CBC AMERICAS
GANZ CORTROL
Administration Guide

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Ganz CORTROL Administration Guide

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1 Software Purpose and Use Cases

CBC AMERICA LLC software products can be used for any type of surveillance system: they offer a wide and flexible choice of components and license types to suit anyone from home users to corporate customers. Different product editions can be selected depending on the application area and available resources.

On top of traditional CCTV functions, Ganz CORTROL servers support integrations with major access control systems, external and internal analytics, and other tools that complement the surveillance system and turn it into a comprehensive data management centre.

Ganz CORTROL Server

Ganz CORTROL Server is a modern piece of the video and data management software from CBC AMERICA LLC, which offers a fast and scalable standalone solution that truly answers your company's security needs. It has been proven to be high-quality and reliable, adding an even more intuitive user interface and better functionality, as well as a long list of supported integrations.

Cross-functional and modern, Ganz CORTROL Server supports over 5000 cameras and other network devices from major producers. The software is designed for single server surveillance systems but can withhold up to several hundreds of IP cameras and also allows hybrid solutions.

Looking for a complete enterprise-level solution? We suggest that you refer to the Ganz CORTROL Global version of the software.

Ganz CORTROL Global

Ganz CORTROL Global is a complete surveillance ecosystem solution for enterprises of any size, including those distributed across multiple sites. The software was designed with the core of CBC AMERICA LLC VMS, whose quality has been proven worldwide over the last decade. The new version of the software, Ganz CORTROL Global, not only offers 64-bit speed and all the necessary tools for setting up an absolute situational alertness system aimed at responding quickly to events, as well as introducing a central server governance hierarchy of all the components.

This is one of the most comprehensive enterprise-level VMS solutions on the market, featuring interactive maps linked to alarms; an advanced event and action manager; analytics tools; video wall support and other impressive components you will definitely appreciate. To ensure the safety of your data, the software also offers archive replication, advanced system health monitoring and failover clustering mechanism, all of which reduce the disruption of your video surveillance recordings to zero. All this, as well as the various possibilities for customisation and CBC AMERICA LLC flawless technical support, makes Ganz CORTROL Global a video surveillance solution you can count on.

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1.1 EditionOverview

The table below contains details on all currently available CBC AMERICA LLC video management software editions.

Feel free to contact our sales department via cortrol@cbcamerica.com to get the latest information on prices and software availability in your region.

	Feature list per edition (v1.2 January 2nd 2017)					
	Features	**Prime**	**Premier**			**Global**
General	Number of simultaneously connected cameras	9	24	48	96	Unlimited
	Licensing type	Per server				Central server only with camera packs
	Technical support	Not available	2 years since last available release date			
	Version updates	Free	2 years since license activation date			
	Version update subscription plans	Not applicable	+ 2, +4, +10 years			
	License upgrade option	Available				Through camera packs
	Archive size/duration	Unlimited (storage limitations apply)				
Server/Console	Clients application connections	1 simultaneous	Unlimited			
	Web application connections					
	Android and iOS application connections					
	Local and Remote configuration management	Per each server				Centralised
	Local and Remote user management					
	Supported video stream resolutions	FullHD and lower	Unlimited			
	Supported cameras/devices*	> 4000 models				
	Generic Device drivers: ONVIF, RTSP, HTTP	Available				
	Analog PTZ protocols (via RS-232,422,485 ports)	Available				
	32 and 64 bit versions	Both available				
	Video capture board support	Not available	Available			
	E-mail notifications					
	Advanced Events & Actions		Available within each server			Global for all connected servers
	Recording server autodiscovery	Not applicable				Available
	Service mode	Available				
	Software watchdog					
	Device autodiscovery					
	Local storage support					
	Remote/network storage support					
	Storage configuration per camera					
	Camera/Device side motion detector support*					
	Camera/Device side VCA event support*					
	Software motion detector support					
	Motion information recording					
	Constant Video and Audio recording					
	Video and Audio recording by Motion					
	Recording profiles by Schedules					
	User permissions per each resource/component					
	Device and User grouping					
	User audit					
	System monitoring					
	API for third party integrations					
	Configuration backup and restore					
	Camera side multicast support					
	E-maps	Not available	Available within each server			Centralised
	Recording Server failover support	Not available				Available
	Archive replication/backup within multiple servers					
	Video Wall support					
	Organizations hierarchy support					
	Active directory & LDAP					
	Remote upgrade for server, Console and Monitor applications					
	Edge recoding support (for ONVIF Profile G devices)	Not available	Available			
	Support for Digital inputs*					
	Support for Digital outputs*					
	Client application multicast support					
	Software VCA support (additional license required)					
	LPR and FR support					

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Client	32 and 64 bit versions	Both available	
	Server connections	One at a time	Unlimited
	Live video streaming	FullHD and lower	Unlimited
	Live video substream support (please refer link)		
	Number of supported displays	Unlimited	
	Instant playback	Available	
	Archive forward and backward playback		
	Playback speed controls: regular, slow and fast		
	Archive sequence explorer		
	Archive smart search		
	Build-in and custom layouts		
	Layout management		
	Layout sequences		
	PTZ, Iris and focus control		
	PTZ presets		
	PTZ tours		
	Digital PTZ		
	Fisheye and Panomorph dewarping		
	Motion detection status and overlay		
	Multiscreen setup		
	Alerts		
	Export Snapshot from live view and archive		
	Video export from archive		
	Export Library		
	Operation modes:Always on top, Exclusivity and Locked		
	Advanced Information about live video stream		
	Video maintain aspect ratio mode		
	USB Joystick Support		
	Archive Bookmarks		
	User buttons	Not available	Available
	Shared Layouts		
	E-maps		
	LPR and FR data support		
Mobile and Web	Server connections	One at a time	Unlimited
	H.264 streaming to Web and Mobile applications	Available	
	Live video substream support (please refer link)		
	Up to 6 cameras per single live view for Mobile apps.		
	Up to 4 cameras per single live view for Web application		
	Hardware GPU utilization for Mobile application		
	Custom view layouts		
	Two-way audio support		
	PTZ control		
	PTZ presets		
	Archive playback		
	Save snapshots		
	Google Chromecast support		
	Video & audio streaming from mobile devices		

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Ganz CORTROL Prime

Free software version allows a limited number of channels at maximum picture resolution of 1080p. Client application - Ganz CORTROL Client - can only be connected to a single Ganz CORTROL Prime server, and streaming server (Web/mobile access), which is an integral part of the server, is limited to one connection at a time.

Advanced features like centralised server management, events & actions, external components (LPR, FR, VCA), maps etc. are not supported for free software edition; technical support is not guaranteed.

Free version upgrade is offered for Ganz CORTROL Prime.

Ganz CORTROL Server

Ganz CORTROL Server is, alike Ganz CORTROL Prime, a single server installation with no imposed limitation on stream resolution; number of allowed cameras varies depending on the server license type: 24, 48, and 96 channel editions are available. Also, there are no restrictions for remote connection amount from Ganz CORTROL Client applications and Web/mobile clients.

CBC AMERICA LLC LPR, VCA, face recognition (FR), as well as map and event/action modules are supported locally.

Free software updates are offered for 2 years since last license activation date; technical support is provided for 2 years since last version installation, making it a maximum of 4 years of support for non-renewed license. In order to obtain further updates and support, a license subscription upgrade should be acquired.

Ganz CORTROL Global

Ganz CORTROL Global edition presents a full-scale CCTV solution with centralised management and advanced enterprise features. Vast number of servers can be merged into a single surveillance system, offering transparent configuration for physically separated servers.

Unlike previous two editions, Ganz CORTROL Global solution is licensed per channel, with no theoretical limitation for total amount of cameras distributed between multiple servers.

All external modules are available via centralised management, and events/actions are shared between servers.

Free software updates are offered for 2 years since last license activation date; technical support is provided for 2 years since last version installation, making it a maximum of 4 years of support for non-renewed license. In order to obtain further updates and support, a license subscription upgrade should be acquired.

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1.2 Hardware Requirements

The table below details several typical **minimum** recommended **hardware sets** for CBC AMERICA LLC **recording servers**. Please note that these specific processor models are given only as examples and are not compulsory: you can use a different CPU model, provided that it has the same number of threads and its performance is analogous.

Calculations are given for two major configuration examples: all streams in D1 or FullHD resolution; of course, intermediate and mixed cases may also exist. Please contact CBC AMERICA LLC representatives if you require help with choosing hardware.

<table>
<tr><th colspan="6">HARDWARE RECOMMENDATIONS TABLE</th></tr>
<tr><td colspan="3">Installation specifications</td><td colspan="3">Recommended hardware per usage scenario.</td></tr>
<tr><th>Video Stream</th><th>Number of cameras</th><th>Motion Detector</th><th>Server only</th><th>Monitor*** only</th><th>Server + Monitor***</th></tr>
<tr><td rowspan="6">D1 30fps</td><td rowspan="3">Up to 9</td><td>None or camera-side*</td><td rowspan="2">CPU: Intel G1840; RAM 4GB</td><td rowspan="3">CPU: Intel G4500; R a.m. 4GB</td><td>CPU: Intel i3-6300; RAM 8GB</td></tr>
<tr><td>Software HP**</td><td rowspan="4">CPU: Intel i5-6600; RAM 8GB</td></tr>
<tr><td>Software HA**</td><td rowspan="3">CPU: Intel G4500; RAM 4GB</td></tr>
<tr><td rowspan="3">Up to 16</td><td>None or camera-side*</td><td rowspan="3">CPU: Intel i3-6300; RAM 4GB</td></tr>
<tr><td>Software HP**</td></tr>
<tr><td>Software HA**</td><td>CPU: Intel i3-6300; RAM 8GB</td></tr>
<tr><td rowspan="6">FullHD 30fps</td><td rowspan="3">Up to 9</td><td>None or camera-side*</td><td>CPU: Intel G1840; RAM 4GB</td><td rowspan="3">CPU: Intel i5-6600; RAM 8GB</td></tr>
<tr><td>Software HP**</td><td>CPU: Intel G4500; RAM 4GB</td></tr>
<tr><td>Software HA**</td><td>CPU: Intel i5-6600; RAM 8GB</td><td rowspan="2">CPU: Intel i7-6700; RAM 8GB</td></tr>
<tr><td rowspan="3">Up to 16</td><td>None or camera-side*</td><td>CPU: Intel G4500; RAM 4GB</td><td rowspan="3">CPU: Intel i7-6700; RAM 8GB</td></tr>
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<tr><td>Software HA**</td><td>CPU: Intel i7-6700; RAM 8GB</td><td>CPU: Intel i7-5930K; RAM 16GB</td></tr>
</table>

DDR4/DD5 RAM is strongly recommended!

- *Please refer to the list of CBC AMERICA LLC supported cameras for camera-side motion detector support
- **High Performance/High Accuracy mode
- ***System must provide:
    - DirectX 10 support
    - Graphics card with at least 256MB memory
    - Latest graphics driver version

For **Ganz CORTROL Client workstations**, onboard video memory should be at least 256MB per display, and the recommended minimum is 512MB per display.

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For **Ganz CORTROL Video Analytics** (VA): 1x physical core 3GHz+ and 1GB RAM per video channel. CPU **must** support AVX/AVX2.

For **Ganz CORTROL Global servers** without any camera assignment (**management only**) you can use a stable but low-spec machine with high-speed OS medium with at least 4 cores (8 threads). Example: Intel i3-10320 with 16 GB DDR4 and NVMe SSD. Virtual machines are supported but make sure to allocate enough cores. If your Ganz CORTROL Global server will assume any additional load (video channels, in the first place) and/or the number of simultaneous client connections is large (hundred or hundreds of connections), please consult with cortrol@cbcamerica.com to get tips for your server hardware.

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1.3 Prerequisites

There are a number of requirements for the Ganz CORTROL host system:

- Microsoft Windows operating system (7 SP1, 8, 8.1, 10, 11, Server 2012 R2, Server 2016, Server 2019), real or virtual machine
- both .NET Framework 3.5 SP1 and 4.x installed (the latest version should come with OS updates)
- for Windows Server operating systems, make sure the Desktop Experience feature is installed
- all Windows updates must be installed (especially, this is critical for Windows 8 and newer editions and for pending updates)
- ports for remote connections should be enabled through the firewalls (default ports are 60554 for Ganz CORTROL Client and Ganz CORTROL Console and 8080 for the Ganz CORTROL Streaming Server and external services)
- installation and recording directories should be added to antivirus exception list so that they are not scanned or interfered with in any other manner
- indexing and defragmentation services must be disabled for the storage locations
- for the software analytics requirements, see the corresponding section of the VCA manual (provided as a separate document)
- for Ganz CORTROL Client application, DirectX 10+ is required along with the latest stable graphics card drivers
- for Ganz CORTROL Client, display resolution of 1280x720 pixels or higher is recommended

For Windows Server 2016 and 2019, specify the *Server with Desktop Experience* option as part of the installation. Prior versions of Windows Server allow you to install this feature post installation.

If you use a server with a clean Windows installation, make sure to install **all available Windows updates before** starting the software installation. Component deficiency (framework components, redistributables etc.) may lead to unexpected issues in software operation.

If you are using Windows 10 N or KN (special edition without media technologies), make sure to install **Windows 10 Media Feature Pack** in order to ensure Ganz CORTROL operation. Without media features, Ganz CORTROL will not work. You will find the media feature pack online, provided by Microsoft.

In order to enable GPU usage for video analytics, please install **NVIDIA CUDA toolkit redistributable** package, which is NOT a part of the Ganz CORTROL installation. You can download the toolkit from the CBC AMERICA LLC website (usually available with the latest Ganz CORTROL version), or request it from CBC AMERICA LLC representative or via cortrol@cbcamerica.com.

For **recording**, the following recommendations apply:

- for 48+ channels and/or >20MB/s total recorded stream, RAID 5/6/10 with high speed hardware controller is strongly advisable
- defragmentation and indexing must be disabled for all storages
- every recording location, regardless of its type, must have 10-15% of free space, not used by Ganz CORTROL or any other software
- recording to the system disk is strongly not recommended
- antivirus software or any other scanners should be disabled for the storage locations
- no third-party VMS should be recording to the same location as Ganz CORTROL
- for NAS, make sure to disable the *Recycle Bin* feature, so that the erased files are actually deleted and not just moved to trash folder

Antivirus **scanning**, **defragmentation**, **indexing** and other similar processes being enabled for Ganz CORTROL storages may result in dramatically decreased write speed, recording disturbances and, occasionally, database corruption. We strongly recommend that you make sure that storage locations are not affected by these processes.

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⚠ CBC AMERICA LLC is **not responsible** for software failures and/or any footage loss caused by underlying OS and/or hardware issues. It is the responsibility of the systems administrator to configure the server and provide maintenance, unless otherwise agreed (e.g., if server hardware has been shipped by CBC AMERICA LLC for bespoken configuration).

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1.4 Getting Started

Before starting the installation, make sure that:

- you have downloaded the correct software package
- you have acquired the corresponding valid **license** key
- the host operating system is stable (functioning correctly) and has all the **updates and drivers** installed
- server **hardware matches** the project **requirements**, taking into account all used features and planned post-deployment modifications
- host system retains all the features and configuration required for software operation

⚠ We strongly advise that you keep the software versions (e.g., 1.**x.**x) and subversions (e.g., 1.2.**x**) across your system match exactly. Software build numbers (e.g., 1.2.0.**xxxxx**) may differ slightly in case your are using 64-bit and 32-bit editions.

If you are not sure about what server hardware to choose, do not hesitate to use CBC AMERICA LLC provided hardware calculators and/or contact CBC AMERICA LLC representative for an accurate estimation.

We advise installing and activating the software on the ultimate server assembly, as extensive subsequent hardware changes are likely to cause software license activation failure. If this happens, undo these changes, if possible, or contact product support to find a solution.

Ganz CORTROL is installed as a Windows service so please make sure that the Windows user you are logged in as has sufficient privileges; otherwise, software may not be installed correctly. Note that there is no option to install and run the software in application mode.

The following topics will guide you through the installation process, as well as provide details on product configuration. If you are using a CBC AMERICA LLC product for the first time, we strongly advise you to carefully read and follow the instructions in this manual and related documentation.

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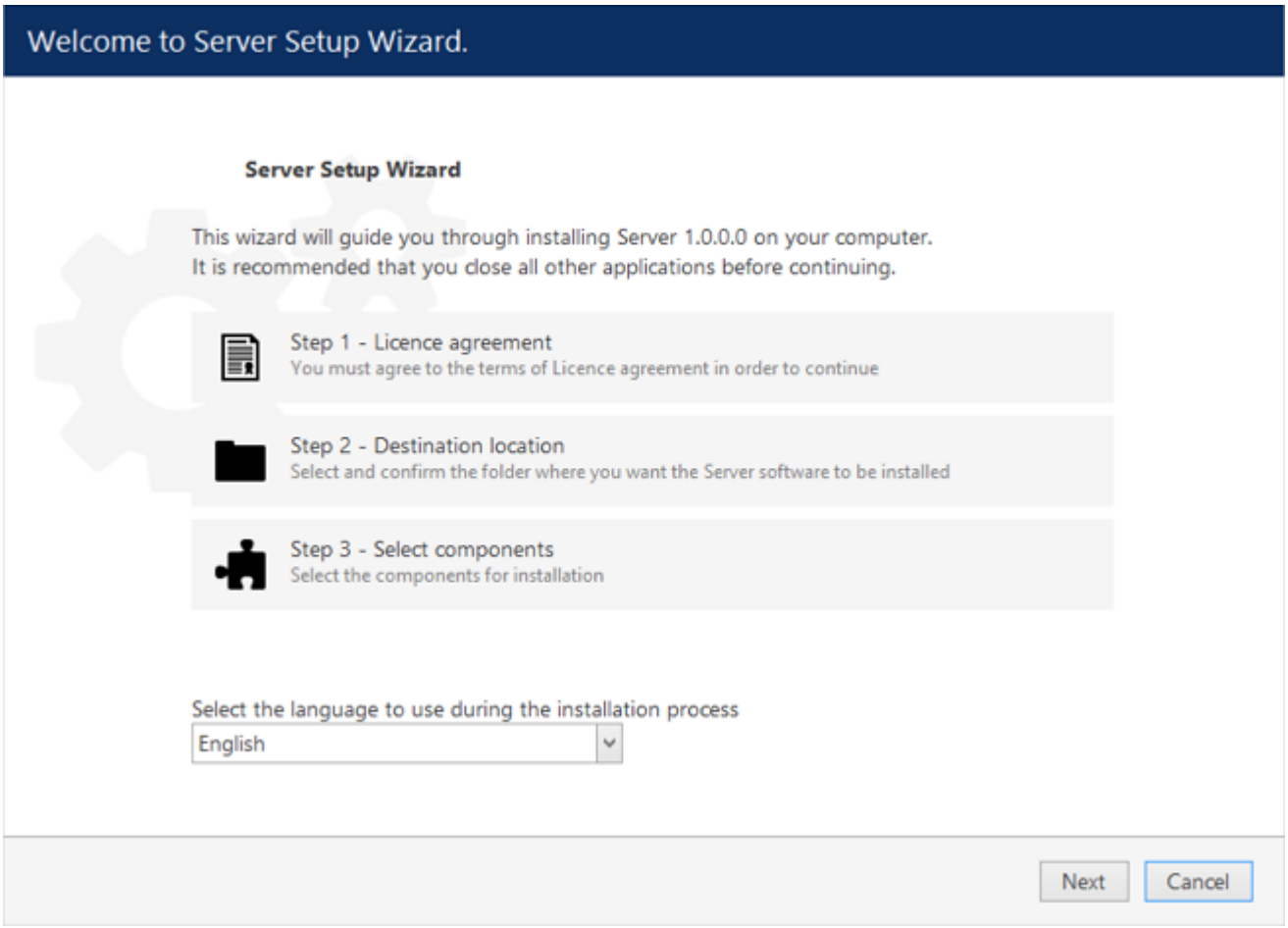
1.5 Installation of Ganz CORTROL Server

Start the installation process by double-clicking on the Ganz CORTROL Server executable package file. The setup wizard will guide you through the installation process, providing available installation-time options depending on the chosen software package. Note that, depending on your Windows UAC configuration, you may have to confirm and/or provide administrative credentials.

We strongly advise that you stop all running third-party applications, as well as stopping antivirus scanning and Windows (and any other) updates during this phase, as these may interfere with the process and result in corrupt installation, which may cause unexpected behaviour and hard-to-track issues during further software operation.

The installation wizard displays an overview of the process; also, you are able to select the installation language here. You will be prompted to select the Ganz CORTROL Server interface language later.



Ganz CORTROL Server Setup Wizard

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Step 1

Carefully read the CBC AMERICA LLC license agreement: you must agree to all parts of the given document in order to proceed. If you agree, select *I agree...* in order to continue; otherwise, terminate software installation. If you have any questions regarding the contents of the present license agreement, please contact cortrol@cbcamerica.com.

License Agreement

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Step 2

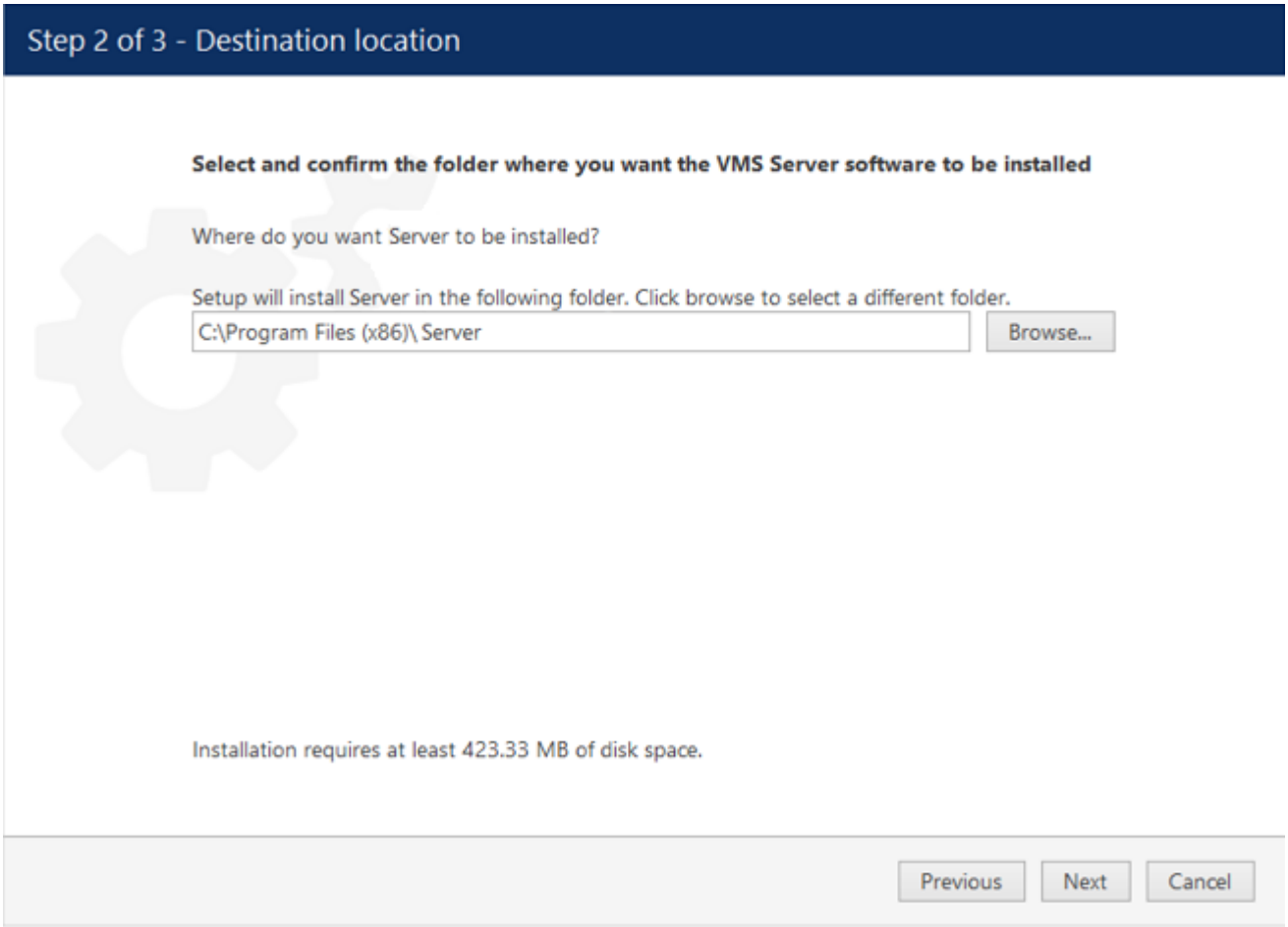
Select the destination folder you want the software to be installed in. By default, Ganz CORTROL Server is installed in:

32-bit: *C:\Program Files (x86)\CBC AMERICA LLC\Ganz CORTROL Server*

64-bit: *C:\Program Files\CBC AMERICA LLC\Ganz CORTROL Server*

If you are re-installing Ganz CORTROL Server and previously selected a non-default location, make sure to select the same destination directory, or, alternatively, completely uninstall previous Ganz CORTROL Server version. If unsure about this, ask for CBC AMERICA LLC technical support team assistance. A full description of the software upgrade procedure is available in the corresponding section of the Ganz CORTROL administration manual.

The setup wizards estimates how much disk space will be required. Make sure you have enough free space on the target disk. Note that low system disk space will dramatically decrease system performance and affect overall system stability.



Installation Directory

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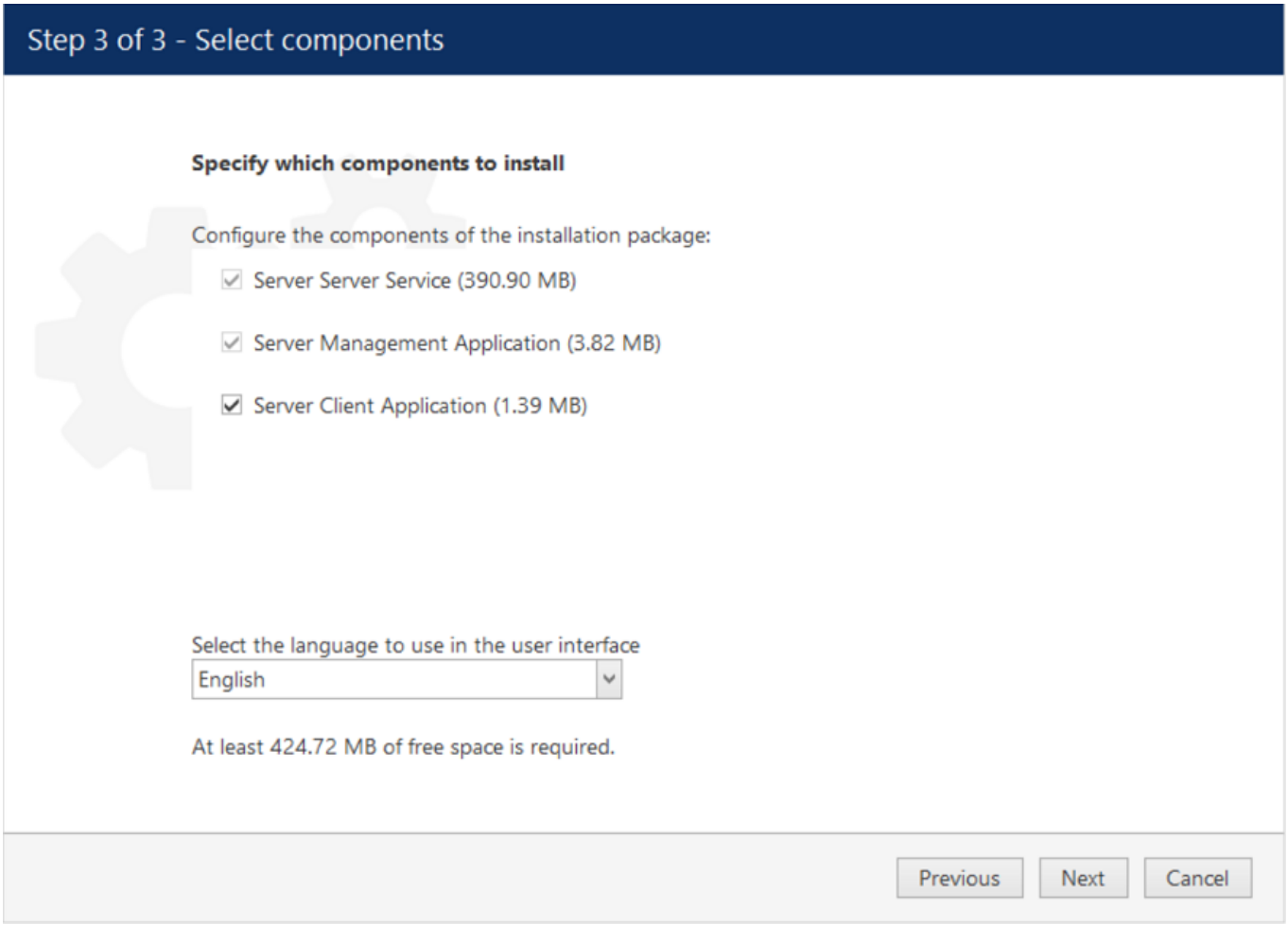
Step 3

Some components are optional and so you can choose not to install them. The main Ganz CORTROL Server parts are obligatory and cannot be deselected (by default, these options are selected and greyed out).

If not chosen at this stage, Ganz CORTROL Client can be installed separately later.



Select Software Components

If you are ready to proceed, click *Next* to begin the installation. Depending on selected components and host system condition, the process may take some time to complete, so please be patient.

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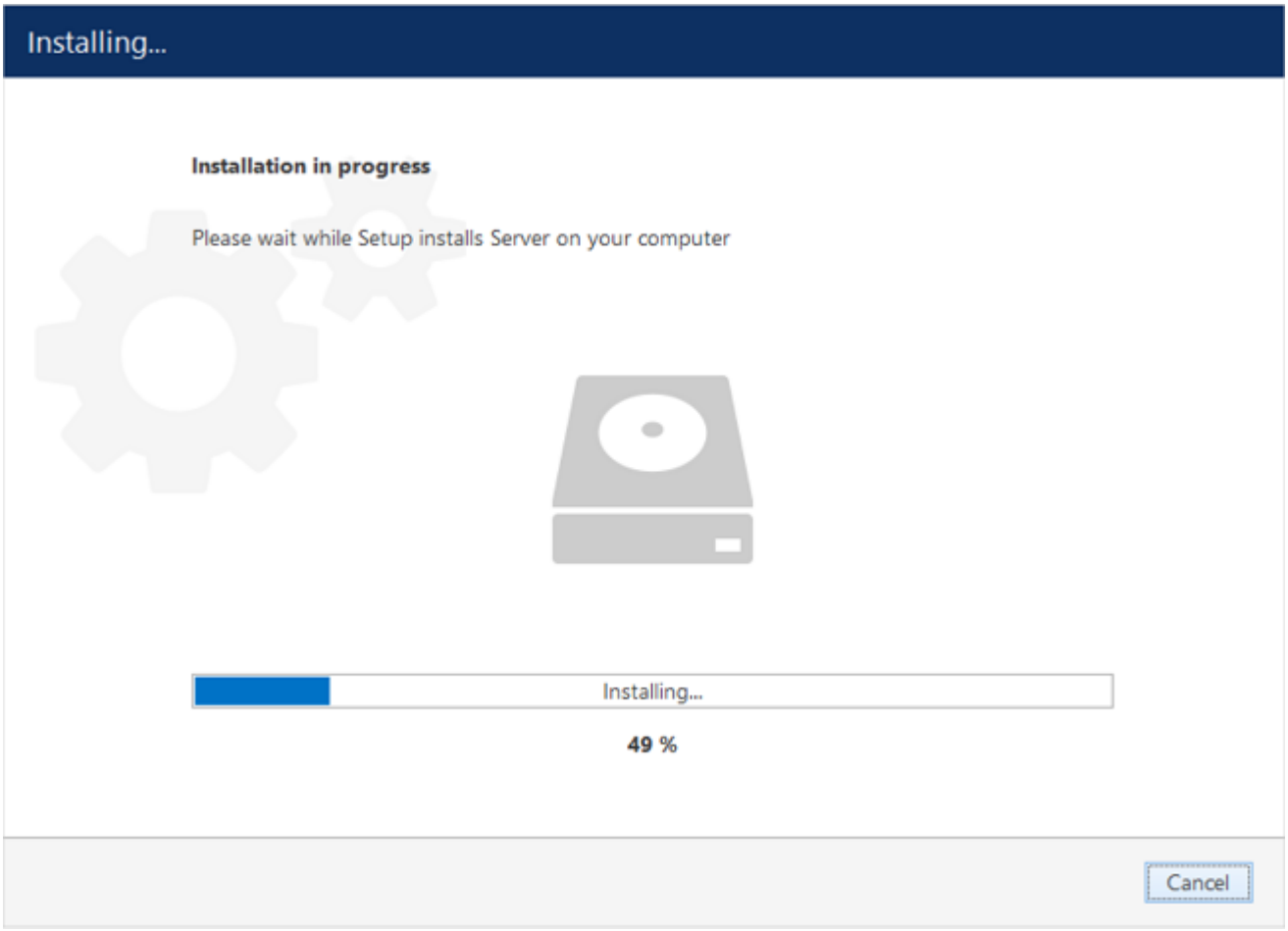

Installation Progress

Upon completion, the setup wizard will show you an installation summary. If all the steps have been fulfilled successfully, simply click *Finish* to close the wizard.

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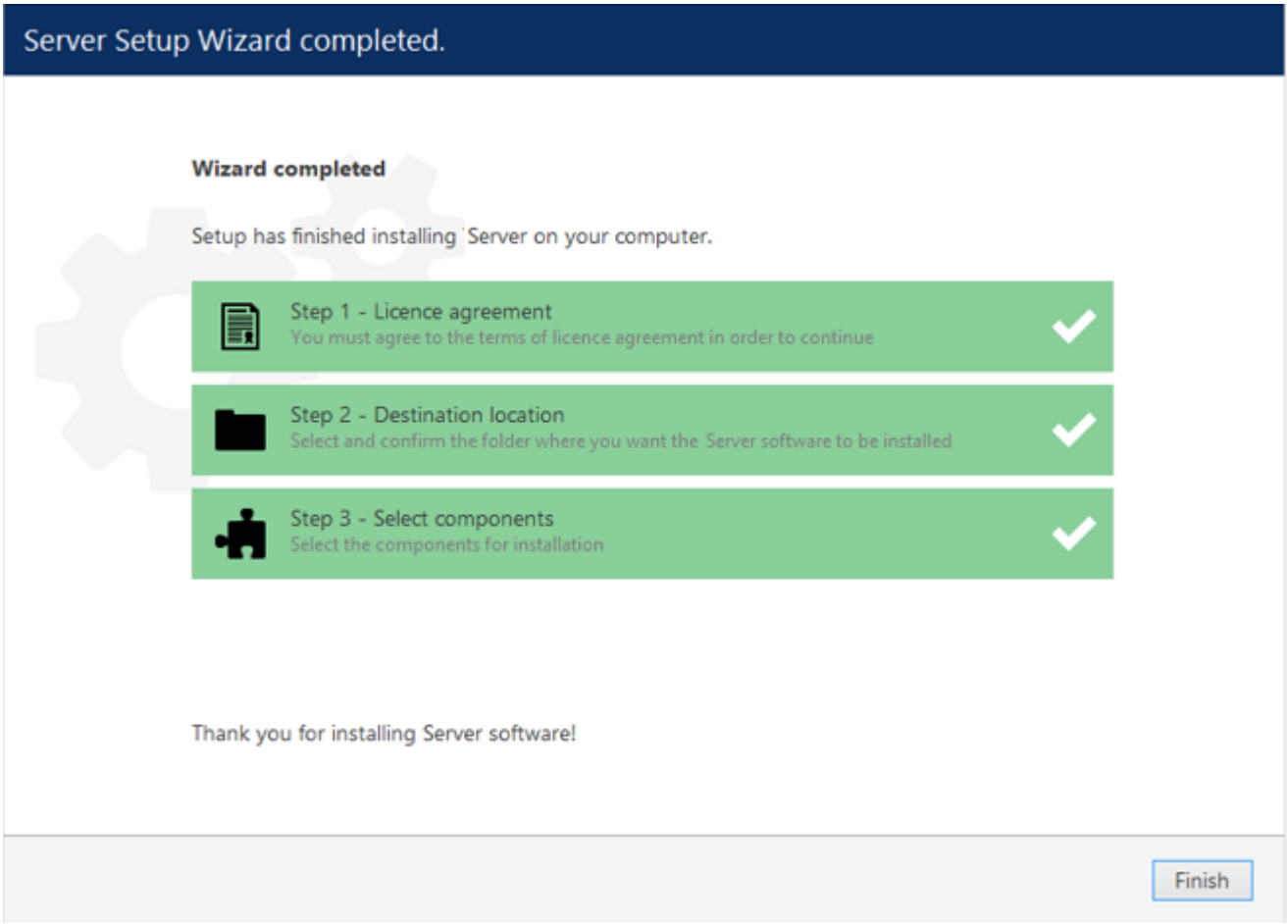

Installation Complete

After the installation has been completed, there are a few more steps necessary for you to begin using the software:

- apply server initialisation settings via *Server Setup Wizard* - it will pop up automatically after the installation in case you are doing a clean or a new installation
- activate the software - if it is not activated, the wizard will also pop up automatically
- after you run the console for the first time, you will be offered to complete the *Setup Wizard* to start the deployment, following the recommended configuration steps

All of these steps are described in details in the full version of the Ganz CORTROL management manual, which is available right after the installation via your Start menu.

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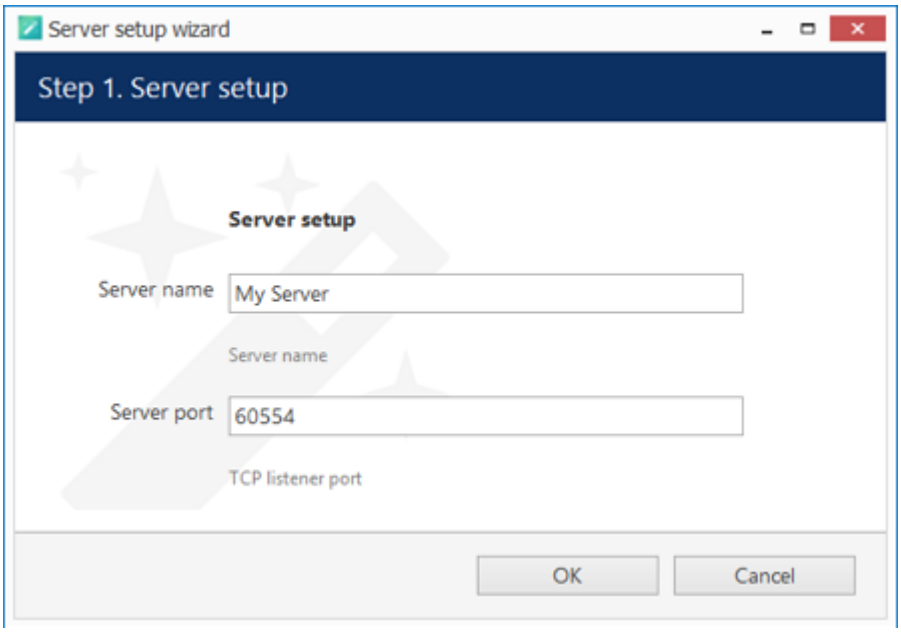
1.6 Initialisation and Remote Upgrade

After completing the installation wizard, you will be offered to enter server setup. The settings selected during server setup can be changed later at any time via Server Setup Wizard, which will be available via your Start menu.

> ⚠ You will be unable to connect to the server that has not been initialised, it will return an error (*The server is not configured*).

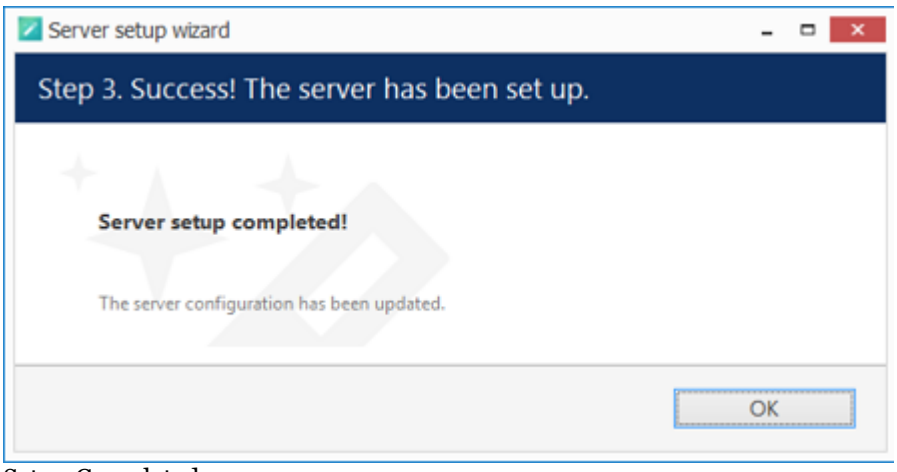
This step is **mandatory**; you will be unable to connect to your server and configure it if it has not been initialised. It is necessary to initialise the server even if you are planning to restore its configuration using the Server Backup and Restore Wizard later.



Choose Server Title and TCP port

Setting	Description	Default Value
Server name	User defined server title	*Server Title* or last used title
Server port	TCP port for the incoming remote Ganz CORTROL Client connections	60554

Note that the port defined here will be used to retrieve the server data via local Ganz CORTROL Client and Ganz CORTROL Console connections. You will need to define the external (Internet) port for your Ganz CORTROL Server via Ganz CORTROL Console in order to be able to receive video streams from remote Ganz CORTROL Client connections.



Setup Completed

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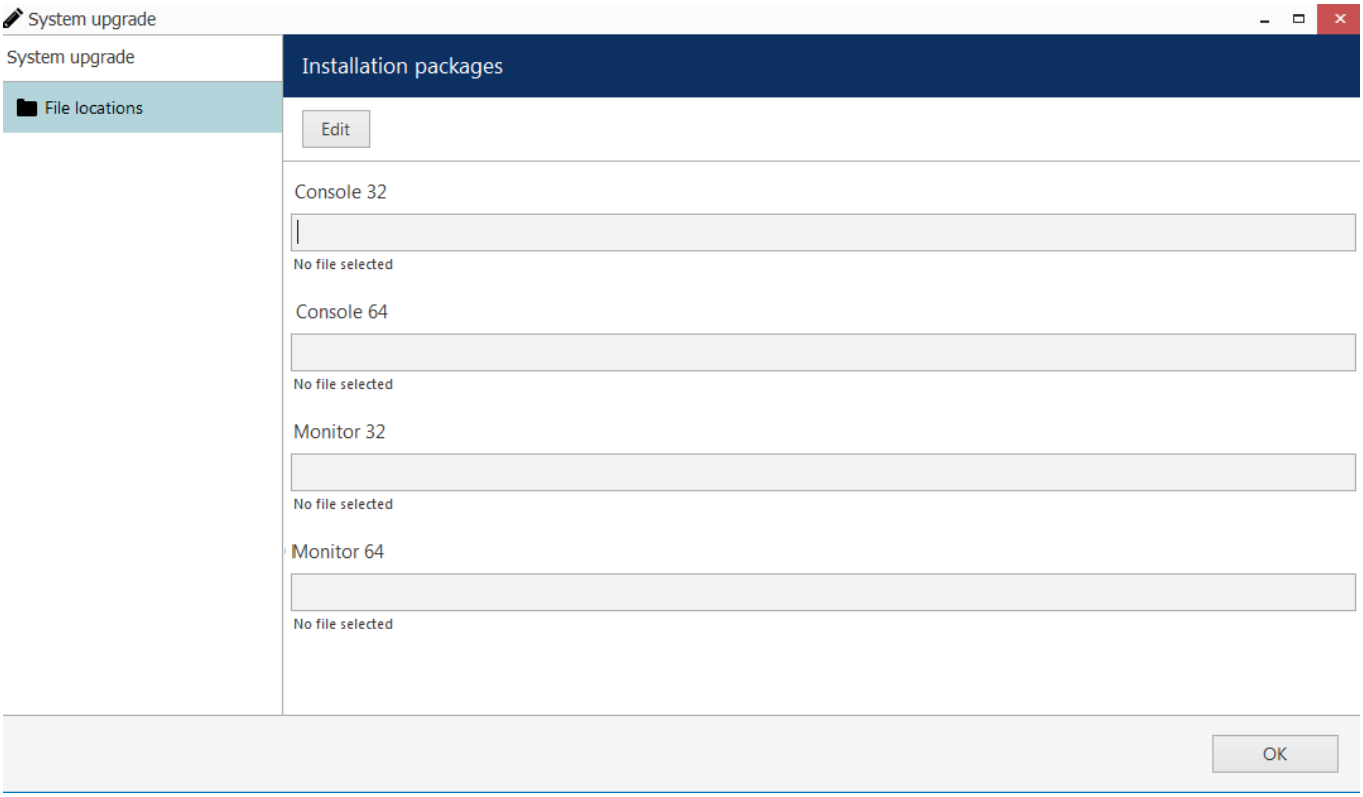
Remote Upgrade

Starting from software version 1.10.0, it is possible to apply remote upgrade to Ganz CORTROL Console and Ganz CORTROL Client components from the Ganz CORTROL Server server. This feature allows you to deploy remote client machines once and then easily handle the upgrades from any place, keeping the whole system up to date with little effort.

Once you have upgraded the Ganz CORTROL Server server to a newer version, you can then put the installation packages of the same version onto the Ganz CORTROL Server server computer. The idea is that you first define the location of the executable files and then remote Ganz CORTROL Client and Ganz CORTROL Console applications receive an update notification. The locations must be on the Ganz CORTROL Server server machine, even if you are accessing the server from a remote Ganz CORTROL Console. The installation itself is initiated from the remote client side.

To access the remote upgrade feature, open your Ganz CORTROL Console application, click the main application menu button in the upper-right-hand corner and choose the *System upgrade* option. The *System upgrade* dialog box will appear.



Specify files for the remote upgrade

Here, you have four entries - for 32- and 64-bit editions of Ganz CORTROL Console and Ganz CORTROL Client applications. These installation files can be downloaded from http://ganzsecurity.com/cortrol. Specify the path to each file and click *OK* to save.

> ⚠ **Do not use beta versions** of the installation files on production servers.

Now, if a remote Ganz CORTROL Console or Ganz CORTROL Client application of an older version is used to connect to this server, it will receive a notification about the available upgrade. The notifications can be disabled in the application settings.

So, if Ganz CORTROL Console or Ganz CORTROL Client detects that an upgrade is available, it will offer you to download it straight away. If your network connection allows it, click *OK* to agree and download the upgrade package.

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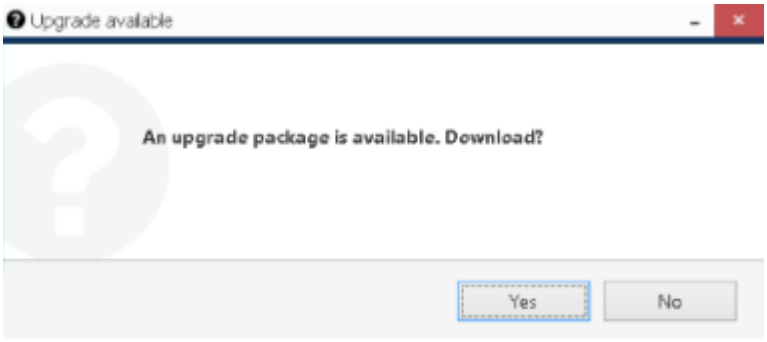

Ganz CORTROL Console application offering an upgrade on startup

The upgrade package will be downloaded using your default Web browser and saved on your local computer. You can start its installation at any time, provided that your Windows user has enough privileges to run the installation. After the installation, just start the application as usual.

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1.7 Software Update and Uninstall

This topic provides guidelines on the installation management use cases.

We recommend that you keep the software version up to date, as new versions include new features, various improvements and optimizations, as well as the latest bug fixes.

⚠ We strongly advise that you keep the software versions (e.g., 1.**x.**x) and subversions (e.g., 1.2.**x**) across your system match exactly. Software build numbers (e.g., 1.2.0.**xxxxx**) may differ slightly in case your are using 64-bit and 32-bit editions.

⚠ Before starting the upgrade/uninstall procedure, ensure that all Ganz CORTROL processes have been terminated and that Ganz CORTROL files are not in use: this is necessary in order to upgrade all files to the newer versions. This includes any Ganz CORTROL processes or related applications that are running, and also any third-party applications that have access to Ganz CORTROL files, e.g., antivirus scanners, third-party integrations, etc. Ganz CORTROL processes can be found via Task Manager: these start with *VMS*, e.g., *VMSServer.exe*.

If the processes are not stopped, or if other applications are still interfering with the process, you may be asked for a **reboot**: in that case, please restart your server machine afterwards to complete the action. This will not affect the overall process quality.

Upgrade Software

This section describes manual software update (newer version installation on top of the older one) by running the installation **locally**. For remote upgrades, see the corresponding section of this document.

Before starting the software upgrade:

1. Make sure there are no other running installations and that the operating system is not in the middle of installing updates. If Windows updates are pending, apply them, then restart the computer (if required), and start the Ganz CORTROL upgrade.
2. Verify that the operating system is stable and is running normally (check system logs, overall health) - these must be no "blue screens", unexpected shutdowns, slowdowns etc. (Normally, we recommend that you regularly run such system checkups, not only before upgrade).
3. Ensure stable power and connectivity (the latter is essential if you are connected via RDP).
4. See if there are any special requirements or recommendations from CBC AMERICA LLC regarding the target version. Usually, these are either mentioned on the download page, or provided alongside the download links in case the new version was recommended and sent by our engineers.
5. Check your software license subscription, and renew it, if necessary: the subscription must not run out before the target version release date. You can check the software release date by right-clicking the installation file > *Properties* > *Digital signatures* > see timestamp. The license information is available via license manager, *Ganz CORTROL Activation Wizard*.

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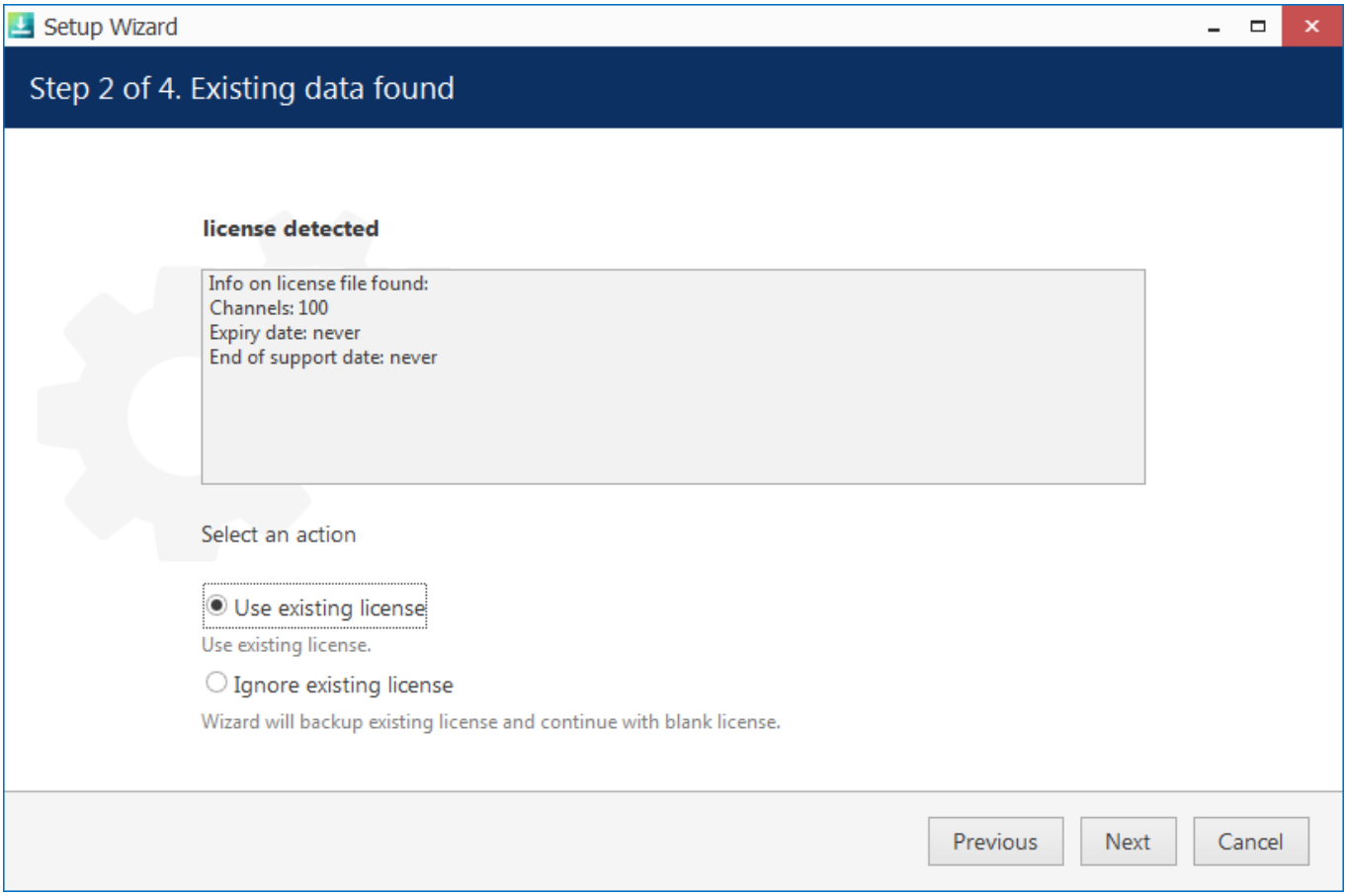

Choose license preference for the upgrade

If you launch a newer version installation package of the same kind as the already installed Ganz CORTROL edition, you will be given the option to **upgrade** the product. It is not possible to install another type of package on top of the existing one, e.g., Ganz CORTROL Recorder on top of Ganz CORTROL Server: if you wish to change the server type, uninstall the old software package first.

Press *Next* to go through the steps and complete the wizard, which is very much alike the installation wizard. At each step, read all the information displayed and press *Next* until finished.

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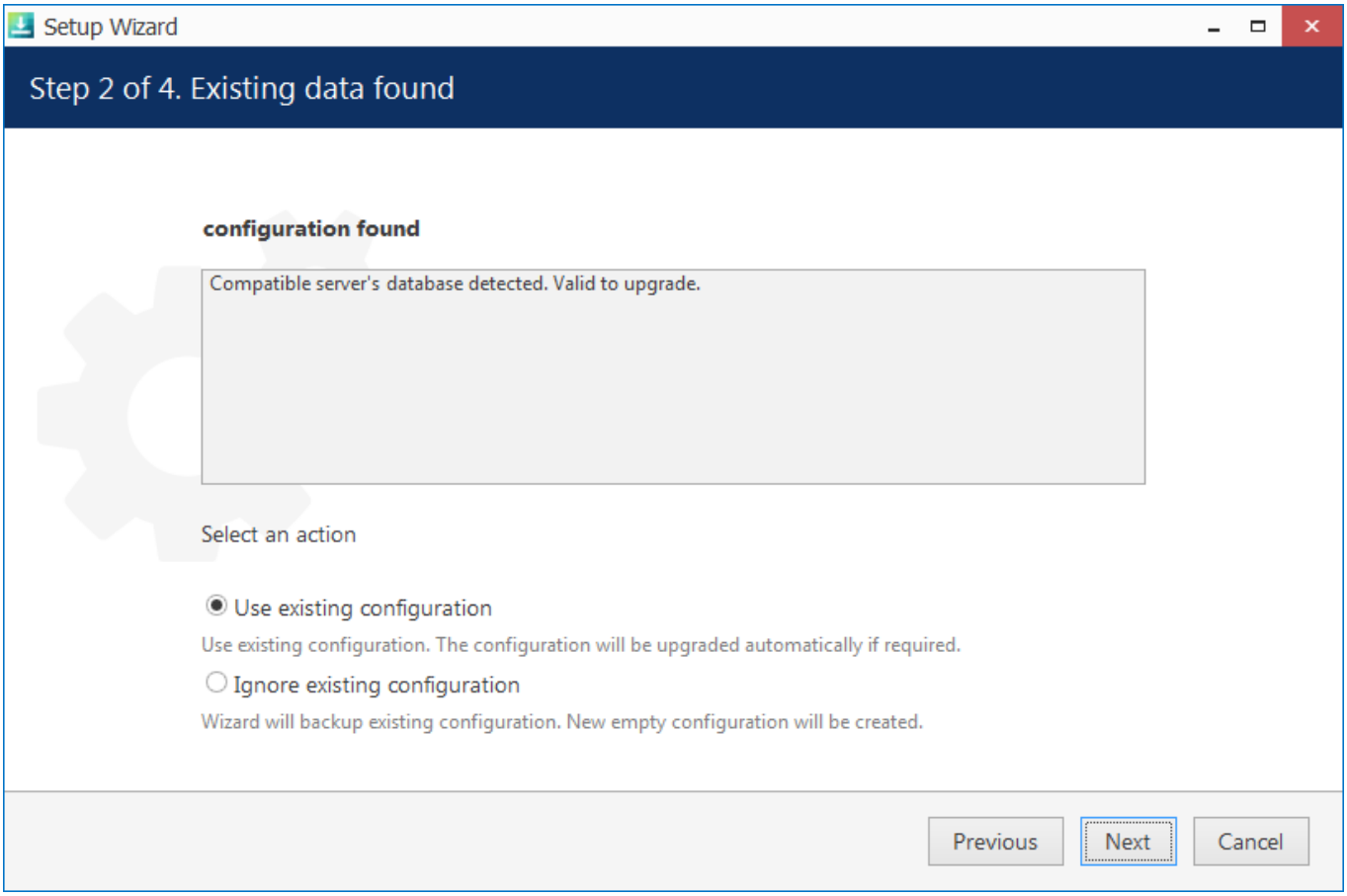

Use existing database configuration

If you want a clean installation, choose to ignore the existing **configuration**: the current database will not be used and will be replaced with an empty one, as if you were installing the software from scratch. Otherwise, leave the wizard to use the existing configuration. In either case, the old database is not actually removed but is saved as a backup, so you will be able to load it anytime later via Backup and Restore Wizard.

In case the installation wizard detects your **license subscription** has run out, you will get a **warning** about license compatibility. By default, the initial subscription will allow for version upgrades during 2 years, starting from the license activation date. Hence, if the target upgrade version is newer, this warning will pop up.

- If you have already acquired a subscription upgrade, proceed with the installation, then run the license manager and upgrade your license in either online or offline mode
- Otherwise, cease the installation and choose another software version that was released before the license subscription ran out (or continue using the existing version)

You can contact our sales department via cortrol@cbcamerica.com or via direct manager contact to learn about the license subscription options and price offers.

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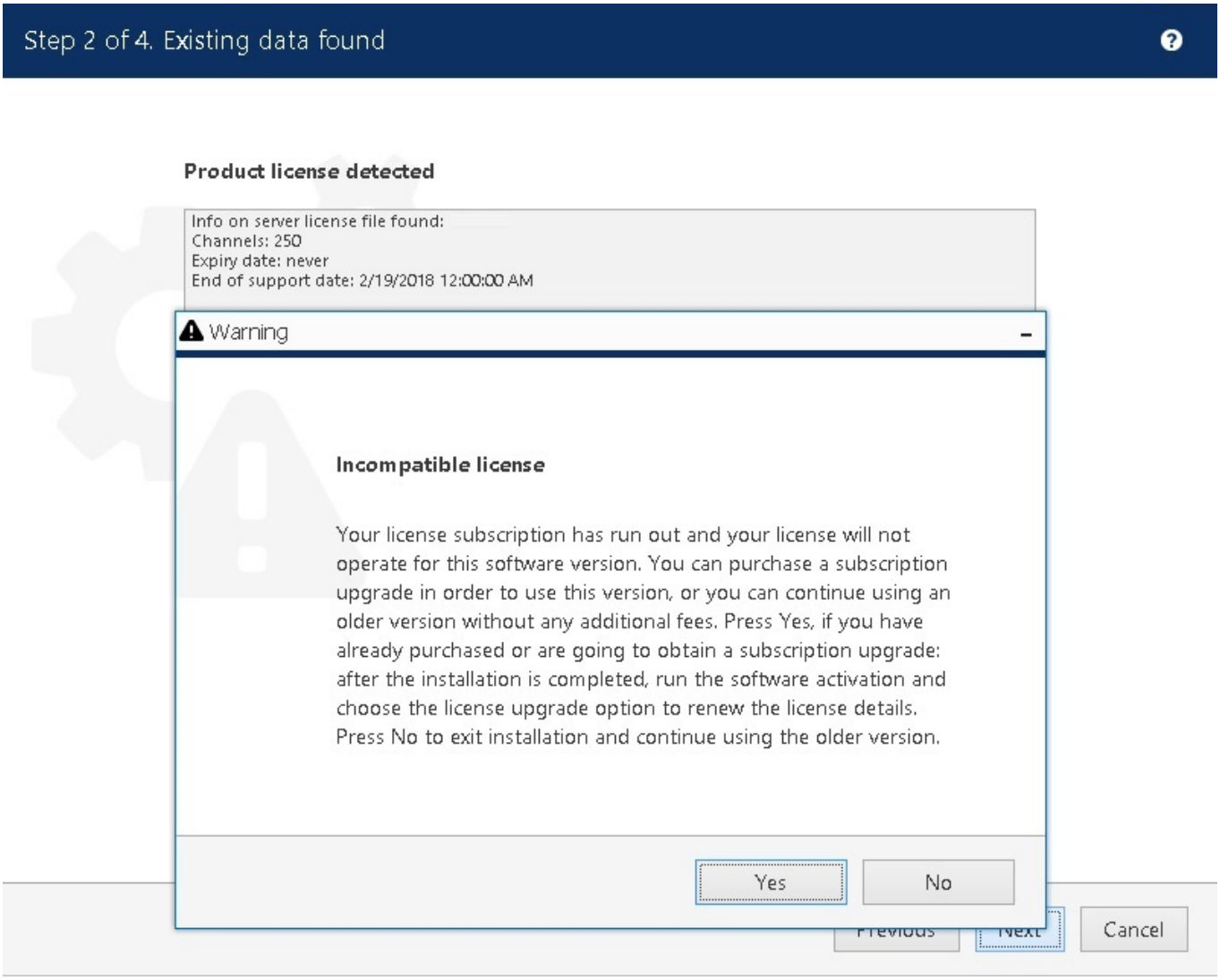

If you proceed with the upgrade but do not provide a valid license after the installation is complete, the software will not operate. Therefore, do not proceed with the upgrade until you have renewed the subscription.

To verify the software release date against your license subscription expiration date, right-click the installation file > choose *Properties* > go to the *Digital Signatures* tab and check the timestamp.

If some of the files cannot be upgraded because they are in use, you will get a corresponding warning.

- Choose *Ignore* to proceed with the installation: reboot may be required afterwards but it is safe to select this option, esp. if the processes are from Ganz CORTROL; or
- Stop the listed applications/services and click *Retry* to continue installing the software, or
- Click *Abort* to roll back the installation (the process will be cancelled and you will get a corresponding error in the wizard's dialog box).

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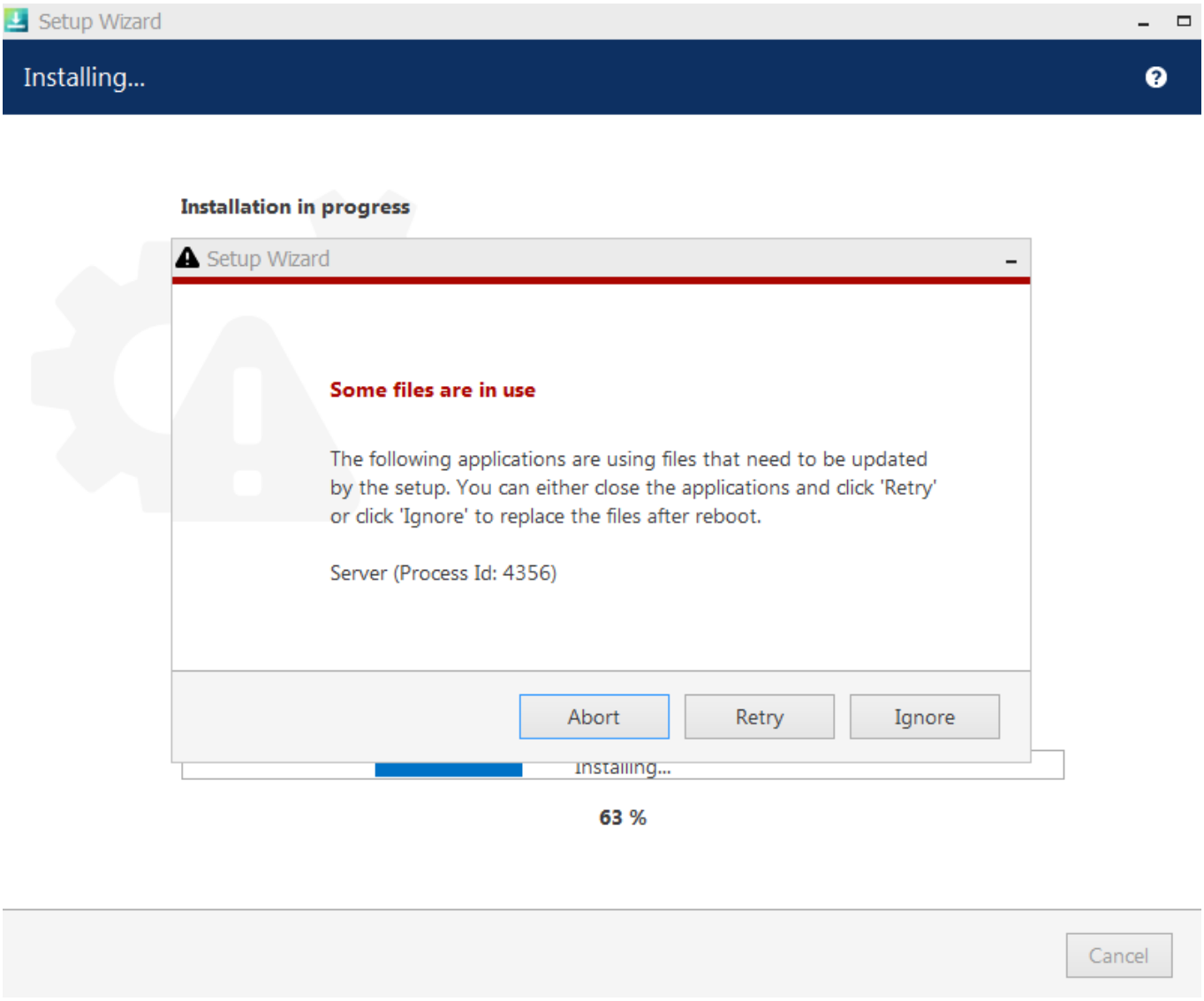

Click *Ignore* to proceed with installation (reboot may be required afterwards)

The upgrade process will then continue and replace your Ganz CORTROL software version to the newer one.

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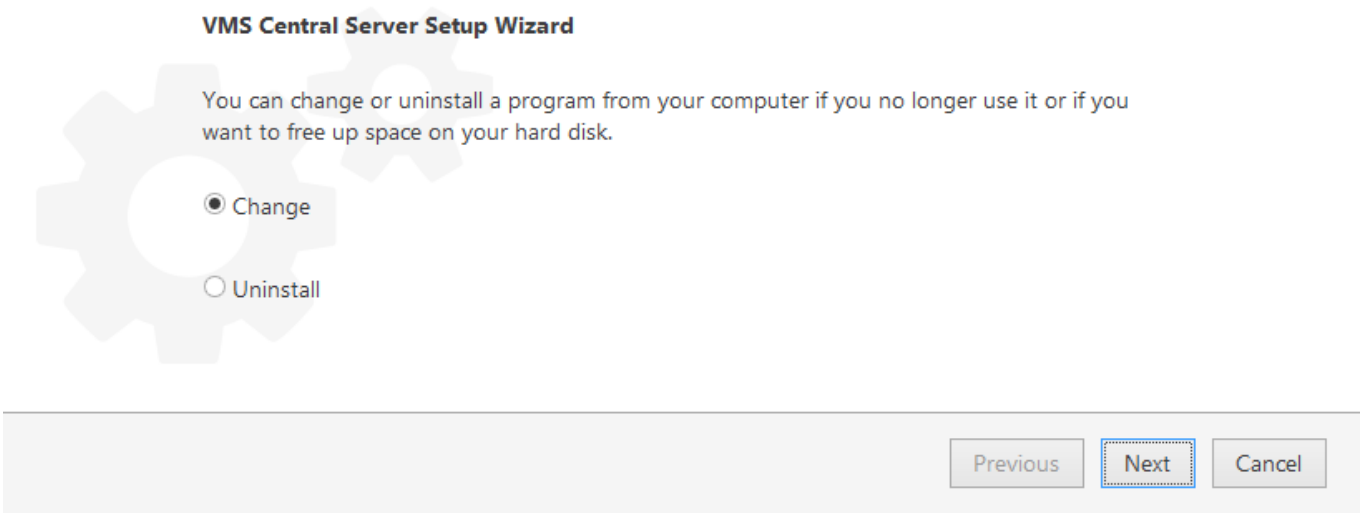
Uninstall/Change Software

Software can be uninstalled in two ways:

1. From the Windows Control Panel
2. By launching the same package that was used for installation

In either case, you have a choice between changing and uninstalling the product.

> ⚠ Before making any changes to the installation, make sure to close and stop all software services and applications. If processes are not stopped, some of the software components may not be removed or replaced during the installation process.
>
> In order to check this, open Windows Task Manager, select *'Show processes from all users'* and make sure there are no processes starting with 'VMS..'. If there are any, stop them manually and then proceed with the installation changes.



Change or uninstall the product

Select *Change* if you wish to re-install or add software components. The process will be similar to the initial installation.

Select *Uninstall* to remove all software components. You will be asked if you wish to keep the configuration and the current license; the following common use cases apply:

- keep the license and remove the configuration if you wish to re-configure everything from scratch after re-installation (e.g., in event of a corrupt database or having to move the server to a different system);
- keep both if you are going to clean install the software;
- remove both if you do not intend to use the software on this machine anymore.

Press *Next* to proceed with the de-installation process. Note that you may have to confirm these changes if UAC has been turned ON.

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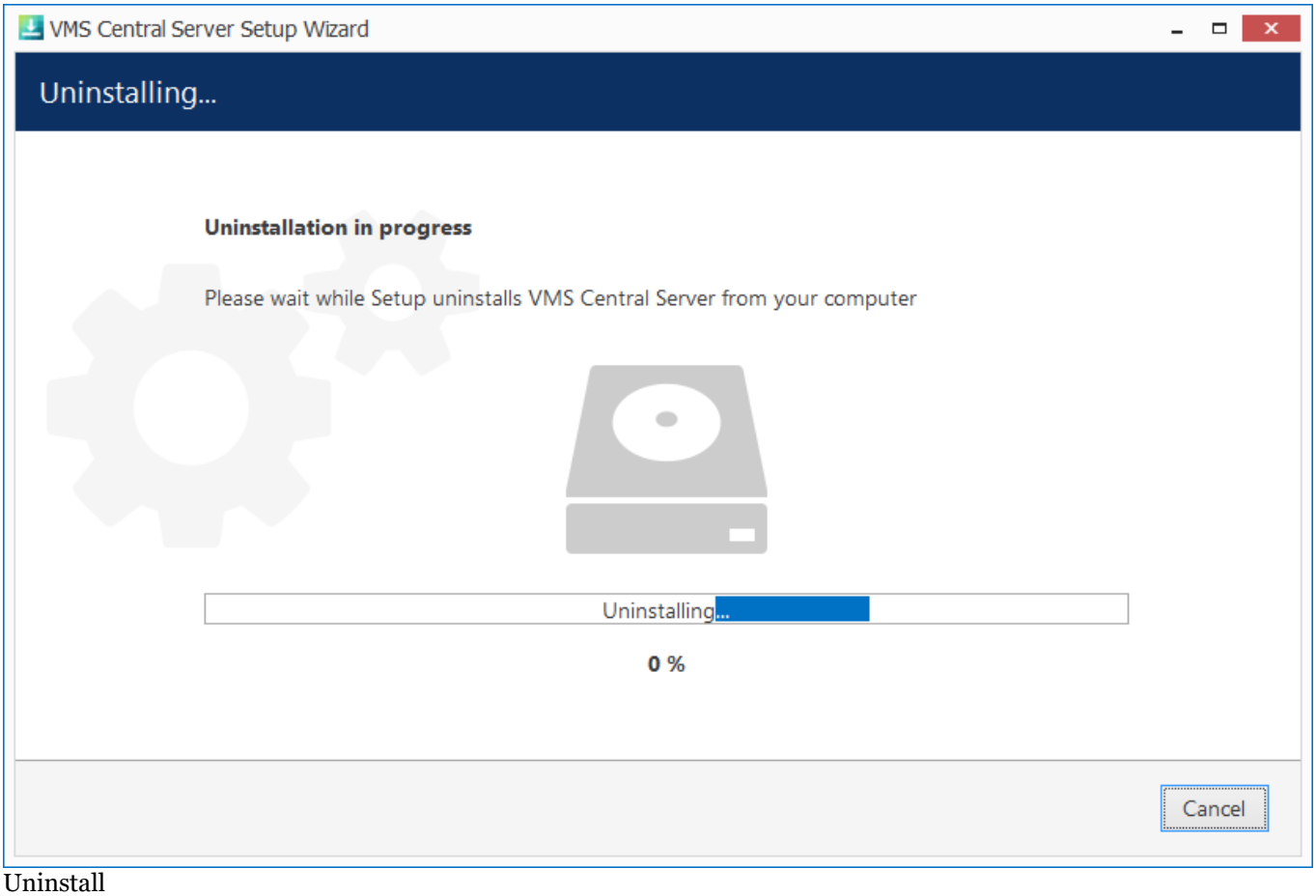
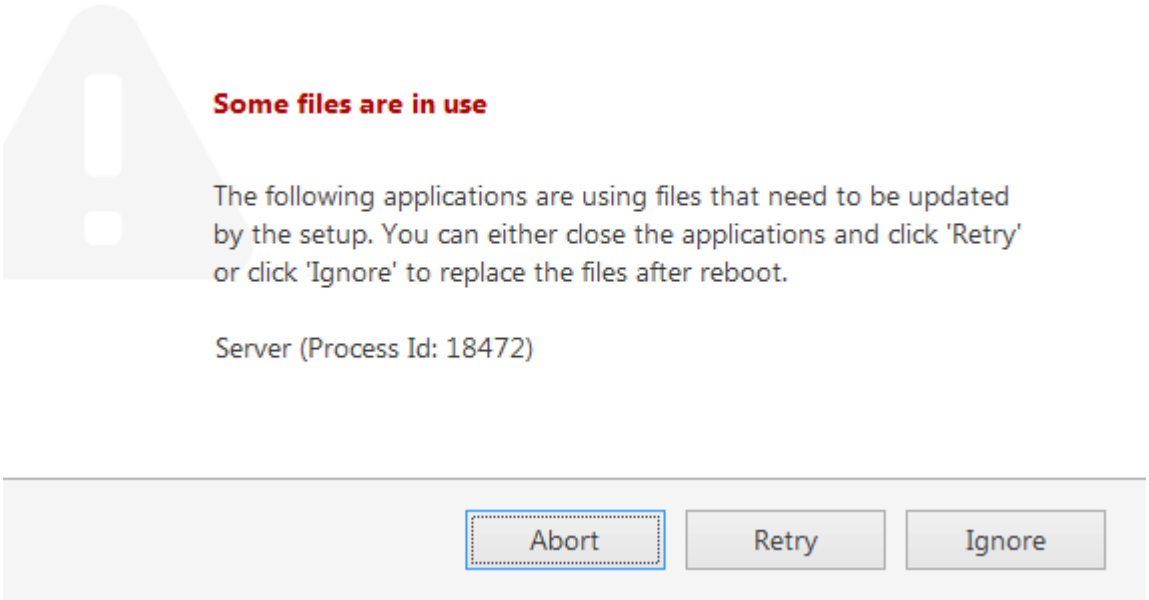


Uninstall

If you did not stop the Ganz CORTROL server before starting the uninstall process or if some third-party software (e.g., antivirus) has locked Ganz CORTROL files, you will get a warning.



A warning about some files being locked by a process

In this case:

- choose **Abort** to cancel the uninstall process
- stop the processes manually yourself and then click **Retry**

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- click **Ignore** to let the wizard handle the files automatically (recommended, an reboot may be required)

Generally, if you see that the process mentioned in the warning is Ganz CORTROL **own process**, simply choose the **Ignore** option and let the wizard do the job.

When the wizard finishes removing software components, hit *Finish* to exit.

Clean Install

Sometimes it is necessary to install software anew, i.e., to change software bit version, roll back version, and also in event of major software-related troubles.

> You can perform clean install yourself if you are already familiar with the software. If you are doing it for the first time, we recommend that the procedure is supervised by a CBC AMERICA LLC support engineer so that you learn how to do this quickly and effectively, avoiding possible mistakes.

> Although software upgrade is not possible with different bit versions, you can migrate your installation to a different bit version by performing a clean install.

To perform a clean installation, it is crucial to make sure that no CBC AMERICA LLC software processes are running, whether explicitly or in the background. Follow these steps:

1. Stop all CBC AMERICA LLC software services and/or applications;
2. Open Windows Task Manager, click *'Show processes from all users'* and check that there are no processes starting with 'VMS..'; if there are any, stop them;
3. Uninstall software as described above, keeping your license and configuration;
4. Install [new] software version, carefully following all steps and recommendations;
5. Start the software and check if the desired change has been carried out.

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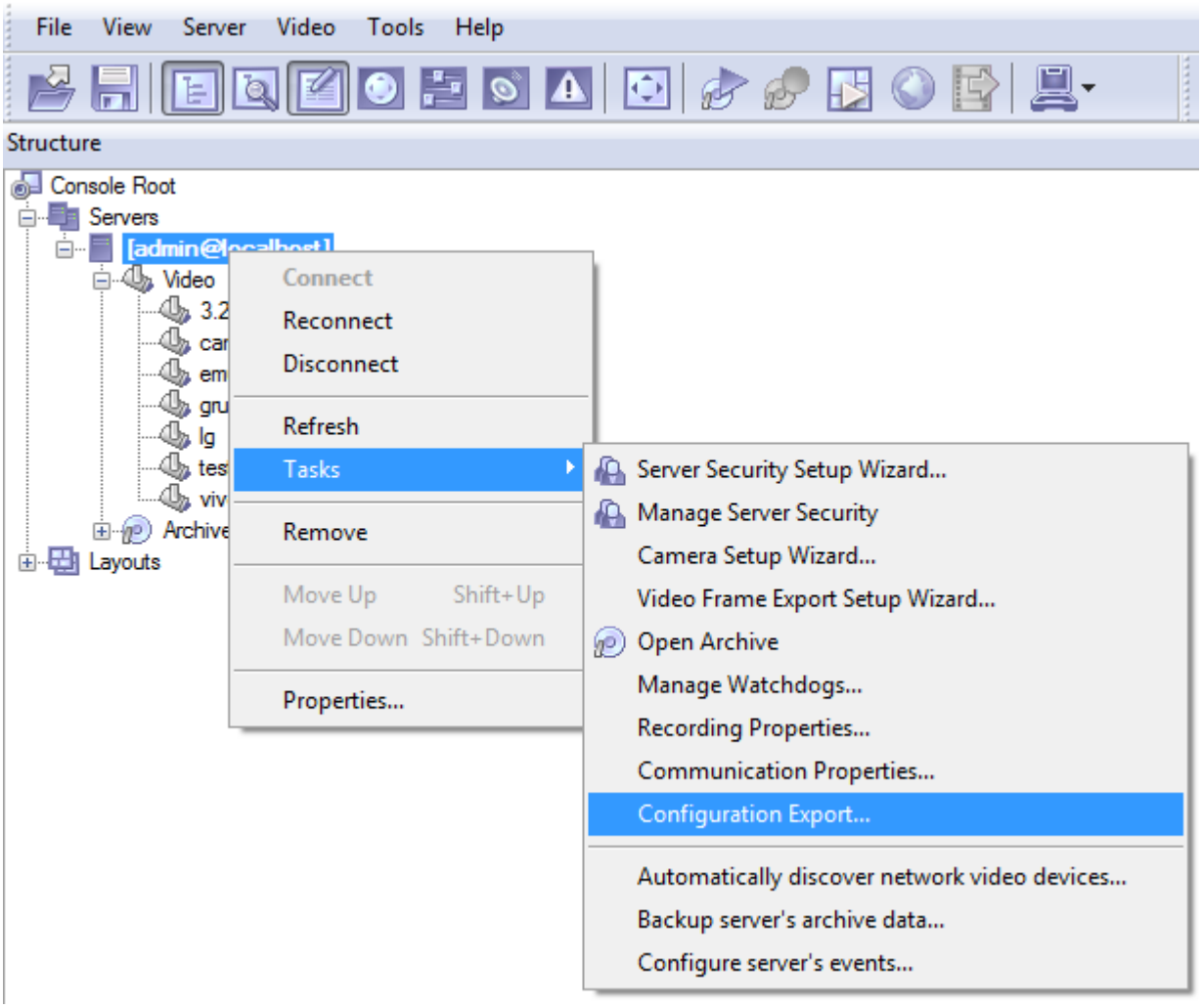
1.8 Migration From Previous Product Versions

It is possible to migrate the basic configuration from the older CBC AMERICA LLC software version, ZNSNVR. All you have to do is export an XML file from ZNSNVR and then import it via Ganz CORTROL Console.

> ⚠ In Ganz CORTROL version **1.6.0**, major changes were made to permission management. As a result, configuration imported from an **XML** file (from ZNSNVR) will **not** contain any user permissions: you will need to **review and set all user permissions after importing the configuration**.

In your ZNSNVR Client, right-click your desired server and choose *Tasks* -> *Configuration Export*.



Run *Configuration Export* from the server right-click menu

Export wizard will display a summary of all the exported resources and give you an option to save the configuration in XML format. In order to do this, click the *Export to...* button and choose a location and enter the filename, then click *Save*.

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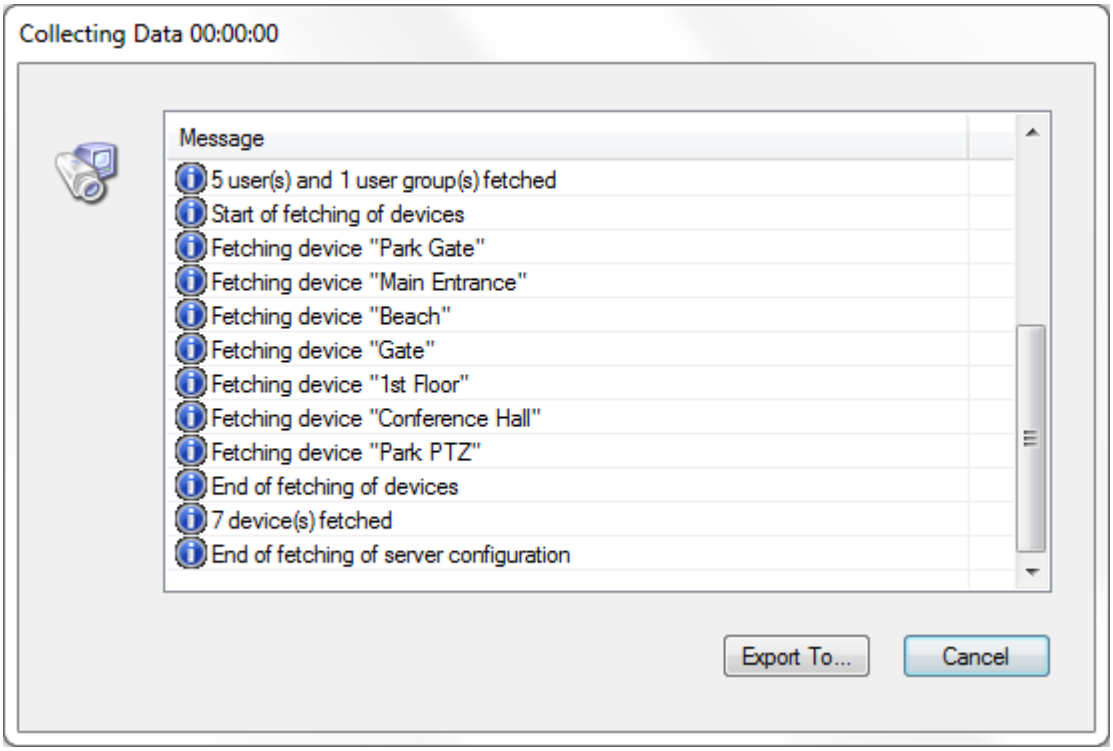
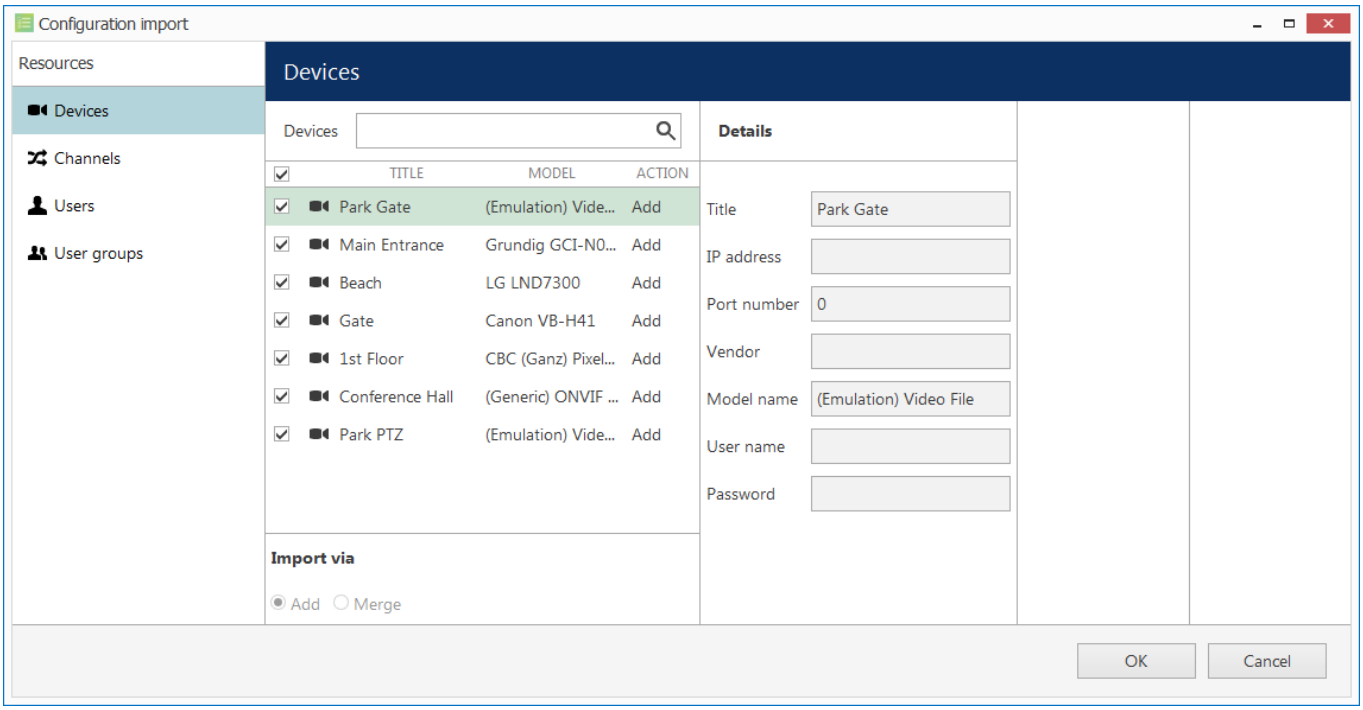


Export tool

Next, switch to your Ganz CORTROL installation where you want to load the configuration: open Ganz CORTROL Console and log into the target server. In Ganz CORTROL Console, click the application menu button located in the upper-right-hand corner of the Ganz CORTROL Console window and choose *Configuration import*. Locate your pre-saved XML file in the *Open file* dialog box and click *Open: Configuration import* dialog box will open, giving you the option to review the resources to be imported.



Choose devices to be imported

Review the list of devices to be imported from your pre-saved configuration; note that you can only view the settings but there is no option to change them. You will be able to alter device settings later, after you import the configuration. At this stage, you can choose whether or not the device will be imported: to do this, simply put a checkmark next to each device name. By default, all devices are selected for import.

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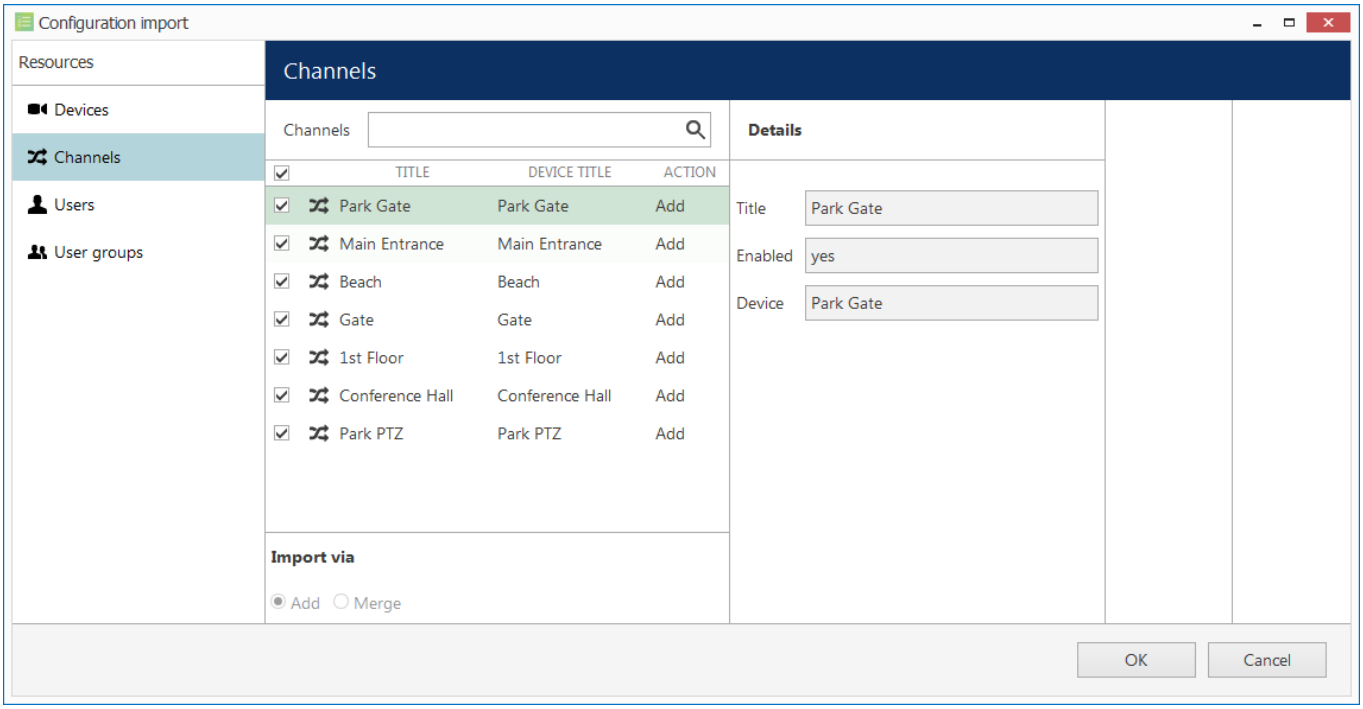
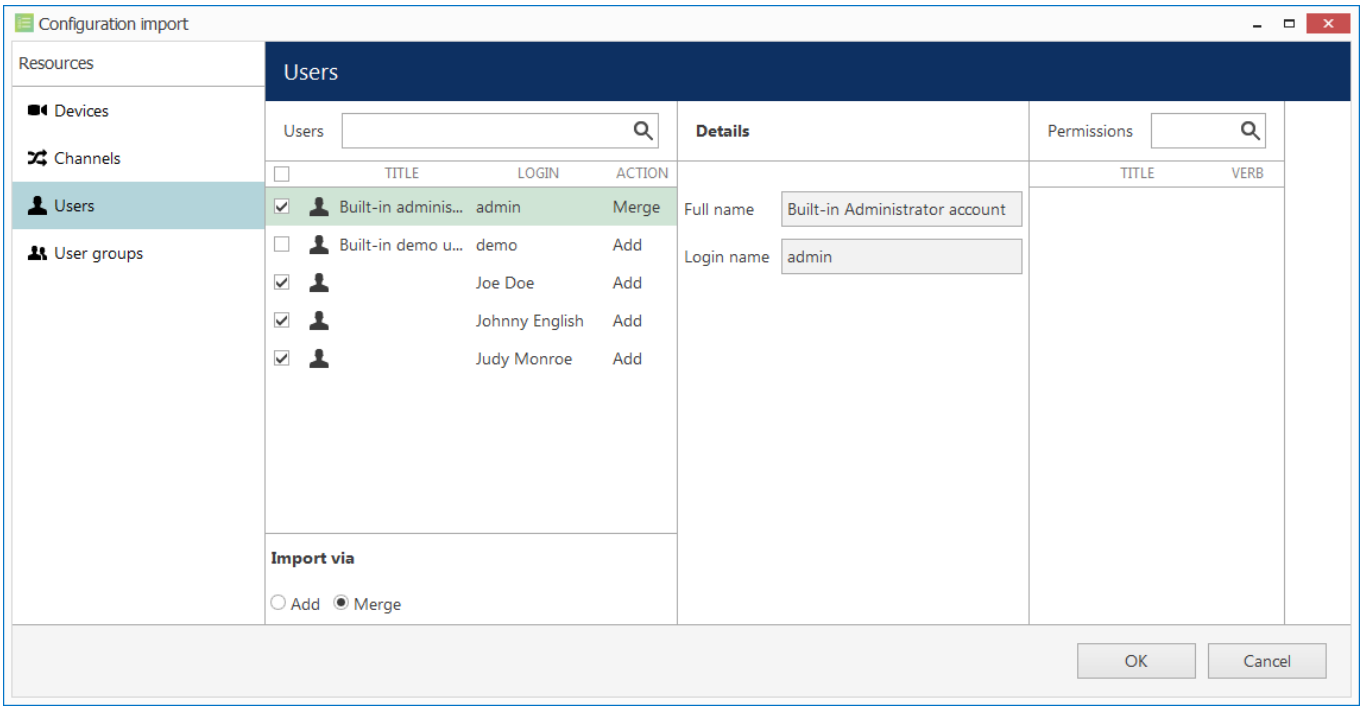


Choose channels to be imported

Next, switch to the *Channels* tab and review the channel list.



Choose users to be imported

When you have finished with devices and channels, review users and user groups to be imported.

If some resource is already present in Ganz CORTROL configuration, the wizard will mark the imported copy to be **merged** to the existing one; you can change this by selecting the desired resource and choosing the import type below: *Import via -> Add/Merge*. Merging means that user permissions are extended and in case of any differences Ganz CORTROL settings have priority. Otherwise, the import wizard will simply **add** the target resource to your configuration and action type choice will be grayed out.

