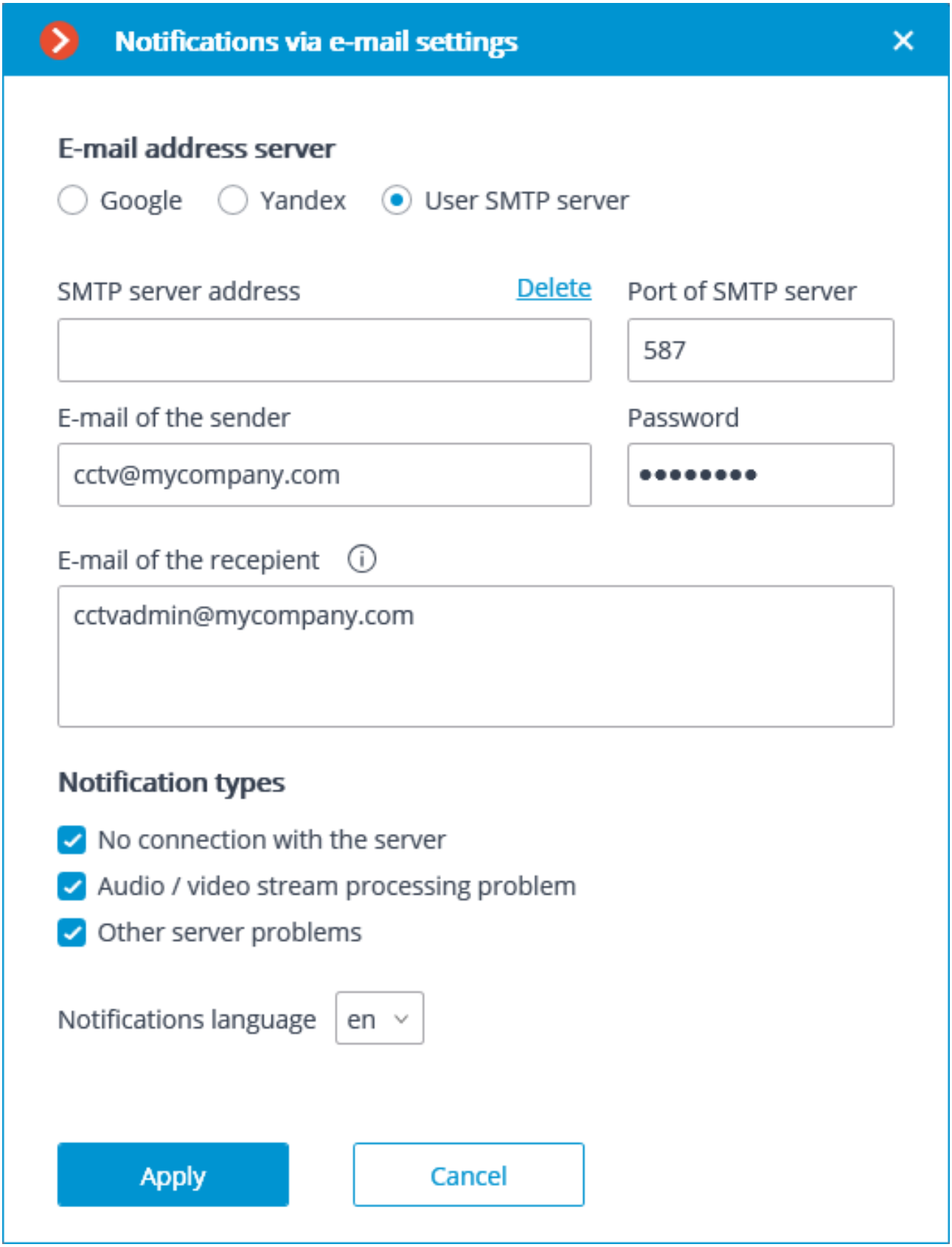
System Healthcheck password is a password, providing access to the settings and viewing of Healthcheck information. This password is set only in the **Monitoring Web-client**, so already existing password shall be specified here.

⚠ Immediately after the **Eocortex System Health Monitoring** component installation, the password is blank by default, so in the course of first monitoring activation this field shall be left blank, but when the password is changed in the **Monitoring Web-client**, the value of this field need to be changed.

Interval between the data sent is the interval of time, in which the system status data shall bel updated.

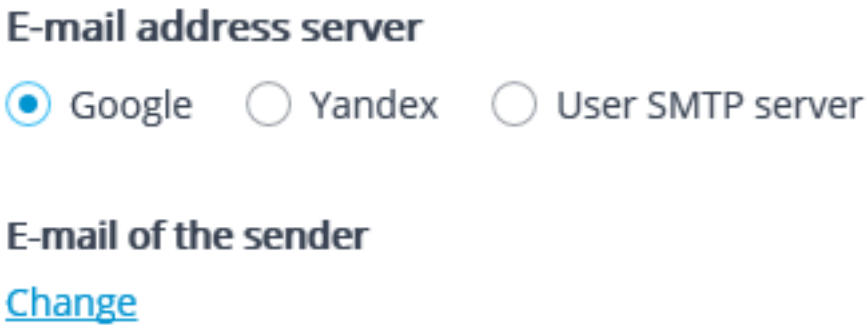
Servers controlled by System Healthcheck : monitored servers should be specified in this group of settings..

If you need to send an e-mail notifications concerning the critical events, press **Set e-mail notifications** link and set the sending options in the opened window.



E-mail address server: the type of mail server used: **Google**, **Yandex** or **User SMPT server**.

If a Google account is used, it is required to click the **Change** button — the **Google** authorization form will open, in which it is needed to specify the name and password of the user on whose behalf notifications will be sent.



When using another mail server, it is required to specify the **SMTP server address** and **Port of SMTP server**, as well as the **E-mail of the sender** and **Password**.

In the **E-mail of the recepient** field, it is needed to specify one or more addresses to which the notifications will be sent. When specifying several addresses, it is required to separate them with commas, semicolons, or specify each address in a separate line.

It is also needed to mark the required **Notification types**.

Additionally, it is possible to select a **Notification language**.

The settings will come into force only after they are applied.