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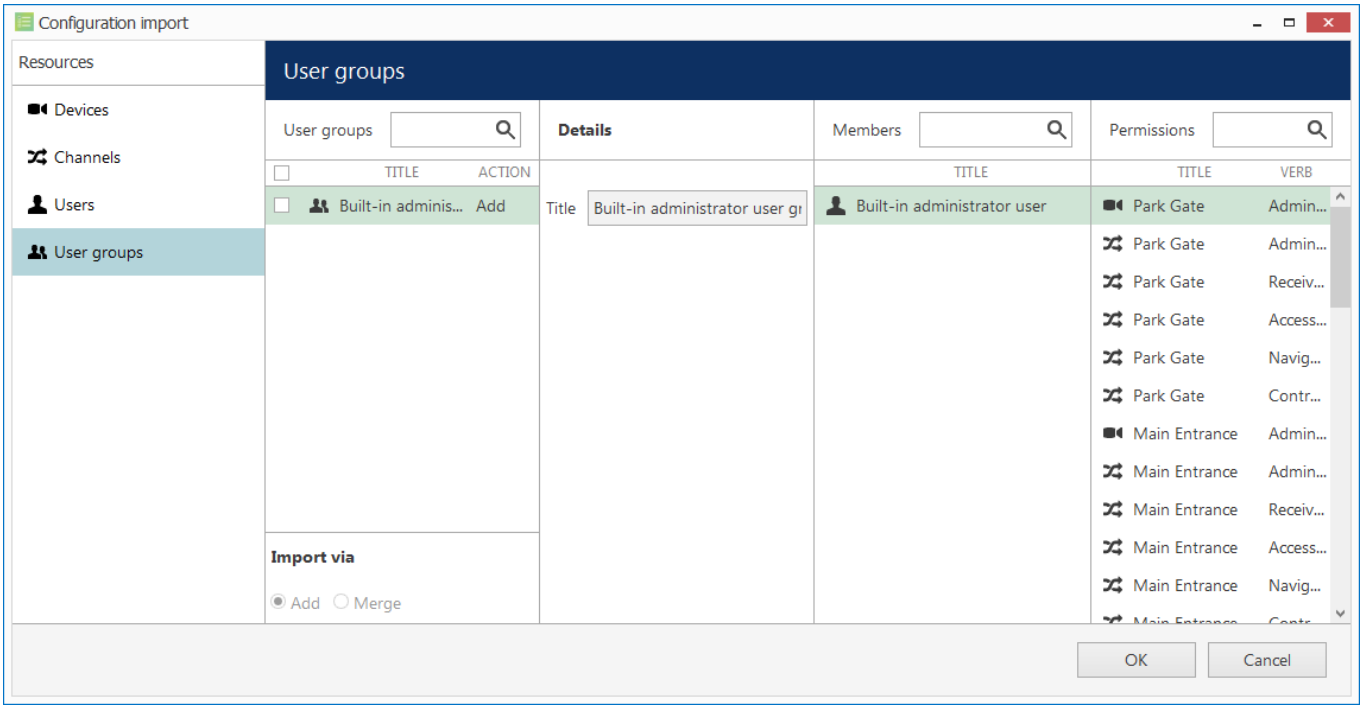
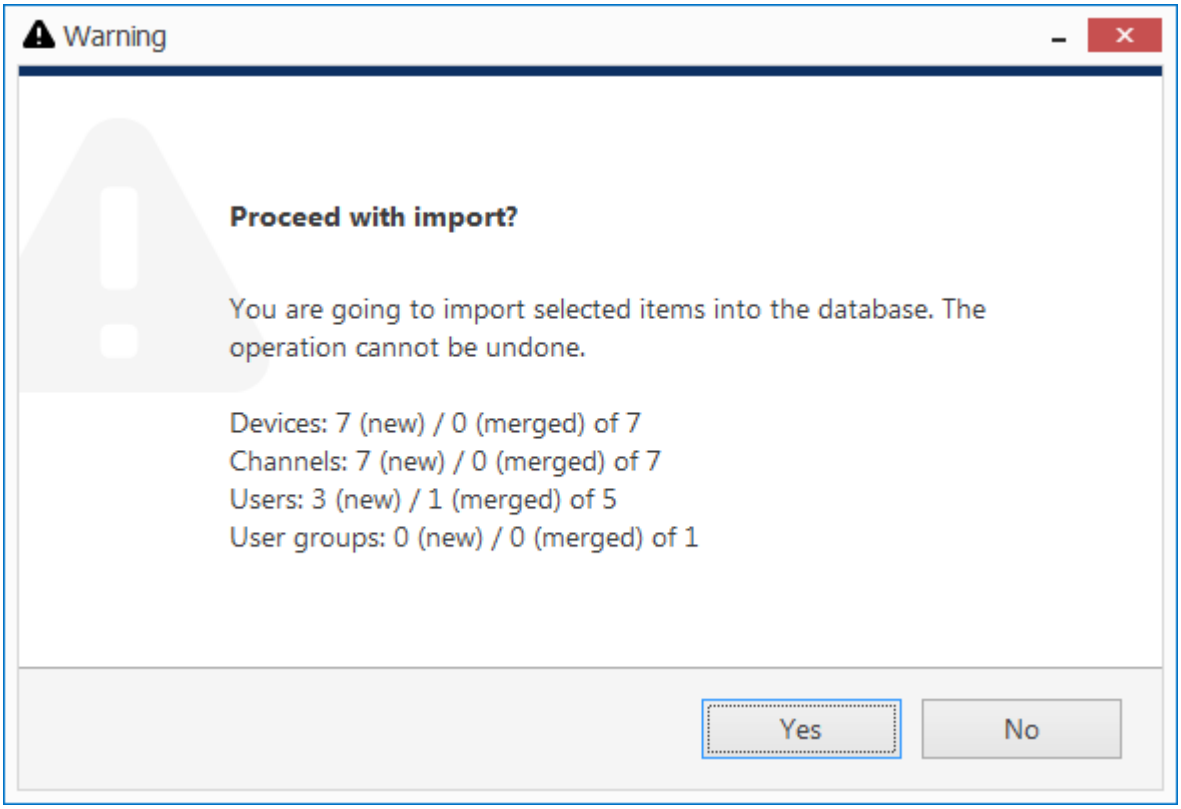


Choose user groups to be imported

When you are done, click OK to import the configuration. Ganz CORTROL will show you a short summary and ask you to confirm the action.



Confirm import

After the import, you will be able to edit the newly added resources as usual via corresponding menu sections.

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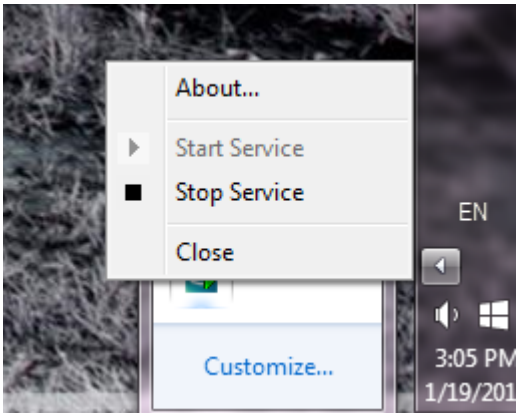
1.9 Start & Stop Server Service

After software installation (except for the Ganz CORTROL Console or Ganz CORTROL Client only installations), two components are registered as **Windows services**: CBC AMERICA LLC Server service and the accompanying Watchdog service. Both these services are set to automatic start meaning that they will be launched straight after Windows start-up regardless of whether any user is logged in or not.

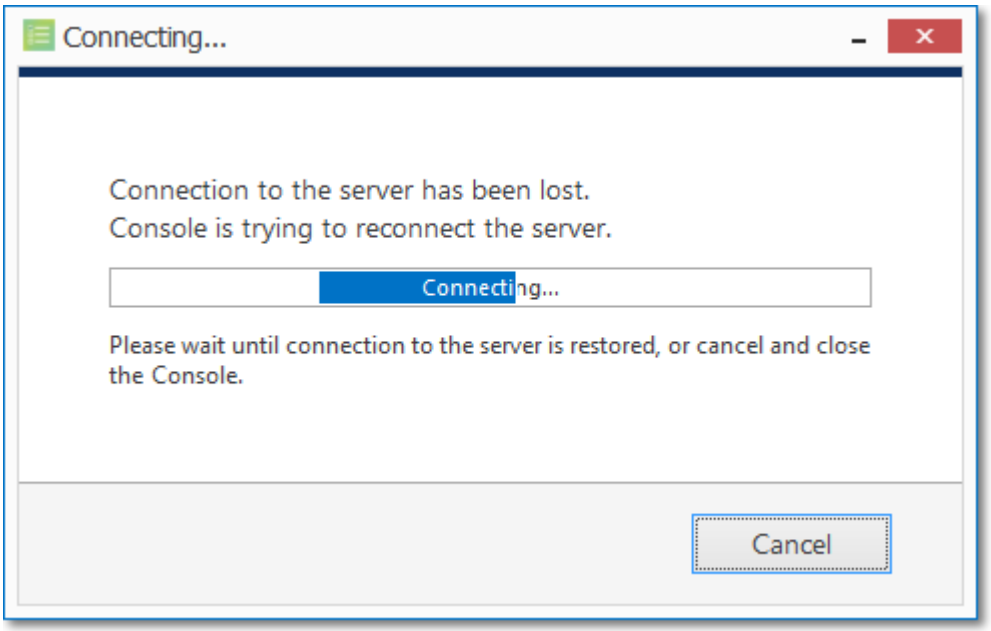
By default, the server will run in silent service mode, i.e., without any status indication other than that in the Windows Services management console; from there, both services can be stopped, started and restarted.

Double-click the server shortcut on your desktop to launch the system tray shell for the server: the server icon will appear in the system tray, allowing you to start and stop the service by right-clicking it and selecting your desired option. Ganz CORTROL Watchdog service runs silently in background as an auxiliary service and has no user interface except for the settings' dialog box in Ganz CORTROL Console.



Start and stop the server service from the system tray

If the server service is stopped while Ganz CORTROL Console connections are active, the wait-for-server-connection window will appear on top of Ganz CORTROL Console, disabling any input. The same thing will happen if there are any problems with server connectivity. It will automatically disappear when the server is online again; alternatively, you can click *Close* to exit Ganz CORTROL Console at this point and open it manually later.



Connection lost

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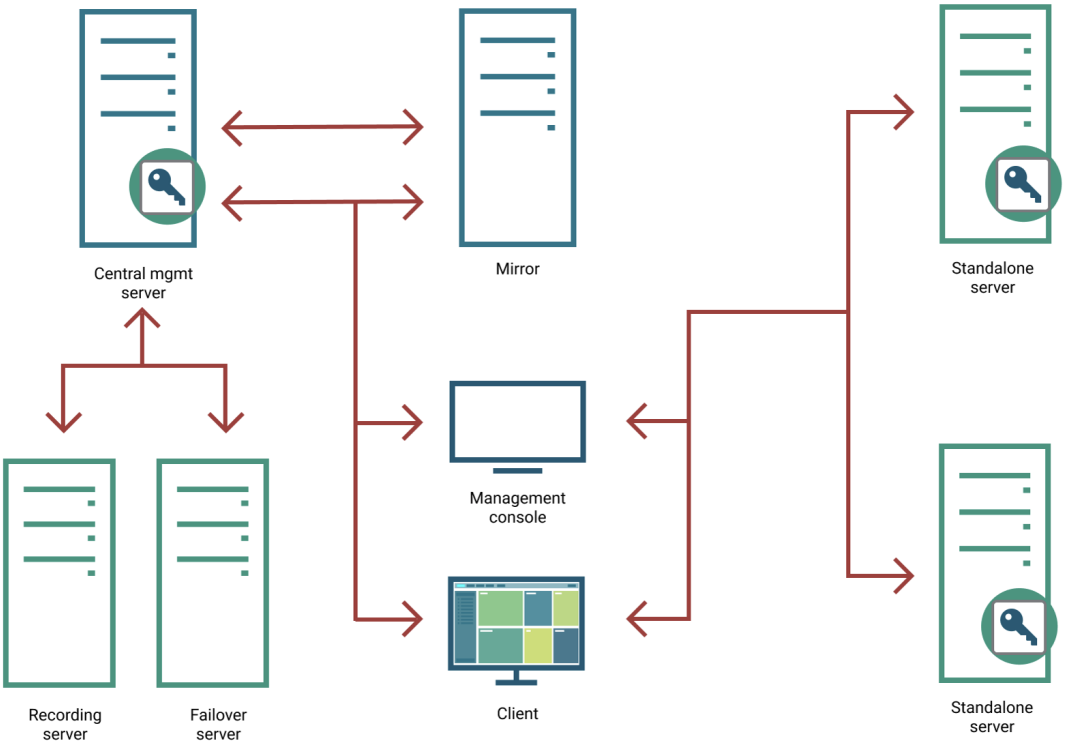
2 License Activation

In order to use the product, a **valid license** is required - whether this is a trial or a purchased one. Any of these licenses can be activated using this wizard; note that license activation choice will differ depending on the installation package you have selected.

For the standalone server edition, Ganz CORTROL Server, the license is applied to that specific server. Client applications do not require a license to operate.

For the Ganz CORTROL Global system, the license is applied to the Ganz CORTROL Global server (central management server) only; Ganz CORTROL Recorder machines do not require a license to operate because they cannot operate independently. Client applications do not require a license to operate.



Ecosystem with two Ganz CORTROL Server servers and one Ganz CORTROL Global: components requiring license are marked with the key icon

Each server only accepts one Ganz CORTROL license key, no matter how many and which features it includes. Each Ganz CORTROL license key can only be applied on one machine.

License Types

Each license includes a certain number of **video channels**, and a certain number of **advanced** functionality **channels**. Also, each Ganz CORTROL license, including the free Ganz CORTROL Prime edition, contain 1 (one) generic video analytics channel free of charge.

Extra licences (on top of video channels) are required for:

- **VA** - embedded video analytics (generic VA engine)
- specialized VA (embedded, different engine types)
- CrossLink - interactive channels
    - **CrossLink Basic**: interactive web applications (webpages)
    - **CrossLink Advanced**: interactive remote applications (workstations)
- advanced device integrations (Leica, CrossWalk, etc.)

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For detailed information on Ganz CORTROL license options, please contact our sales via cortrol@cbcamerica.com.

⚠ The free Ganz CORTROL Prime license is not available anymore starting from the software release 1.22.0 for **all software versions**. Enjoy the fully featured trial version of Ganz CORTROL Server!

License Activation

Once you have installed the software and entered the server initialisation settings, the activation wizard will appear. If you have rebooted the server computer after completing the installation, simply run the **activation manager** in one of the following ways:

- from the Windows Start Menu, under CBC AMERICA LLC folder, or
- by typing *Activation Wizard* in the search field, or
- by right-clicking the server tray icon and selecting *About* > *Manage license* (server tray icon appears only after you run the Ganz CORTROL Server shortcut from your Desktop or Start menu), or
- when connected to localhost via Ganz CORTROL Console, go to the main menu > *About* > *Manage license*.

The license manager will only pop up automatically after the initial installation. If you wish to apply license upgrades at any time, including the after-software-upgrade, run the license manager manually as described above.

It is advisable to run hardware stability tests and finalise the server hardware configuration before applying the license, as subsequent hardware changes may cause activation related issues. Approximately up to 30% of the initial hardware components can be replaced without losing the activation.

Subtopics here describe every type of license activation in details.

💡 Licensing is mandatory for Ganz CORTROL Server and Ganz CORTROL Global software packages. Ganz CORTROL Recorder does not require a license as it is not an independent component but rather operates under a Ganz CORTROL Global server only.

💡 Virtualised environment is supported starting from software version 1.13.0. If you experience any issues with the license activation, kindly contact our support engineers by emailing cortrol@cbcamerica.com.

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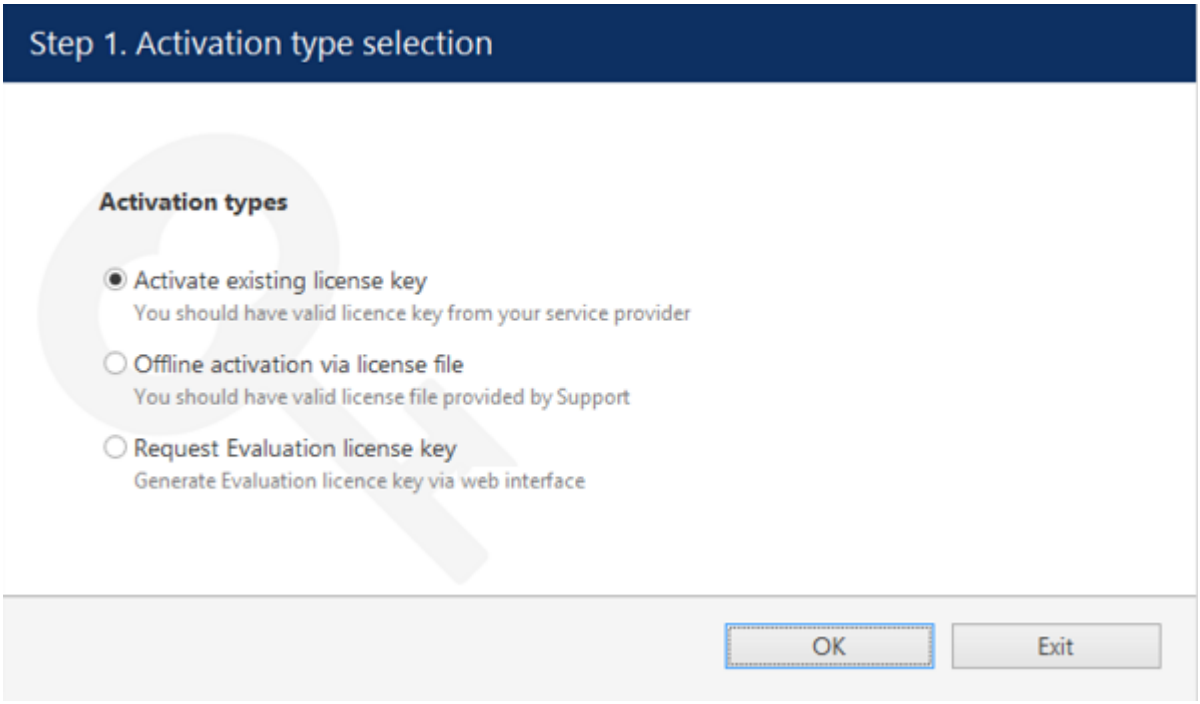
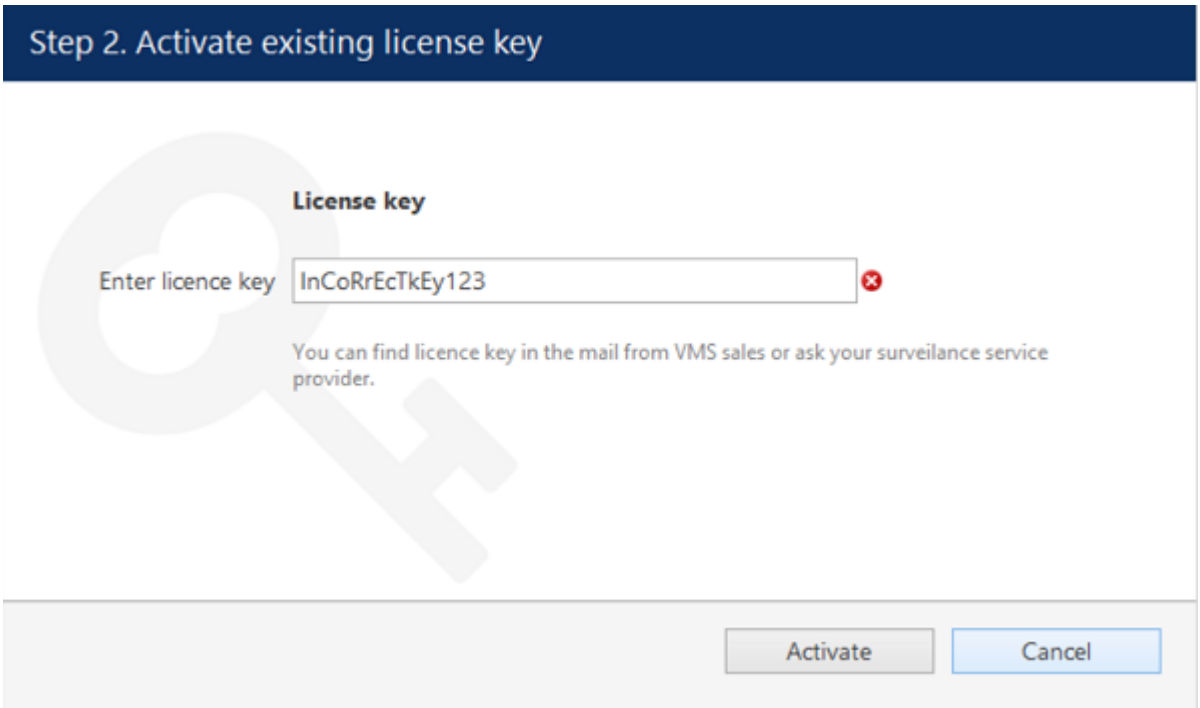
2.1 Online Activation

If your server has Internet connection available, you can choose online activation mode. The software will automatically connect to the activation server and register your pre-purchased license.



Activation Type Selection

Enter your product license key and hit *Activate*. If your key is incorrect, the wizard will notify you with a red *X* sign next to the key field: if this happens, double-check the key you have typed, looking out for mistyped characters and superfluous spaces at the start or end.



Enter License Key

When you have entered a valid license key, the wizard will activate your software. If you have decided to go with a different activation option, click *Cancel* to return to the activation type selection step.

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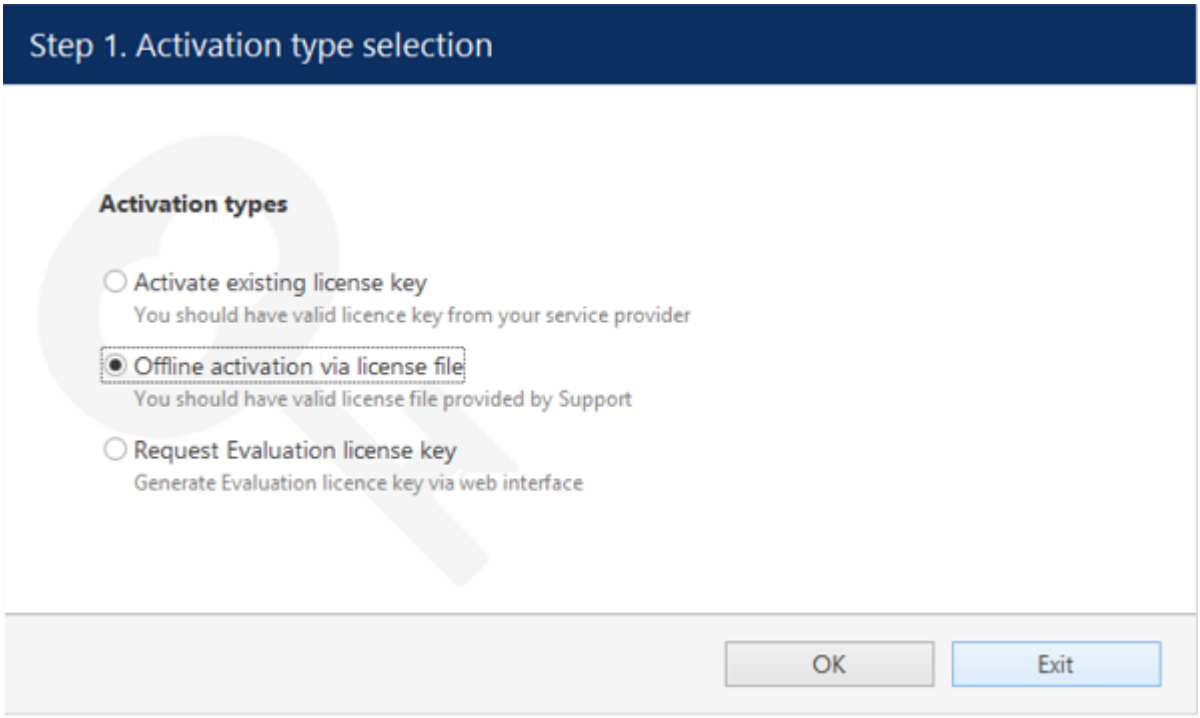
2.2 Offline Activation

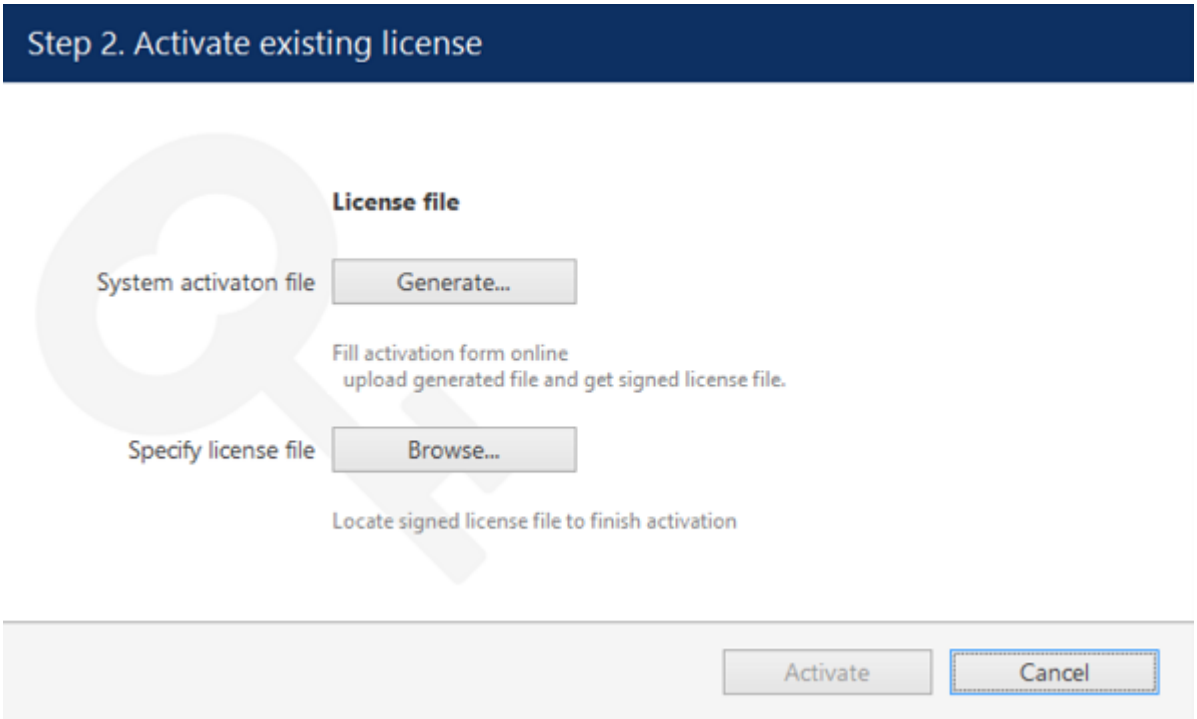
If there is no Internet connection for security reasons and/or server disposition particularities, choose the *Offline Activation* type.



Activation Type Selection

This mode consists of three steps:

- generate the activation file on the target server
- go to the online activation system at http://ganzsecurity.com/CORTROL-Activation and fill in the form
- apply provided license file to your system



Offline Activation Steps

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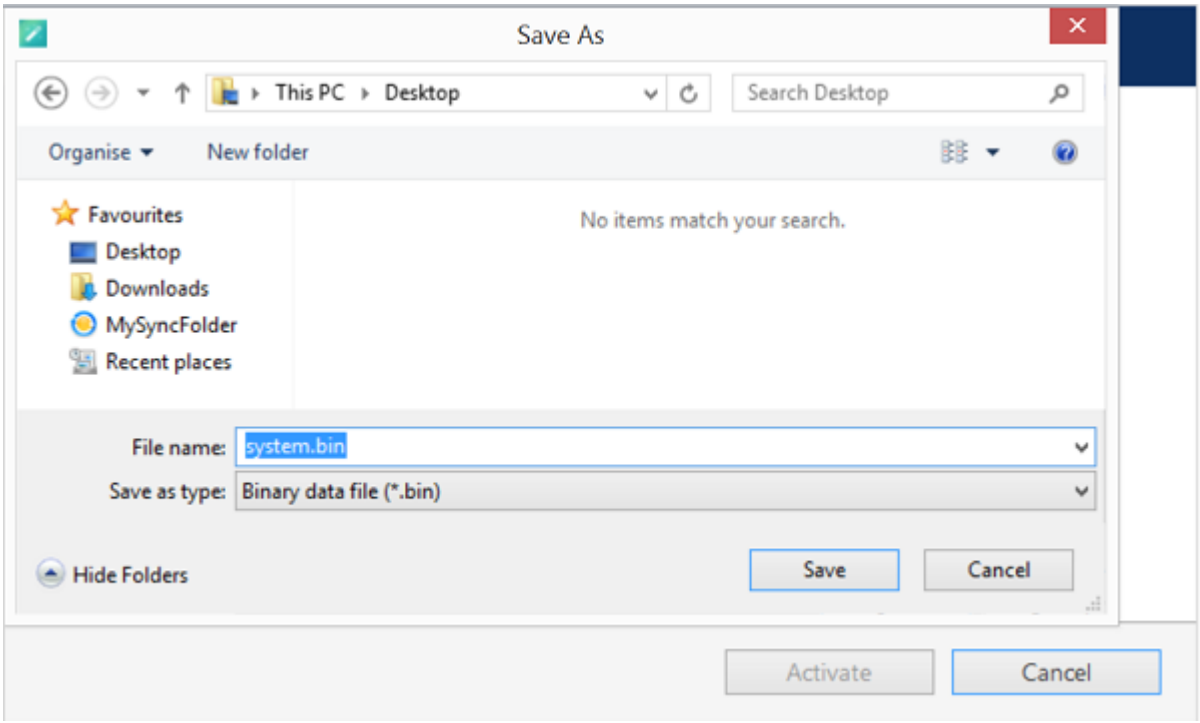
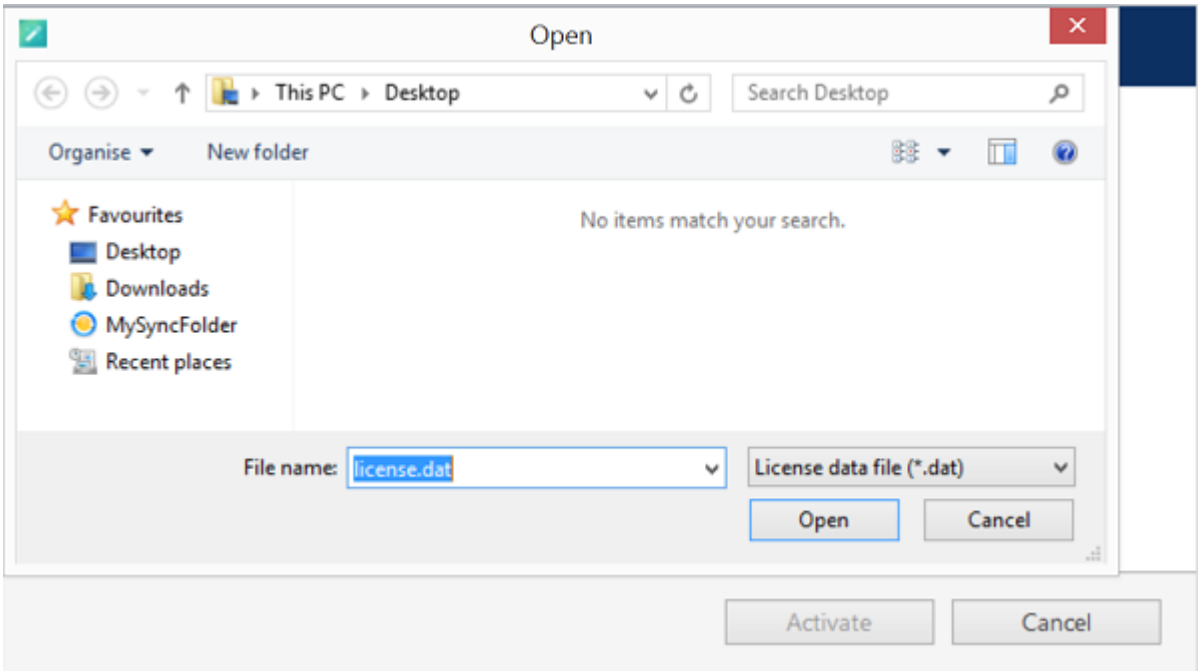
Click *Generate* to create the activation file; choose a location and save it. The default file name is *system.bin* and we do not recommend changing it.



Save Activation File

Next, copy this binary file to any other computer that has Internet access, then go to the online form available at http://ganzsecurity.com/CORTROL-Activation, fill in the required fields and upload the file. The activation system will process your file and allow you to download a license file. This license file will be unique and will only be valid on the same machine from which the original *system.bin* file comes.

You can close the activation wizard after creating the activation file and reopen it later to apply the license file. Click *Browse* to locate it and open the *license.dat* file provided by the activation system.



Browse for License File

The validated license.dat file will be loaded, allowing you to finish the registration process.

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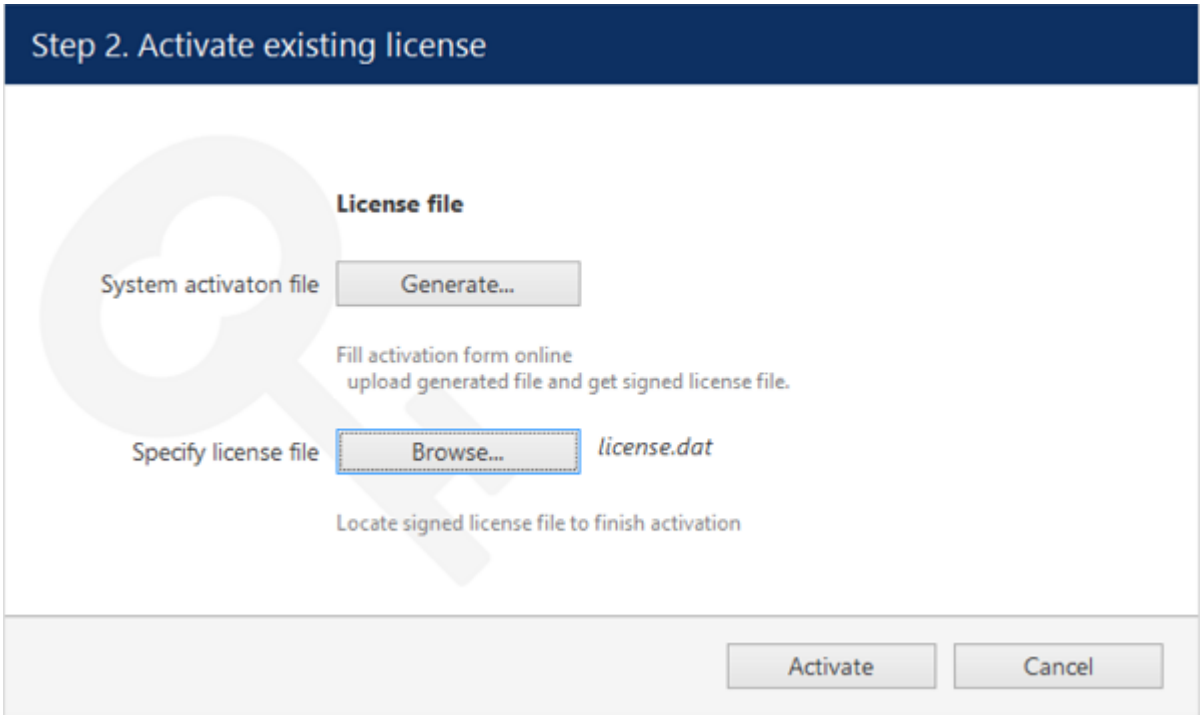

Load the License File

Click *Activate* to apply the license file. If the license is valid, you will see an activation success confirmation with the following details:

- product type
- license key
- license key expiration date, if applicable
- support subscription expiration date
- allowed channel amount

The license information will be stored on your server. However, you may wish to save a snapshot of this screen for your future reference, so that this information will be accessible in case of server OS or hardware failure.

Finally, click *Done* to exit the activation wizard or click *Start Quick Setup Wizard* to proceed with server configuration.

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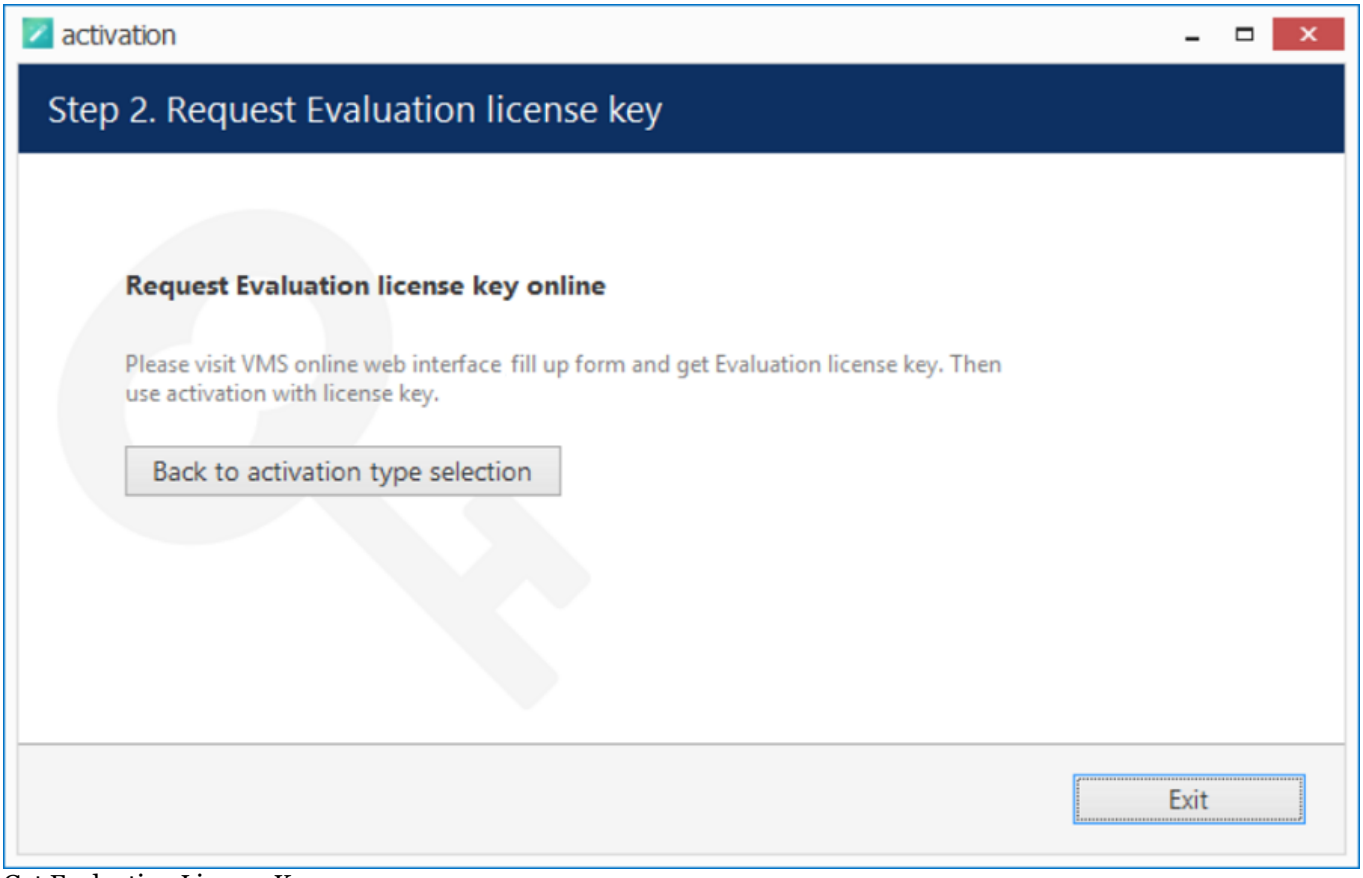
2.3 Evaluation License

If you wish to evaluate the fully featured Ganz CORTROL Server product or need to assess server performance over a certain period of time and with specific features, you can request an evaluation license key from CBC AMERICA LLC.



Get Evaluation License Key

After receiving the evaluation license, activate the trial key using the usual online or offline activation algorithm. When you purchase a production license, simply replace the evaluation license by removing it and then activating the permanent license in the preferred manner.

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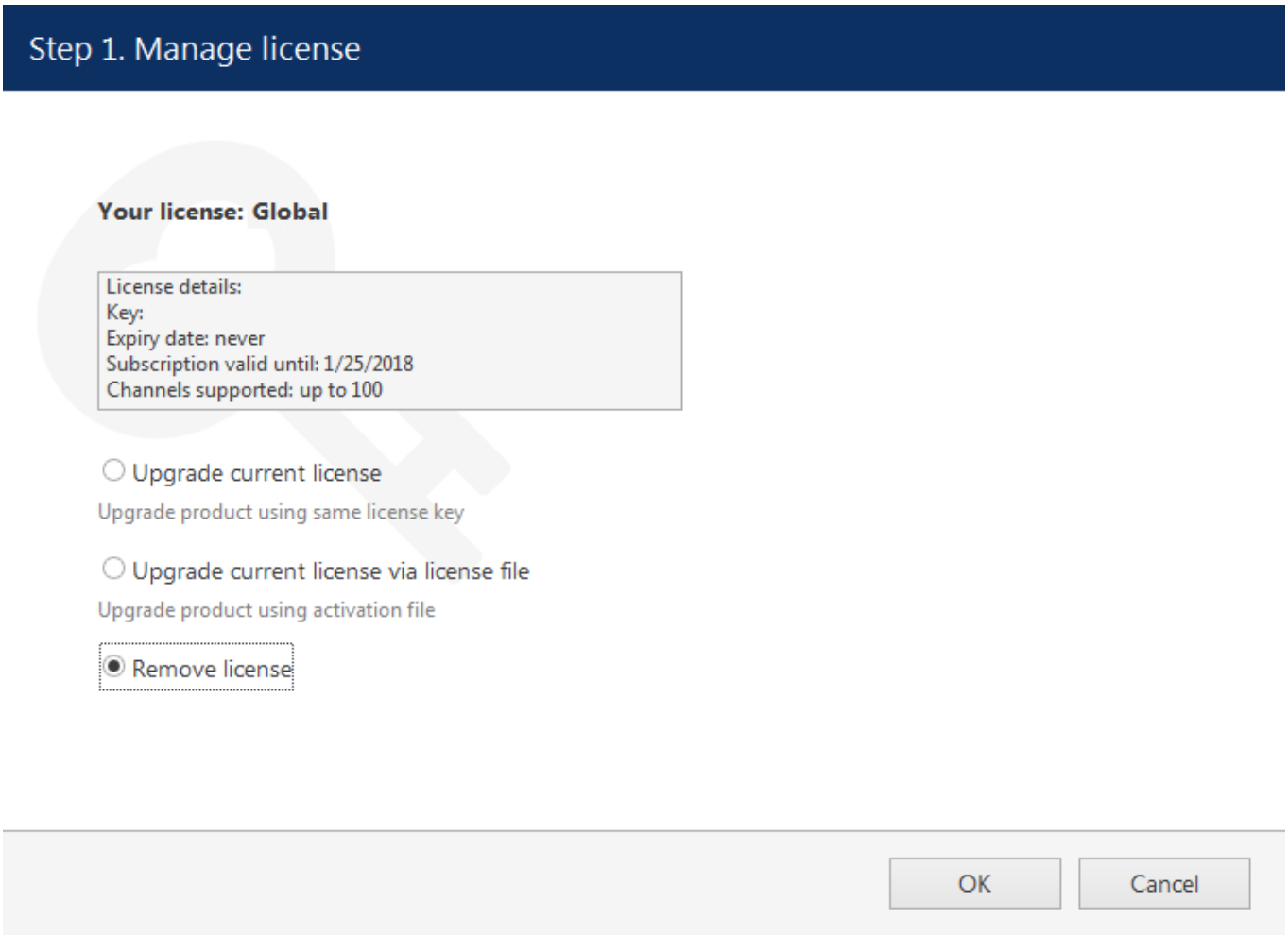
2.4 Activation Management

When a server already has a license key installed, you can retrieve that information in two ways:

- right-click server icon in the system tray and select *About*. The dialog box will contain basic information about the product version and license type
- run the *Product Activation Wizard* from the Start menu

To start the wizard, go to *Start -> All Apps -> CBC AMERICA LLC -> Activation Wizard* (in Windows 7 and older versions, use *Start -> All Programs -> software installation folder -> Tools -> Activation Wizard*); alternatively, use Search to locate the Activation Wizard in the programs menu.



Choose an option in order to proceed

The wizard will display a summary about the currently installed license key and show the available management options.

Online license upgrade

License upgrade is available for the license keys purchased earlier. Note that all the software processes (both applications and services) must be stopped in order for the license to be applied correctly.

For upgrade acquisition details and assistance, please contact us via cortrol@cbcamerica.com.

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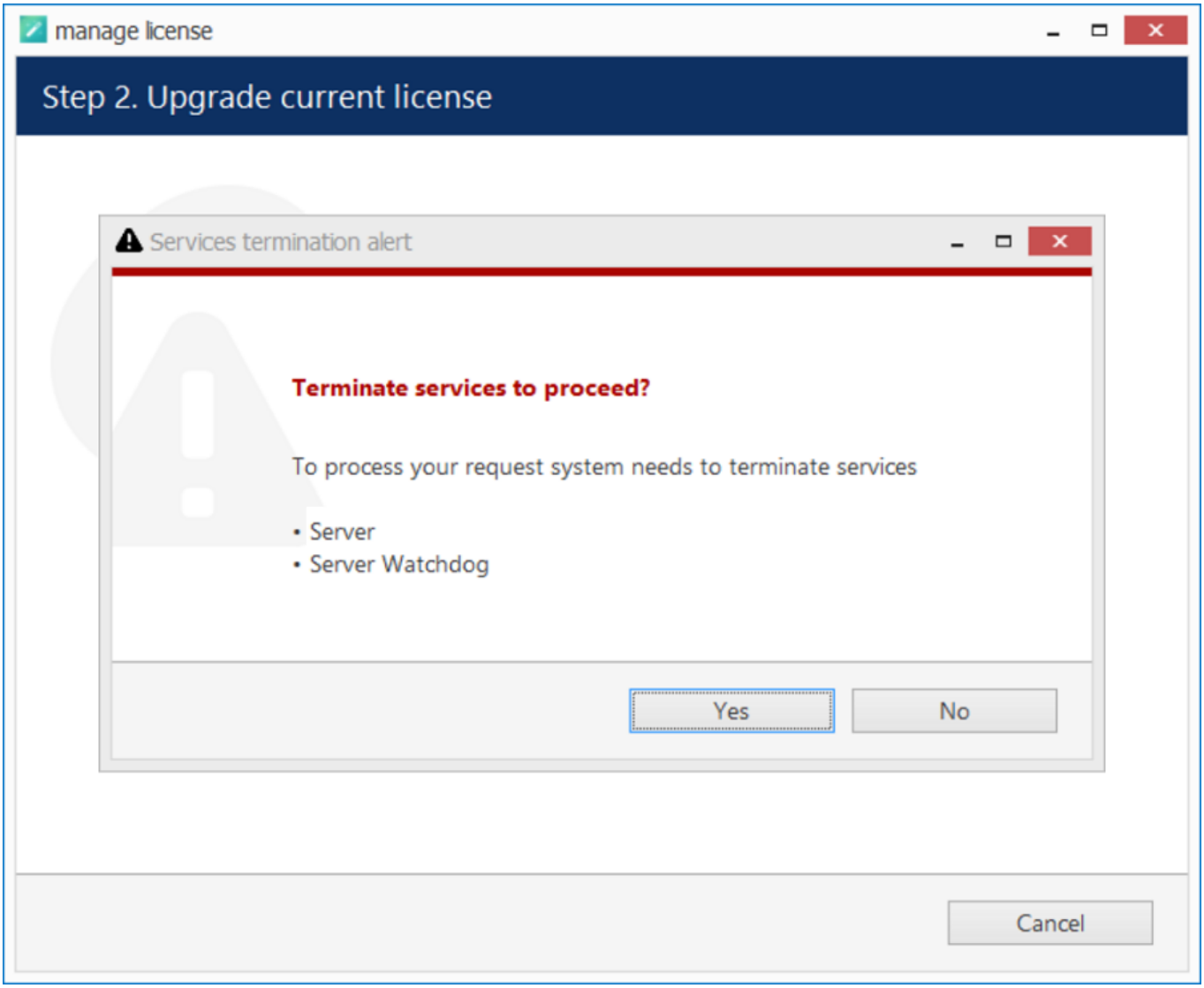

All software processes must be stopped in order to apply license related changes

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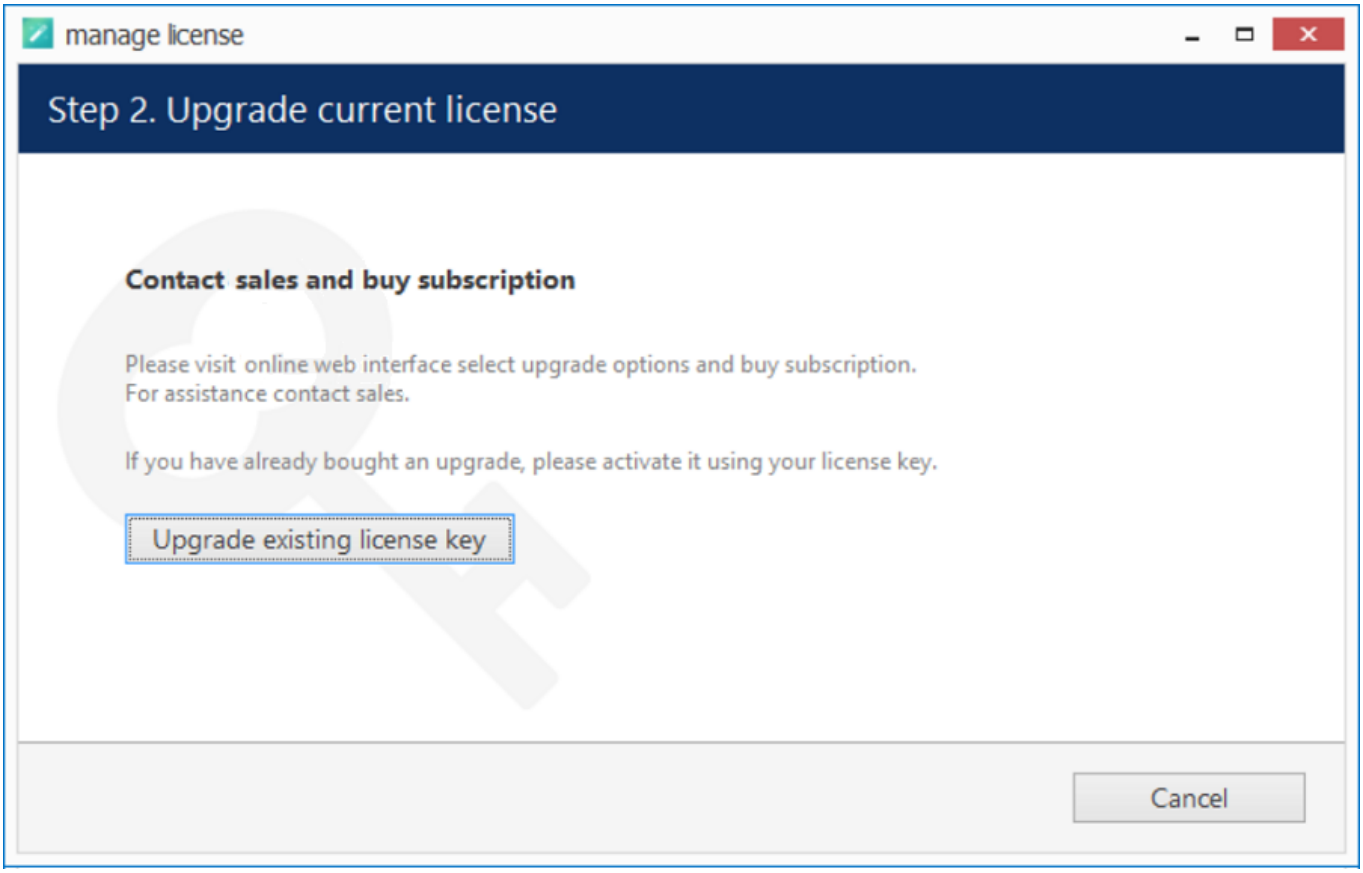

License upgrade option

After acquiring the upgrade from CBC AMERICA LLC, click *Upgrade Existing License Key* to enter it. Your license information will be synchronised with the activation server and you will be presented a license summary. Click *Cancel* to return to the beginning of the wizard.

Offline license upgrade

Offline license upgrade essentially the same as the offline license activation process: the same steps should be taken to retrieve the new license file.

- generate activation file on the target server
- go to the online activation system at http://ganzsecurity.com/CORTROL-Activation and fill in the form
- apply provided license file to your system

Click *Cancel* to return to the beginning of the wizard.

Remove license

Select *Remove License* if you wish to completely delete all the license information from the server.

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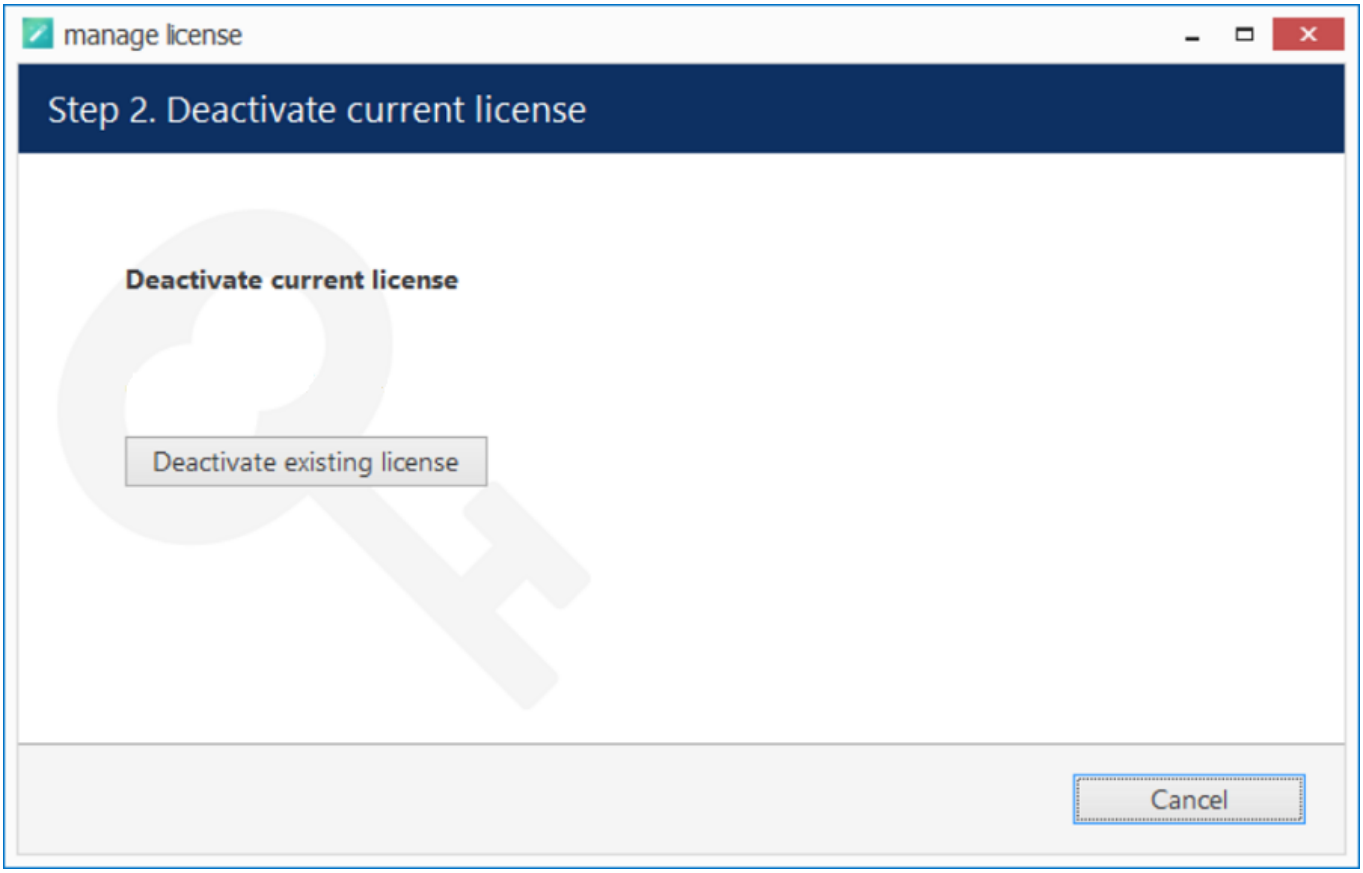
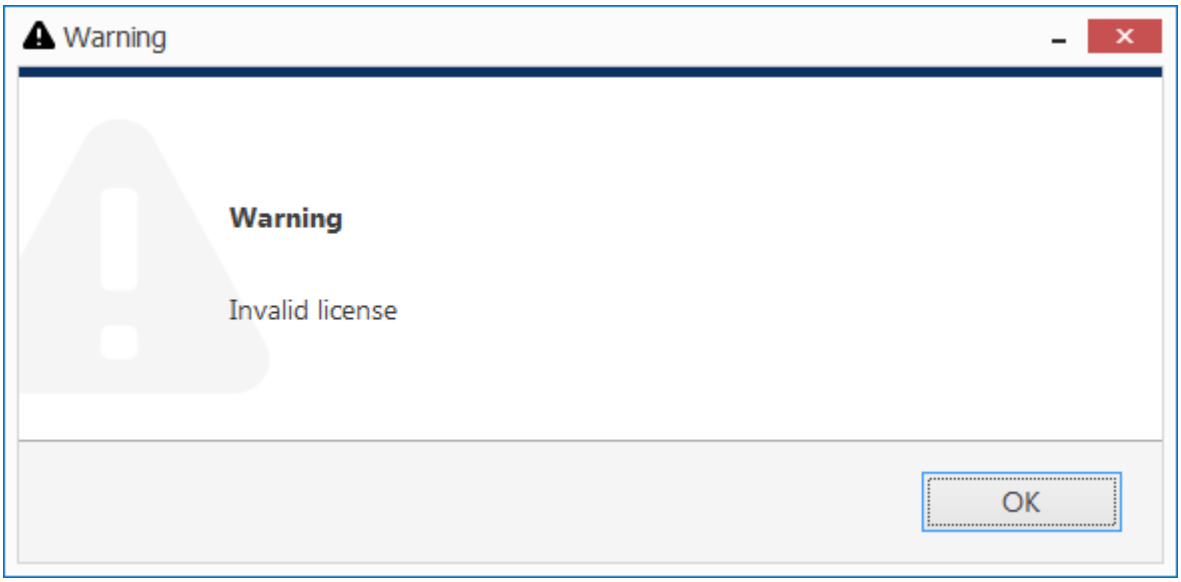


Deactivate license

Click *Deactivate Existing License* to confirm deletion of the currently installed license. Note that you will be unable to log into Ganz CORTROL Console to access your current server configuration without a valid license of the same type; Ganz CORTROL Client applications will also not connect to such a server. In order to use the server again, you will have to enter the license again - either the same or a new one.



An attempt to log into Ganz CORTROL Console failed because the license is missing

Alternatively, press *Cancel* to return to the wizard start page. If you are not sure about the deactivation, consult CBC AMERICA LLC technical support.

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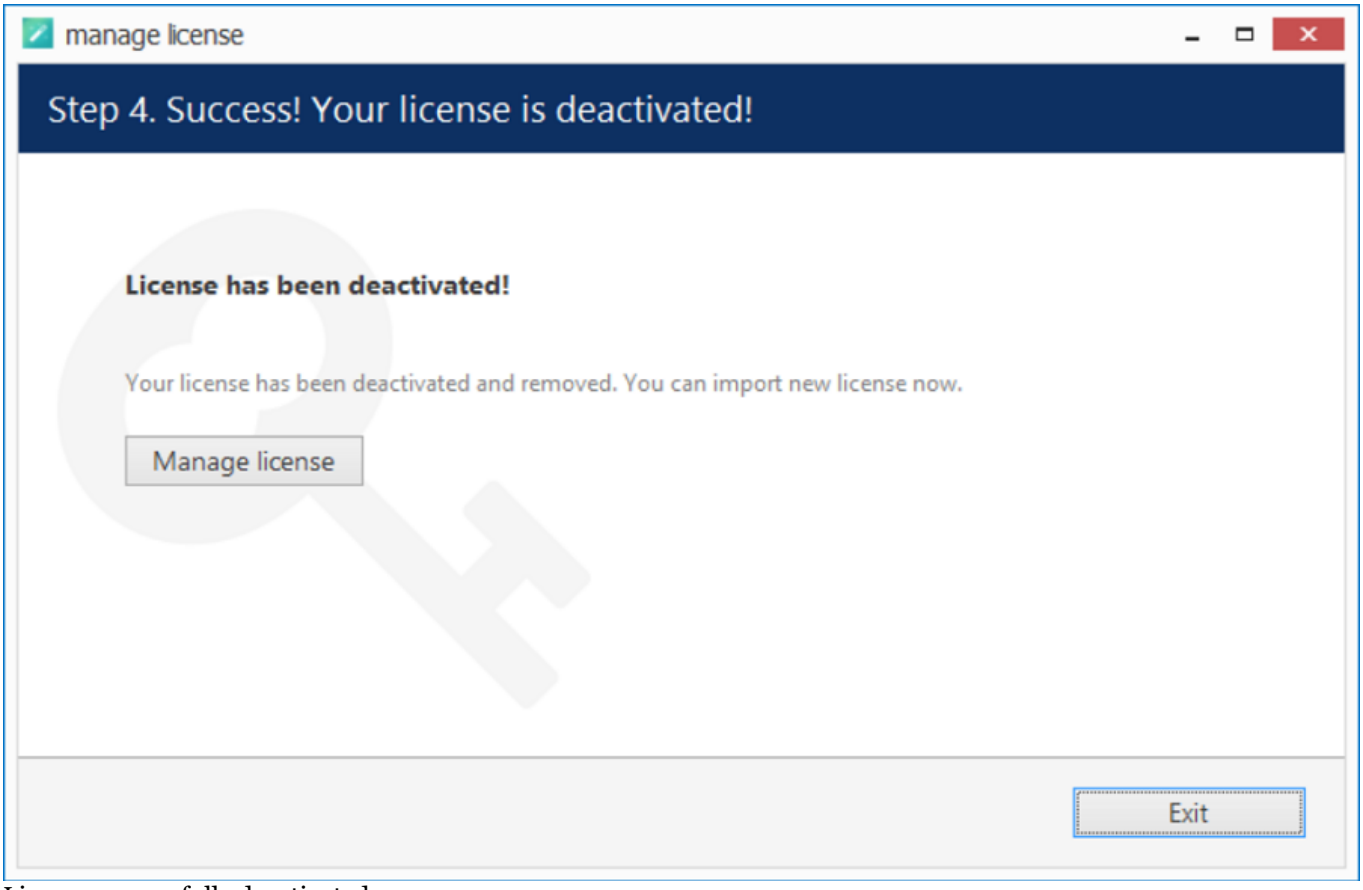

License successfully deactivated

After license deactivation, you will be offered the chance to go back to license management in order to enter a new software license.

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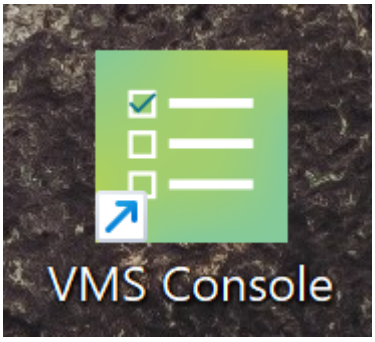
3 Ganz CORTROL Console Login

All server configuration is conducted through a dedicated interface - the Ganz CORTROL Console management application. The management interface has been intentionally separated from the Ganz CORTROL Client application in order to concentrate all administrative utilities in one place and also to conceal the unnecessary menus from the Ganz CORTROL Client operator. Applications are totally independent from each other and can be or not be installed on the same machine. Ganz CORTROL Console for a single installation management can be installed on one or more computers, depending on the system administrator's needs.

Run the Ganz CORTROL Console application by double-clicking the Ganz CORTROL Console shortcut from the desktop or Start menu.



To log in, simply enter your Ganz CORTROL Server server's local or remote address (IP or host name), TCP port and user information. If you have logged into different servers from this Ganz CORTROL Console instance in the past, the Ganz CORTROL Console login dialog box will have a drop-down list in the *Server* field.

If your server has a default TCP port configured (60554), you do not need to specify it when connecting: simply type the IP or hostname of the server to connect to. However, if the server TCP port has been altered, you need to specify the port explicitly, making the connection address look as follows:

<address>:<port>, e.g., *192.168.1.77:60555* or *localhost:60887*

Server TCP port can be changed via Ganz CORTROL Server Setup Wizard.

Note that, if you already have pre-configured user accounts, the user must have corresponding permissions in order to connect.

First-Time Login

When logging in for the first time, use the default combination of user name and password**:** admin/[empty]. You will be asked to change the password to a more secure one immediately afterwards.

The **default username and password** for the new installation is **admin/[empty]**.

If you are refused the connection, make sure that the server is running and accessible over the network. (For more detailed information about what to do, please refer to the Troubleshooting section of this document: it is constantly updated with most common cases).

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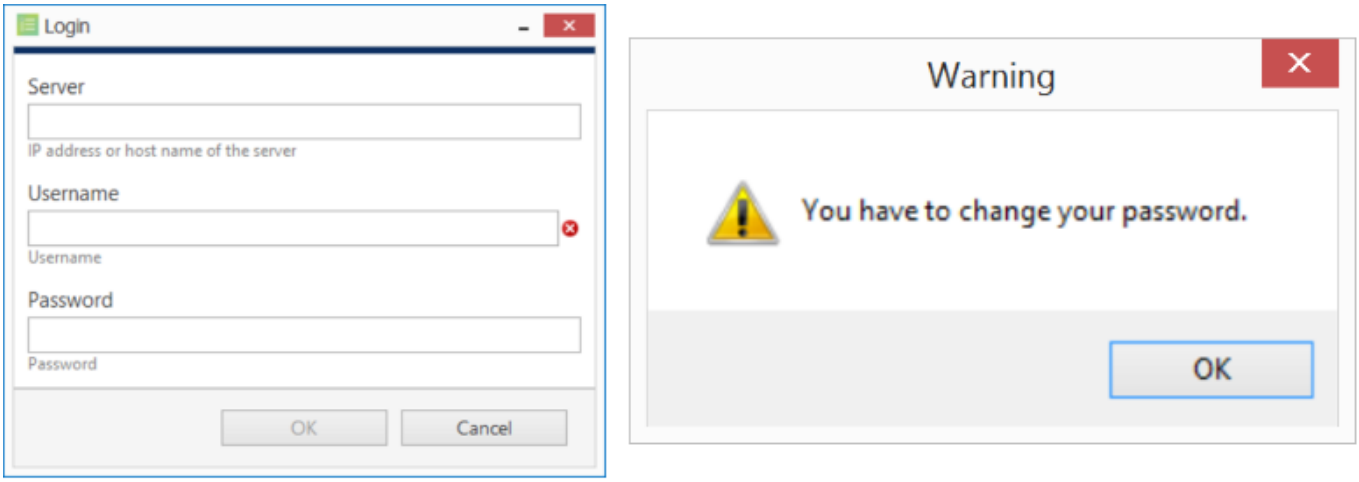
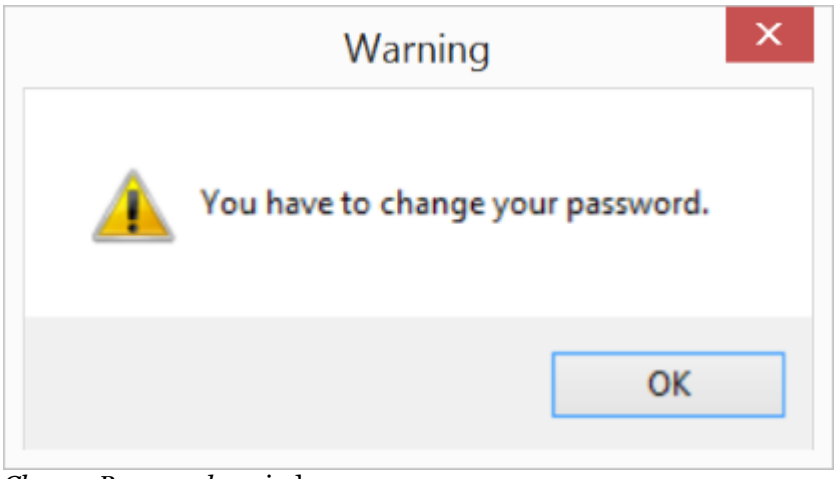


Ganz CORTROL Console login

After logging in for the first time with default username and password, you will be reminded to change your password. For security reasons, the default policies are strict; you will be able to adjust the policies and the password itself after you log in.



Change Password reminder

You will be given the option to change the password using an additional dialog box. To change the password, enter your old password (initial, default password is empty so just leave the field empty), then enter your new administrative password for the current server, enter it for the second time to confirm, then click *OK to save*.

The new password must **comply with server policies**, by default these are: minimum 8 characters total length, including at least 2 lowercase and 2 uppercase letters.

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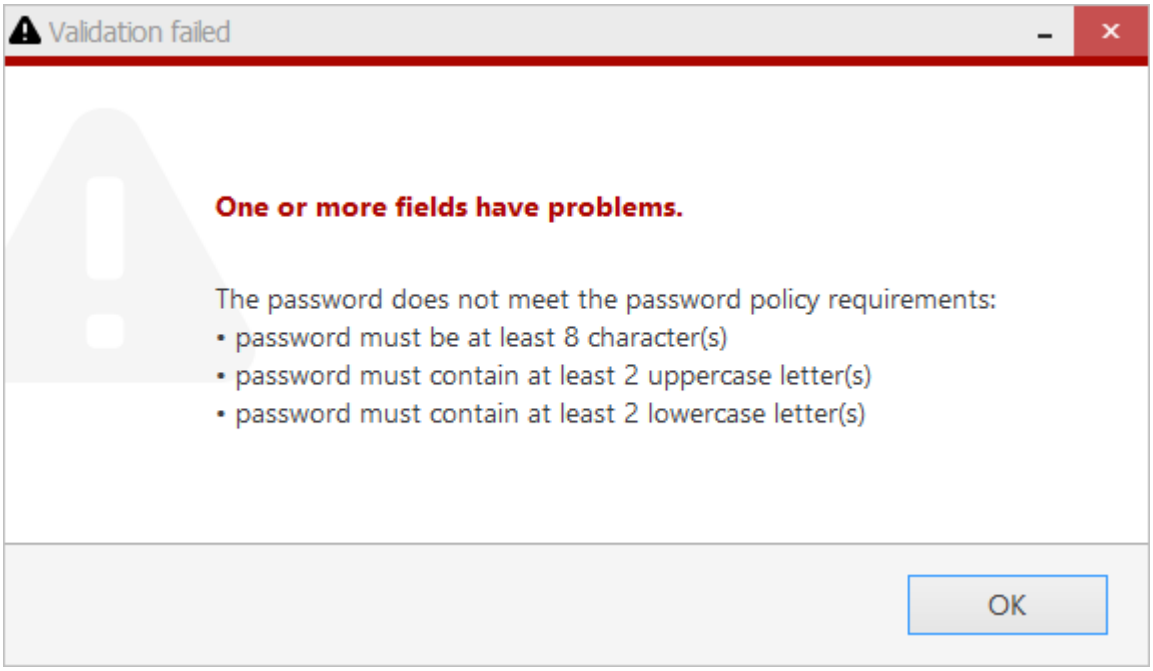

Password must meet the server policy requirements

After you are done with the password update, you will be given the opportunity to fill in the initial server settings using the quick Setup Wizard. We recommend that for optimum first-time configuration you follow the steps in the wizard.

Two-Factor Authentication Login

Starting from the version 1.21, Ganz CORTROL supports 2FA for Ganz CORTROL Console.

This application supports two-factor authentication as an additional security measure for the user login. It does not eliminate the necessity to enter the user password; instead, it serves as an additional security layer.

If the target server has two-factor authentication (2FA) policy enabled, you will be asked to confirm your identity by requesting and entering a code. Depending on the server configuration, the code may be requested by email or by SMS.

2FA is configured by the Ganz CORTROL server administrator, so if you have any issues with requesting, receiving, or entering the code, contact the person who maintains the target Ganz CORTROL server. Provide the server administrator with your valid email and full phone number.

The 2FA settings affect all users and all clients by default; the system administrator can set up exceptions for localhost connections and also for individual users.

The login procedure with 2FA is as follows:

- an additional dialog box pops up upon the server connection attempt
- choose one of the provided verification methods and click *Request code*
- in the next dialog, you will see a session ID and an empty box
- check your email or phone (or other provided verification source) for a message with the same session ID (for example, marked as #6708 here) and copy the code from the message body (1234 here)
- click *Submit code*: if everything is OK, you will be logged in

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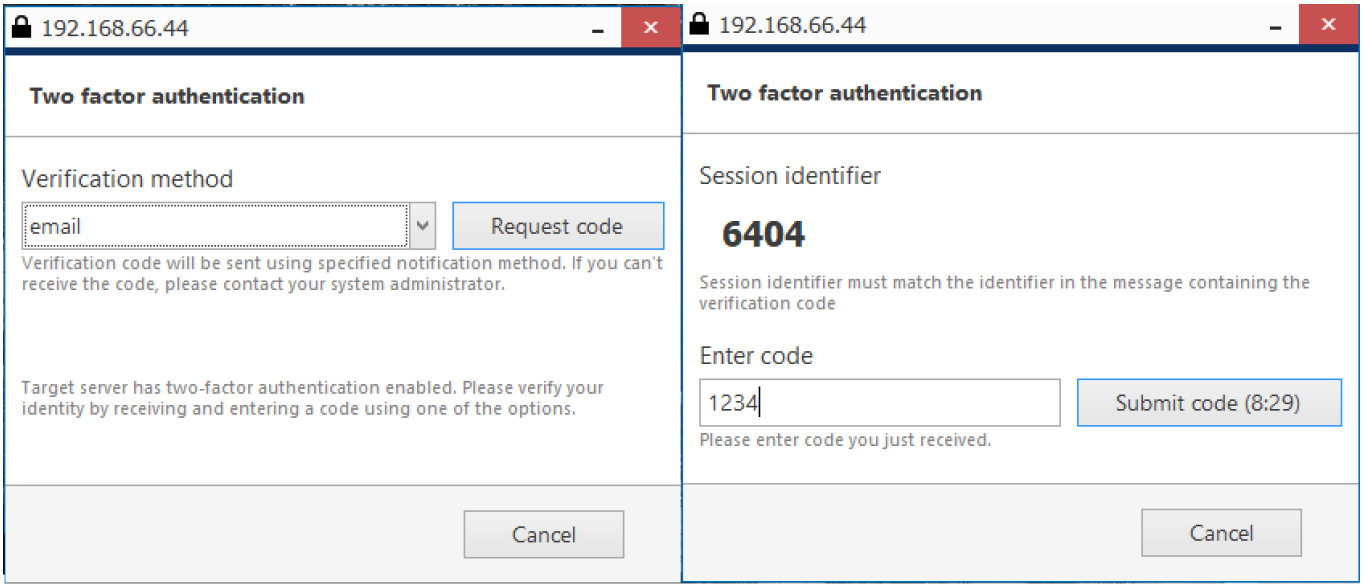

Two-factor authentication example for Ganz CORTROL Console: request a 2FA code and enter it in order to log in

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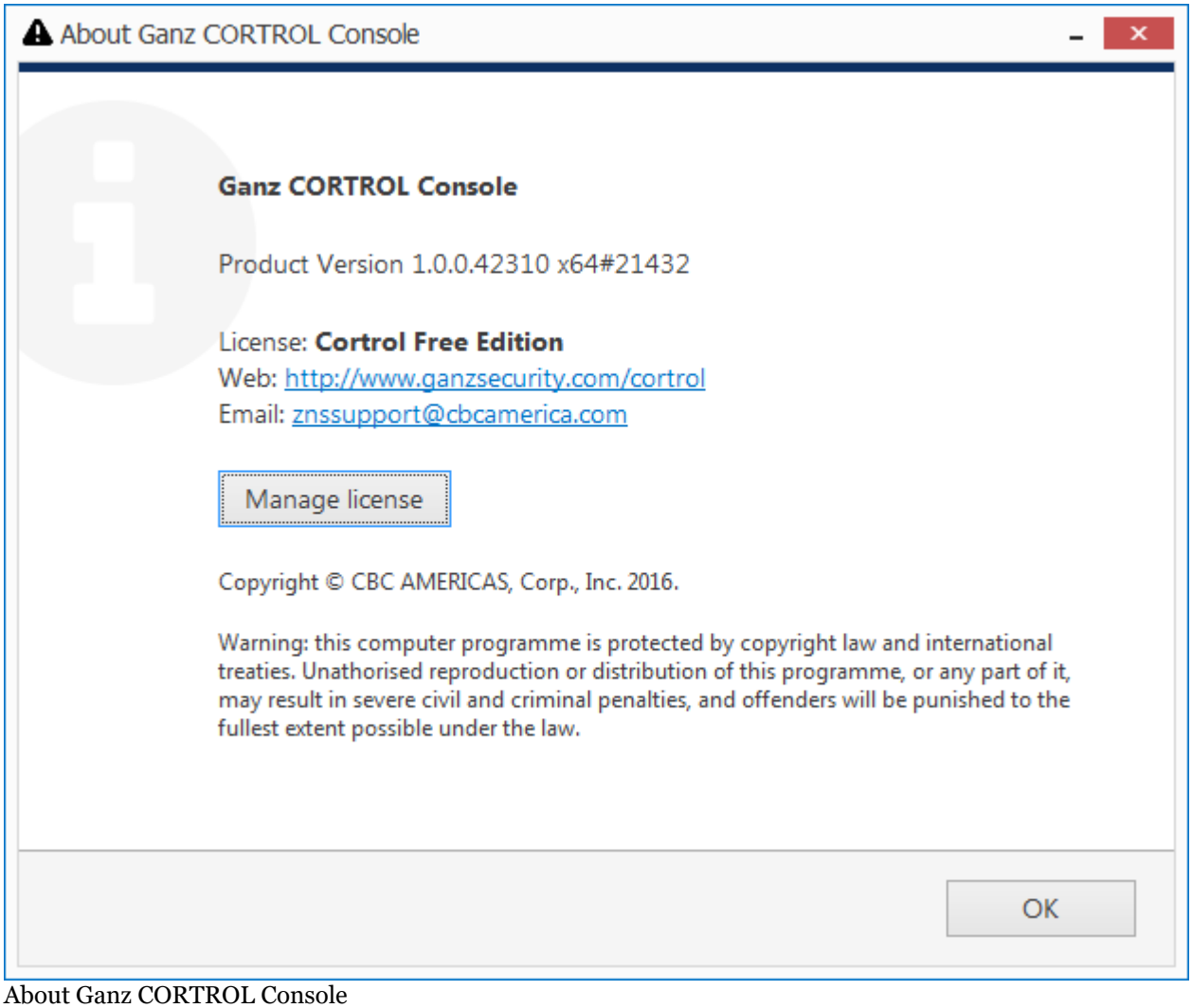
3.1 About Product

Information about currently running software can be viewed from the local computer in the following ways:

- **Ganz CORTROL info**: right-click the system tray icon and select *About* (if there is no tray icon, launch server shortcut to run the tray shell);
- **Ganz CORTROL Client info**: from Ganz CORTROL Client, go to the main menu, click *Help* and select *About;*
- **Ganz CORTROL Console info**: from Ganz CORTROL Console, go to the main menu, click *Help* and select *About*.



About Ganz CORTROL Console

If you are connected to your Ganz CORTROL server locally (via *localhost*), the *About* window will allow you to open the activation manager from here (except for Ganz CORTROL Client). For remote connections, this option will be grayed out.

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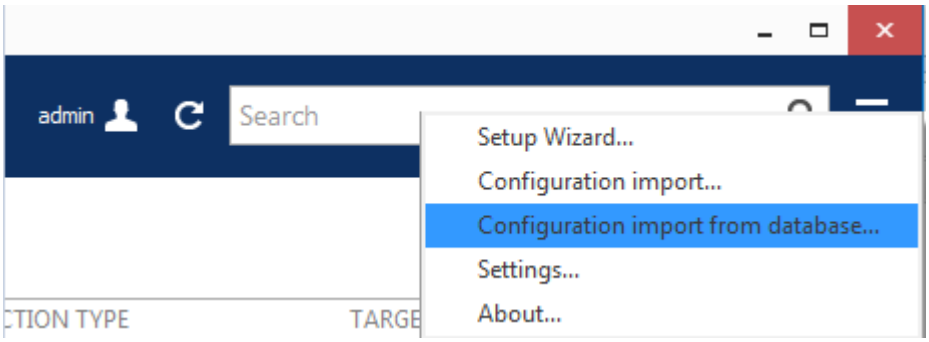
3.2 Database Import

It is possible to use a Ganz CORTROL database - either coming from a different server and/or a different software edition - to import resources into your Ganz CORTROL installation. This feature allows you to add such resources as devices, channels, users and Event&Action Configurator content. It is possible to import the data from **single server** databases.

Possible scenarios for this feature may be as follows:

- combine many Ganz CORTROL Server servers into a single Ganz CORTROL Global installation
- transfer configuration from one Ganz CORTROL Server server to another



Choose the database import option from the application menu

To start data import, press the application menu button in the upper-right-hand corner of the Ganz CORTROL Console window and choose the *Configuration import from a database* option.

You can also bring a database from another server. By default, all Ganz CORTROL databases are located in the following directories:

- C:\ProgramData\CBC AMERICA LLC\Ganz CORTROL Server - for the Ganz CORTROL Server product edition
- C:\ProgramData\CBC AMERICA LLC\Ganz CORTROL Global - for the Ganz CORTROL Global product edition
- C:\ProgramData\CBC AMERICA LLC\Ganz CORTROL Recorder - for the Ganz CORTROL Recorder component of a Ganz CORTROL Global installation

From the standard Windows Explorer *Open File* dialog box, locate the target *VMSConfig-xxxxxxxxxxxx.db* file and open it.

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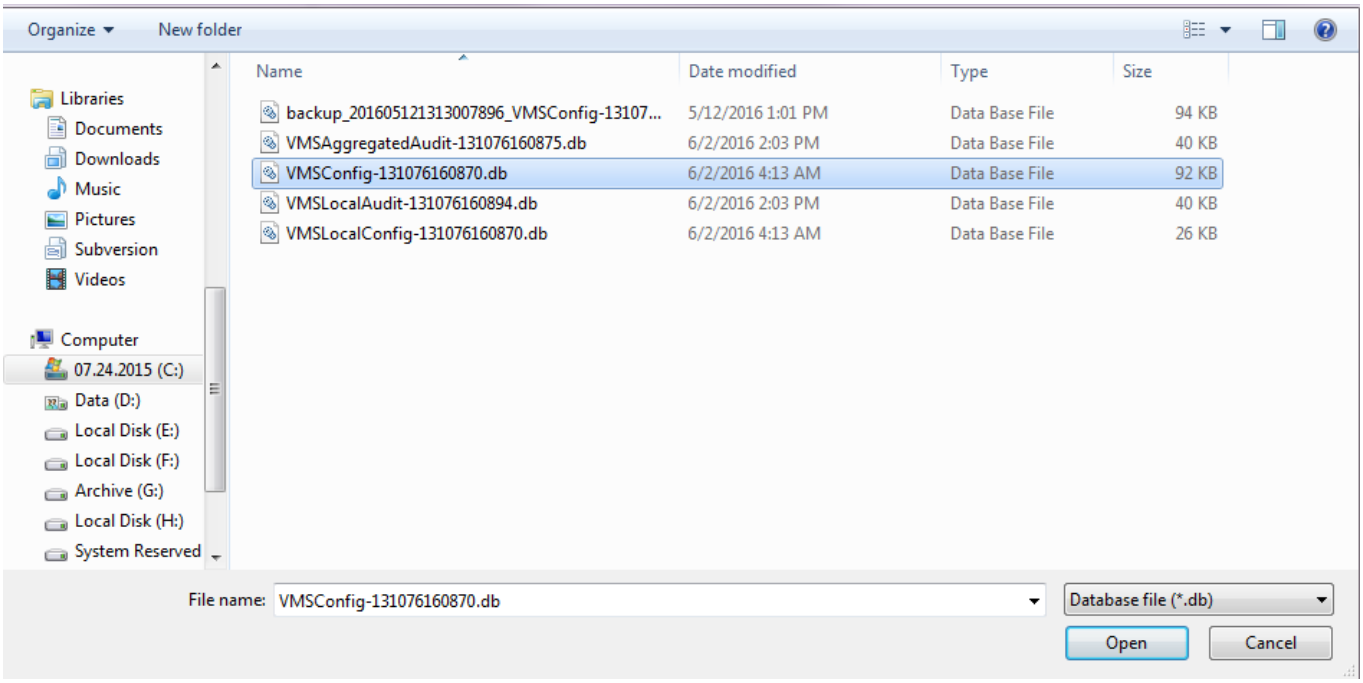
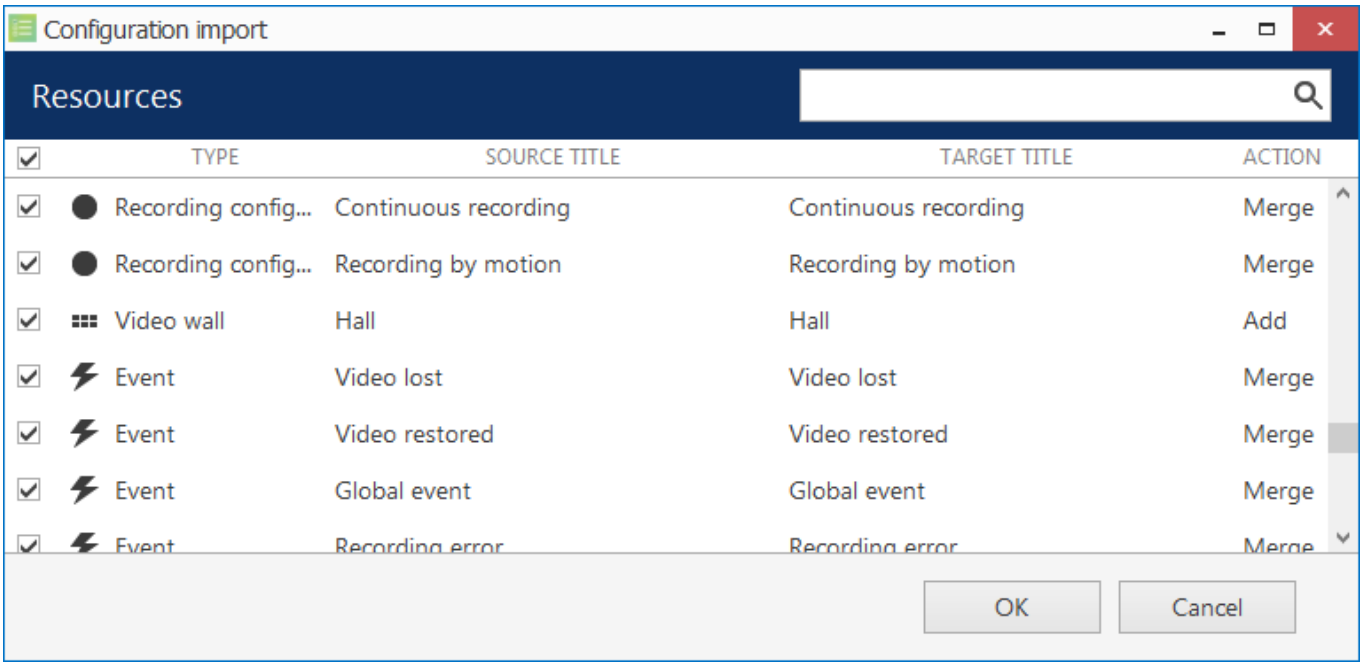


Locate the database file

The resource selection dialog box will appear. Choose the items to be imported using checkmarks in the left column; use the search field in the upper right corner to filter the items by type or by any other text field. In case the imported entities already exist on the host server (e.g., built-in recording profiles), their import action will be *Merge*; otherwise, the action will be marked as *Add*. When resources are merged, their permissions are merged as well. All types of resources can be imported.



Choose resources to be imported

When you have finished with resource selection, click *OK* to proceed.

> ⚠ **Important**: this action cannot be undone. Before confirming, make sure to review all the changes you wish to apply.

Before applying all the changes, review your import summary and click *OK* to confirm and finish the import.

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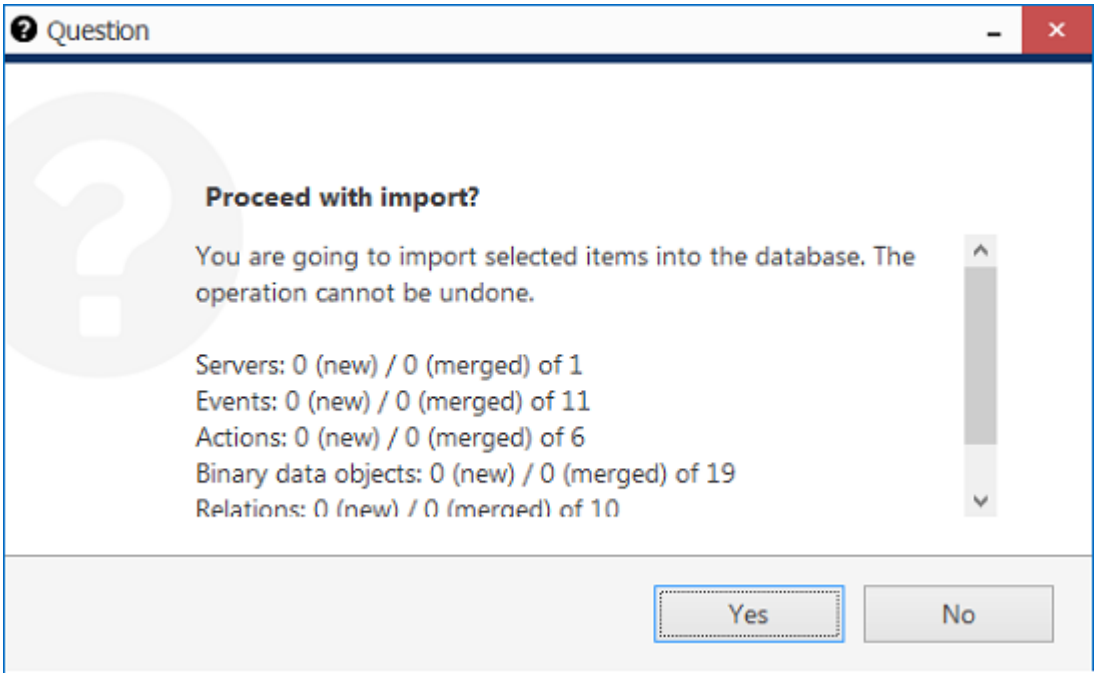

Review the summary and confirm configuration import

All selected items will be added to the server configuration immediately and you will be able to work with them normally.

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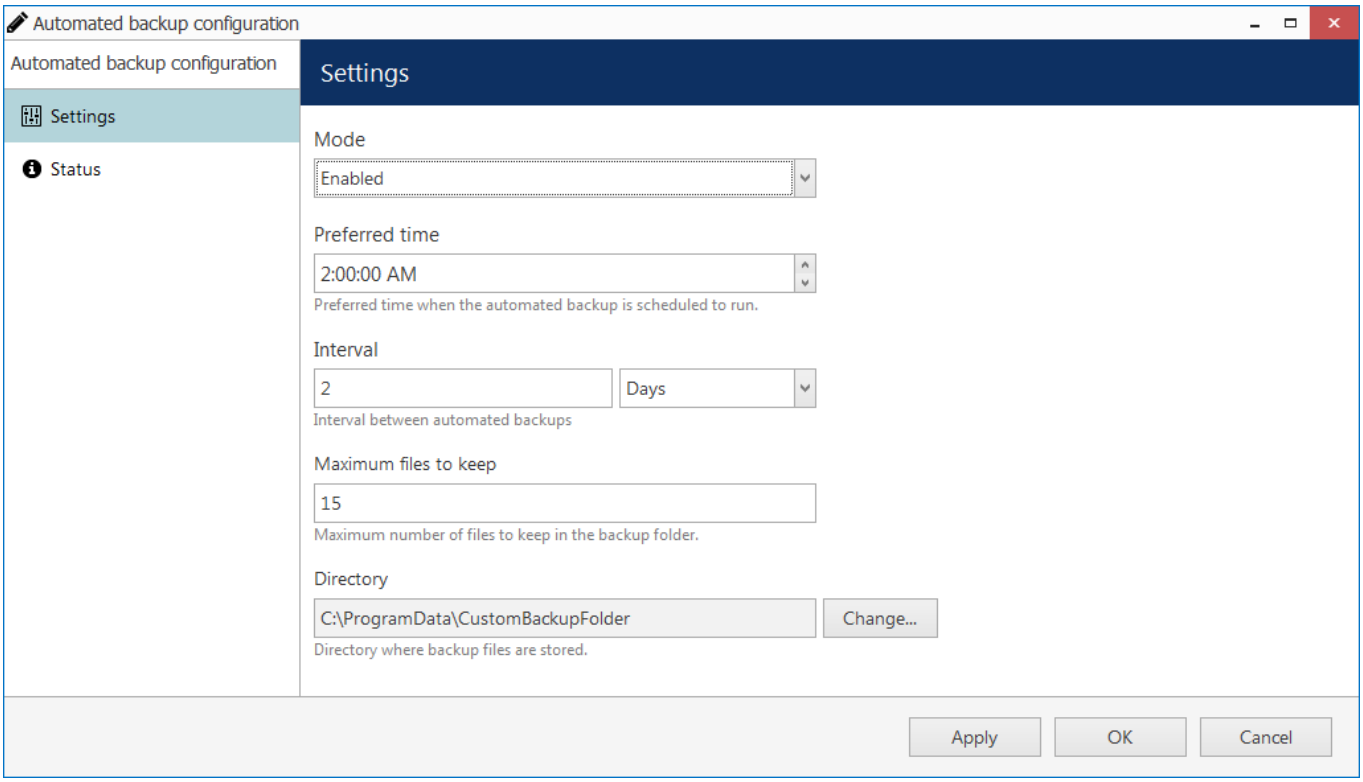
3.3 Configuration Backup

Server configuration is a time-consuming process and it is wise to save a copy of your Ganz CORTROL database after certain changes so that you have something to start the server with in case the main database becomes corrupt because of a hard disk failure or some other reason. Ganz CORTROL provides several options for database backup and we strongly recommend that you create configuration restore points to save the trouble of re-configuring the server from scratch.

Automatic Backup

Automated configuration backup allows you to save your Ganz CORTROL database based on a schedule. To access the settings via Ganz CORTROL Console, click the application menu button in the upper-right-hand corner and choose *Automated backup configuration*.



Set automatic database backup preferences

Automated backup is enabled by default with the following settings: a restore point is created every two days at 2AM, with a maximum of 15 files to be kept. You can either leave the default settings, including the default location, or define your own backup time and frequency in the *Settings* tab.

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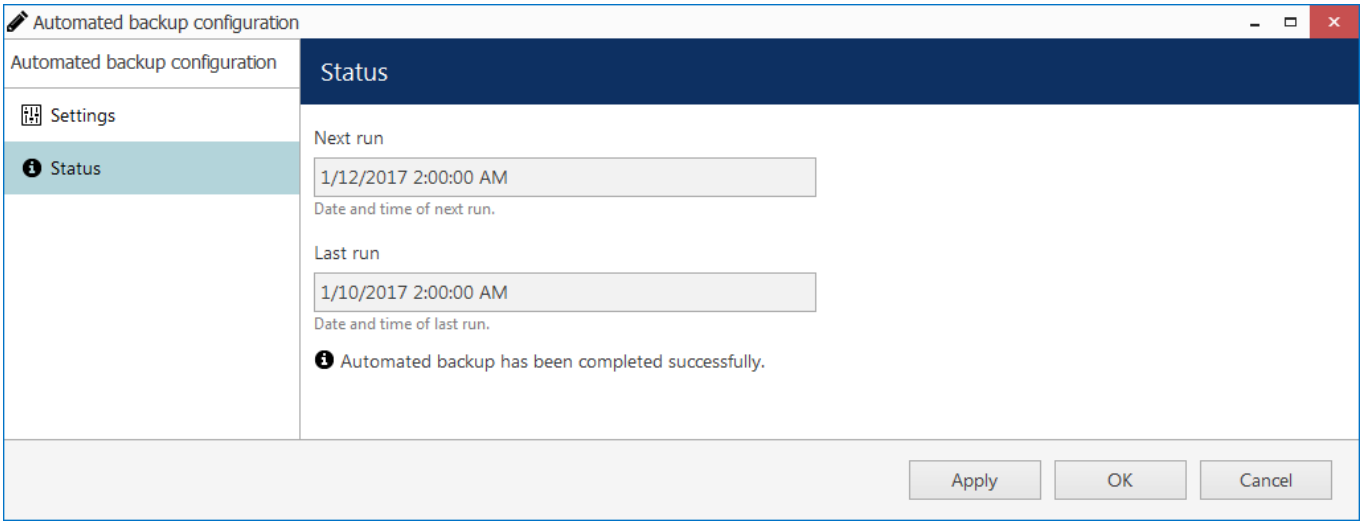


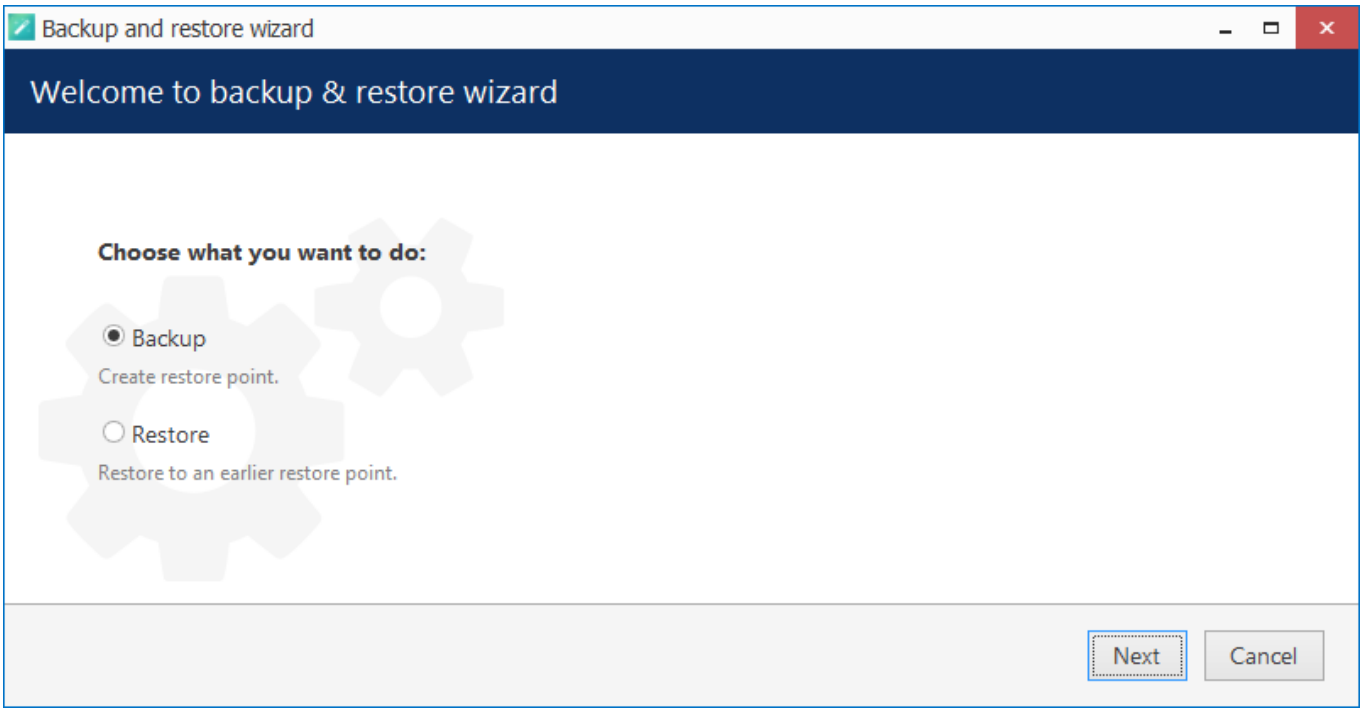
Backup status

In the *Status* tab, you can see the date of the last backup attempt and the next scheduled backup time.