Monitoring Web-client

Launch
Home page
Events Log
Email settings
Password changing
Server's info

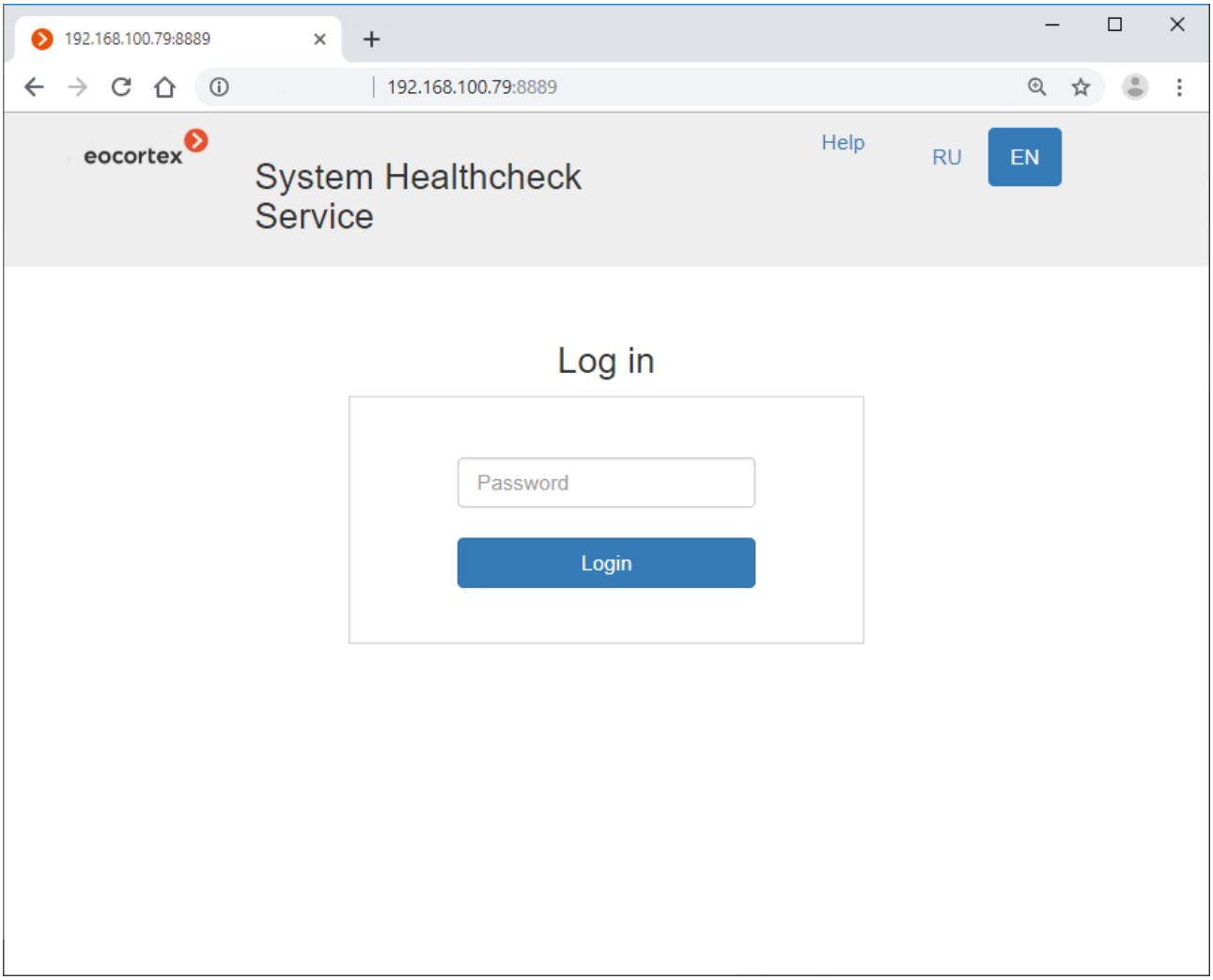
Launch

To launch the **Monitoring Web-client**, enter the following line in the address bar of the web browser: **http://address_or_name_of_monitoring_server:8889/**. For example, **http://192.168.200.161:8889/** or **http://cctv.mycompany.com:8889/**.

⚠ Specification of the port: **8889** is mandatory. Port number cannot be changed.

Enter the **System Healthcheck password** in the opened authorization form and press the **Login** button.

⚠ Immediately after component installation, **System Healthcheck password** is blank by default.

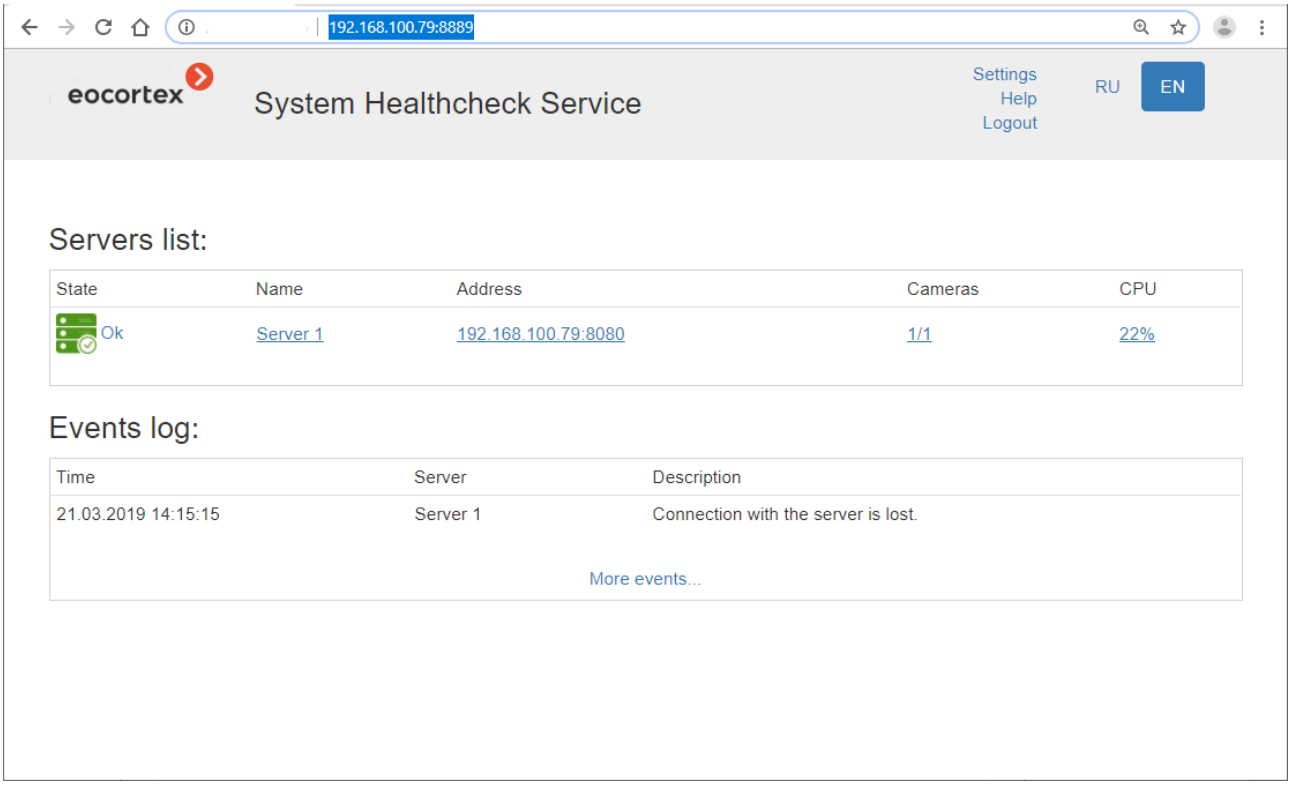


If the login is successful, the **Home page** opens.

If in the **Eocortex Configurator** application the **Eocortex System Health Monitoring** is not enabled, or no servers are selected, **Help** page shall be opened.

Home page

Links Settings, **Help** and **Logout**, as well as the language selection buttons, are located in the upper right corner of the page. Working area of the page contains Servers list and Events Log (digest).

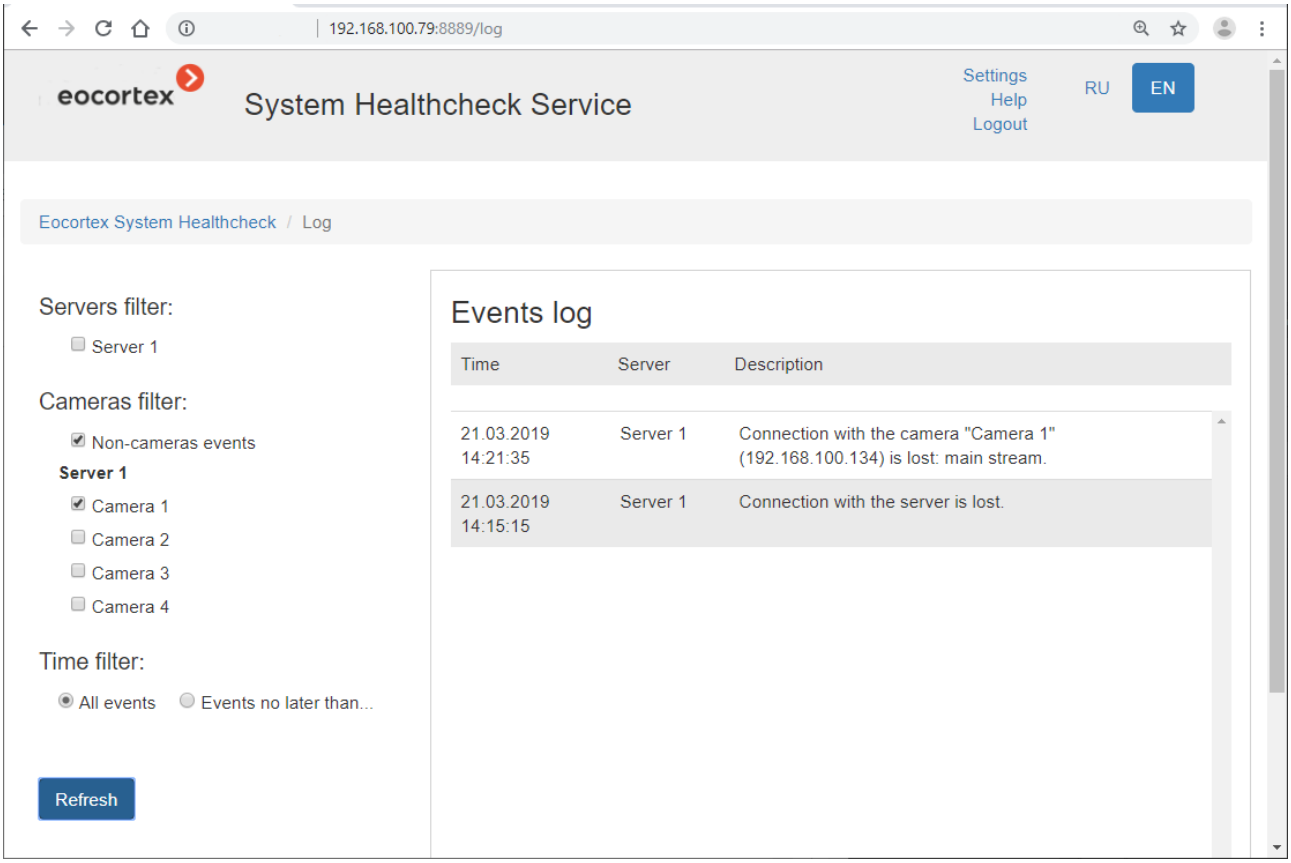


To go from any page to the Home page, click on the logo in the upper left corner.

Servers list is a list with the names and addresses, number of bound cameras, and percentage of CPU utilization. By clicking on the server line Server's info page is opened.

Events log (digest) is a short list with information concerning the last critical events: date/time of the event, server on which the event is registered, and description of the event. By clicking on the **More Events...** link Events Log pageis opened.

Events Log

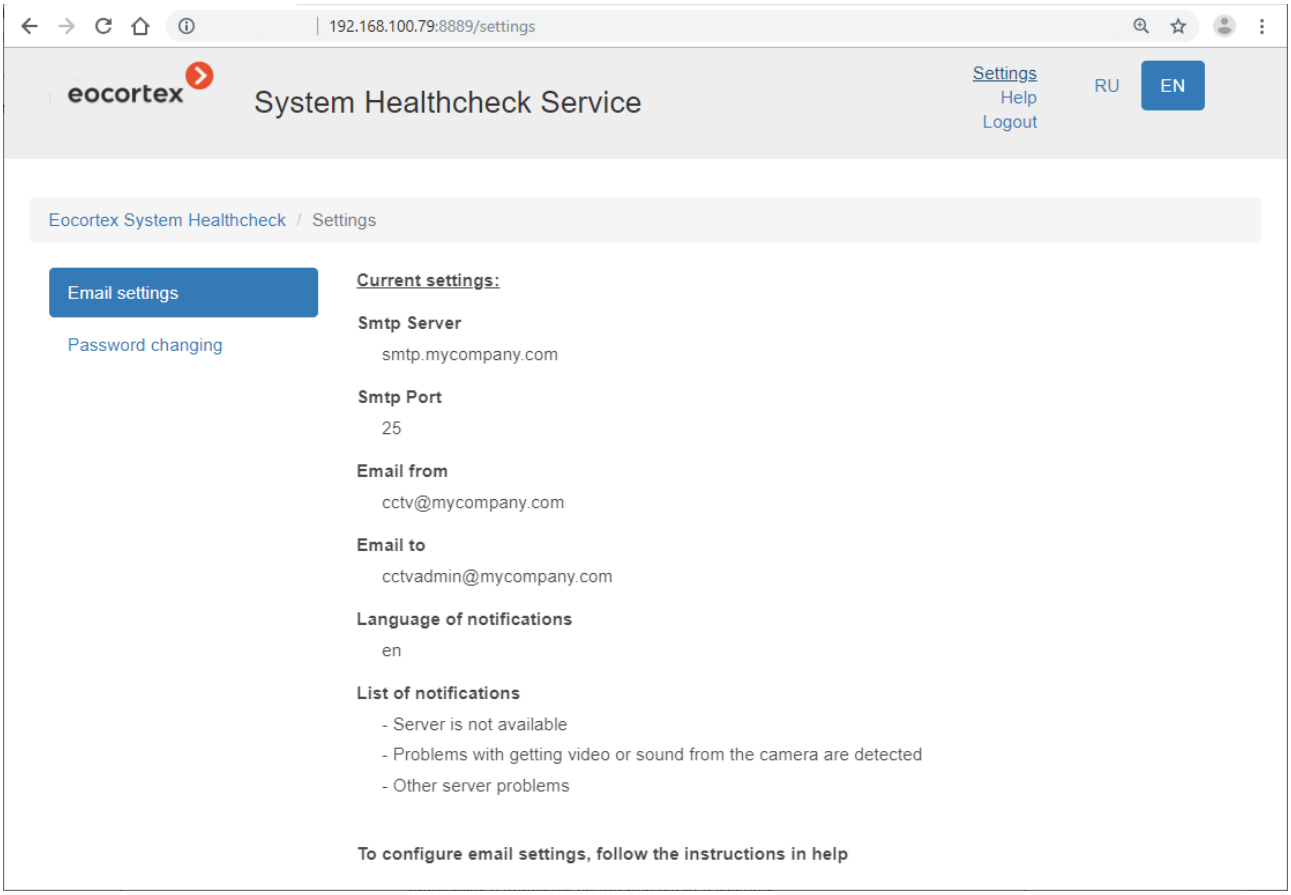


List with information about the critical events is displayed on the right side of the page (in the reverse chronological order): date/time of the event, server on which the event is registered, and description of the event.