Backup and Restore Wizard

Additionally to the automated backup, it is possible to create a configuration restore point manually at any time. The same wizards provides an opportunity to start the Ganz CORTROL with an earlier database version.

Run the *Backup and restore wizard* from your Windows Start menu: *Start -> All Apps -> CBC AMERICA LLC -> CBC AMERICA LLC Server Backup and Restore Wizard*. In Windows 7 and older versions, use *Start -> All Programs* -> software installation folder -> *Tools -> CBC AMERICA LLC Server Backup and Restore Wizard*; alternatively, use Cortana/Search to locate the wizard in the programs menu.



Choose whether you want to back up or restore the database

Create Backup

Choose the first option to back up the database contents to serve as a restore point and click *Next*.

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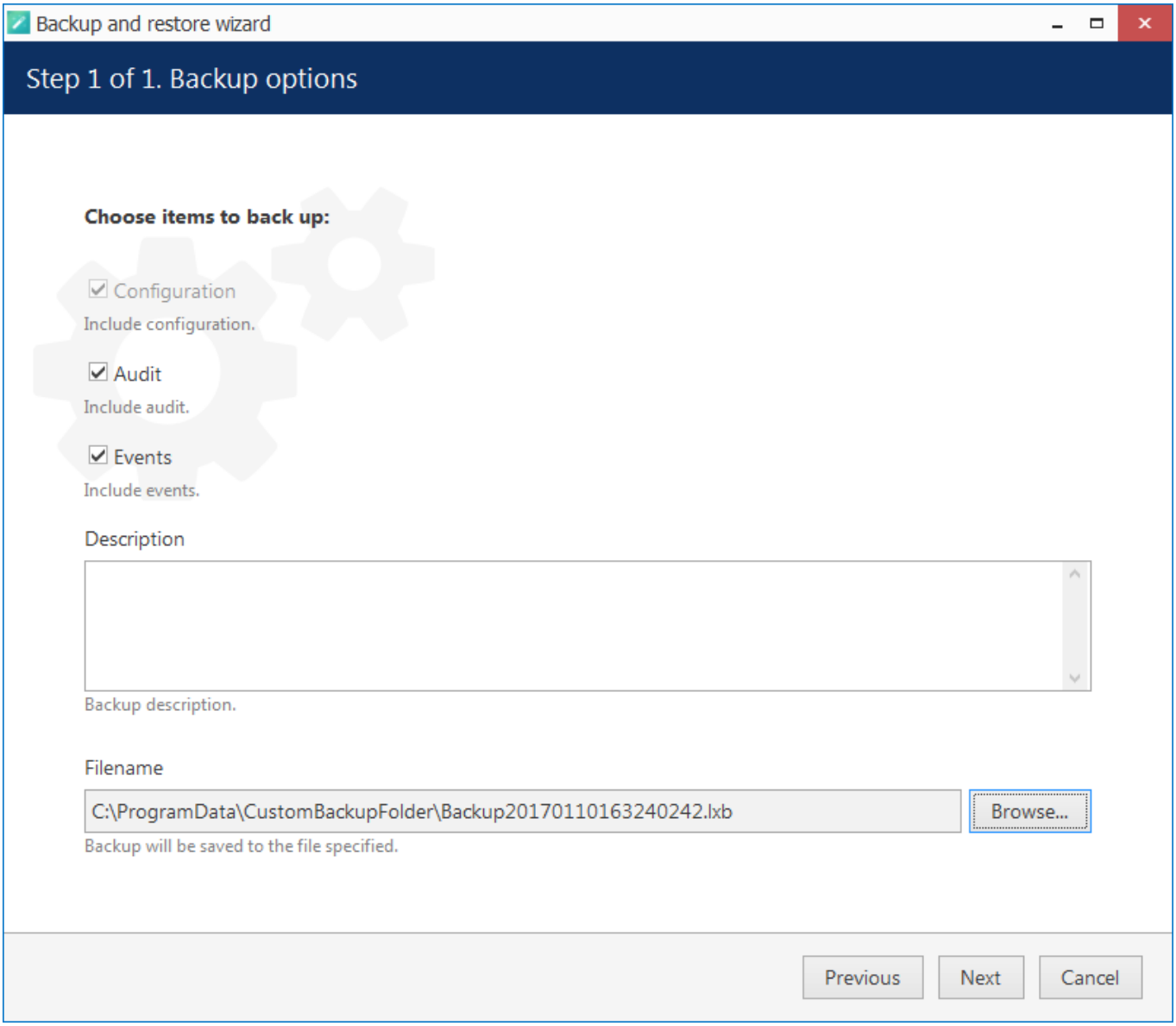

Choose items to back up

Here, you can choose the information to be saved and also add a custom description for your future reference. You can either use the default destination folder or choose a custom one, even located on a different disk or a network drive.

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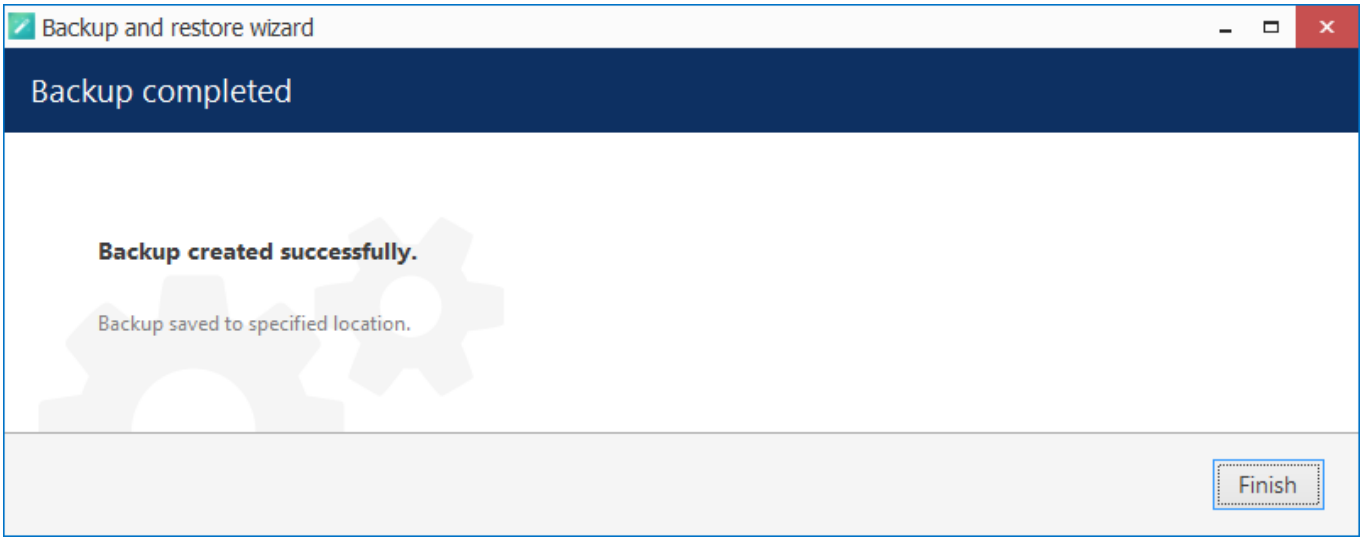

Restore point successfully created

The wizard will create the backup and display a success message. Click *Finish* to exit.

Restore to an Earlier Database Version

Choose this option if you wish to start the Ganz CORTROL server with a database from an earlier time instead of the current configuration.

> ⚠ If you have a clean Ganz CORTROL installation and wish to restore its configuration from an earlier point, make sure to initialise the server using the Server Setup Wizard, which usually pops up automatically after the installation is completed and is available via Start menu. (There is no need to do this if you upgraded the software to a newer version so that it already has been initialised earlier).

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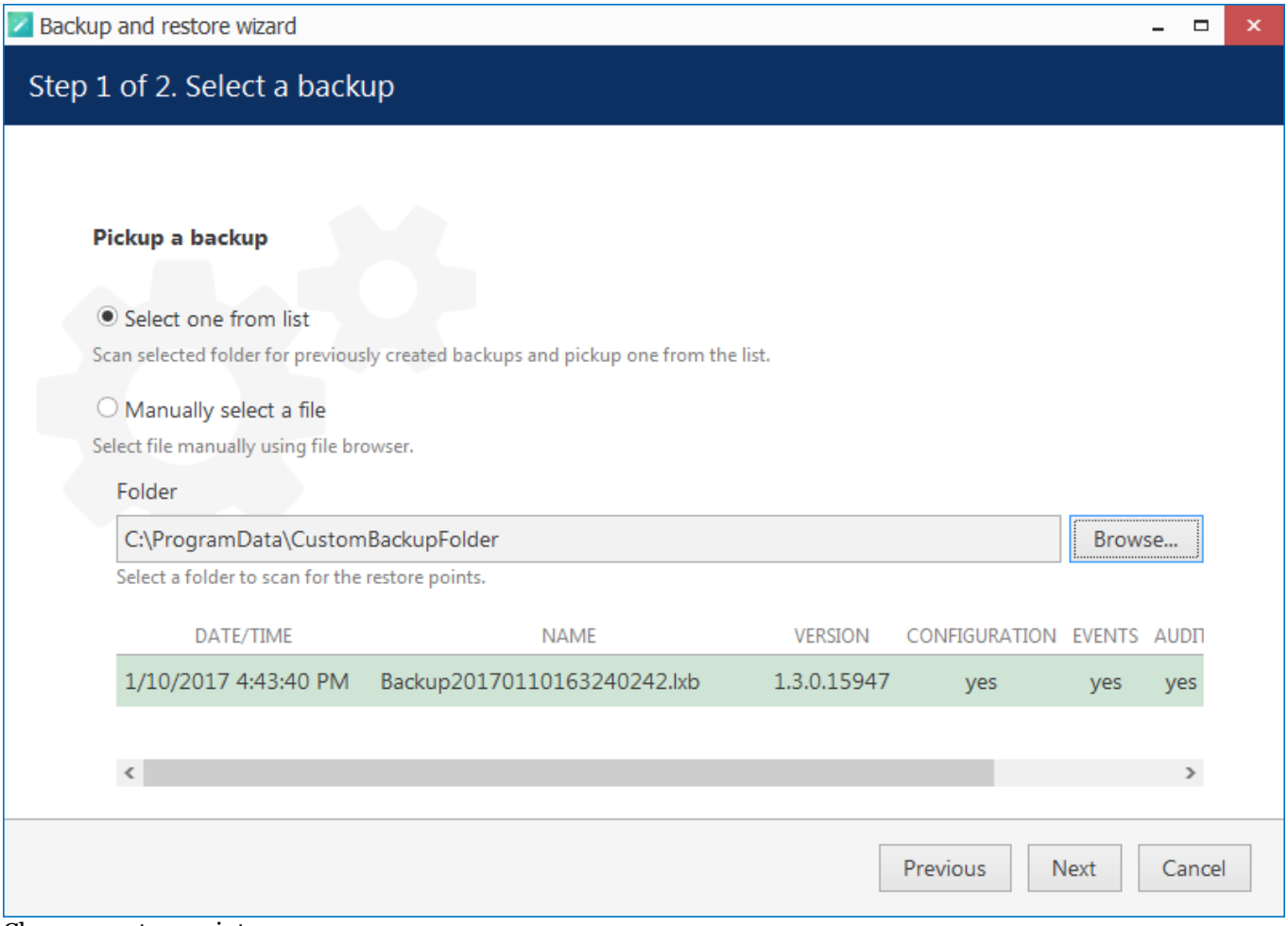

Choose a restore point

Here, you have two options: select a backup file from the list or manually locate the necessary *.lxb file. In either case, make sure you have chosen the right backup to be used and then click *Next*.

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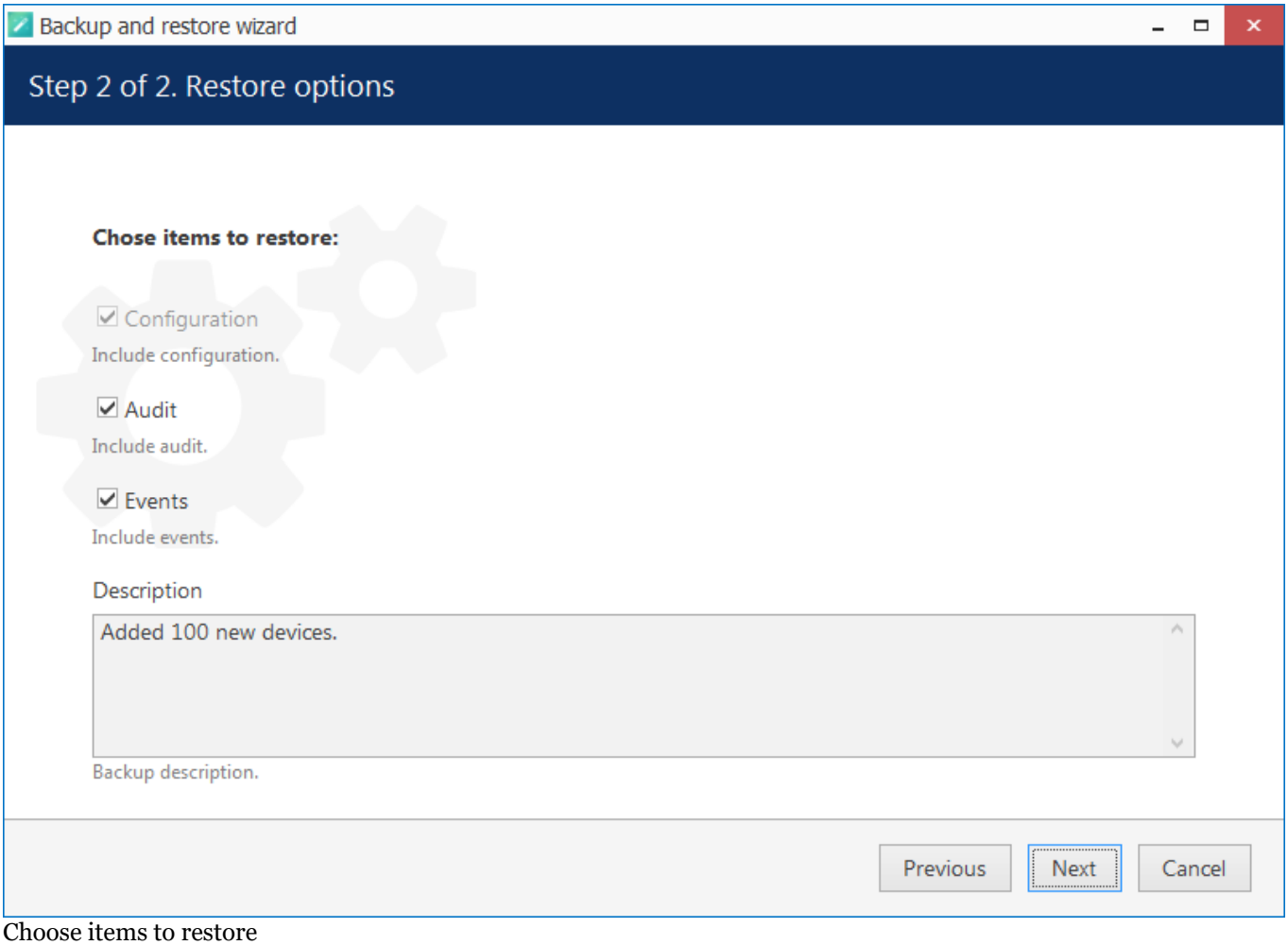

Choose items to restore

Make sure you have chosen a suitable database to be restored by reviewing the items and using your earlier comments as a reference. Click *Next* when ready.

On this additional step for Ganz CORTROL Global, you will be able to choose to **reset** the Ganz CORTROL Recorder configuration.

How to choose the right option?

- If you are just restoring the Ganz CORTROL Global server database (e.g., after the central server version rollback), you do not need to reset the recording servers because their configuration is actually the same (just the DB version is incompatible).
- If you are using a much earlier database backup that certainly has a different Ganz CORTROL Recorder configuration, then you need to include the reset.

⚠ Recording server reset is usually necessary if the remote server configuration is invalid (corrupt or different from the target DB contents).

If you choose to reset all recording servers at this point, it will take some time for them to re-synchronize (remove and then accept the restored configuration), which may result in some downtime. On slow connections with a lot of remote servers the downtime may be significant.

If you have many recording servers on a slow connection, we recommend that you do NOT reset them at this point. These servers will continue to operate with their current configuration but their status in the *Monitoring* section may turn to *Not synchronized*. In that case, initiate the re-synchronization manually later via %console% main menu > System upgrade > select server > Re-synchronize configuration.

This option is disabled by default to decrease the potential downtime.

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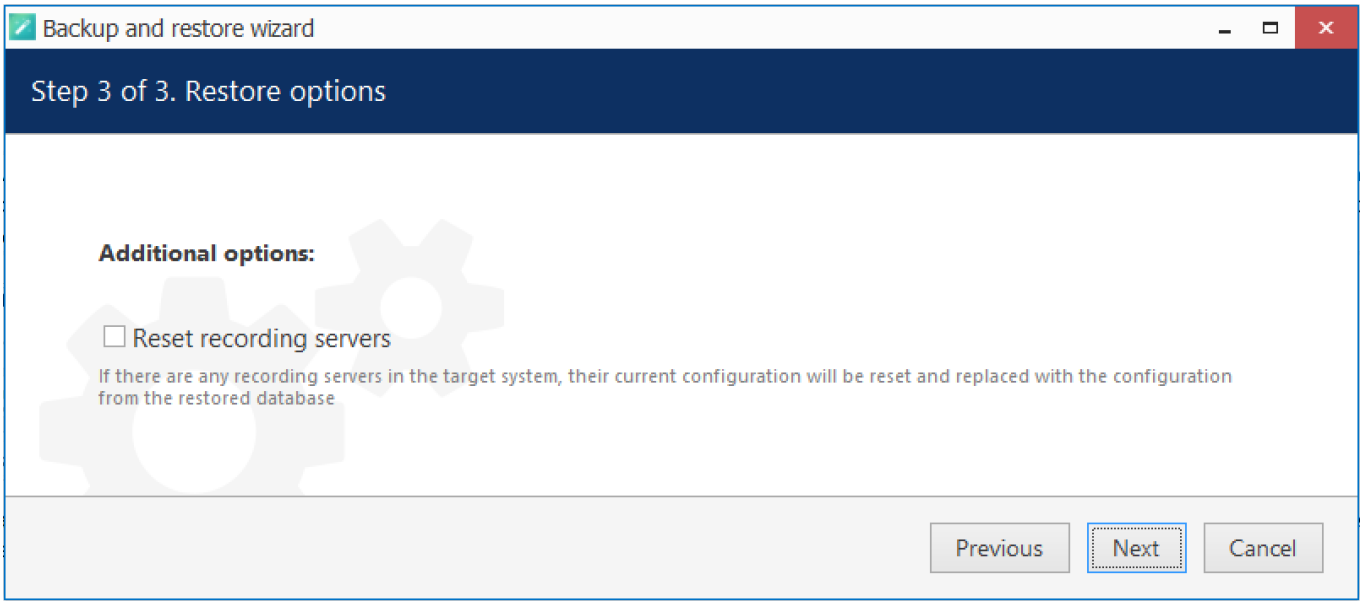

Recording servers are not reset by default

When you click *Next*, you will see additional details about the recording server reset, which will help you choose the correct option for your system before proceeding - and give you a chance to re-consider. Carefully estimate the need for the reset before initiating the restore procedure!

A database from a newer software version cannot be used for this. Older database versions can be used without issues; however, we recommend that you use the latest available backup from a stable software version (not beta).

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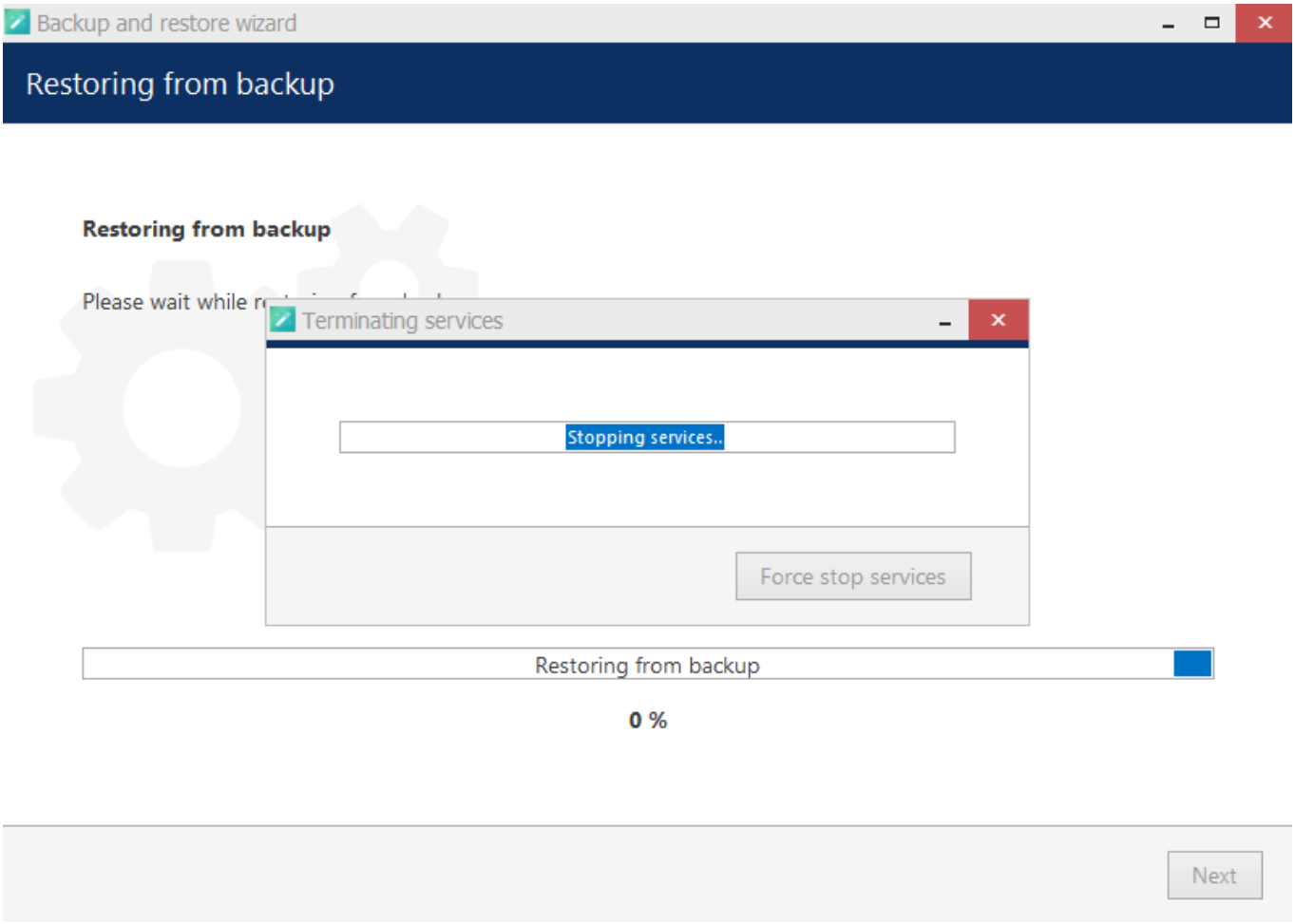

Restore in progress

Then, the wizard will ask you to stop the Ganz CORTROL services and start restoring the database after your confirmation.

> ⚠ Caution! This is an irreversible operation. Do not abort the process or shut down the server machine during the process.

If nothing interferes with the restore process and the backup file is intact, you will receive a success message after the wizard finishes restoring your Ganz CORTROL server configuration. Server service will be automatically started with the restored database. If you chose to reset the recording server configuration, all Ganz CORTROL Recorder instances will receive the restored configuration as well.

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3.4 Setup Wizard

The Ganz CORTROL Console Setup Wizard is automatically started after product installation and activation is complete. You can skip the wizard at this point and launch it later anytime from the Ganz CORTROL Console upper-right-hand corner menu:

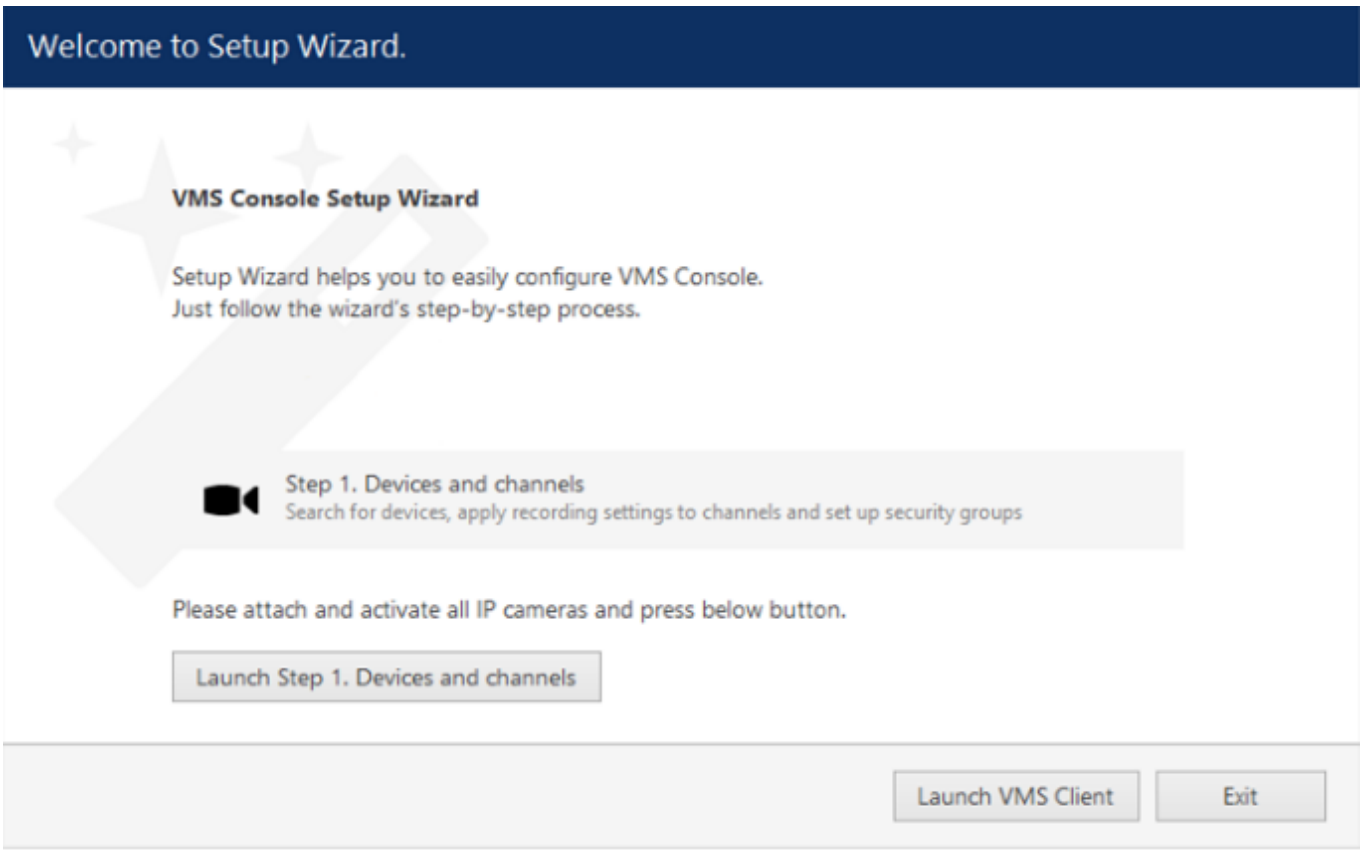
Run Setup Wizard from Ganz CORTROL Console

Setup Wizard will show you the process summary and guide you through the steps to configure the installation. To proceed with each next step, simply click the button below the step list; to exit the wizard prematurely, press either *Exit* or *Launch Ganz CORTROL Client* button in the bottom-left-hand corner.

Setup wizard for Ganz CORTROL Prime consists of just one step that covers devices and channels; setup wizard for Ganz CORTROL Server includes three steps, which are devices& channels, users and basic events&actions. Make sure you connect all devices (IP cameras and/or other video sources) before launching the wizard: it will automatically scan the network for available video sources.

Step 1: Devices and Channels

This step will allow you to automatically search and add cameras and other video source devices into your server configuration. Press the *Launch Step 1* button to begin.



Setup Wizard

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Scan Parameters

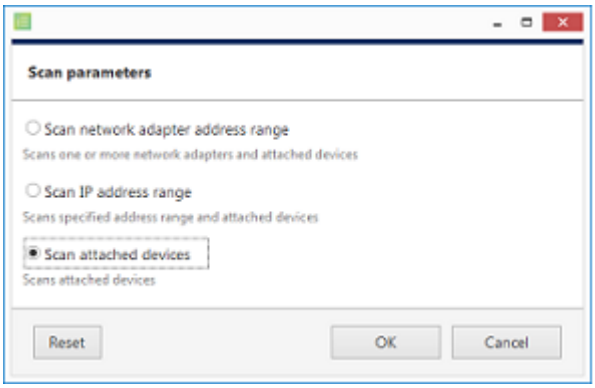
First, select scan mode; the following options are available:

- scan IP address range: specify a continuous LAN segment to be scanned
- scan network adapter address range: select one or more network interfaces to be fully scanned
- scan attached devices: the local hardware system will be scanned for capture boards and Direct Show video sources

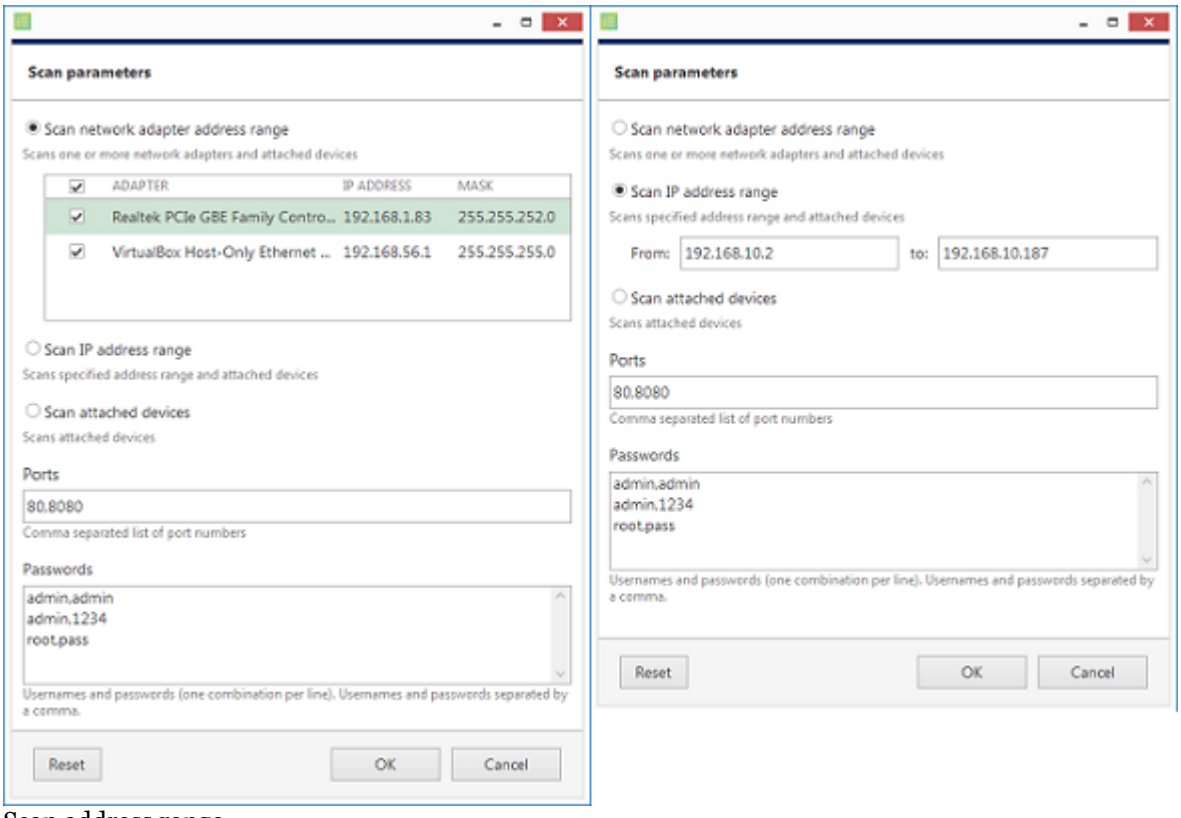
If you have chosen to search for IP video sources, you should review additional connection settings and change or update them, if required:

- ports: HTTP ports, comma separated
- user credentials: pairs of comma-separated user names and passwords, one pair per line

Use the *Reset* button below to discard all changes and start entering scan parameters again. When you are ready, press *OK* button below to begin scanning.



Scan attached devices



Scan address range

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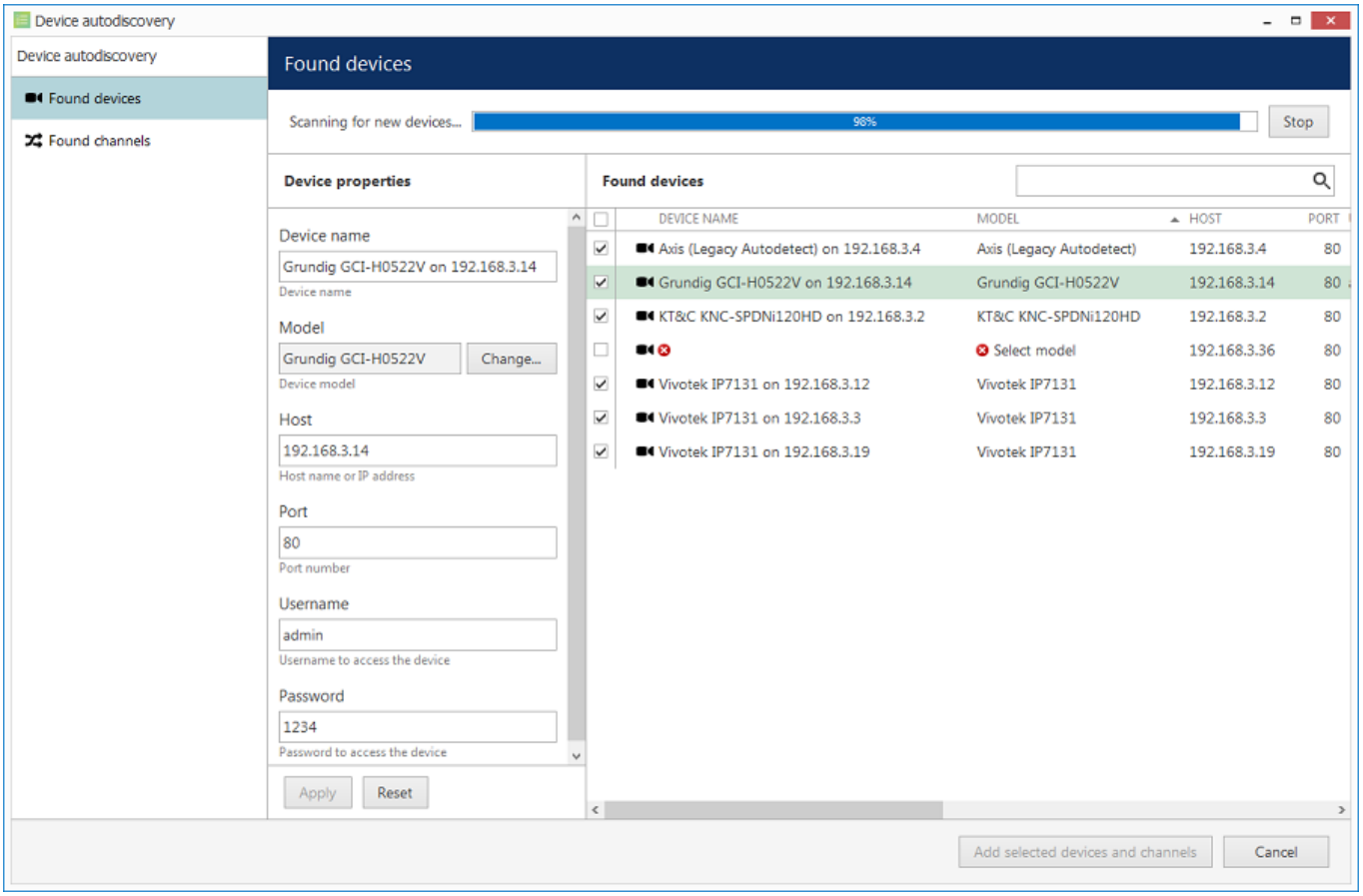
Device Autodiscovery

After scanning has been completed, you will be taken to the Device Autodiscovery dialog box, which will allow you to review the found devices and their channels, and enter/modify related settings. Use the *Search* field in the upper-right-hand corner to find a specific device by name, model, IP, port or hardware ID (for IP devices, ID includes MAC address).

> There are two types of selection in the item list: checkboxes and colour highlight. **Checkboxes** are used to choose the items to be added to server configuration after you close the dialog box; **highlighted** items are subject to immediate properties changes. Use *CTRL+click* or *Shift+click* to select all or several items at once to change their settings.

Click a device in the item list to load its settings into the *Device Properties* window. Note that some settings may be missing for some of the automatically found devices; this depends mostly on device and whether user data was correctly provided. In such cases, simply fill in the missing data manually and click the *Apply* button below to save the configuration changes.



Set up discovered devices

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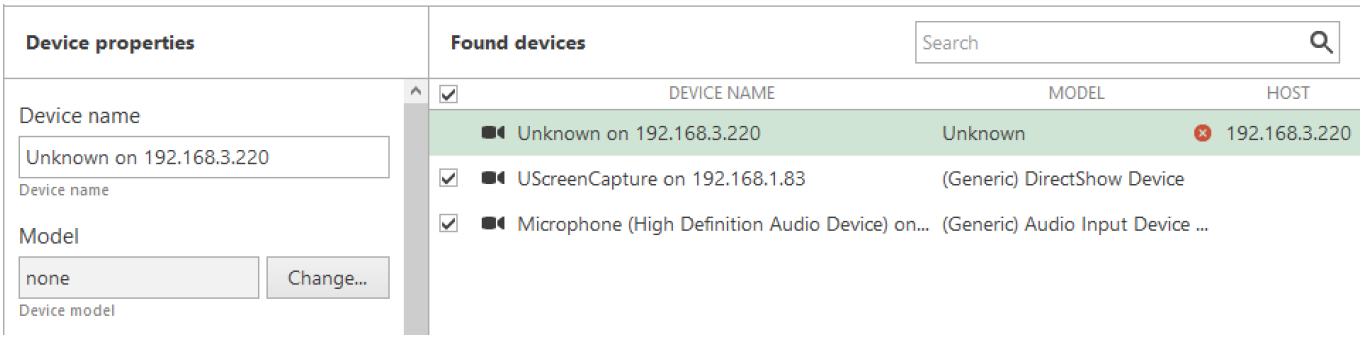
If device is not integrated with the software (native support), it may be detected as generic type (e.g., ONVIF). If you think some devices have not been discovered, check if they have different HTTP ports; also, try adding them manually.



If an unknown device is discovered, change its model manually

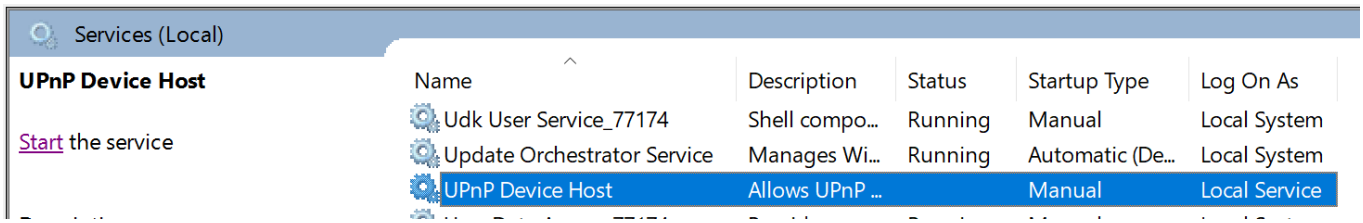
If the device cannot be matched with a model in the list and it also does not respond as generic ONVIF, it may be discovered as *Unknown*; in that case, try settings its model manually to the closest one (from the *Suggested models*), or try Generic RTSP and specify an RTSP URL in the channel settings. This may happen to devices that are not listed as an exact model and are also old enough not to support ONVIF Profile S.

Setting	Description	Default value
Device name	User-defined video source name	Autodetected model + IP, empty if not detected
Model	Device manufacturer and model, or generic type	Autodetected vendor and model, empty if not detected
Host	Device IP address	Autodetected
Port	Device HTTP port	Autodetected
Username	Device user credentials; note that you have to provide administrative profile credentials in order to be able to change device settings via software interface	Appropriate username from provided list or autodetected
Password	Device user password	Appropriate password from provided list or autodetected

Make sure you select all the devices you wish to add by putting a checkmark next to them. Devices with missing configuration (model and/or IP) are unchecked by default and will not be added to active server configuration.

⚠ If the autodiscovery **does not find any cameras** or all of them are Generic ONVIF instead of proper models:

- check models
- check IPs and passwords and ports
- make sure that the UPnP Device Host service is functioning properly on your system.



Switch to *Channels* tab to review the detected video channels of the discovered devices: this is particularly important if you are using multichannel devices, e.g., capture boards and encoders. Use the *Search* field in the upper-right-hand corner to find specific channels by name or device name.

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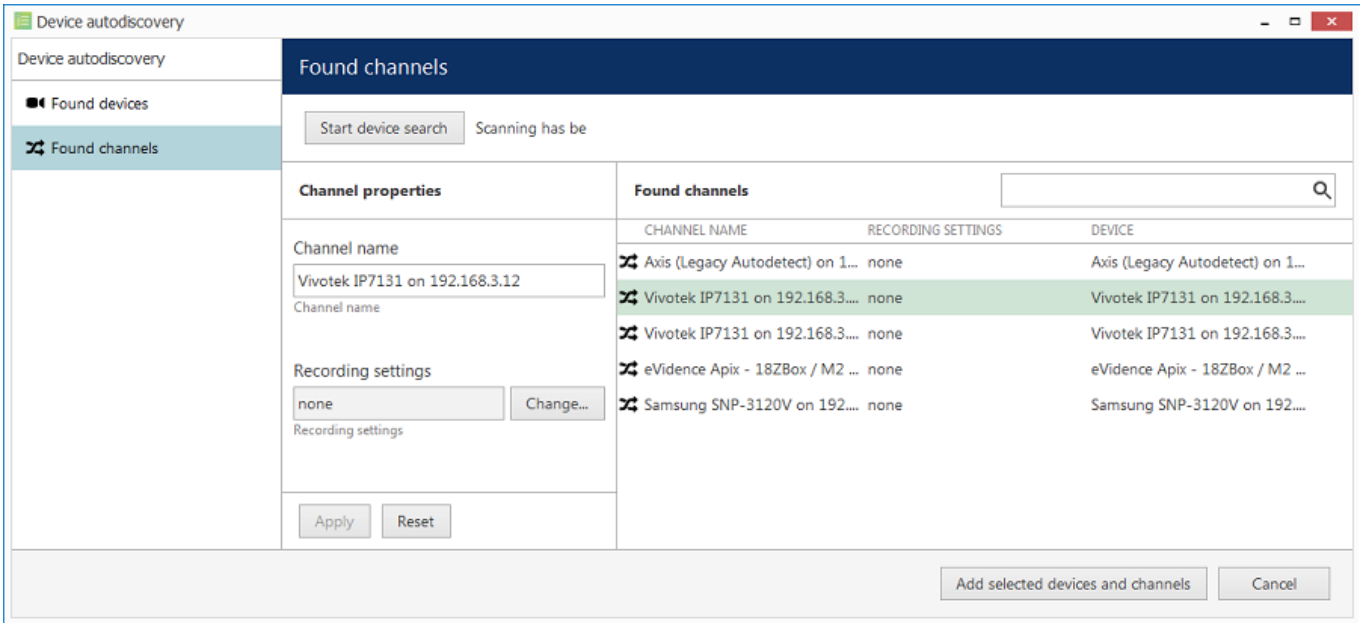
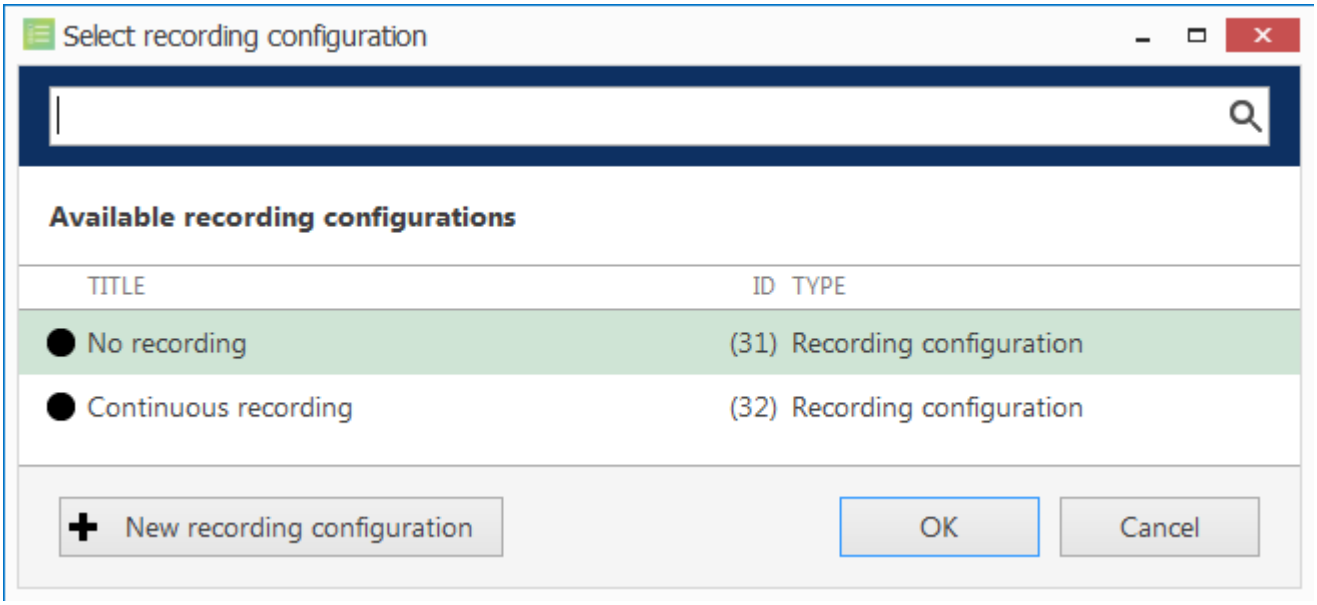


Set up discovered channels

Here you can edit the channel name and assign recording configuration. By default, recording is enabled for all channels: click the *Change* button near *Recording settings* to manage recording profiles and assign them to your channels. To add a new recording profile, click the *+ New recording configuration* button below; you can find more details about recording profiles in the corresponding section. Click *OK* to save and return back to devices and channels; click *Apply* to save configuration changes.

> ⚠ After changing the channel recording configuration, do not forget to click *Apply*, otherwise the changes will not take effect.

> 💡 Recording configuration here is assigned to the **main streams** of the target channels. In order to set up substream recording, please go to channel configuration.



Select the recording configuration or create a new recording profile

Click the *Start device search* button above at any time to restart device discovery.

> ⚠ All previously discovered devices and all configuration changes will be discarded if you restart camera autodiscovery.

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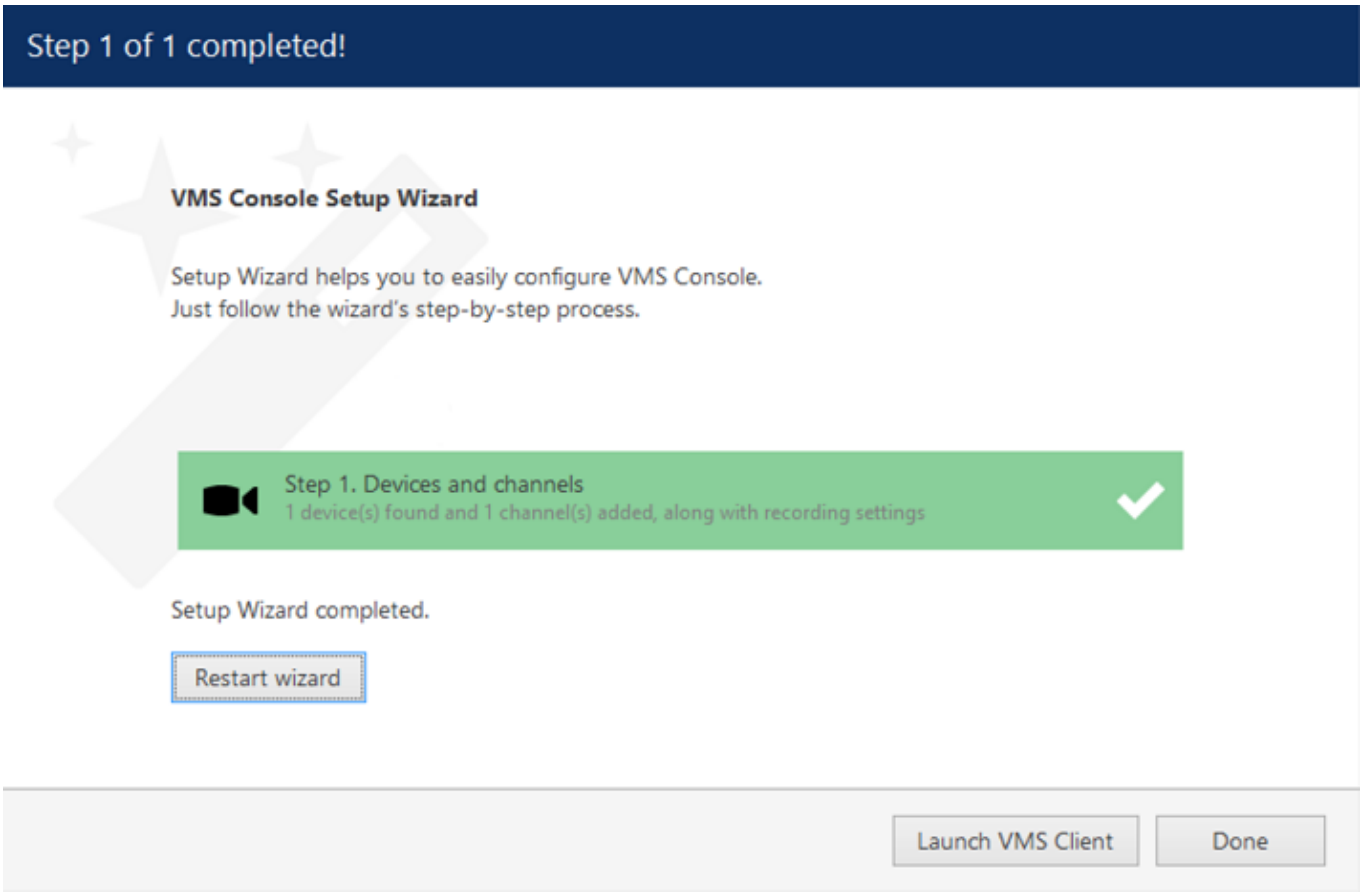
When you have finished with configuration, click *Add selected devices and channels* to go back to the wizard.



Wizard completed successfully

If you are using the Ganz CORTROL Prime version of the software, you can now either restart the wizard to cover the rest of your devices, or close it. Press the Launch Ganz CORTROL Client button to switch to the monitoring mode at once.

Step 2: Users and User Groups

Ganz CORTROL Server users can press the *Launch Step 2* button to proceed with *Users*. This step will allow you to add users and user groups and give them permissions for the devices and channels added earlier.

> The built-in Administrator user account and built-in Administrators group are root users with access to absolutely all the available resources. As a result, resources choice is unavailable for the Administrators group, and it is also impossible to add Administrator user to any other group.
>
> Any users added as members to the built-in Administrators group will have the same full authority as root users.

User Groups

First, decide whether you want to create user groups or work with a non-systemised array of user accounts. For large systems with complex user structure, groups are strongly recommended for reasons of improved manageability. Choose *No* to proceed with plain user management at once; otherwise, you will be offered the chance to create user groups and distribute existing resources between them. Note that the Setup Wizard interface offers simplified settings for user groups at this point; later, you will be able to create nested groups via the corresponding Ganz CORTROL Console section.

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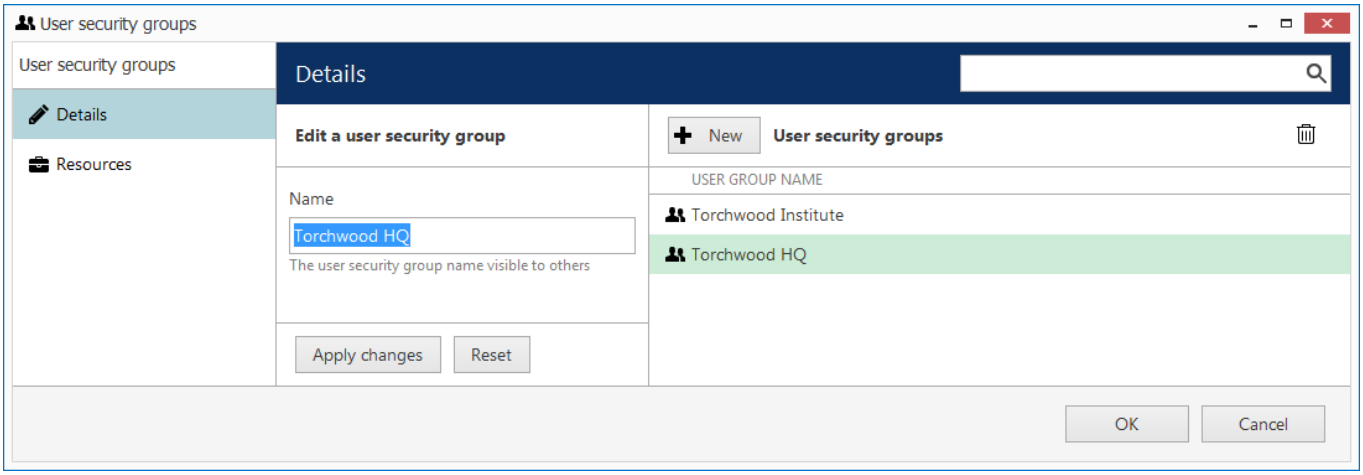
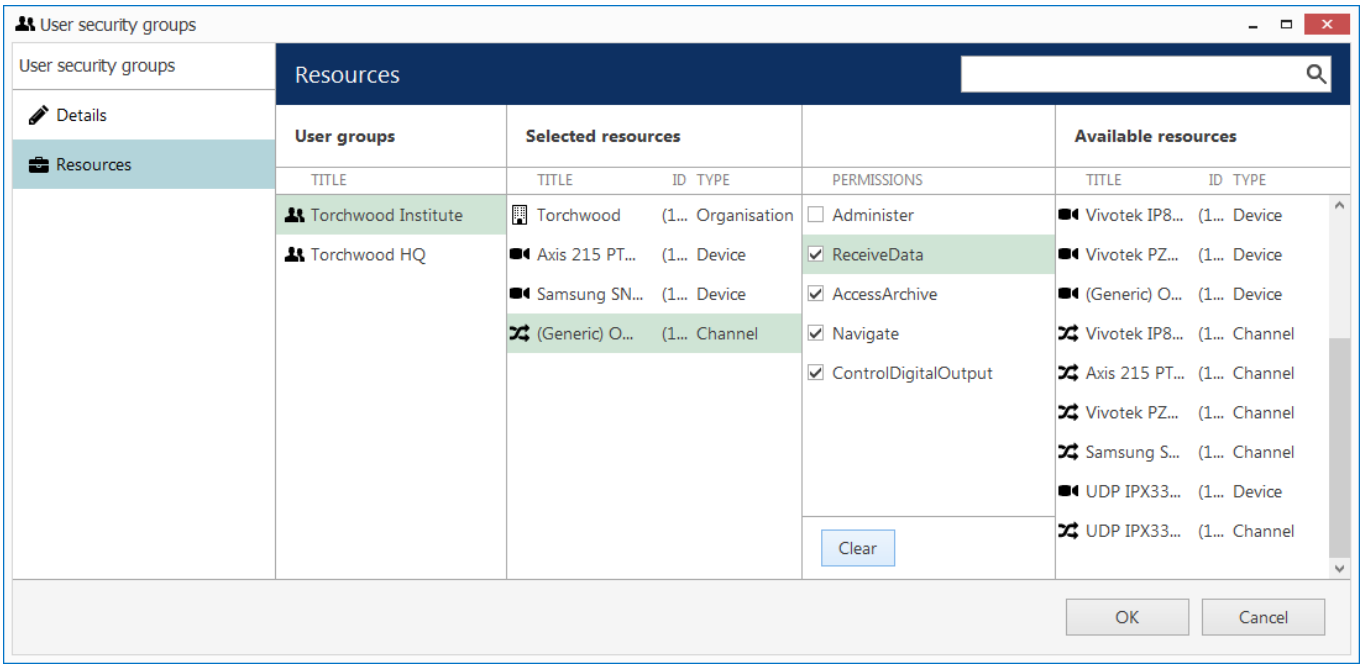


Add one or multiple user groups

Enter a name for the first user group and then click the *Create* button below: newly created group will appear in the item list on the right. By default, the last modified group stays opened for changes. Correct group name, if necessary and then click *Apply changes,* or click *Reset* to discard the latest changes and revert to the most recently saved state (the same thing will happen if you select a different item for editing).

To create more groups, click the + *New* button on the upper panel and proceed in the same way as on the first iteration. Use the recycle bin icon to delete selected group(s) (hold CTRL or Shift to select multiple items).

Switch to the *Resources* tab to assign the permissions for this user group. Available resources at this point include servers, devices and channels.



Add resources for created group(s)

Choose the group name in the first column to manage its resources. To add a resource, pick at least one permission for it and it will be automatically moved to the *Selected resources* list. To remove a resource, uncheck all its permissions - either manually or using the *Clear* button below. Note that double-clicking resources does not work here as one or multiple different permissions must be specified.

When you have finished, click *OK* to proceed with user accounts.

Users

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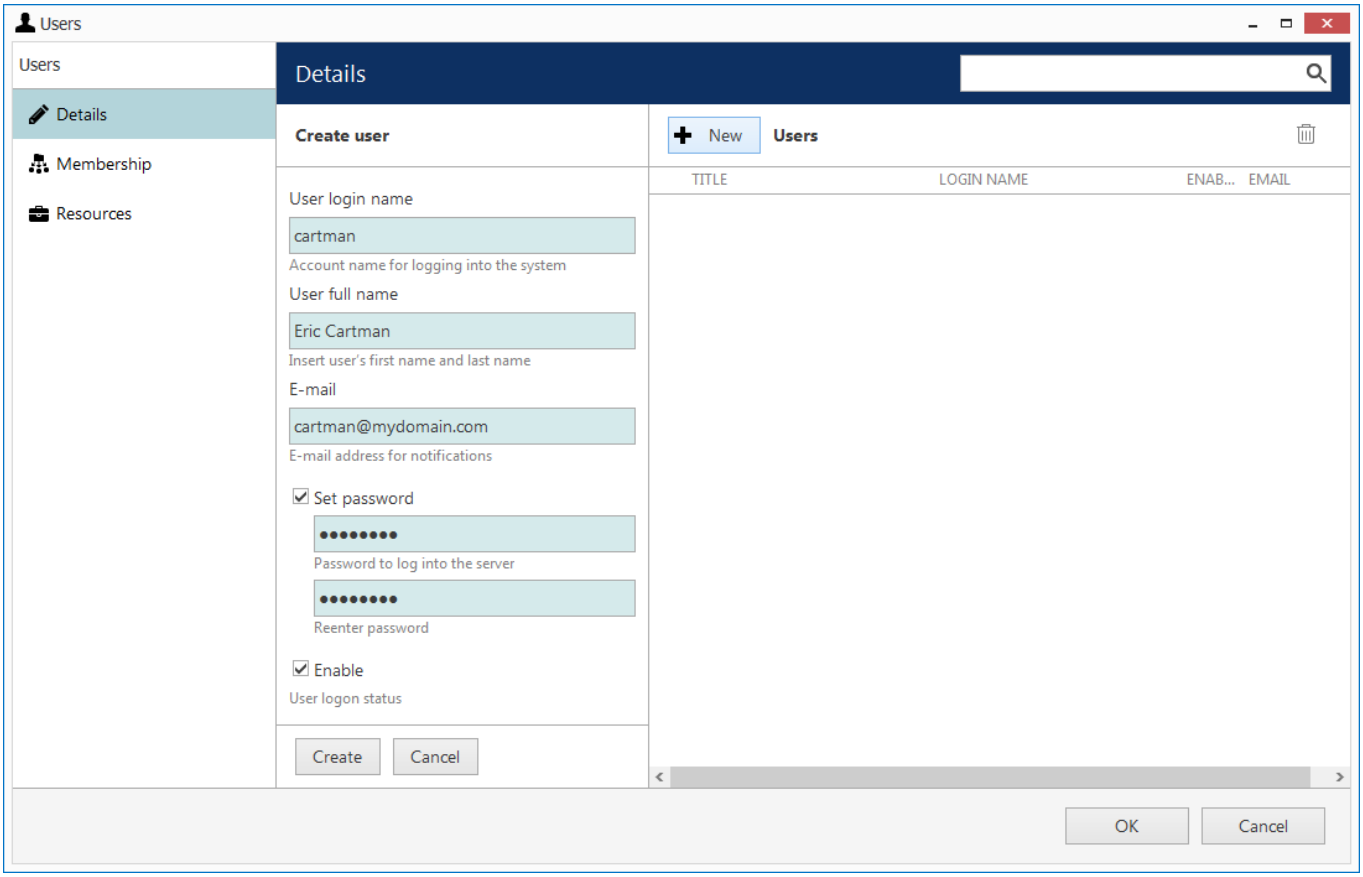
To create the first user, simply fill in their details and then click *Create* below. By default, the most recently modified user will stay open for changes; correct user details, if necessary and then click *Apply changes,* or click *Reset* to discard the most recent changes and revert to the latest saved state (the same thing will happen if you select a different item for editing). Note that you do not have to re-enter the password when editing - only activate *Set password* if you wish to re-define it.

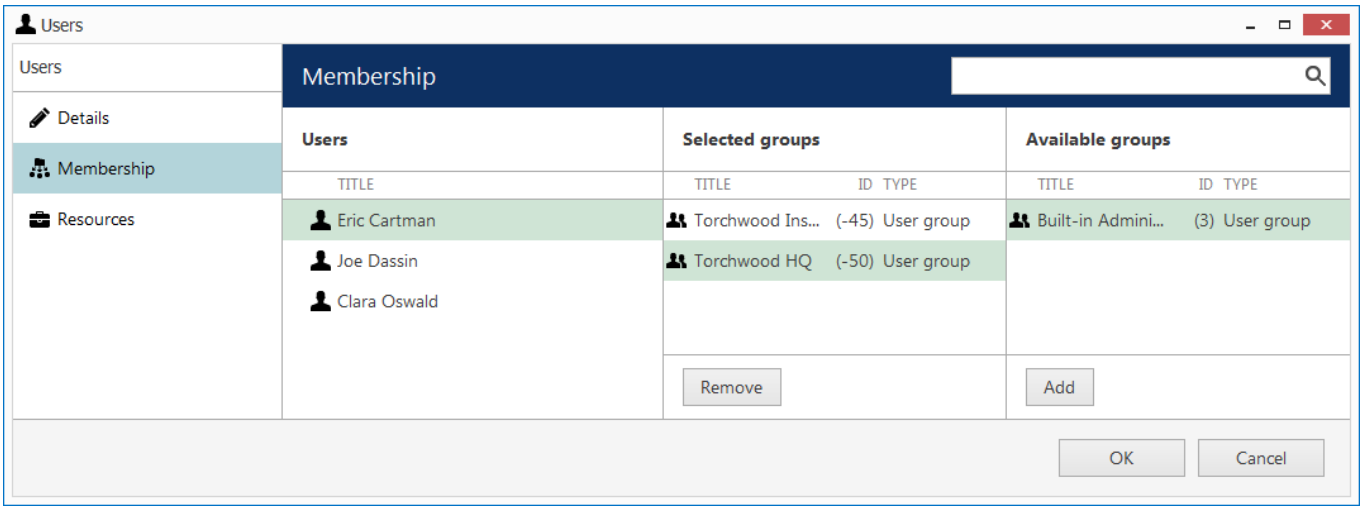
To add more users, press the + *New* button on the upper panel and proceed in the same way as described previously.

Use the recycle bin icon to delete selected user(s) (hold CTRL or Shift to select multiple items).



Enter user details

One the *Details* tab, the following user properties are available (all fields are required): login, full user name, email address, password and status. Passwords must be entered twice - this is a security precaution to avoid typos. Every user is enabled by default meaning that the target account is active and can be used for server logon; disable user accounts you wish to suspend while keeping all user-related information and resource permissions.



Choose groups for the newly created users

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On the *Membership* tab, select groups for the specified users to become members of: move groups by double-clicking them or by using the *Add/Remove* buttons below.

Switch to the *Resources* tab to add individual resource permissions. This can be used both for group members and for users not belonging to any of the groups; individual permissions will not be removed if the user is excluded from the group.

To add a resource, pick at least one permission for it and it will then automatically be moved to the *Selected resources* list. To remove a resource, uncheck all its permissions - either manually or using the *Clear* button below. Note that double-clicking resources does not work here as one or multiple different permissions must be specified.

When you have finished, click *OK* to save and go back to the main wizard window.

Step 3: Events and Actions

On the last step, basic alarm and action management is introduced. Press the *Launch Step 3* button to open the dialog box.

Note that all the settings here apply solely to the channels discovered on the previous step; if you have configured other devices prior to launching this wizard, they will **not** receive the current event & action settings - launch the *Event & Action Configurator* to set up rules for other devices. You can also use *E&A Configurator* if you wish to add other (advanced) types of alarms and/or actions.

When you are finished with all steps, you have the following options:

- **Restart wizard**: start the wizard again to set up more resources
- **Launch Ganz CORTROL Client**: open Ganz CORTROL Client application (will close the wizard)
- **Done**: close the wizard and proceed to Ganz CORTROL Console

You can run this Setup Wizard again at any time via your Ganz CORTROL Console application menu in the upper right corner.

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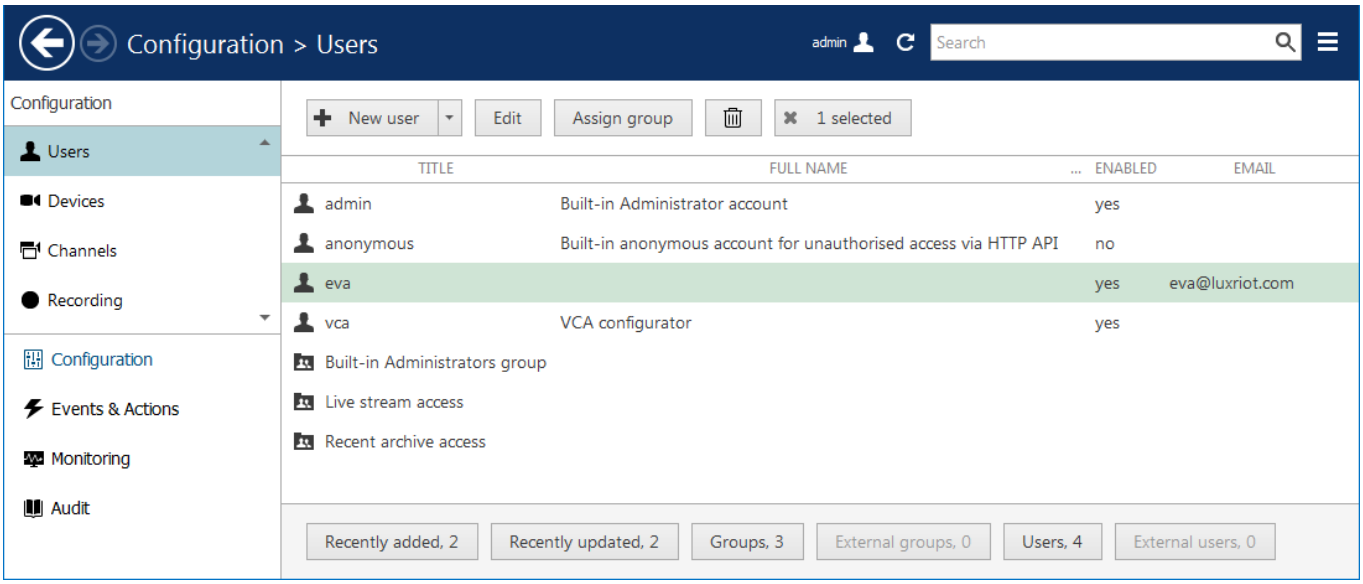
3.5 Interface Overview: Management Application

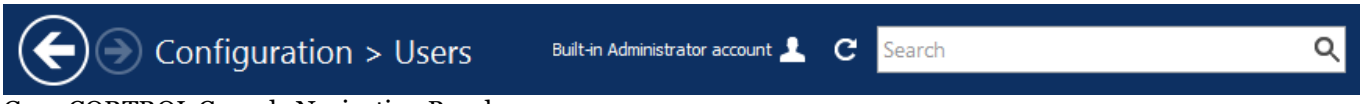
Ganz CORTROL Console is a straightforward graphics user interface tool with access to all possible server settings. To ensure comfortable and easy navigation, it is important that you become acquainted with its structure before starting to use it.

Note that Ganz CORTROL Console appearance slightly depends on your software package and license limitations. Nevertheless, its logic always remains the same. Those sections, which are unavailable due to license restrictions, will be greyed out but still listed to get you acquainted with all available features. You can hide those features via Ganz CORTROL Console settings or upgrade your Ganz CORTROL server to a superior version.



Ganz CORTROL Console management application interface

Navigation Panel



Ganz CORTROL Console Navigation Panel

The blue panel on top serves as navigation bar and its usage is similar to that of Windows Explorer. Here are its main components (from left to right):

- *Left* and *Right* arrows enable navigation through your browsing history and allow you to switch between previous and next locations; you can also use Backspace on your keyboard to go back
- Your current location is displayed right next to these arrows
- If you are in the *Organisations* view, an *Exit* button will appear
- Currently logged in *User account* button with options to view user profile or to log out
- *Refresh* button - reloads current item list
- *Search* field - only items matching the search criteria will be displayed in the list (this filter is maintained as you switch between the sections)

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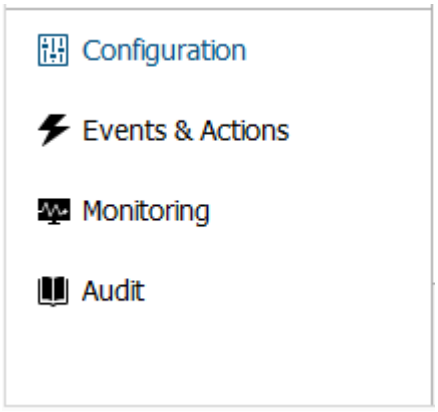
Application Menu

Application Menu, position: top right

Application menu button in the upper-right-hand corner gives you the following launches the options:

- launch the Setup Wizard
- import the configuration from an XML file
- import the configuration from another Ganz CORTROL server database
- change Ganz CORTROL Console settings
- enable cybersecurity checks
- set up automatic configuration backup
- remotely upgrade system components
- open the software documentation
- open the About section

Sections



Sections panel, position: bottom left

The bottom left panel allows you to switch between the four main Ganz CORTROL Console sections: Configuration, Events & Actions, Monitoring and Audit. The contents of the components panel on the left will change depending on the selected section. If the Ganz CORTROL Console windows is resized, the sections will be reduced to icons.

Components

The panel on the left will display the list of all available configuration components based on the selected section. As a result of license limitations, some of the items may be greyed out or unavailable. The list below shows maximum available items by category:

- **Configuration**: setup for the server components
    - Servers, Networks, External services, Failover clusters, Users, Devices, Channels, Recording, Maps, Layout templates, Layouts, Video walls, User buttons, Visual groups, Webpages, Live podcasts, Data sources, Mail servers, Reports, Access control, Organisations
- **Events & Actions**: configuration of automated scenarios
    - Rules, Events, Actions, Global events, Conditions, Schedules, Counters, OPC, Indicators, Variables, Tags, Subjects
- **Monitoring**: live component status
    - Servers, Devices, Channels, Streams, Archive statistics, Storages, User sessions, Video walls, External services, Reports, Access control, OPC, Indicators
- **Audit**: log of server events and user actions
    - Servers, Users

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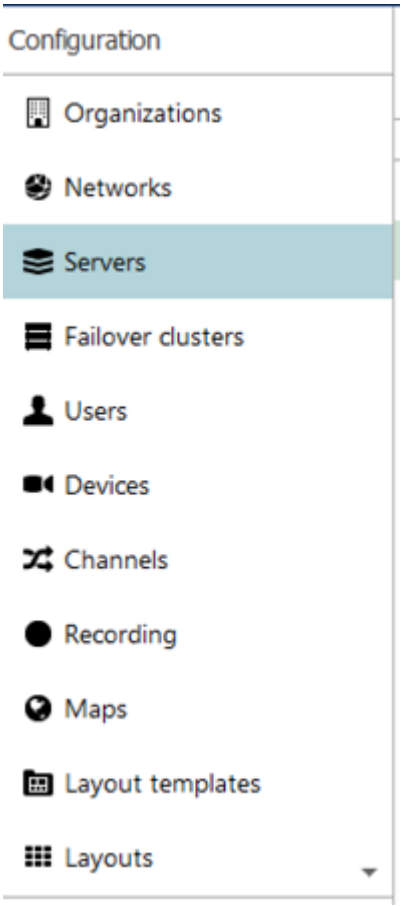
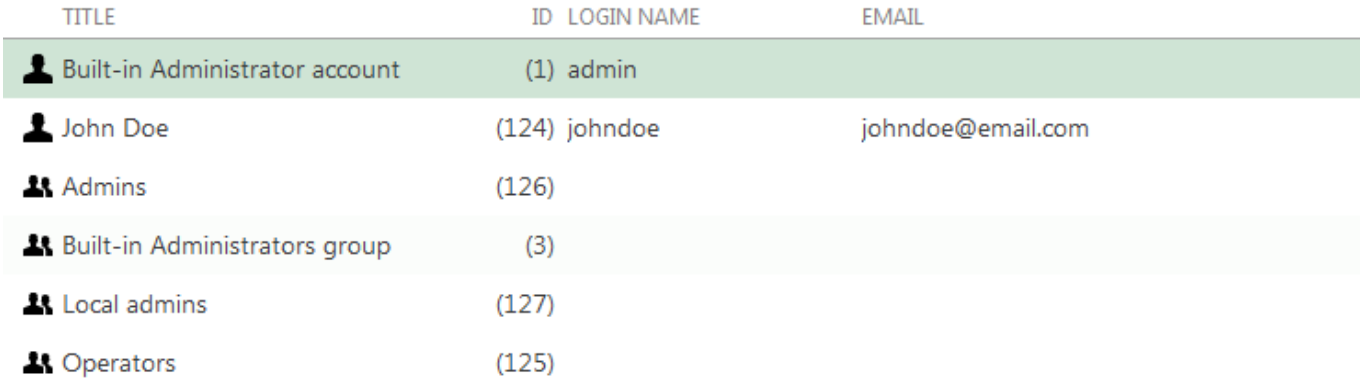
This document further describes the purpose and usage of each category in details.



Components panel, position: left

Item List

The main part of the Ganz CORTROL Console window displays items in the selected category depending on the search and/or item filters. You can select one or more items at once using the *Shift* or *CTRL* button.



Item list, position: centre

Click any column title to use is as a **sorting** basis for the whole item list; the little arrow near the column title indicates that it is currently being used for arrangement - either ▲ ascending or ▼ descending. Right-click item list header for sorting options and column fit settings. The *Best fit* option will assign automatic size to all columns based on their name width. You can change column **width** simply by dragging their boundaries in the header row: these adjustments will be remembered and restored after you go to other sections, or close and re-open the Ganz CORTROL Console application.

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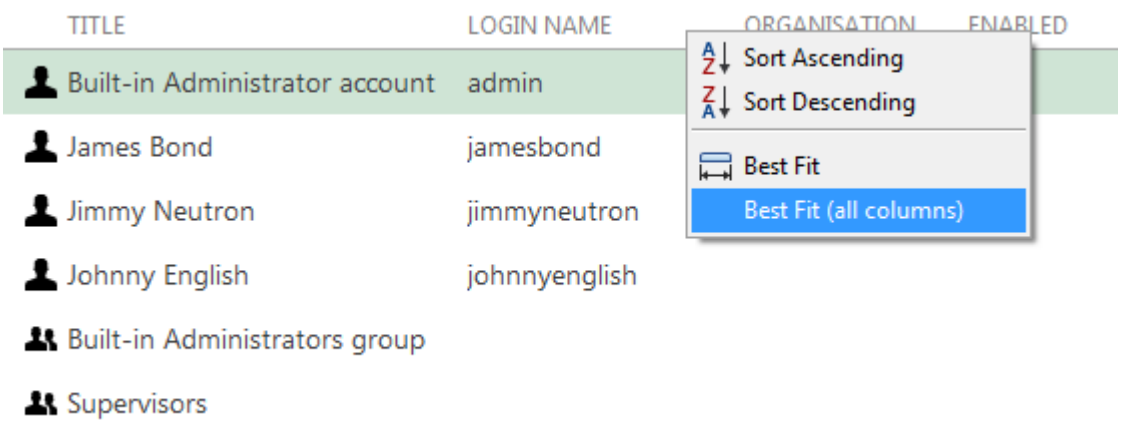
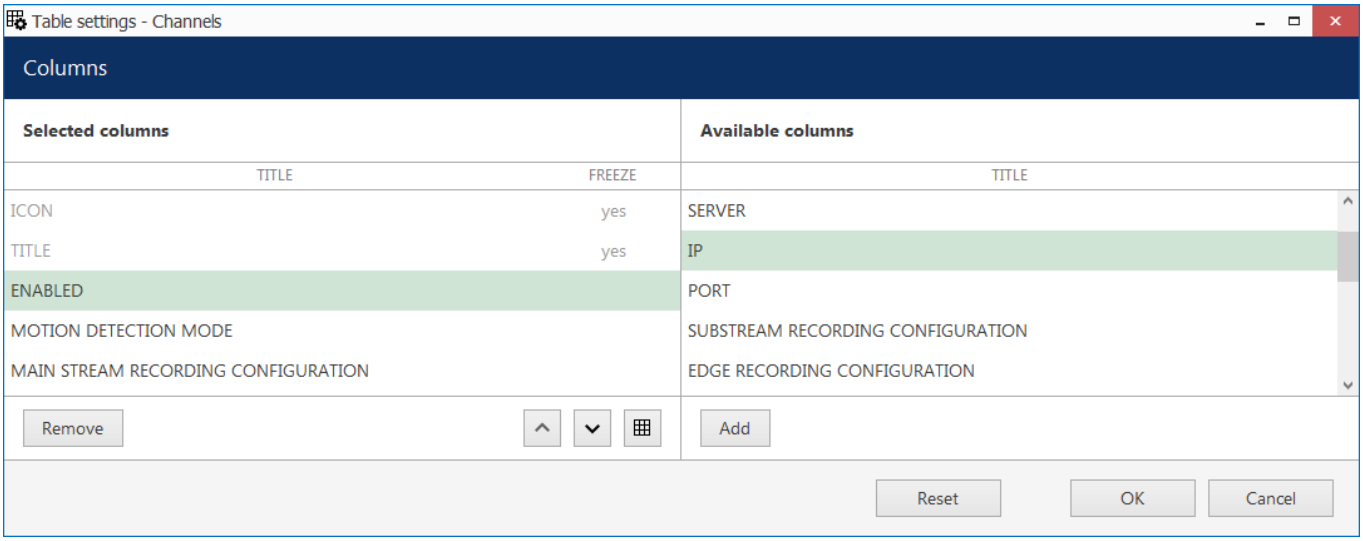


Right-click header for additional options

For each category, it is possible to **define the set of columns** to be displayed, and **freeze** one or several leftmost columns for convenient horizontal scrolling. To do this, click the grid icon in the upper right corner just below the application menu (the rightmost button in the upper panel). An additional window will pop up, allowing you to define the column layout.



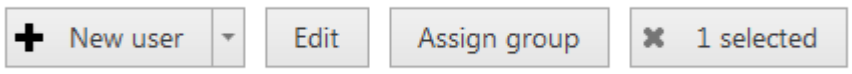
Choose item details to be displayed

One the left, you will see the currently displayed details. On the right, there will be all available columns.

- Use the *Add* and *Remove* buttons, or simply **double-click** items to move them from left to right and vice versa to select and deselect them.
- Use the *Up* and *Down* arrows to sort your selected columns on the left side.
- The grid button next to these arrows allows you to **freeze/unfreeze** the leftmost columns (i.e., those on top of the list). These will stick to the left window side as you scroll the table horizontally. You can freeze as many columns as you like, but only the ones on the far left side. For the columns in the middle of the list, this button will be greyed out (inactive).
- To discard all changes and **restore** the default (application original) list of columns, click the *Reset* button.

When done adjusting the table layout, click *OK*. Your new column configuration will appear: adjust the width of the newly appeared details, as desired.

Item Actions



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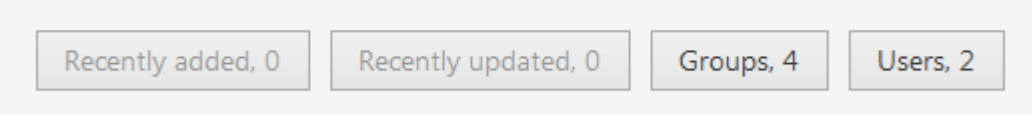
Item actions panel, position: top right, under Navigation panel

The panel above the item list displays the available actions, if applicable. Usually, the buttons here will allow you to create a new item, edit or delete existing ones, create or edit contiguous items, etc.

Item Filters



Item filters panel, position: bottom right

The bottom panel contains miscellaneous item filters, such as: recently added and updated, corresponding groups etc. Click any of the filters to apply them; use the *X* button to reset and display the full item list.

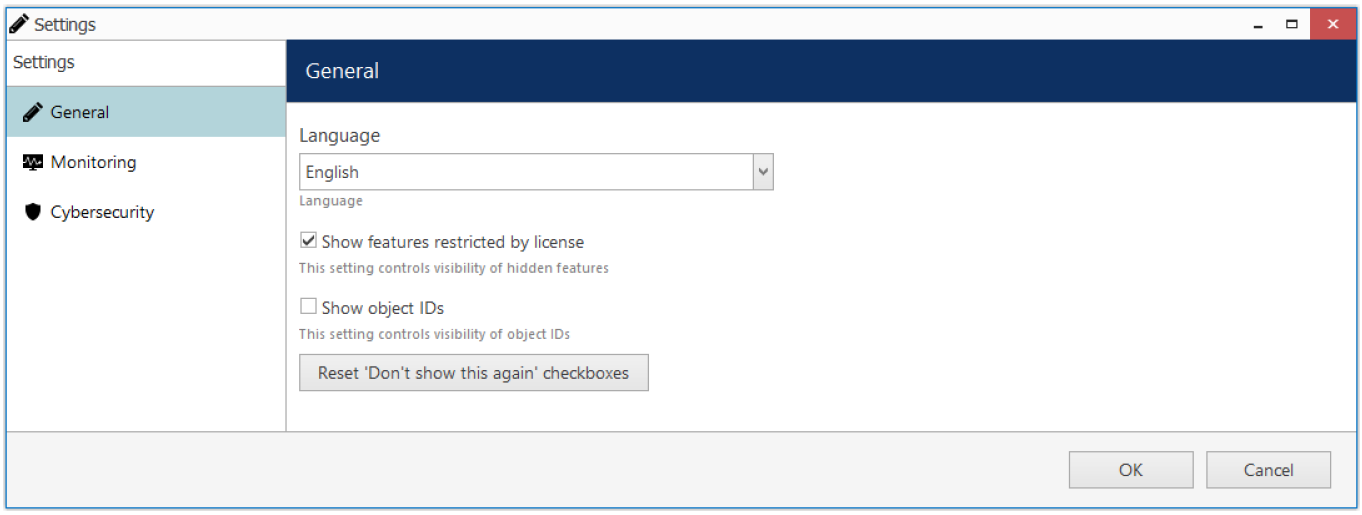
Application Settings

To change Ganz CORTROL Console application settings, go to the main application menu in the upper-right-hand corner and choose *Settings*. The preferences here only affect the current Ganz CORTROL Console instance, no matter to which server it connects. The interface language setting also affects the Ganz CORTROL Client application installed on the same machine.

For your convenience, the settings have been grouped into several tabs.

General

General interface settings, which do not belong to any specific category.



Ganz CORTROL Console application settings

Here, it is possible to:

- change application **language** (by default, the language chosen during installation is used)
- show or hide software features restricted by license
- show or hide object identifiers (internal object IDs mostly necessary for addressing Ganz CORTROL entities via HTTP API)
- reset all *Don't show this again* checkboxes, which have been set so far
- reset monitoring section warnings, if they had been reset manually

Monitoring

This section contains settings related to the *Monitoring* section of Ganz CORTROL Console, namely:

- auto refresh interval in seconds for the *Monitoring* section dashboards (set 0 to disable autorefresh)
- show or hide monitoring warnings (critical errors will always be showed, only warning level info can be

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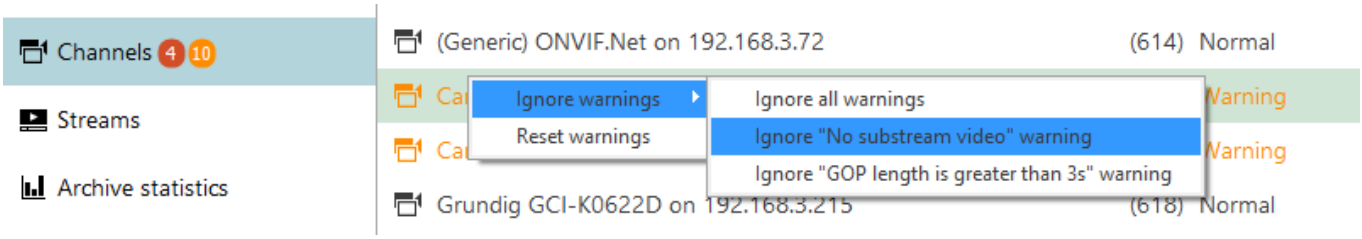
turned off)
- reset all *Monitoring* warnings, which have been cancelled (set to be ignored) so far

See below for more information about warnings.



Ignore channel warnings in the monitoring section

Cybersecurity

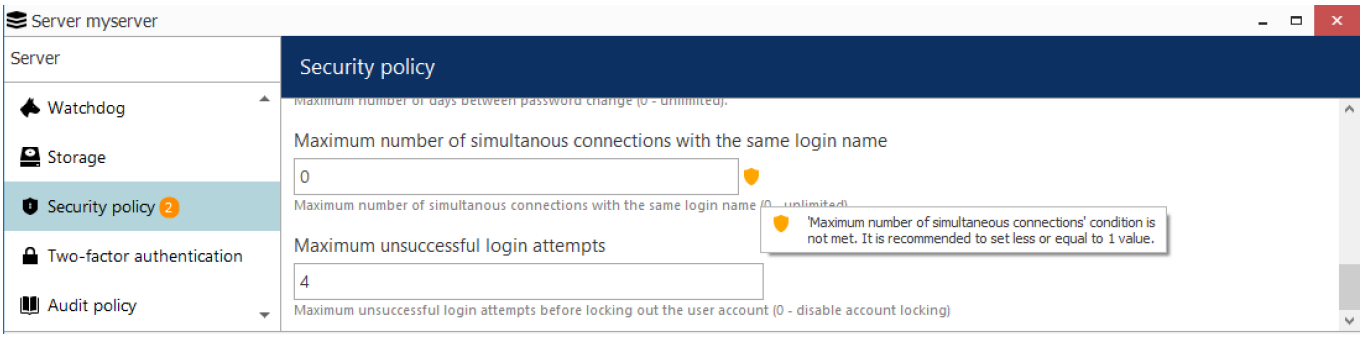
The following setting is related to cybersecurity:

- show cybersecurity warnings

Cybersecurity warnings are different from those in the Monitoring section. Security warnings are displayed as shields in the server and channel settings, indicating that the related setting does not match the defined security level. See below for more information about warnings.

Errors and Warnings

The Ganz CORTROL Console application will sometimes warn you about certain misconfigurations. For example, when the entered setting value is out of range, invalid, or incoherent with the system settings in some way, you will see a corresponding **mark** next to the preference.



A warning notifying about an issue with the security setting

The following marks are used:

- **security** shield indicates that the setting value does not meet the current cybersecurity level preference
- number of issues shows how many **warnings** (orange) or **errors** (red) are in the current category
- an X icon is used to mark a completely invalid value (e.g., the field cannot be empty)
- other kinds of red or orange marks on top of the item icons, or text colour

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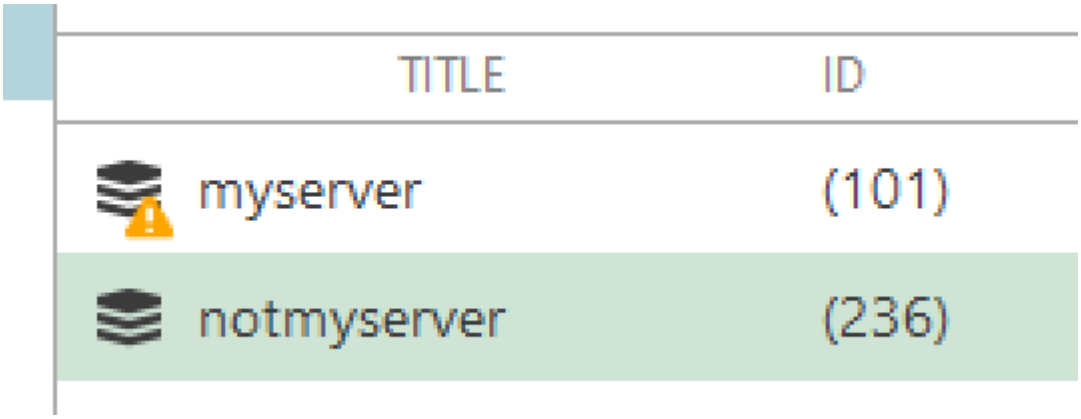

A warning mark on the server icon indicating an issue with the server settings or policies

Channels having warnings and errors in the Monitoring section

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3.6 Conventions and Keyboard Shortcuts

Mouse Gestures

Double-click an item containing more entities (e.g., any group): opens item contents in the same window

Double-click a **non-expandable** item (e.g., server, user): opens entity configuration dialog box

CTRL+click or **Shift+click**: select multiple items in a list

Right-click on a text field: standard text edit menu

Right-click on a text field when creating an action: standard text edit plus text macros

Keyboard Shortcuts

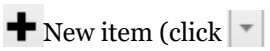
Backspace: browse one step back in Ganz CORTROL Console

Alt+F4: close Ganz CORTROL Console

CTRL+A: select all items

Visual Elements

General


New item (click drop-down arrow to see available options)

Remove item(s)

Deselect item(s)

Unacceptable filed value, hover mouse cursor for more information

More information about the item, click to view the details

Refresh item list

Search

Ganz CORTROL Console sections

Configuration

Events & Actions

Health monitoring

Audit log

Management

Network (server connection), connection settings

Server

Server group

External service

External service group

Failover cluster

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Software Watchdog

Storage

Resources (all or any type)

User account/session

User group

General details

Members of the current item

Current item membership in other groups

User and user group permissions for target item

Device

Device group

Channel

Channel group

Recording profile (core recording settings)

Recording schedule (recording itinerary based on core recording settings)

Recording configuration (recording interface assignable to channels)

Motion detector

Layout Template

Layout

Layout group

Map

Video wall

User button

Visual group

Shared channel

Audit Journal (software log)

Set (period etc.)

Events & Actions

Rules

Events

Actions

Global events

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Conditions

Event & Action schedules

Mail servers

Action delay timers

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4 Server Settings

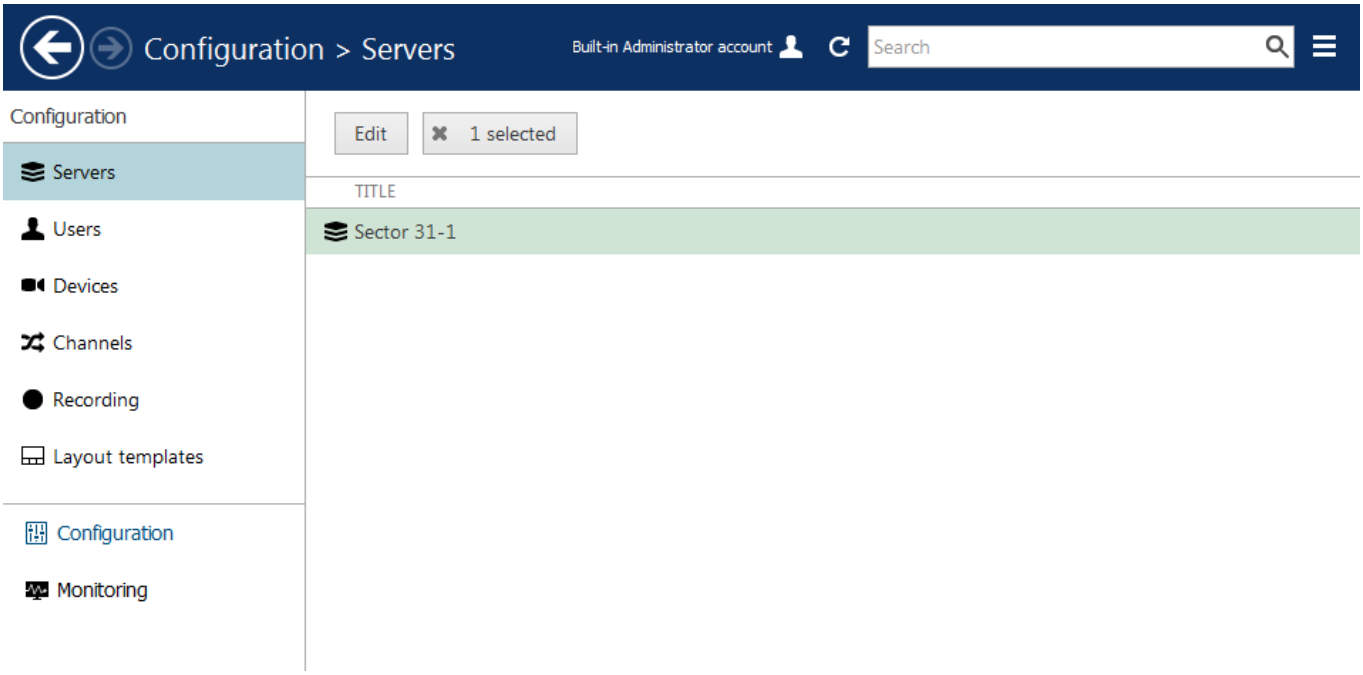
All the changes in the server configuration are done via Ganz CORTROL Console application. The settings are immediately saved and stored in an **encrypted internal database**, which guarantees that your server configuration cannot be accessed without entering a valid username and password.

> ⚠ Server database encryption is automatic, meaning that you do not need to enabled it explicitly, and is available starting from the software version 1.8.0.

This topic describes available server settings.

General

In order to access Ganz CORTROL Server server settings via Ganz CORTROL Console, select *Configuration* section and then choose *Servers* components from the menu on the left.



Configuration -> Servers

Double-click server or click the *Edit* button on the upper panel to access server configuration dialog box.

Details

On the *Details* tab, you can change the server **name**: it will appear everywhere in Ganz CORTROL Console and in the connected Ganz CORTROL Client applications, including Web client.