Filters bar, which allows filtering events by various parameters, is placed on the left side of the page. For display of the filtered events, specify the conditions, and then press the **Refresh** button.

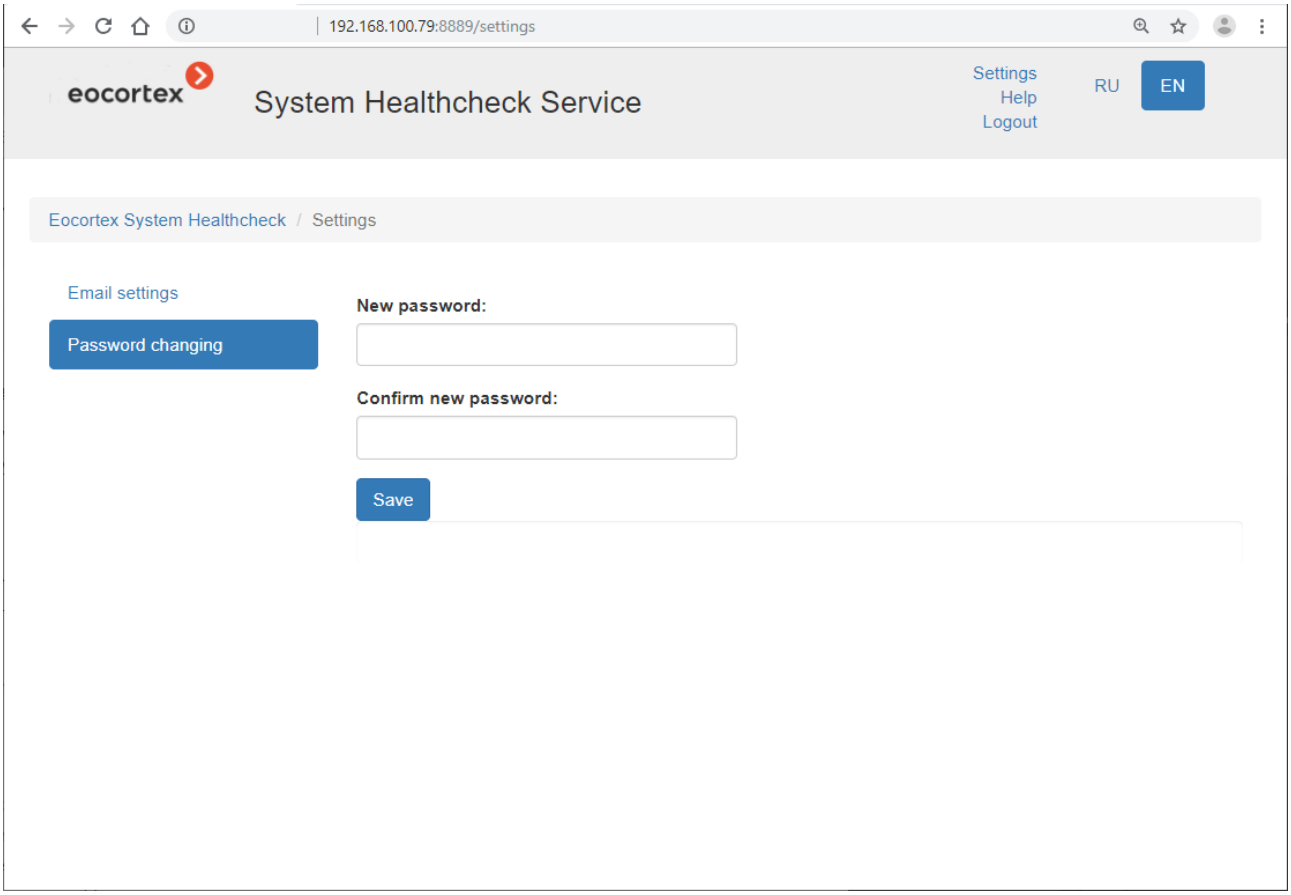
Email settings

To view the notification settings, click the **Settings** link, then select the **Email settings** item in the menu on the left.