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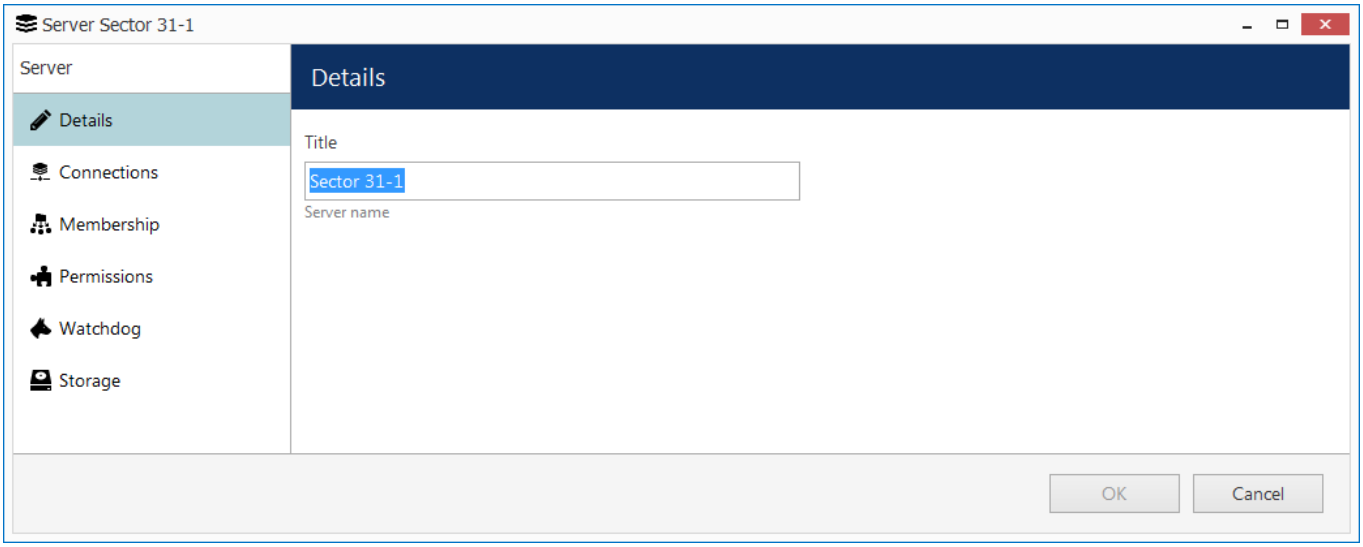
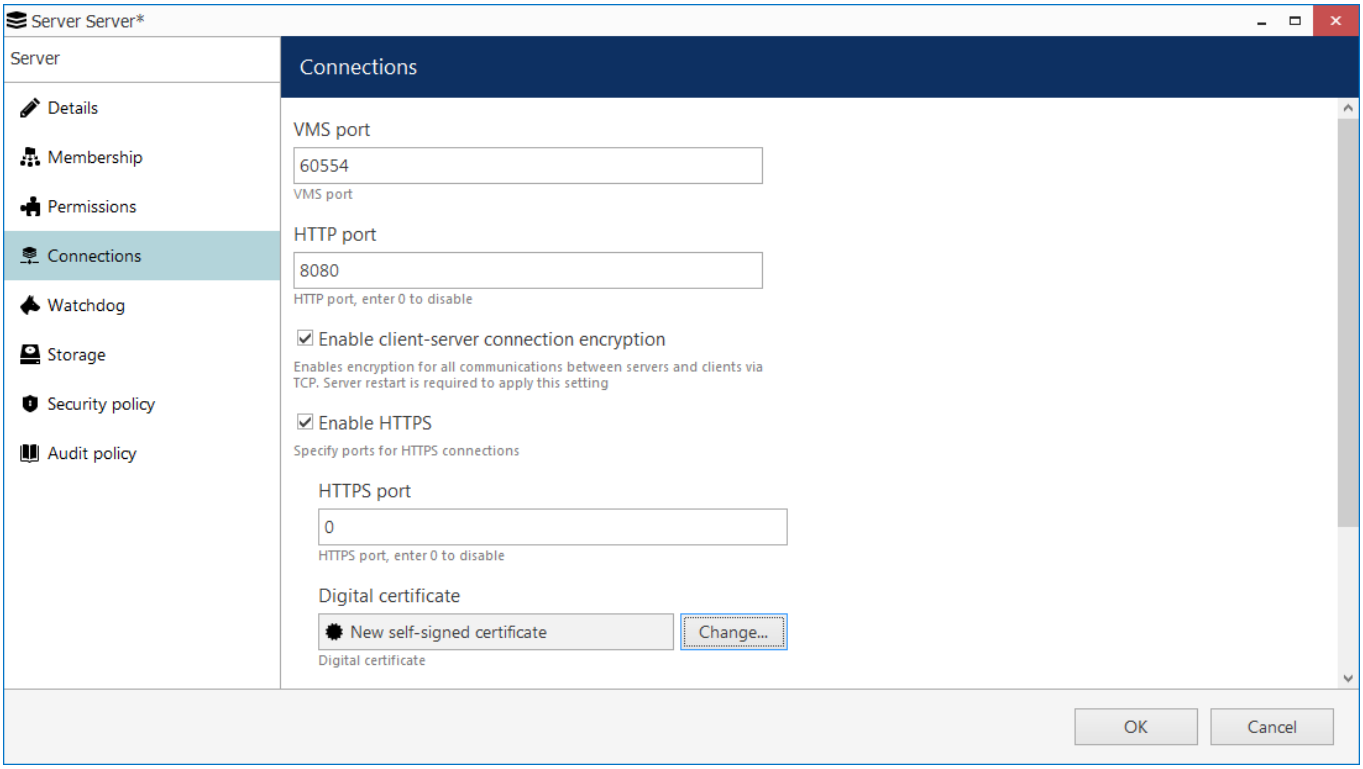


Server details

Connections

The *Connections* tab allows you to define **ports** for Ganz CORTROL Client and Ganz CORTROL Streaming Server connection; the default ports are **60554** for Ganz CORTROL Client and **8080** for Ganz CORTROL Streaming Server (HTTP). Note that, in case you plan to access your Ganz CORTROL Server server from the Internet, the ports must be properly forwarded on your router according to your desired topology and allowed through the firewall. Details on the port forwarding setup can be found in your router operation guide.



Connection settings

Here, you can **enable encryption** for client-server connections and also for HTTP connections (by default, it is disabled).

Server-client encryption setting affects all TCP traffic, i.e.:

- Ganz CORTROL Console connections to the Ganz CORTROL Server server
- Ganz CORTROL Client connections to the server

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When you change the server-client encryption setting, all currently connected clients - both Ganz CORTROL Console and Ganz CORTROL Client applications - will be disconnected so that the encryption settings can be applied correctly. They will re-connect back shortly provided that they support encryption, too - make sure to upgrade them so that their version matches server version.

⚠ Connection encryption is supported starting from software version **1.8.0**. If your system has remote Ganz CORTROL Console and/or Ganz CORTROL Client applications of **older versions**, these will be **unable to connect** to a server that has encryption enabled; therefore, first make sure to **upgrade all the clients** and only then enable encryption on the server side.

To enable **HTTPS** (HTTP over TLS), mark the corresponding setting and then:

- specify HTTPS port (different from HTTP)
- add a digital certificate

You can either use your own valid **digital certificate** or generate one right in the software. In the latter case, the certificate will be self-signed and you will need to add it as trusted when connecting from the mobile app and from your Web browser(s).

⚠ If you are using your own CA certificates, create a *.pem* file with your certificate chain as described here: https://www.digicert.com/ssl-support/pem-ssl-creation.htm

This is necessary for the certificate to be recognized correctly by all HTTP clients - Web browsers and Ganz CORTROL mobile applications. If you simply apply your CA certificate in Ganz CORTROL Console, there is a chance it is not recognized because some applications require the entire certificate chain.

Then, apply the *.pem* file as the certificate together with your key when the importing certificate into Ganz CORTROL Console.

Also, if you are going to use SNMP traps in your Event & Action scenarios, here you can define server's **SNMP community** name and **SNMP port** for incoming and outgoing messages. Community will be used by the SNMP manager to send requests; SNMP port will serve for both incoming and outgoing messages (supported incoming messages are third-party SNMP manager requests, **not** external SNMP traps!). Leave both values **zeroed to disable** this functionality.

The next topics describe the remaining aspects of server settings in details.

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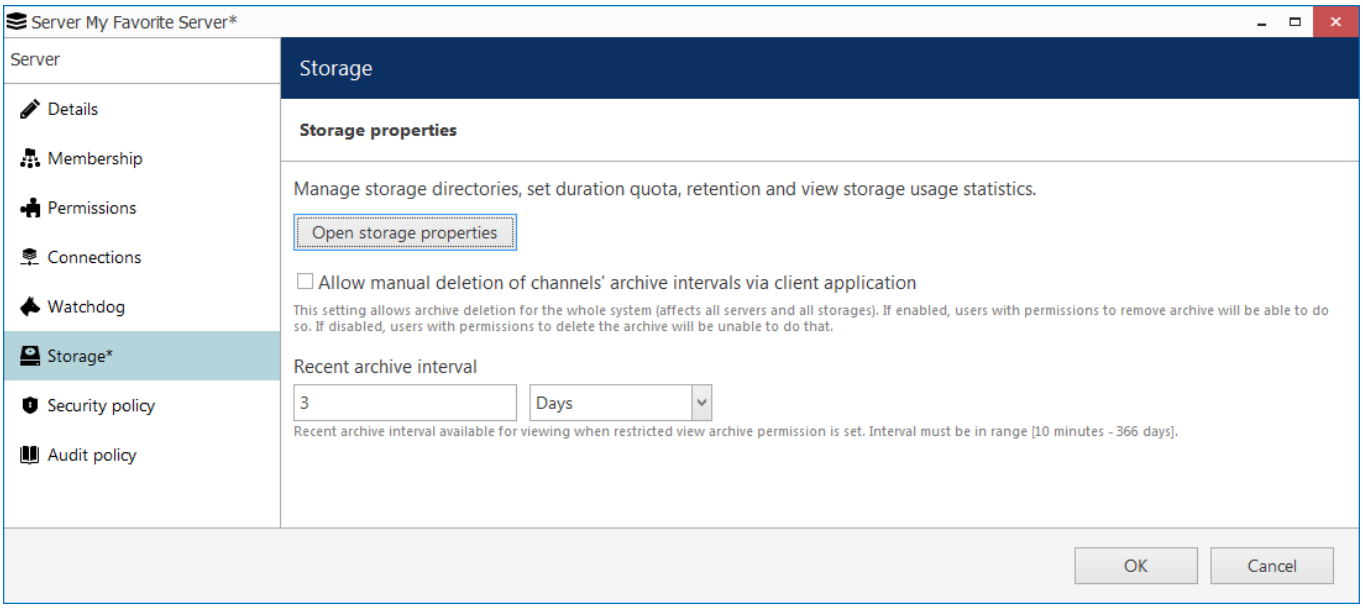
4.1 Storage

Server storage configuration includes storage directories, size and duration quotas, optional encryption, cleanup time settings and storage differentiation by name for further flexible allocation of the recorded streams.

To access the storage settings for the server via Ganz CORTROL Console, choose the *Configuration* section, then select *Servers* from the menu on the left, double-click your server and then click the *Storage* tab. Click the *Open storage properties* button to open the configuration dialog box.

There are also several settings in server settings dialog box itself. These are explained in the end of this chapter.



Access storage settings for selected server

To **save the changes** after you have finished with storage configuration, hit the *Apply* button beneath the storage settings, then hit *OK* to close the storage configuration dialog box, and then click *OK* to finally save the storage settings together with the server configuration. Pressing *Cancel* on the last step will revoke the changes in the storage configuration.

Directories

All available **local disks** will be automatically listed after the first installation (with empty configuration) and enabled for recording with default archive directories using the *Default* storage label. By default, system disk (C:) is not listed if other disks are available, as we strongly do not recommend recording to the system disk.

If you are upgrading, re-installing the software, restoring an earlier database configuration, or inserting new local disks into the server after the software has been installed, the local disks will not be listed automatically so you need to **add** them as **new storages**. You can also add network paths to remote storage locations.

Use UP and DOWN arrows on the right to change the disk order (priority); use the recycle bin button in the top panel to **remove** any local or network directory from the storage configuration.

> Mapped network shares that appear as drives in Windows Explorer will **not** be listed automatically because Ganz CORTROL operates as Windows Service and therefore is unable to access these (due to Windows API peculiarities). You are welcome to add these as network directories in storage settings.

For each storage location, the following information will be displayed:

- storage priority: determined by the item position in the list
- storage label (see description below)
- current quota size
- free space on disk (except network storages)
- total disk size (except network storages)

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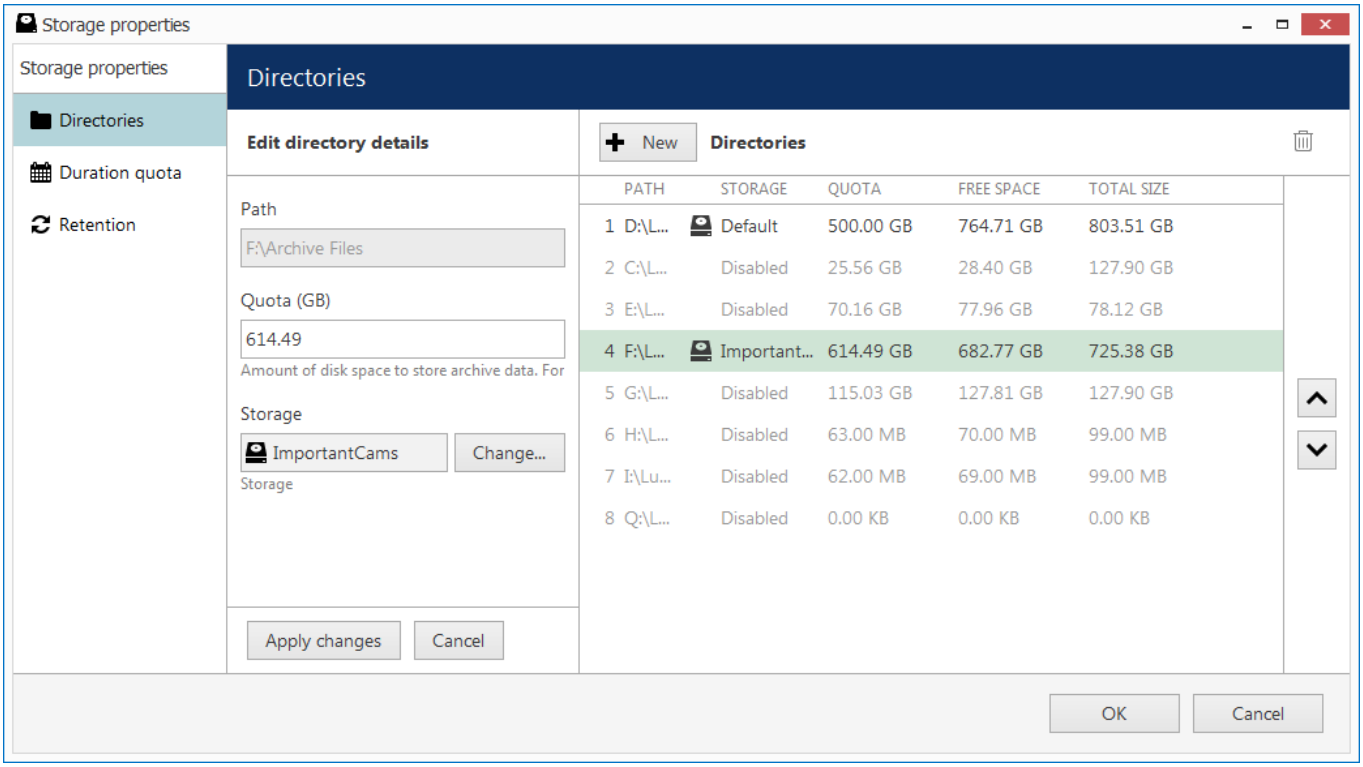

Configure storage directories

Each directly attached storage location will be automatically assigned a quota of 90%; each storage will have 20GB quota by default. We strongly advise that you review all the settings and make sure that all the storage locations have sufficient free space, and, if necessary, free up some space. It is recommended that every recording location has 10-15% of free space: this helps avoid fragmentation effect and also allows highly loaded software to effectively enforce recording quotas.

⚠ **Minimum quota** per each storage location for any storage type is 20GB.

💡 We advise against recording to the **system drive** because it is often used by other processes like defragmentation and system backup, not to mention the operating system itself, and thus doing so may affect recording efficiency and stability. As a result, disk C: is not selected for recording by default.

💡 Total size and free space on the **network storages** is not displayed here. You can check these in the *Monitoring* section of Ganz CORTROL Console, under *Storages*.

To change the disk quota, simply highlight the desired location for storage from the item list, then enter the quota size in GB and click *Apply changes*.

⚠ If you plan to **protect** some footage from being erased (this functionality is available via Ganz CORTROL Client application), keep in mind that **protected archive** areas will be **ignored when forcing quotas**. Make sure there is enough free space on the disk(s) and set lower quotas, if necessary.

To review and/or **un-protect** such areas, go to the *Monitoring* section of Ganz CORTROL Console, choose *Archive statistics* on the left, highlight one or more target channels, and press the Protected intervals button on the top panel.

Storages

You can either use the *Default* storage category for all locations, or create multiple different **storage** profiles (types, names, labels). These can be used for manually distributed streaming between storage directories:

- storage directories are marked with corresponding storage tags
- each channel is assigned to a recording location

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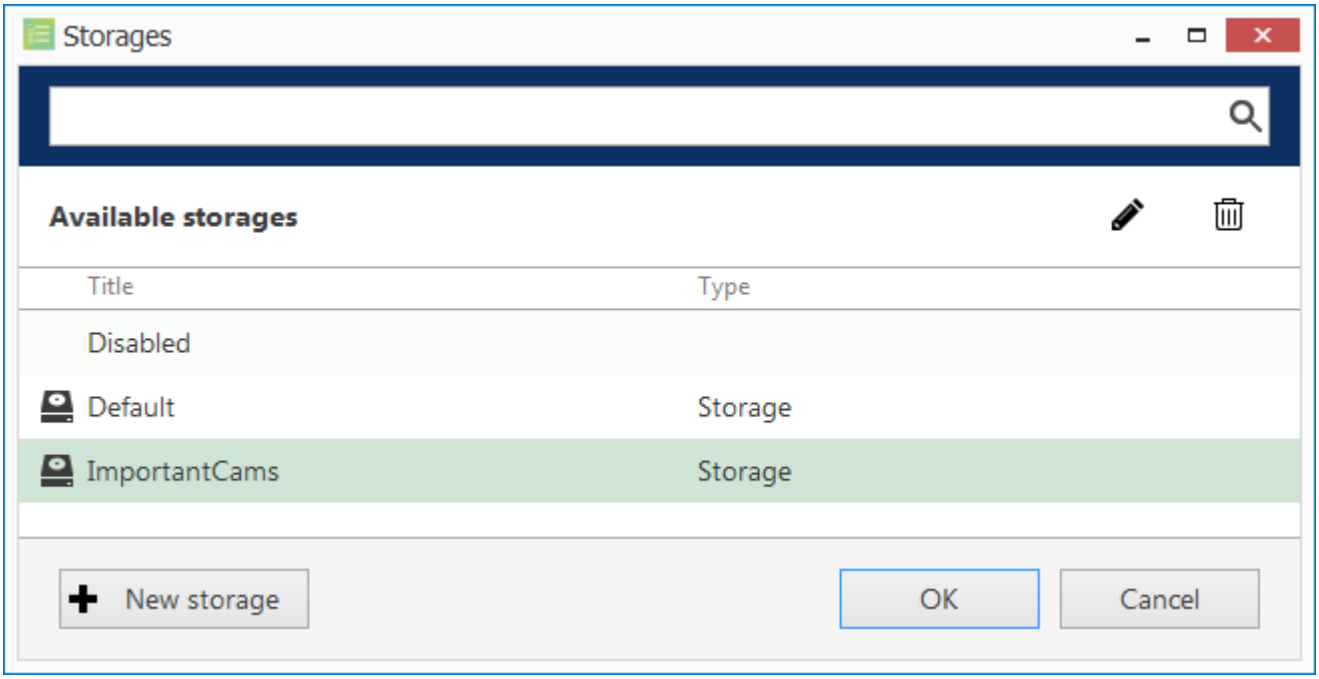
To choose a storage profile different from the *Default*, select the storage location from the *Directories* list and click the *Change* button.

Change storage

Select one of the built-in storage profiles or create and edit a new one.



Choose storage profile

The built-in storage types are:

- **Disabled**: storage location will not be used
- **Default**: default storage tag
- **Fallback**: storage destination to be used if all the storage units with specified tags have failed
- **Readonly**: existing data will be available for reading and will not be erased; no new recordings will be appended to this location

These profiles cannot be edited or removed. Fallback storage settings are available in the corresponding tab of the *Storage properties*.

Readonly storage type can be used, for example, in the following cases:

- it is necessary to view the old data from a different Ganz CORTROL server when you need to insert the disks originating from another computer and you do not wish that these data are erased
- some storage unit contains important footage that has been requested to be kept for a longer time so that the recordings are not erased over time while still allowing access to the footage

Click + *New storage* button to create a new storage profile, or select an existing one and click the *Edit* button in the upper-right-hand corner to change its name.

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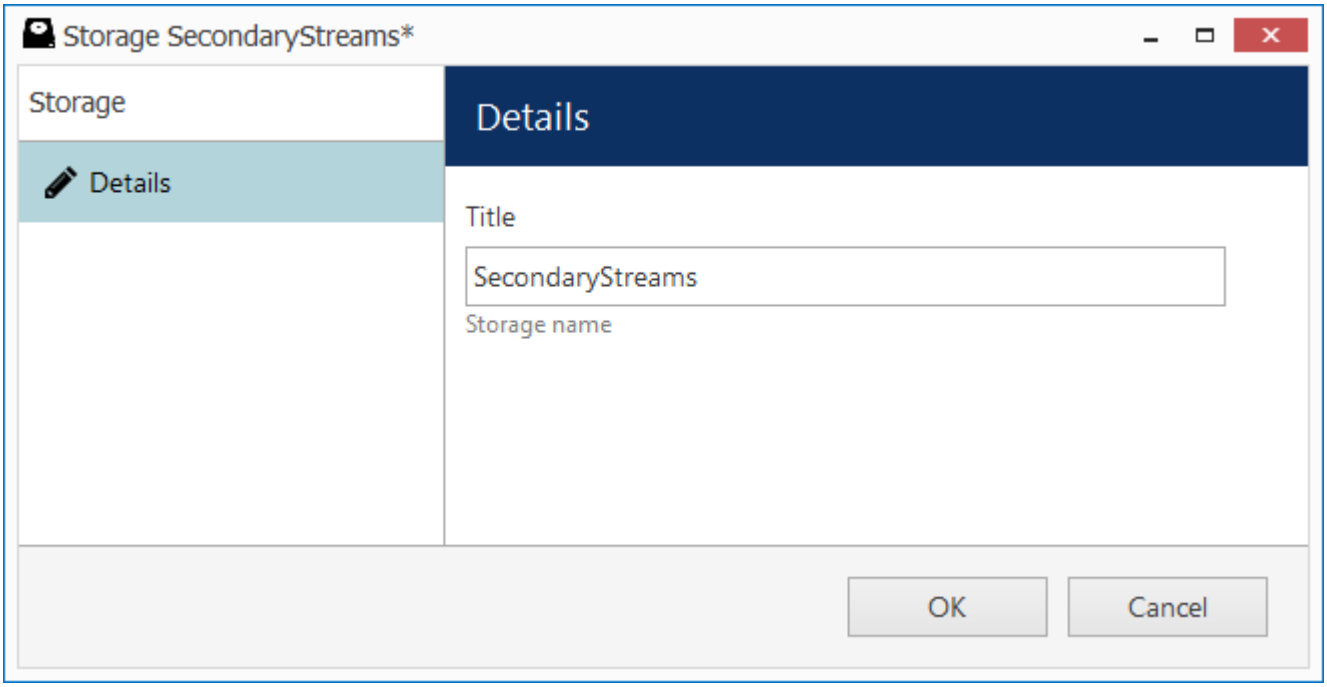

New storage profile

Enter the storage profile title and click *OK* to save and exit.

The storage tag you have selected or just created will appear as selected. Click the *Apply* button below to **confirm** storage configuration settings before proceeding.

Add Storage

In order to add a new **local disk** or a **network storage** (NAS, SAN, network share), click + *New* button on the upper panel, select *New local directory* or *New shared directory*, and then enter the setup details.

⚠ If you are using a NAS, make sure to **disable** the *Recycle Bin* feature (for some NAS models, it is called *trashbox* or similar). This will ensure that the erased files (e.g., when reaching quota) are actually **deleted** permanently.

⚠ If you are adding a previously encrypted storage (e.g., it has been used on another server), make sure to provide the same password. You can track the storage status in the *Monitoring* section of Ganz CORTROL Console, under *Storages*.

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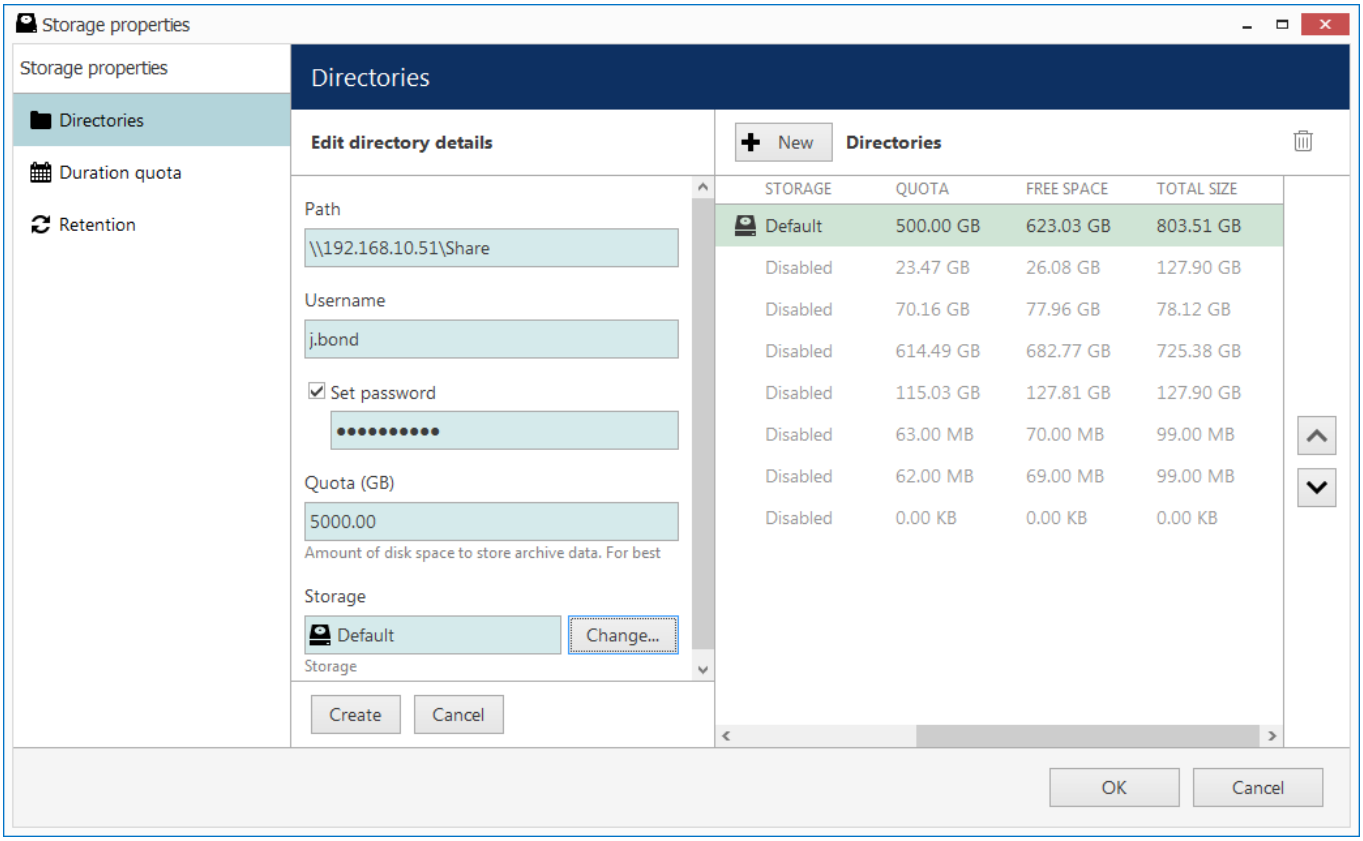

Add a new storage directory

The table below details the available settings for a **shared directory**. Enter the settings for the target storage and click *Create* below: the storage will be validated immediately.

Setting	Description	Default Value
Path	Full network path to the storage directory	\\Server\Share\CBC AMERICA LLC\Archive Files
Username	User name to connect to the storage	[empty]
Password	Define storage access password, if applicable	[empty]
Quota	Maximum amount of storage in gigabytes to be used for recording; 85-90% is recommended	20GB
Storage	Storage label to be assigned to the target storage directory	Disabled

When adding a **local directory**, you are first offered to choose the disk from the list of detected ones. If there is just one disk left available, it will be chosen automatically.

Setting	Description	Default Value
Path	Full path to the archive directory	X:\CBC AMERICA LLC\Archive Files
Quota	Maximum amount of storage in gigabytes to be used for recording; 85-90% is recommended	20GB
Storage	Storage label to be assigned to the target storage directory	Disabled

Storage Encryption

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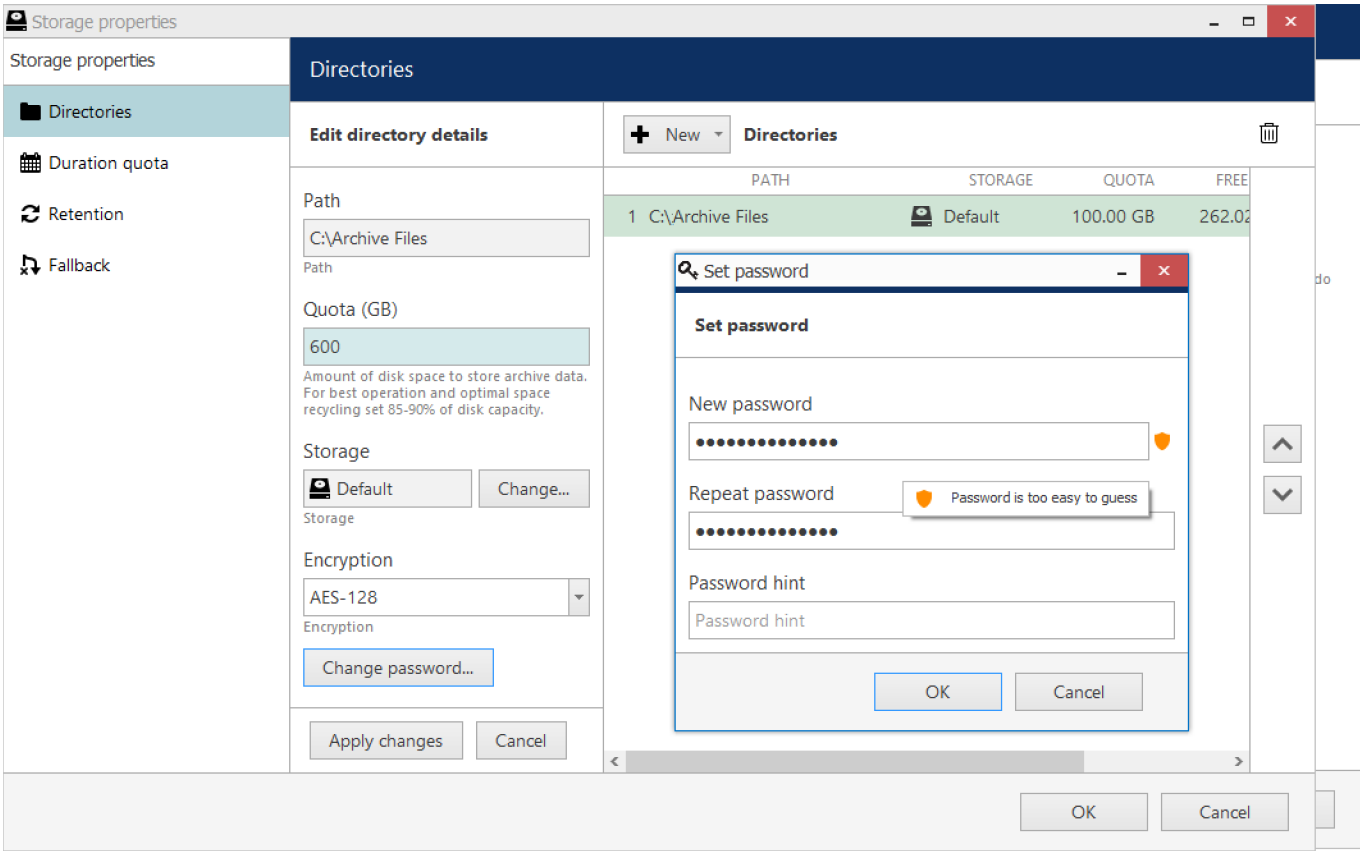
Once you have added all the necessary storages, you can enable encryption and set a password for each storage separately.



Storage encryption settings

Choose the **desired encryption type** and specify the **password** you want. You can change the password at any point, and there is also an additional field that lets you add a hint that may help remembering the password in future: it will appear either as regular text or a tooltip when hovering your mouse cursor over the password prompt field.

The currently available encryption options:

- **None**: no encryption
- **AES-128** or **AES-256**: choose the one you need

When assigning a new password for the storage, make sure to remember it or store in a secure place: you will require it, should you need to access the storage contents in the following scenarios:

- when accessing the archive with the Portable Player tool
- when adding the same disk as a storage unit for another server
- when adding a disk containing archive backup as a storage unit
- if you delete the encrypted disk from the storage configuration and then add it anew

There is a field that allows you to enter a password hint, which will be displayed in these situations.

You will not be prompted for the password when accessing the archive from the Ganz CORTROL Client application connected to a server with encrypted archive: Ganz CORTROL server will decrypt it automatically.

There is no option to recover the storage password if you have forgotten it.

Starting from the moment you set the password, all footage recorded from then on to the target storage becomes encrypted; retroactive encryption for the previously recorded archive is not supported.

When the storage password is changed, the new password is used for encryption from then on. If storage encryption is disabled for some time and then enabled back, that part of the archive will remain unencrypted.

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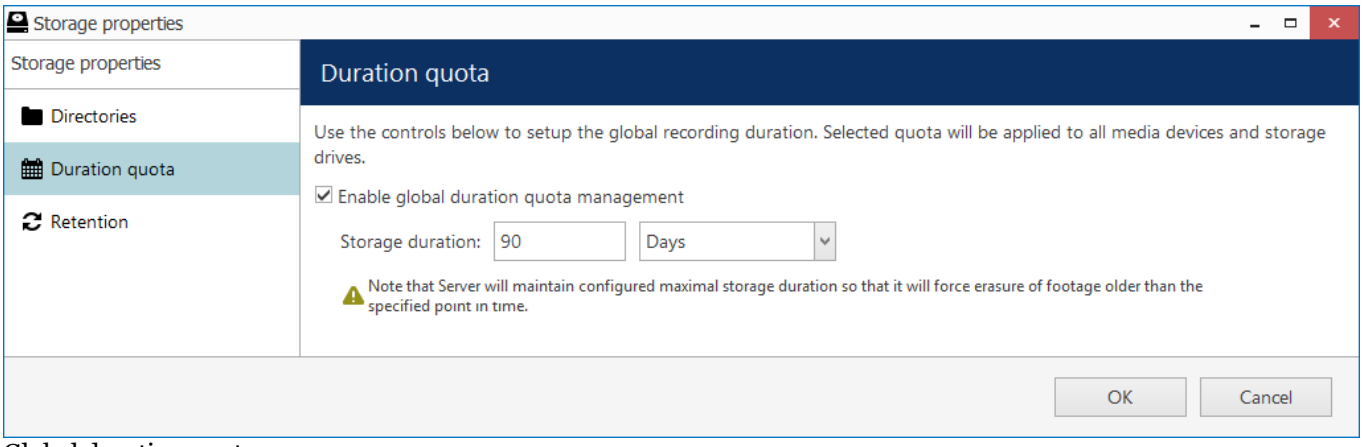
Duration Quota

Set the global recording duration limit for your server here: enable quota management and then enter desired number of days. All recordings older than the number of days specified will be erased.

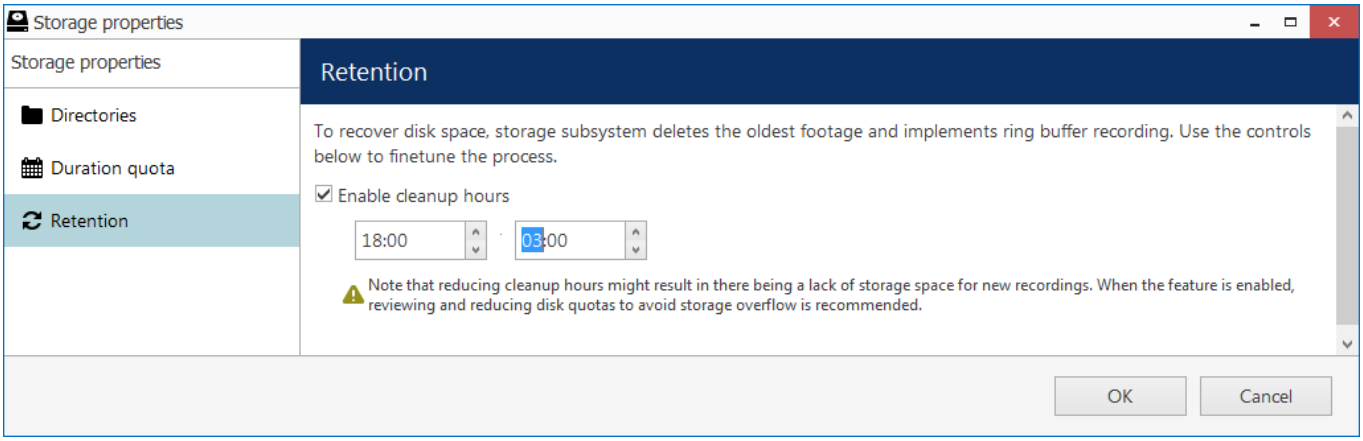


Global duration quota

Note that the global duration quota has priority over the individual (per-channel) duration quota that is set in the recording configurations.

Retention

You can set the software erasing mechanism so that it cleans up old recordings only during specific periods of time, e.g., when the recorder is less overloaded or when the quality of recordings are less important.



Set cleanup hours

To do this, enable the cleanup hours setting and specify the time period during which erasing is allowed.

> ⚠ This control has priority over the storage quota. Setting insufficient cleanup time may lead to storage overflow and result in recordings being lost. We strongly recommend that you do not enable any cleanup hours' restrictions unless you absolutely know what you are doing.

Fallback

You can dedicate a specific recording location to serve as a failover storage, called **fallback storage**. Such storage location will be used for recording only if all specified target storages of the certain type have failed.

Ganz CORTROL server automatically detects when a channel or channels cannot be written onto their normal destination storage and switches to the fallback storage after the specified timeout has been reached. Minimum and also default timeout is thirty seconds, and maximum is five minutes. A default system event is raised when fallback is activated.

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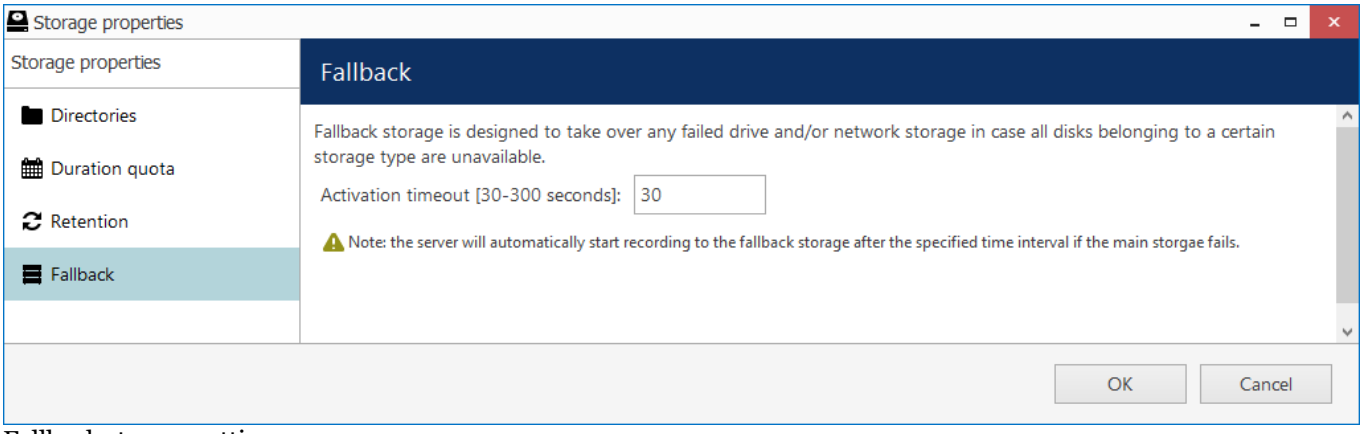
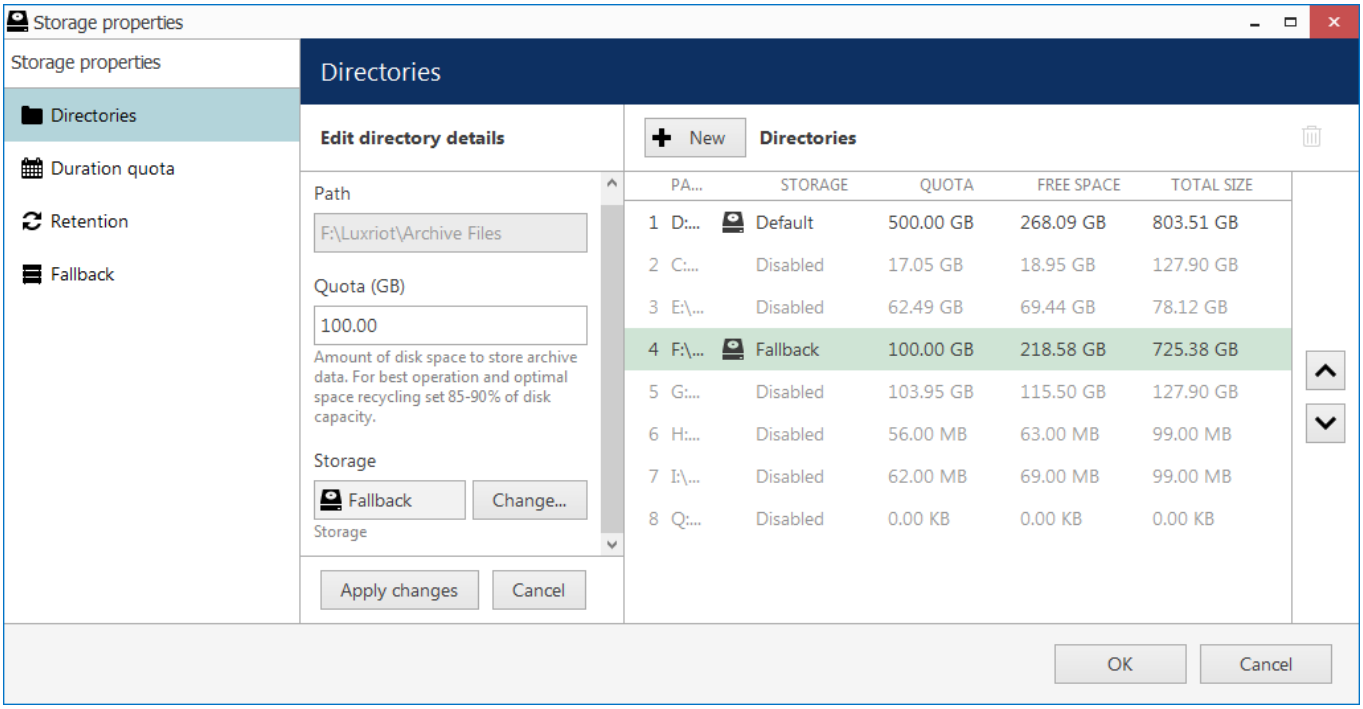


Fallback storage settings

After setting the desired timeout, switch to the *Directories* tab and specify, which storage will serve as fallback.



Set fallback storage units

Usage example:

Consider a system where all main streams are recorded to the storage with the tag *Main* and all secondary streams are, in their turn, recorded to the *Substreams* storage. If either or both of these storages fail, recording will automatically proceed to the *Fallback* storage.

> ⚠ The fallback storage must be able to handle the load and have enough free space to keep the recordings until the main storage gets back online.

Server checks if the main storage is available if one of the conditions has been fulfilled:

- server has finished and closed a data file (4GB)
- the data file has not reached 4GB in size but six hours have passed
- server was restarted

In other words, the recording mechanism checks if the main storage is available every 6h OR every 4GB of recorded data OR after a restart (upon startup). If the main storage is OK, Ganz CORTROL server continues to record onto it; the recordings made onto the fallback storage stay there and are not transferred anywhere.

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To **save the changes**, hit the *Apply* button beneath the storage settings, then hit *OK* to close the storage configuration dialog box, and then click *OK* to finally save the storage settings together with the server configuration. Pressing *Cancel* on the last step will revoke the changes in the storage configuration.

Archive Protection and Deletion

Outdated archive is erased automatically once any of the quotas is reached (storage or duration, server wide or individual). Oldest recordings are removed to free up some space for the newer recordings. However, there are some exceptional cases when the footage is not or may not be erased:

- storage marked as *Readonly* will not be used for writing and no data will be erased from such storages based on quotas (however, footage from such storages can be removed using selective erasing from the Ganz CORTROL Client application)
- no erasing will be conducted outside cleanup hours (by default, erasing is allowed 24/7 and this setting is recommended)
- protected archive intervals will be also ignored by the erasing mechanism until you un-protect them

Archive protection is an additional feature available in the Ganz CORTROL Client application, in playback mode. You can mark certain footage to protect it from being erased if it is important to keep it for longer, overriding the quotas (e.g., important evidence). To unlock the protected intervals, go to *Archive statistics* in the Monitoring section of Ganz CORTROL Console.

⚠ If there are too many protected recordings on a disk, the storage may be filled up to 100%: this may negatively affect the overall recording operation. Pay attention to the amount of free space on every storage unit in case you are using archive protection:

- set lower recording quotas so that there are always 10-15% of free space on each storage,
- un-protect the archive that no longer needs to be protected from erasing.

⚠ When you **protect a short period** of the archive (e.g., several minutes), in fact, the **whole file** containing this period is protected from erasing. Therefore, intervals adjacent to protected period will also be locked. You can verify the exact protected interval by opening Ganz CORTROL Console >> *Monitoring* section >> *Archive statistics* >> *Protected intervals*.

Keep this in mind when protecting too many short intervals: as all files containing them are locked, they will not be erased when forcing quotas, so you may come to a point when there is **not enough free space** on the disk. If you know you will use the archive protection feature a lot, it may be wise to set a **lower disk quota** - for example, 80% instead of 90%.

Ganz CORTROL Client application allows users with corresponding privileges to delete certain parts of the archive. This mechanism can delete recordings from storages marked as *Readonly* but cannot erase protected archive from any storage unit.

If the footage is not protected, it will be removed as outdated when the server eraser reaches one of the quotas. Also, the **unprotected** footage can be removed manually by someone who has a permission to **delete archive**. However, as such a feature may be regarded as a potential threat for the archive integrity, it is **disabled by default**. You can enable it in the server storage settings by marking the *Allow manual deletion* option.

⚠ Enabling manual archive deletion will automatically enable the **admin** user to do so, as admin is a root user who has all possible privileges. The same is true for all users belonging to the *Administrators group*. If you are enabling this feature, make sure that no unauthorized personnel have access to the administrative accounts.

Time Restricted Access to Archive

There is a possibility to grant **archive access** permissions for a **limited time**: for example, for the last N days or M hours. The access permissions are a part of the channel permission set.

Here, in the server settings dialog box > *Storage* tab, you can define the allowed archive access period, starting from the present moment.

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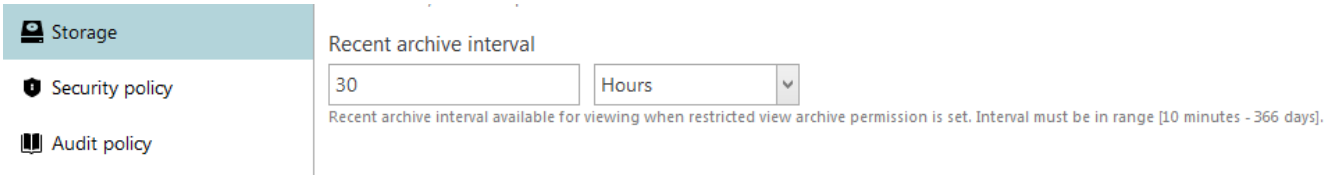

Depending on your needs, the duration can be expressed in **minutes**, **hours**, or **days**. The minimum period is 10 minutes and the maximum value is 366 days (1 year).

Example: if the recent archive interval is set to 30 minutes, all users having a *Restricted video playback* permission will be able to browse the last half an hour of the target channel archive in all archive playback modes of the Ganz CORTROL Client application.

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4.2 Watchdog

General

Server *Watchdog* is an important part of the Ganz CORTROL software. It runs as a separate Windows service and protects the software from certain types of failures by automatically attempting to restart the server.

Watchdog operates based on the software and system overall health monitoring; default trigger values have been selected on the grounds of our analysis of extensive tests, which we conducted on many systems with different configuration and stability level.

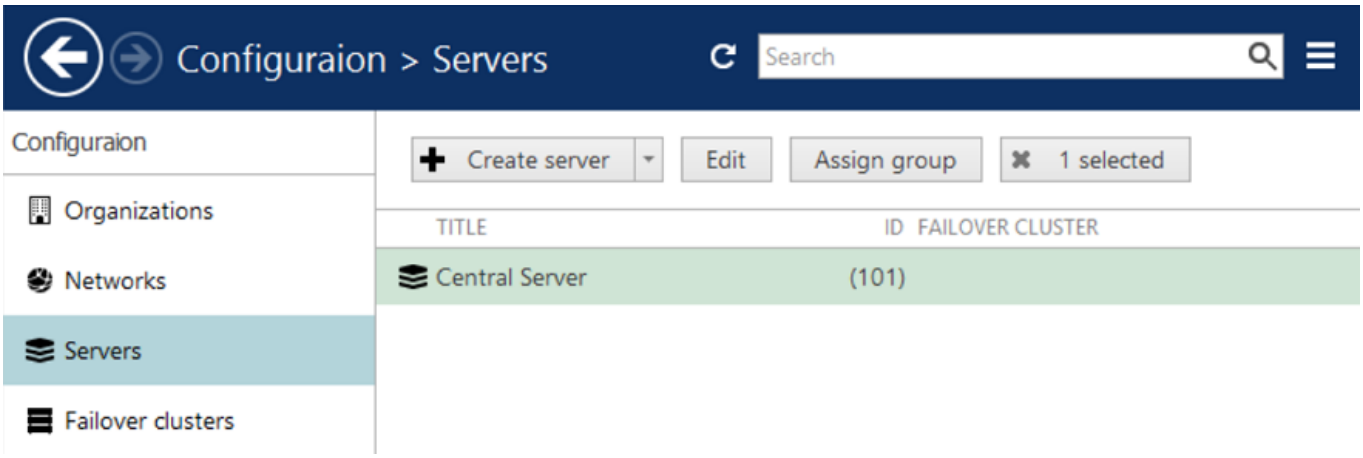
Although it is possible to disable the *Server Watchdog* service, we strongly advise against doing so, as the principal role of the watchdog is to keep the software operation as stable as possible in the given circumstances.

Watchdog operation can be tracked by messages in the Windows Application log and in the software Audit log. If you do experience frequent disturbances such as software restarts or server rebooting, this might be an indication of some serious issue related to the software, operating system and/or underlying hardware. In such a situation, the best course of action is to:

- carefully read the messages in the Windows Application Log, as these may already contain some indication of why Watchdog was triggered;
- refer to the relevant topic in the Troubleshooting section of this manual to read about typical causes of such cases;
- send a Problem Report from the faulty server, providing as much information as possible about the issue;
- consult the CBC AMERICA LLC technical support team directly via cortrol@cbcamerica.com.

Configuration

Watchdog operation can be configured for each server independently. To access the watchdog settings in Ganz CORTROL Console, select *Configuration* in the bottom left menu and select *Servers* from the list on the left, then double-click the desired server or simply click *Edit* button on the top panel for the pre-selected server.



Locate server for Watchdog configuration

In the *Server* dialog box, select Watchdog from the left menu.

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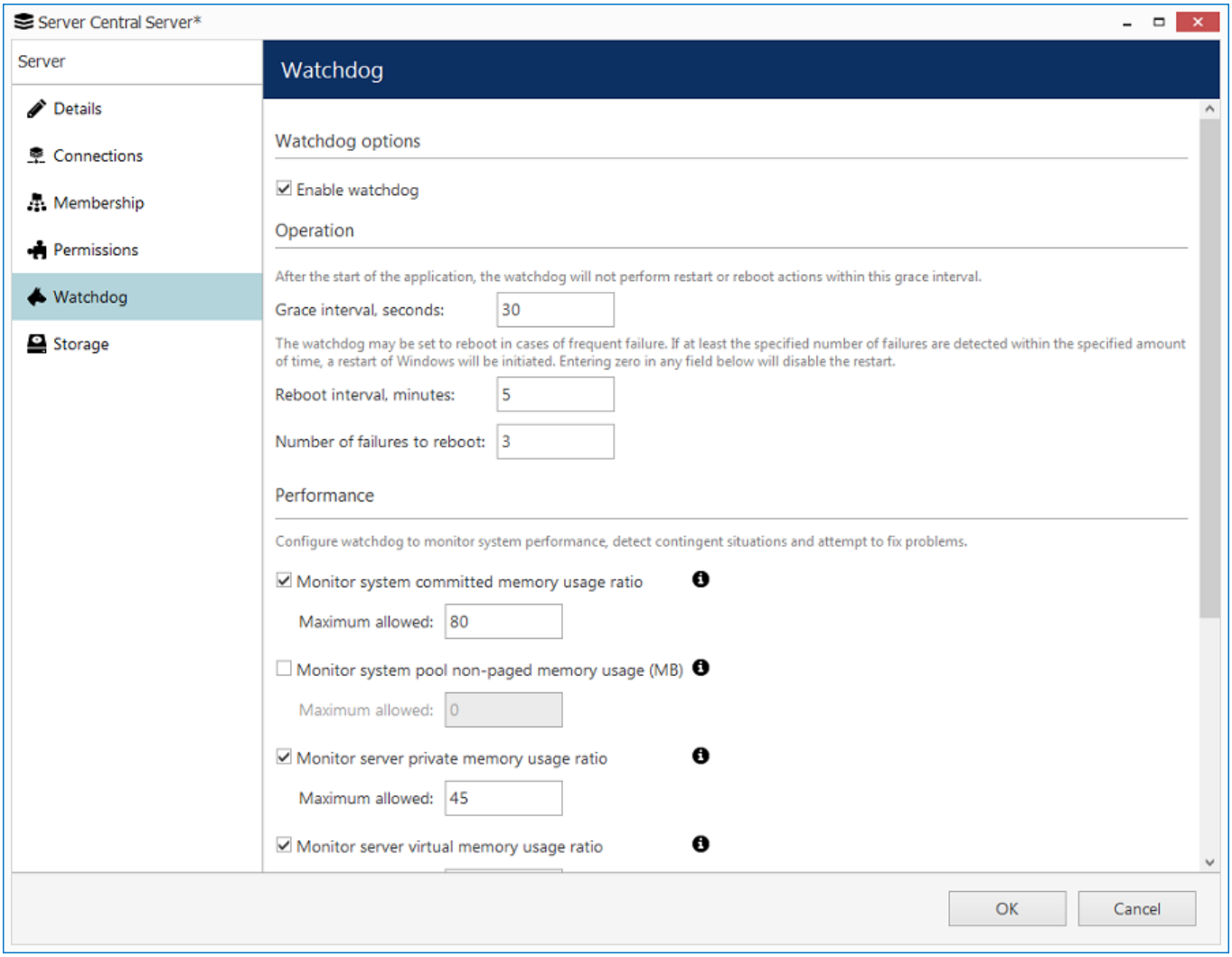

Watchdog configuration

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The table below contains a detailed explanation of the watchdog settings. Please note that, for most cases, **default and near-default settings are recommended**; it is advisable that you consult with CBC AMERICA LLC support if, for some reason, you plan to make extensive changes to these settings. Click the information icon next to each setting to read more about them.

Setting	Description	Default Value
Enable Watchdog	Enables Watchdog operation for the target server	Enabled
Grace Interval, seconds	Time interval in seconds, counting from server start, during which Watchdog will not attempt to restart the software	30
Reboot Interval, minutes	Watchdog will reboot Windows if there have been a certain number (N) of software restarts (N is specified below) in the given time interval; the default for rebooting is 3 restarts in 5 minutes; setting the specified number to 0 will disable rebooting	5
Number of Failures to Reboot	Watchdog will reboot Windows in case there have been N software restarts in the time interval specified above; the default for rebooting is 3 restarts in 5 minutes; setting the specified number to 0 will disable rebooting	3
System Committed Memory Usage Ratio, %	Watchdog will restart the software if the ratio of total system committed memory exceeds the specified percentage; this value is shown under *Memory* section of *Performance* tab in the Windows Task Manager	Enabled, 95%
System Pool Nonpaged Memory Usage, MB	Watchdog will restart software if the amount of system nonpaged pool memory exceeds the specified amount	Disabled
Private Memory Usage Ratio, %	Watchdog will restart software if the amount of private memory used by server process exceeds the specified value	Enabled, 45%
Virtual Memory Usage Ratio	Watchdog will restart software if the amount of virtual memory used by server process exceeds the specified ratio; ratio shows the amount of virtual memory used by server process versus maximum per-process virtual memory allowed by OS	Enabled, 90%
Enable periodic restart	Enables automatic software restart for performance optimisation	Enabled
Restart interval	Choose between every N weeks, days, or hours; use hours for troubleshooting purposes	1 week
Weekday	Restrict periodic restart to specific day of the week	Sunday
Enable periodic restart times	Limit periodic restart to specific hours, e.g. only restart at night; we recommend to leave at least a 1h interval for the restarts	Disabled

Up to software version 1.22, the *System Committed Memory Usage Ratio* was equal to 70% by default. Afterwards, it has been changed to 95% for a more optimal usage of system resources.

If you choose to limit the periodic restart time to specific hours or weekdays, the watchdog service will attempt to restart the main service straight away (at the very beginning of the allowed interval). If the watchdog does not succeed for some reason, it will continue to try until the end of the period, and then the next attempt will only take place when the next safe period begins. For example: if the restart is limited to 00:00-08:00 on Sundays, you should typically expect the restart at 00:01 on Sunday; if the watchdog was manually stopped before that time and started at 08:30, the following periodic restart would not happen until next Sunday at 00:01.

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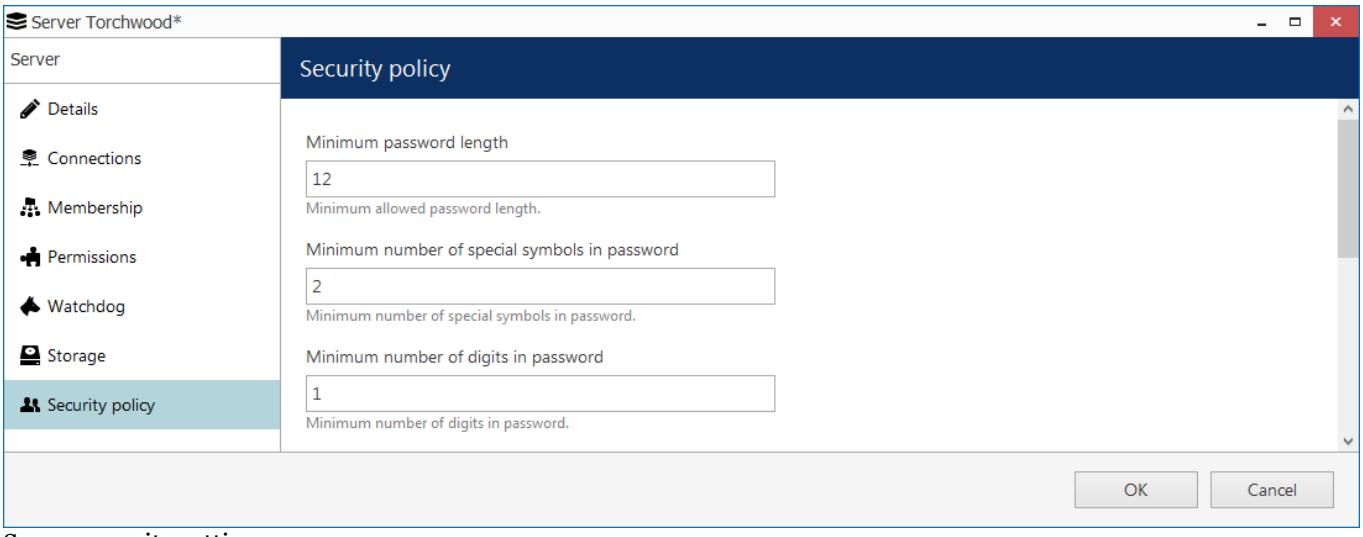
4.3 Server Policies

Ganz CORTROL policies are configurable sets of rules that are followed by Ganz CORTROL servers when handling access requests. At this point, these include security settings and external database configuration. Default values and state of the policies depend on the chosen security level.

Security Policy

Security settings related to password management, connections etc. can be defined for each system. To access the server security policy settings via Ganz CORTROL Console, choose the *Configuration* section, select *Servers* from the menu on the left, double-click your target server and then click the *Security policy* tab.

It is recommended that, in order to enhance your system security, you do not leave the default policy settings but rather define your own, system-specific preferences.



Server security settings

The table below details the available settings.

Setting	Description	Default Value
Minimum password length	Minimal mandatory length of a user password	8
Minimum number of special symbols	Define how many (at least) special characters (#$%&...) must be present in a user password	2
Minimum number of digits	Define how many (at least) digits must be present in a user password	2
Minimum number of uppercase letters	Define how many (at least) UPPERCASE letters must be present in a user password	2
Minimum number of lowercase letters	Define how many (at least) lowercase letters must be present in a user password	2
Number of previous passwords to remember	Password history to be kept by the server to prevent the user from using the same password again when changing it	1
Maximum number of days between password change	Define how frequently Ganz CORTROL will ask users to change their password; this setting can be overridden in the user settings to make the password never expire for a specific user	0 (unlimited)
Maximum number of simultaneous connections with the same login name	Allowed number of simultaneous incoming connections from the same user account via any port (TCP/HTTP) or client app, this setting can be overridden for the specific user in the user settings; 0=unlimited	0 (unlimited)
Maximum unsuccessful	After this number of unsuccessful login attempts the user account will	0

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login attempts*	be blocked (can be unlocked via user properties). Set 0 to allow unlimited attempts.	

Password related policies are solely meant for Ganz CORTROL internal users and they do not affect any other user account settings (e.g., Windows users etc.). All policies are in effect for **all user accounts**, including the built-in root *admin* user account.

*To **unlock the user** account, go to the *Users* section > open the user details for editing > enable the *Active* option > save. To override the policy for a specific user, enable the *Never lock account on bad password* option in the user account details.

The **maximum number of simultaneous connections** from the same user account can be re-defined for any specific user via user settings dialog box. User-specific setting has priority over global connection quota and it may be either larger or smaller than the global quota.

Example 1: global policy is set to 0, which means no imposed limitations. However, user account *admin* has his max number of connections set to 3, which means that three incoming connections with this user account are allowed at a time so that the administrator can connect via Ganz CORTROL Console, Ganz CORTROL Client and Ganz CORTROL Mobile at once for troubleshooting purposes.

Example 2: global policy is set to 1, which means only one connection from each user is allowed at a time. However, user *demo* has an allowance of 30 simultaneous connections so that this account can be used for demonstration purposes.

Two-Factor Authentication

For additional security, you can turn ON **two-factor authentication** (2FA) for all client logins. When 2FA is enabled, all users who want to connect to your Ganz CORTROL server, will have to enter both their password and a code they receive. Thus, the users prove their identity not just by entering what they know (the password) but also what they have (the email or phone). By default, this policy affects all users; you can disable 2FA for individual users in their permissions.

At this point, Ganz CORTROL 2FA supports code sending via **email** and **SMS**, and works for Ganz CORTROL Console and Ganz CORTROL Client login.

Terminology:

- session: an established connection between client and server once the user logs in
- code: a numeric code sent to the user's email

The following settings are available here:

Setting	Description	Default Value
Enable two-factor authentication	If selected, additional authentication will be required for server login	Disabled
Set up notification providers	Set up desired providers (using email servers or other means) that will be used for sending out authentication codes	[button]
Session expiration time	During this time period, 2FA will not be requested again if client disconnect was caused by server; after this time or after user-initiated disconnect, the user will have to use additional authentication again	1 day
Code expiration time	The time period during which the sent code will be valid, starting from the code sendout moment; after this time, the user will have to request another code	00:05:00 (5 minutes)
Code generation interval	The minimum time between two consequent code requests; the user will be unable to request a code more frequently	00:00:10 (10 seconds)
Skip for localhost	If enabled, 2FA will not be applied to localhost connection	Enabled

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connection		
Subject	Message subject line, can consist of text and macros (via right-click)	{SESSION_ID}
Body	Main message part, can consist of text and macros (via right-click)	{CODE}

Name your **notification providers** according to the used verification source (e.g., **Email**) so that the users understand where to look for the code.

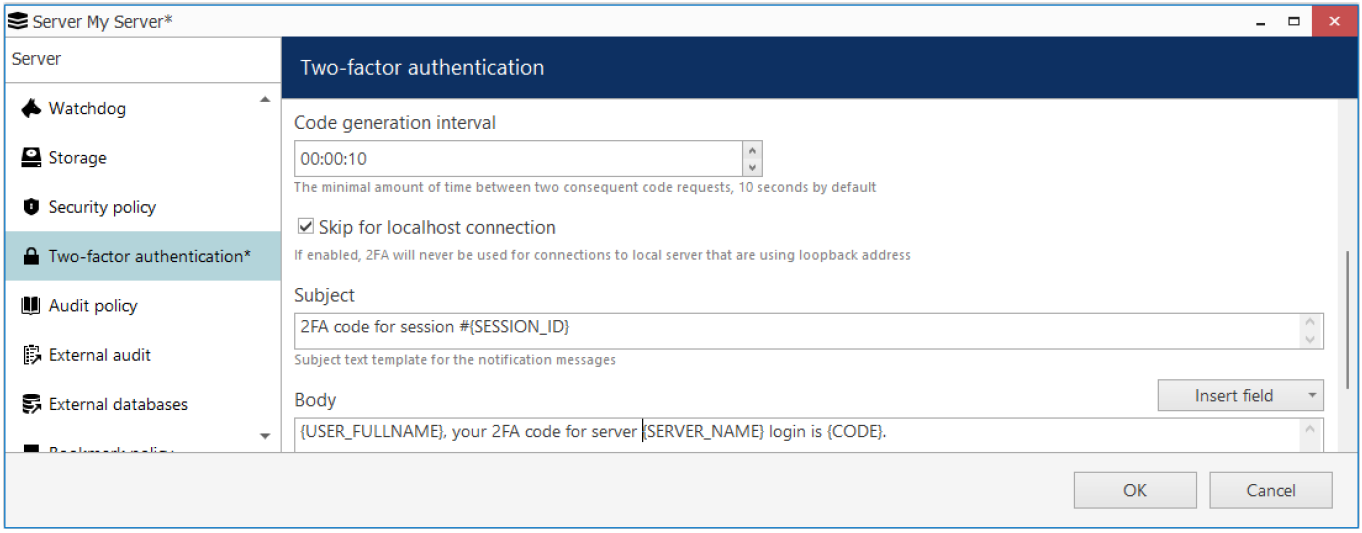
Write some text in addition to the session ID and the code so that:

1. The user understands which one is which
2. The email does not go to Spam

When you try enabling 2FA, you will get a **warning** that you will need to test 2FA before saving the configuration. This is necessary to ensure that all the settings are correct and 2FA actually works; otherwise, you may be unable to log into the system at some point. The 2FA verification will start when you click OK to save and close the settings window.

Settings to be verified before enabling 2FA:

- make sure you have added a valid 2FA notification provider (SMTP server)
- add a contact email for each user
- it is recommended that at least one administrative user account is allowed to log in without 2FA, or 2FA is disabled for localhost connections: this is to ensure that you can log into the system if your 2FA notification provider fails or becomes unavailable



Two-factor authentication settings

The best approach for 2FA configuration:

- in 2FA settings, add a notification provider and adjust everything but do not enable 2FA yet, click OK to save
- make sure your email server user for notification provider is valid, and that all users have correct emails
- go to 2FA settings again and enable it, and go through the test verification

When you turn off 2FA, you will have to go through the setting verification again next time you enable it. If you make changes to the 2FA settings and enable it at once, this test verification will use the previous settings for formatting and intervals (because it basically happens before saving the settings, and these will not be saved until you pass 2FA successfully).

Two-factor authentication is also a recommended setting when you choose the highest cybersecurity level - the system will check if 2FA is enabled and remind you with a warning mark if it is not.

Audit Policy

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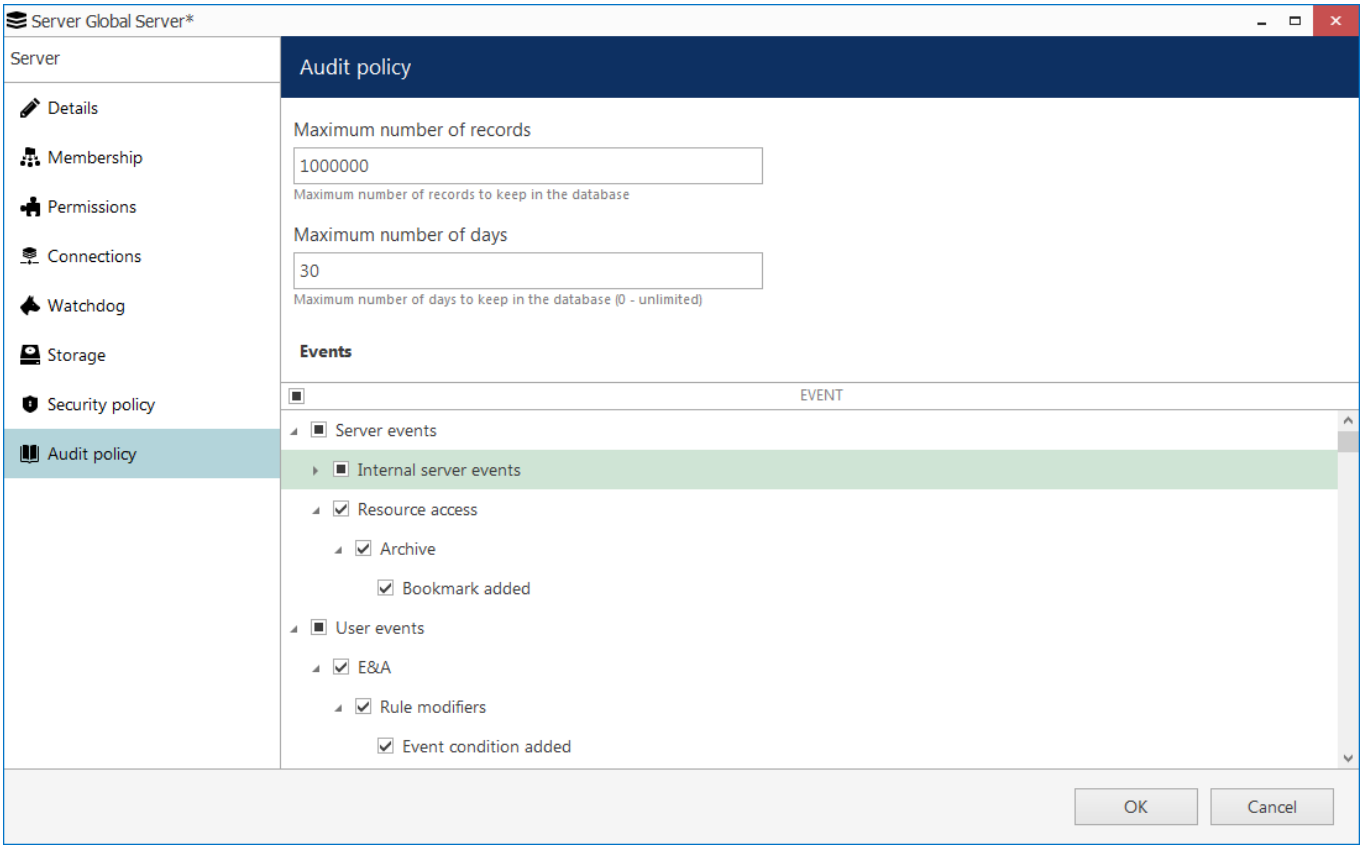
Whenever a permission is used, a corresponding entry appears in the internal Ganz CORTROL audit log; internal server events are logged as well. The audit policy lets you define, which user actions and server events are recorded, as well as set the maximum size and duration of the audit log.



Ganz CORTROL audit policy

The default limit for the number of audit entries is one million and they are kept for one month; set zero days to disable the duration limitation (the quota for the number of records will still have effect). By default, all the events are audited.

External Audit

For Ganz CORTROL Global software edition, it is possible to set up set up log event storing in an **external audit database**.

The main (internal) audit log is kept always, and the external audit is a copy (addition). You cannot turn OFF the internal audit if you do not need it, but you can limit it to one or two days, and keep the external log for a longer period. The built-in database (SQLite) is OK for low and medium load; for high and extra high load, especially for lots of entries per second, an external database with extra hardware is strongly recommended.

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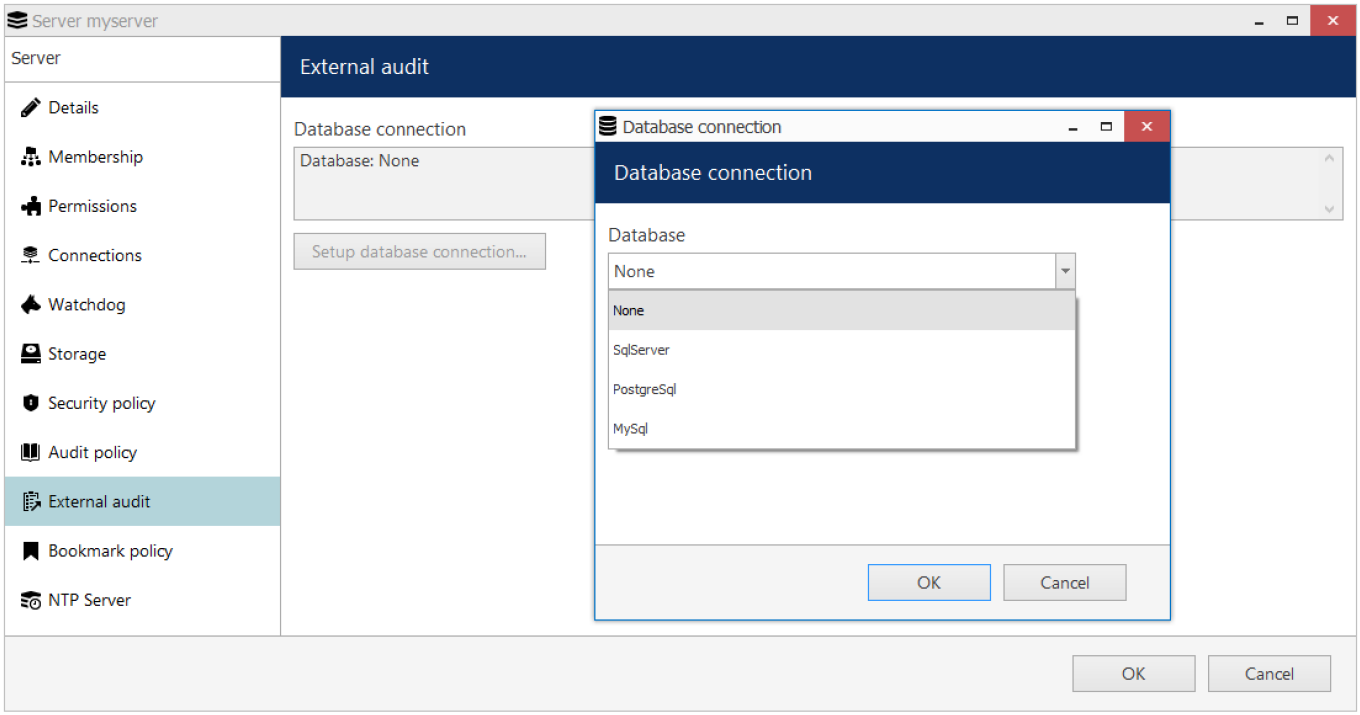


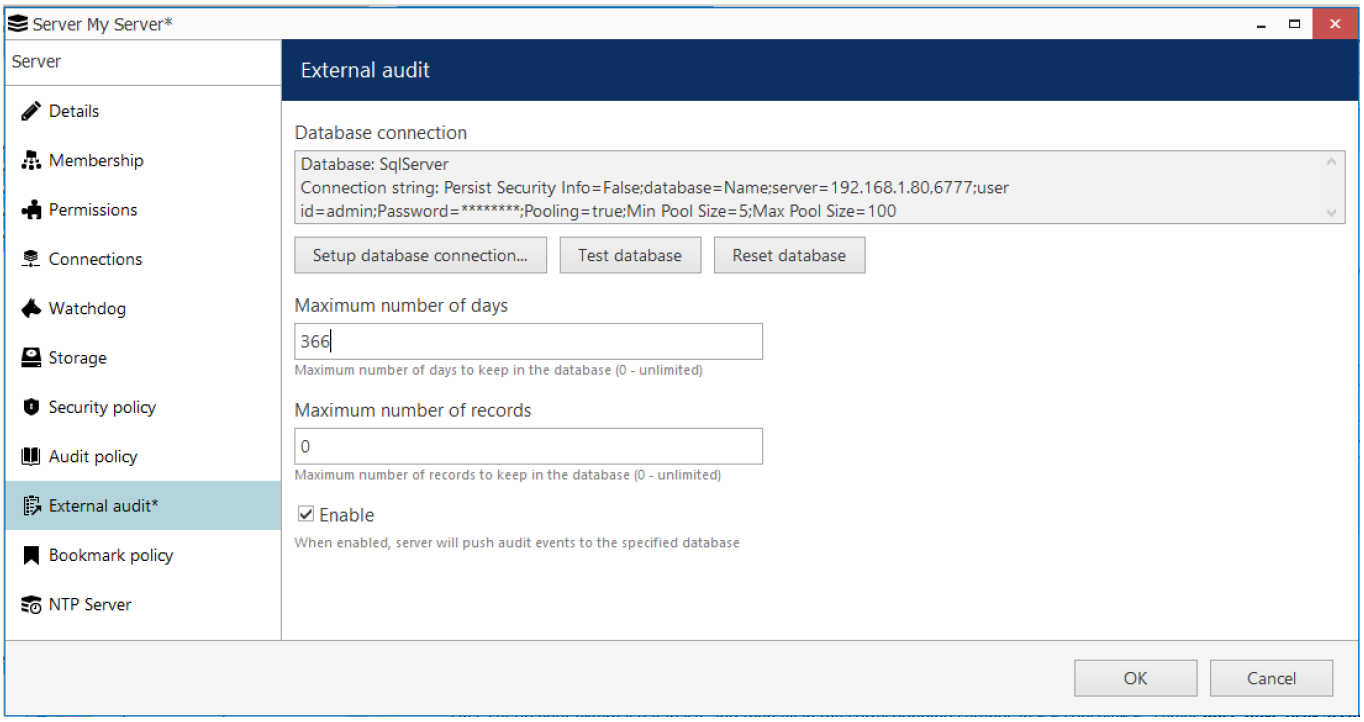
Connecting an external database for the audit log

At this point, three database formats are supported:

- SQL database
- PostgreSQL
- MySQL

First, set up your external database, and then fill in the corresponding settings in Ganz CORTROL Console: server **host**, **port**, **user account**, and target **database name**.

> ⚠ Please consult with your database server architect to build the database server. Ganz CORTROL hardware recommendations do not include hardware for the external database server.



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Once you have entered the database connection details, you can test it and enable it

After adding the database connection, you can **test** it to verify that the entered configuration is correct. The database **must exist** for the Ganz CORTROL server to connect successfully, and you cannot create a new external database from Ganz CORTROL Console. The connection test runs **automatically** once you have entered a new DB connection or modified the connection settings.

> ⚠ The connection **test may take some time**. You can tell by the disabled (grayed out) buttons below. If you close the server settings dialog box, the test will still run in background so you will have the result pop up after some time.

If your target database contains something else and you want to clean it, press *Reset*: all contents of the target database will be then **removed** and replaced with the tables necessary for the audit log.

Similarly to internal audit, here you can **limit** for how long and how many records should be kept in the external audit database. Set zeroes for **unlimited** options (the number of records will be then only limited by database type).

> 💡 External databases are recommended when you need to keep larger amounts of information for much longer periods of time. The built-in database (SQLite) is OK for low and medium load; for high and extra high load, especially for lots of entries per second, an external database with extra hardware is strongly recommended.

You can prepare the database connection and leave it disabled (default mode) until you decide to **enable** the external logging. To do this, put the check mark in the corresponding checkbox.

When done, click *OK* to save the settings and close the dialog box.

Troubleshooting: if, during operation, the Ganz CORTROL server is **unable to write** events to the external database, you will have a **warning** (highlighted orange) in the *Monitoring* section of Ganz CORTROL Console, under the Servers category. Click the target Ganz CORTROL Global server, then click *Details* on the upper panel to see the **database connection errors**.

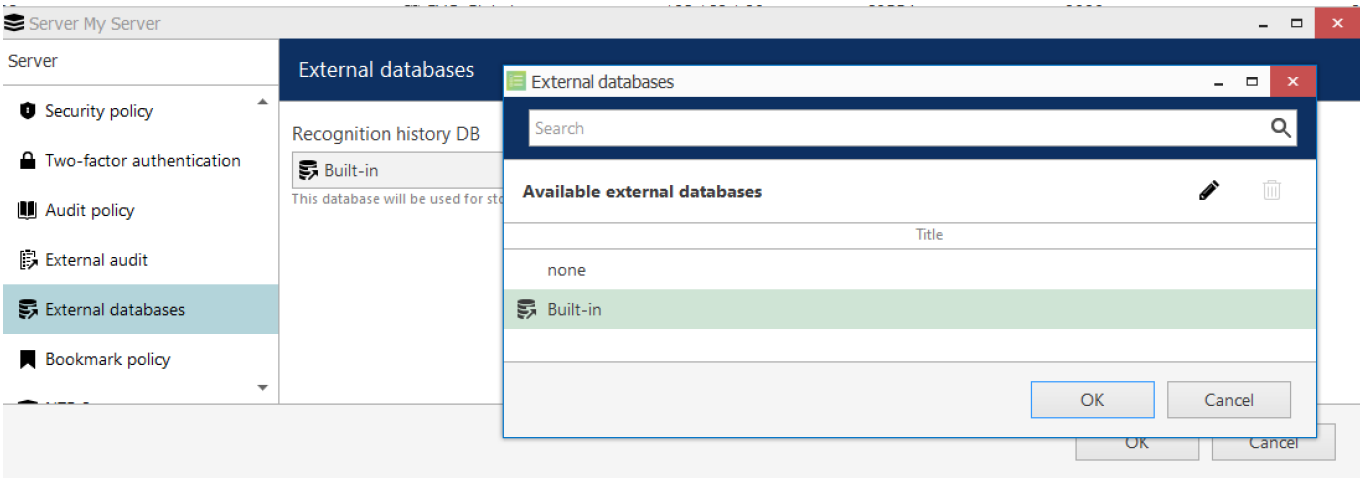
External Databases

For certain data types, you can set up separate databases in a similar manner. In the *External Databases* tab, available databases will appear.

Currently available: a separate database named *Recognition history database* can used for storing external recognition events. Without it, only metadata (bounding boxes) are stored for external recognitions (in the video archive), so you will be unable to search these events in a separate tab in Ganz CORTROL Client. If you do not use external services/cameras for LPR/FR recognition, you will not be needing this database.

> 💡 If you have made a clean installation, this DB is enabled by default. If you made an upgrade from a software version prior to 1.21, this DB is disabled.

Click the *Edit* button to change the built-in database settings: limit the number of recordings and the number of days, and enable/disable the database. Click *OK* to save and then *OK* again to save and close the dialog box.



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Change built-in database settings

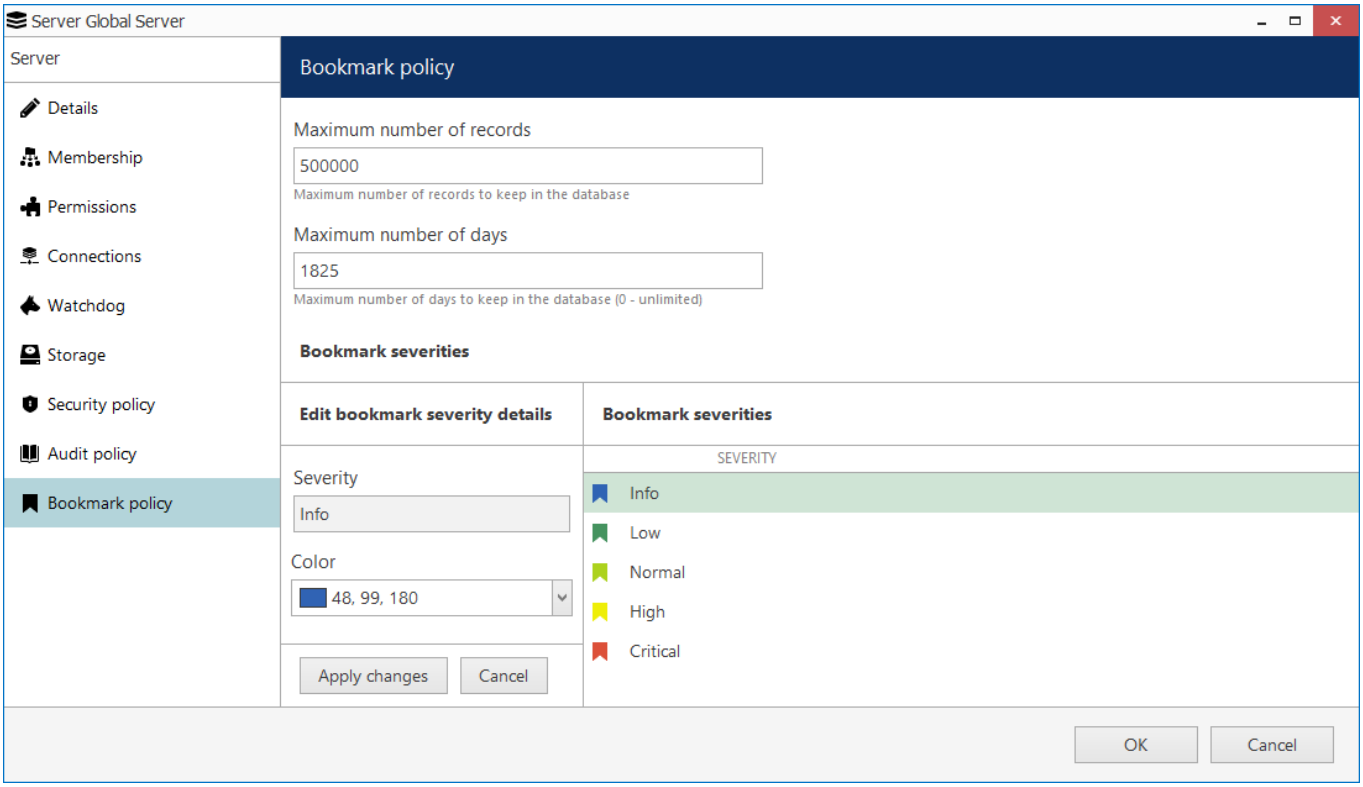
The built-in database cannot be removed and it is enabled by default for all new installations.

Bookmark Policy

Here, you can set limits for the bookmark database by defining its desired duration and size, and also change bookmark colours for different severity levels. The settings here affect the whole system - all servers, all channels.

The default (and also the maximum) **number of records** (items in the database) is 500000, and they are kept for 5 (five) years. Set 0 days to set unlimited **duration quota** (the items' quota will still have effect).

These limitations were introduced in the software version 1.14.1. Therefore, when you upgrade from an older version, database will be reduced in size by removing the oldest bookmarks so that their number matches the default quota (500000). If the old database contains more than 1 million items, it is truncated and compacted during the upgrade.



Limitations for the bookmark database and default colours

Bookmark **severity levels** were introduced in the software version 1.16.0. Prior to this version, all bookmarks were red and had no ranking; to preserve compatibility with older archive, all bookmarks from the older archive will stay red and have the highest severity, *Critical*. Here, in the policy tab, you can change the colours used for different bookmark labels. To do this, select an item in the ranking list, then choose a colour using the built-in picker.

After you change the colour related to a certain severity level, all bookmarks with that severity level will start using the new colour. If the bookmarks are already opened somewhere (e.g., on the timeline of a Ganz CORTROL Client), simply refresh the timeline to see the new colour: remove the channel from the view and add it anew. In instant playback mode, switching to live and back will do the trick.

NTP Server

Ganz CORTROL servers use the local machine time. Ganz CORTROL Console provides you with an opportunity to force **sync time** with the specified NTP server.

Essentially, this is the same as configuring the target server OS use the specified NTP server: the time server you set via Ganz CORTROL Console is applied to the underlying OS settings. The only difference is that you can do this remotely via Ganz CORTROL Console interface, without connecting via RDP or other remote control software.

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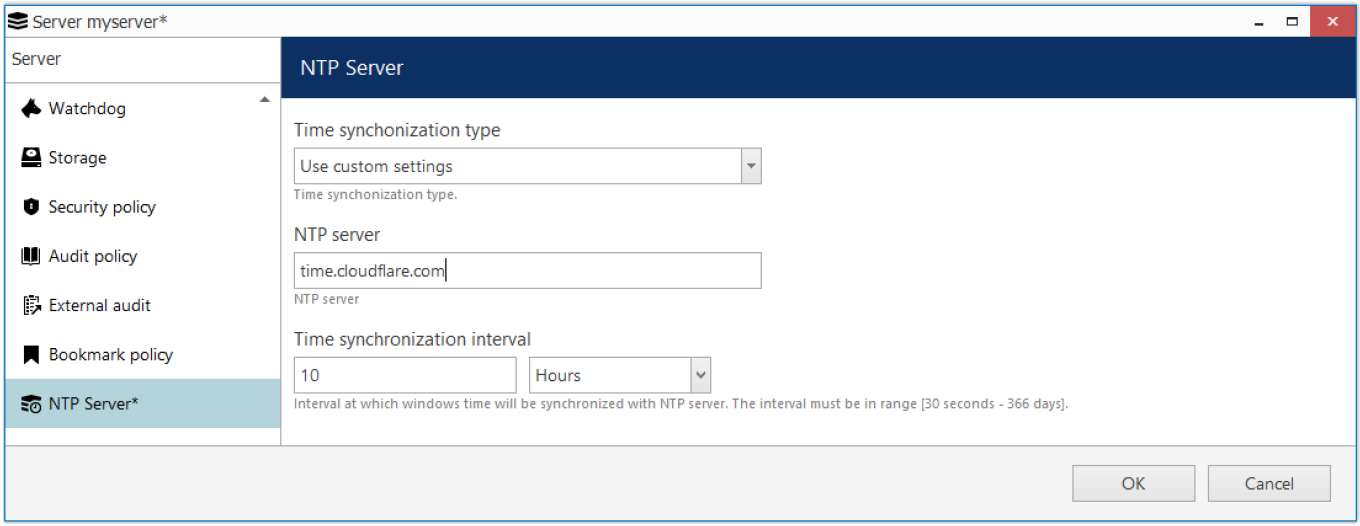

NTP server connection settings

The available settings here are:

- **NTP server**: the target IP or hostname of the time server, local or public
- **Time synchronization interval**: how often to sync the time, choose any desired interval from 30 seconds up to 1 year.

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4.4 Security

All Ganz CORTROL editions have enhanced security aimed at data protection, which includes not only advanced permission management but also encryption wherever possible. Data protection for Ganz CORTROL encompasses database encryption, server-to-server and server-to-clients connection encryption, password protection for the proprietary archive, as well as certain system settings and policies that increase the level of cybersecurity.

The system offers pre-configured security levels, each of which includes a certain preset of security-related features. Some of the security settings are system-wide, and some other can be adjusted for individual servers (e.g., archive encryption).

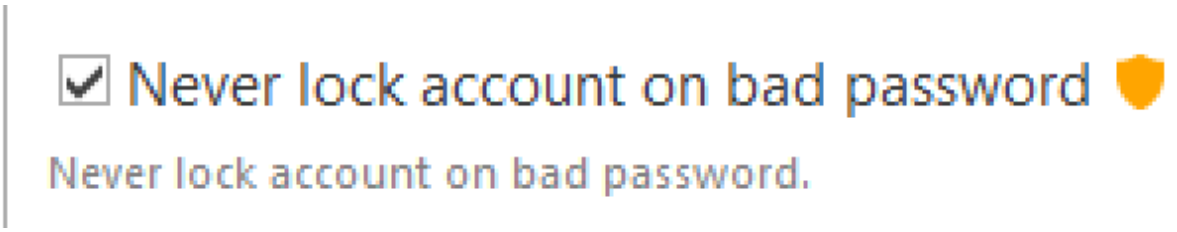
Cybersecurity Dashboard

You can access the cybersecurity dashboard via Ganz CORTROL Console main menu in the top right corner > *Cyber security*.

There are 4 pre-defined security levels, ranging from the lowest to the highest security level. You can choose any level as a basis and, either leave it is it is, or turn off individual security checks.

> ⚠ The security checks for the selected settings mean that these settings are monitored and you are warned trying to assign an inappropriate value. Enabling a certain security level does NOT change any of the related configuration parameters!

Each security check means that the related setting is tracked and you are notified if it does not meet the security requirements. For example, if the automated backup location is on the same disk as the main configuration file, the backup directory setting in the *Automated backup configuration* dialog box will have a warning shield. Thus, the **selected security level is a set of recommended security settings**, and you are free to ignore the warnings or exclude individual checks from the security profile.



Cybersecurity warning example: the setting does not fit the currently selected security profile

The cybersecurity dashboard will display recommended setting values accompanied by warnings if the current preference is lower than recommended. For some of the checks, the warnings cannot be displayed: this happens if the security check is applied at a certain moment. For example, this is true for the storage and device passwords: the server cannot validate the existing password so the password complexity will be estimated on the password creation step.

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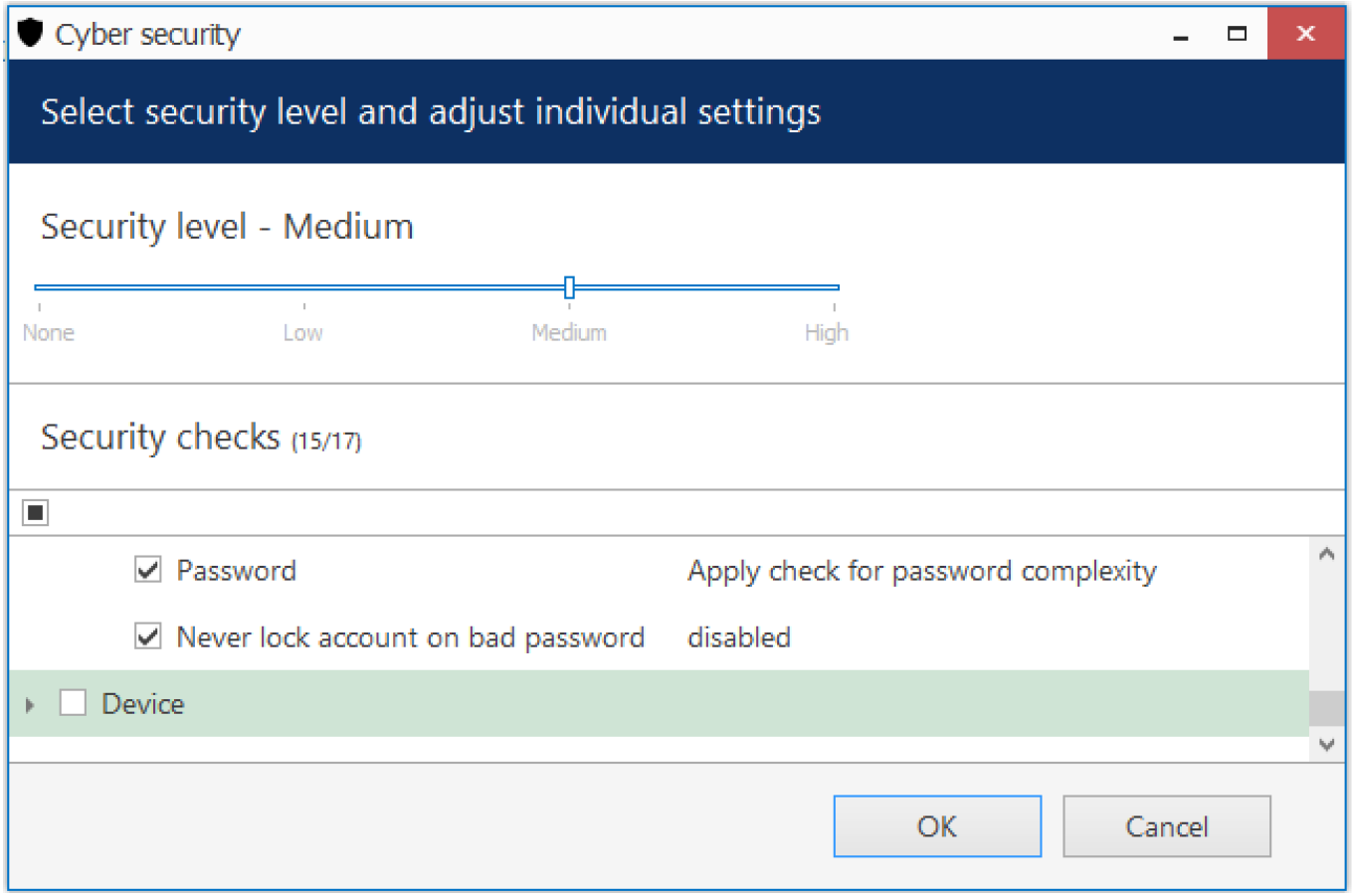

Cybersecurity dashboard

Cybersecurity levels:

- **None**: no security checks at all
- **Low**: only some password policies and server backup settings are tracked
- **Medium**: more of these settings plus user- and device-related settings
- **High**: all possible settings related to security are monitored for maximum system protection

The following security checks are available with their corresponding recommended values for different security levels:

Category	Security check	Low	Medium	High
Automated configuration backup	Automated configuration backup mode	Enabled	Enabled	Enabled
	Automated configuration backup interval	Every 5 days	Every 2 days	Every day
	Number of config backup files to keep (max)	1 or more	15 or more	30 or more
	Backup directory is located on a different drive	-	+	+
	Databases to be backed up	-	All	All
Server security policy	Minimal user password length	6+ characters	8+ characters	12+ characters
	Minimum number of uppercase letters in the user password	1+	2+	2+
	Minimum number of lowercase letters in the user password	1+	2+	2+
	Number of previous passwords to remember	-	1+	3+

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	Number of days between password changes	-	90-	30-
	Max number of simultaneous connections using the same user account	-	1	1
	Max unsuccessful login attempts before blocking the user account	-	5-	3-
	Minimum number of special symbols in the user password	-	-	1+
	Minimum number of digits in the user password	-	-	2+
Server storage	Check storage password complexity (upon setting the password)	-	+	+
	Storage encryption is enabled	-	-	+
Audit policy	All audit options related to security policy are enabled	-	+	-
Server connections	Client-server connection encryption is enabled	-	-	+
	HTTPS is enabled	-	-	+
Two-factor authentication (2FA)	2FA is enabled	-	-	+
User account	Check password complexity against server policy	-	+	+
	Lock account after N unsuccessful login attempts ("never lock on bad password" option is disabled)	-	+	+
	User password is valid for a limited time ("password never expires" option is disabled)	-	-	+
Device settings	Verify password complexity (upon entering the password)	-	+	+

Some of the security options are hard-coded so it is impossible to disable them (e.g., database encryption) and these are therefore not listed here.