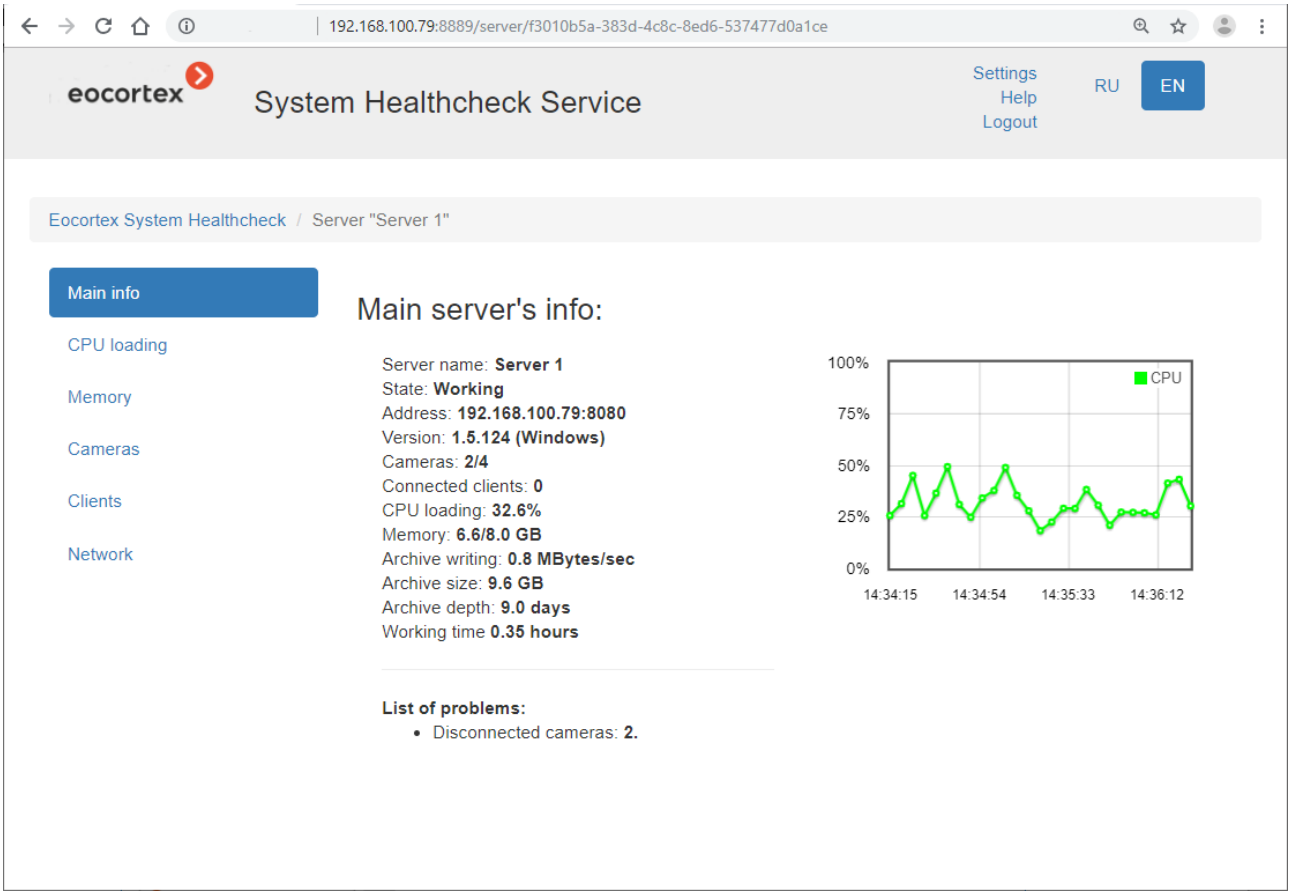
Password changing

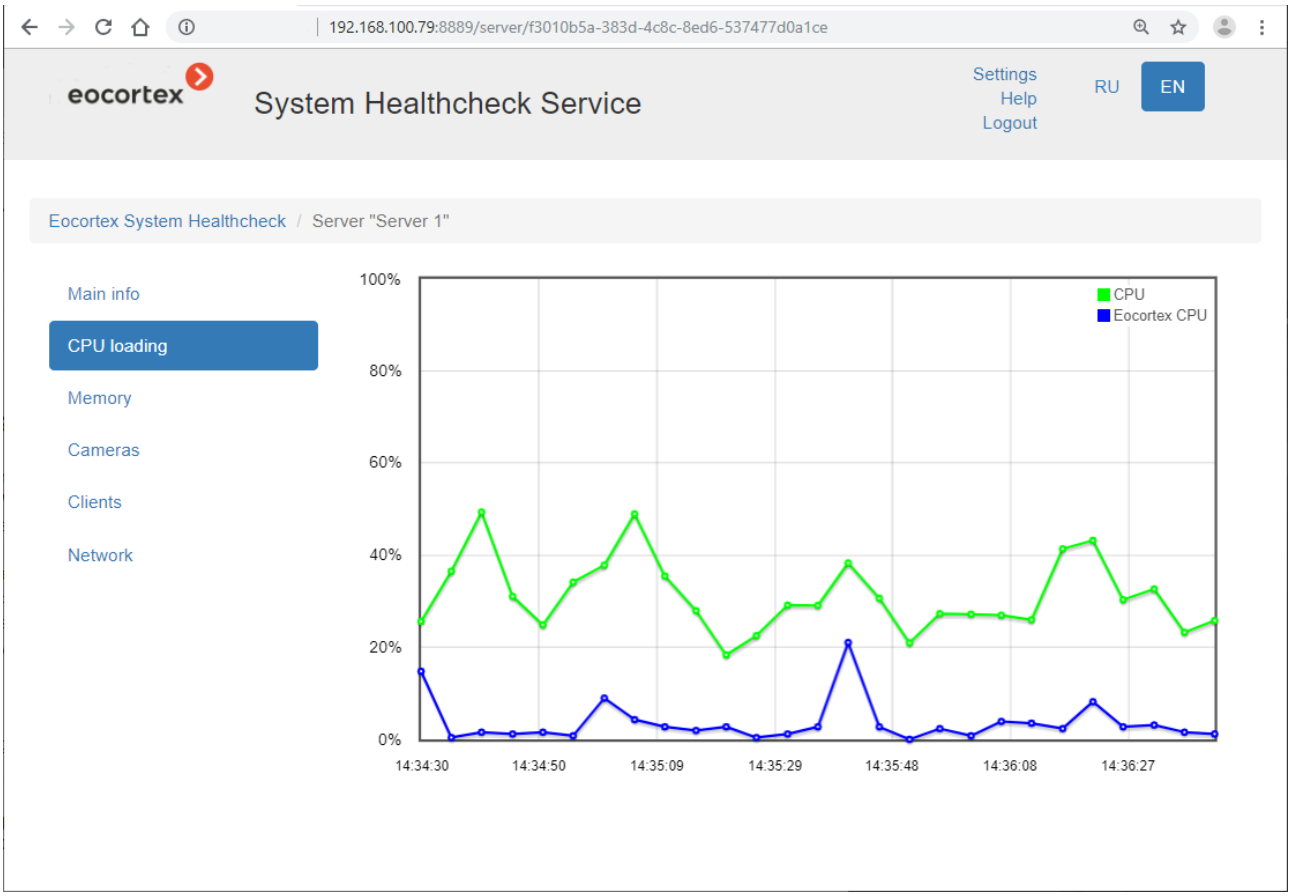
To change the password, click on the **Settings** link, and then select the **Password changing** item in the menu on the left.