Database Encryption

Ganz CORTROL server uses several databases for storing the server configuration, audit logs and other software data, and all of them are encrypted by default. Once you install the software version that supports database encryption, all the databases are automatically converted to the encrypted format. There is no need to adjust any settings to enable this feature.

Database encryption was introduced starting from the Ganz CORTROL version 1.8.0 and is supported in all succeeding versions.

Connection Encryption

Traffic encryption is not enabled by default, it can be turned ON in the server settings, in the *Connections* tab. There are separate settings for TCP connection encryption and HTTPS.

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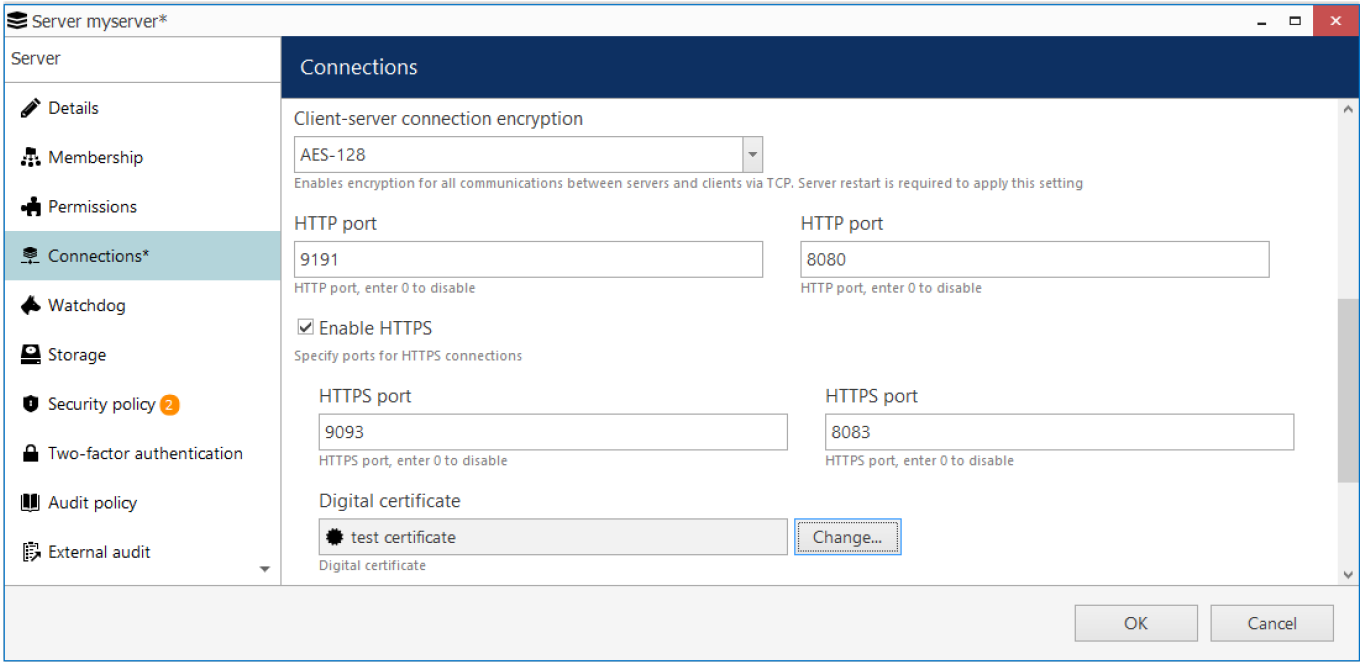

Ganz CORTROL Global server connection settings with encryption options

Client-Server Connections

This setting affects all TCP traffic between servers and clients, including server-to-server communications in Ganz CORTROL Global.

The currently available encryption options:

- **None**: no encryption
- **AES-128** or **AES-256**: choose the one you need

> ⚠ When configuring a Ganz CORTROL Global system that has remote servers and clients of version 1.7 or earlier, make sure to upgrade all remote components to the same version as Ganz CORTROL Global so that they support encrypted connections. As soon as it is done, you can safely enable encryption for TCP connections.

HTTPS

Connections from remote Web browser clients and mobile applications, as well as API connections, can also use a secure channel instead of plain HTTP.

To enable secure communications, enable HTTPS in the server settings, then specify desired HTTPS ports (different from HTTP ports) for local and internet connections, and then add the digital certificate you wish to use; you can either use your own certificate or generate a self-signed one right on this step.

> ⚠ If you are setting up a Ganz CORTROL Global system:
>
> In addition to the setup in the central management server settings, HTTPS should be enabled for each Ganz CORTROL Recorder **separately**, in the settings of the target server. The certificate, though, should be only added **once**, and then you just need to choose it from the list, when setting up HTTPS on the Ganz CORTROL Recorder machines.

> 💡 It is recommended that you use a valid digital certificate signed by a trusted authority instead of self-signed ones. If you use a certificate generated by Ganz CORTROL, your browser will show you a warning.

Archive Encryption

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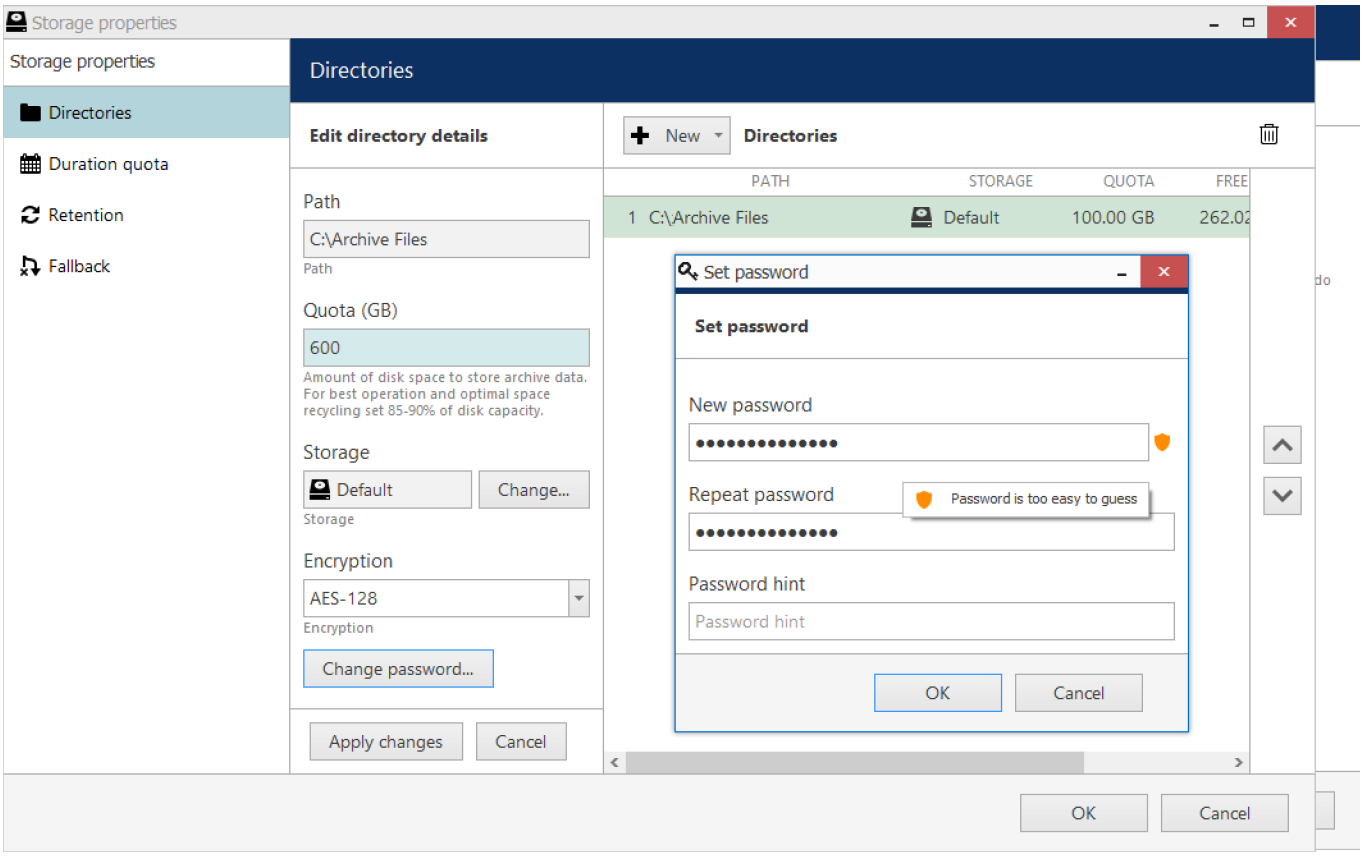
Each archive storage (local or network), as well as archive backups made through the Archive Backup Wizard, can be encrypted. You can provide a different password for every storage unit, and there is also an option to change the password at any time.

Regular Server Archive

To access the archive encryption settings in Ganz CORTROL Console, open the *Configuration* section, choose *Servers* on the left, then double-click the desired server to edit its settings. In the *Storage* tab, click the *Open storage properties* button.



Password-protected storage setup

Click the target storage in the list on the right or add a new local or network storage unit by using the *+New* button above the storage list: its properties will appear on the left. Mark the *Enable encryption* option and specify the password you want.

The currently available encryption options:

- **None**: no encryption
- **AES-128** or **AES-256**: choose the one you need

To **save the changes**, hit the *Apply* button beneath the storage settings, then hit *OK* to close the storage configuration dialog box, and then click *OK* to finally save the storage settings together with the server configuration. Pressing *Cancel* on the last step will revoke the changes in the storage configuration.

When assigning a new password for the storage, make sure to remember it or store in a secure place: you will require it, should you need to access the storage contents in the following scenarios:

- when accessing the archive with the Portable Player tool
- when adding the same disk as a storage unit for another server
- when adding a disk with archive backup as a storage unit
- if you delete the encrypted disk from the storage configuration and then add it anew

There is a field that allows you to enter a password hint, which will be displayed in these situations.

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You will not be prompted for the password when accessing the archive from the Ganz CORTROL Client application connected to a server with encrypted archive: Ganz CORTROL server will decrypt it automatically.

⚠ **There is no option to recover the password if you have forgotten it.**

Starting from the moment you set the password, all footage recorded to the target storage becomes encrypted; retroactive encryption for the previously recorded archive is not supported. If you wish to have the already recorded data to be encrypted, you can use the replication feature in Ganz CORTROL Global, targeting the replicas to an encrypted storage.

When the storage password is changed, the new password is used for encryption from then on. If storage encryption is disabled for some time and then enabled back, that part of the archive will remain unencrypted.

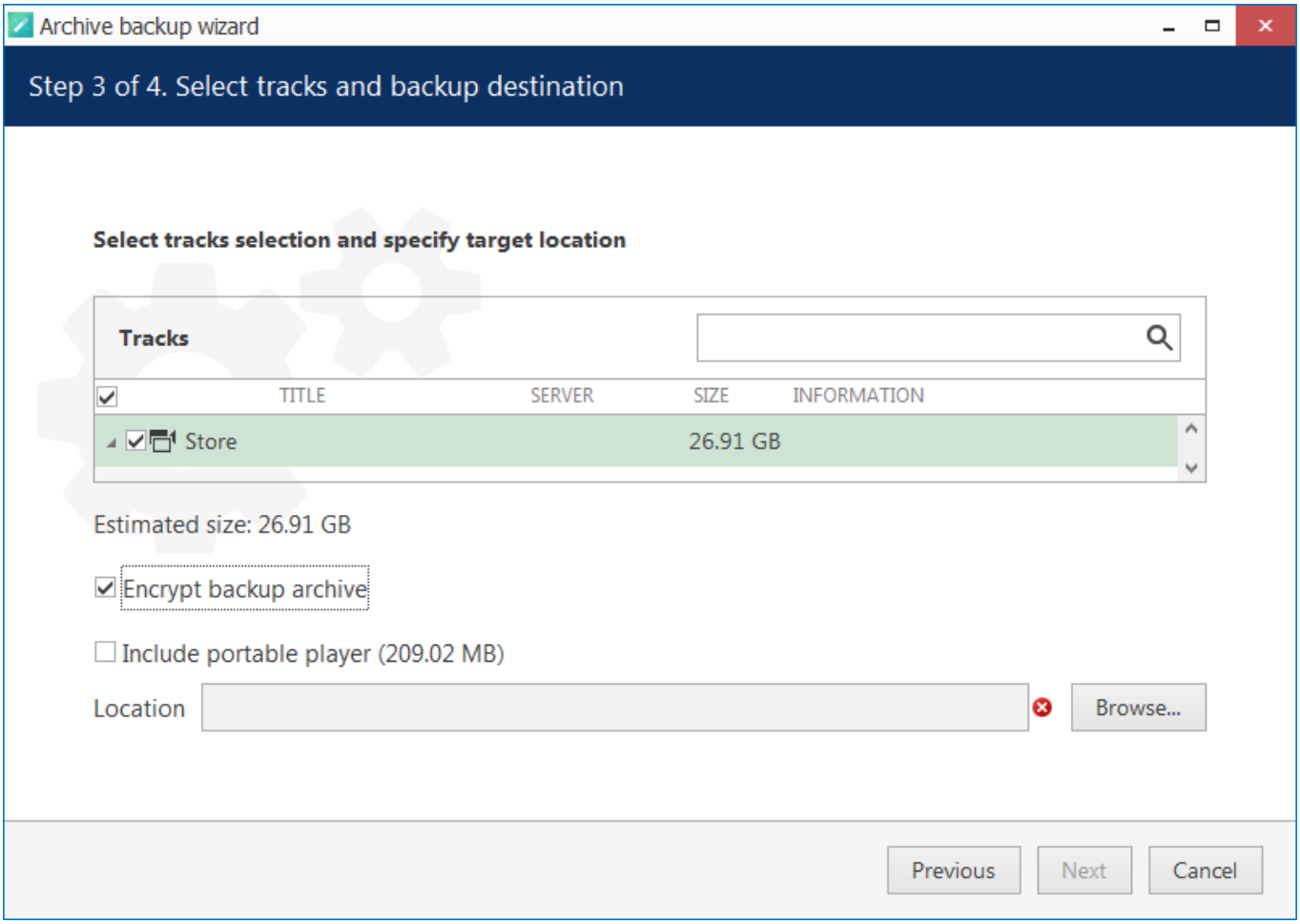
Adding an Encrypted Disk

If you wish to use a storage, which contains encrypted archive, as a new storage unit and add it to the server configuration, you will be prompted for the password. You need to provide the **password** that was used to encrypt that disk. If you have provided a password hint earlier, it will appear as a **tooltip** when hovering your mouse over the password field.

⚠ Do not modify the contents of encrypted disks manually, this may result in the corruption of the whole archive.

Archive Backups

The archive backup tool also provides an option to specify a password to encrypt the backup.



Password protection for the archive backup

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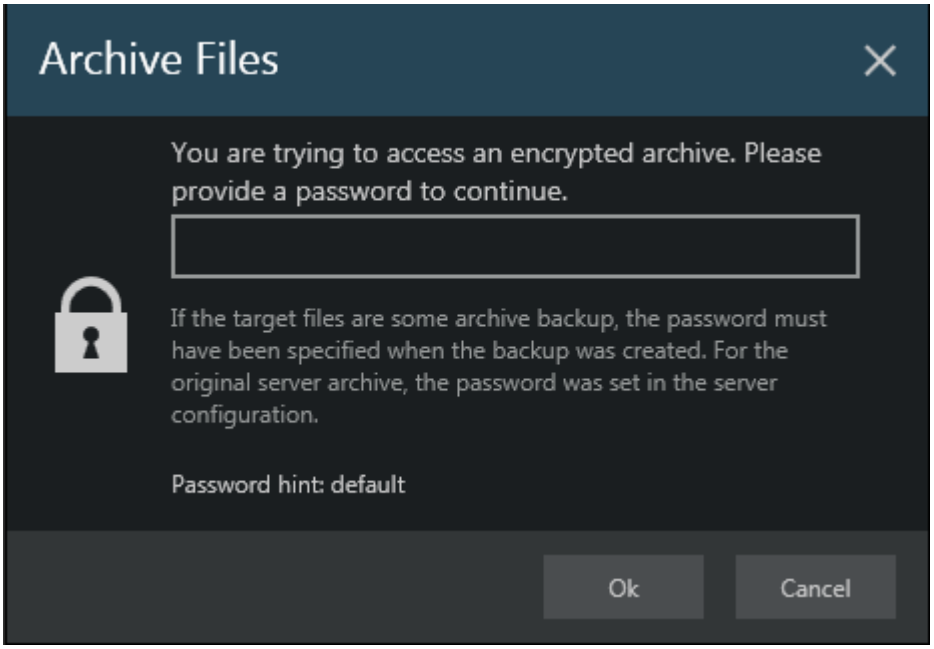
There is no difference if the backup is made from an encrypted or an unencrypted storage; the password provided at this step will be used in future for archive access, whether you read the disk contents using the Portable Player tool or add the disk as a new storage to some Ganz CORTROL server.

Encrypted Archive Access

When accessing an encrypted storage via Ganz CORTROL Client and Ganz CORTROL Mobile, the archive is decrypted automatically and provided for browsing according to the user permissions.

Should you want to access a directory that contains proprietary Ganz CORTROL archive or its part (backup) using Ganz CORTROL Portable Player tool, you will be prompted for the password.



Encrypted archive access in the Portable Player tool.

If you have specified a hint at the point of setting the password, it will be displayed as text or as a hint when hovering your mouse over the password field.

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4.5 Two-Factor Authentication

Ganz CORTROL servers support two-factor authentication (2FA) for the Ganz CORTROL Console and Ganz CORTROL Client logins. It is disabled by default, and you can turn it ON via server policies. When 2FA is enabled, all users who want to connect to your Ganz CORTROL server and who are not an exception, will have to enter both their password and a code they receive. Thus, the users prove their identity not just by entering what they know (the password) but also what they have (the email or phone). By default, this policy affects all users; you can disable 2FA for individual users in their permissions.

At this point, Ganz CORTROL 2FA supports code sending via **email** and **SMS**, and works for Ganz CORTROL Console and Ganz CORTROL Client login.

Terminology:

- **session**: an established connection between client and server once the user logs in
- **code**: a numeric code sent to the user's email
- **notification provider**: an SMTP server or a GSM modem that will relay the notification

The **recommended** course of action is: first, create a notification provider, then fill in all the settings, save, and then enable and test 2FA.

2FA Settings

2FA is configured via server settings: in the *Configuration* section, choose *Servers* on the left, then double-click your server to open its properties. In case of a Ganz CORTROL Global system, make sure to open the central management server properties.

The following settings are available here:

Setting	Description	Default Value
Enable two-factor authentication	If selected, additional authentication will be required for server login	Disabled
Set up notification providers	Set up desired providers (using email servers or other means) that will be used for sending out authentication codes	[button]
Session expiration time	During this time period, 2FA will not be requested again if a client was disconnected by server; after this time or after user-initiated disconnect, the user will have to use additional authentication again	1 day
Code expiration time	The time period during which the sent code will be valid, starting from the code sendout moment; after this time, the user will have to request another code	00:05:00 (5 minutes)
Code generation interval	The minimum time interval between two consequent code requests; the user will be unable to request a code more frequently	00:00:10 (10 seconds)
Skip for localhost connection	If enabled, 2FA will not be applied to localhost connection	Enabled
Subject	Message subject line, can consist of text and macros (via right-click)	{SESSION_ID}
Body	Main message part, can consist of text and macros (via right-click)	{CODE}

Name your **notification providers** according to the used verification source (e.g., **Email**) so that the users understand where to look for the code.

In the verification message, write some text in addition to the session ID and the code so that:

- The user understands which one is which

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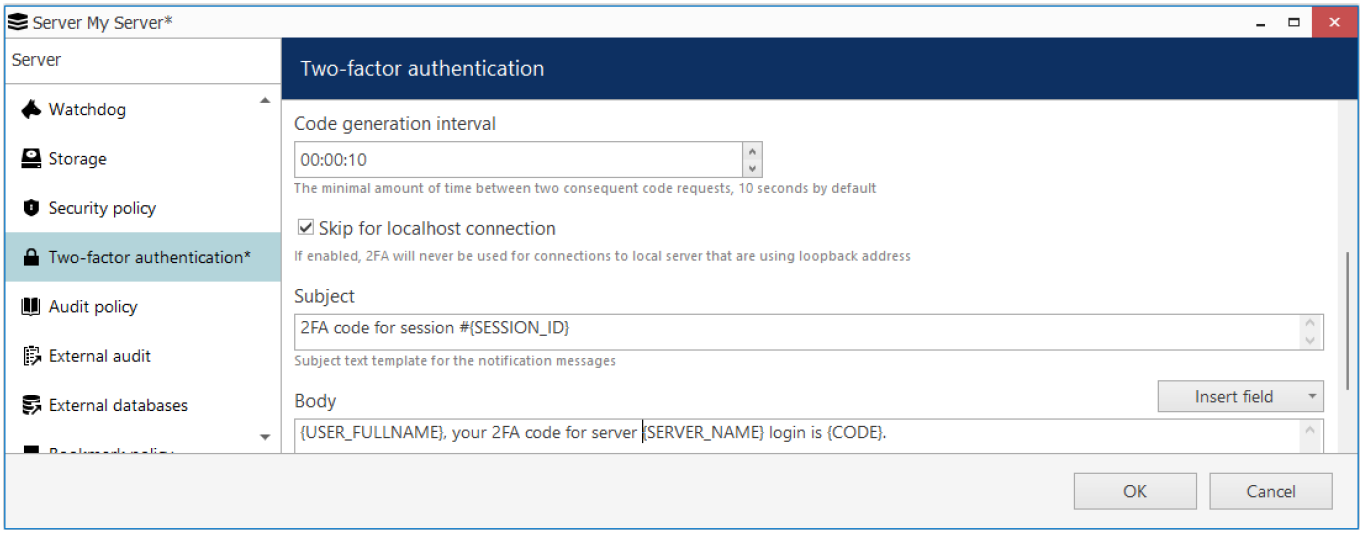
- The email does not go to Spam

When you try enabling 2FA, you will get a **warning** that you need to test 2FA before saving the configuration. This is necessary to ensure that all the settings are correct and 2FA actually works; otherwise, you or other user(s) may be unable to log into the system at some point. The 2FA verification will start once you click *OK* to save the settings and close the window.

Settings to be verified before enabling 2FA:

- make sure you have added a valid 2FA notification provider (SMTP server or modem)
- add a contact email/phone number for each user
- we recommend that you allow at least one administrative user account to log in without 2FA, or that you disable 2FA for localhost connections: this is to ensure that you do not lose access to the system if your 2FA notification provider fails or becomes unavailable

You can configure 2FA without enabling it, verify these settings, and then finally enable 2FA.



Two-factor authentication settings

The best approach for 2FA configuration:

1. In 2FA settings, add a notification provider and adjust everything but do not enable 2FA yet, click *OK* to save.
2. Make sure your email server or GSM modem used as a notification provider is valid, and that all users have correct emails/phone numbers in their account properties.
3. Go to 2FA settings again and enable it, then go through the verification.

When you **turn off** 2FA, you will have to go through the setting verification again next time you enable it. If you make changes to the 2FA settings and enable it at once, this test verification will use the previous settings for formatting and intervals (because it happens before saving the settings, and these will not be saved until you pass 2FA successfully).

Two-factor authentication is a recommended setting when you choose the highest cybersecurity level - the system will check if 2FA is enabled and remind you with a warning mark if it is not.

Set Up Notification Providers

You can set up one of multiple notification providers of each kind to give your users an alternative in case one of the providers does not work or is unacceptable for some reason.

To add a new notification provider, click the corresponding button in the 2FA settings. In the dialog box, you will see the list of existing providers (none exist by default). Click the + *New*.. button in the bottom or use the drop-down arrow to see all options.

For each provider, specify:

- **Title**: name that will be shown to the user (so make sure to include the communication means, e.g., Email

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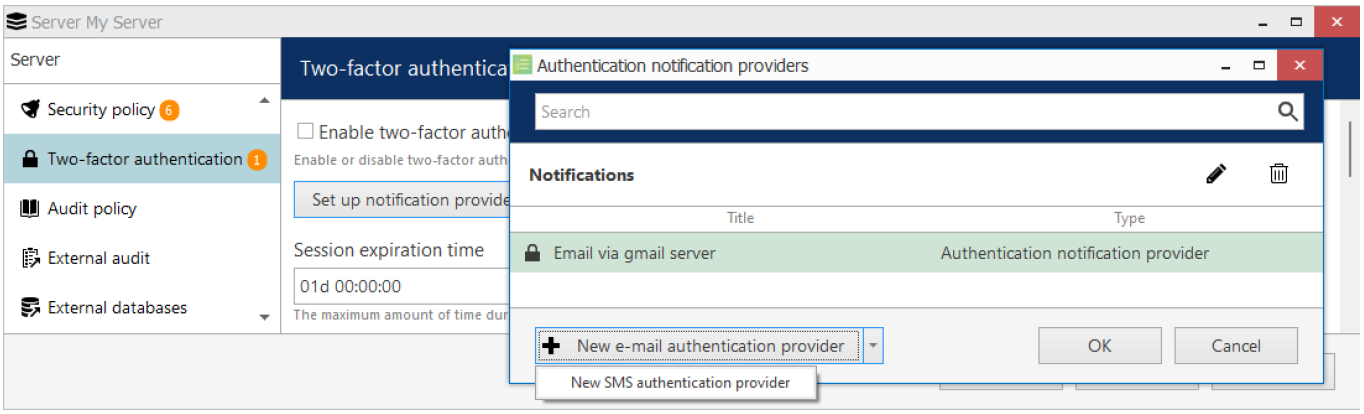
via Office 365)

- **Mail server**: for e-mail notification providers, choose one of the pre-configured SMTP servers
- **GSM modem**: for messages, choose one of the pre-configured modems



Add new or edit existing notification provider

If you have no pre-configured means of notification delivery, add them, and then return to this screen.

Click *OK* to save the provider, then click *OK* to go back to 2FA settings. All created providers will be shown to the user when they try logging in.

> Tip: if some of your notification providers do not work temporarily, add a corresponding note to the provider name. Thus, you will not have to remove it from the configuration but the users will know that they cannot use it for 2FA.

To edit an existing provider, use the pencil button on the top panel; to remove any of the items, select it and then click the *Recycle bin* button. Removed providers will be erased from the list, but the related email servers & modems will be preserved.

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5 Devices and Channels

The traditional idea of cameras as surveillance software entities has been developed, resulting in the concept of **devices and channels**. Essentially, it represents the separation of physical and data layers for reasons of security and easier management.

"Device" refers to any piece of physical equipment that serves as a data provider; a hardware piece delivering video, audio and event streams to the server. IP cameras, video encoders, capture boards, USB web cameras - these are all examples of devices that can be added to CBC AMERICA LLC software. Devices do not include any data streams.

"Channel" refers to any actual video stream (with corresponding audio/event stream, if applicable) delivered to the server from any of the configured devices. Software licensing mechanism counts channels and not devices.

In Ganz CORTROL Console, devices hold camera TCP/IP and user settings, as well as actual hardware model. By contrast, channels do not possess these properties: this allows them to be handled as virtual entities, detaching and re-attaching them from/to devices. Channels feature video stream configuration settings - resolution, frame rate, bit rate and others - as well as all supplementary data streams, such as audio, motion and digital input/output events, PTZ control and camera-side analytics information. Thus, the underlying device may be removed or replaced without losing its channel's configuration, which also includes user permissions.

As there are also some multichannel devices, e.g., capture boards and video encoders, each device can have one or more channels attached to it - these can either be assigned or detected automatically; maximum number of channels for each specific device is stipulated by the device model.

Devices only appear within Ganz CORTROL Console, allowing the administrator to apply all necessary configurations. Ganz CORTROL Client only displays the channels and does not provide any access to the devices' properties to the end users.

Both devices and channels can be grouped independently. For internal Ganz CORTROL Console management, device groups and channel groups are available; for Ganz CORTROL Client channel grouping, visual groups are to be used.

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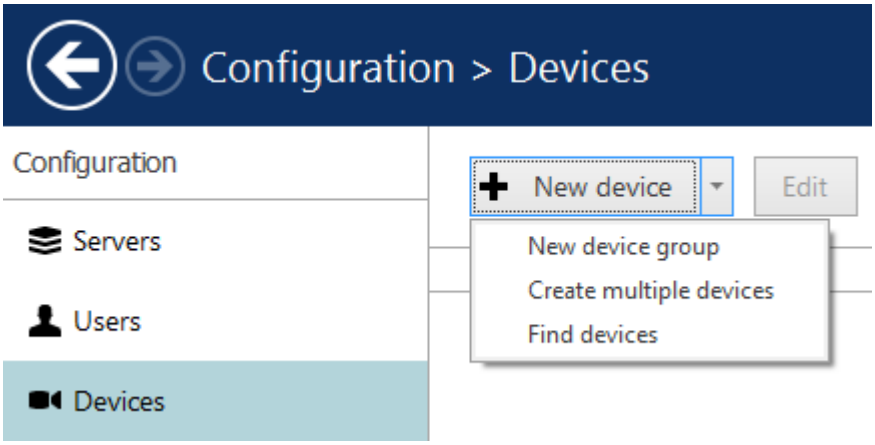
5.1 Add Devices Using Autodiscovery

Use automatic device discovery feature to find all available devices. This method is of great help when dealing with large amounts of cameras, and also when exact addresses of devices are not available.

To access the configuration dialog box from Ganz CORTROL Console, open *Configuration* section and select *Devices* in the menu on the left; in the upper panel, click down arrow near *New device* button and then select *Find devices*.



Add new device

Scan Parameters

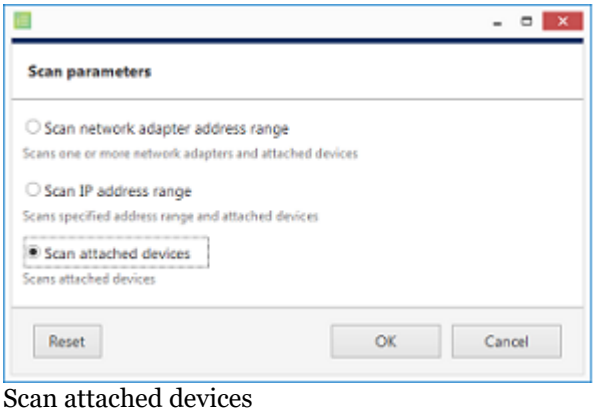
First, select scan mode; the following options are available:

- scan IP address range: specify a continuous LAN segment to be scanned
- scan network adapter address range: select one or more network interfaces to be fully scanned
- scan attached devices: the local hardware system will be scanned for capture boards and Direct Show video sources

If you have chosen to search for IP video sources, you should review additional connection settings and change or update them, if required:

- ports: HTTP ports, comma separated
- user credentials: pairs of comma-separated user names and passwords, one pair per line

Use the *Reset* button below to discard all changes and start entering scan parameters again. When you are ready, press *OK* button below to begin scanning.



Scan attached devices

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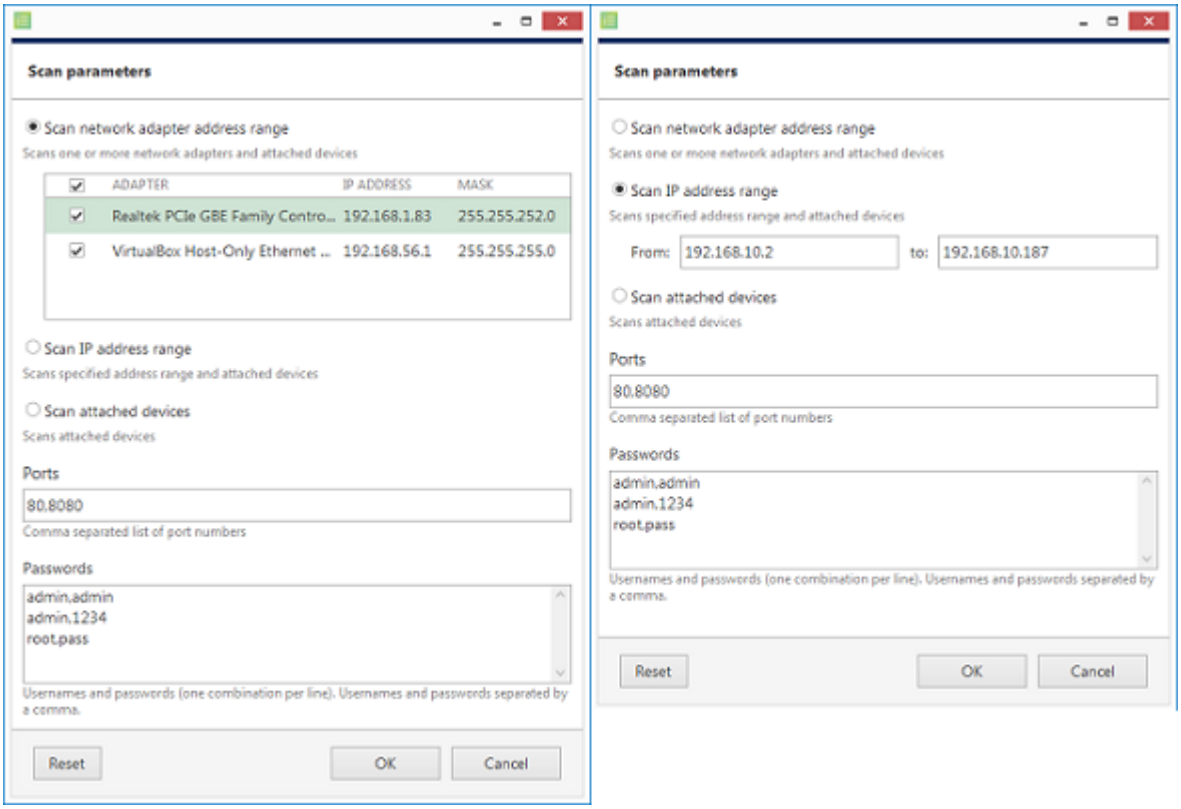

Scan address range

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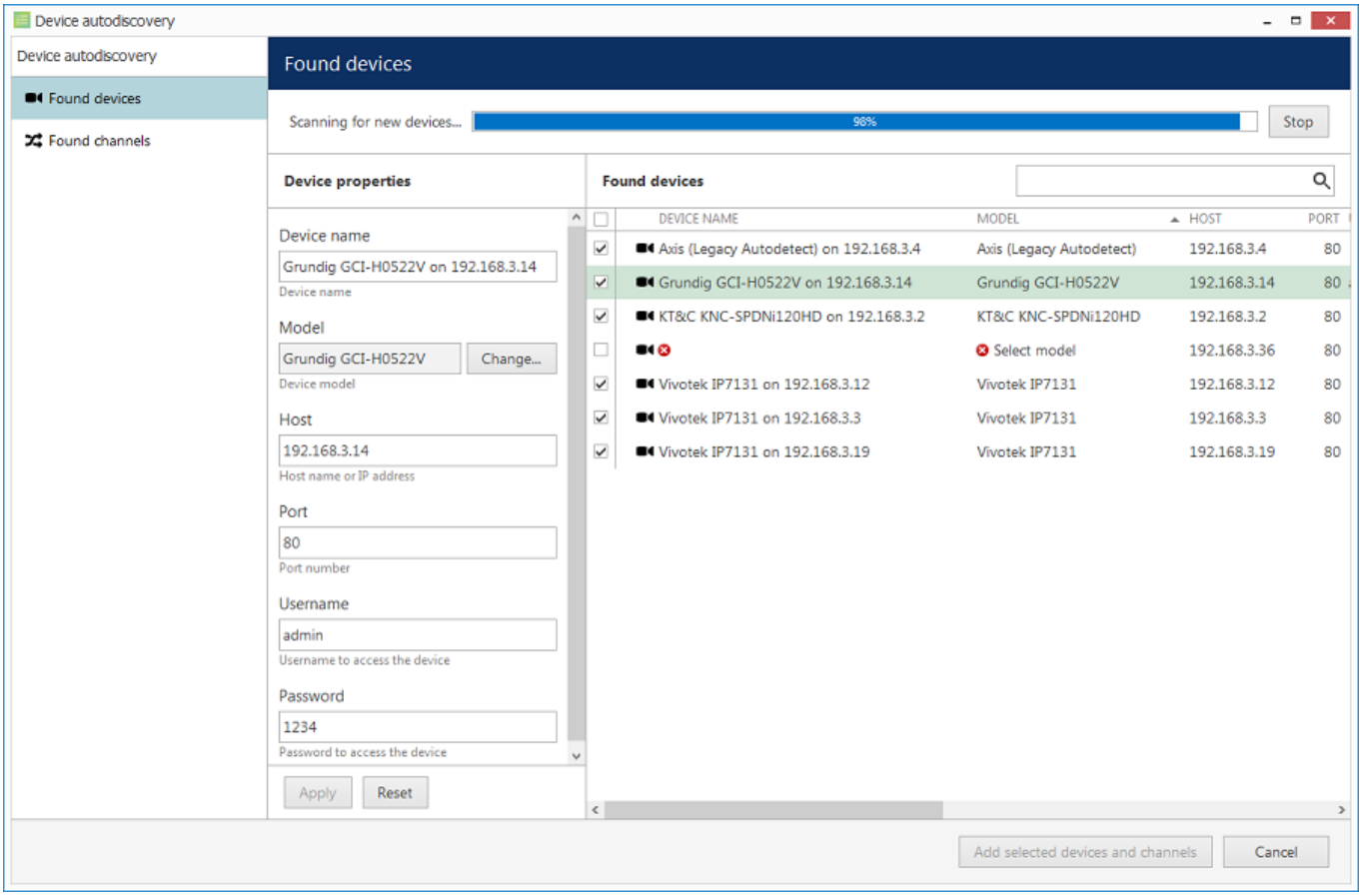
Device Autodiscovery

After scanning has been completed, you will be taken to the Device Autodiscovery dialog box, which will allow you to review the found devices and their channels, and enter/modify related settings. Use the *Search* field in the upper-right-hand corner to find a specific device by name, model, IP, port or hardware ID (for IP devices, ID includes MAC address).

> There are two types of selection in the item list: checkboxes and colour highlight. **Checkboxes** are used to choose the items to be added to server configuration after you close the dialog box; **highlighted** items are subject to immediate properties changes. Use *CTRL+click* or *Shift+click* to select all or several items at once to change their settings.

Click a device in the item list to load its settings into the *Device Properties* window. Note that some settings may be missing for some of the automatically found devices; this depends mostly on device and whether user data was correctly provided. In such cases, simply fill in the missing data manually and click the *Apply* button below to save the configuration changes.



Set up discovered devices

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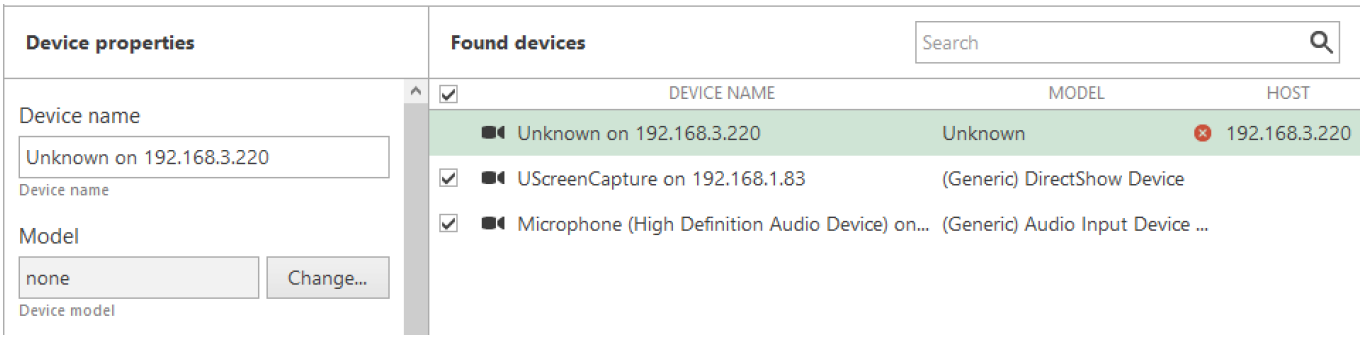
If device is not integrated with the software (native support), it may be detected as generic type (e.g., ONVIF). If you think some devices have not been discovered, check if they have different HTTP ports; also, try adding them manually.



If an unknown device is discovered, change its model manually

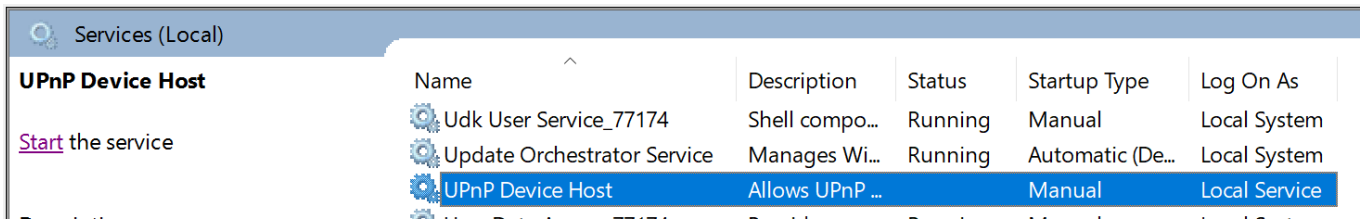
If the device cannot be matched with a model in the list and it also does not respond as generic ONVIF, it may be discovered as *Unknown*; in that case, try settings its model manually to the closest one (from the *Suggested models*), or try Generic RTSP and specify an RTSP URL in the channel settings. This may happen to devices that are not listed as an exact model and are also old enough not to support ONVIF Profile S.

Setting	Description	Default value
Device name	User-defined video source name	Autodetected model + IP, empty if not detected
Model	Device manufacturer and model, or generic type	Autodetected vendor and model, empty if not detected
Host	Device IP address	Autodetected
Port	Device HTTP port	Autodetected
Username	Device user credentials; note that you have to provide administrative profile credentials in order to be able to change device settings via software interface	Appropriate username from provided list or autodetected
Password	Device user password	Appropriate password from provided list or autodetected

Make sure you select all the devices you wish to add by putting a checkmark next to them. Devices with missing configuration (model and/or IP) are unchecked by default and will not be added to active server configuration.

⚠ If the autodiscovery **does not find any cameras** or all of them are Generic ONVIF instead of proper models:

- check models
- check IPs and passwords and ports
- make sure that the UPnP Device Host service is functioning properly on your system.



Switch to *Channels* tab to review the detected video channels of the discovered devices: this is particularly important if you are using multichannel devices, e.g., capture boards and encoders. Use the *Search* field in the upper-right-hand corner to find specific channels by name or device name.

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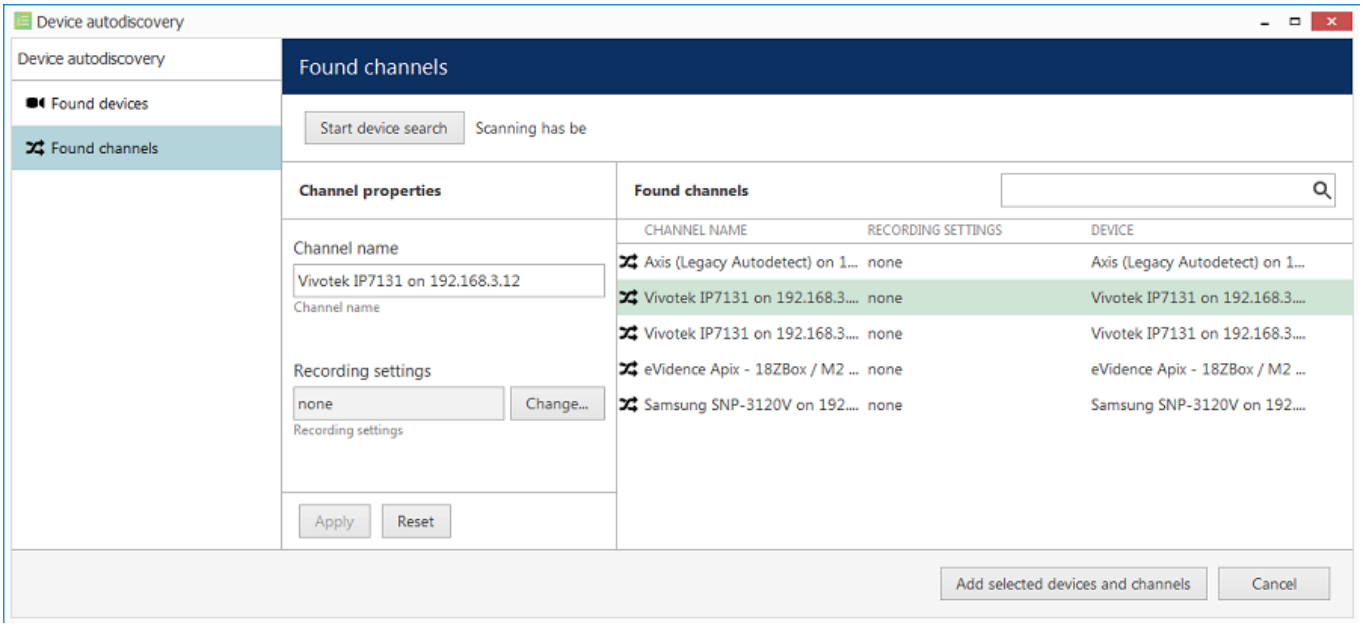
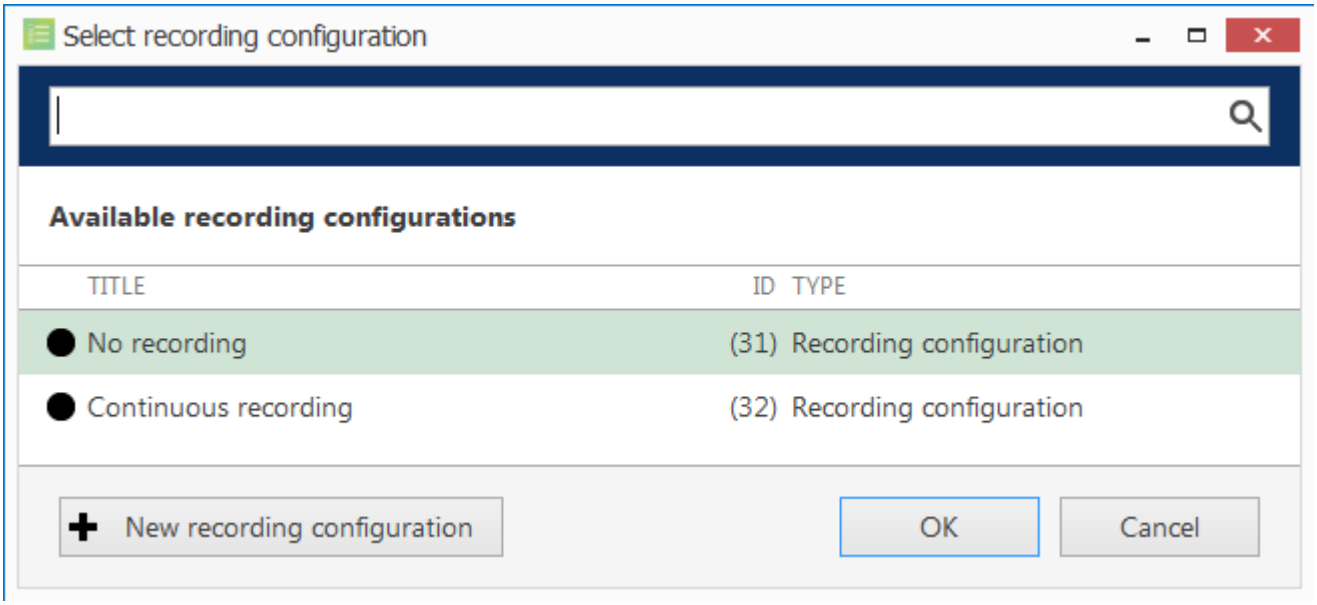


Set up discovered channels

Here you can edit the channel name and assign recording configuration. By default, recording is enabled for all channels: click the *Change* button near *Recording settings* to manage recording profiles and assign them to your channels. To add a new recording profile, click the *+ New recording configuration* button below; you can find more details about recording profiles in the corresponding section. Click *OK* to save and return back to devices and channels; click *Apply* to save configuration changes.

> ⚠ After changing the channel recording configuration, do not forget to click *Apply*, otherwise the changes will not take effect.

> 💡 Recording configuration here is assigned to the **main streams** of the target channels. In order to set up substream recording, please go to channel configuration.



Select the recording configuration or create a new recording profile

Click the *Start device search* button above at any time to restart device discovery.

> ⚠ All previously discovered devices and all configuration changes will be discarded if you restart camera autodiscovery.

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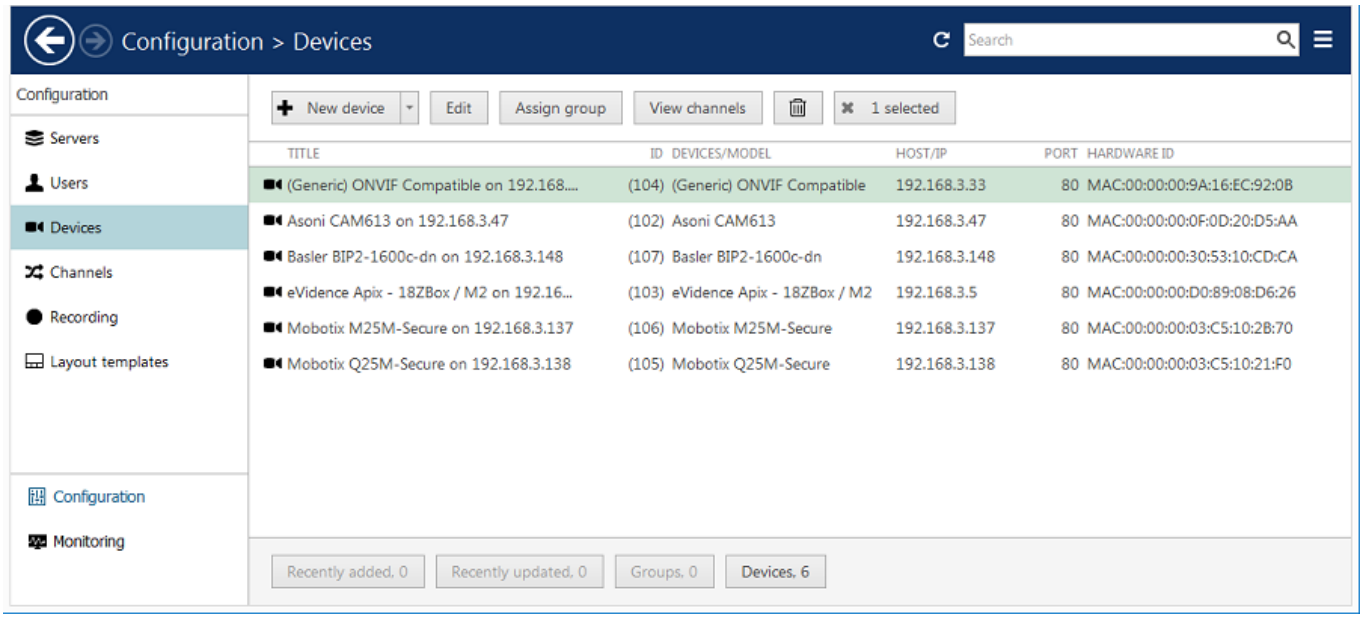
When you are ready, click the *Add selected devices and channels* button below; all checked devices will be added with selected corresponding channels. Newly added devices and channels will be added to the item list.



Added devices will appear in the item list

Use the buttons on the upper panel to manage your devices. You can now add new devices and/or device groups, launch autodiscovery again, assign devices to groups, as well as removing both devices and groups.

⚠ When deleting devices, remember that corresponding channels will **not** be **removed** at the same time and therefore your newly discovered devices may not be added due to license limitation. Go to the *Channels* tab to manage them separately.

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5.2 Add Devices Manually

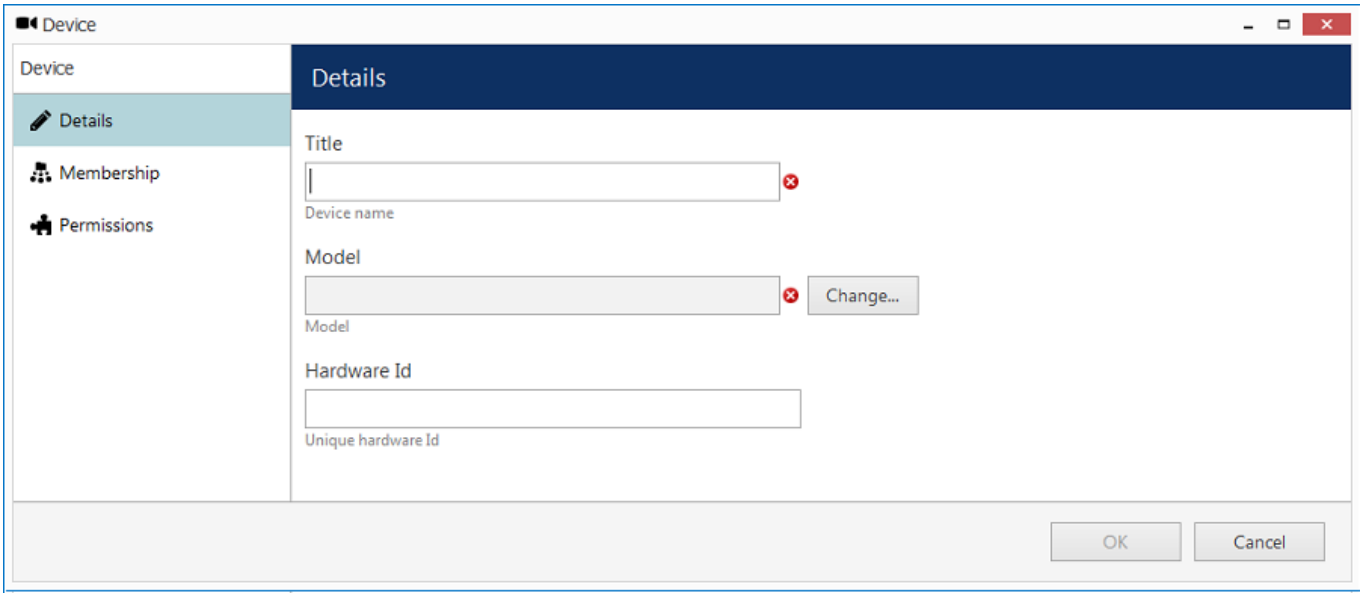
You can add devices manually instead of using autodiscovery in the following cases:

- actual devices have not been connected yet
- devices are not connected at the current deployment stage but it is planned that they will be connected later
- the server needs to be configured while being away from its future position
- some devices in use cannot be automatically discovered (not listed as models and do not support ONVIF Profile S at the same time)

Only IP devices can be added manually. Attached devices (e.g., capture boards) require autodiscovery.

Add single device

To access the configuration dialog box from Ganz CORTROL Console, open the *Configuration* section and select *Devices* in the menu on the left; in the upper panel, then click the *+ New device* button.



Add new device

Enter a user-defined name for your new device and pick a model. If your camera model is not listed, select the closest similar model or choose a generic type.

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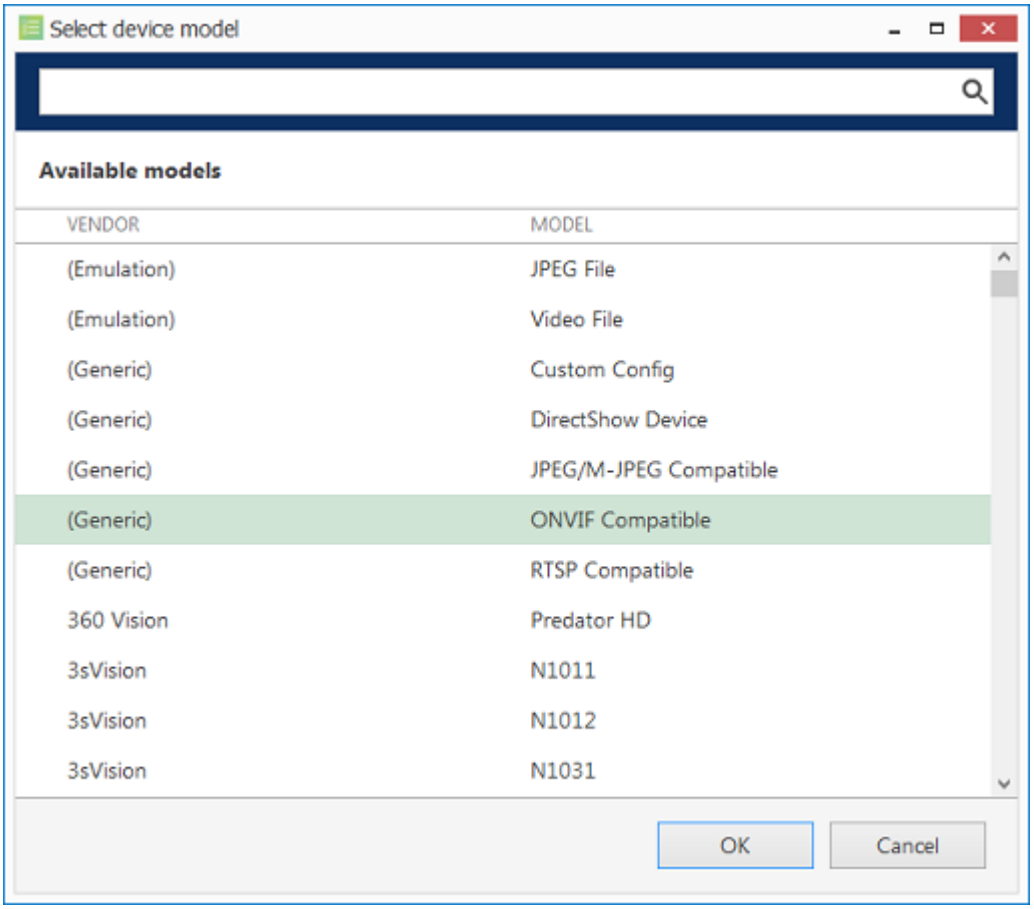
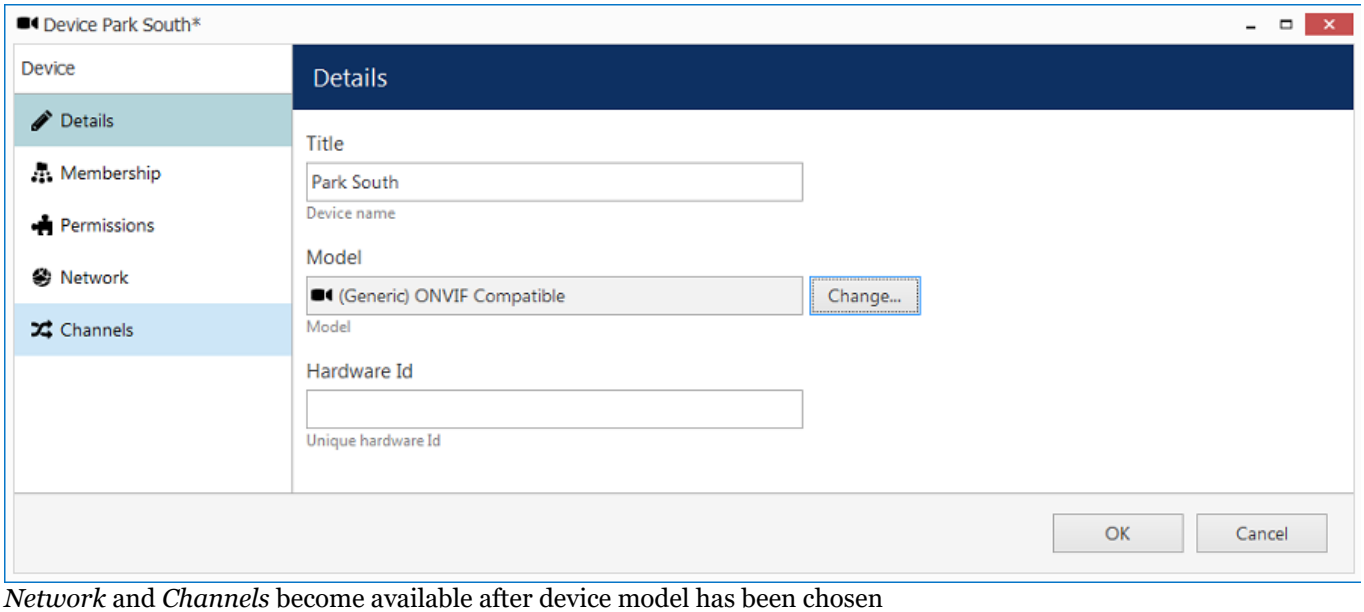


Select device model

After you have chosen manufacturer and model, additional tabs will become available in the main configuration dialog box: *Network* and *Channels*. These tabs are described in details later in this section.



Network and *Channels* become available after device model has been chosen

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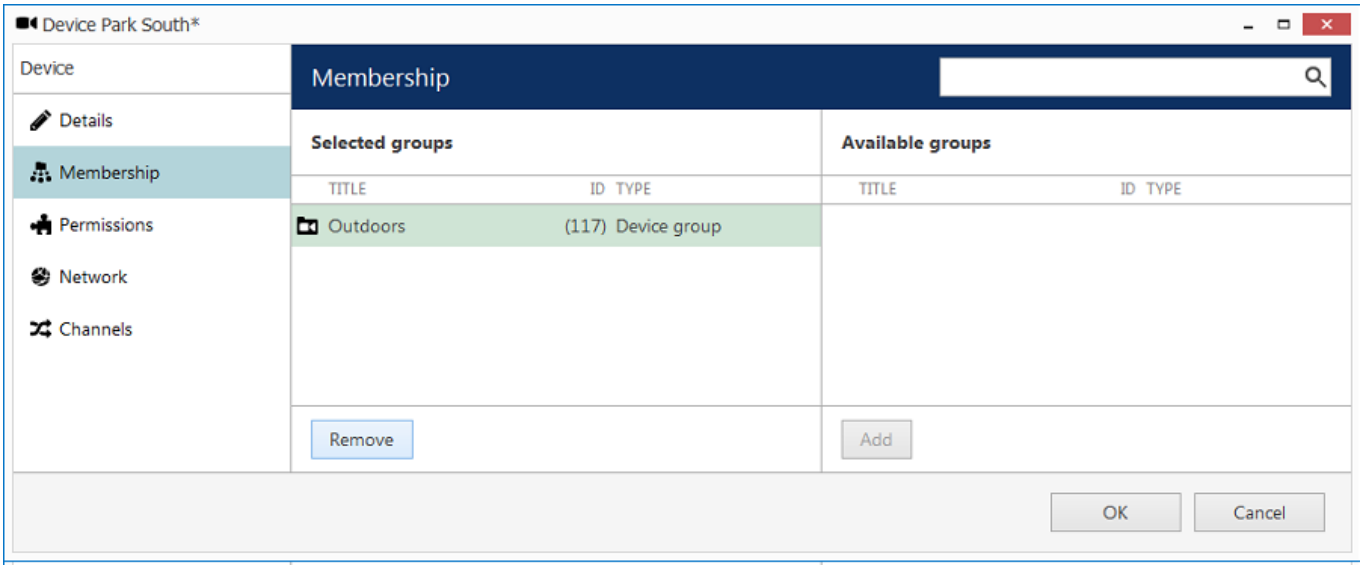
Details

Setting	Description	Default value
Title	User-defined device name	[empty]
Model	IP device manufacturer and model, or generic type	[empty]
Hardware ID	Unique hardware identifier containing a device hardware identifier; this filed should be left empty, as it will be filled automatically later, when the device has been connected and identified	[empty]

Membership

Choose groups for the current device to become a member of. Use *Add* and *Remove* buttons below or double-click to manipulate groups. One device may belong to several groups at once.



Define groups for the device being added

Permissions

Add users and/or user groups simply by checking at least one permission for the target server; remove by clearing permissions - either by deselecting them or by clicking the *Clear* button below. You can also double-click users to remove them from the list of privileged users. Devices with an empty permission list will not be available to anyone except for the root (global) administrator.

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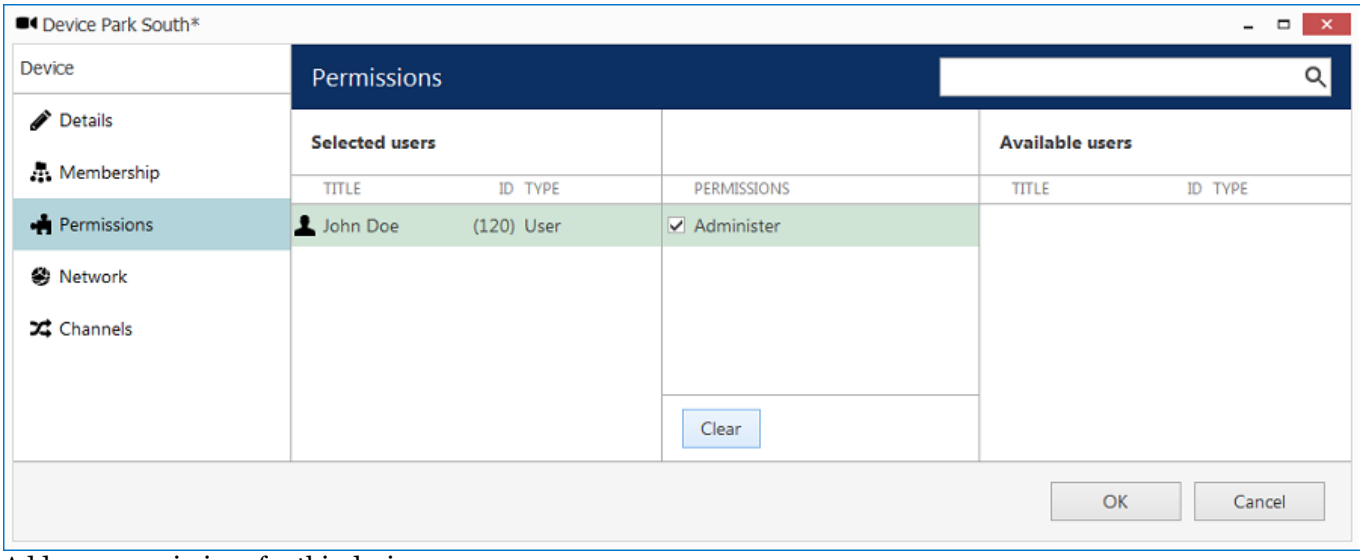
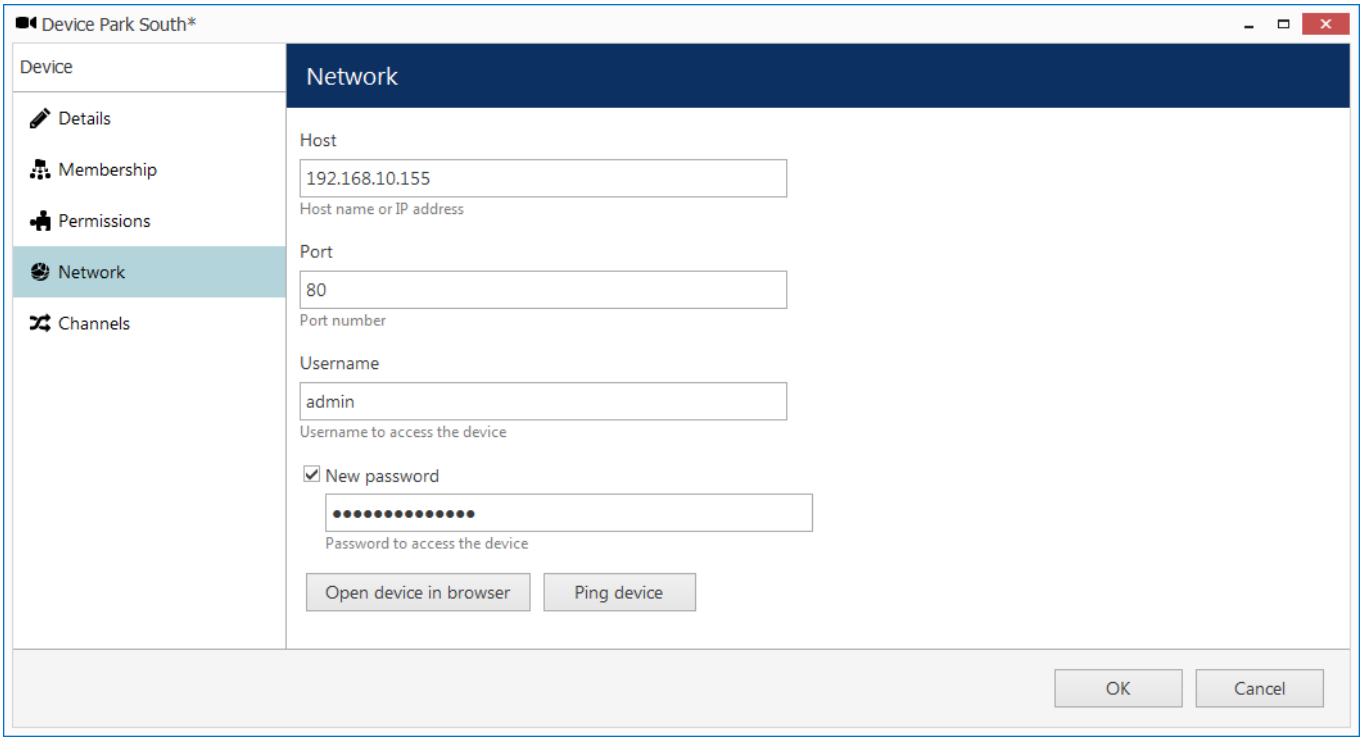


Add user permissions for this device

Network

Enter TCP/IP settings for device access here.



Enter TCP/IP settings for device access

Before filling in the details, make sure the settings match those on the camera. If device has not been connected yet, ensure that the same settings are applied during the camera installation. You can use the *Ping Device* button to check camera availability and/or verify your settings; the *Open Device in Browser* button will try to reach your camera Web interface using you default browser.

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Setting	Description	Default value
Host	Device IP address	[empty]
Port	Device HTTP/HTTPS port. Use port 80 for HTTP and 443 for HTTPS connection (or change to corresponding forwarded ports).	80
Secure connection	Use HTTPS instead of HTTP (change port above to 443). **Warning**: if you have HTTPS enabled on the **camera side**, make sure to enable HTTPS here, too. Otherwise, some camera features may be unavailable.	Not enabled
Username	Device user credentials; note that you need to provide a valid administrative user profile to be able to change device settings via software	[empty]
Password	Password for camera access	Enabled

In order to enable HTTPS connection:

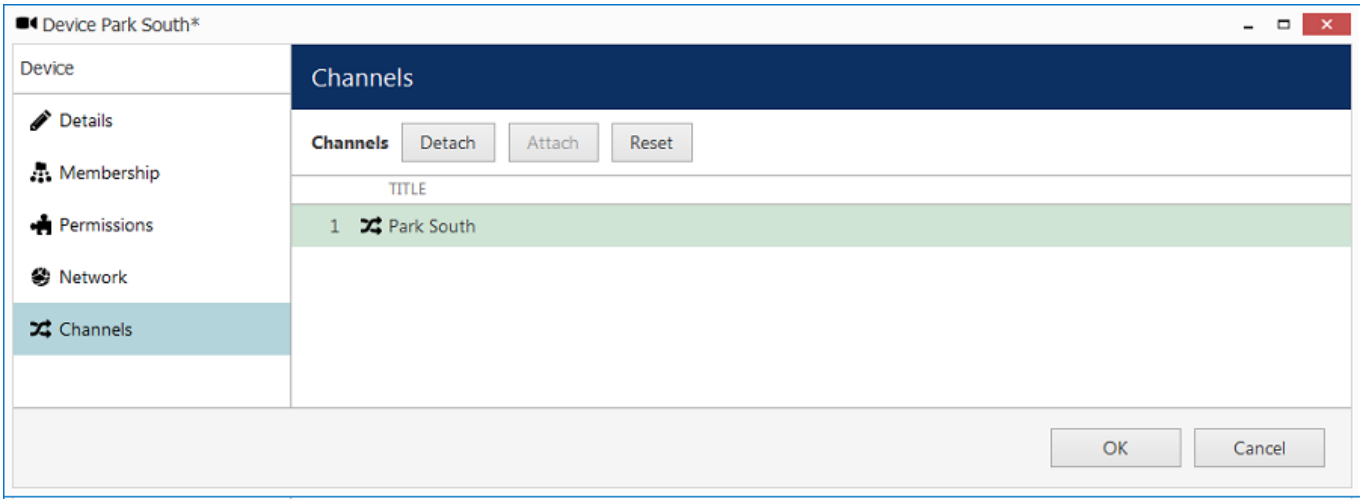
- change port to 443 (or whatever port is used/forwarded for secure HTTP)
- enable *Secure connection* option

Note that HTTPS must be enabled on the device side for this feature to work properly. On the other hand, if you are not planning to enable HTTPS in the software, disable HTTPS on the device side. DIfferent settings on the device and software side may cause malfunctions (e.g., device metadata will not be available).

Channels

Here you can detach automatically detected channels from the device and replace them with one of the existing 'free' channels (not attached to any device). Use the *Reset* button to undo any changes made to the channels (this only works for current editing session, reset will not be available after you save the changes and reopen this dialog box).

If you wish the original camera channel(s) to stay attached to the device, just leave the channel list as it is.



Channels

Add multiple devices*

*Feature is subject to license limitations and may be **unavailable in some software editions**.

If you have a number of devices of the same type in your system, you can add them all at once to save time. This method is also suitable is you have multiple groups of devices of the same type.

Open the *Configuration* section and select *Devices* in the menu on the left; in the upper panel, click the little arrow next to the + *New device* button and select *Create multiple devices*.

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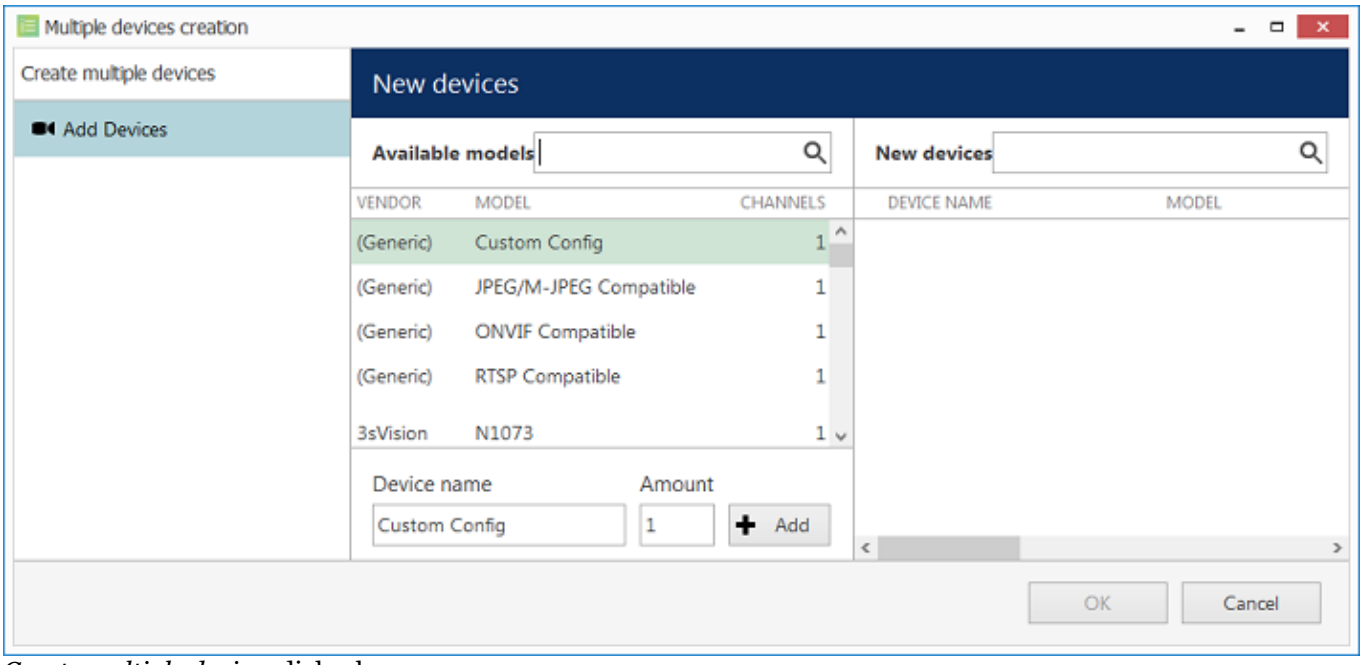
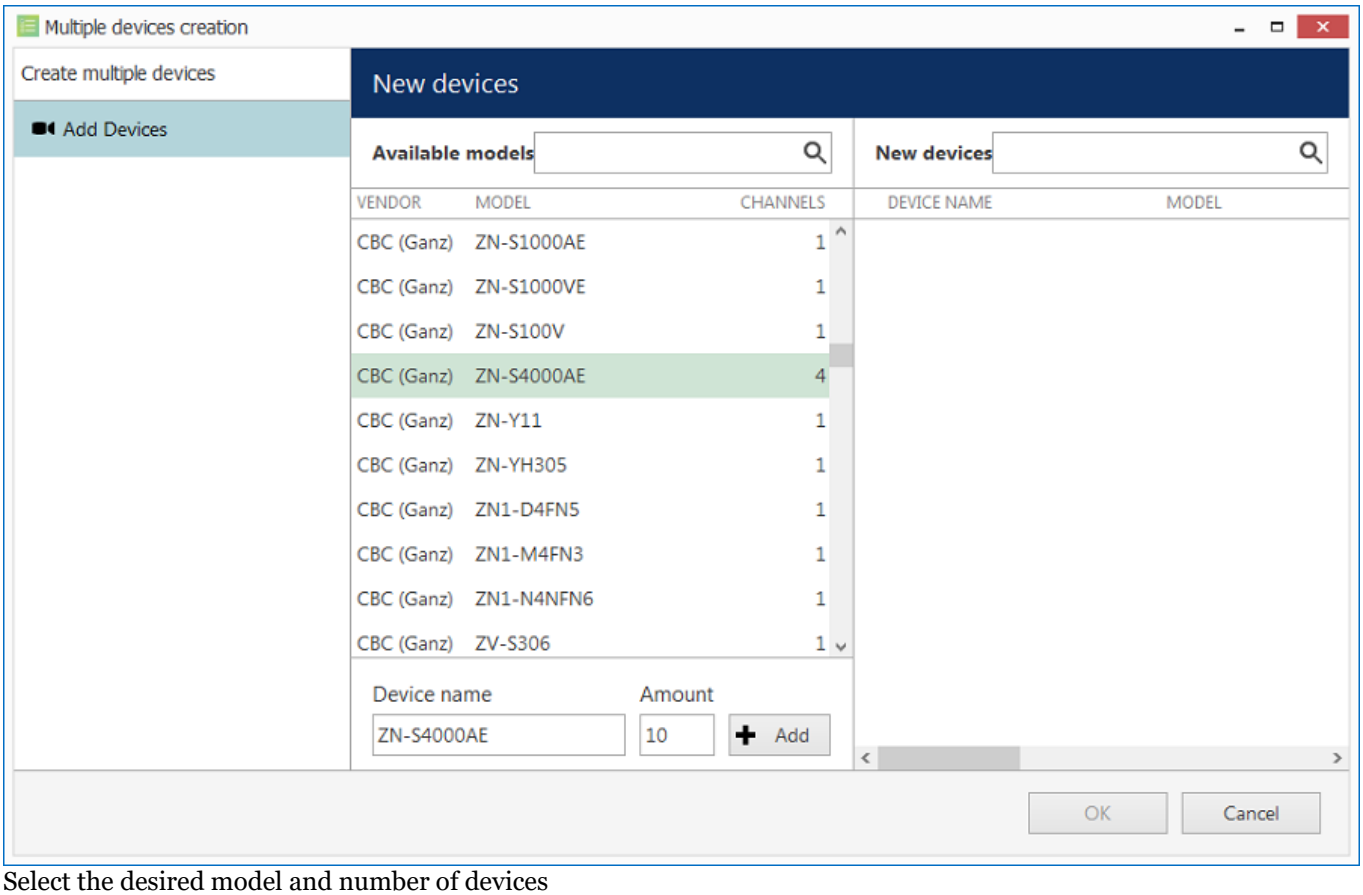
Add devices



Create multiple devices dialog box

You can add any number of different devices here (assuming this is permitted by license limitations). First, select the device model from the list, and then enter your desired number of existing devices of the same model.



Select the desired model and number of devices

When you are ready, click the + *Add* button below to attach the camera set to the new devices list. As soon as there is at least one device, additional tabs will become available: *Device Parameters* and *Channel settings*. Device list on the right will be available in all tabs.

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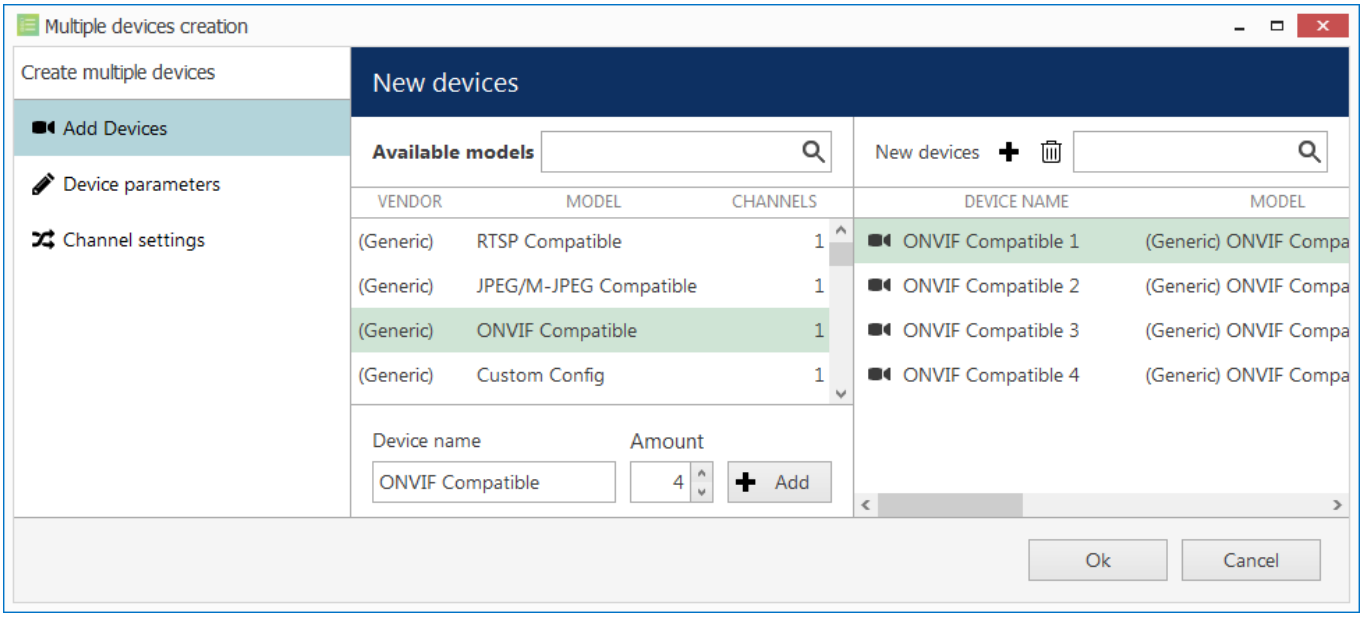
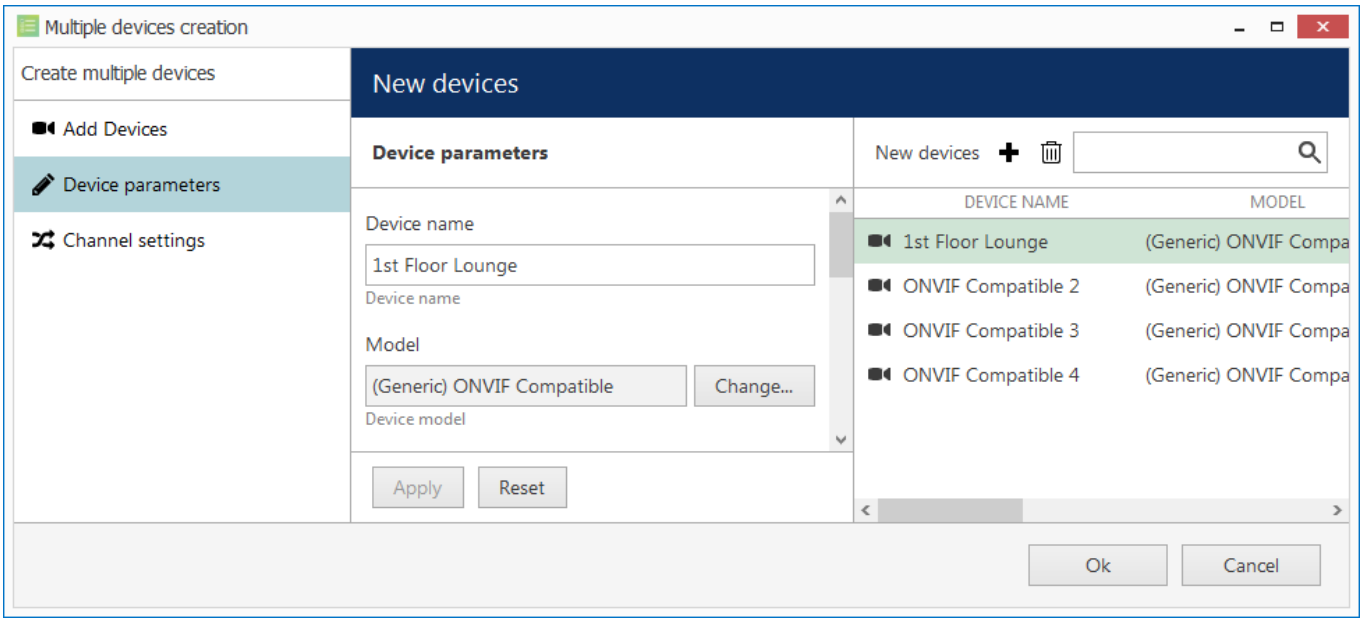
To **remove** any of the listed items, select them with your left mouse button (use *CTRL+click* or *Shift+click* to select multiple devices at once*)* and hit the *Delete* button on the upper panel or on your keyboard. Select any device and use the ✚ *Add* button on the upper panel to add a copy of that device.



Add several new devices

Device parameters

For each added device, enter corresponding settings. Note that you can skip IP and port on this step if you wish to use automatic incremental IP assigning (see *IPs and Ports* tab description below).



Modify device parameters

Select a device by clicking on it in the item list: it will become highlighted green and related available settings will be displayed in the *Device parameters* window. You can select multiple devices by holding *CTRL* or *Shift* when clicking.

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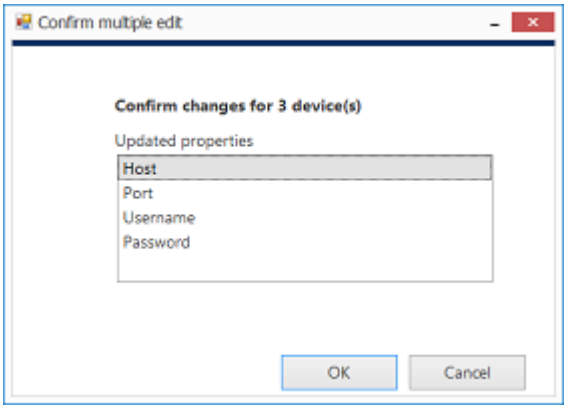
Setting	Description	Default value
Device name	User-defined device name	Device model
Model	Device manufacturer and model, or generic type; click Change to alter	Loaded automatically
Host	Device hostname or IP address	[empty]
Port	Device HTTP port	80
Username	Device user credentials; note that you need to provide a valid administrative user profile to be able to change device settings via software	[empty]
Password	Password for camera access	[empty]
Server	Target server, to which the device will be attached	Central Server

When you have finished, click the *Apply* button below for the changes to take effect.

⚠ If you do not apply the modifications, they will be discarded when you select a different device from the item list. Remember to always click the *Apply* button.

You will be asked to review the list of modified fields and confirm the changes.



Confirm changes

Click *OK* to accept the changes and go back to the configuration dialog box.

You can select multiple devices and assign IP addresses incrementally with the defined increment. Similarly, it is possible to change the HTTP port for all devices at once, if required (port value stays the same for all selected devices, with no increment). In order to do this, select desired devices by using *CTRL+click* or *Shift+click*, then start entering the IP address: the field will expand, giving you the option to enter the increment.

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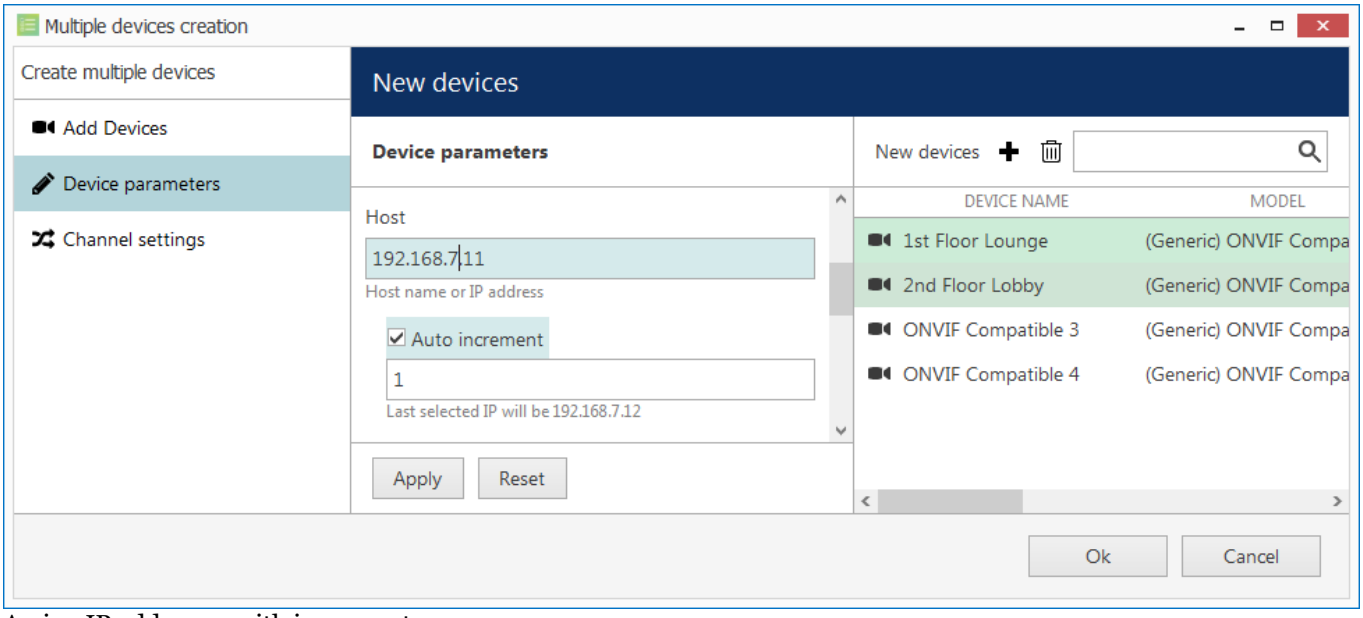


Assign IP addresses with increment

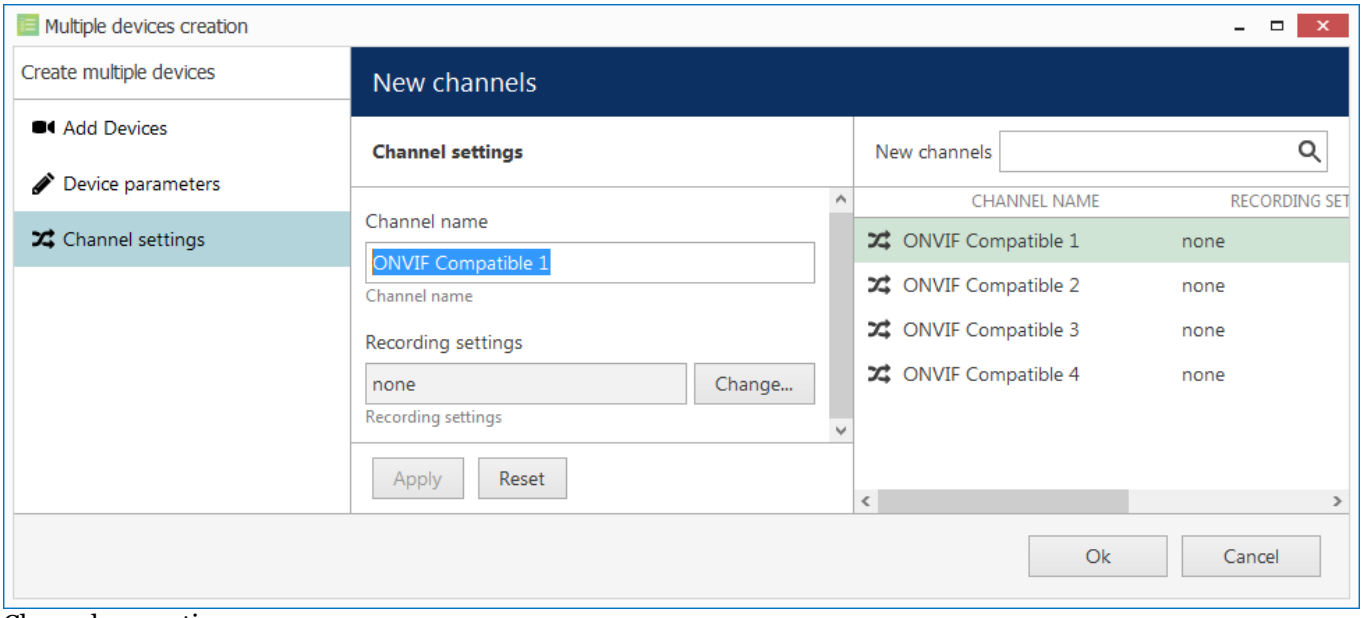
Click the *Apply* button below to save the changes, similarly to the previous step.

Channel Settings

Here you can modify channel names and recording configuration. Note that channel name is not copied from the device name.

Unlike with automatic device discovery, default recording configuration here is [none], meaning that recording is not conducted. Select one or multiple devices and then click the *Change* button in order to choose an existing recording configuration for the target devices or create a new one.

Depending on the selected device model, the number of channels may coincide with or exceed the number of devices, e.g., when device is a 4-channel encoder.



Channel properties

Select one or multiple devices and click *Change*, then select appropriate recording profile or create a new one.

When you have finished, click *OK* to add all the new devices and their channels to your server configuration.

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5.3 Manage Devices and Device Groups

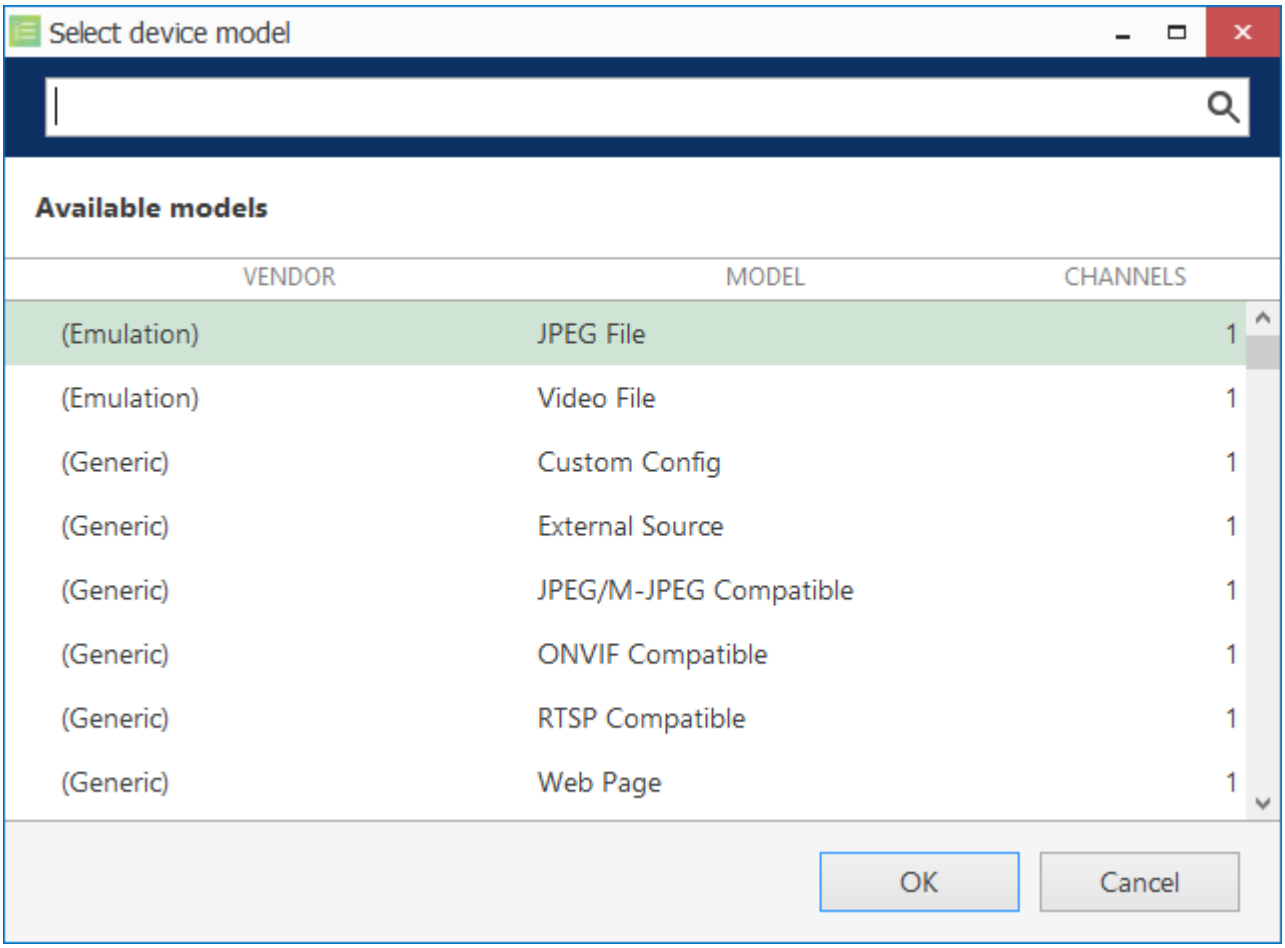
This topic describes general device handling as well as common use cases in device management.

Device Models

There are several device types available in the Ganz CORTROL model list:

- emulation
- generic
- models by vendor

Each group of models is further explained in more details. The selected model affects device-specific functionality; server-side functions (e.g., motion detection, Open VCA) will be available regardless of the device model.



Generic device drivers

Emulation From File

Emulation devices allow using a video/image file as the video source. This is an auxiliary driver often used for demo purposes, or when configuring/troubleshooting license plate or facial recognition. Still images must be in JPG/JPEG format. Video files must be in AVI format, encoded as MPEG4 AVC h.264; video files exported from Ganz CORTROL Client or Portable Player will work, too, provided that they were exported as AVI with JPEG compression.

After creating an emulation device, go to its channel's properties and specify the full local path to the target video/image file (*Channels* > open channel for editing > *Channel configuration* tab > *Channel properties* > *Settings* > *Location*). If you move such a device to another server, make sure to copy the file to the new server, or adjust the path in the channel settings.

Generic Streaming Drivers

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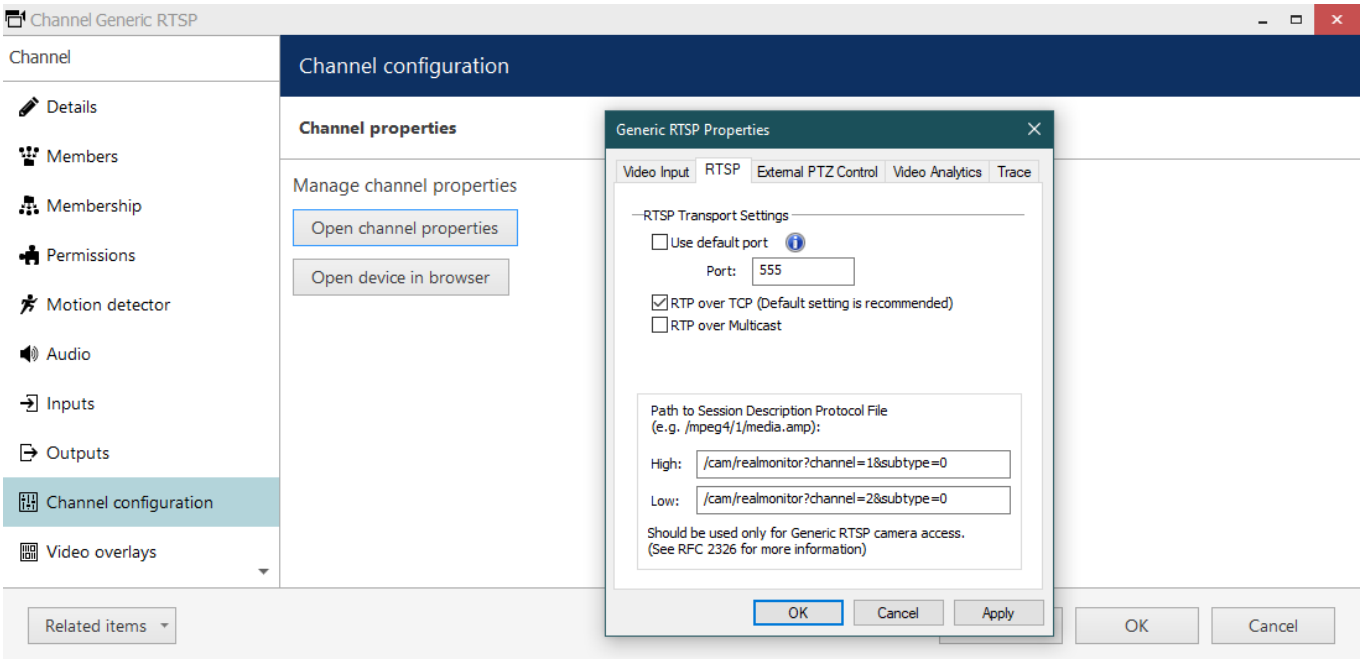
Generic drivers are based on common video transfer protocols, so these can be used for legacy hardware, non-integrated cameras/video servers, or non-traditional video sources (e.g., screen capturing software).

RTSP uses **generic RTSP** streaming over TCP/UDP, and includes two video streams and also audio (G.711). After adding this kind of device, go to its channel properties and specify the RTSP tag for both main and secondary video streams (*Channels* > open channel for editing > *Channel configuration* tab > *Channel properties* > *RTSP* > *Path to Session Description Protocol File*). The RTSP tag is the URL part after the IP address, so it should look something like */mpeg4/media.amp* or */videostream.cgi*. You can find this information in the device HTTP/CGI documentation provided by the manufacturer. You can also specify a **custom RTSP port** here, in case the device configuration uses a non-standard port, or if port forwarding is set up.



Example of channel properties for the generic RTSP driver

Custom configuration driver is similar to the generic RTSP driver, but it allows adding RTSP flags and PTZ commands via .INI file (text file with configuration, formatted in a special way). The file should contain the desired HTTP/CGI commands and URLs, according to the device documentation. The path to the configuration file is also specified in the channel properties, in the *Configuration* tab. Browse for the file, then hit *Apply*: you should see the configuration details appear above. If there are no details and the date is incorrect, the file has incorrect extension, or is not formatted properly.

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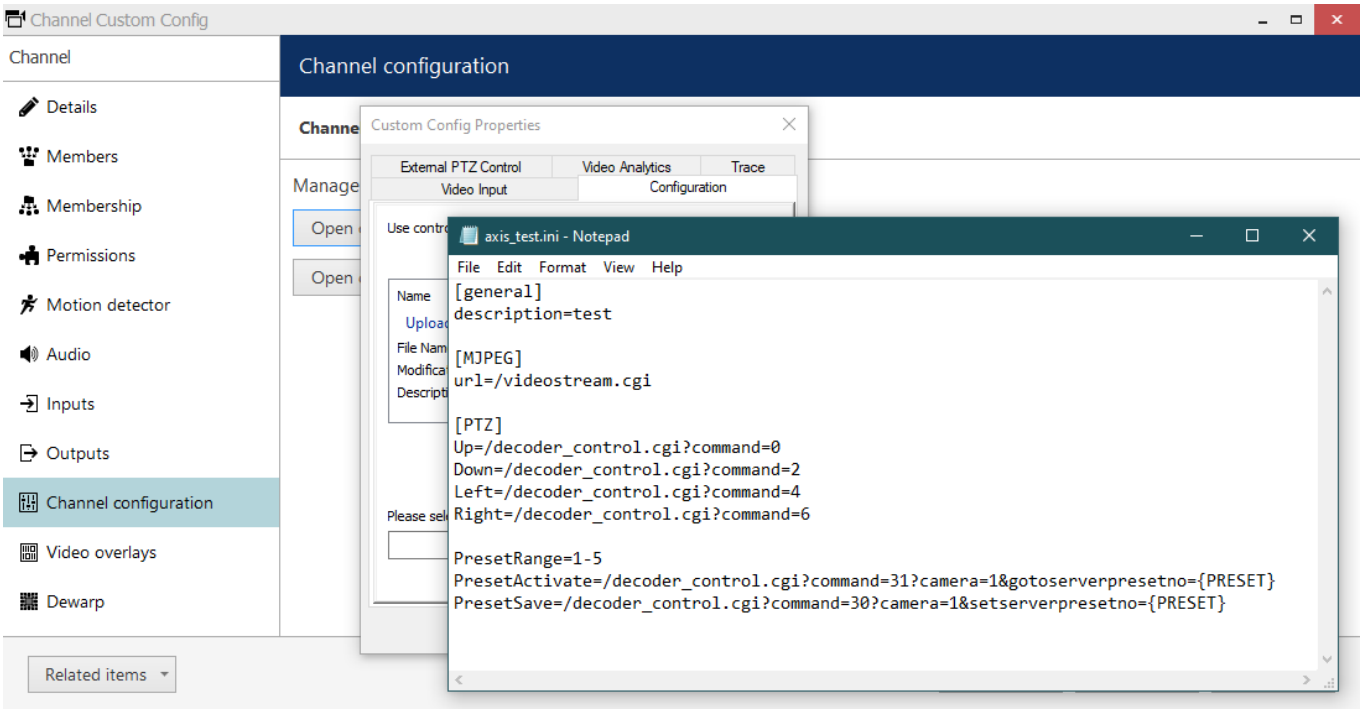

Custom config channel with a sample configuration file

JPEG/MJPEG driver is also similar to the generic RTSP driver, the only difference being that the transport here will use HTTP instead of RTSP. This model is rarely used, mostly for legacy devices not supporting RTSP/ONVIF.

ONVIF Driver

This driver can be used for all devices that are ONVIF Profile S conformant. By default, the *ONVIF Compatible* model is recommended (and it is also used when auto-detecting devices). It it does not work with older cameras, try the *ONVIF Compatible (legacy)* driver.

In device autodiscovery, this model will be used alongside with the native integrations: for not-yet-integrated brands/models, ONVIF model will be assigned wherever possible (i.e., if device responds properly to the ONVIF communication).

External Source

This device type is reserved for receiving streams from the Ganz CORTROL Mobile applications. Channels belonging to such devices are only counted by the license when the app streaming is active.

After adding this device, copy the *Code* from its properties to your Ganz CORTROL Mobile app to enable streaming from the app to the Ganz CORTROL server. You will find more details in the mobile app section of this document.

HTML Source

Choose this model to add streaming emulation from a **website** UI. The contents rendered from the specified URL will be displayed as a single, **static** (non-interactive) live **video stream**, with an option to record it. You can use this device driver for streaming from public services, monitoring web services, sites with dynamic contents etc.

Unlike for the generic RTSP driver (where you set the device IP and then add the RTSP URL in the channel properties), here you need to specify the full URL in the device settings at once. Channel properties for webpages will have a separate tab, *Web page configuration* (*Channels* > open channel for editing > *Web page configuration*).

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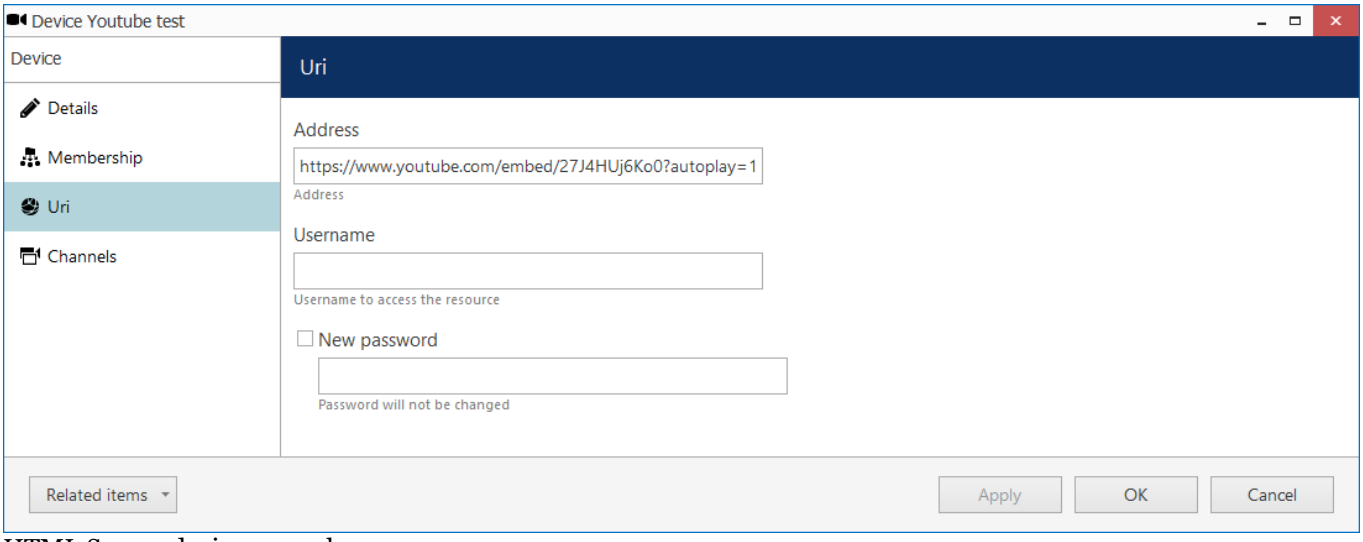

HTML Source device example

The device settings include full resource URL (mandatory) and username/password (optional, you only need to specify the user account is the target web service requires it).

As the webpage contents will be static in the Ganz CORTROL Client application, you need to take care of the contents transition. To force refresh contents from the Ganz CORTROL side, use the auto refresh parameter in the channel properties. In the example here with YouTube streaming, the video is looped by adding URL parameters; the final link will look as follows:

https://www.youtube.com/embed/VIDEOID?autoplay=1&mute=1&loop=1&playlist=VIDEOID - video added in such a way will be played on repeat indefinitely.

Please note that this type of device uses Ganz CORTROL **channel license** as any other regular IP camera.

CrossLink Devices

Two types of devices are available here: **interactive Web pages** and **interactive remote desktop** applications. Both are fully functional server-side devices that provide live and recorded contents. All interactive items require a special license type called CrossLink.

Models by Brand

Native device integrations are available for over 140 manufacturers and their 5000+ device models. This list includes cameras, NVRs, video encoders, and I/O modules. Models from this list are used when running device autodiscovery, and you can also use them when manually adding devices.

If you cannot find your exact device model in the list, try the closest available model: quite often, cameras within a series are intercompatible. Also, if you know the device's OEM brand, you can try models from that manufacturer.

Manage Devices

Device management is accessible via Ganz CORTROL Console *Configuration* section, by choosing the *Devices* category in the menu on the left.

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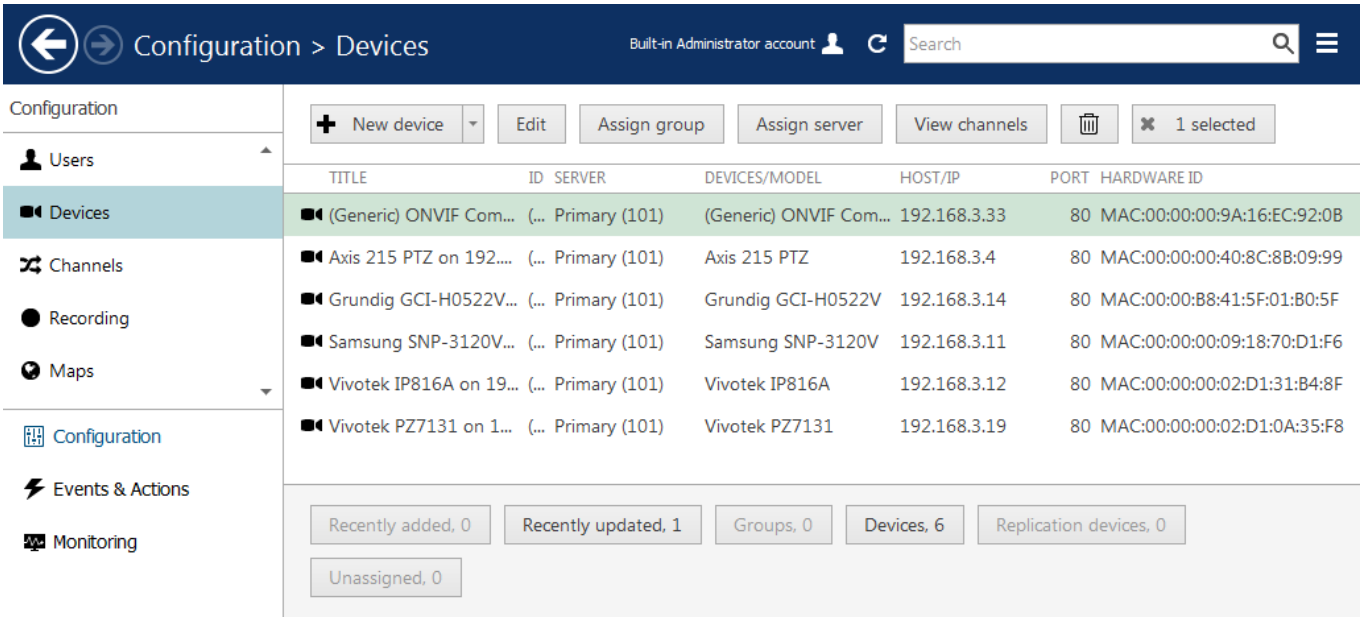


Configuration -> Devices

Upper panel items allow you to add devices automatically or manually, edit, view and remove them, as well as quickly assign groups and servers. Double-click any device to open it for editing; click *View channels* on the upper panel to open channel-specific controls in the same window. If device has multiple channels, all of them will be listed.

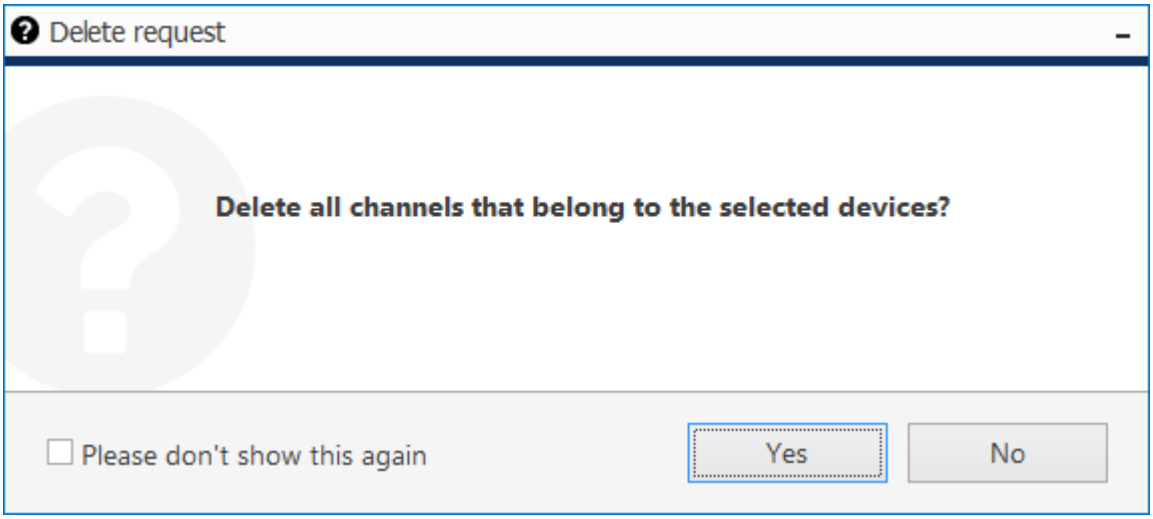
> If you have opened a device for editing but there is a need to **open** the associated **channel's properties at the same time**, use the *Related items* buttons in the bottom left corner of the *Edit device* dialog box.

Please refer to the *Add Devices Manually* section of this document for detailed description of all available tabs and settings.

Use bottom panel buttons to quickly filter recently added/updated devices, choose groups only or solely devices not assigned to any of the servers.

Remove Devices

To remove a device, select it in the item list and use the *Recycle bin* button on the upper panel to delete the target device. Use *Shift+click* or *CTRL+click* to select multiple devices, or *CTRL+A* to select all.



You can choose to remove all associated channels together with the device(s)

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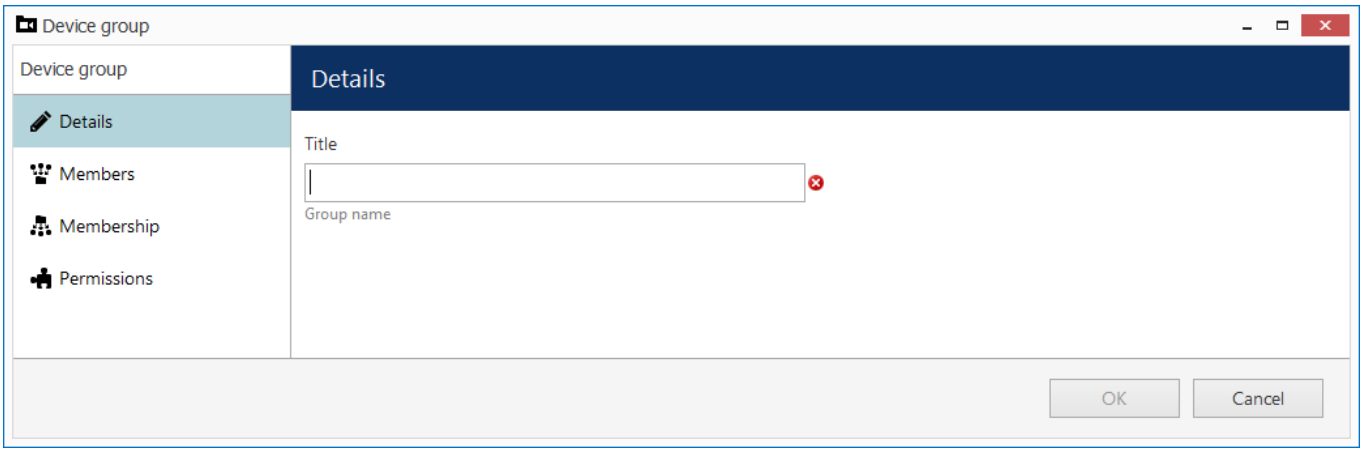
You will be offered to remove all the attached channels together with the device(s). Press *Yes* to delete the channels or choose *No* to leave the channels: they will appear as detached in the channel list then and you will be able to re-attach them to other devices, keeping the channel recording configuration. If you choose *Yes*, all existing shared channels based on the channels of the target device will be removed automatically as well.

> ⚠ If you try deleting a device that has **associated rules** in the Event & Action Configurator, you will get a warning dialog box with those rules listed. You can either proceed with removing the target device, its channel(s) and its rule(s), or cancel the deletion.

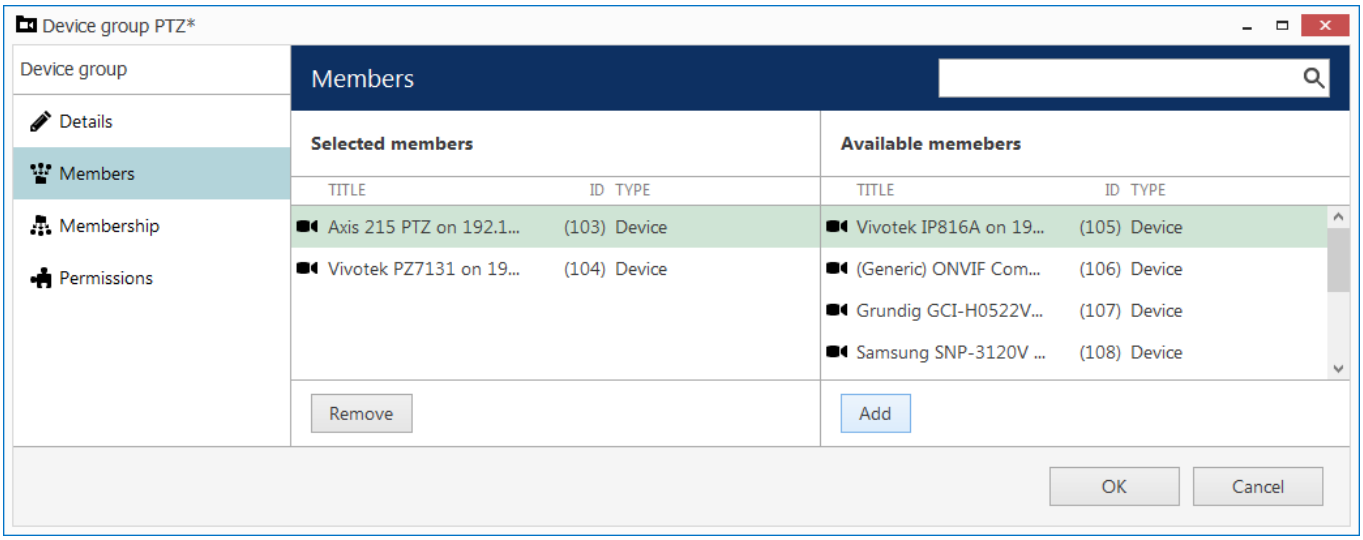
Add Device Groups

As with other resources, devices can be grouped together for easier management. Click the little arrow near + *New device* button and select *New device group*.



Device group details

Enter a name for the device group in the *Details* tab, then switch to the *Members* tab and choose devices to join this group. Double-click items or use the *Add/Remove* buttons below to select and deselect devices.



Device group members

In the *Membership* tab, you can select 'higher' level groups to contain this device group (nested architecture).

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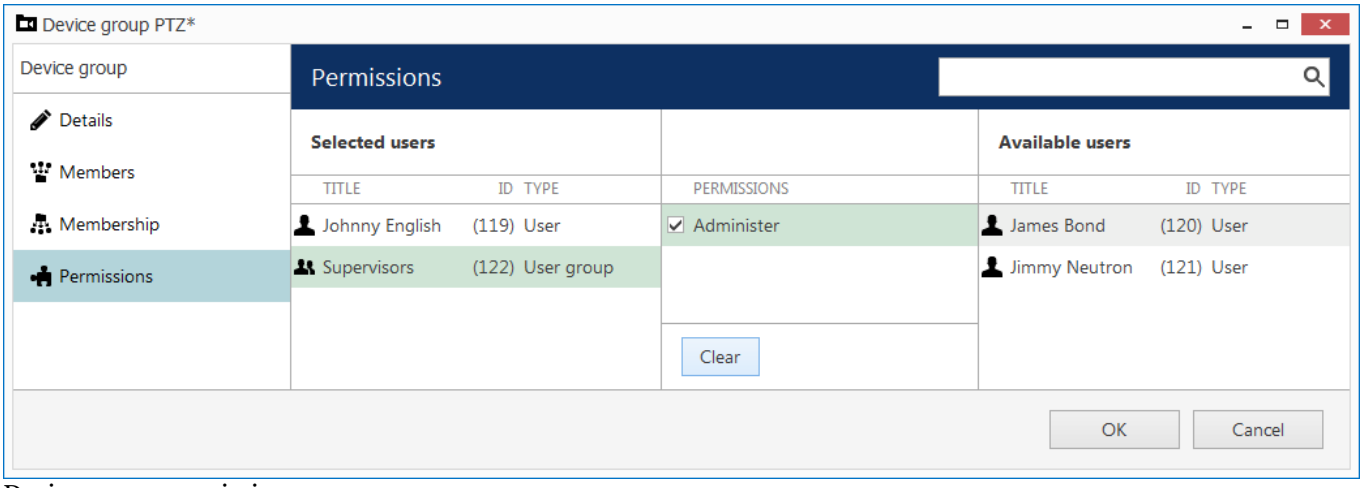


Device group permissions

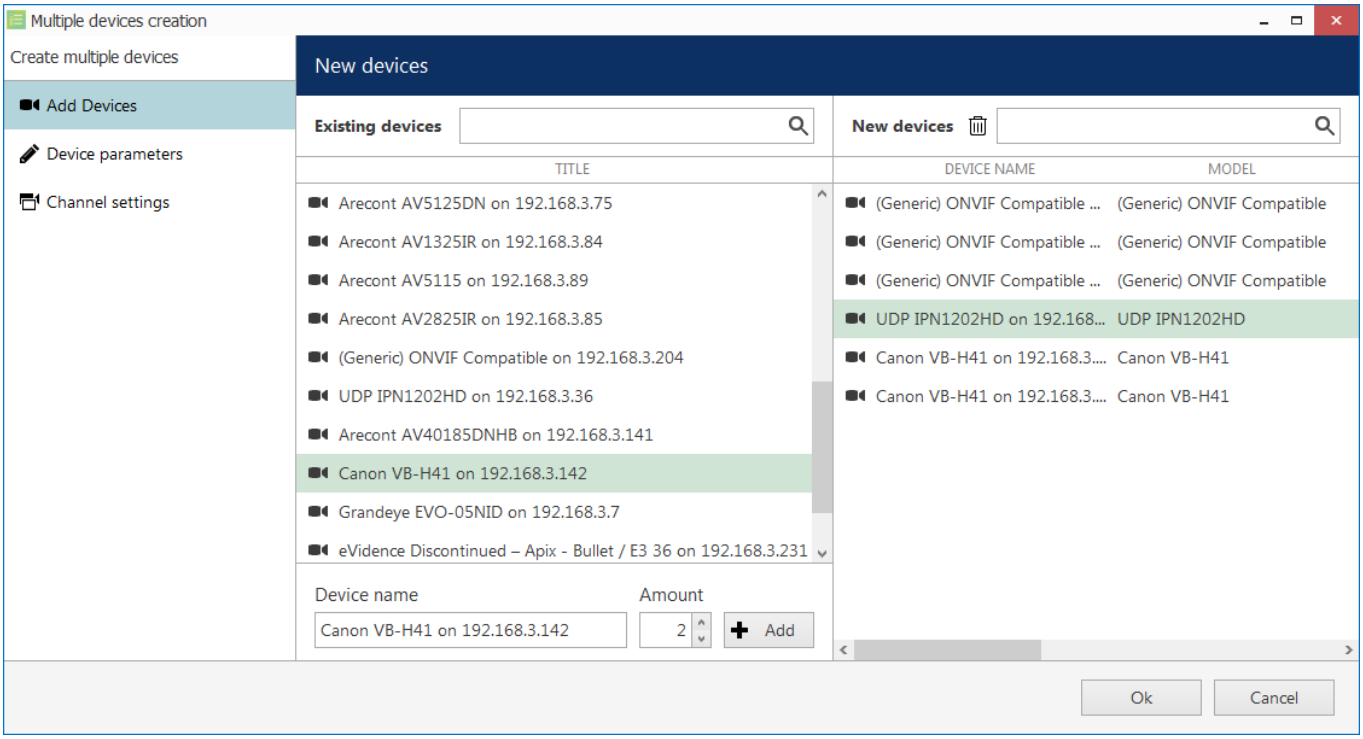
Finally, open the *Permissions* tab to assign user privileges for this device groups: check at least one permission to select the user or user group, uncheck all or use the *Clear* button below to deselect. When you have finished, click *OK*; the newly created group will then appear in the item list.

Double-click any group to open its contents in the same window; use the buttons on the upper panel to edit/remove it. Click *Edit* to adjust group settings: procedure is similar to that of creating a new device group.

Copy Device*

*Feature is subject to license limitations and may be **unavailable in some software editions**.

Starting from the Ganz CORTROL version 1.11.0, it is possible to **copy an existing device** and its channel(s). To copy a device, click the little arrow next to the + *New device* button on the upper panel and choose *Create copy* from the drop-down list. The related channel(s) will be copied automatically.



Copy one or multiple devices

In the dialog box that appears, you can create one or multiple copies of any device(s) currently present in the Ganz CORTROL server configuration. In the list on the left, all existing devices will be listed; in the list on the right, your copies will appear.

First, choose the source for the copy in the *Add devices* tab:

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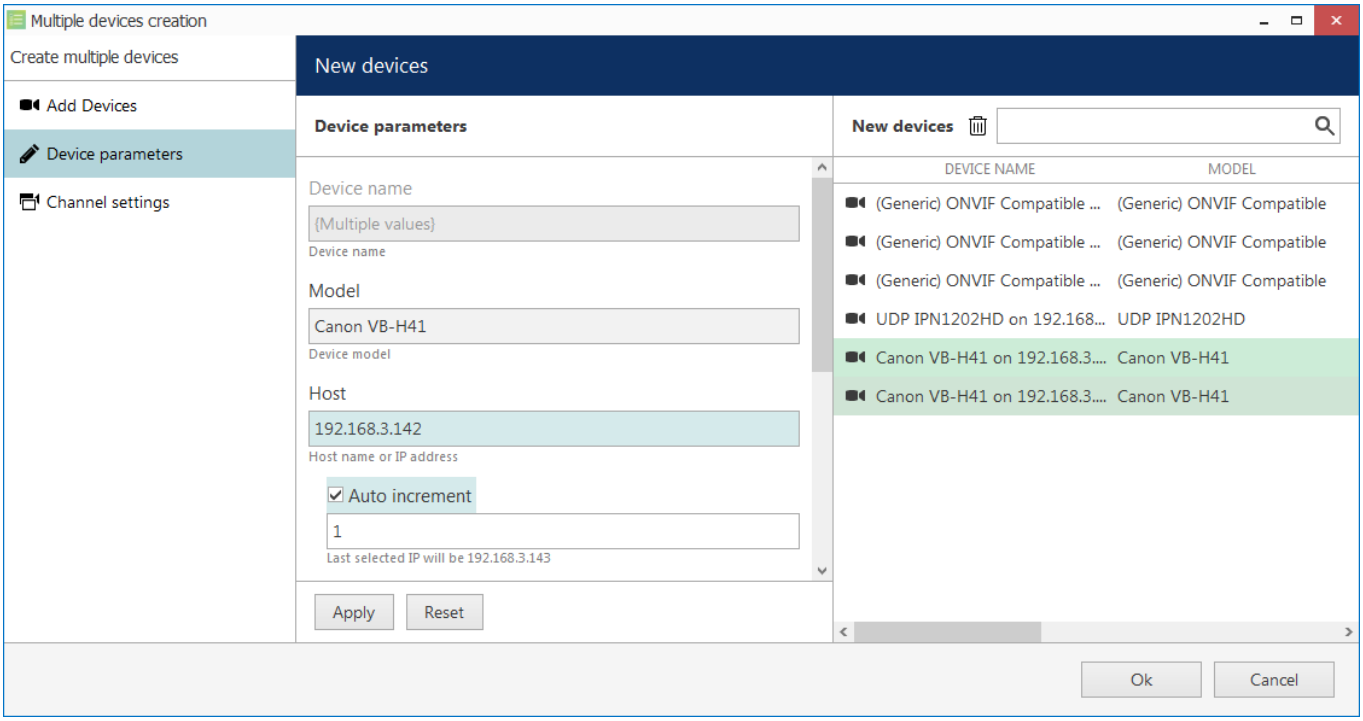
- select one of the existing devices in the list on the left (a single device can be selected at a time),
- set the number of target copies below,
- when ready, click the + *Add* button to **create** the selected copies,
- repeat previous steps with other devices, if required.

To add a single device copy, you can simply double-click it in the list.

Use the search fields on top of the lists to find the necessary item in a long list. If you no longer wish to add any of the created copies, you can select multiple items using *CTRL+left click* or *Shift+click* and **remove** them using the *Recycle bin* icon above.



Change parameters of the target copies

In the *Device parameters* tab, you can adjust:

- the **name**(s) of the target copy (copies),
- their **IP addresses**, with an option to select multiple with CTRL+left click and then assign a range of IP addresses using auto increment with the specified step,
- HTTP **port** and **user credentials.**

After you have altered any settings here, do not forget to hit the *Apply* button to **save** them, otherwise the changes will be discarded when you deselect the device(s) or switch to a different tab. Use the *Reset* button to **roll back** to the original settings (this works if you have not applied the settings yet).

Note that, at this step, the new device **model** remains the same as the source device model and it cannot be changed at this point. This is necessary for the Ganz CORTROL engine to successfully create a duplicate. You will be able to change the model later via editing the desired device.

The same applies to the **server** where the device is attached: at the moment of cloning, the new devices are created on the same server. If you are using Ganz CORTROL Global, you will be able to move the devices to a different server after you have added the copies by editing the target device(s).

In the *Channel settings* tab, the only available parameter at this point is the **channel name**. You will be able to edit other settings after creating the copy (copies) by editing the target channel(s).

When finished with the settings, click the *OK* button to **save** your newly created device+channel copies. They will be automatically added into the server configuration database.

⚠ After you have added new devices using this method, please allow **some minutes** for the configuration to be saved. After that, you will be able to change the newly created device and channel settings.

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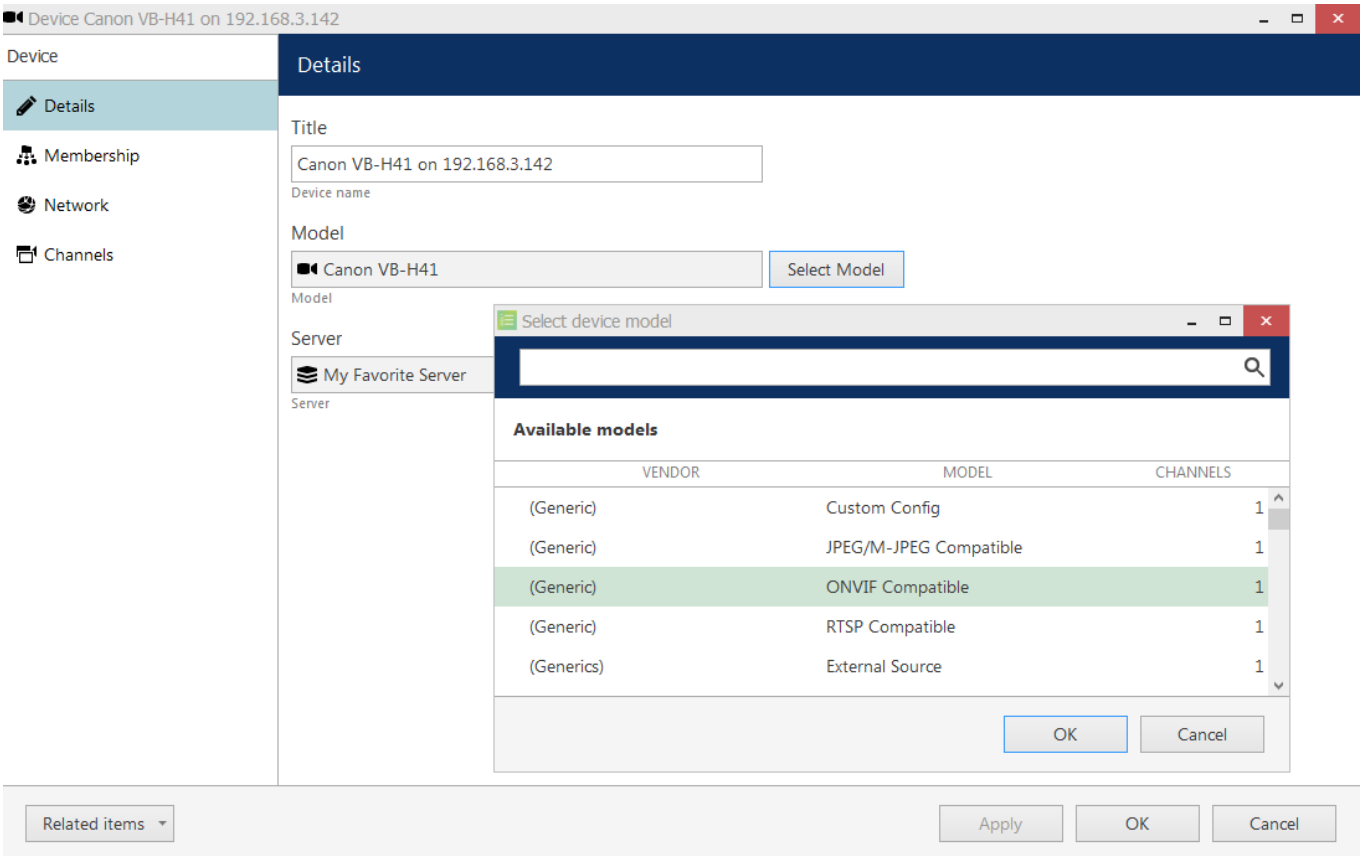
The associated **channel**(s) will be added **automatically** with all the existing settings, including the assigned recording configuration.

Replace Camera

In the Ganz CORTROL versions up to 1.11.0, it was impossible to alter the device model, so a special procedure was foreseen if the camera needed a replacement.

Now, if you replace the hardware, you can simply **change the device model** by opening the target device for editing - either by double-clicking it in the device list, or by using the *Edit* button on the upper panel. Note that, when you change the model of an existing device, you will only see model suggestions with the **same number of channels**, and not the whole list of available devices.



Change the device model

To quickly open the associated channel settings without closing this dialog box, use the *Related items* button in the bottom left corner.

> ⚠ When you change the device model, all the **channel settings** that are configured via *Channel properties* dialog box are **discarded**. These settings include video stream properties, audio, DI/DO etc.
>
> Channel settings that are **preserved** are: motion detection, dewarp, data source, user permissions and recording configuration.

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5.4 Configure Channels

Channels are contents received from physical devices attached to the system. Several channels can originate from a single device - in the case of multichannel devices, i.e., capture boards, but single channel can only be attached to one device at a time, as it makes no sense for a video stream to come from two cameras at once. Channels are created automatically at the same time as the source device but can later be detached and attached to different devices.

Channels include the video stream configuration settings - resolution, frame rate, bit rate and others - as well as all supplementary data streams, such as audio, motion and digital input/output events, PTZ control and camera-side analytics information. Recording configurations are assigned to channels. Finally, channels are displayed in Ganz CORTROL Client and other clients.

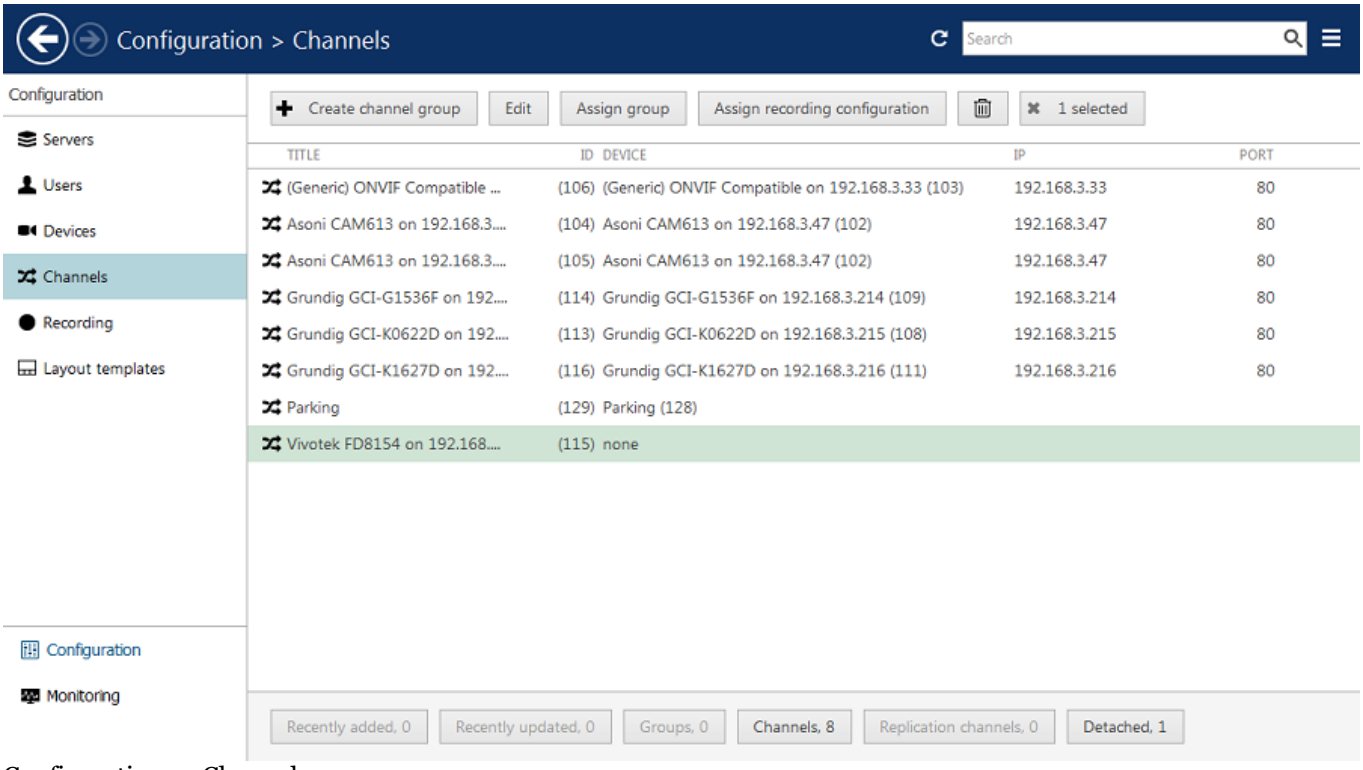
To access the channel configuration dialog box in the Ganz CORTROL Console, open the *Configuration* section and select *Channels* from the menu on the left side. Use the filters on the bottom panel to quickly access specific channel sets.

The upper panel buttons enable you to create new items in this category, as described below, and perform channel-specific actions, such as editing, assigning groups, assigning recording configuration and deleting selected channels. To select multiple items, hold *CTRL* or *Shift* and click items in the list.

⚠ Channels currently **bound to devices** cannot be deleted: the recycle bin button will only appear when detached channels are selected. To **remove a channel**, go to *Devices*, open properties of the target device and disengage the channel on the *Channels* tab by clicking the *Detach* button; also, you will be offered to delete all associated channels when you remove the device itself - this will also remove any existing shared channels.

⚠ Channels that have any associated **rules** in the Event and Action Configurator **cannot be removed**. If you try deleting such a channel, you will get an error saying *The channel cannot be removed because it is in use*.

In order to remove such a channel. you need to delete the rules related to it first. To do so, just go to the *Events & Actions* section, choose *Rules* in the menu on the left, select the target server and open the configurator, then remove the necessary rules from the central column by using the < and > buttons.



Configuration -> Channels

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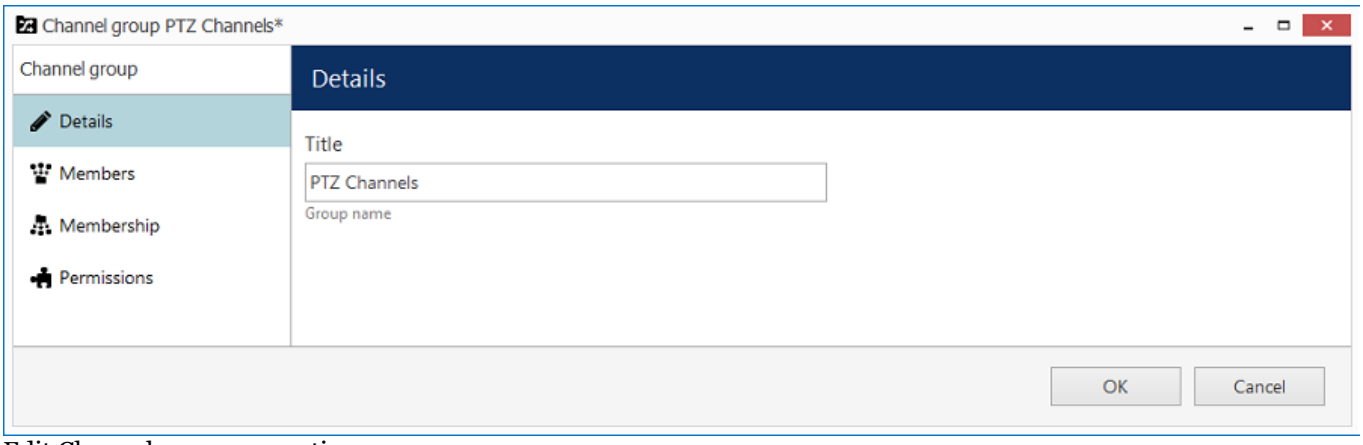
All available channels and channels groups will be listed here. The upper panel offers a range of configuration opportunities.

Create Channel Group

Channel groups can be added for easier management in Ganz CORTROL Console; by default, there exist no built-in channel groups. Click + *Create channel group* button to bring up the corresponding dialog box.

Enter the group title here, select channels to be group members and select higher level group(s) to contain target group as a member, if desired. Set user permissions for channels in this group.



Edit Channel group properties

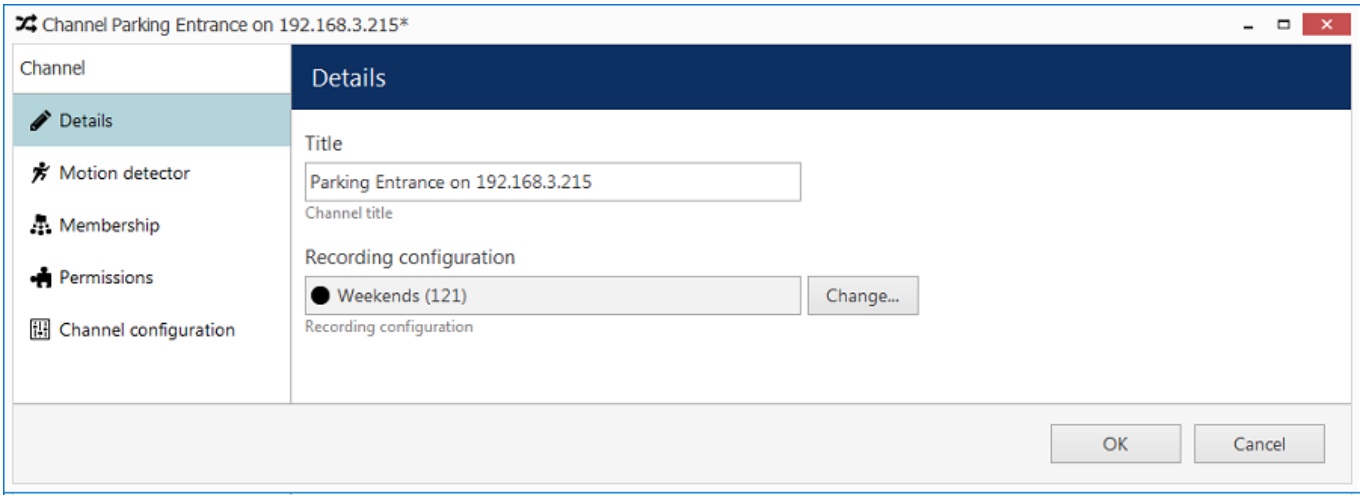
Click *OK* when you are ready: newly created group will appear in the item list.

Edit Channel Group

Double-click any existing channel group in the list or use the *Edit* button in the upper panel to bring up the configuration dialog box. Available options are analogous to the ones displayed during group creation time.

Edit Channel

Channels are automatically created together with each newly created device; it is not possible to create a channel separately. Click any channel in the list twice or use the *Edit* button on the upper panel to manage the channel properties.



Edit channel properties

The configuration dialog box enables the following changes:

- **Details tab:** change channel title and assign recording configuration
- **Members tab:** bind user buttons to channels so that they appear together in the Ganz CORTROL Client
- **Membership:** make the channel a part of a channel group or a visual group

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- **Permissions tab:** grant channel access permissions to users and user groups
- **Video file configuration**: settings for the generic video emulation driver: main and substream file path and delay between frames
- **Motion detector* tab:** choose between a camera-side or software-side motion detector, default state is disabled
- **Video analytics**: server-side video analysis configuration
- **Audio tab:** combine current channel with audio from another source
- **Inputs/Outputs**: DI/DO settings
- **Channel configuration:** open an additional channel configuration dialog box to manage video stream settings, frame adjustments and DI/DO
- **Video overlay:** configure different overlay elements, e.g., textual contents received from data sources
- **Dewarp tab:** select dewarp profile for fisheye and Panomorph lenses
- **Video configuration**: main and secondary stream adjustment (for newer device drivers)
- **RTSP configuration**: RTSP port and transport selection (for newer device drivers)
- **Edge configuration**: configuration of edge (device-side) synchronization (for newer device drivers)

Please refer to the Channel Settings topic for detailed description for each of the tabs.

*Motion detector on the software side has two options: **high performance** and **high accuracy**:

High Performance mode: this type of analysis is performed for only key frames whose frequency can vary from several frames per second to one frame every few seconds - this is less sensitive for picture quality, but greatly affects detector operation. CPU consumption is significantly lower due to this, and it can be additionally reduced by increasing time interval between two analyzed frames.

High Accuracy mode: this mode performs motion analysis for the whole video stream, so we recommend selecting this option when you want to achieve best detection results. The lower time interval means higher precision. Keep in mind that CPU and virtual memory usage is much greater if this mode is selected.

If you have opened a channel for editing but there is a need to **open** the associated **device's properties at the same time**, use the *Related items* buttons in the bottom left corner.

Live Channel Preview

After a device and its associated channel has been added to the configuration, it is vital to check if the actual video is received. There are several methods to do this in Ganz CORTROL Console:

- click the *Show video* button on the upper panel in the *Configuration* > *Channels*: you can switch from main to the secondary stream and back
- go to the *Monitoring* section > *Channels* and check the channel status
- open the target channel for editing and go to *Dewarp* or *Data source* settings

Assign Group

Channel membership can be managed via the channel properties dialog box. To quickly assign group to any of existing channels, select desired channel(s) (use CTRL+click or Shift+click to select multiple items) and click *Assign group* button on the upper panel.

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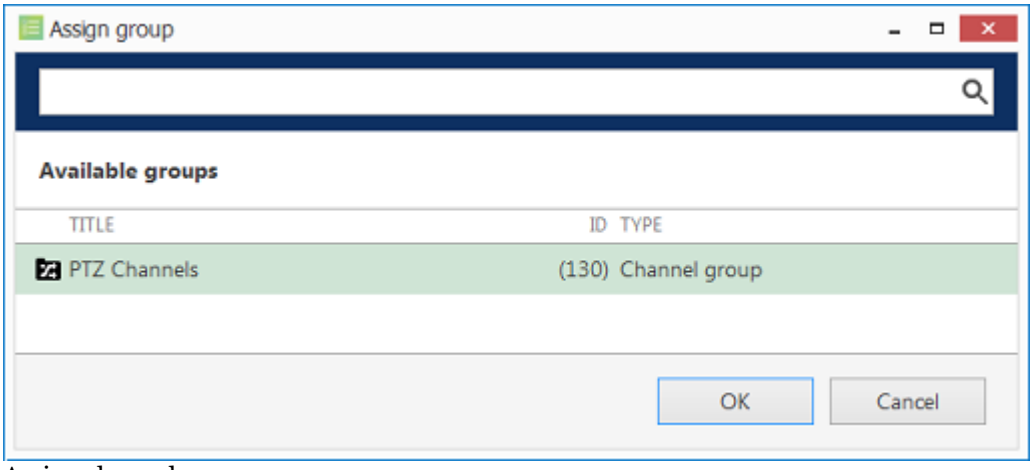


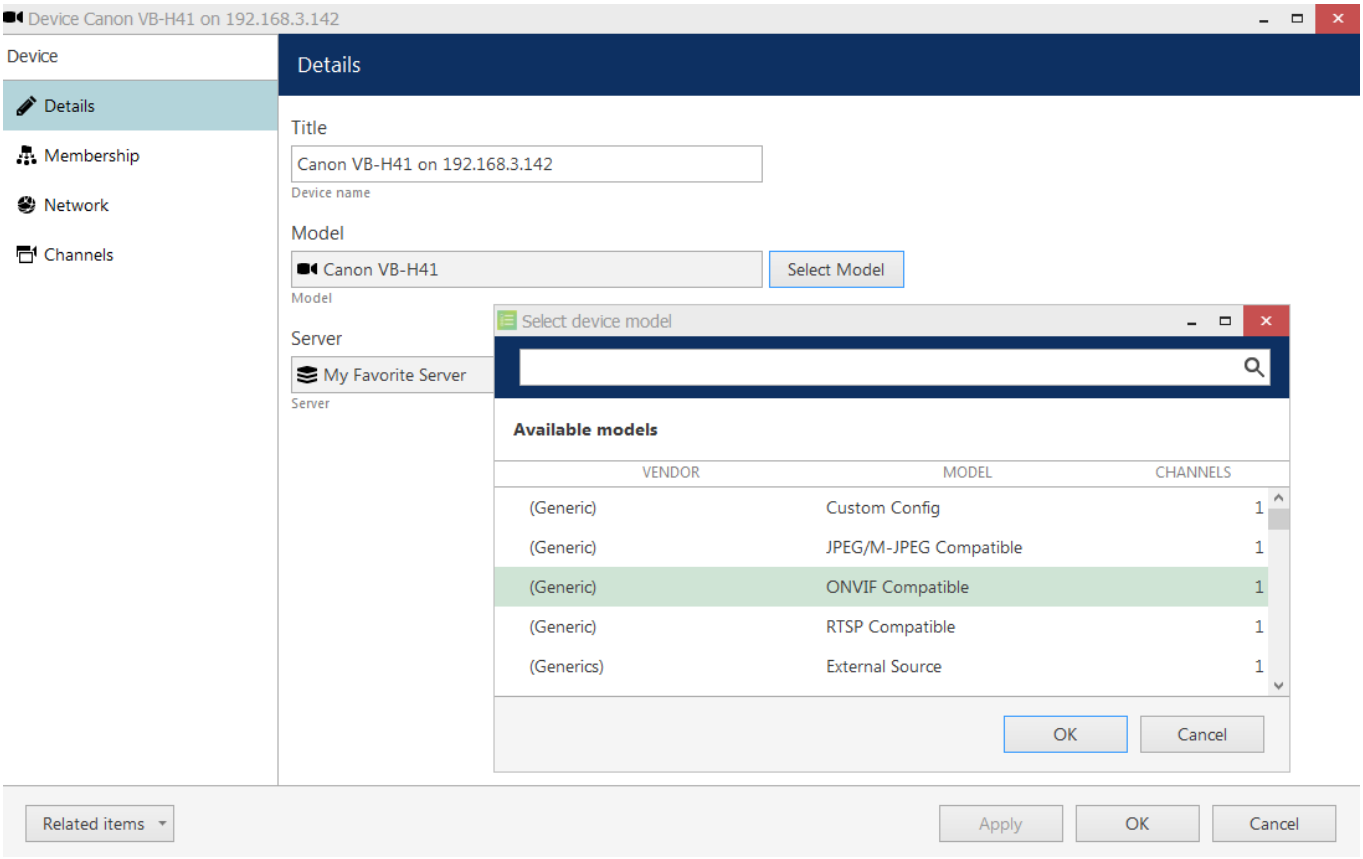
Assign channel group

Pick a group from the existing channel groups' list and click *OK* to save. If any of the channels already belonged to some group, it is not a problem: membership in multiple channel groups is allowed.

Replace Camera

In the Ganz CORTROL versions up to 1.11.0, it was impossible to alter the device model, so a special procedure was foreseen if the camera needed a replacement.

Now, if you replace the hardware, you can simply **change the device model** by opening the target device for editing - either by double-clicking it in the device list, or by using the *Edit* button on the upper panel. Note that, when you change the model of an existing device, you will only see model suggestions with the **same number of channels**, and not the whole list of available devices.



Change the device model

To quickly open the associated channel settings without closing this dialog box, use the *Related items* button in the bottom left corner.

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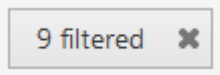
⚠ When you change the device model, all the **channel settings** that are configured via *Channel properties* dialog box are **discarded**. These settings include video stream properties, audio, DI/DO etc.

Channel settings that are **preserved** are: motion detection, dewarp, data source, user permissions and recording configuration.

Other

Select one or multiple channels/channel groups and click the *Disable* button on the upper panel to deactivate target items. **Disabled** channel contents will not be requested from actual physical devices, and, as a consequence, will not be recorded; neither will they be displayed in the Ganz CORTROL Client application(s).

The filter panel at the bottom enables you to view recently added/updated items, as well as other relevant filters. The filter that is currently active is highlighted blue: click the *N filtered* button to reset all filters and display all the available items again.



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5.5 Channel Settings

Double-click a channel or use the Edit button on the upper panel to open the channel settings.

> Channels with the same device driver (e.g., ONVIF), can be edited **together**. You can select multiple channels by holding CTRL and then open the settings dialog box.

The channel configuration dialog box has several setting categories; these are described in details in this topic. As you move across the tabs and alter the configuration, the tabs containing **unsaved changes** will be marked with an asterisk (*).

Some of the tabs are present for all channels. Other tabs only appear for special driver types (e.g., Web page, Video emulation etc.).

Details

Here you can change the channel title and assign recording configuration. Available fields:

- **Title**: user-defined cannel name, as it will appear in Ganz CORTROL Console and Ganz CORTROL Client applications
- **Main stream recording configuration**: choose how the first video stream (usually, higher resolution) will be recorded
- **Main stream storage**: destination storage for this stream (may differ from other streams)
- **Substream recording configuration**: choose how the second video stream (usually, lower resolution) will be recorded
- **Substream storage**: destination storage for this stream (may differ from other streams)
- **Edge stream recording configuration**: choose how the edge stream will be recorded, if used (available for ONVIF Profile G conformant devices and also for offline recordings made by Ganz CORTROL Mobile)
- **Edge stream storage**: destination storage for this stream (may differ from other streams)
- **Record supplementary streams with substream***: if enabled, the selected auxiliary data streams will be stored with the substream
    - *Audio*: incoming sound track
    - *VCA*: video analytics metadata
    - *Motion*: motion detector data
    - *Data*: data from data sources (serial text like POS etc.)
- **Video lost time**: the amount of time in seconds for Ganz CORTROL to wait after all channel's video steams disappear and before triggering a *Video loss* event
- **Recording identifier** (only displayed if *Show object IDs* option is enabled in the application settings): unique channel identifier that is used as its folder name in the archive

If you enter a custom **title** for a channel, a special button on the right side will allow you to revert to the device title with a single click.

*By default, all **supplementary data streams** are stored with the main stream, and the secondary stream is recorded is video only. However, if you wish to keep the secondary stream for a longer period (e.g., 7 days for the main stream and 30 days for the substream), you may wish to keep the data streams with the substream so that these tracks are available when you play back the archive. Otherwise, the supplementary data will be erased with the main stream based on the quotas. This setting is also useful when you use different storages for both streams and it is crucial where the supplementary data goes.

> Each of the supplementary data streams - audio, MD, metadata, and serial data - can only be recorded **once**: either with the main or with the secondary video stream. None of these streams are copied. Thus, for example, if you keep the substream longer than the main video stream, you may want to record the audio together with the secondary stream.

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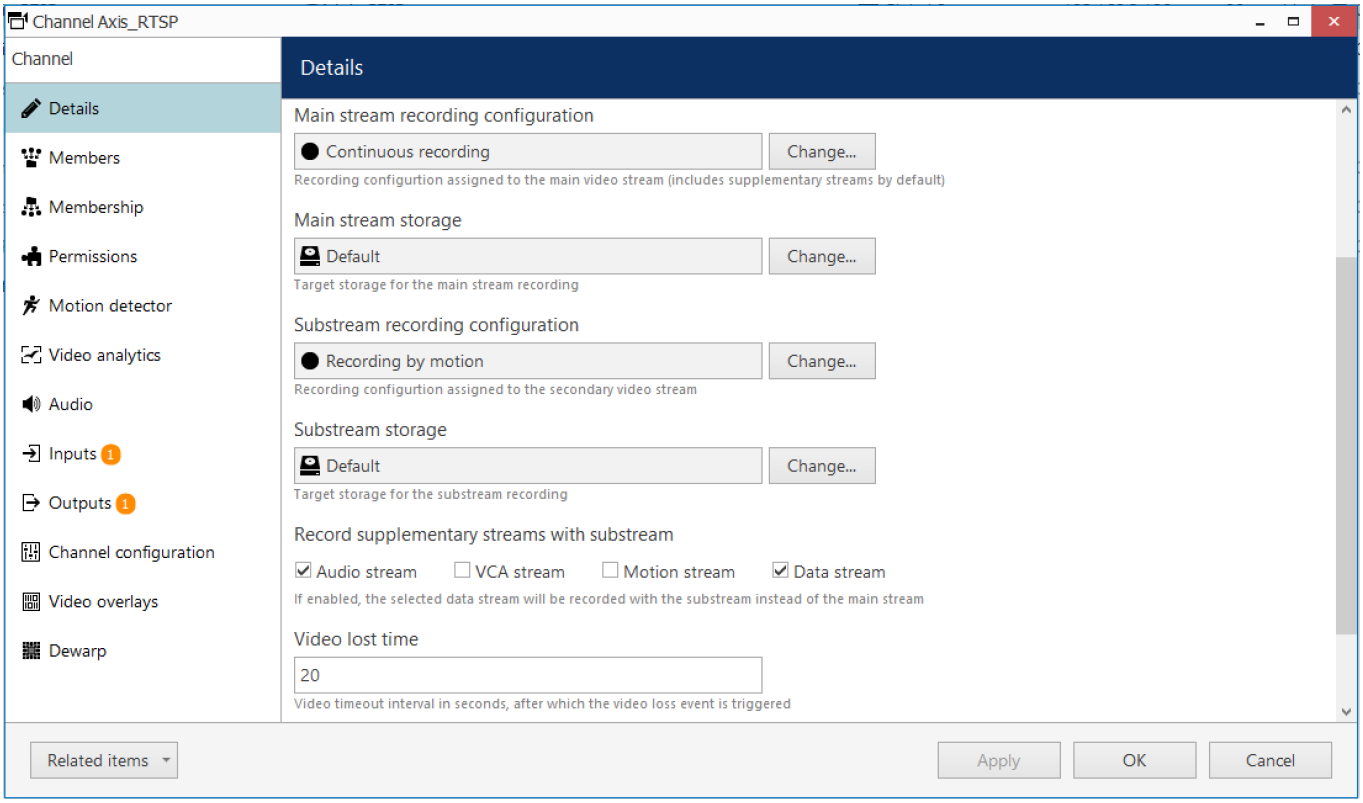

Channel details

You can either use the *Default* storage category for all target streams, or use different storages for different streams. The latter can be used for manually distributing streams between different directories:

- storage directories are marked with the relevant storage profiles (e.g., *Main*, *Substreams*, *Edge*),
- each channel and even channel's streams are then assigned different storages.

To choose a storage profile that is not *Default*, select a storage from the *Directories* list and click the *Change* button.

Click the *Change* button to choose the recording configuration: you can pick an existing configuration or create a new one, or a schedule on the spot from the same dialog box.

⚠ Please choose *Continuous Recording* configuration for **edge** streams to ensure proper recording.

When you assign a **motion-based recording configuration** to a channel with a disabled motion detector, the software will automatically suggest enabling motion detection for the target channel. The camera-side detector is given priority; if it is not available, the software-side detector will be enabled and set to the high-performance mode. We recommend that you **review** the motion detector settings to make sure it operates as desired, especially if the camera-side detector is in use.

Note that if you leave motion detection OFF and assign motion-based recording configuration to the target channel, no data will be recorded.

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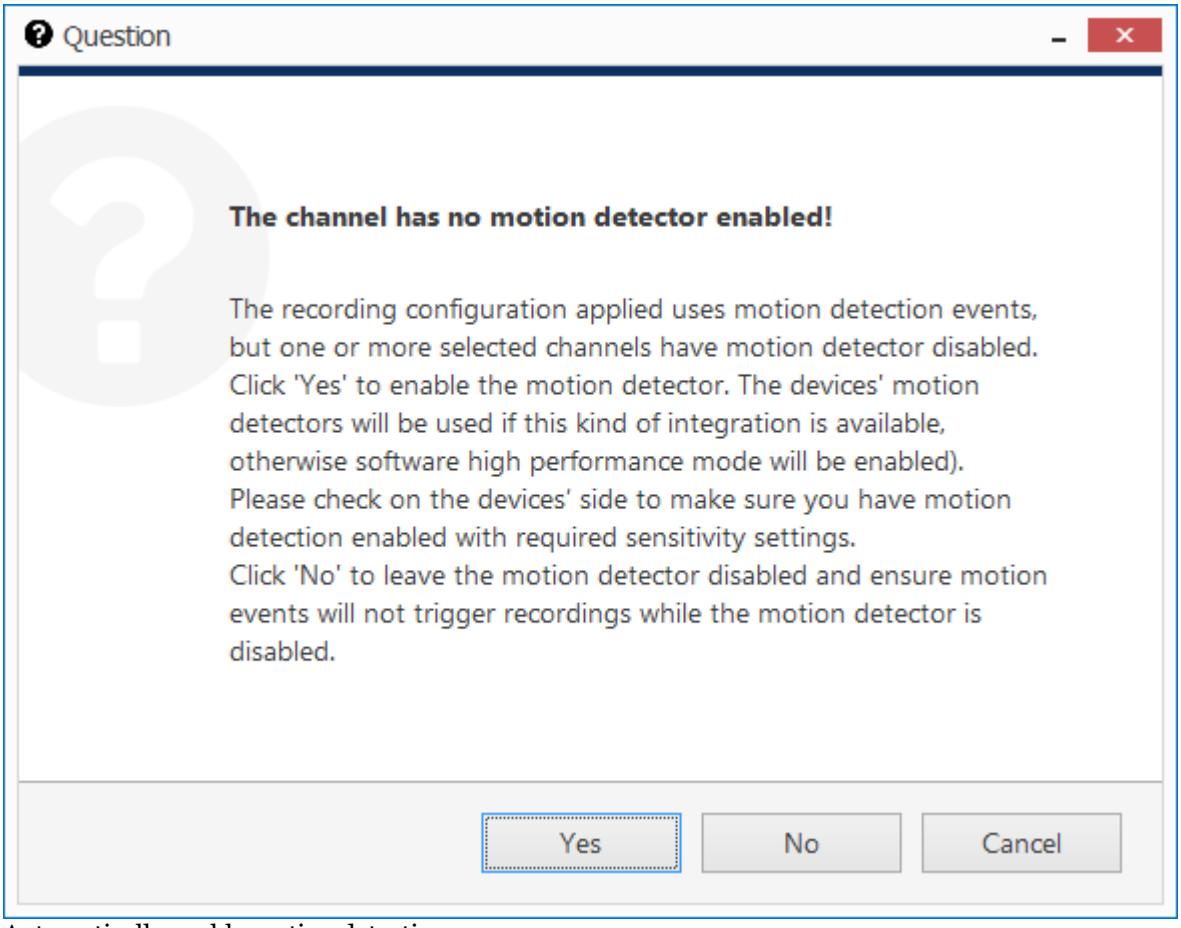
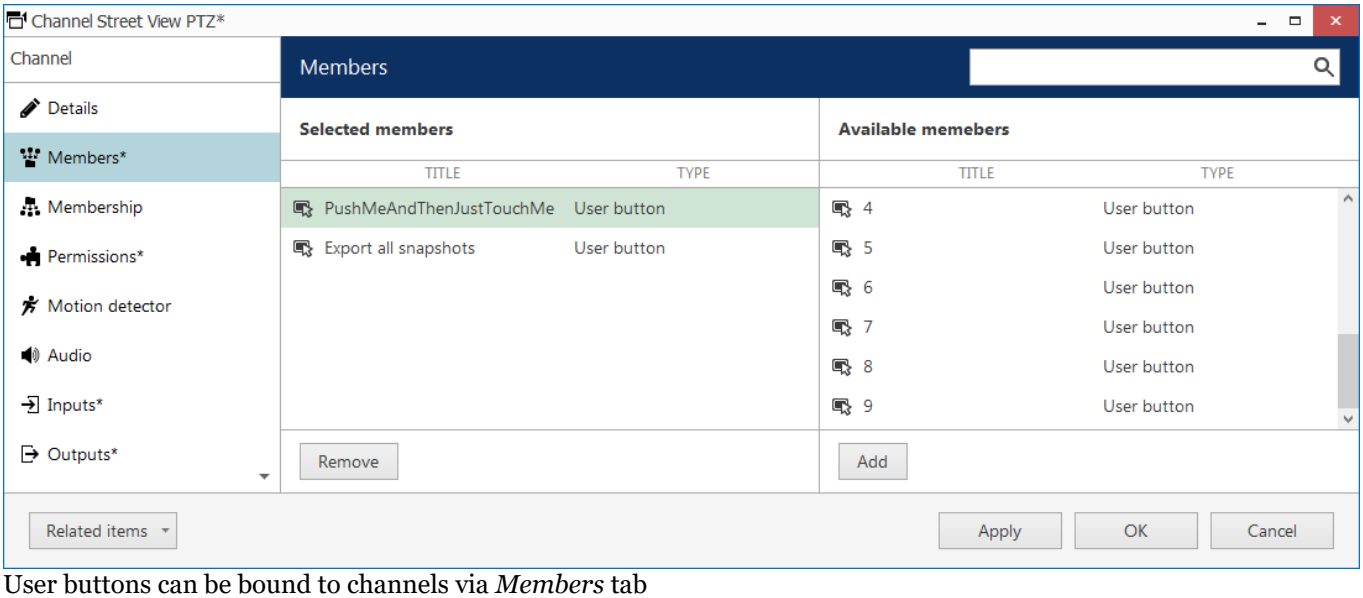


Automatically enable motion detection

Members

This section allows you to attach user buttons to channels, so that they appear together in the Ganz CORTROL Client application. User buttons bound to channels in this way will appear as video overlay controls when the target channel is placed into a viewport.

If you are editing a channel group, this tab will allow you to put other channels and channel groups into the target group.



User buttons can be bound to channels via *Members* tab

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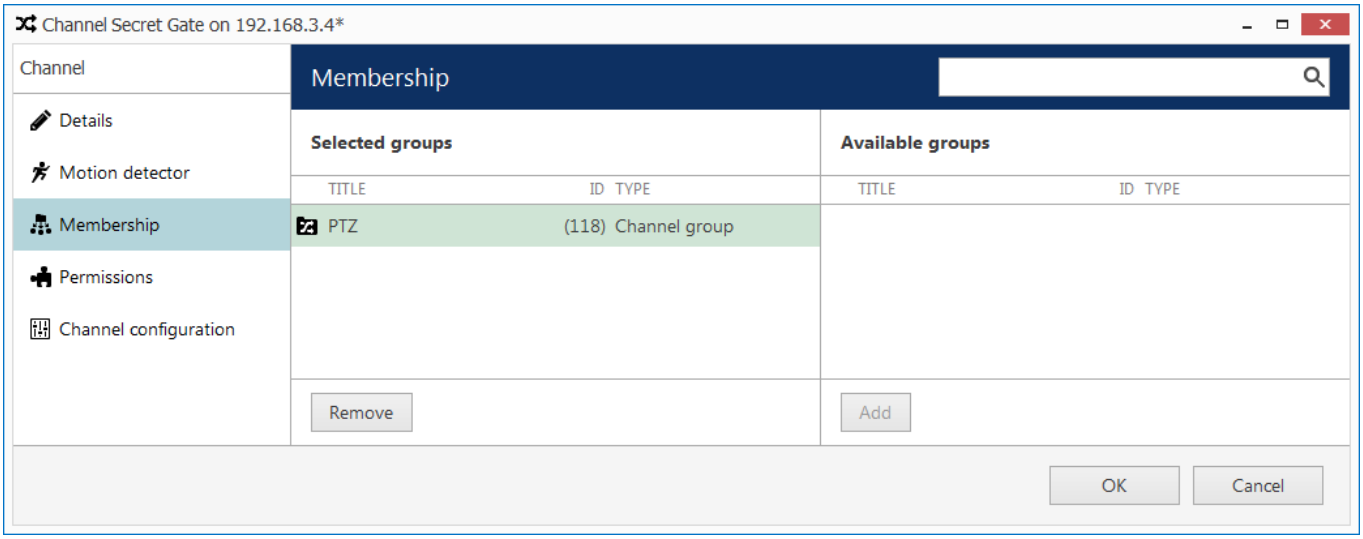
Membership

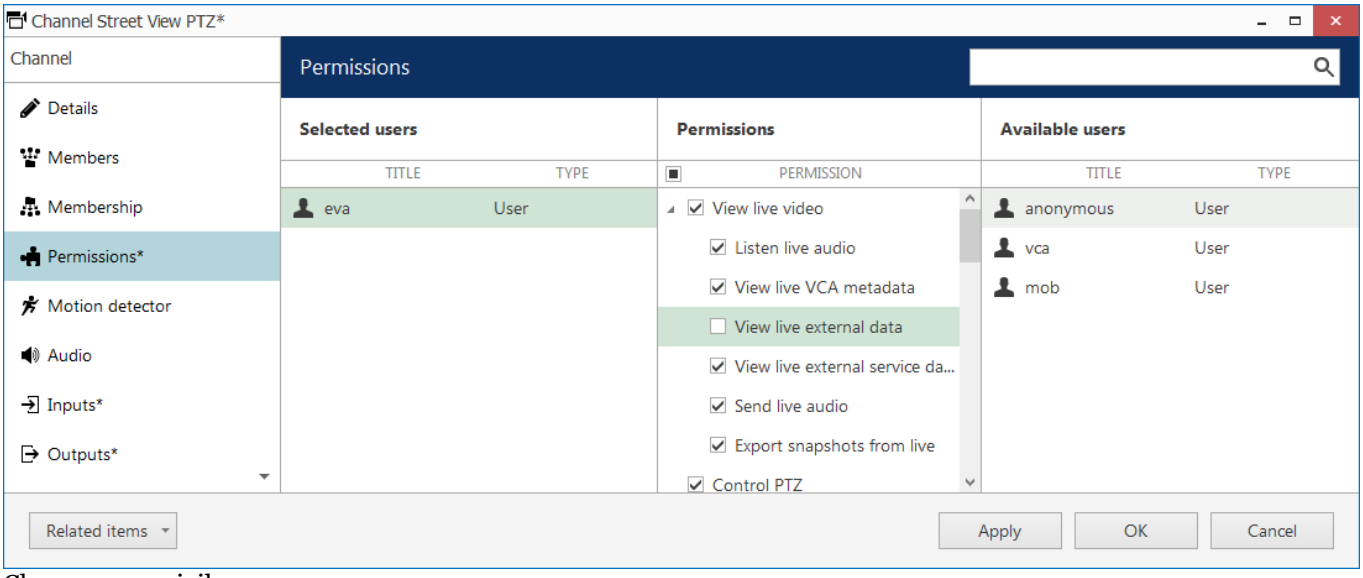
Choose the group(s) you want to contain the target channel as a member: double-click the relevant items or use the *Add/Remove* buttons below to select/deselect. You will have both channel groups (internal in Ganz CORTROL Console) and visual groups here.



Choose channel membership

Permissions

Allow users and user groups to access and administer the target channel. To **add** a user or user group, simply select at least one permission, and the user (user group) will be automatically moved to the *Selected users* list. To **clear** all permissions, double-click the user in the left-hand column. You can also use the **checkbox** next to *Permissions* in the central column to toggle between **all/none** (if not all permissions are selected, the checkbox will be filled with a black rectangle).



Change user privileges

Webpage Configuration

This kind of tab will only appear for Crosslink channels and channels bound to devices with the *HTML Source* model (generic model specifically dedicated to static streaming from web), and will affect both live and recording.

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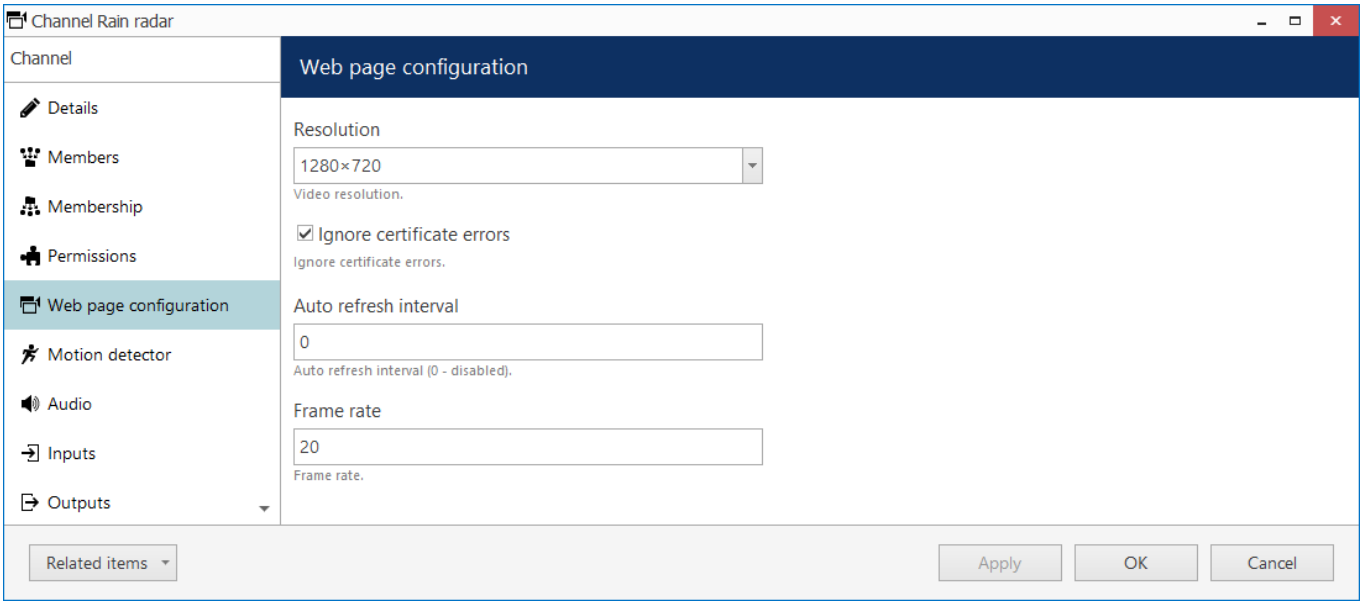


Web page properties

The following settings may be available here are:

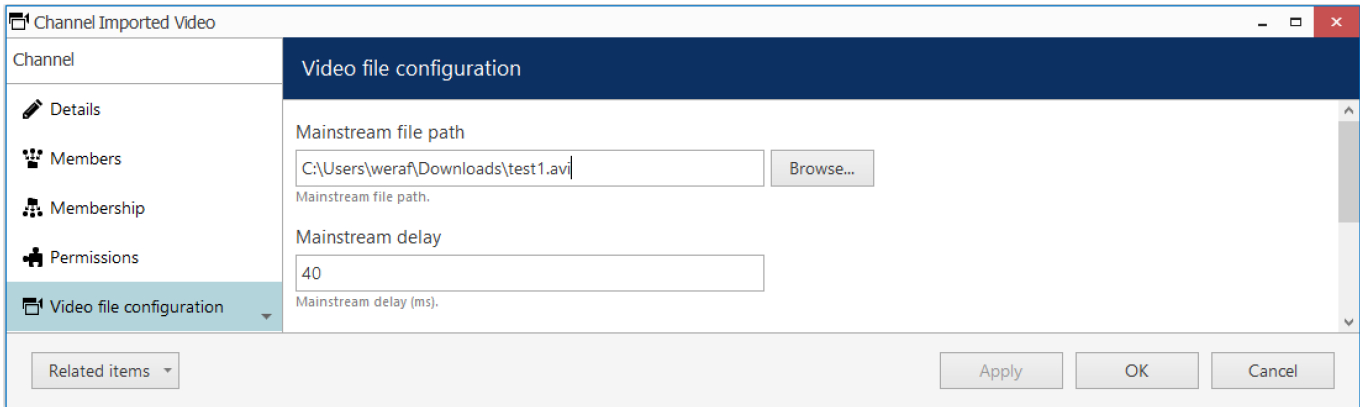
- **Ignore certificate errors**: if the target webpage has a self-signed certificate, the built-in browser may be unable to open it; choose this option to prevent certificate-related issues (unsafe but more likely to operate)
- **Auto refresh interval**: if the page contents is not dynamic (i.e., does not refresh itself), define a refresh period in seconds here (0=disabled, for dynamic contents)

Resolution and frame rate settings have been moved to the *Video configuration* tab.

Video File Configuration

This tab only appears if the underlying device is of the *(Emulation) Video File* type. Here, you can specify the paths to the video streams that will act as main and secondary stream.

Click the *Browse* button to choose the file using Windows Explorer.



Video file properties

For both streams, you can adjust the frame delay: this will affect the speed of the video.

Motion Detector (MD)

Choose between **camera-side** or **software-side** motion detectors (MD). The default detector state is *disabled*, meaning that no motion information is received or passed for recording for the target channel. If you are using motion-driven recording profiles, make sure to enable motion detection for the selected channel(s).

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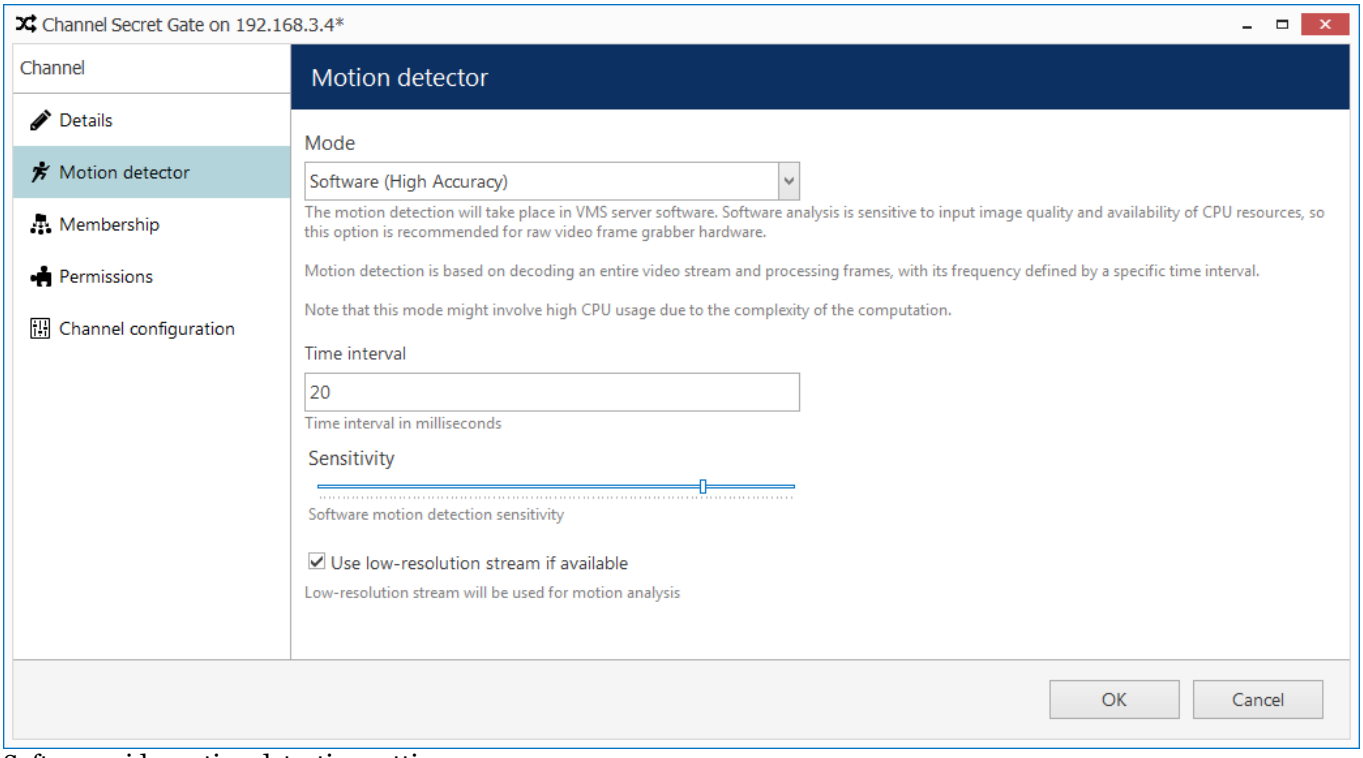
⚠ When selecting **camera-side motion detection**, make sure to go to device Web interface to enable and configure motion detector. Settings may vary depending on device manufacturer; also, check with CBC AMERICA LLC to make sure hardware motion detection is supported for the target device.

Camera-side motion detection is recommended for most cases for two basic reasons:

- computational load is transferred from servers to devices, decreasing server load, and
- on most devices, hardware-side motion detection is performed on raw video stream, which means superior accuracy compared to software-side detector, as software only gets access to compressed stream.

Software-side motion detector is a preferable choice if:

- legacy devices without MD support are used, or
- there is a necessity to use build heatmaps - in this case, grid-like MD on the software side is helpful.



Software-side motion detection settings

The motion detector on the software side has two options: high performance and high accuracy:

***High Performance** mode:* this type of analysis is performed for only key frames whose frequency can vary from several frames per second to one frame every few seconds - this is less sensitive for picture quality, but greatly affects detector operation. CPU consumption is significantly lower due to this, and it can be additionally reduced by increasing time interval between two analyzed frames.

***High Accuracy** mode:* this mode performs motion analysis for the whole video stream, so we recommend selecting this option when you want to achieve best detection results. The lower time interval means higher precision. Keep in mind that CPU and virtual memory usage is much greater if this mode is selected.

In both modes, the **level of sensitivity** can be adjusted, as can the time interval setting which defines the frequency of frame analysis.

Regardless of which mode you select, you can further decrease the amount of server-side calculations by using a **lower-resolution stream** (if available). For example, if your main stream is 3MP and your substream is D1, the motion detection engine will spend much less system resources on D1 analysis than it would spend on a 3MP image. Note that some cameras deliver lower-resolution streams as cropped high-resolution images (not resized, as it would be expected) - in such cases, using a substream for MD analysis will produce wrong results and therefore doing so is not advisable.

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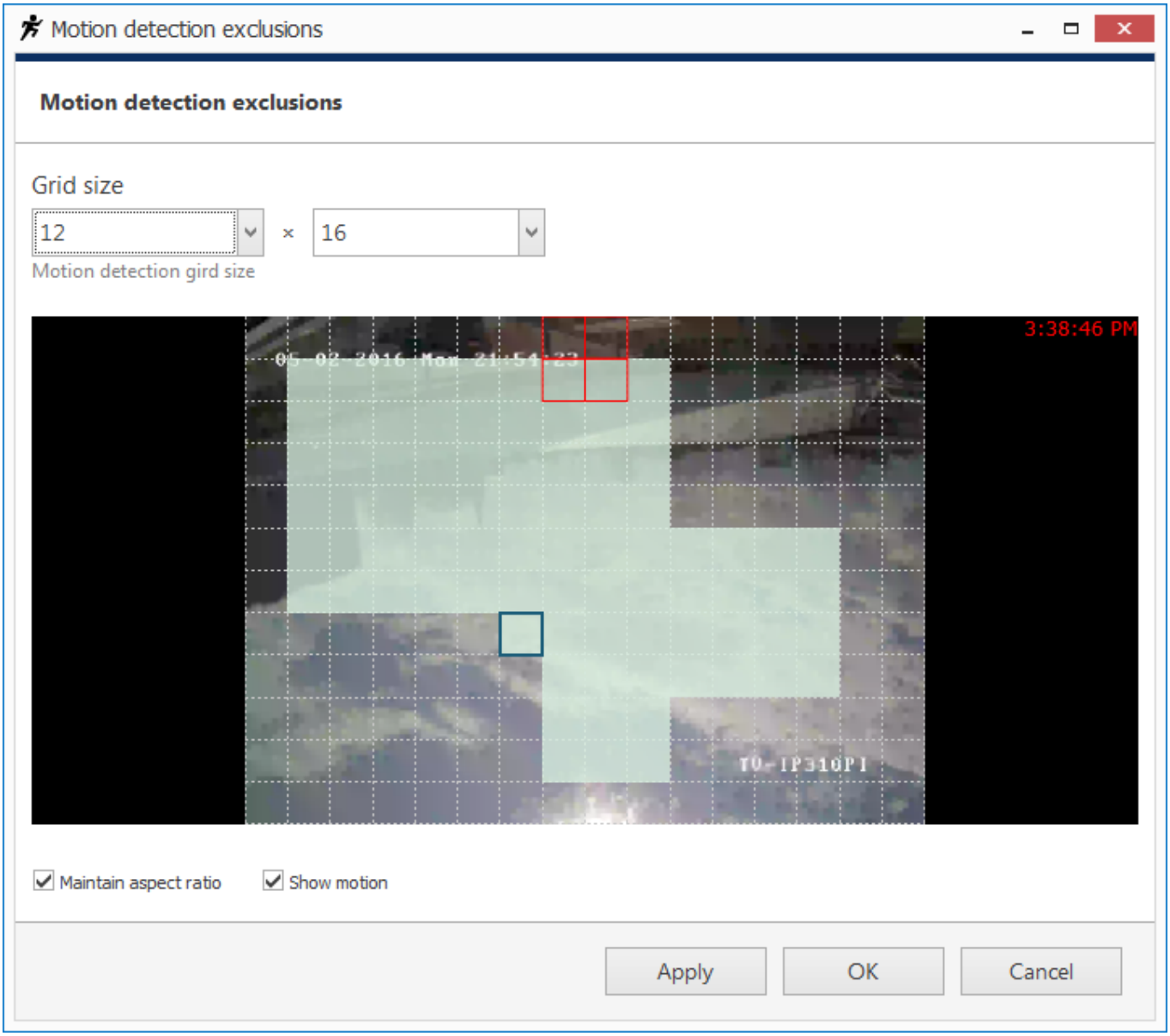
Most cameras provide second stream as first stream image scaled to fit low resolution; however, some devices crop the centre of a high-resolution image to fit the small frame, and thus the substream picture appears as if it were zoomed in. Keep this in mind when you are using substream for live view and especially for software-side motion detector analysis.

Click the *Motion detection exclusions* button in order to set up **exclusion zones**. Note that these settings only cover the software-side motion detector; in order to configure the exclusions for the camera-side motion detector, go to the Web interface of the target device.



Set up exclusion zones for the motion detector

First, choose the **grid size** for the detector: this will define the size of the smallest detection region. Minimum grid size is 2x2 cells (resulting in four detection areas), and maximum size is 64x64 cells. Then, mark your desired **exclusion area** simply by clicking and dragging on the viewport; you can **draw** several rectangles to form a complex polygonal area. Exclusion area(s) will be highlighted light green. In order to cancel the selection, simply draw a rectangle over it.

Settings in the bottom are here to ease the configuration process:

- *Maintain aspect ratio*: displays original picture proportions, if selected, or stretches the picture to fill the viewport
- *Show motion*: shows currently present motion, if selected

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In order to test the behaviour of the selected grid size, enable the *Show motion* option, the click *Apply* and see how the detector works with your defined grid.

When you have finished, click *OK* to return to the main channel configuration dialog box.

Video Analytics

Ganz CORTROL servers have a built-in CNN-based engine for the video analysis (VA) with object classification, zones, lines, counters, and rules. In this tab, you can enable and configure the detection parameters for the target channel.

There are several supported neural network **engines** that do the analytics processing:

- Object detector: generic object detector (people, vehicles, animals) with multiple performance options.
- PPE Detector: personal protective equipment detector (vests, head covers).