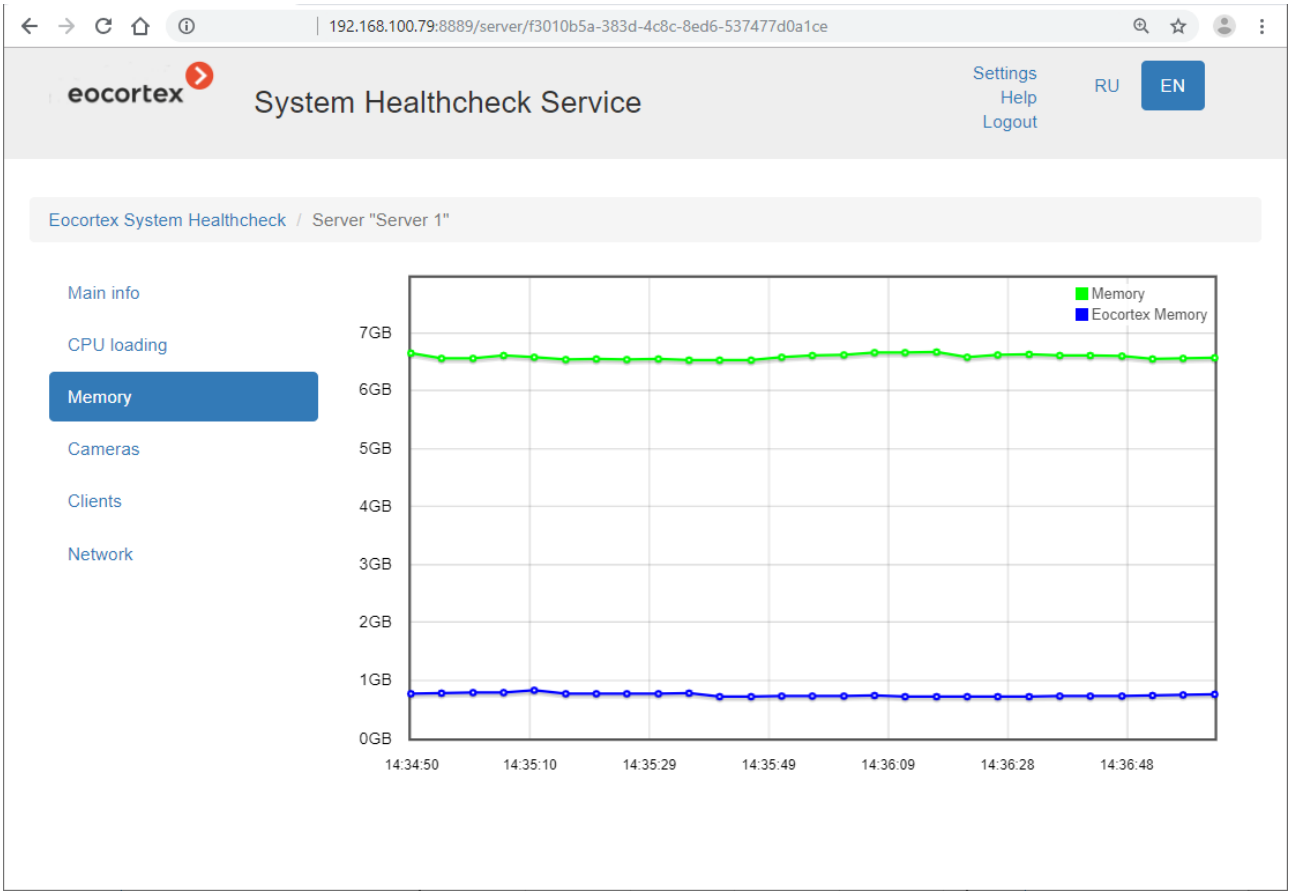


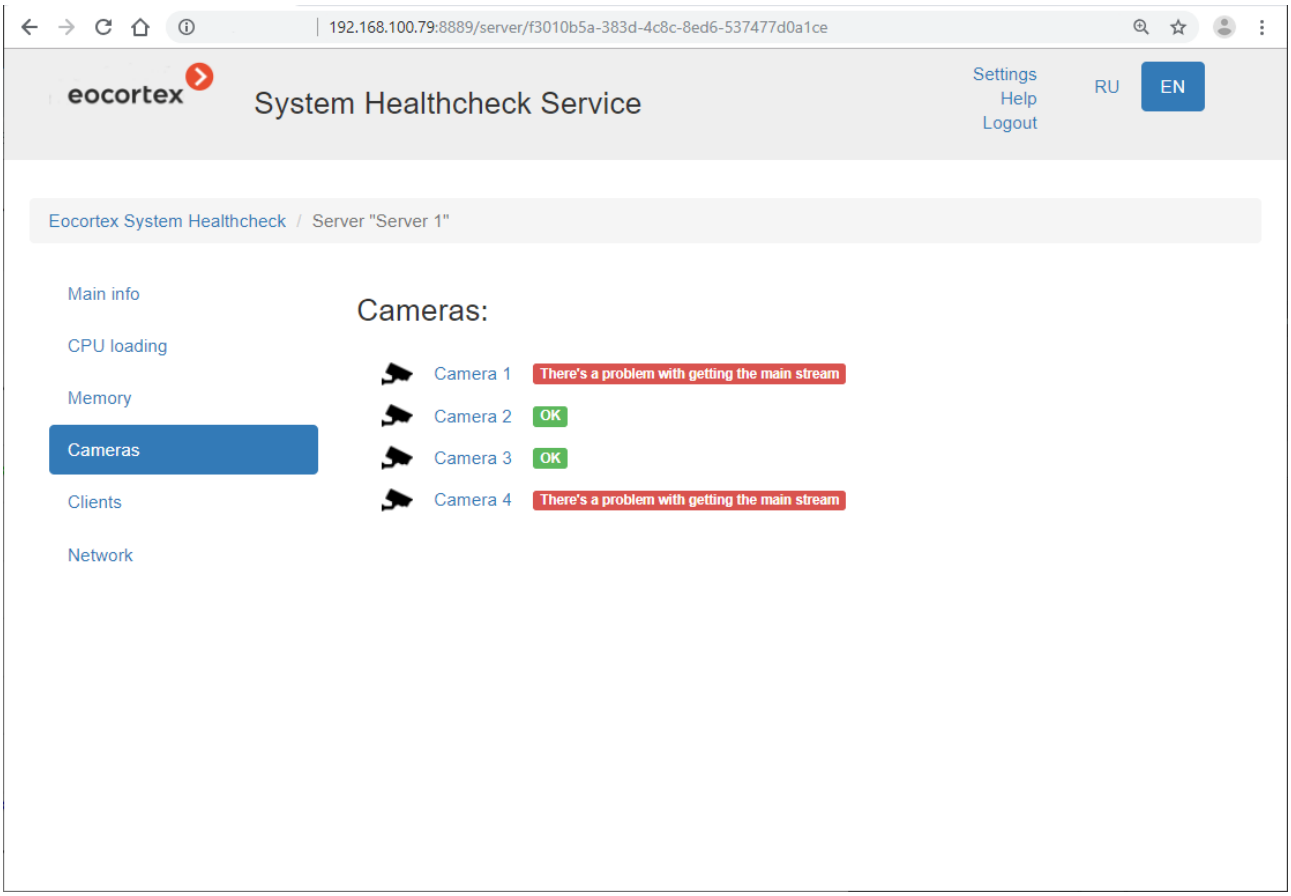
Server's info

To view server information, click on the line of this server on the Home page.