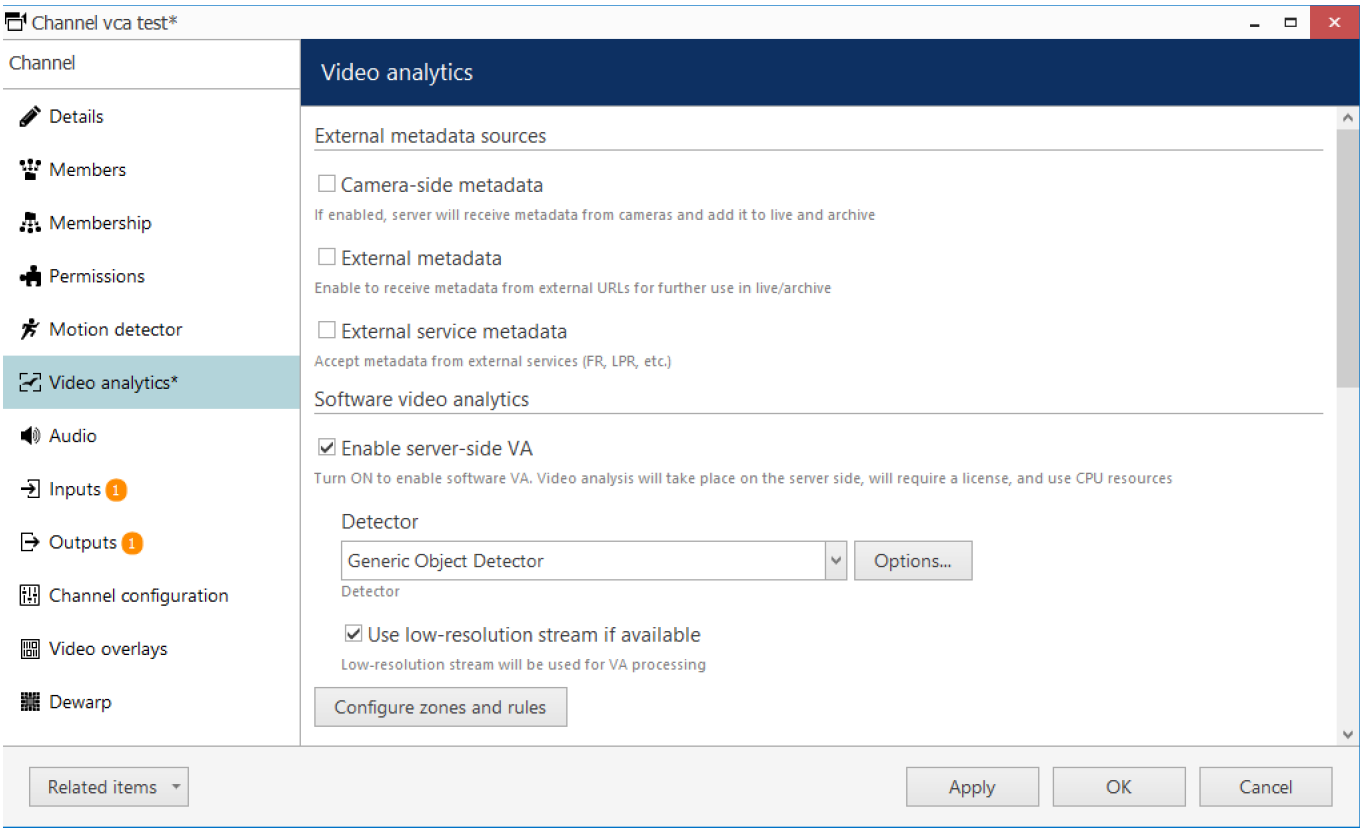
Choose one of the engines to be used for object detection on the target channels. (It is not possible to enable multiple detector engines to run in parallel).

Generic object detector engines use the same neural network. The numbers next to the name designate the size of the downscaled image that will be fed to the VA engine. The bigger the image, the higher the CPU/GPU load will be; larger images also mean that smaller objects will be detected better. Model aspect ratio also may affect detection quality. Overall, it is recommended to test different models and settings for each individual scene.

Please see the dedicated documentation on VA and separately for PPE Detector for more details and recommendations.

> You can configure VA without enabling it for the target channel. This may be convenient when you have a limited VA license but still want to pre-configure the detection.

Before enabling VA for the channel, make sure your VA license allows it. Each Ganz CORTROL installation includes 1 (one) generic VA channel free of charge. Specific engines like PPE Detector require a separate license. You can check what channels are using VA license by adding the corresponding column in the *Channels* section. To do this, click the grid icon in the upper right corner of Ganz CORTROL Console and move the *Video Analytics* column to the list on the left, then click *OK*.



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Video analytics tab allows you to enable and set up VA for the target channel

The following sections with settings are available here:

External metadata sources: metadata coming from any source other than Ganz CORTROL embedded video analytics. This also includes old generation Open VCA (embedded into older Ganz CORTROL versions).

- **Camera-side metadata**: if enabled, metadata received from the device (edge VA) will be displayed in Ganz CORTROL Client overlaying the video stream, and will also be used for event triggering.
- **External metadata**: if enabled, server will accept metadata sent by external sources in JSON format for video overlay, event triggering, and search
- **External service metadata**: if enabled, server will accept metadata from integrated services that are configured as external services, for the purposes of live/playback overlay, search, and event triggering

Software video analytics: here, you can enable and configure server-side VA.

- **Enable**: if selected, the server will perform video analysis for the target video channel, and metadata overlay will be turned ON on the Ganz CORTROL Client side (affects all connected Ganz CORTROL Client applications)
- **Use low-resolution stream if available**: similarly to motion detector, VA can be performed on the secondary video stream in order to save server resources. We recommend that you keep this setting ON.
- **Detector**: choose one of the available detection engines.
- **Options**: click to set the engine-specific parameters
- **Configure zones and rules**: click the button to enter overlay setup
- **Classes**: click *Change* and choose the object classes that you want to be detected in the target video (deselected classes will be unavailable for rules)
- **Detection interval***: time (delay) in milliseconds between two successive detections (similar to MD), default: 200ms
- Object loss timeout: time interval in seconds, after which the object out of sight will be considered lost (and will be detected as new object if appears again), default: 6 seconds
- **Scene dynamics****: relative speed of the objects in the scene
- **Confidence threshold**: minimum level of confidence to decide if the object belongs to a class (detections with lower confidence will be disregarded), default: 70%
- **Object similarity threshold*****: the minimal level of object similarity between two detections to decide that it is the same object (objects with lower similarity will be detected as new), default: 85%, optimal range: 50-90%
- **Maximum object size**: percentage of the image height and width that can be occupied by a single object at max. Enable this option to eliminate false detections of large non-existent objects.

*This is the minimum time between two detections. If the video stream FPS is low, the actual interval may be longer.

**This setting teaches the VA engine where to look for the same object in the next frame. Slower option means the object is present in more frames. Faster means the object is present in less frames during its appearance. Choose slower options for calm scenes with low-speed objects (e.g., people walking), and faster for dynamic scenes (highway etc.).

***Highly affects the engine ability to track the objects. If the value is too low for the target scene, different objects may be considered one. Too high (close to 100) causes each detection to produce a new object each time. We recommend that you start with the default value, and change it slowly when testing. Scenes with many similar objects (e.g., items on the conveyor belt) require slightly higher similarity and correct object speed (see above).

Engine Options

Click the *Options* button next to the VA engine drop-down list to open the engine-specific settings. These mostly refer to GPU usage.

For the **generic object detector** engine, the following settings are available:

- **GPU device***: choose one of the supported graphics cards, or choose *Disable* to leave VA running on CPU
- **Advanced** (only change this if you know what you are doing!)**: per process GPU memory fraction**: amount of video memory in % to be allocated for CUDA; default value 50%
- **Advanced** (only change this if you know what you are doing!): **allow GPU memory growth**: set this to *Yes* this if you prefer the entire video memory chunk to be pre-allocated instead of gradual growth

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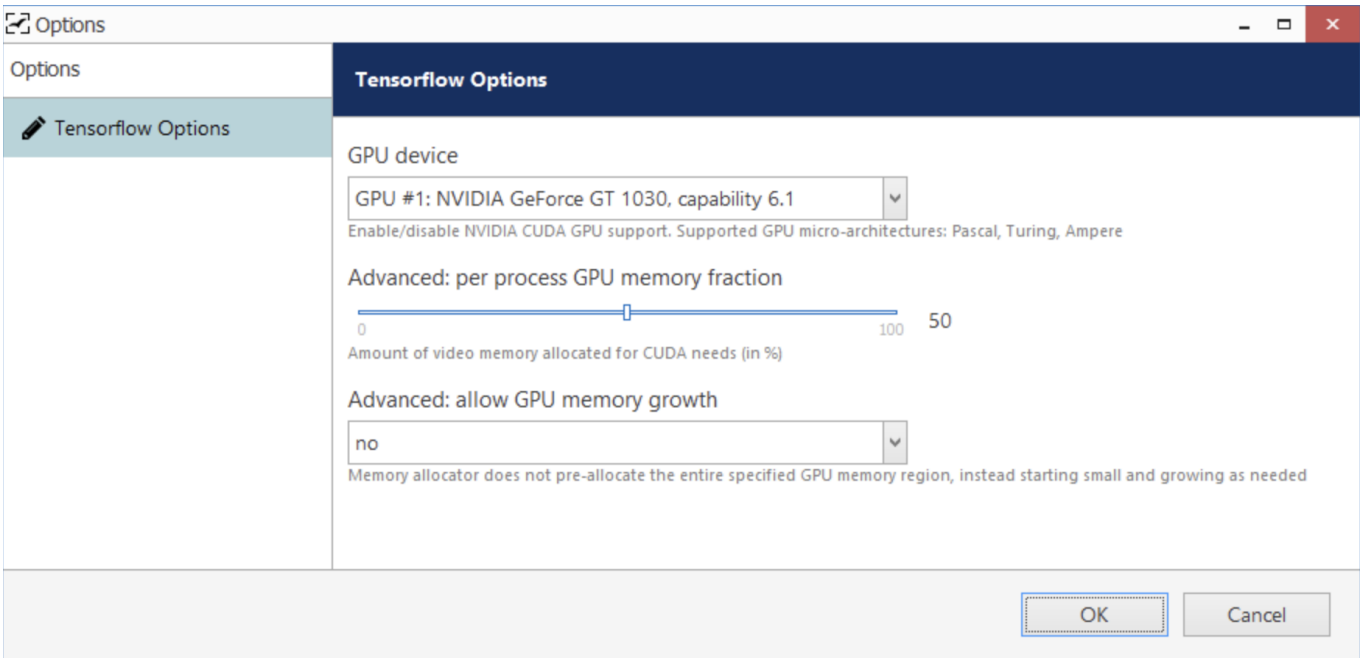
*Supported GPUs are NVIDIA video cards with capability parameter 6.0 or higher (Pascal, Turing, or Ampere architecture).

> ⚠ In order to enable GPU usage for video analytics, please install **NVIDIA CUDA toolkit redistributable** package, which is NOT a part of the Ganz CORTROL installation. You can download the toolkit from the CBC AMERICA LLC website (usually available with the latest Ganz CORTROL version), or request it from CBC AMERICA LLC representative or via cortrol@cbcamerica.com.



GPU settings for generic Tensorflow VA engine

If you have **multiple** video cards, you can assign different cards to different channels. Leave the **advanced settings** the same for all channels that use the same graphics card. You can also leave some channels to run on CPU (for example, the generic 300x300 model is optimized for mobile CPUs and will therefore better perform on CPU, not GPU).

Create VA Zones and Rules

Click the *Configure zones and rules* button to bring up the video overlay dialog box. By default, only VA overlays are displayed, but you can use the *Show all* checkbox to see if there are other overlays (e.g., data sources) configured for this channel.

In the top right corner, there are VA markers: **counter**, counting **line**, and polygonal **zone**. Drag and drop the marker onto the picture to place it, then adjust its size and position.

Zone and Line Properties

Click a **zone** or a **line** to see its properties in the rightmost column:

- **Type**: corresponding element type (line, polygon)
- **Title**: user-defined item name, e.g., Lobby
- **Colour**: choose the element colour using the standard palette
- **Opacity**: colour opacity (0=transparent, 100=solid)

Additionally, each **zone** has some properties that affect event triggering and are individual for each zone:

- Object **presence** time: time in seconds for the object to stay inside the zone before the "object entered or appeared" event is triggered (default: 1 second)
- Object **absence** time: time in seconds for the object to stay outside the zone for the "object left or disappeared" event is triggered (default: 1 second)
- Object **intersection threshold**: percentage of the object area to cross the zone border for it to be

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considered a crossing (default: 50%, half of the object)

For example, with default settings: if more than half of the object stays inside the zone for longer than one second, the "object appeared" event is triggered.

> ⚠ Please note that markers are just **visual** elements: you need to add **rules** and then create **E&A rules** to trigger some event chains.

> 💡 Zones are rectangular by default but you can add **new nodes** by right-clicking on the zone border and selecting *Add*.

Rules and Counters

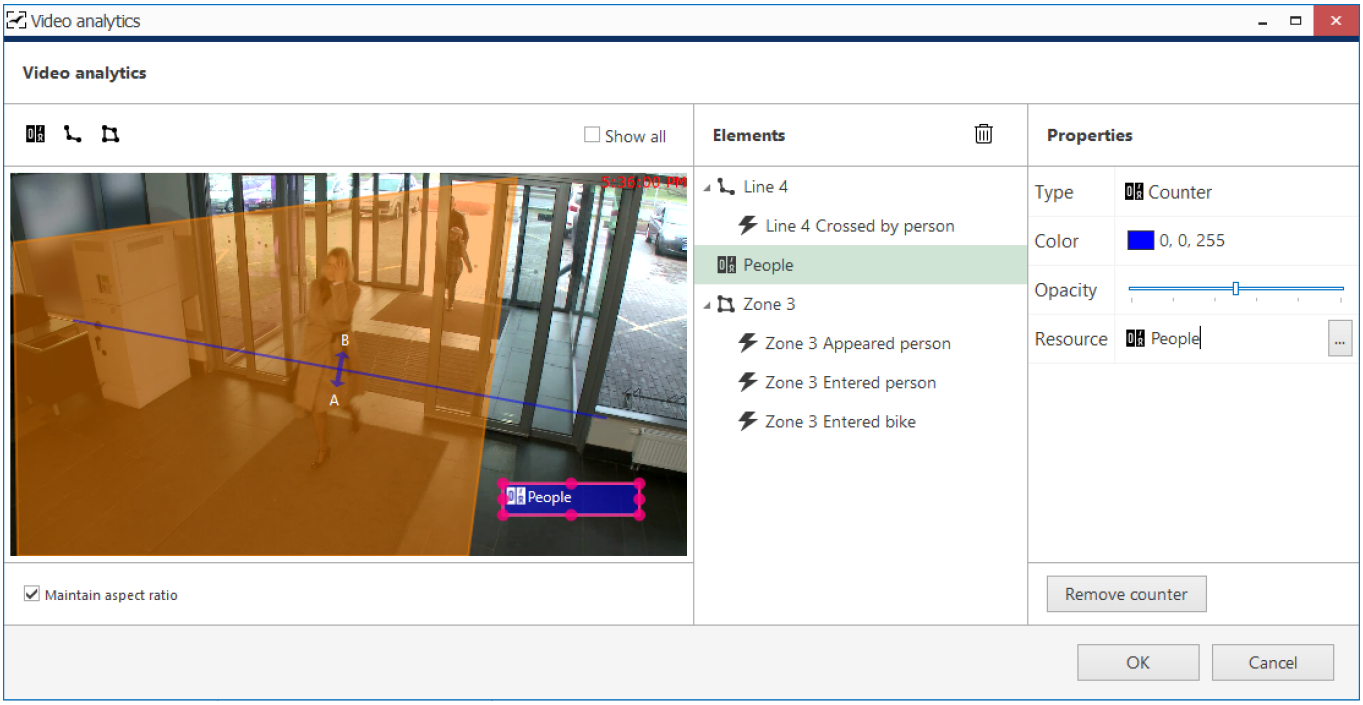
For each **zone** or **line**, you can create rules, which can be later used to trigger events in E&A. For example, such rules can increment counters:

- for reflecting the current number of objects in the zone, use the special *Zone counter type*,
- for other rules, create new counters and then go to the E&A configurator to add rules that will increment those counters.

For each **counter marker** in VA, you will need to map it to a real counter to make it work.

- to **track the number of people in any zone**: create *Zone counter* under the zone, then drag and drop a counter marker, and bind it to the zone counter
- to **count objects** appearances for **lines** or **zones**: create a new counter (or choose an existing E&A counter from the list), then drag and drop the counter marker and bind it to the counter

In such a way, you can use the same counters from E&A for multiple channels' VA, for example, to count the total number of customers coming via different doors.



Add zones, lines, counters, and rules

For each zone/line rule, you can choose one or multiple **object classes** to be tracked. You can only choose among classes that have been enabled for the current channel in the previous dialog box.

Available **line rules**:

- *Crossed AB* or *Crossed BA*: object has crossed the line in the specified direction
- *Crossed*: object has crossed the line in any direction

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Available **zone events**:

- *Entered or appeared*: the object appeared in the zone either by crossing its border from outside to inside, or appeared directly inside (e.g., if the zone order is equal to the frame border, or there is a door inside the zone)
- *Leaved or disappeared*: the object departed from the zone either by crossing its border from inside out, or simply disappeared inside the zone (e.g., there is a door inside the zone)

Available counter types:

- zone counter: reflects the current number of certain objects in the zone
- counter: E&A software counter

Use the buttons below the objects and their properties to create and remove rules. Note that these rules only exist in VA configuration; in order to set up reactions, go to the Events&Actions section of Ganz CORTROL Console.

VA Configuration Examples

Workflow **example**: count the number of people who entered the zone.

1. Drag and drop a zone marker onto the picture. Stretch the zone and add new nodes to cover the desired area.
2. Click the *New rule* button, then select the *Entered or leaved* event type, and set class to *Person* on the right.
3. Drag and drop a counter marker onto the picture.
4. Click the counter, then click the ... (three dots) button in the properties column on the right and choose a counter. If there are none, create a new one using the *New counter* button below the list.
5. Save the video analytics settings.
6. Go to Events&Actions, create a new event of the *VCA event* type, choose your VA camera as source, and your VA zone event from step 2 as VCA rule. (Note that the rules will not be listed if VA is disabled for the target channel).
7. Create a E&A rule using the event from step 6 and a built-in action *Increment counter* for the target counter.

Zone counters can only reflect the current number of typed objects in the zone, therefore, these cannot be incremented or decremented.

Example 2: pop up camera if there are 3 people in the zone.

1. Drag and drop a zone marker onto the picture. Stretch the zone and add new nodes to cover the desired area.
2. Click the *New zone counter* button below the zone list. The counter will appear in the same list.
3. Save the video analytics settings.
4. Go to Events&Actions, create a new event of the *Counter value* type. Select the counter you created on step 2 as event source. Set the operator to Equal and value to 3.
5. Create a E&A rule using the event from step 4 and a built-in action *Pop up camera on screen*. Set the desired channel as rule target to define, which camera pops up.

Audio

Here, select the **audio source** for the target channel. The available options are:

- **None**: the channel will have no audio track
- **Internal**: built-in or line-in camera microphone will be used as the audio source (G.711 only!)
- **Attached**: a microphone that is physically connected to the server will serve as the audio source (server must be the one having this channel in its configuration)
    - **Audio source**: select one of the devices from the drop-down list. If the list is empty, make sure that the server has a microphone connected and that it is visible/working in the Windows Control Panel.
- **External**: use audio from another channel. Audio will be combined with the target channel video in both live and playback.

When fetching audio from the device side (**internal** source), make sure to choose the **G.711** codec. Other codecs are not supported at this point, and selecting them may result in unavailable video stream, too, when both video and audio are packed into the RTSP stream.

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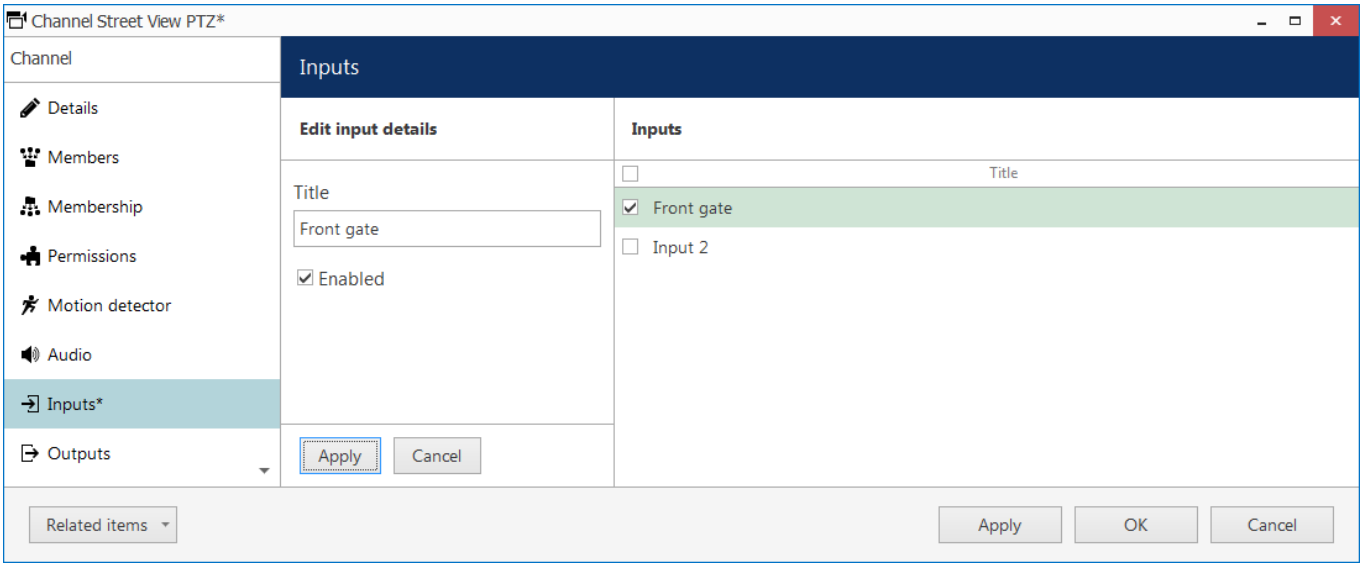
For audio sources that are **attached** to the server: you can use both line-in microphones, as well as ones connected via audio board, which supports multiple microphones at once. There are three important requirements here:

- the target channel and the target audio device must belong to the same server
- the attached audio device(s) must be recognized by the operating system
- the list of audio devices is retrieved live, so the target server must be online for you to apply the configuration

Digital Inputs

If **digital inputs** (DI) are supported for the underlying device, the available inputs will be listed here. Mark them in the list in order to allow event generation from those inputs: events can be later set up in the E&A Configurator using the *Digital input* event type. After changing the DI name, click *Apply* below for the changes to take effect: the setting will not be saved if you simply switch to another tab.

Note that the tab contents is retrieved in **real time** from the target device, therefore, it may take several seconds for the contents to become available. In case the target device is offline/unavailable, or if there is no support for DI for the selected device model, the list will be empty and a corresponding warning will appear.



Enable event generation from the camera digital inputs (DI)

Digital Outputs

You can change the state of **digital outputs** (DO) from the E&A Configurator (target action type: *Control digital output*). For the DO to be available in actions, select them here by putting a mark in the corresponding checkboxes. Optionally, you can also change the DO names. Click the *Apply* button below the output details to save the changes before moving to other settings.

For each relay output, you can also specify the desired **mode**: switch, inverted switch or pulse. This defines the command that will be sent to the device when DO action is triggered in E&A.

Note that the tab contents is retrieved in **real time** from the target device, therefore, it may take several seconds for the contents to become available.If the target device is offline/unavailable, has no DO, or if there is no support for DO for the selected device model, the list will be empty and a corresponding warning will appear. In case your device does have DO but they are not supported by software, you can still change their state from Ganz CORTROL E&A by using CGI/HTTP commands (action type: *Send HTTP request* or *Run program*). The exact command text depends on the device and can be found in the device documentation.

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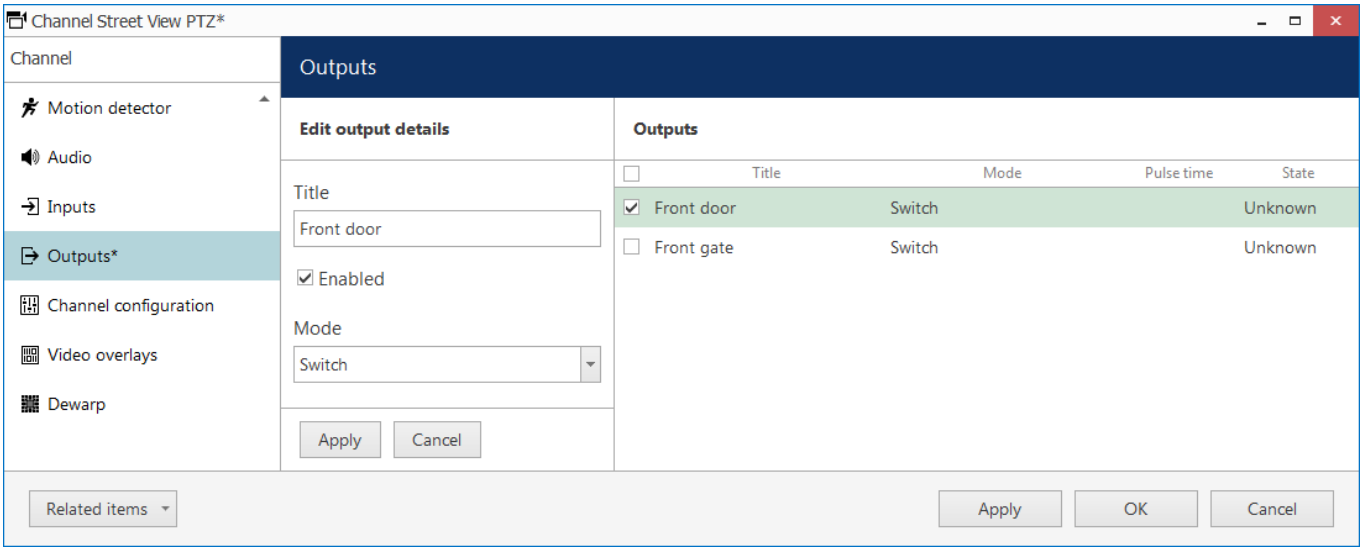


Mark relay outputs for further usage in E&A

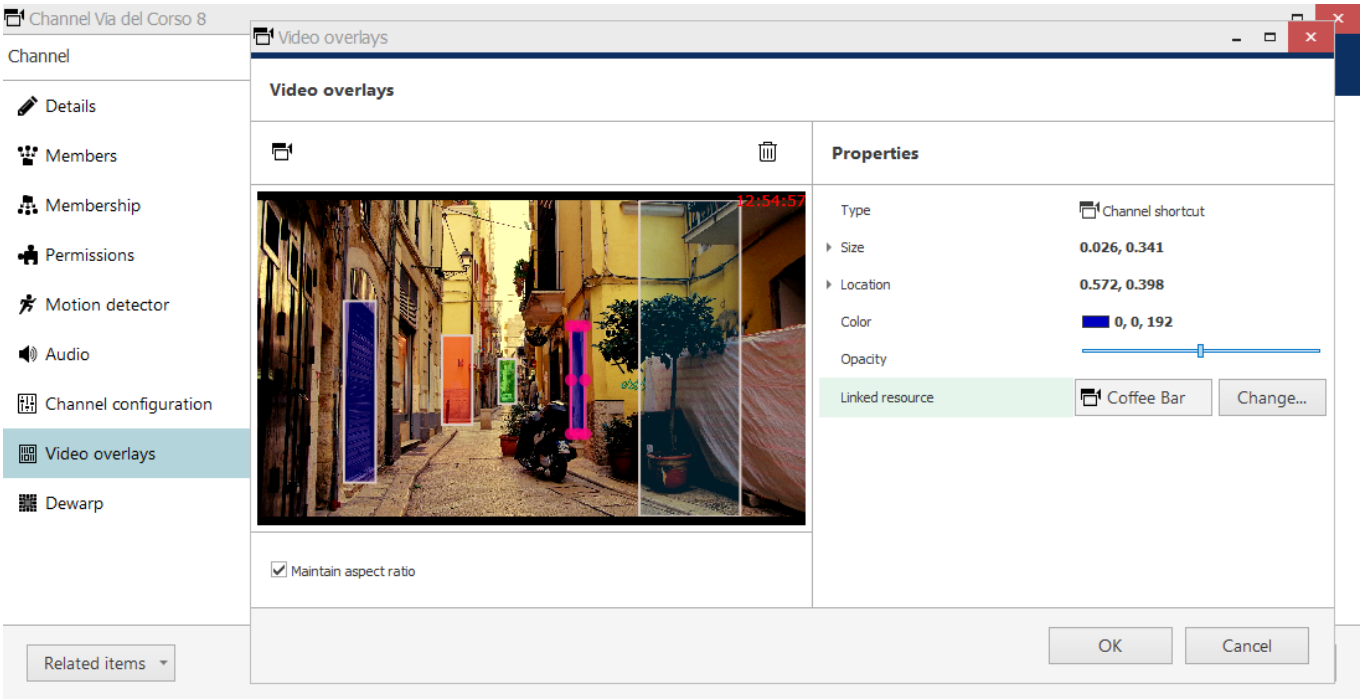
Video Overlays

Here, you can create **channels shortcuts** and also choose a data provider to **embed** some **textual data** with the video. The section below explains channel shortcuts; for setup guidelines on the data overlay, please refer to the Data Sources section of this document. Video analytics visual elements are explained above.

> By default, only channel shortcuts and data source overlays are displayed here. Enable the *Show all* option above the video preview to **see all visual elements** (e.g., video analytics).

Channel shortcuts are interactive video overlay elements intended for instant switching between video channels in the Ganz CORTROL Client application's live view mode. In other words, these are visual controls that appear on top of the video and clicking them will open other (pre-defined) video channels in the same viewport. These "portals" are configured in Ganz CORTROL Console and then used in the Ganz CORTROL Client application.

Click the *Configure video overlays* button to bring up the dialog box.



Street view camera with visual shortcuts to other cameras

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Start by dragging and dropping a channel shortcut from the panel above the video. A coloured rectangle will appear on top of the video: drag it around and use the visual controls to change its size, and place it where you want the shortcut to be. As the shortcut is a "portal" to another video channel, usual shortcut places are windows, doors, ends of streets or corridors, etc.

⚠ Make sure the video from the target channel is available before setting up the channel shortcuts in order to ensure correct shortcut placement.

On the right side of the configuration dialog box, there are **channel shortcut properties**:

- **Size**: visual element size (relative to the viewport size)
- **Location**: coordinates of the top left corner of the visual element in the viewport
- **Colour**: choose the element colour from one of the standard palettes (blue by default)
- **Opacity**: transparency of the visual element, from 100% transparent on the left to 100% opaque on the right
- **Linked resource**: target video channel (mandatory setting)

The **linked resource** is the video channel that will be displayed once the shortcut is clicked by user; it must be defined, otherwise the shortcut does not make any sense and will not be saved. Other settings are optional. The visual element size and location are listed for your reference: it is more convenient to change the rectangle size and position by manipulating it in the viewport. However, you can still change the numbers to adjust the size and position.

To **remove** any unneeded shortcut, select it in the video viewport and click the *Recycle bin* button in the panel above the video.

To **save** the video overlay settings, click *OK* to close the dialog box and then click *Apply* or *OK* in the *Edit channel* dialog box. If you click *Cancel* to discard changes in the *Edit channel* dialog box, adjustments in the video overlays will not be saved.

Channel Configuration

The *Channel Configuration* tab allows you to adjust advanced channel settings. Some of these can be changed via Ganz CORTROL Console but sometimes software does not cover some of the device settings, so you are also given the option to go straight to the device Web interface - simply click the *Open device in browser* button to do this.

For ONVIF channels (if device model is set to (Generic) ONVIF Compatible), there is an option to set up **imaging settings**: the corresponding button will appear next to the *Channel properties* button. Please see below for more details.

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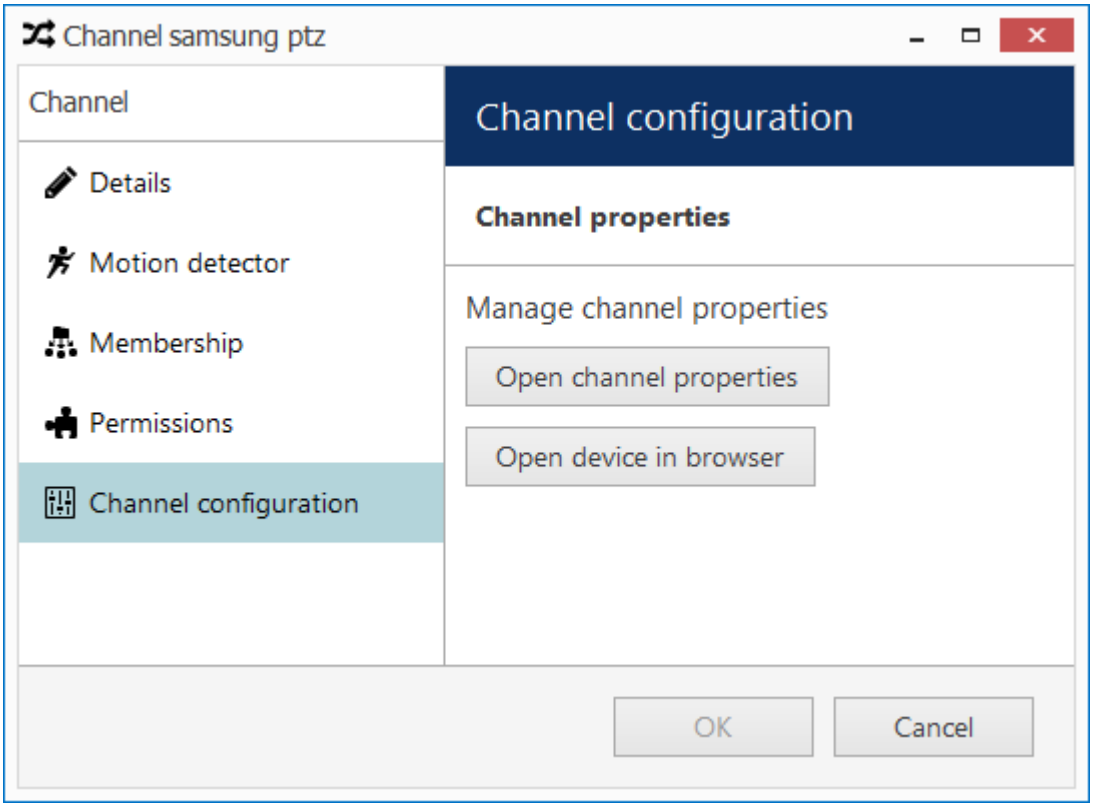

You can open the target device in browser or go to the software provided settings dialog box

Click *Open channel properties* to access the additional channel configuration dialog box. The available tabs depend on the device model and capabilities: for some cameras, only basic configuration options are present, while for others, advanced settings are accessible. If you see that a camera has certain capabilities that are not configurable via Ganz CORTROL Console configuration interface, go to the device's Web interface in order to change that specific setting.

- **Video Input tab**: set video transport (the available list of options depends on the device type and model; common types include HTTP, RTSP* and native transport)
- **Video Adjustment tab**: fine-tune picture settings such as brightness and contrast level
- **Substream tab:** enable second (lower resolution) stream; some integrations also support stream settings
- **Video Configuration tab**: choose streaming settings**
- **Motion Detection tab:** with some devices, the camera-side motion detector must be explicitly enabled here
- **External PTZ tab**: adjust external PTZ controller settings; communication port must match the communication port that the RS232/485 controller is connected to, and baud rate has to match the baud rate of your PTZ controller/analog PTZ camera
- **RTSP tab**: appears if RTSP transport type has been chosen; set **RTSP port** and mode (TCP/UDP/multicast***) here

*You may have to specify the RTSP port on the corresponding tab if it differs from default (port 554 is default for most devices). To do this, select the RTSP transport type and then click *Apply*: as a result, the RTSP tab will become available. For ONVIF devices, the RTSP port is set automatically.

**Remember, the higher the resolution/bitrate/quality/frame rate you set, the more storage space and bandwidth it will use when recording. These settings also affect CPU/virtual memory resource consumption for live video and software-side motion detection.

***Multicast mode availability depends on device integration.

Note that a valid administrative account login and password for the camera should be provided in *Device* settings in order to access and set the device configuration.

Imaging Settings

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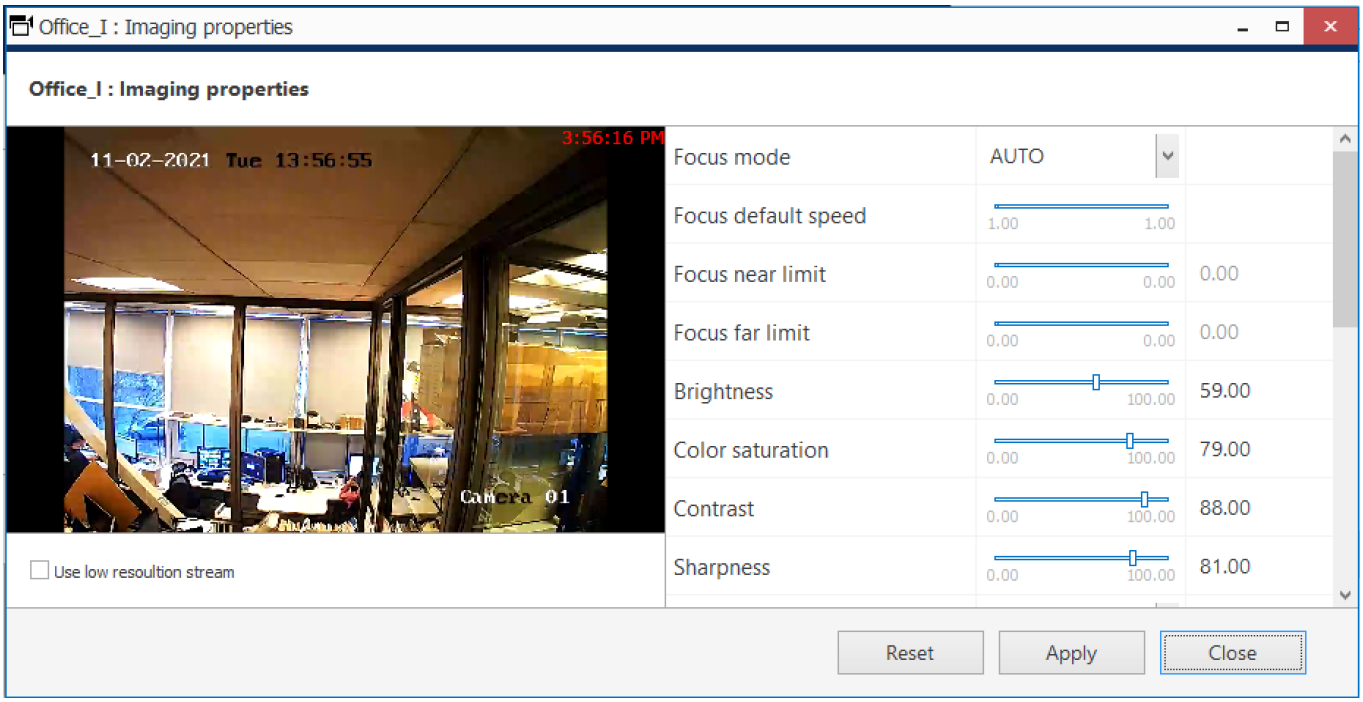
For ONVIF device channels, it is possible to adjust the image settings like brightness, saturation etc. To access these settings, open the channel for editing, choose the *Channel configuration* tab, then click the *Open imaging properties* button.

Adjust the settings, then click *Apply*. If you like the result, click *OK* to close the dialog box and exit.

Use the *Reset* button to revert the latest changes. If you save the changes and close the window, next time you open it Ganz CORTROL Console will treat the previous settings as default and will reset to them (and not some other set of values). To reset the imaging settings to the factory defaults, use the camera Web interface.



Use the low resolution stream for image preview to compare the pictures and make sure the applied imaging settings look good on both streams (e.g., make sure important elements are visible).

Dewarp

Here, you can configure generic dewarp settings or enable dewarp engine for the Panomorph Enables® lens. For details, please see the subsequent topic on dewarp setup.

Video Configuration

This tab is only available for certain device drivers like ONVIF. For other devices, go to the *Channel Configuration* tab (described above).

Here, you can select stream properties for both **main** and **secondary** video streams. The options are fetched from the device so the availability may differ depending on the vendor.

⚠ The settings are changed on the device side, too, so make sure the target device is not configured in some other video management software in order to avoid configuration conflict.

Available settings:

- **Profile**: choose one of the video stream profiles (built-in or pre-configured on the device side)
- **Encoding**, **resolution**, **quality**, **GOV length***, **frame rate**, **bitrate**, **bitrate mode**: choose one of the available settings according to your needs

By default, camera-side settings are used (whatever is currently set on the device side). You can override all settings or only some of them.

💡 Note that a valid administrative account login and password for the camera should be provided in *Device* settings in order to access and set the device configuration.

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*Too long GOV intervals (hence, low i-frame rate) may cause recording and **playback issues**. Channels with too low i-frame rate will have a warning (orange colour) in the *Monitoring* section of Ganz CORTROL Console, under *Channels*. To view this column, click the grid icon in the upper right corner and move the columns *Main stream GOP size* and *Substream GOP size* to the left, then click *OK*.

RTSP Configuration

This tab is only available for certain device drivers like ONVIF. For other devices, go to the *Channel Configuration* tab (described above).

By default, the **default port of 554** is used for obtaining video over RTSP. Here, you can **override** the default port, and also choose between unicast and multicast.

Edge Configuration

This tab is only available for certain device drivers like ONVIF. For other devices, go to the *Channel Configuration* tab (described above).

For some devices, Ganz CORTROL can fetch the recording done on the device side (on camera SD card). This tab contains some settings related to the edge stream synchronization.

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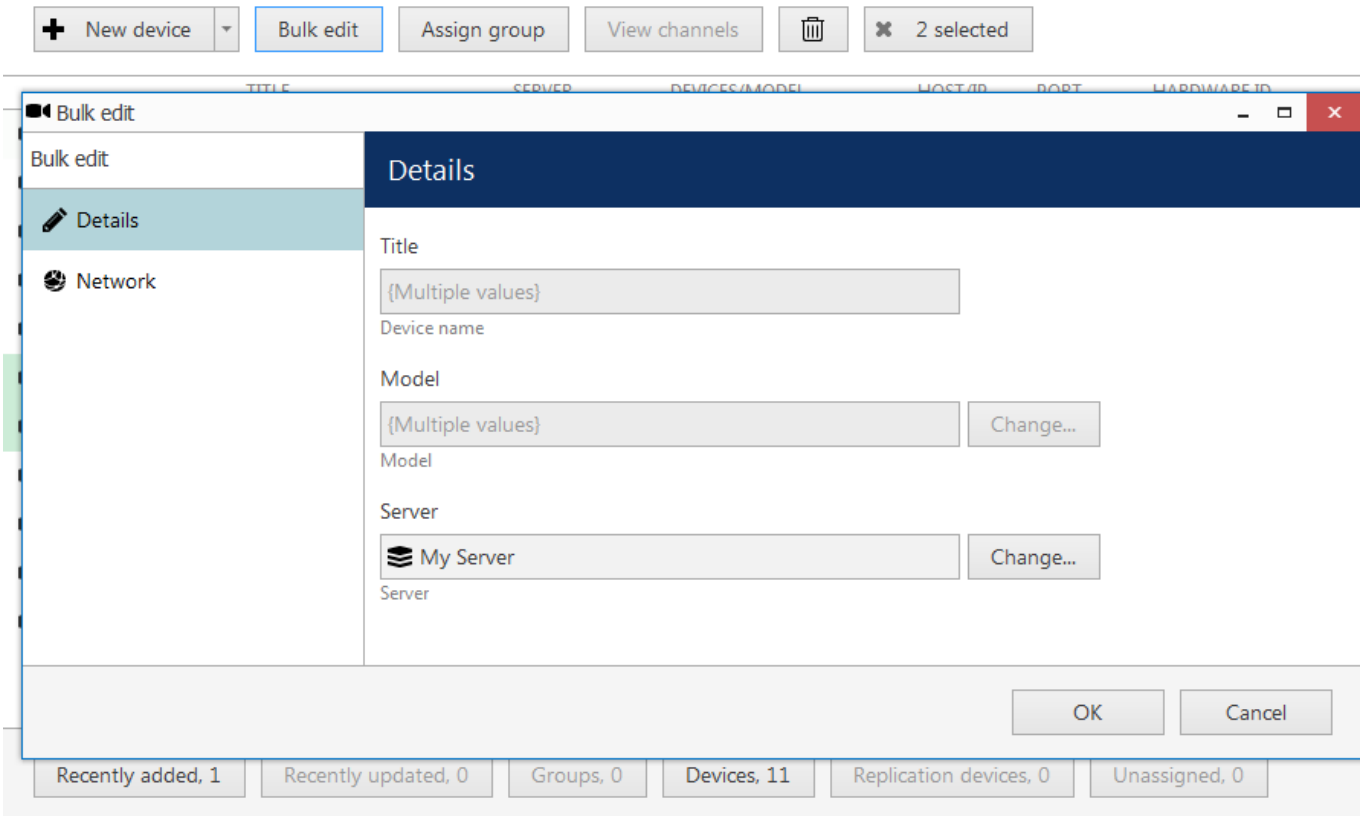
5.6 Bulk Edit for Devices and Channels

For easier resource management, it has been made possible to edit certain settings of devices and channels, e.g., recording settings and motion detection, for multiple items at once. To do so, simply select more than one device or channel in the item list using CTRL+click or Shift+click (use CTRL+A to mark all) and then click the *Bulk Edit* button on the top panel. Note that the button will not be there unless at least two items are selected.

- Some settings will be grayed out, indicating that these either cannot be changed at all or specifically via bulk edit
- *{Multiple values}* text in the setting field indicates that selected items have different options, e.g., have different recording configurations
    - leave such a field untouched if you wish to keep these settings different
    - change the value of such a field to something specific using the *Change* button to assign the same setting to all selected items
- Fields containing specific values or empty fields indicate that all selected items have the same setting (often default); change the value to assign the setting to all items at once

Edit Multiple Devices

Select at least two devices in the list and click *Bulk Edit* on the top panel to bring up the corresponding dialog box. Some settings will be grayed out, indicating that these settings either cannot be changed at all or specifically via bulk edit.



Edit multiple devices using bulk edit

For devices, you will be able to modify the following settings:

- *Details* tab:
    - **Server**: the server where the devices belong
- *Network* tab:
    - **Port**: HTTP port to connect to the device (for IP devices)
    - **Username and password**: user credentials to log in with

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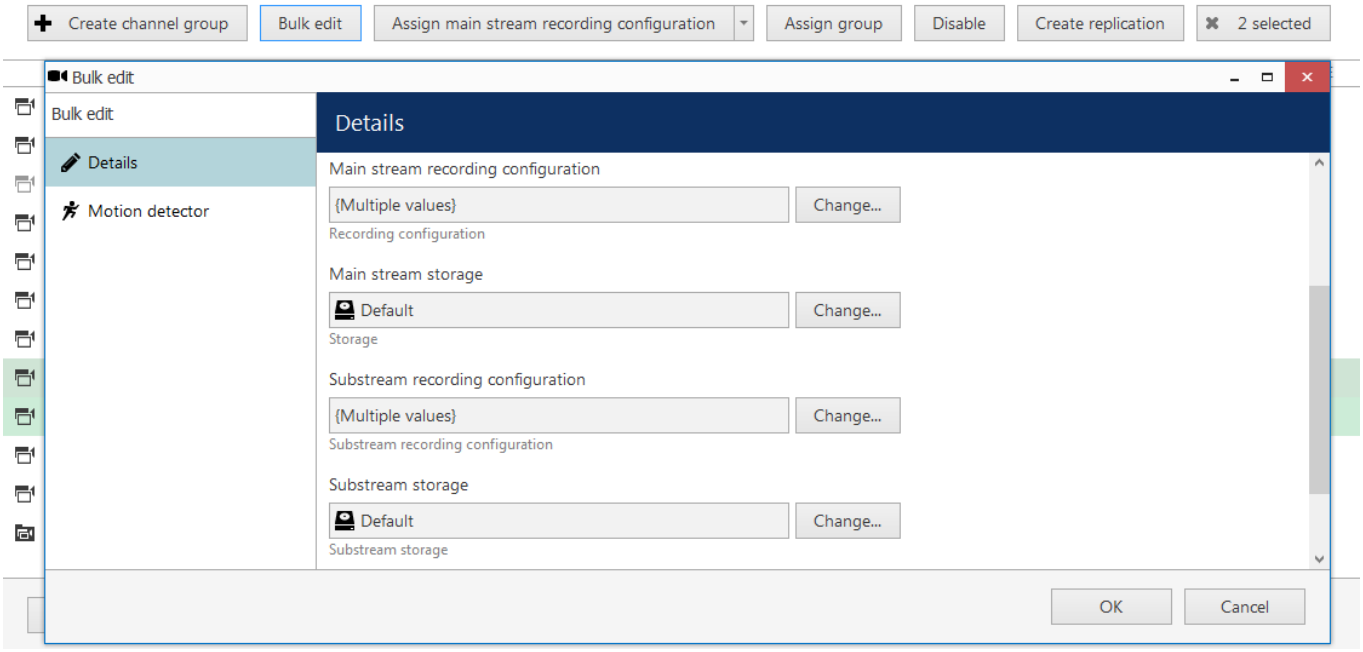
When done, click *OK* to save and close the dialog box: the settings will be applied to all the selected devices.

Edit Multiple Channels

Select at least two channels in the list and click *Bulk Edit* on the top panel to bring up the corresponding dialog box. Some settings will be grayed out, indicating that they either cannot be changed at all or specifically via bulk edit: for instance, it is impossible to change the title field this way, as each channel normally has its own name, which therefore should be edited for each channel individually.



Edit multiple channels using bulk edit

For channels, the following settings can be changed via bulk edit:

- *Details* tab:
    - **Organisation***: the organisation the channel belongs to
    - **Main stream recording configuration**: default recording setting for the main stream
    - **Main stream storage**: main stream recording destination
    - **Substream recording configuration**: default recording setting for the secondary stream, if available
    - **Substream storage**: secondary stream recording destination
    - **Edge** recording configuration**: set *Continuous Recording* here for proper operation
    - **Edge** storage**: recording destination for the footage fetched from the device
    - **Video lost time**: timeout for streams absence, after which the video stream is considered lost and the corresponding event is raised in the E&A engine
- *Motion detector* tab:
    - **Mode*****: choose between camera-side or software-side (high performance or high accuracy software modes available) motion detection

*Ganz CORTROL Global edition only

**Only for channels coming from ONVIF devices

***You will find more details on the motion detection modes in the *Channel Configuration* topic

When done, click *OK* to save and close the dialog box: the settings will be applied to all the selected channels.

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6 Configure Recording Profiles

This topic describes how to create and configure stream recording profiles. For global server storage settings, please see the Storage section of this document.

To access recording configuration dialog boxes in Ganz CORTROL Console, select the *Configuration* section and choose *Recording* in the menu on the left.

There are three types of resources in the *Recording* setup:

- **profile**: choose what data streams are recorded and in what mode (continuous/alert triggered)
- **schedule**: set a recording timetable based on profiles
- **configuration**: profile- or schedule-based recording configuration to be assigned to channels

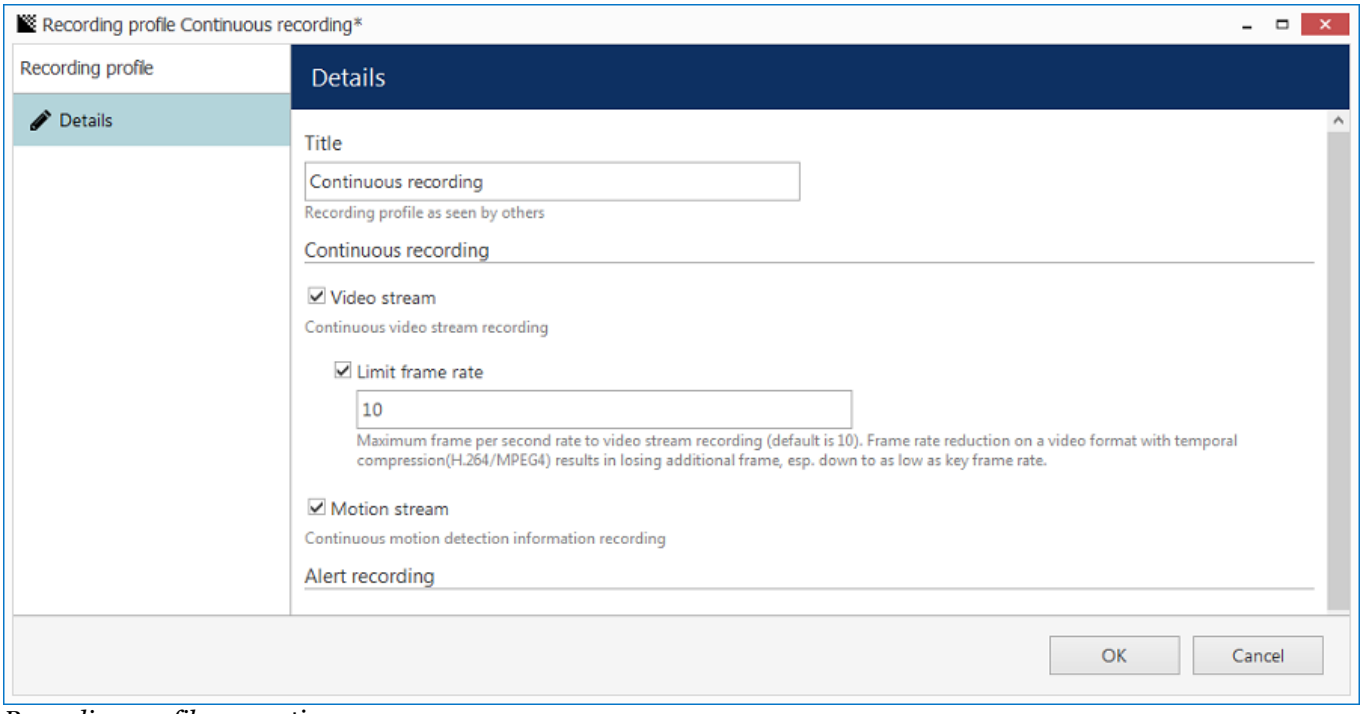
Buttons on the upper panel give the option to create, edit and remove recording resources.

> ⚠ Recording resource cannot be deleted if it is currently in use, i.e., when a recording profile is assigned to a recording configuration or a schedule, or when any of the recording resources are assigned to a channel.

Create Recording Profile

Recording profiles allow users to set which data streams are recorded and how. Profiles cannot be assigned directly to devices; rather, these are used as components for recording schedules and recording configurations. For this reason, profiles do not include such settings as pre-recording interval: this setting is defined per-channel and, therefore, is set in the recording configuration.

To add a new recording profile, click the down arrow button near + *New recording configuration* and select + *New recording profile*. The profile creation dialog box will appear.



Recording profile properties

The dialog box has two sections: for continuous and event-driven recording. Note that you only can select one mode at a time: if continuous recording is selected, alert-based recording options will be greyed out.

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To configure **motion-based recording**, enable *Video stream* in the *Alert recording* section and enable *Detected motion triggers alert* setting. If you wish to record still frames at low rate during non-motion period, keep the *Video stream* option in the *Continuous recording* section enabled and set your desired frame rate - e.g., 1FPS - then set high FPS or no limit in the *Alert recording* section. If you only wish to record while motion is present, deselect the *Video stream* option in the *Continuous recording* section.

When you assign a **motion-based recording configuration** to a channel with a disabled motion detector, the software will automatically suggest enabling motion detection for the target channel. The camera-side detector is given priority; if it is not available, the software-side detector will be enabled and set to the high-performance mode. We recommend that you **review** the motion detector settings to make sure it operates as desired, especially if the camera-side detector is in use.

Setting	Description	Default Value
Title	User-defined recording profile name	[empty]
Video stream (continuous)	Select to enable continuous video recording	Disabled
Limit frame rate (for continuous video recording)	Set frame rate restriction for recorded video; note that for compressed video streams (e.g., H.264) actual frame rate may differ due to compression algorithms	10 FPS
Audio stream (continuous)	Select to enable continuous audio recording	Disabled
Data stream	Select to enable data recording from the associated the data source	Disabled
VCA stream	Select to enable continuous video analytics event recording	Disabled
Video stream (alert)	Select to enable alert-driven video recording; video will only be recorded after alert generation, for the time period defined in the *Post-recording interval*	Disabled
Limit frame rate (for alert video recording)	Set frame rate restriction for recorded video; note that for compressed video streams (e.g., H.264) actual frame rate may differ due to compression algorithms	10 FPS
Post-recording interval	The time period during which alert-driven recording will be conducted after alert generation	10 seconds
Detected motion triggers alert	Motion will act as a trigger for recording; enable this setting to set up motion-based recording	Disabled

When done, click *OK* to save recording profile: it will appear in the item list of the *Recording* section. The profile is now ready for further configuration.

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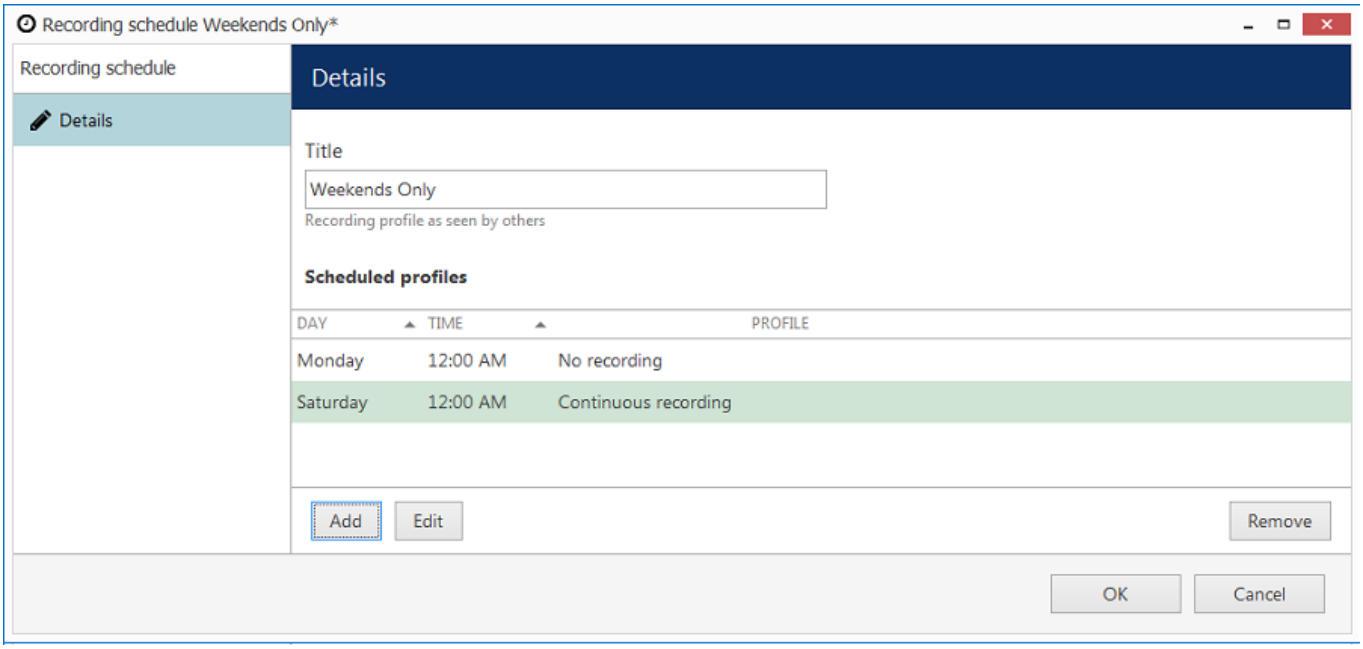
Create Recording Schedule

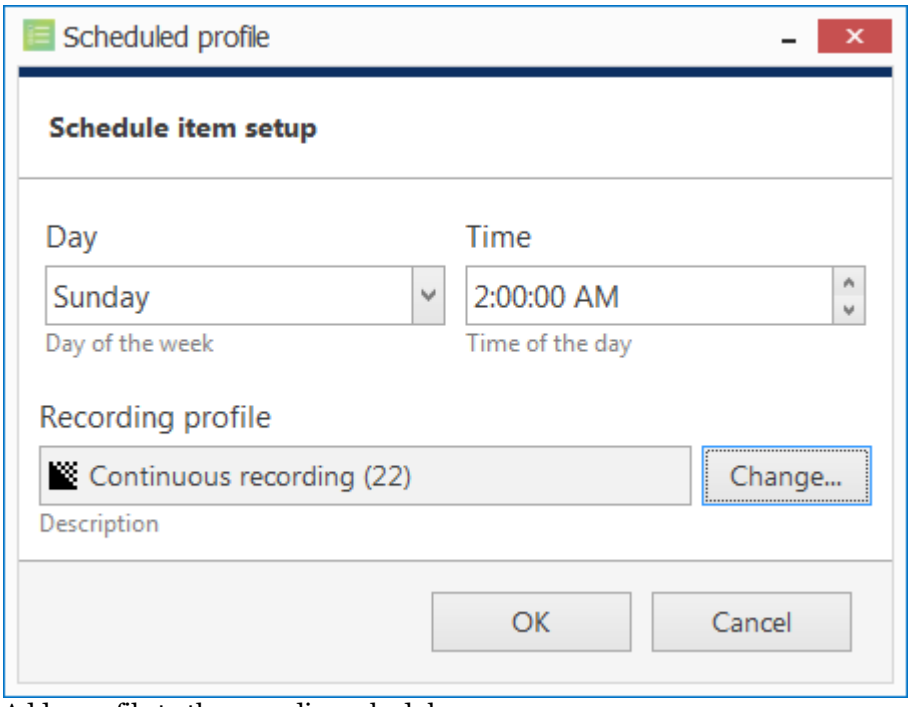
Recording schedules are sets of recording profiles that define what recording profiles are used depending on the day and time of the week.

To add a new recording schedule, click the down arrow button near + *New recording configuration* and select + *New recording schedule*. The schedule creation dialog box will appear, allowing you to enter a user-defined name for the new schedule and add multiple profiles to define recording behaviour.



Recording schedule properties

Click the *Add* button below to insert a new profile with defined start time.



Add a profile to the recording schedule

Note that only begin time is set for each added profile: the end time is determined by the start time of the next profile. For example, if you require continuous recording during weekdays and motion-driven recording during weekends, your continuous recording profile should be scheduled to start on Monday at 12 a.m. and motion-driven one - on Saturday at 12 a.m..

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Click *OK* to save and add the profile to the schedule. Multiple profiles will be automatically sorted based on their start time.

Use the *Edit* and *Remove* buttons below to manage the profiles added. When you are finished, click *OK* to save; the newly created schedule will be added to the item list in the *Recording* section.

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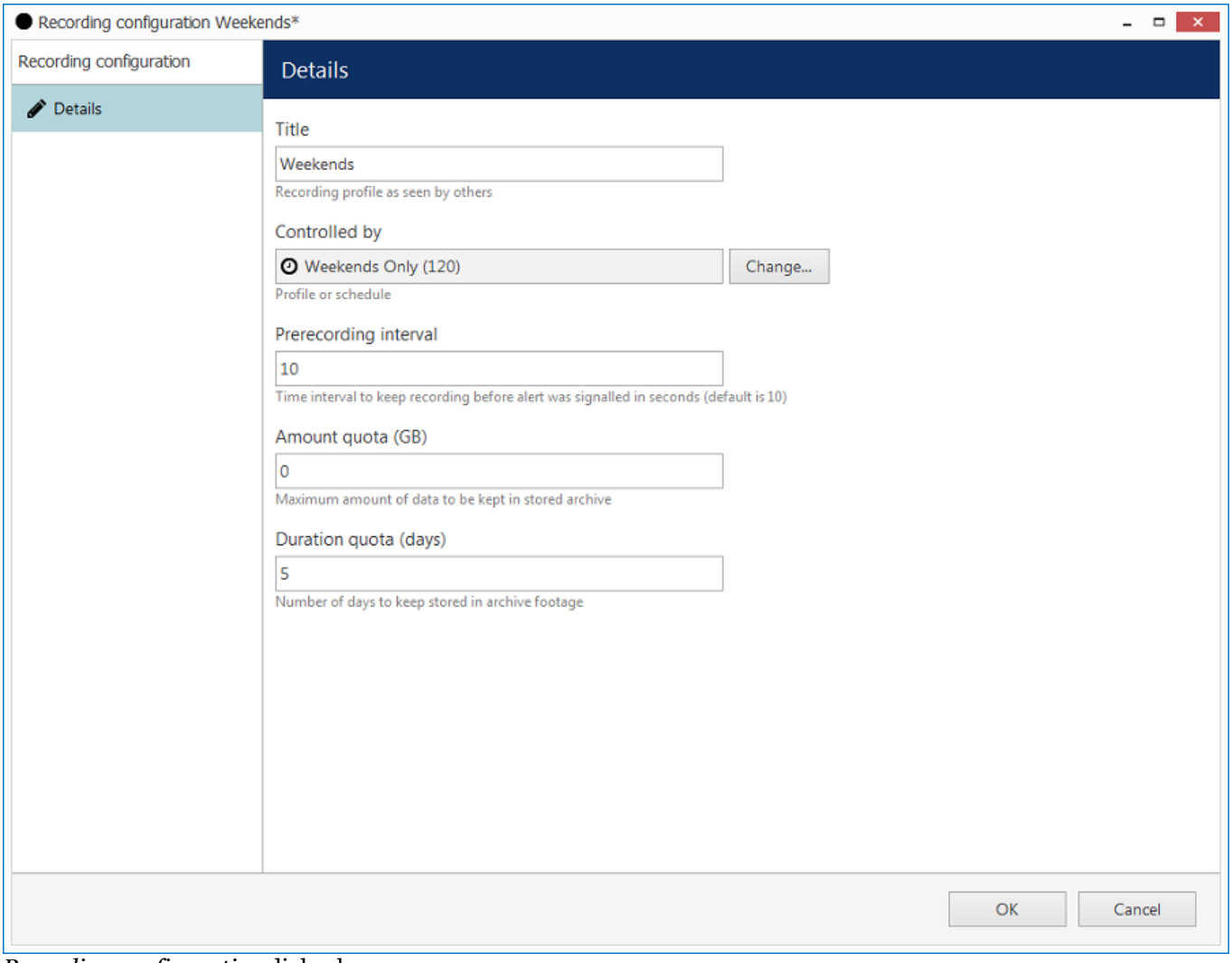
Create Recording Configuration

Recording configurations are global recording arrangements that can be assigned to a per-channel recording setup. Recording configurations can be based on a single recording profile or on a pre-defined recording schedule.

To add a new configuration, click the down arrow button next to + *New recording configuration*.



Recording configuration dialog box

The corresponding dialog box will then appear, allowing you to enter the configuration properties.

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Setting	Description	Default Value
Title	User-defined recording configuration name	[empty]
Controlled by	Choose existing recording profile or schedule for current configuration or create a new one from the sub-dialog	[none]
Pre-recording interval	Set the pre-recording interval for alert-driven recording, if applicable; note that large pre-recording interval will increase virtual memory usage - if the used profile is not alert or motion driven, set 0 here to decrease memory usage. Maximum value accepted by server is **60 seconds**.	10 seconds
Amount quota	Storage quota in GB: the maximum amount of space that can be taken up by recordings on each storage, if the maximum size is reached, the oldest footage will deleted; set 0 to disable any limitations	0 (unlimited)
Duration quota	Duration quota in days: the maximum number of days that recordings are kept in the archive on each storage; after this, recordings will be erased; set 0 to disable any limitations	0 (unlimited)

Before setting recording limitations, make sure there is sufficient space in the server storage for all cameras. The quotas may be ignored if actual storage size is insufficient, and this will result in shorter footage durations.

Note that maximum the **pre-recording** time is 60 seconds. Larger values will be ignored by server core. Also, actual pre-recording buffer may be smaller if the server detects that it is not required (see below). The **actual buffer size** in seconds will be displayed in the *Monitoring* section, under *Streams*. It may differ from your pre-recording setting in the recording configuration. Ganz CORTROL server applies smart logic here and traces situations when larger buffer is not necessary, or even preventing the system from normal operation. Thus:

- if the currently used recording profile does not involve any pre-recording (e.g., *Continuous recording*, or event-driven with no defined E&A events), the buffer size will be reduced to 0 - this is absolutely normal, once you add any recording-triggering events, Ganz CORTROL will automatically increase the buffer size
- if there is not enough memory for all channels (the server is overloaded), the server will reduce pre-recording buffers; channels with largest frame cache size will have their buffers reduces first pf all
- upon server startup, the buffer size is increased gradually for smoother start

If your pre-recording buffer size requires more memory than there available, you will see channels with top buffer size (in MB) appear marked red and with an * (asterisk) in the *Monitoring* section, under *Streams*. Also, the *Audit* section of Ganz CORTROL Console will contain events from the corresponding server stating that there is *Not enough memory to process frames*. If this happens regularly, review your server hardware using CBC AMERICA LLC provided hardware calculator and add more RAM to your server, or decrease the pre-recording interval duration wherever possible.

Note that quotas do **not** give priority to channels that are assigned configuration. For example, if you set the duration quota to ten days, it merely means that the maximum recording duration will be ten days for a channel with given configuration; this will **not** reduce recording duration for other channels.

When you have finished, click *OK* to save and exit. Recording configuration will now be added to the item list and will become available in channel recording configuration.

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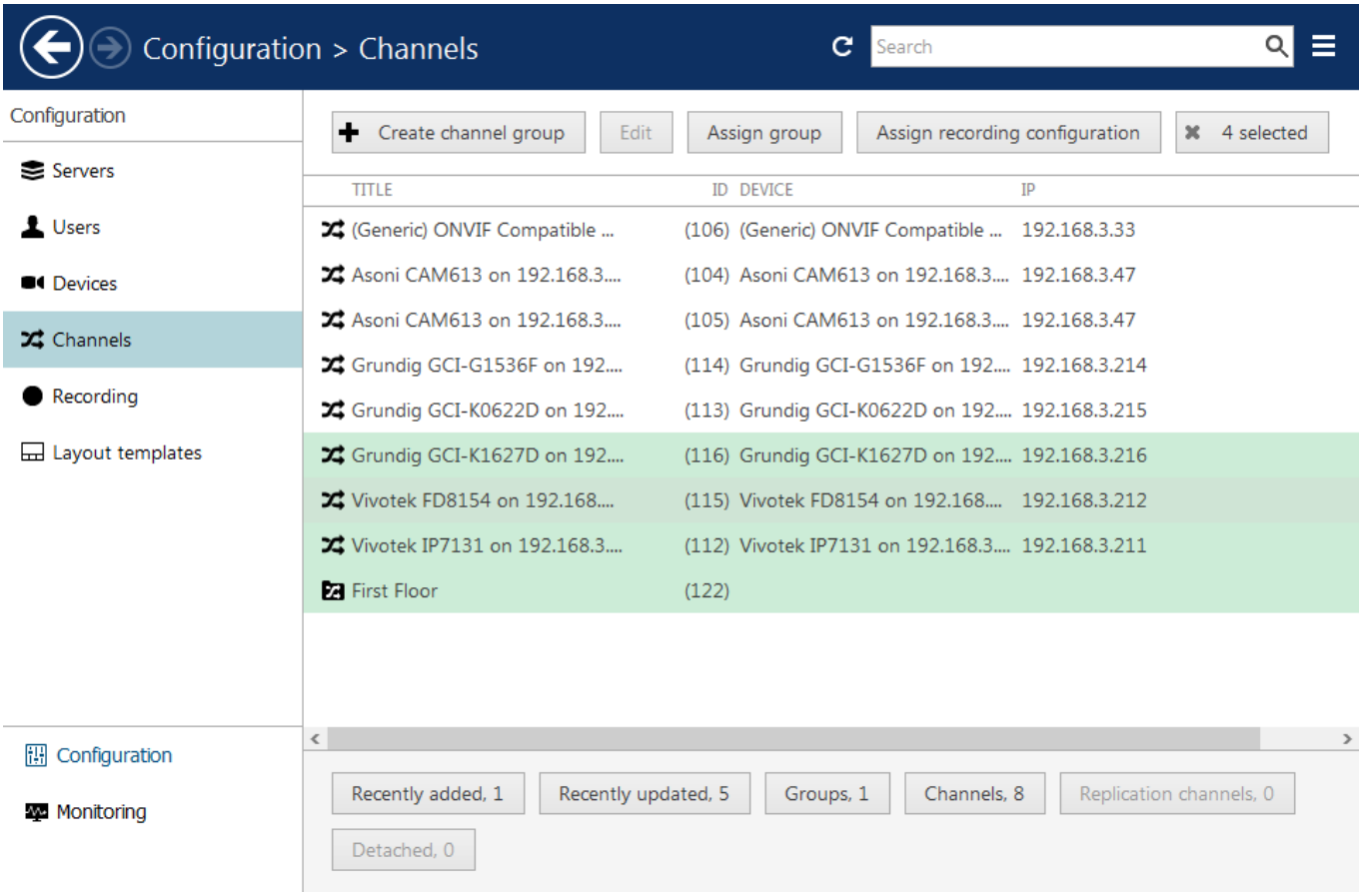
6.1 Assign Recording Configurations

Recording configurations can be assigned to channels and channel groups to define how data streams are recorded. There are several ways to assign a recording configuration:

- when using device autodiscovery: via *Found channels* tab (automatically discovered channels are assigned the *Continuous recording* configuration by default)
- when creating multiple devices: from multiple channel creation dialog box, *Channel settings* tab (manually added devices are set not to be recorded by default)
- after adding a single device manually: via *Channels* section, *Edit channel* dialog box, *Details* tab (manually added devices are set not to be recorded by default)
- for existing channels, per channel: via *Edit channel* dialog box, *Details* tab
- for existing multiple channels: via *Channels* section, using *Assign recording configuration* button on the upper panel

Topic body below explains how to assign configurations via main Ganz CORTROL Console window (latter option). All the rest alternatives are similar: you are offered configuration selection list at once from corresponding setup window.

Enable Recording



Select the channels that are subject to recording configuration changes

In Ganz CORTROL Console, choose *Configuration* section and select *Channels* from the menu on the left. Select one or multiple channels and/or channel groups (use *CTRL+click* or *Shift+click* to select several items at once) and then click the *Assign recording configuration* button on the upper panel. The list of available configurations will appear.

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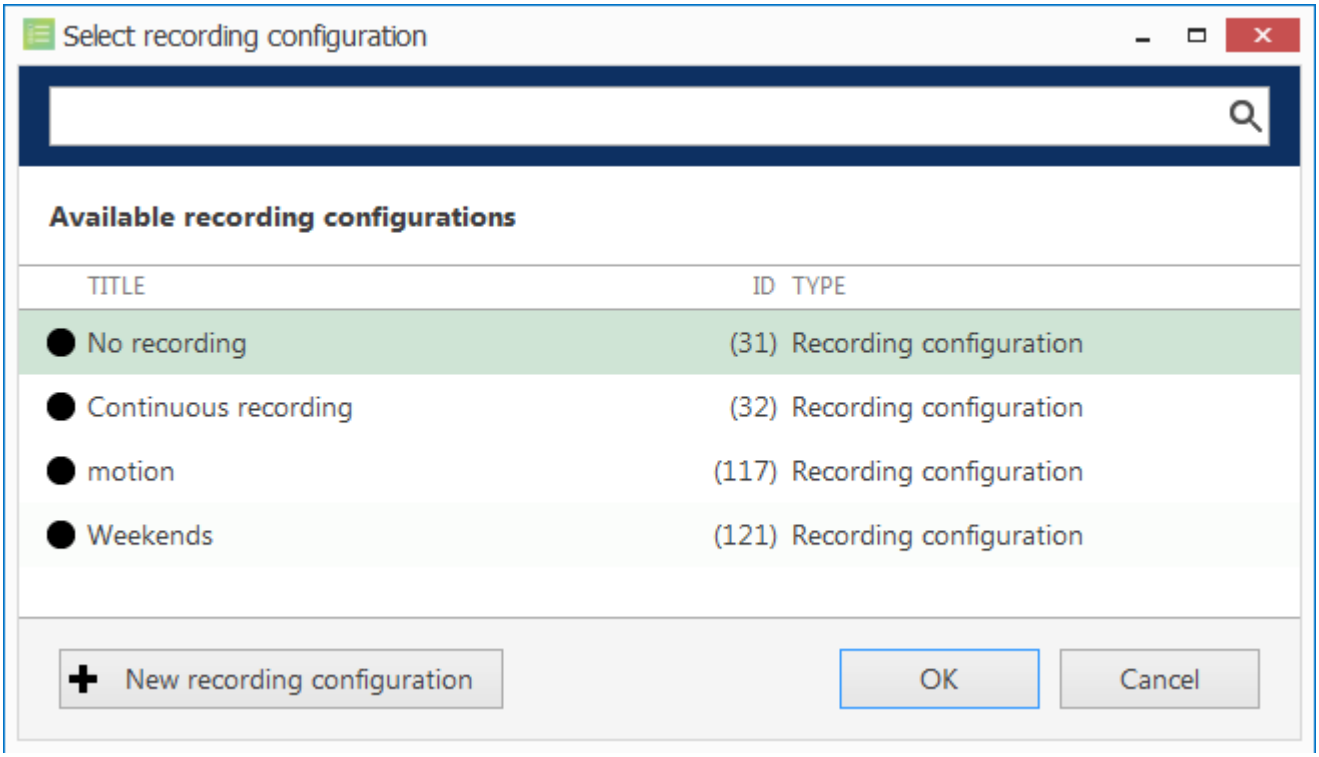

Choose a recording configuration for the channels selected

Note that you can only directly assign **configurations**, not profiles or schedules. Configurations are based on profiles or schedules (sets of profiles); please refer to the *Configure Recording Profiles* section of this document for details.

Click the + *New recording configuration* button below to create additional configurations from existing profiles/schedules at this point.

When you assign a **motion-based recording configuration** to a channel with a disabled motion detector, the software will automatically suggest enabling motion detection for the target channel. The camera-side detector is given priority; if it is not available, the software-side detector will be enabled and set to the high-performance mode. We recommend that you **review** the motion detector settings to make sure it operates as desired, especially if the camera-side detector is in use.

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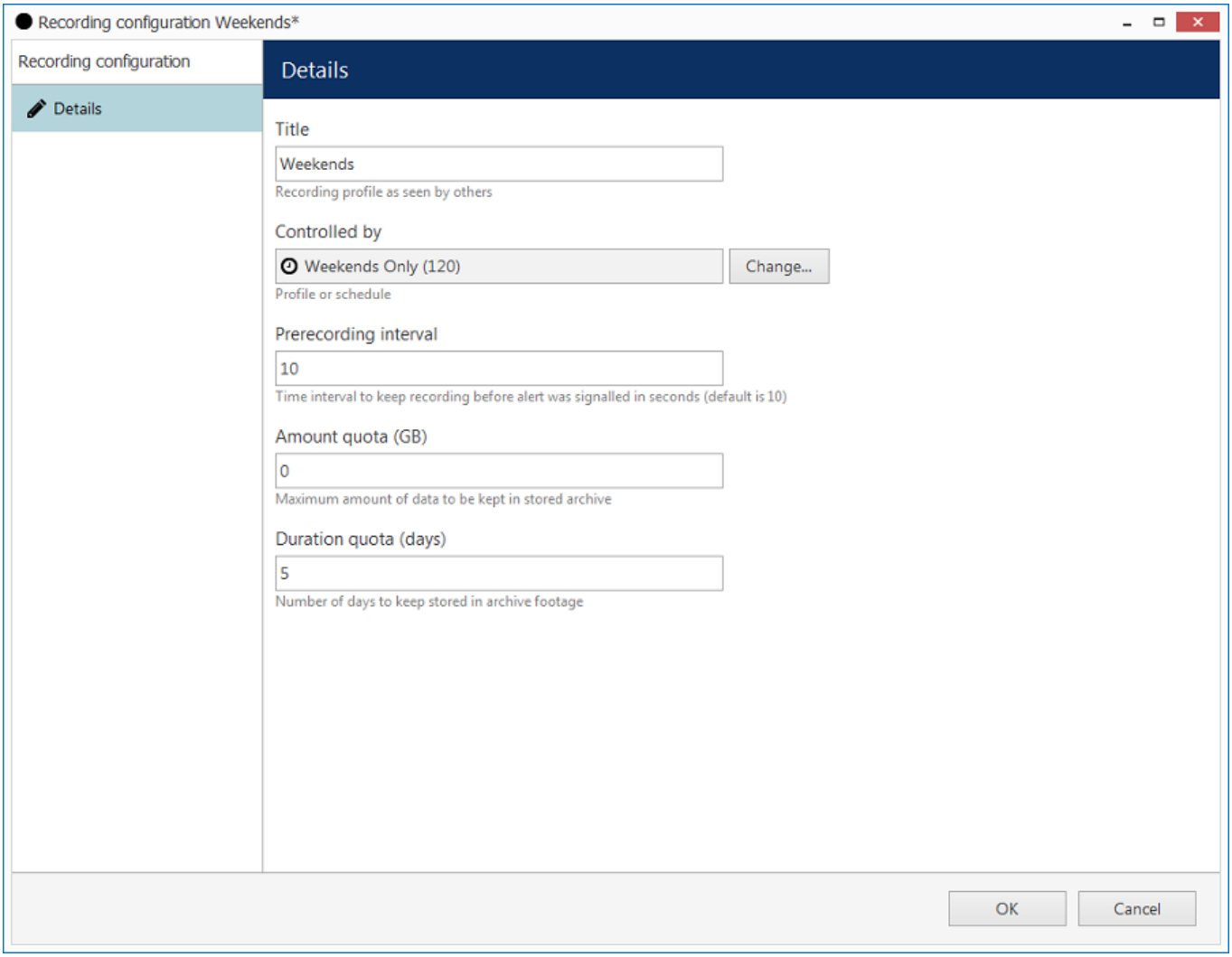

Add new recording configuration

Press *OK* to save and go back to the channel list: newly created recording configuration will be automatically assigned to channels previously selected.

Disable Recording

To disable recording for any channel(s), choose the *No recording* configuration, which is present in the list by default. If you have deleted it, simply create a new recording profile without any streams selected for recording and then create a recording configuration for this profile.

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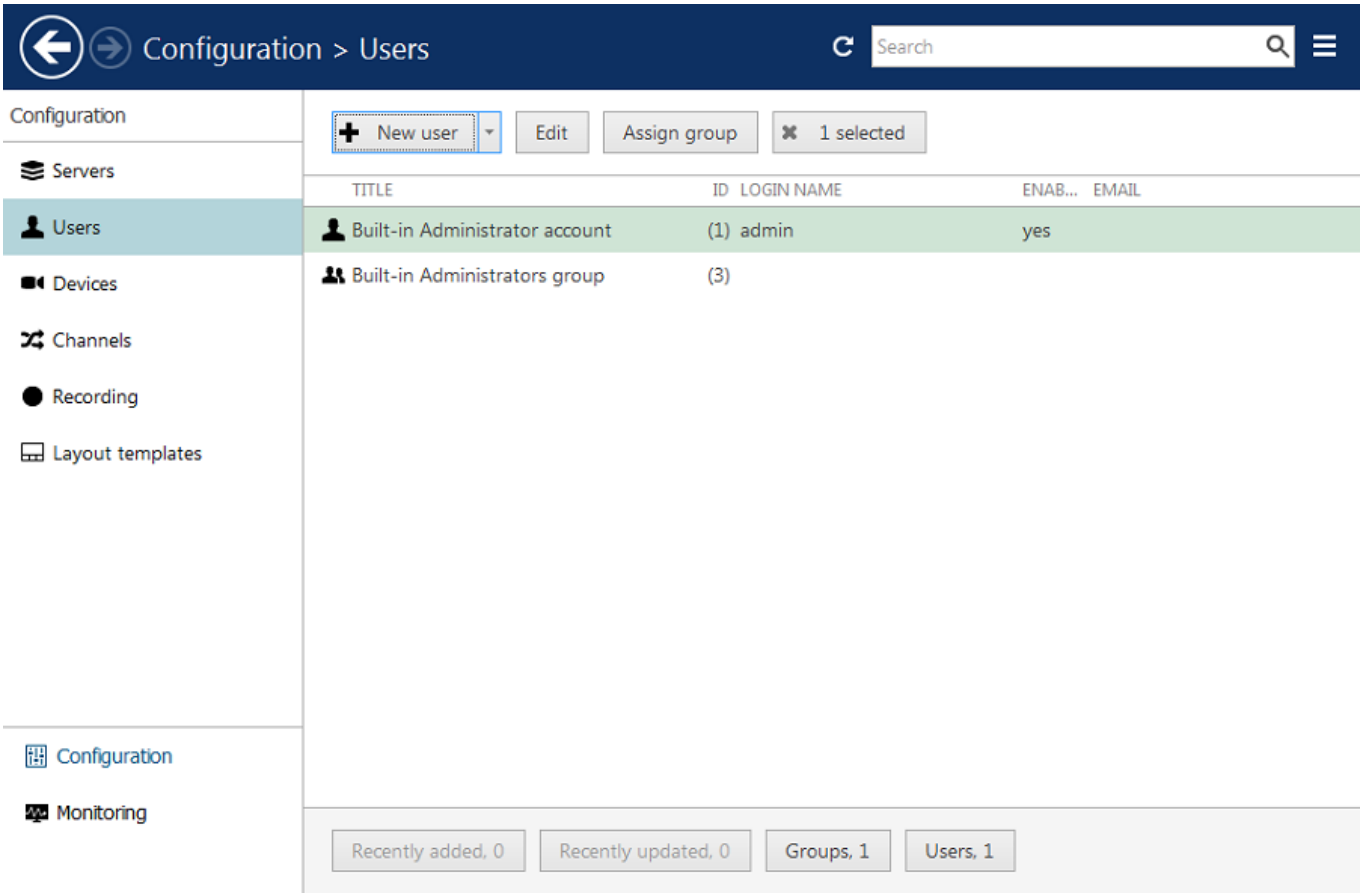
7 Add Users and User Groups

User management is accessible via the *Users* component of the *Configuration* section. By default, the system already features a built-in global Administrator account and built-in Administrators group.

> The built-in Administrator user account and built-in Administrators group are root users with access to absolutely all the available resources. As a result, resources choice is unavailable for the Administrators group, and it is also impossible to add Administrator user to any other group.
>
> Any users added as members to the built-in Administrators group will have the same full authority as root users.



Configuration -> Users

Add Users

Click the + *New user* button on the upper panel to bring up the configuration dialog box.

Details

Enter user login information here.

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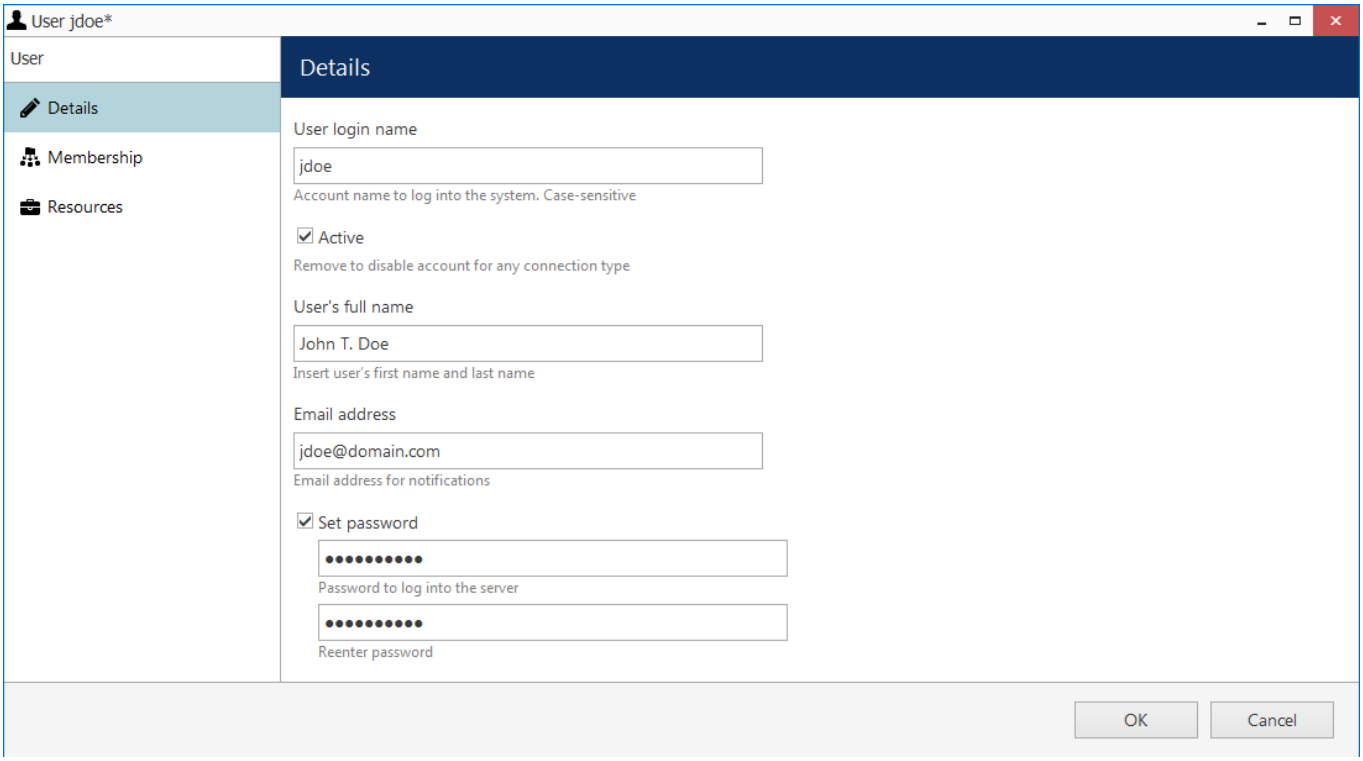

Enter user details

The table below details the available settings.

Setting	Description	Default Value
User login name	Alphanumeric user name for login, **no spaces** allowed	empty
Active	Allow the user to log in via Ganz CORTROL Console and Ganz CORTROL Client: any users who have been disabled will not be able to use software	Enabled
User full name	User full name	empty
Email address	User email address used for notifications	empty
Phone number	Phone number in international format (with country code) for 2FA	empty
Set/new password	Enable to enter a password and re-enter it to make sure no typos were made; mandatory when creating a new user	empty
Password never expires	User will not be prompted to change his password once in a while; enable this to ensure a permanent password for this user account (this setting can be overridden by the *User must change password.*. setting in the same dialog box); otherwise, password will expire after the number of days specified in the server security policy	Disabled (not selected)
User must change password at next logon	User will be prompted to change his password upon his next logon attempt; enable this if you want to force user change the password even if his password is set to never expire	Disabled (not selected)
User cannot change password	Enable this to prevent the user from changing his password; this option is not available if user password is not permanent or if you have selected to force user change their password at next logon using the settings above	Disabled (not selected)
PTZ priority*	0 = lowest, 10 = highest	5
PTZ priority	The amount of time for the PTZ controls to be locked after each user's action	10s

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timeout		
Override default limit of simultaneous connections	Maximum number of simultaneous connections allowed from this user account; the setting has priority over server-defined limitations; 0=unlimited	Disabled (not selected)

*See below to learn more about how PTZ priorities work.

Some user settings like PTZ priority are not updated immediately: the user will have to log out and then back in for the changes to take effect.

Deleting a user also removes all the settings related to that user; restoring these may be time-consuming. Use the *Active* setting to enable/disable users and temporarily block access for those.

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PTZ Priorities

PTZ priority is used to for:

- manual control of PTZ cameras (speed domes),
- automated PTZ control (tours and presets),
- control of interactive video channels (CrossLink devices allowing users to control **remote Web and Desktop** applications).

PTZ related user actions include manual PTZ control (mouse clicks) and the calling of PTZ presets and tours. CrossLink control involves manual interaction (mouse clicks).

PTZ tours always have zero (the lowest) priority, no matter who initiates it, so that any user can interrupt it.

After each user action, the control is locked onto the user with a higher priority for the amount of time specified as PTZ priority timeout (10 seconds by default). PTZ priority is used to decide who gains access first: user with a lower priority is blocked for N seconds to allow a higher-priority user to use PTZ. If two users with the same PTZ priority have an access conflict, they will be both granted PTZ access simultaneously.

If two or more users try controlling the **same device at the same time**:

- if both users have **the same** PTZ priority, the timeout will be ignored and each user's action will immediately take effect
- if user A has a **higher priority**, his first action will take control from user B with a **lower priority** and lock the control for the specified timeout, preventing everyone with a priority lower than A's from controlling the device; once the time is out, any user can try gaining the control again

Thus, the PTZ priority timeout is only taken into account when taking over control, and does not matter when the users have equal priorities.

Default PTZ priority for all users, including those built-in and imported, is equal to 5 (five, medium priority). You can assign any user a higher PTZ priority (six to ten) or a lower one (four to zero) by editing individual user properties.

For **PTZ preset actions** in E&A, you will be asked to specify the PTZ priority when creating the action. For **PTZ tour actions**, the priority is always 0, allowing any user to interrupt the preset execution.

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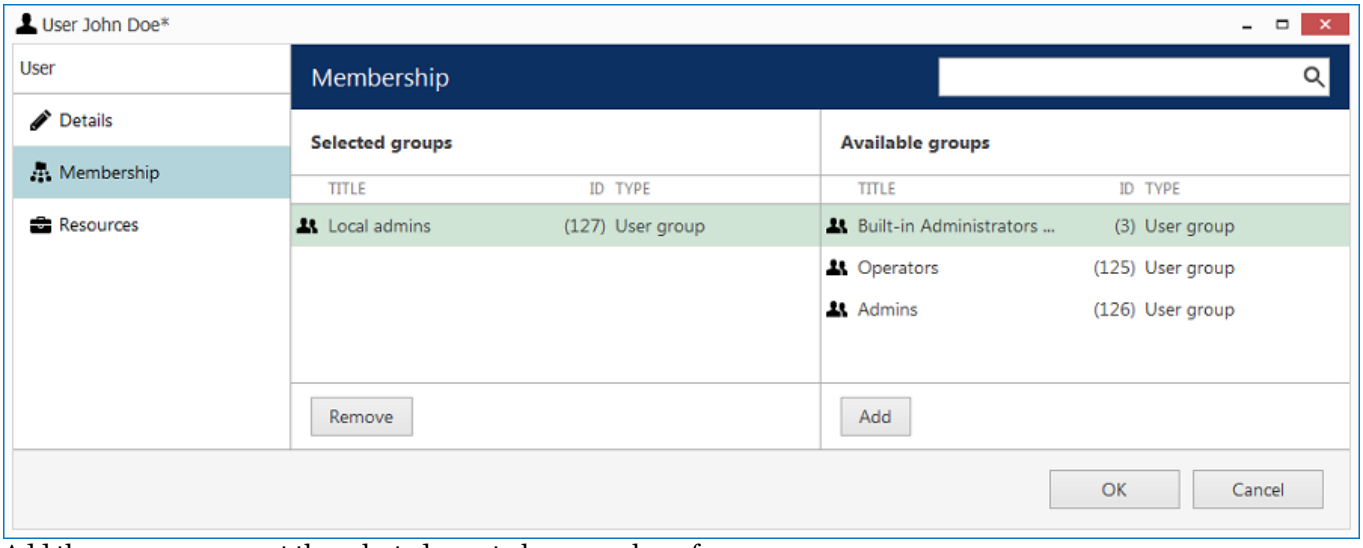
Membership

Choose which groups you want the selected user to be a member of. Every user can participate in one or multiple groups, depending on the system structure.

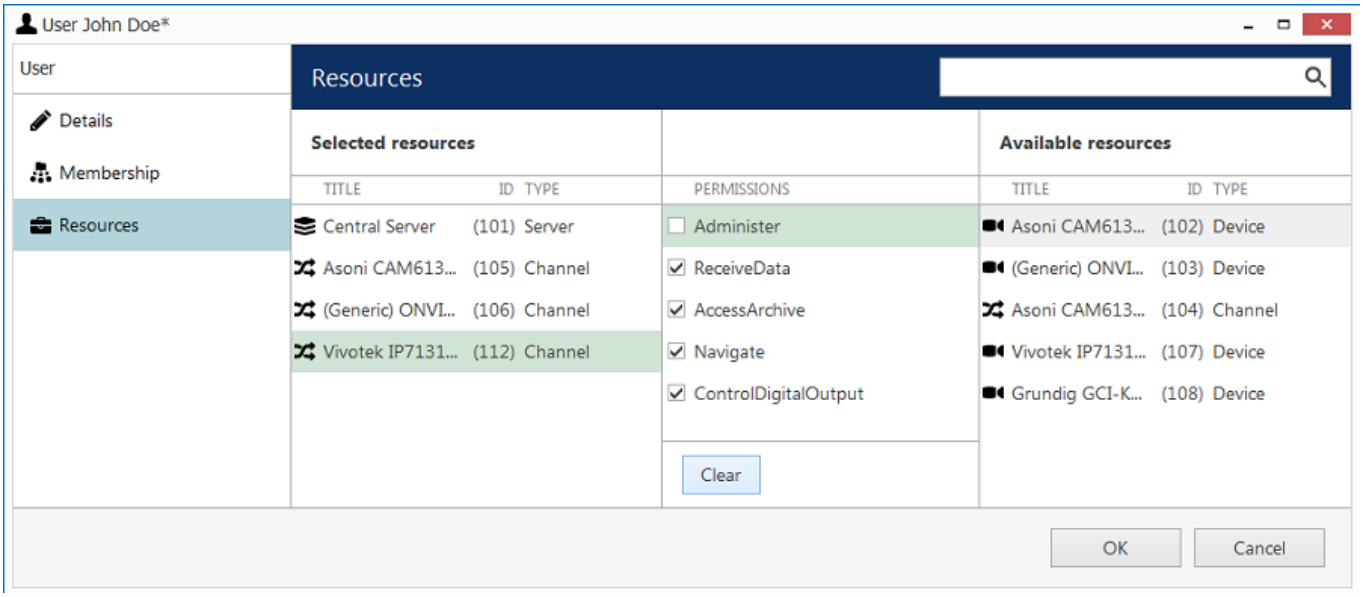


Add the groups you want the selected user to be a member of

Manipulate the groups by double-clicking a group or using the *Add/Remove* buttons below. Use the *Search* field in the upper-right-hand corner to filter the groups available.