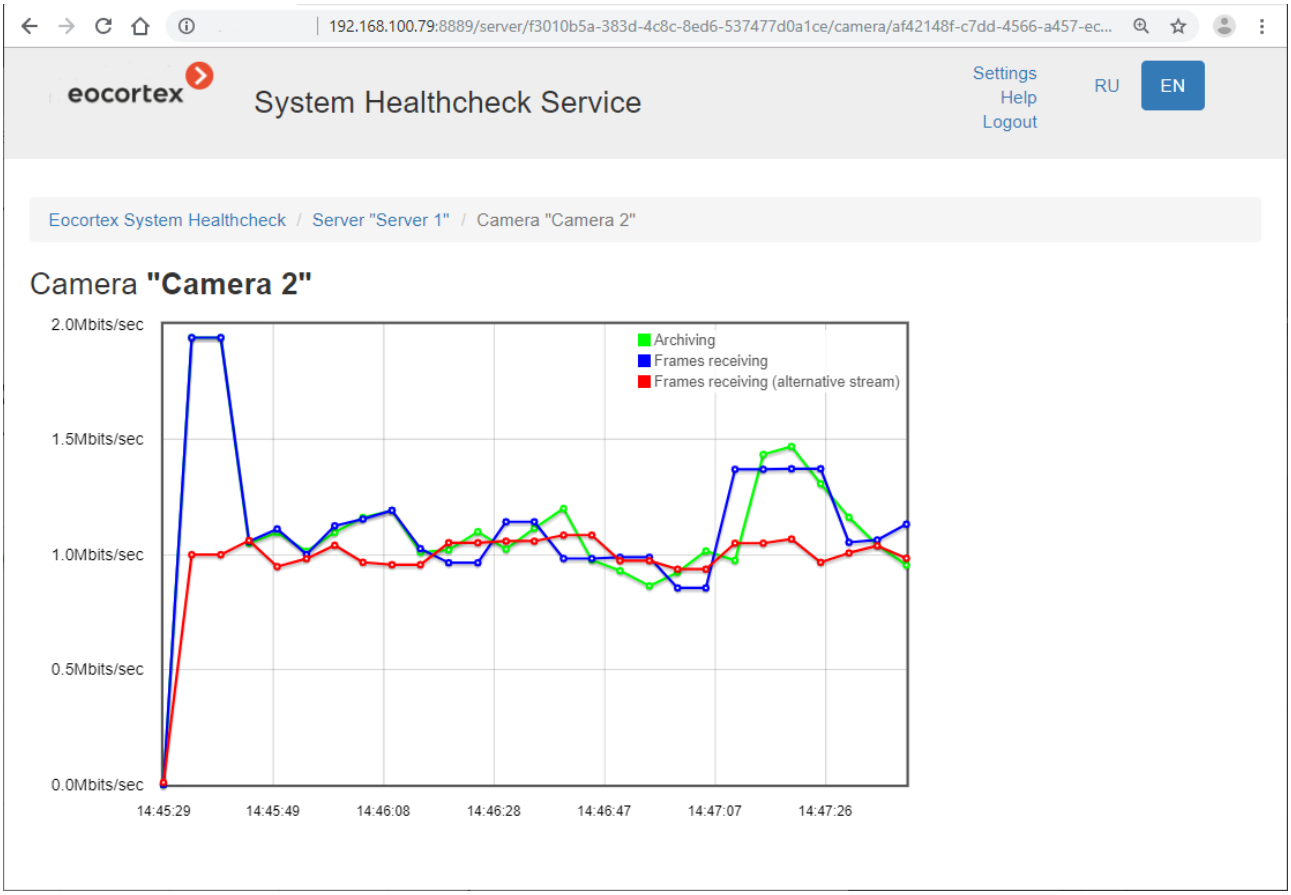

192.168.100.79:8889/server/f3010b5a-383d-4c8c-8ed6-537477d0a1ce
eocortex
System Healthcheck Service
Settings
Help
Logout
RU
EN
Eocortex System Healthcheck / Server "Server 1"
Main info
CPU loading
Memory
Cameras
Clients
Network
Main server's info:
Server name: Server 1
State: Working
Address: 192.168.100.79:8080
Version: 1.5.124 (Windows)
Cameras: 2/4
Connected clients: 0
CPU loading: 32.6%
Memory: 6.6/8.0 GB
Archive writing: 0.8 MBytes/sec
Archive size: 9.6 GB
Archive depth: 9.0 days
Working time 0.35 hours
List of problems:
Disconnected cameras: 2.
100%
75%
50%
25%
0%
CPU
14:34:15
14:34:54
14:35:33
14:36:12

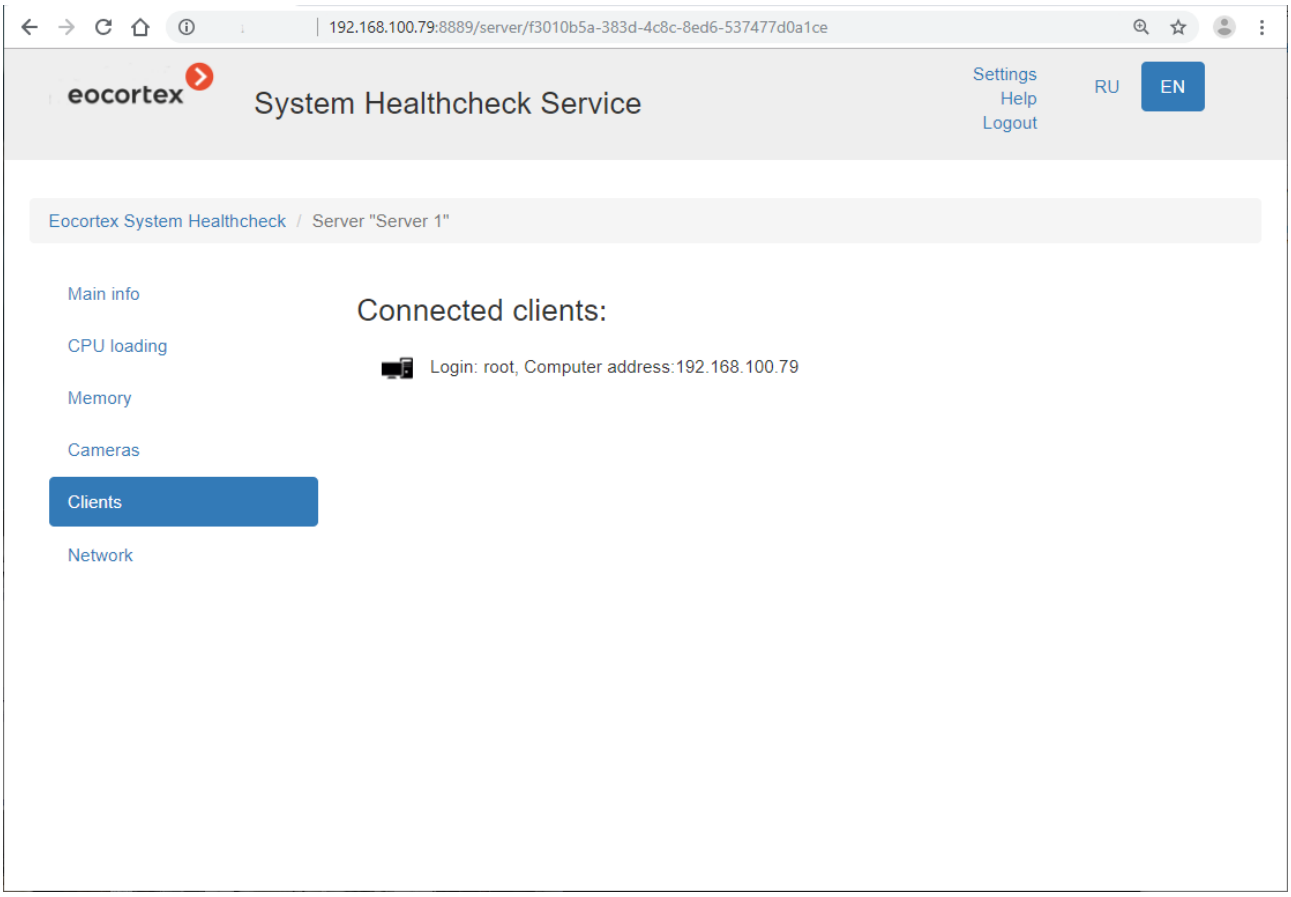

192.168.100.79:8889/server/f3010b5a-383d-4c8c-8ed6-537477d0a1ce
eocortex
System Healthcheck Service
Settings
Help
Logout
RU
EN
Eocortex System Healthcheck / Server "Server 1"
Main info
CPU loading
Memory
Cameras
Clients
Network
100%
80%
60%
40%
20%
0%
CPU
Eocortex CPU
14:34:30
14:34:50
14:35:09
14:35:29
14:35:48
14:36:08
14:36:27

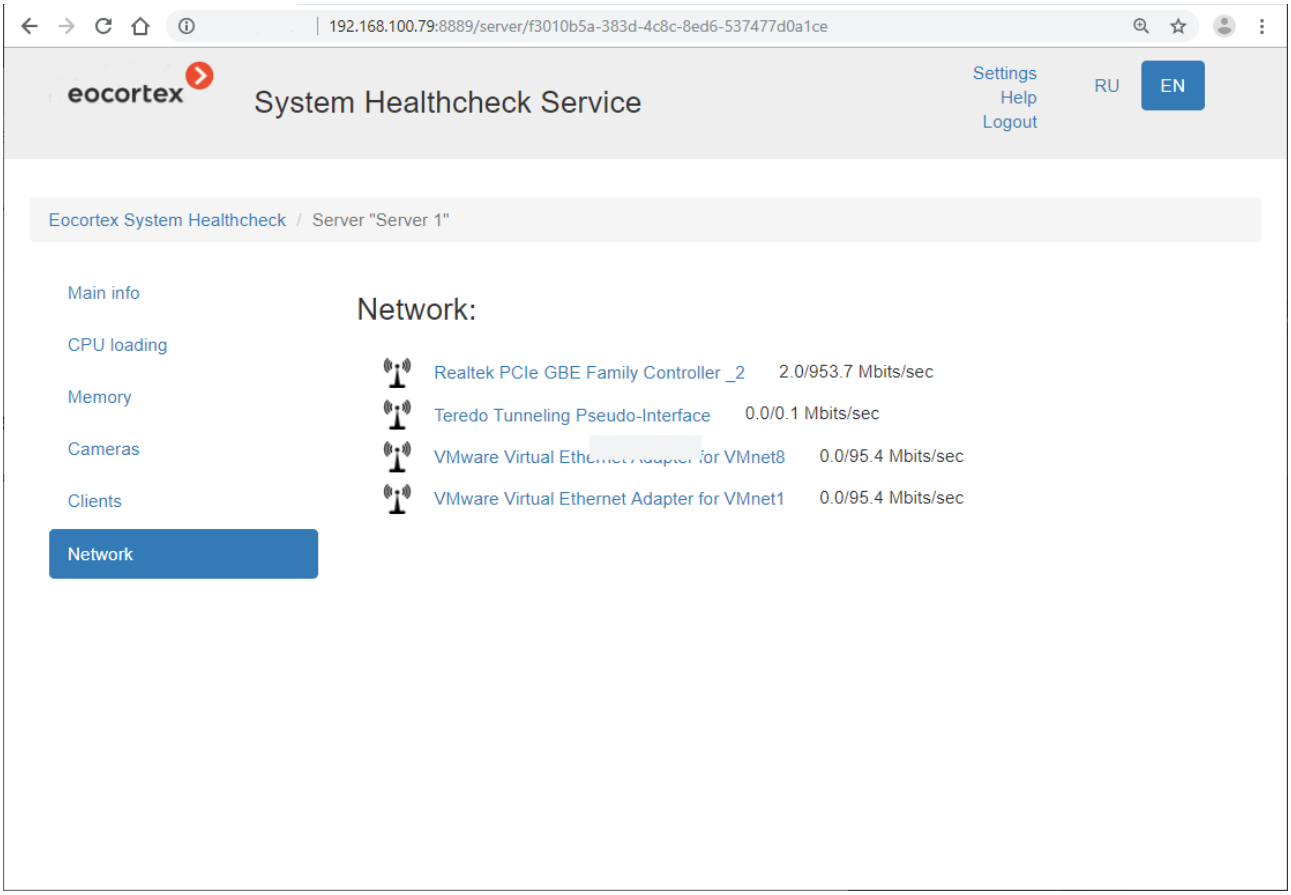
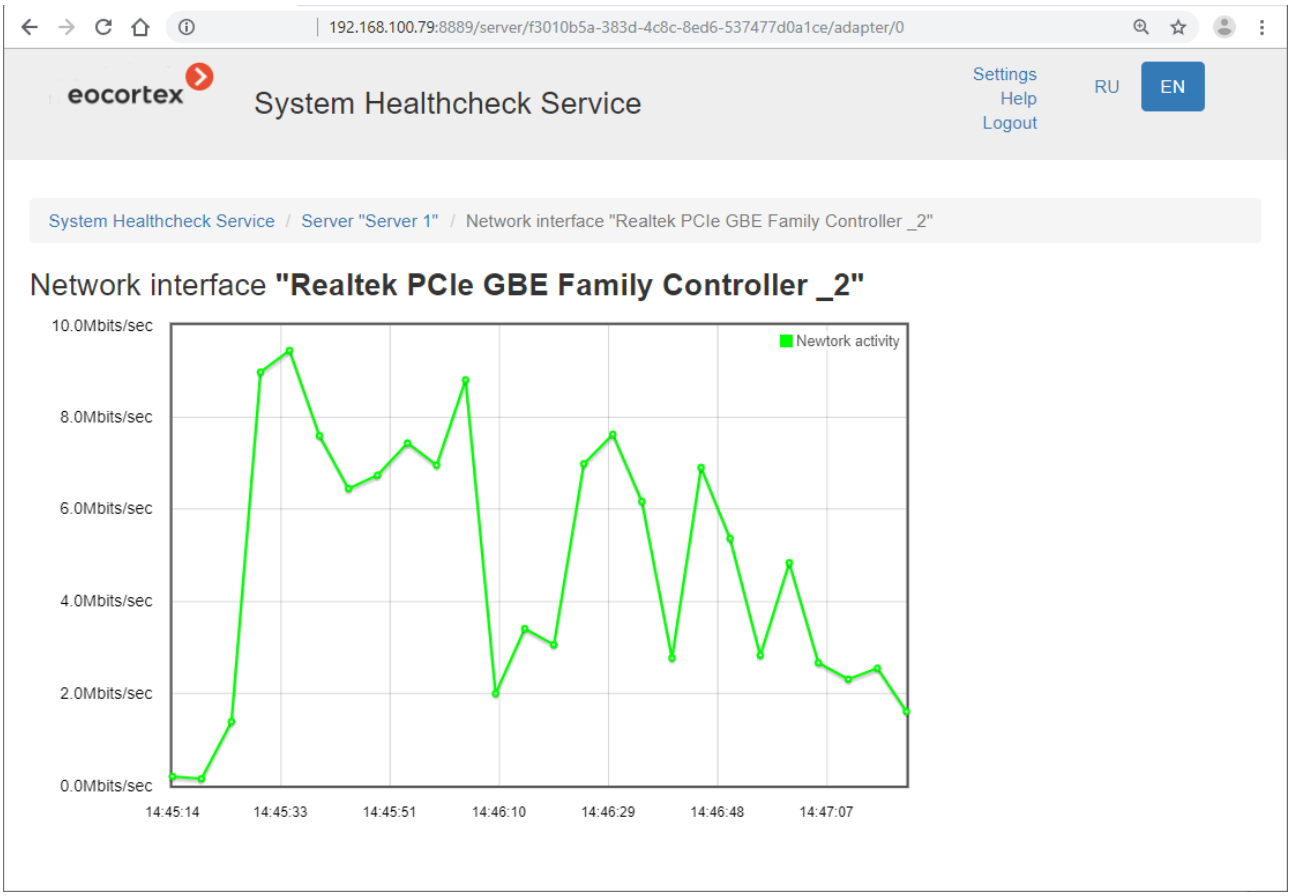




Clicking on the camera opens the information page on this camera.


192.168.100.79:8889/server/f3010b5a-383d-4c8c-8ed6-537477d0a1ce/camera/af42148f-c7dd-4566-a457-ec...
eocortex
System Healthcheck Service
Settings
Help
Logout
RU
EN
Eocortex System Healthcheck / Server "Server 1" / Camera "Camera 2"
Camera "Camera 2"
2.0Mbits/sec
1.5Mbits/sec
1.0Mbits/sec
0.5Mbits/sec
0.0Mbits/sec
Archiving
Frames receiving
Frames receiving (alternative stream)
14:45:29
14:45:49
14:46:08
14:46:28
14:46:47
14:47:07
14:47:26


192.168.100.79:8889/server/f3010b5a-383d-4c8c-8ed6-537477d0a1ce
eocortex
System Healthcheck Service
Settings
Help
Logout
RU
EN
Eocortex System Healthcheck / Server "Server 1"
Main info
CPU loading
Memory
Cameras
Clients
Network
Connected clients:
Login: root, Computer address:192.168.100.79



Clicking on the name of the network adapter opens the information page on this adapter.