Resources

Each user can be granted permissions for server and channel/channel group administration. Select resources by adding at least one permission; remove them by clearing permissions using the *Clear* button below, or simply by double-clicking them in the *Selected resources* list.



Add resources for the selected user

Click *OK* when you have finished to return to *Users*; the newly created account will be added to the item list. Use the buttons on the upper panel to edit user details at any time, to quickly assign groups and remove specified users (hold *CTRL* of *Shift* to select multiple items at once).

If there are a large number of user accounts, the *Search* field in the upper-right-hand corner and the content filters in the bottom panel can help you quickly find the accounts you are looking for.

Add User Groups

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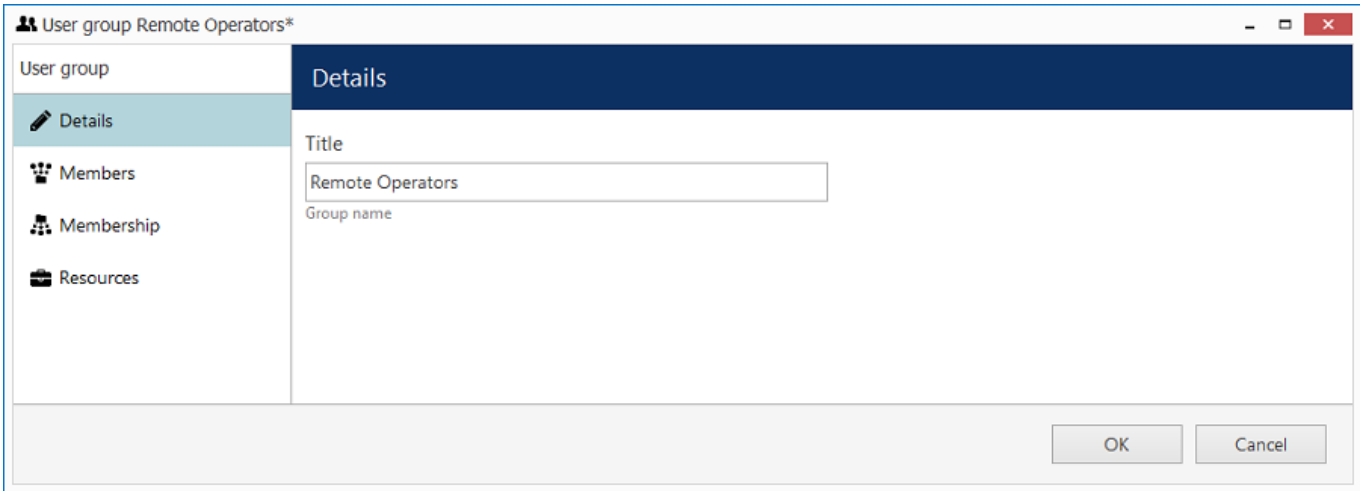
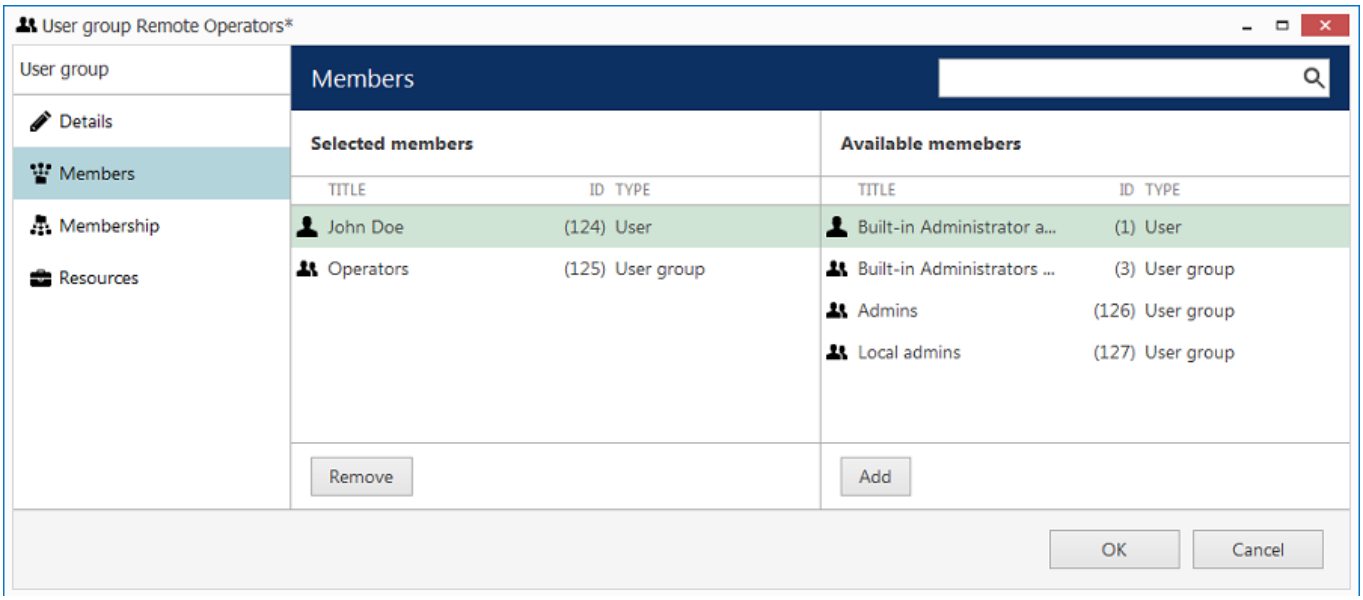
When the number of users is large, it may be more convenient to create multiple user groups and then distribute resources between user groups, rather than between individual users. One user can be a member of several groups.

Click the down arrow near the + *Create new user* button and select *New user group* from the drop-down list to bring up the configuration dialog box.



New user group

In the *Details* tab, enter group name.



Choose group members

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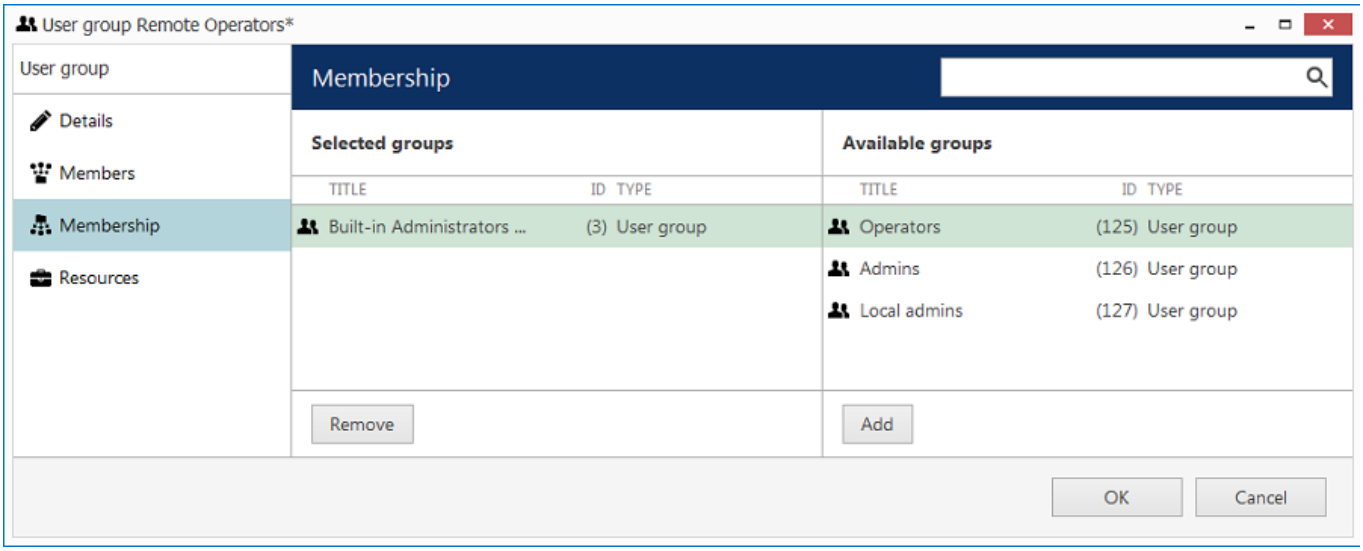
In the *Members* tab, choose which users and/or user groups will become members of the target group: manipulate items by double-clicking them or using the *Add/Remove* buttons below.



Choose group membership

In the *Membership* tab, select the group(s) you want to include the current group as a member: manipulate items by double-clicking them or use *Add/Remove* buttons below.

Finally, you can grant resources permissions using the *Resources* tab in a similar way to adding a single user. Select resources by adding at least one permission; remove them by clearing the permissions using the Clear button below, or simply by double-clicking them in the *Selected resources* list.

Click *OK* when you have finished to return to *Users*; the newly created group will be added to the item list. Use the buttons on the upper panel to edit the group details at any time. If there are a large number of user accounts, the *Search* field in the upper-right-hand corner and the contents filters in the bottom panel can help you to quickly find the accounts you are looking for.

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7.1 Active Directory and LDAP User Import

Ganz CORTROL allows you to import users and user groups from the existing Active Directory/LDAP service database. The only thing that is left to do is to specify permissions for the imported users and/or user groups (referred to as *AD users* further in this topic).

Please keep in mind that in multi-server systems - using Ganz CORTROL Global - all recording servers must belong to the domain for the AD/LDAP imported users to be able to access their resources - streams and the recorded video archive. If some of the servers are out of the domain, external users will be unable to connect to them (this happens automatically, in background) and there will be errors instead of the video streams.

Active Directory and LDAP user import is available in the following Ganz CORTROL versions:

- Ganz CORTROL Global - fully supported for all versions
- Ganz CORTROL Server v.1.4.1 - 10 users
- Ganz CORTROL Server v.1.5.0 and newer - fully supported

AD/LDAP imported user accounts can be used to log into Ganz CORTROL Console, Ganz CORTROL Client, and Web client for Ganz CORTROL Streaming Server. These user accounts **cannot** be used in Ganz CORTROL Mobile applications at this point.

Note that it is not necessary for you to be logged into Windows under the same AD account; rather, once AD accounts are imported as external users into Ganz CORTROL, you can use any valid AD account credentials to log into Ganz CORTROL Console or Ganz CORTROL Client. Also, note that you are always required to enter the password for the AD account, even if you are logged under the same user account in your current Windows session.

If you are using AD/LDAP user accounts for the **Web login**, we strongly recommend that you turn on HTTPS for enhanced safety. Plain HTTP will work, too, but is not recommended for security reasons.

For you to be able to log into a Ganz CORTROL server with an AD user account, you must be able to log into the target server computer with the same AD account. If you are unable to do so, contact your Windows administrator and let him check the effective policies.

In order to use your imported AD account with Ganz CORTROL, type in your full domain name and user name, and then specify the password. Please see the description below on how to add your AD users into Ganz CORTROL.

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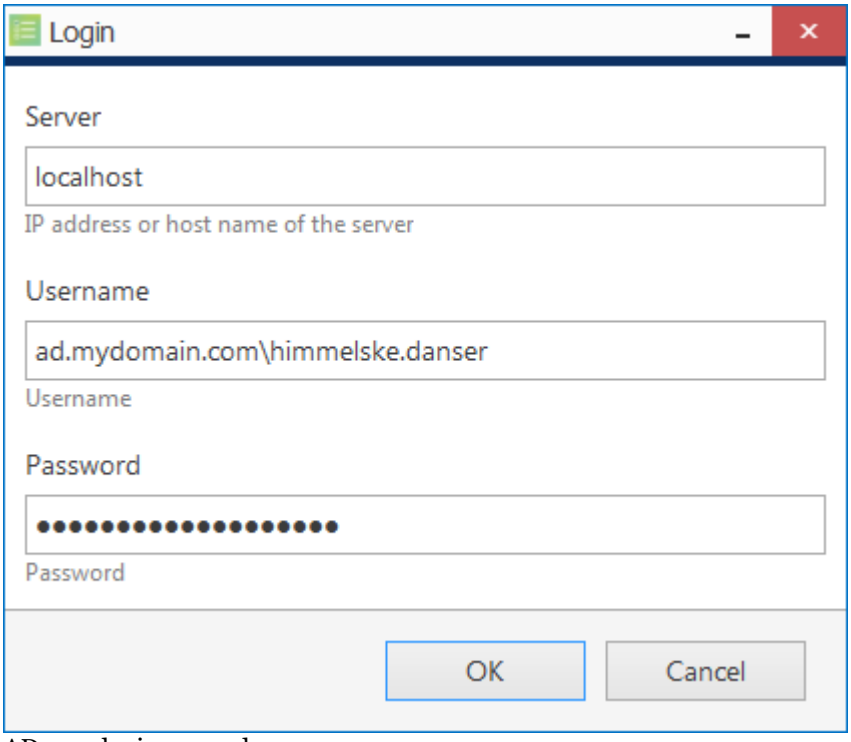
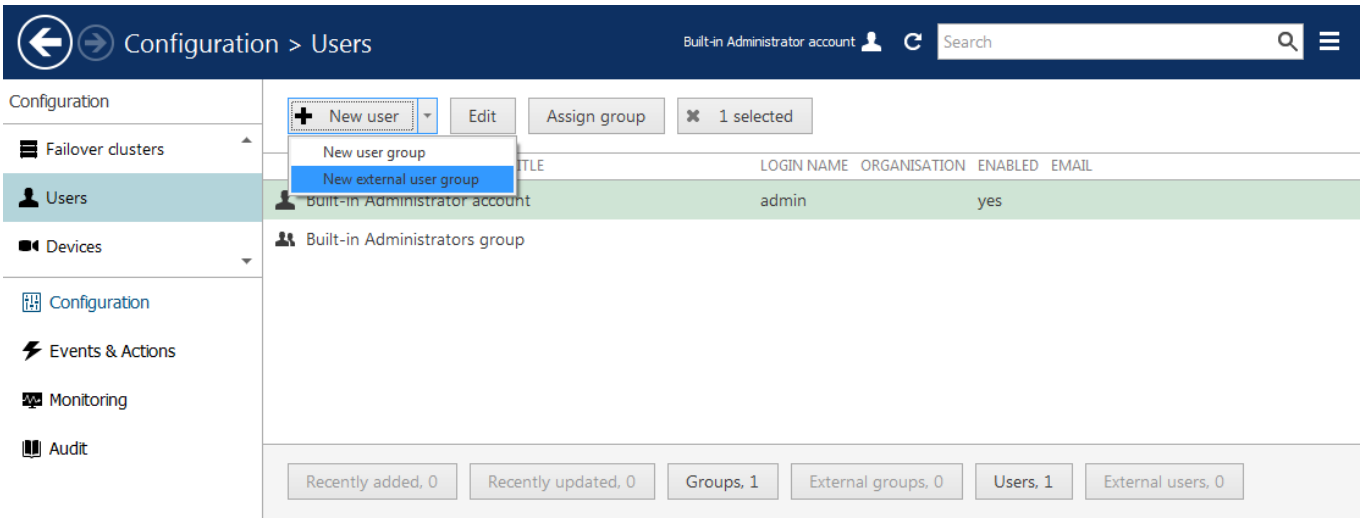


AD user login example

Add Active Directory and LDAP Users

In Ganz CORTROL Console, open the *Configuration* section and choose *Users* from the menu on the left; then, click the little arrow next tot the *+New user* button and choose *New external user group* from the drop-down list.



Create new external user group from the *Users* menu section

On the *Details* tab, click the *Change* button next to the empty *External group* field in order to load the available AD group list in a separate dialog box.

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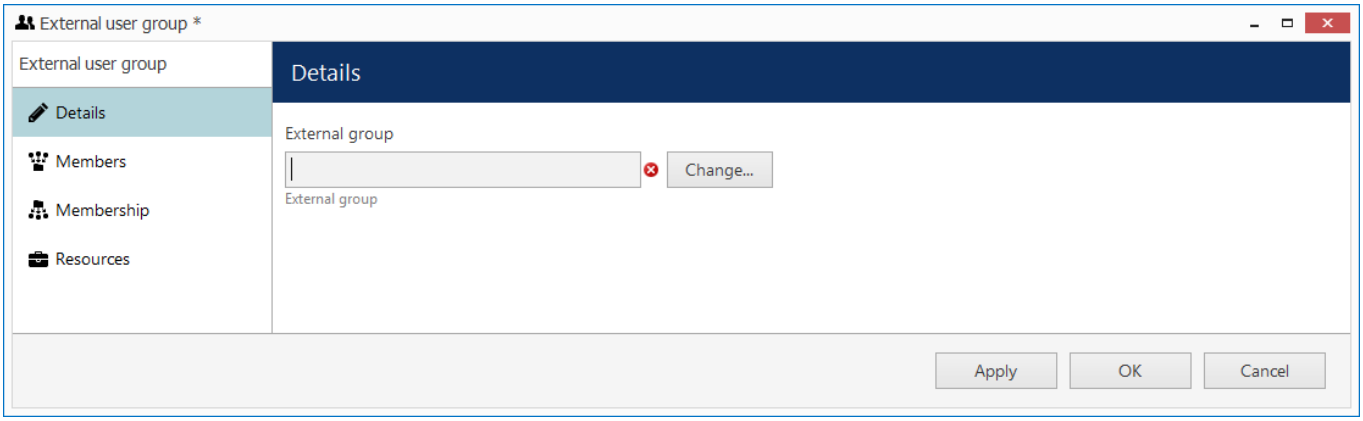
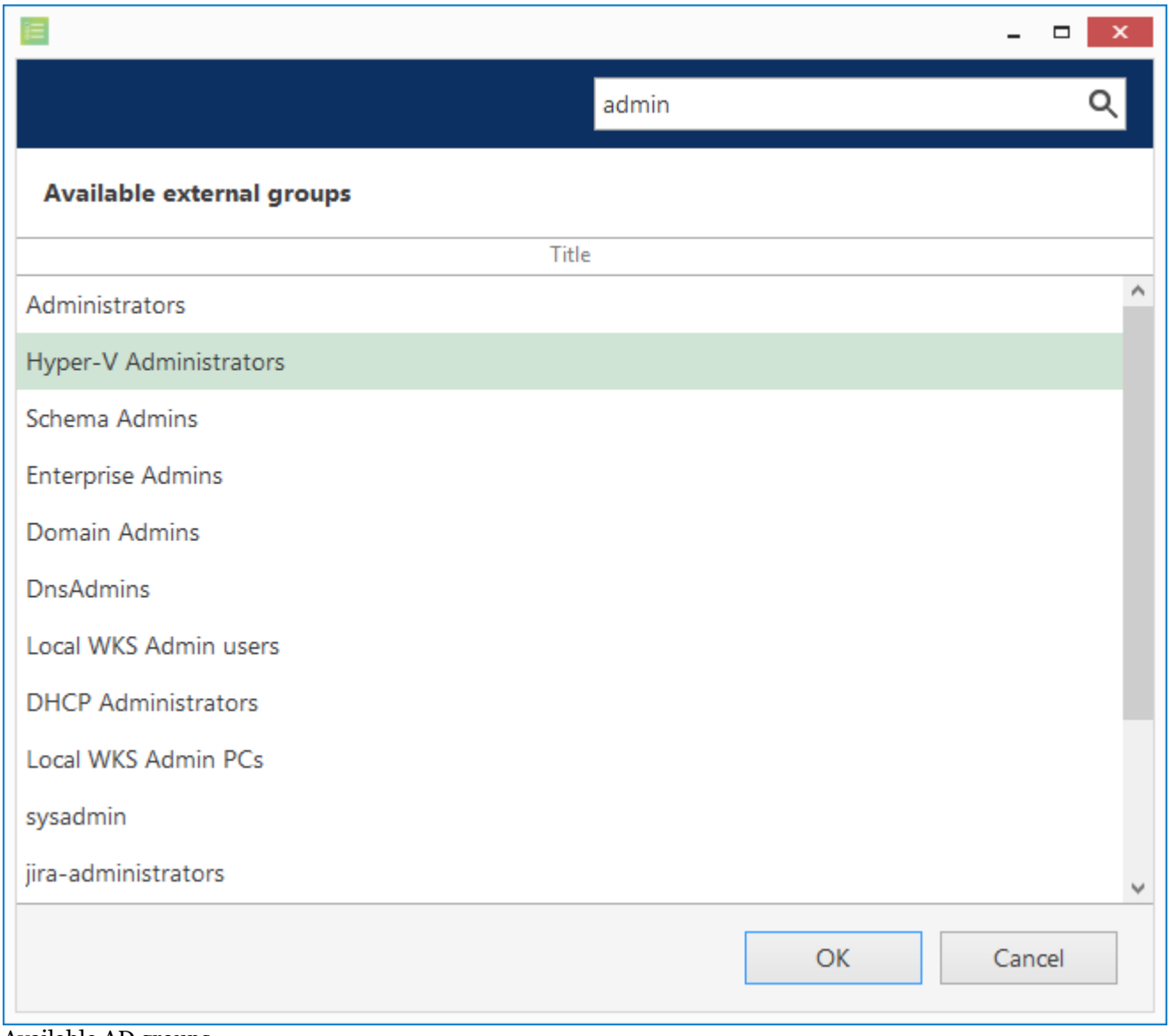


New external user group

Ganz CORTROL will automatically fetch all user groups available via your Windows AD service. Pick a group from the list of available AD user groups and confirm your choice either with a double-click or using the *OK* button below.



Available AD groups

The selected user group will appear in *External group* field in the *Details* tab. Switch to the *Members* tab to view the imported user list.

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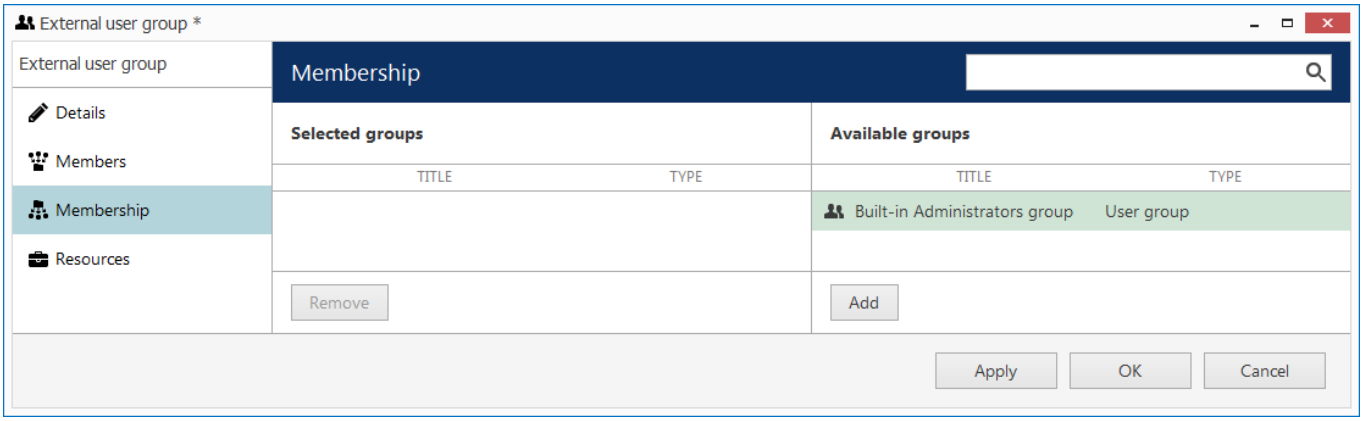
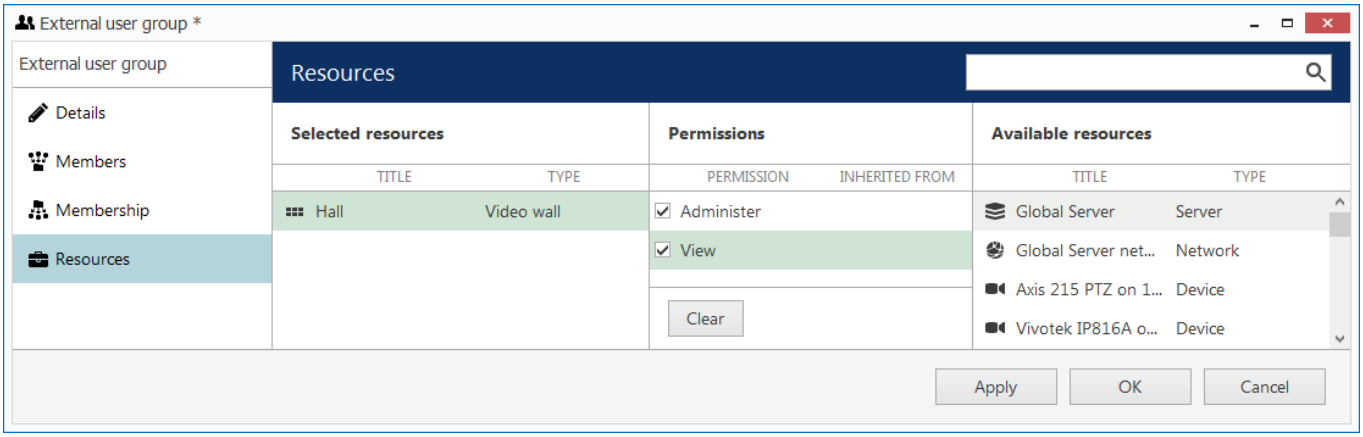
On the *Membership* tab, you can choose an internal user group to contain the newly imported external user group (nested grouping). All user permissions inherited from the higher level group will be applied to the members of the imported external user group and will be displayed as grayed out in the *Resources* tab.



You can make the external user group a part of some other internal user group

If you have decided to make no nested groups or wish to add more permissions specifically to the AD user group, go to the *Resources* tab to manage the user permissions.



Manage user permissions on the *Resources* tab

Select resources by adding at least one permission; remove them by clearing the permissions using the *Clear* button below, or simply by double-clicking them in the *Selected resources* list.

Click *OK* when you have finished to return back to *Users*; the newly created external user group as well as all users contained in that AD group will be added to the item list. Use the buttons on the upper panel to edit the group details at any time. If there are a large number of user accounts, the *Search* field in the upper-right-hand corner and the contents filters in the bottom panel can help you to quickly find the accounts you are looking for.

Edit External Users Or User Groups

After adding the external user group, you can edit the group properties as well as individual external users. In order to do this, select the target user/user group in the list and click the *Edit* button on the upper panel, or, alternatively, simply double-click the desired item to bring up the configuration dialog box.

Editing an external user group will be pretty much the same as adding a new one; individual external user settings will have some differences comparing to the regular, built-in user settings.

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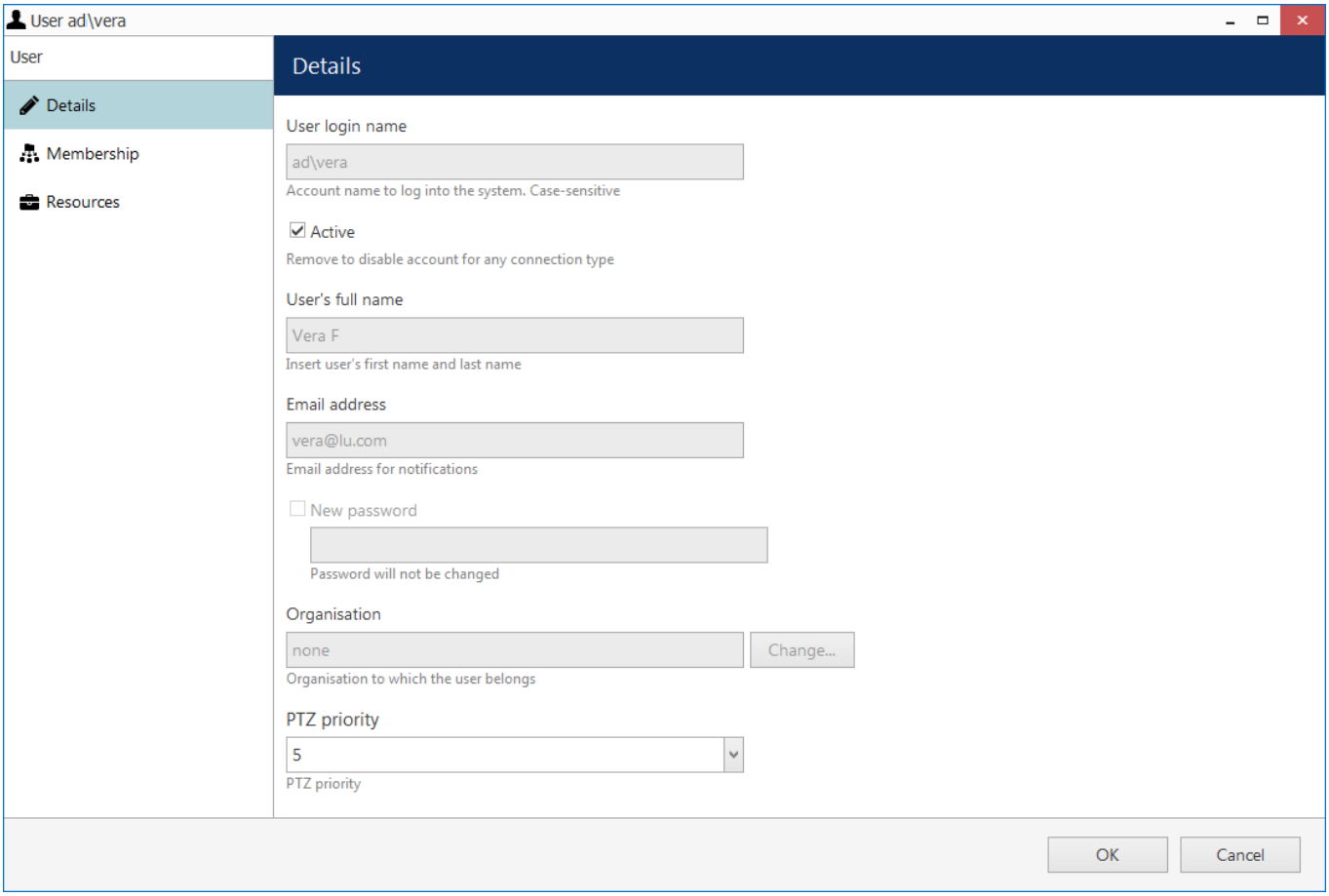

Edit imported user

On the *Details* tab, the only settings available for editing will be user account status (enabled by default) and PTZ priority (which will be 5, by default). All the other properties will be greyed out as they cannot be changed via Ganz CORTROL and should be changed via Active Directory instead.

If two or more users try using PTZ control of a device at the same time, **PTZ priority** is used to decide who gains access first: user with a lower priority is blocked for ten seconds to allow a higher-priority user to use PTZ. If two users with the same PTZ priority have an access conflict, they will be both granted PTZ access simultaneously.

Default PTZ priority for all users, including those built-in and imported, is equal to five (medium priority). You can assign any user a higher PTZ priority (six to ten) or a lower one (four to zero) by editing individual user properties.

On the *Membership* tab, you can choose an internal user group to contain the AD user as a member. All user permissions inherited from the group will be applied to the target AD user and will be displayed as grayed out in the *Resources* tab. You can assign additional user-specific permissions on the *Resources* tab.

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7.2 Permissions and Membership

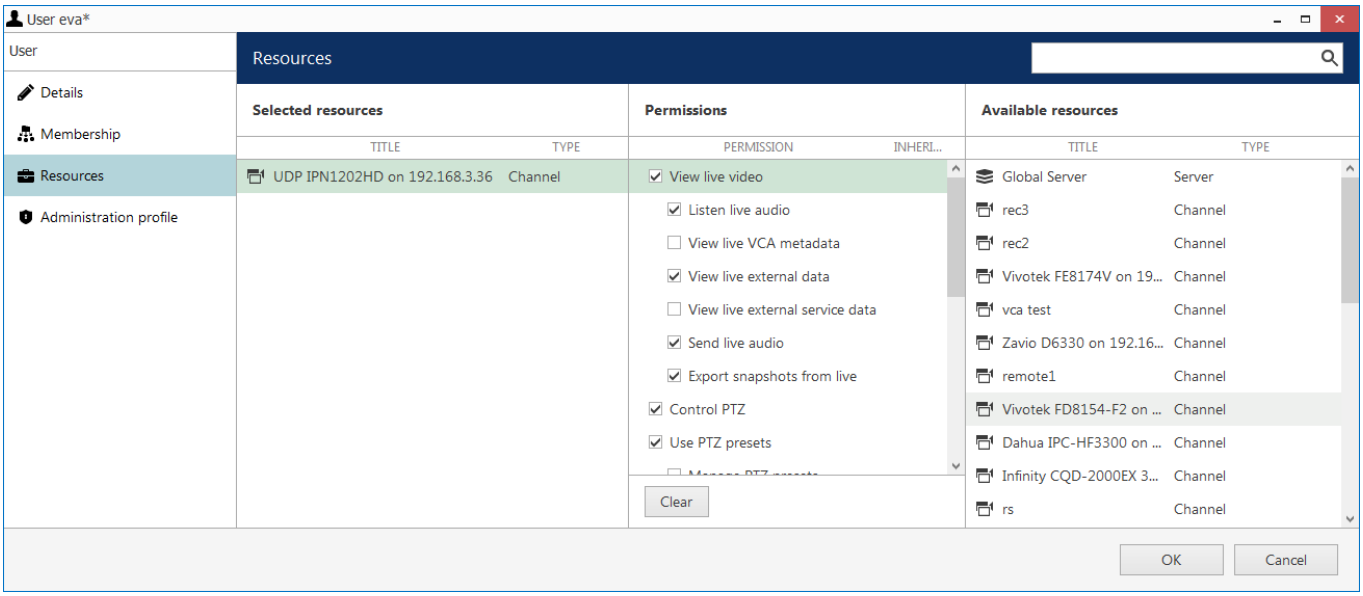
You can handle the user and user group **access permissions** for channels, devices, servers and other resources via the *User* and *User group* configuration dialog box -> *Resources* tab, or via resource settings -> *Permissions* tab. **Administrative permissions** are handled in the *Edit User/User group* dialog box, under the *Administration profile* tab. Most of the events that are raised as a permission is used are logged in the *Audit log* and are available in the *Audit* section of Ganz CORTROL Console.

Please note that some of the permissions may not be applicable to your software license edition.

In Ganz CORTROL version **1.6.0**, major changes were made to permission management. As a result, configuration imported from an **XML** file (from ZNSNVR) will **not** contain any user permissions: you will need to **review and set all user permissions after importing the configuration**.

Access Permissions

All the available resources are listed in the column on the right; click any item to load the permission list in the central column. Then, **mark** all the permissions you wish to grant; resources having at lest one permission enabled will be automatically moved to the left column.



Permission management example

To **remove** all permissions for some resource, simply double-click it in the *Selected resources* list on the left.

It is not possible to select **multiple** resources for the permission management. You are welcome to use resource **grouping** (e.g., channel groups) for easier and faster permission management.

When permissions are inherited from some group(s), a corresponding mark will appear in the central column next to the permission type.

The following types of permissions are available (each one can be defined separately):

- **Server**
  - **Playback**: allows users to access recorded video, audio, VCA metadata and external data from the specified server for those recordings that do not have corresponding channels in the server configuration (i.e., **orphan archive tracks**)
  - **Export**: allows users to export video clips and snapshots from such recordings
- **Channel**
  - **Live**: access live video, audio, VCA metadata, external service data, external data (from *Data Sources*), send audio OUT and export snapshots from the live view mode
  - **PTZ**: general **PTZ control**, preset and tour usage, preset and tour management OR

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interactive control of CrossLink devices
    - **Playback**: access to recorded video, audio, VCA metadata, external service data, external data (from *Data Sources*), snapshot and video clip export from all playback modes, view and manage bookmarks
    - **Restricted playback**: same permission set with a time limitation**
    - **Uncategorized**: back up and delete archive, protect archive from deletion, remove protection
- **External Service Group**
    - **View live data**: see the live data coming from the external services in the target group
    - **External service search**: browse recorded external service data
- **Layout**
    - **View**: see and use the layout in Ganz CORTROL Client
    - **Manage**: delete or replace existing layouts via Ganz CORTROL Client
- **Layout Group**
    - **View**: see and use layouts from the target group in Ganz CORTROL Client
    - **Manage**: add new shared layouts from Ganz CORTROL Client and delete existing layouts
- **Visual Group**
    - **View**: see visual group contents in Ganz CORTROL Client*
- **Map**
    - **View**: see and use the map in Ganz CORTROL Client
- **Webpage**
    - **View**: see and use the webpage in Ganz CORTROL Client
- **Software Counter**
    - **Access archived VCA metadata**: see the counter in Reports in Ganz CORTROL Client
- **Video Wall**
    - **View**: see and use the video wall in Ganz CORTROL Client
    - **Manage**: change video wall contents via Ganz CORTROL Client
- **User Button**
    - **View**: see and use the target user button to viewports in Ganz CORTROL Client and in Ganz CORTROL Mobile applications

Starting from the software version 1.15.0, it is possible to grant individual rights for software counters. However, if the *Access archived VCA metadata* permission has been given for the **whole server**, the target user or user group will have access to **all counters** on that server, regardless of the individual counter permissions.

*A visual group will only be displayed in Ganz CORTROL Client if the user has permissions to see at least one visual group element.

The permission sets under **time-limited *Restricted video playback* and **full** *Video playback* are essentially the same. The difference is that restricted access only allows users to access the last N minutes/hours/days of the archive. Therefore, the two sets are mutually exclusive. The **restricted interval** is defined individually for each server in the server **storage settings**.

When you have finished, click *OK* to save and exit.

Administrative Permissions

Administrative permissions for the resources, servers and connections can be managed via *Administration profile* tab in the user management dialog box.

Giving a user at least one permission from the *Console* section will allow this user to log into the target server via Ganz CORTROL Console. The corresponding resources will be available for configuration and all the rest of the contents will be hidden.

The following types of permissions are available for per-user/per-user group configuration:

- **Client**

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- Login via **Monitor**: connect to the target server via Ganz CORTROL Client application
- Login via **Monitor** without entering **login reason**: if unchecked, the user will be prompted to enter a justification (comment) before logging in
- Login via **HTTP**: connect to the target server via Web client and from external services, including LPR and FR
- Login via **Mobile**: connect to the target server from Ganz CORTROL Mobile and OS X app

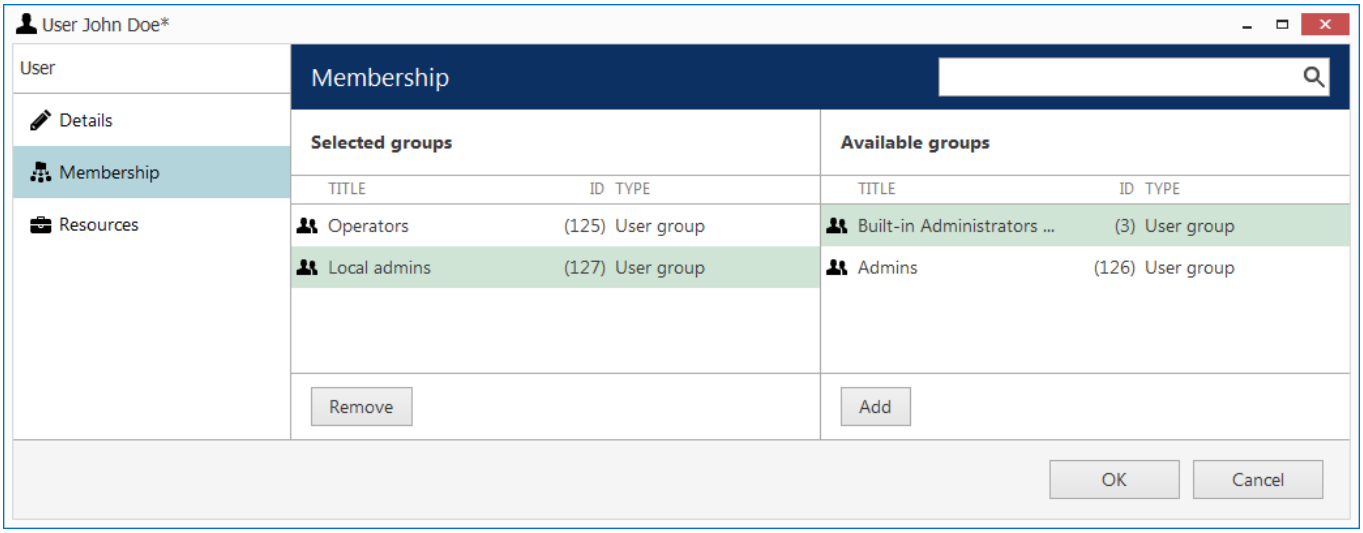
- **Console**
  - Manage **organisations**, **servers**, **users**, **permissions**, **networks**, **external services**: enables the user to access the configuration of the corresponding server contents
  - Manage **devices**, device **channels**, **visual groups**, **layouts**, **layout templates**, **video walls**, **maps**, **data sources**, **user buttons**, **shared channels**: enables the user to edit existing and create new (if applicable) resources of the given type
  - Manage recording: create and edit **recording profiles, schedules** and **configurations**
  - Manage Event & Action rules: create, remove and edit events, actions and all the related resources in the **Events & Actions section**, including mail servers, conditions etc., regardless of permissions for the source items
  - Access **audit log** and **monitoring section**: view all the information in the server *Audit* and in the *Monitoring* sections
  - Manage **auto backup**: access scheduled backup configuration
  - Start wizard: allows users to run the **quick setup wizard** via Ganz CORTROL Console for step-by-step configuration
  - **Remote upgrade**: access the remote upgrade section of Ganz CORTROL Console, set up and do the remote upgrade procedure
  - **Import configuration**: load configuration from XML (from the old product version) and import existing Ganz CORTROL database

Starting from version 1.13.0, there is an additional user permission under *Administration profile*: log into Monitor application without entering **login reason**. If this permission is granted, users will log into the Ganz CORTROL Client application as usual; if not, an additional prompt will pop up, asking them to enter a justification for logging into the server.

Membership

Users can be grouped logically to make permissions management easier. Groups can overlap, meaning that a single user can belong to multiple groups at once, and some groups can be nested - i.e., one group can contain one or more other groups. In addition to own permissions, each user inherits permissions from all the groups he is currently in.

To manage user membership from the user configuration dialog box, double-click any user. This will open the properties window, where you can switch to *Membership* tab. Here you can pick which group - or groups - this user will be a member of.



User membership

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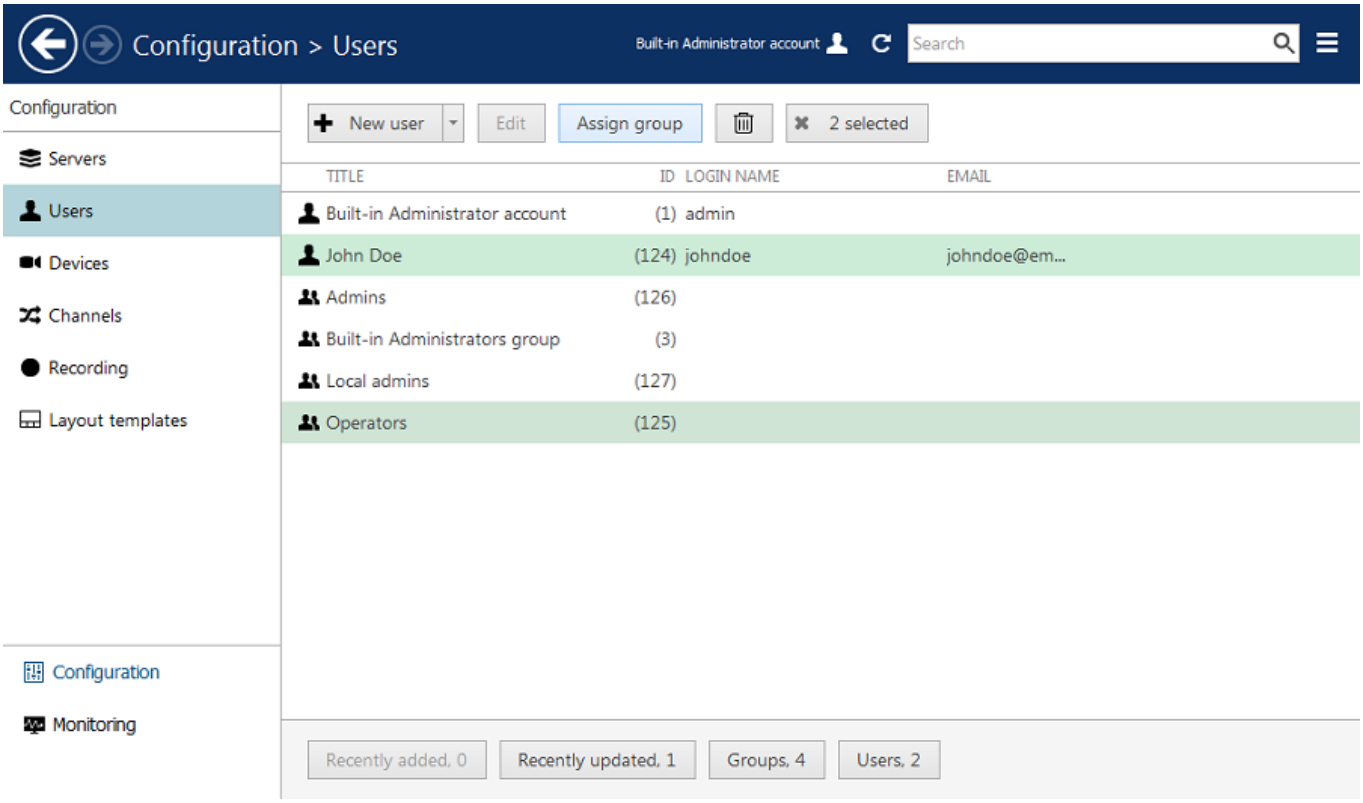
Double-click on groups or use the *Add/Remove* buttons below to move groups between columns. When you have finished, click *OK* to save changes and exit.

Alternatively, you can select one or multiple users from the users list, then click the *Assign group* button on the upper panel: a list of available groups will appear, allowing you to select one of the existing groups. After this, click *OK* to add selected users to the target group.



Select multiple users and assign them to a group

We strongly recommend grouping users and resources as it makes the permission management process much easier. Individual user permissions can be combined with permissions inherited from multiple groups at once.

Permission Sets and Dependencies

Permission management in Ganz CORTROL is flexible and allows each individual user permission to be enabled separately, thus giving the Ganz CORTROL administrator full control over the system. Sometimes, in order to give enough user rights for specific use case, several different permissions should be granted. This section covers some examples and gives you an idea of what permissions may be related, as well as explains some peculiarities about the permission management in Ganz CORTROL.

General

Administration profile permissions to manage maps, visual groups, live podcasts etc. include access to all channels from the *Edit* dialog of these entities. For example, a user is granted permission to manage maps but does not have any per-channel permissions: when creating a map, he will be able to put channel markers on it and associate these markers with any channels on the server. At the same time, he will have no access to the channel management whatsoever.

Allow a User to Add New Devices

In order to enable a user to add new cameras or devices of other types, it is necessary to grant the following permissions from the *Administration profile*:

- *Manage devices*
- *Manage device channels*

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This is necessary as devices and channels are related entities in Ganz CORTROL and a single Manage devices permission is not enough as new channels are created automatically alongside with the newly added devices.

The *Manage devices* permission itself allows the user to change device settings (e.g., IP address, group membership) and create new device groups.

Access Data from Third Party Services

To see the data from external services (e.g., LPR/FR recognitions, third-party integrations via HTTP API) in the live view notification panel or search the past records, the following permission sets are required:

- **Live**:
    - *View live external service data* (per-channel permission under *View live video* permission group)
    - *View live external service data* (permission for the external service group)
- **Archive**:
    - External service search (per-channel permission under *Video playback* permission group)
    - *External service search* (permission for the external service group)

This allows to cover the case when one channel belongs to several different external service groups.

Archive Backup

Archive backup permissions have the following logic:

- *Make archive backups* permission from the *Administration profile* allows Archive Backup Wizard login
- *Backup archive* per-server permission from the *Video playback* permission group grants access to the orphaned archive tracks (recordings that exist on the server but do not have any existing channels in the system configuration associated with them)
- Backup archive per-channel permission under *Video playback* permission group grants access to the footage of the target channel via Archive Backup Wizard

Snapshot Export

For a user to be able to save multichannel snapshots from the *Archive playback* mode, the *Export snapshots from playback* permission must be granted for all channels present in the layout.

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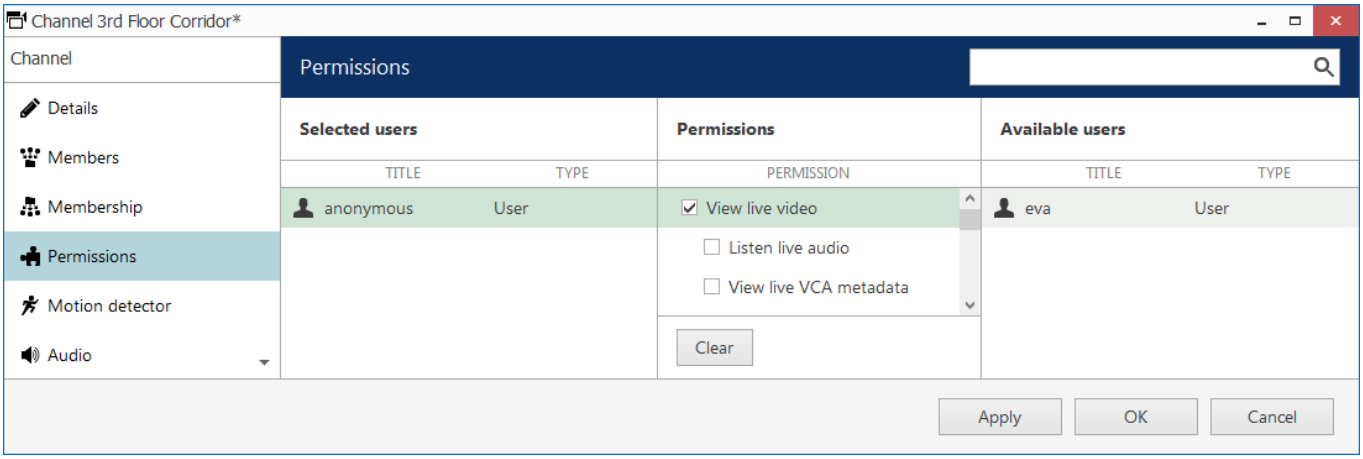
7.3 Anonymous User

Anonymous user is a built-in user account, which has been designed for unauthorised access to video streams via HTTP API - a very basic example of Ganz CORTROL API usage.

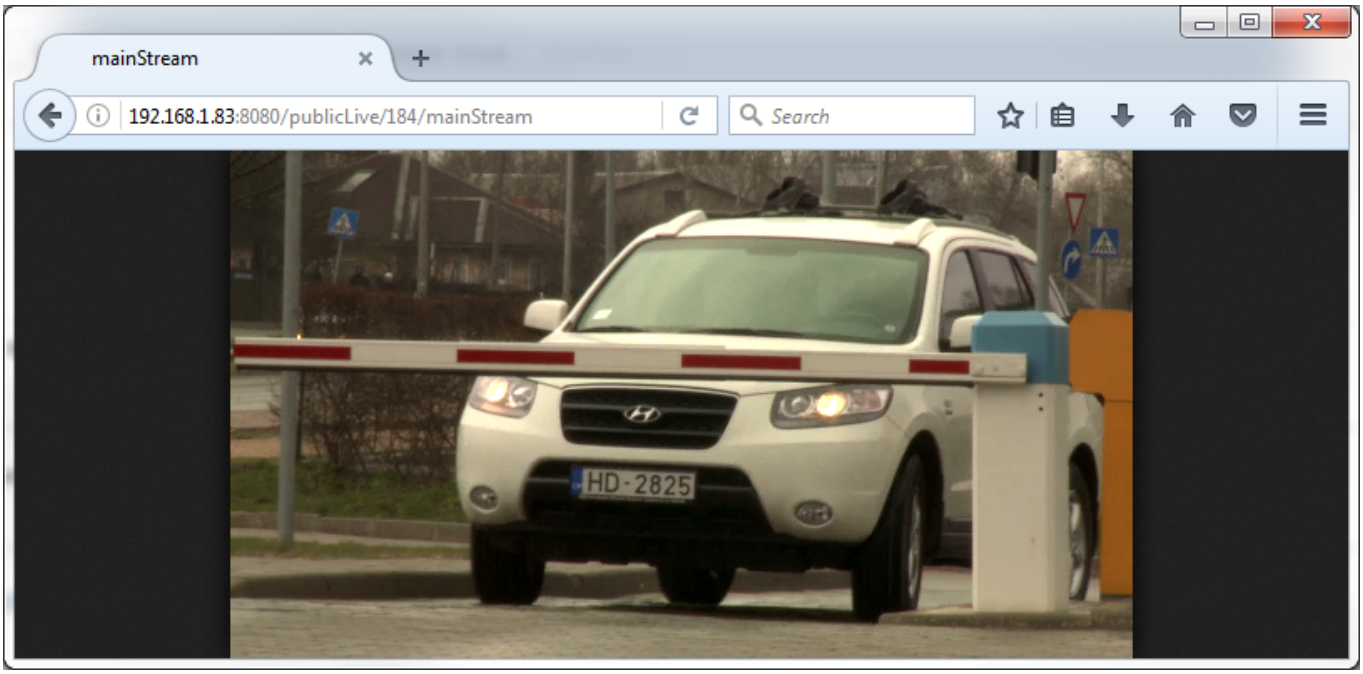
The anonymous user is disabled by default and does not have any permissions. In order to allow HTTP access:

- **enable** the anonymous user: double-click him in the user list, mark him as active, then save;
- **add** the *View live video* **permission** for this user in the properties of the target channel(s).



Add permission for the anonymous user to receive live view data

Now you can use a short link to receive live video feed over HTTP from your configured channels without authorisation.



Live stream received with anonymous URL

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The link can be embedded into your own webpage to provide 'Live Cam' functionality.

HTTP **link** is built as follows:

IP:PORT/publicLive/<channel_id>/mainStream

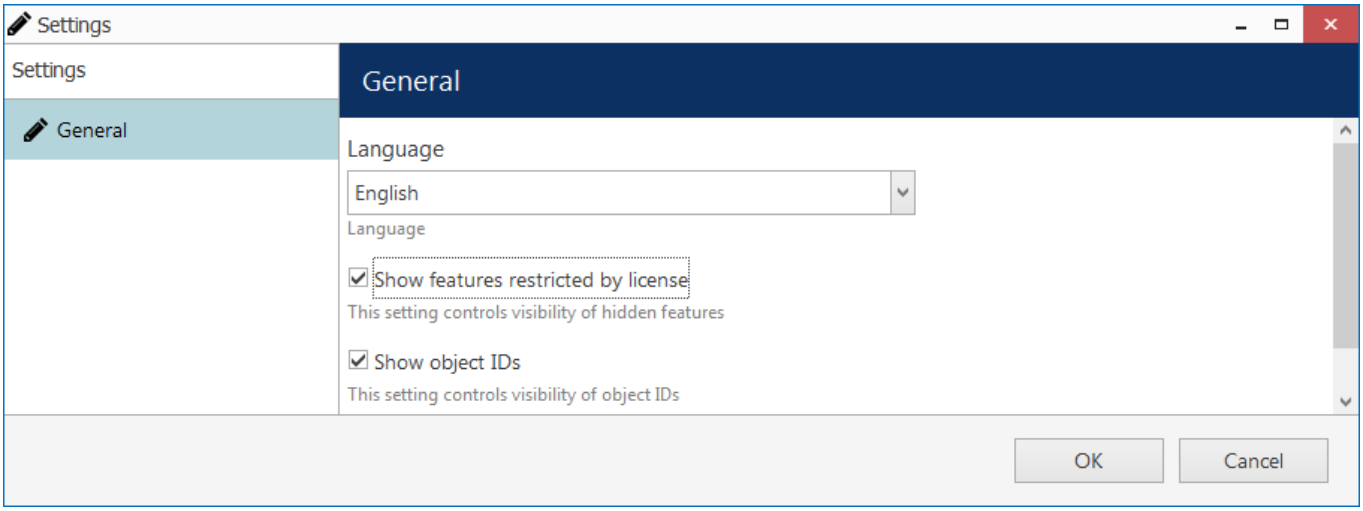
where

- *IP* is server IP address or hostname,
- *PORT* is server HTTP port (8080 by default),
- *<channel_id>* is internal channel identifier, which can be looked up in Ganz CORTROL Console when IDs are enabled in the application settings.

Example: *192.168.1.83:8080/publicLive/184/mainStream*

This functionality requires that Streaming Server is enabled (HTTP port is not set to zero in the target server settings).

In order to see the channel identifiers in Ganz CORTROL Console, go to the application settings via main menu button in the upper-right-hand corner and choose *Settings*. In the dialog box, enable the *Show object IDs* option and save.



Enable object identifiers in Ganz CORTROL Console

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8 Streaming Server Configuration

The Ganz CORTROL Streaming Server allows quick and easy access to your cameras via web browser and/or native mobile applications.

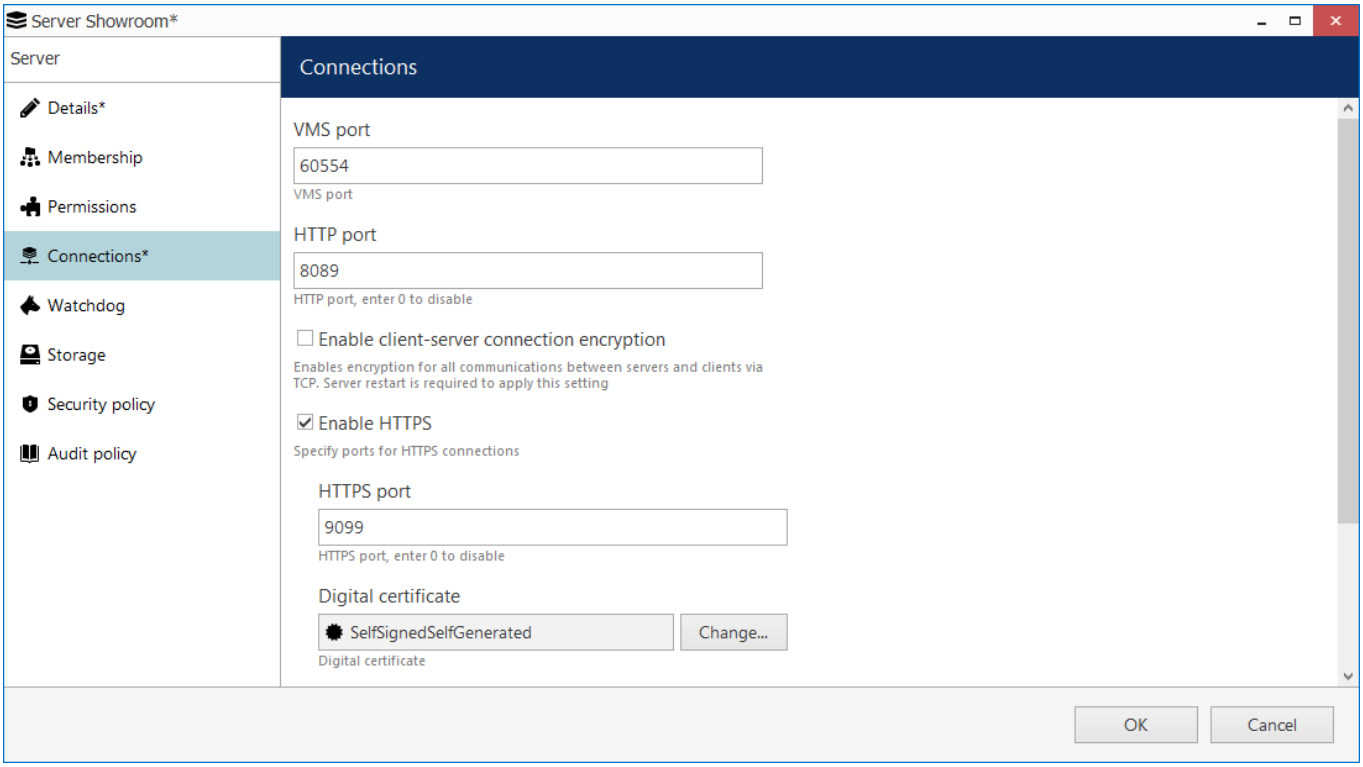
Ganz CORTROL Streaming Server is a part of Ganz CORTROL software integrated into the Ganz CORTROL core. It is designed for video streaming to multiple web-browsing platforms such as Mozilla Firefox and Google Chrome. Some major Ganz CORTROL Streaming Server features are: video stream live view, archive playback, Pan-Tilt-Zoom control. The Ganz CORTROL Streaming Server optimises video streaming for web or mobile clients, to a degree dependent on connection speed and device viewing capabilities.

⚠ If you are using AD/LDAP user accounts for the Web client login, we strongly recommend that you turn on HTTPS for enhanced security.

💡 At this point, the recommended **browsers** (100% supported) for clients are Google Chrome and Mozilla Firefox (under any operating system).

Ganz CORTROL Streaming Server Configuration

Ganz CORTROL Streaming Server configuration on the Ganz CORTROL Console side is simple and only consists of setting up the HTTP port for streaming connections. To access the Ganz CORTROL Streaming Server setup in Ganz CORTROL Console, go to the *Configuration* section and then click *Servers* in the menu on the left; double-click the target server to bring up the configuration dialog box, and switch to the *Connections* tab.



HTTP and HTTPS port settings under server connections

You only need to define a HTTP port for Ganz CORTROL Streaming Server; the default port is 8080. On top of that, you can secure your connection and use a HTTPS port for the same purpose. Secure HTTP will require a valid digital certificate, either a self-generated (generate on the fly, will require trust confirmation everywhere) or issued by authority (paid, bound to your domain).

⚠ Please make sure that your chosen HTTP port:

- is opened on the target server firewall;
- is properly configured for port forwarding on all intermediate network equipment, if necessary;
- is not being used by any other application or service on the target server.

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If you are using HTTPS with your own **CA certificate** (bound to your domain name), remember these important guidelines for the mobile app setup:

- when connecting via local network, use server IP address
- when connecting over internet (4G etc.), use the hostname instead of IP (main domain must be the same as in the certificate)
- if port forwarding is used (local HTTPS port is different from external), enter the port number as the "Internet port" in the server connection configuration

> ⚠ If you are using your own CA certificates, create a *.pem* file with your certificate chain as described here: https://www.digicert.com/ssl-support/pem-ssl-creation.htm
>
> This is necessary for the certificate to be recognized correctly by all HTTP clients - Web browsers and Ganz CORTROL mobile applications. If you simply apply your CA certificate in Ganz CORTROL Console, there is a chance it is not recognized because some applications require the entire certificate chain.
>
> Then, apply the *.pem* file as the certificate together with your key when the importing certificate into Ganz CORTROL Console.

Once you are done with the setup, click *OK* to save and close the dialog box.

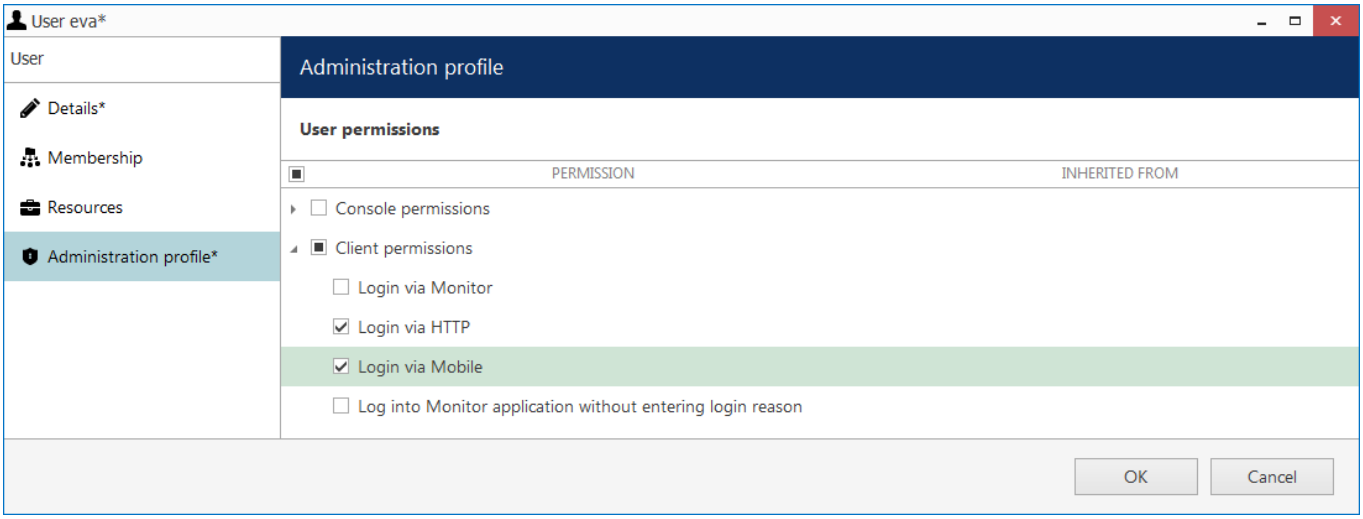
Your Ganz CORTROL Streaming Server will now be set up and accessible via local - and, if used, external - IP address. You can immediately check if the connection is working: just open your browser and type: *<local IP>:<HTTP port>;* for example, server configuration for the snapshot above will require *192.168.1.83:8089*.

User Permissions for Ganz CORTROL Streaming Server

If you are going to create a non-administrative user account for Ganz CORTROL Streaming Server access (designated or combined with other permissions sets), the following user permissions should be granted in the user properties dialog box:

- for Web browser and API login: under *Administration profile* > *Client permissions* > *Login via HTTP* (includes HTTPS)
- for the Ganz CORTROL Mobile access: *Login via Mobile*
- to allow editing HTTP connection properties: *Console permissions* >*Manage servers* (this will automatically enable Ganz CORTROL Console login, and also grant access to other server settings)

In the *Resources* tab, select channels and features you wish to grant access to. There are separate permissions for live and archive access, PTZ, audio, and bookmarks.



User permissions for Ganz CORTROL Mobile and Web browser login

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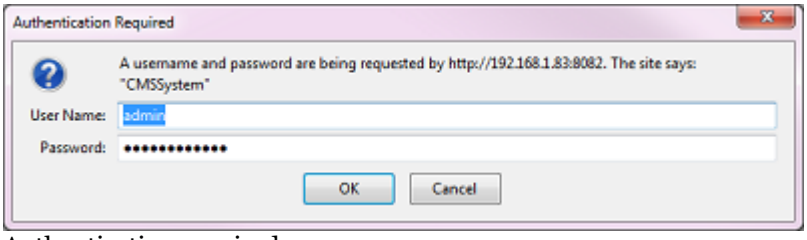
8.1 Streaming Server User Interface

Ganz CORTROL Streaming Server provides HTTP connections for Web browsers and native Ganz CORTROL Mobile applications, OS X Thin Client (similar in functionality to Ganz CORTROL Mobile), as well as services that use Ganz CORTROL HTTP API, which includes CBC AMERICA LLC own external services (License Plate Recognition, Face Recognition modules) and third-party integrations. While the Web browser client functionality is very basic, Ganz CORTROL Mobile applications support many useful features, such as two-way audio, push notifications, mobile edge recording, streaming from device camera to the Ganz CORTROL server and many more.



Authentication required

When configured, Ganz CORTROL Streaming Server is accessible via browser from the server itself and from computers on the local network, and, if system is not isolated, from the Internet. This is the simplest way to make sure your Ganz CORTROL Streaming Server is running and reachable. To access the Ganz CORTROL Streaming Server, open your browser and type:

<Server IP>:<HTTP port>

then press *Enter*. Your browser will connect to Ganz CORTROL Streaming Server, and user authentication will be requested: enter your user name and password to proceed.

Starting with Ganz CORTROL version 1.14.0, you can also use your **AD/LDAP user accounts** for the Web browser login. The user name should be entered in the following format:

domain.name\user.name

The field is case-insensitive, meaning that you can use either *user.name* or *User.Name* notation.

After logging in, you will see Ganz CORTROL Streaming Server Web browser user interface:

- **left menu**: channel list and setup tabs
- **main window**: live streaming/playback area
- **upper-right-hand corner**: layout templates and layouts
- **upper-left-hand corner**: the Ganz CORTROL Streaming Server logo; click the logo to extend viewing area by minimizing the menu on the left

Access Permissions

The channel and feature availability depends on the user permissions; the built-in administrator has access to all resources. For the Web browser connections, only HTTP connection, live, archive and PTZ access permissions are applicable, as other functionality (e.g., audio) is not present.

In order to allow a user to connect to Ganz CORTROL Streaming Server, go to *Configuration* section of Ganz CORTROL Console, choose *Users*, then select the user or user group for editing and open the *Administration profile* tab:

- add the *Login via HTTP* permission to allow Web browser and/or HTTP API connections
- add the *Login via Mobile* permission to allow connections from mobile apps and OS X client

To allow channel access, add per-channel or per-channel group privileges in the *Permissions* tab:

- *View live Video*: enables live view
- *Listen live audio*: enables incoming audio (from the camera)
- *Send live audio*: send audio to camera (talk back)
- *Control PTZ*: pan, tilt and zoom controls
- *Use PTZ presets*: access to existing PTZ presets

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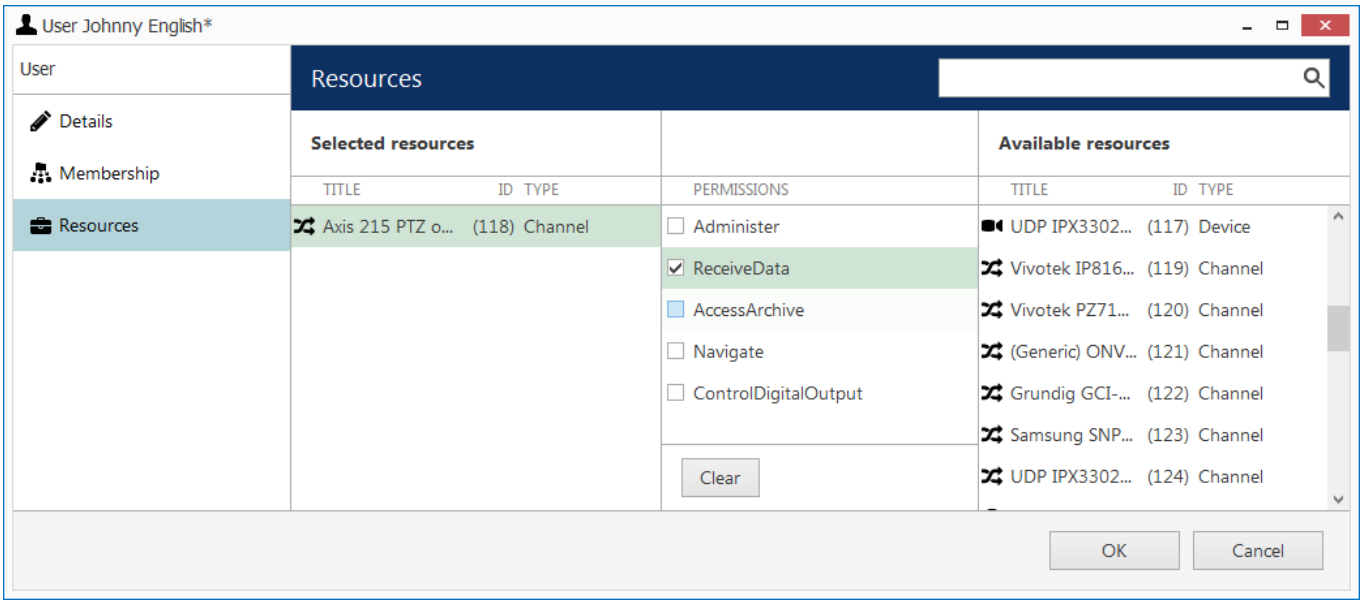
- *Use PTZ tours*: access to existing PTZ tours
- *Video playback*: enables access to recorded video data
- *Audio playback*: access to the recorded audio data

Additional permissions for the Ganz CORTROL Mobile applications:

- for *User Buttons*: the *View* permission allows you to see and use the user button



Set user permissions in order to see channels in Ganz CORTROL Streaming Server

Channel, channel group and user button permissions can also be changed in the *Channels* section, by double-clicking the corresponding channel or channel group in the list and then selecting the *Permissions* tab.

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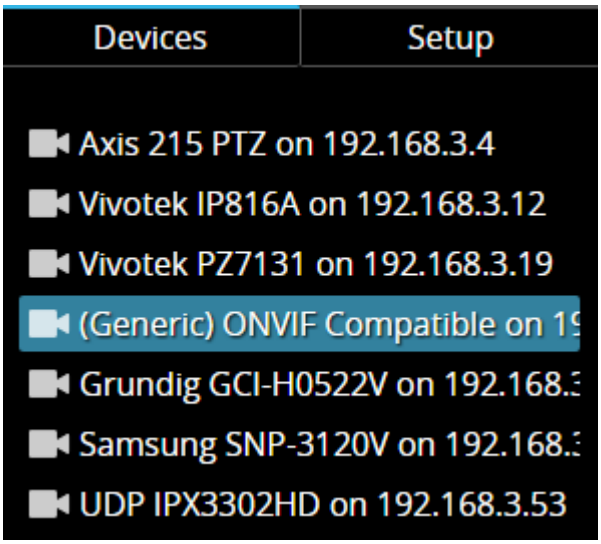
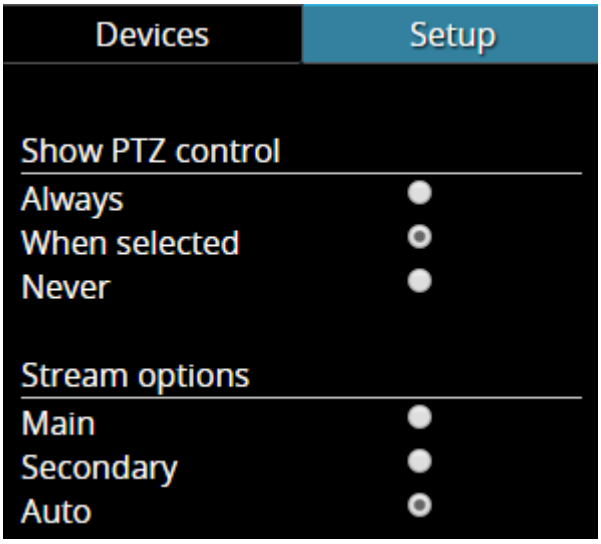
Web Interface: Configuration

The menu on the left has two tabs: *devices*, which shows which channels are available, and *setup*, which contains streaming settings. Click on the titles to switch between them.



Devices

The video sources are loaded in a single list. To start streaming from a particular device, select layout template from the menu in the upper-right-hand corner, then click your desired viewport so that it is highlighted blue, and then click a device from the list.



Setup

The *Setup* tab allows you to choose PTZ control behaviour and configure stream options:

- **PTZ controls**:
  - **Always**: if the camera supports Pan-Tilt-Zoom, virtual PTZ sphere will be always shown as overlay control
  - **When** selected: if the camera has PTZ capabilities, the virtual PTZ sphere will be shown when the corresponding stream is selected
  - **Never**: do not show PTZ controls at all, meaning that PTZ functionality will be disabled
- **Stream options**:
  - **Main**: only the first (main) stream, [usually] of a larger resolution will be used for all devices
  - **Secondary**: only the secondary stream (substream), [usually] of a smaller resolution will be used for all devices
  - **Auto**: the most appropriate stream will be selected automatically based on viewport size

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Web Interface: Streams

The Web browser client allows you to view live video and to play back recorded video from the available channels. For live view mode, PTZ controls are available.

Live

To start live-streaming, select a layout template from the upper-right-hand menu (1x1, 1x2, 2x1 or 2x2), then click your desired viewport so that a blue frame selection appears around it, and then choose the target stream from the *Devices* list on the left. To replace the existing live stream, either select it and choose a device 'on top' of it, or click the *X* button in the upper-right-hand corner of the viewport to close it and then assign a new stream to this viewport.

Notice that some images may appear with horizontal or vertical black stripes at the sides: this happens because image aspect ratio is maintained instead of it being stretched to fill the viewport. When the picture size is smaller than the target viewport, there will be a black background on either sides.

Live view with overlay PTZ controls

Each live view item contains the following information and controls:

- upper-left-hand corner: stream name (static info)
- upper-right-hand corner: archive playback (if applicable), presets button (click to load preset list), *X* button (press to close the live stream and free the viewport)
- bottom-right-hand corner: PTZ mode (if applicable), stream resolution, stream codec (MP4/JPEG/WEBM) (static info) and zoom mode ON (static info)
- centre: stream picture, virtual PTZ sphere (overlay control) (if applicable)

To **pan and tilt** the PTZ-capable cameras, use overlay PTZ controls: left-click and hold in the desired direction. By default, pan/tilt mode is enabled for PTZ cameras: notice the *PanTilt* label in the bottom-right-hand corner of live view.

In order to **zoom** IN and OUT: first, scroll your mouse wheel DOWN to enable zoom mode - in the bottom-right-hand corner, a *Zoom* label will appear. In this mode, virtual PTZ sphere works for zoom only: click and drag UP (upper hemisphere) to zoom IN, and DOWN (lower hemisphere) to zoom OUT. To release zoom mode and go back to the pan-tilt sphere, simply scroll your mouse wheel UP until the *Zoom* label disappears.

For some cameras, you may notice that the further you drag the cursor from the sphere centre, the faster the camera goes: in this way, PTZ speed is controlled; however, for other cameras, only the constant speed is supported either by software or device itself, and the pan/tilt speed will remain constant no matter what position your mouse cursor is in.

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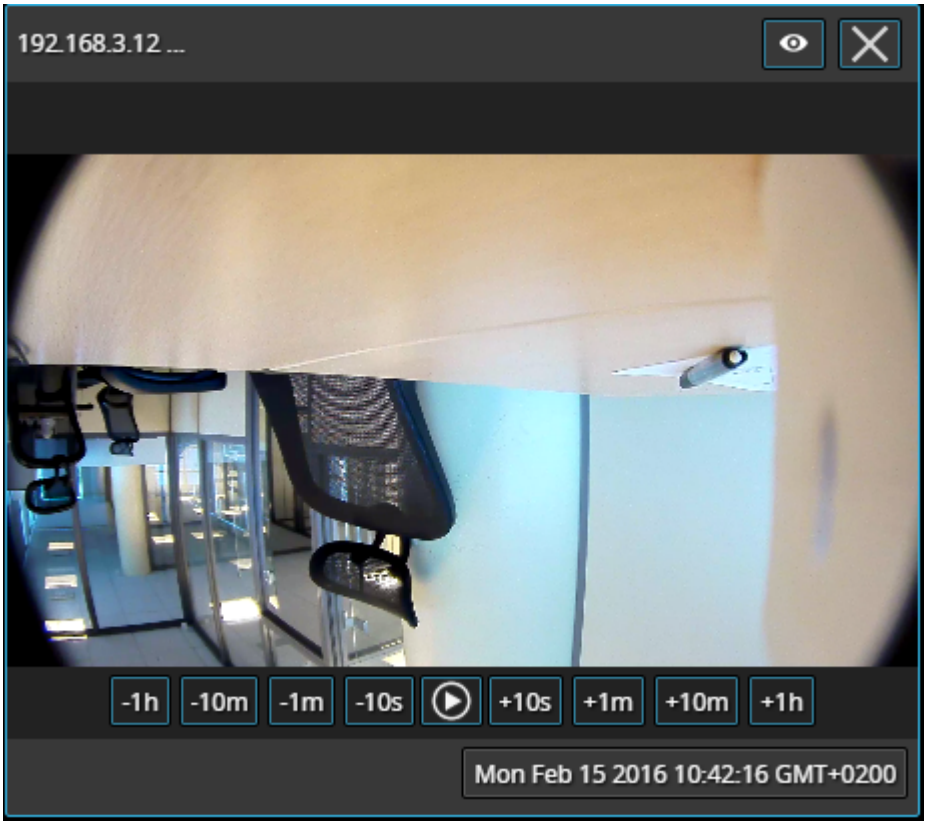
Archive Playback

If recording is enabled for the target channel, the stream overlay controls will include an archive playback button in the upper-right-hand corner. Press the button to begin **playback**: the target stream will be displayed in single channel mode. To switch **back to live view,** press the 'eye' button in the upper-right-hand corner; this will restore your previous layout.



Archive playback view

Playback view contains the following information and controls:

- upper-left-hand corner: stream name (static info)
- upper-right-hand corner: 'eye' icon to go back to live view, *X* button (press to close the live stream and free the viewport)
- bottom-right-hand corner: timestamp (current time and server time zone shift)
- centre: stream picture
- centre bottom: playback controls

Overlay controls allow you to start/pause playback and jump back/forward by ten seconds, one minute, ten minutes or an hour.

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Web Interface: Layouts

Layout templates allow you to choose viewport layout: 1x1, 2x1, 1x2 and 2x2 are currently available options.

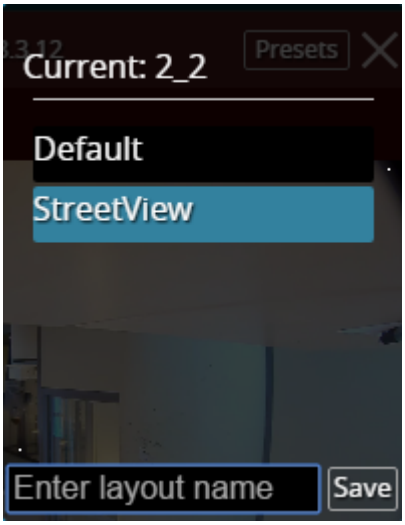
Default layout templates

Click on any thumbnail at any time to immediately load the corresponding **layout template** on the screen. If there are any active streams, they will be discarded. If the target layout template has been already used in the same browser and cookies have not been cleared, previously used channels will be loaded; if not, an empty template will be displayed.

If you wish to **save the layout** currently being displayed, click on the 'portrait' button.

Layouts menu button

The layouts menu will appear, allowing you to save your layout under a user-defined name: enter the layout name and click the *Save* button. Note that, at this point, only Latin characters [A-Za-z] and Arabic digits [0-9] are supported for layout names; special symbols or characters from non-Latin alphabets are not allowed.



Layouts menu

From here, you can also load the previously saved layouts simply by clicking them; if your layout list is longer than the menu window, use the mouse wheel to scroll down.

The layouts are saved in your browser **cookies**, so:

- Ganz CORTROL Streaming Server layouts cannot be transferred to other browsers, user accounts or computers
- layouts are removed when browser cookie data is cleared

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8.2 Mobile Application for Streaming Server

Ganz CORTROL Mobile app for Ganz CORTROL servers provides mobile client functionality for smartphones, tablets and phablets. Its feature range is much wider than that of the Web browser client.

You can install the Ganz CORTROL Mobile application from Play Store (for Android users) or iTunes (for iOS users).

Supported OS:

- Android 4.4 and higher
- iOS 8.2 and higher

Thin client for macOS has almost identical functionality. It can be downloaded from http://ganzsecurity.com/cortrol. Just as Ganz CORTROL Client, the mobile and macOS clients are free of charge and do not require any additional license to run. Using these, you can connect to any of your Ganz CORTROL servers, provided that Ganz CORTROL Streaming Server functionality is enabled in their settings, as described earlier.

Below, you will find guidelines on your Ganz CORTROL Mobile configuration and usage.

Getting Started

Install Ganz CORTROL Mobile from the corresponding app store, or by following a link from our website http://ganzsecurity.com/cortrol.

Interface Overview

Ganz CORTROL Mobile user interface is mostly intuitive: you can interact with the app by tapping or long tapping the interface elements, and also by swiping.

In the top left corner, you will find the **application menu**. It contains:

- an option to add a new server connection,
- a possibility to record offline in-app video for further upload to any sever,
- app settings,
- details about the app version.

After you connect to any server, the application menu will be replaced by **server menu** containing server-specific resources and actions:

- view selection (channel arrangement for live view),
- event log (push notifications from the server),
- bookmarks,
- user buttons,
- camera streaming option (device >> server),
- log out option.

The server menu also has a **submenu** 'three dot' button next to the server name. Apart from the *Log out* option, it allows you to edit the connection settings (e.g., change the user account) without returning to the server list. The 'three dot' button is also present in other places within the app, and it offers extra option or actions.

Finally, wherever it is impossible to place the submenu button, a 'hidden' drop-down menu is available. **Long tap** any channel in the multichannel view to see the available quick actions.

When running in foreground, the app will prevent you phone from going to sleep, so the display will not be switched off automatically. Keep this in mind and do not forget to exit the app or lock the device/turn the display OFF when you do not need the app anymore.

When you first start Ganz CORTROL Mobile, you will have a demo server connection present by default: feel free to use it for a tryout. You can start adding your own server connections at once but we recommend that you first review the app settings and adjust them to fit your needs.

Settings

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Tap the menu button in the top left corner to bring up the main app menu, then tap *Settings*. The parameters here define global app behaviour (for all servers); they are preserved as you upgrade the app but are discarded if you uninstall it.

The settings are logically grouped for your convenience. Tap a category to access the settings.

- **General**
    - *Language*: set application interface language here (matches device locale by default)
    - *Date format*: set the date presentation format you want the application to use, e.g., YYYY/MM/DD
    - *Time format*: set the time presentation format you want the application to use, e.g., HH:MM:SS (24h)
    - *Timezone*: choose between your mobile client or connected server time zone
- **Streaming**
    - **Quality** preference
        - *Main*: only the first (main) stream, [usually] of a larger resolution will be used for all devices
        - *Secondary*: only the secondary stream (substream), [usually] of a smaller resolution will be used for all devices
        - *Auto*: the most appropriate stream will be selected automatically based on the connection
    - Display **video statistics**
        - *ON/OFF*: defines if the video stream properties (FPS, bitrate) are shown for both incoming and outgoing streams
    - **Decoder** configuration: choose how the incoming streams will be decoded
        - *Hardware only*: hardware decoding modules available on your phone will be used automatically (recommended for battery saving)
        - *Hardware and software*: software decoders will be used if required (**warning**: software decoding is battery intensive!)
        - *Per codec configuration*: choose decoding settings individually for each of the expected codecs
    - **Icons**: descriptive elements overlaying the video
        - *Show battery intensive decoder icon*: the icon will appear in case a software decoder is in use
- Device **camera**: settings related to your phone's camera; the first time you open this section, you will be prompted to run camera detection
    - Camera choice and preferences for the reverse streaming (device >> sever) for both live and offline recording modes
        - *Off*: choose this if you do not plan to stream device's video to the server
        - *Camera 1*: main mobile device camera (normally, back camera)
        - *Camera 2*: secondary camera (normally, front camera with less megapixels)
        - Resolution/FPS/bitrate/codec preference, **microphone** ON/OFF
        - Preview: camera preview with the settings defined above
    - **Detect** cameras: allow the app to retrieve your phone's camera configuration (detection may take some time, making the app unresponsive - expected behaviour)
    - Stream **device GPS location** with video to server: when ON, the video streamed from the device camera will be overlayed with GPS coordinates and device marker will be displayed on the geo maps, if configured
    - **Offline video**: settings for offline video recording (for further upload)
        - *Store offline video*: choose whether you want to store the recorded files in the app directory on the internal storage or on the external storage (SD card)
        - *Offline video storage limit*: restrict the space available for recordings to 100, 200 or 500 MB, 1, 2, 5, 10 or 20 GB, or unlimited
        - *When no space left*: the app can either overwrite the oldest file(s) or stop recording new files

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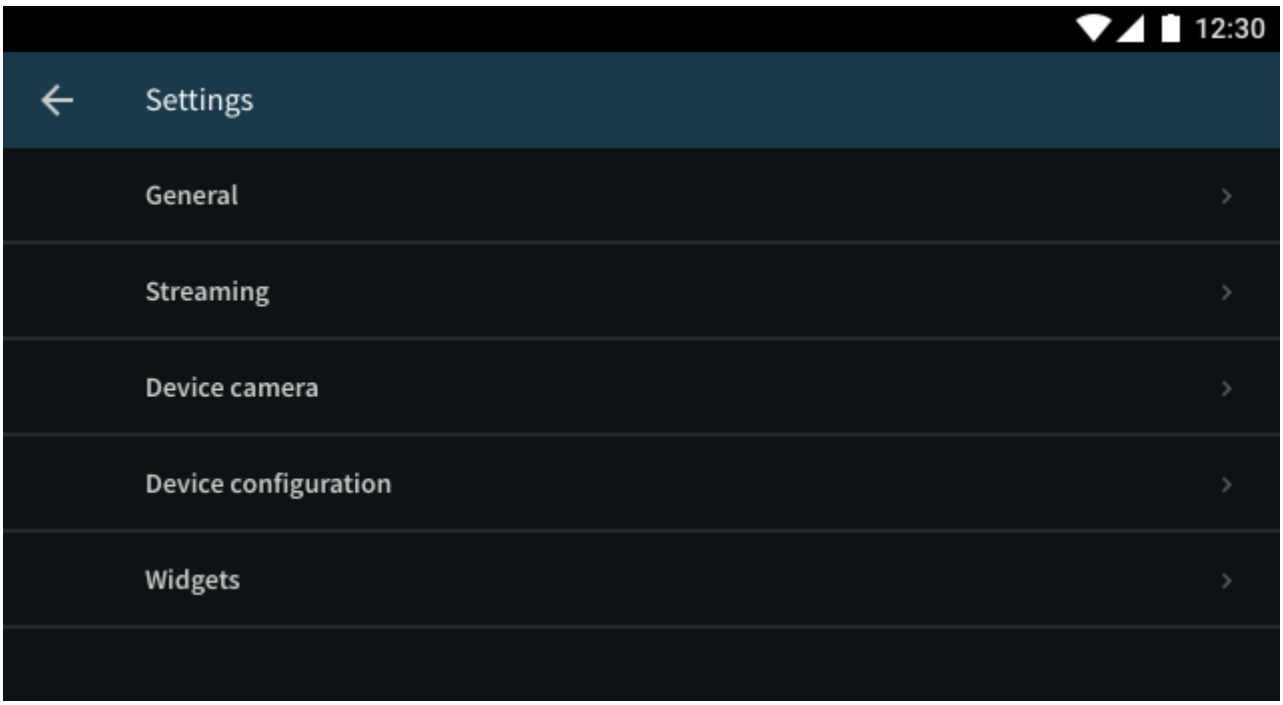
        - *Default video upload server*: choose server every time you upload the video or set one of the configured servers to be the default destination
- Device configuration: **network** and other settings related to your phone (but not directly to its cameras)
    - *Allow app/widgets to use*: choose preferred network type for the app and for the app widgets separately
        - *WiFi only*: the app will only connect to the server(s) if it is connected to a wireless network (including servers available via VPN)
        - *WiFi and mobile data*: the app will use both wireless networks and enabled data services (3G/4G)
- **Widgets**: all settings related to the app widgets (application extensions)
    - *Widget update interval*: automatically load a new frame every 30 seconds, every 1, 2, 5, 10 or 15 minutes
    - *Allow widgets to use*: WiFi only, or both WiFi and 3G/4G
    - **Panic button**: choose the default server for streaming (panic buttons is a widget-like buttons that can be placed on the home screen; tapping the button will start streaming live video to the pre-defined server (device must be registered on the server)

⚠ When enabling a camera and turning ON sound, you may be asked to confirm **permissions** for the app to access your phone's camera(s) and microphone. Select YES to grant access to these components if you wish to be able to stream video and audio from your phone to the server and clients connected to it.



Application settings

To exit, tap the arrow icon in the upper left corner, or use your device's *Back* button (software or hardware) or gesture.

Add a New Server

Tap the "plus" button in the bottom right corner to create a new server connection. Alternatively, you can also tap the main app menu in the top right corner, and then select *Add server*. The following parameters should be filled in:

- **Host**: server IP or domain name from your Ganz CORTROL configuration
- **Port**: HTTP or HTTPS port to use (must match the one configured on the server side), 8080 by default
- **Username and password**: user account credentials to connect to the Ganz CORTROL server (a corresponding permission to connect via mobile must be granted)
- **Name**: user-defined connection title (the value from the *Host* field will be used automatically if you leave this field empty)

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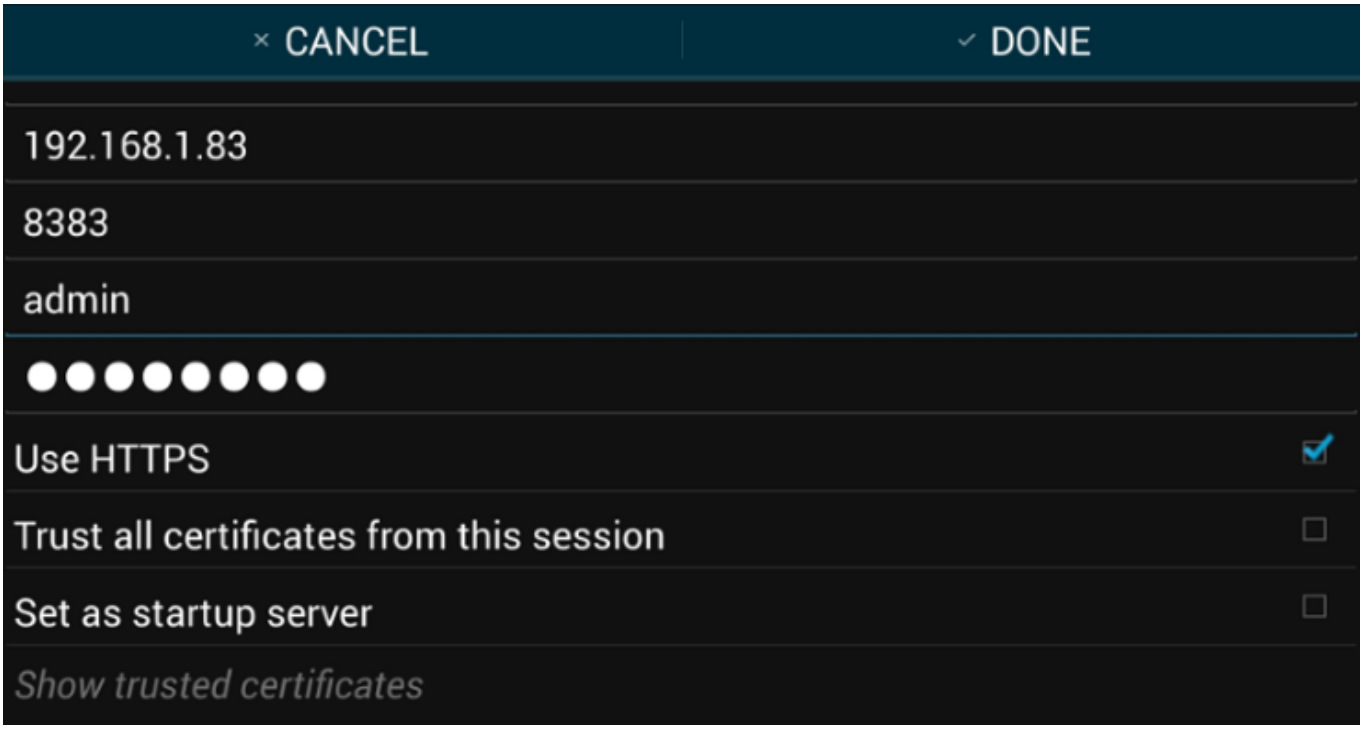
Additional options:

- **Use HTTPS**: use HTTPS over TLS instead of plain HTTP (target server must have HTTPS enabled and configured)
- **Enable event notifications**: turn ON push notifications from Ganz CORTROL servers (notifications should be pre-configured via Events & Actions using the *Send event to client* action)
- **Trust all certificates from this session**: accept all digital certificates provided by target server (required in case you are using a self-signed certificate on the server side)
- **Set as startup server**: turn this ON if you wish the app to connect to the target server upon startup: when started, the app will load the server list and try to connect to the selected server automatically
- **Show trusted certificates**: display all accepted digital certificates from the target server; tap the certificate to discard it



Server settings

When you are ready, tap *Save* to save the settings and exit the dialog box, or tap the "<-" *Back* to discard the changes and simply go back to the main menu.

To edit the settings for an existing server connection, tap the vertical dots on the right side next to the server name, and then tap the *Edit* button that will appear in the drop-down menu. Use the *Delete* menu option to remove any existing entry.

Live View

Tap your pre-configured server in the list to establish connection. If you are using HTTPS with a self-signed certificate, you will have to confirm that you trust the server certificate.

When you connect to a server, the **live view** mode is loaded by default. If you have already connected to the selected server previously, the most recent live view layout will appear. Each channel's name will be displayed in the top left corner of the picture, together with video stream properties - codec, bit rate, frame rate and resolution; stream statistics can be turned OFF via app settings (see above).

Tap any camera live view video to switch to the **single channel** view. Tap the "<-" *Back* button in the upper left corner to return back to the channel list. In both multi- and single channel view, you can **swipe** up and down to **switch** between channels. In the single channel view, they will appear one by one. In the multichannel view, the new portion of channels will be shown.

You can change the multichannel **layout** by tapping the server menu in the upper left corner > *View* > choose the desired layout (1x1, 2x1, 2x2, and 3x2 options are available).

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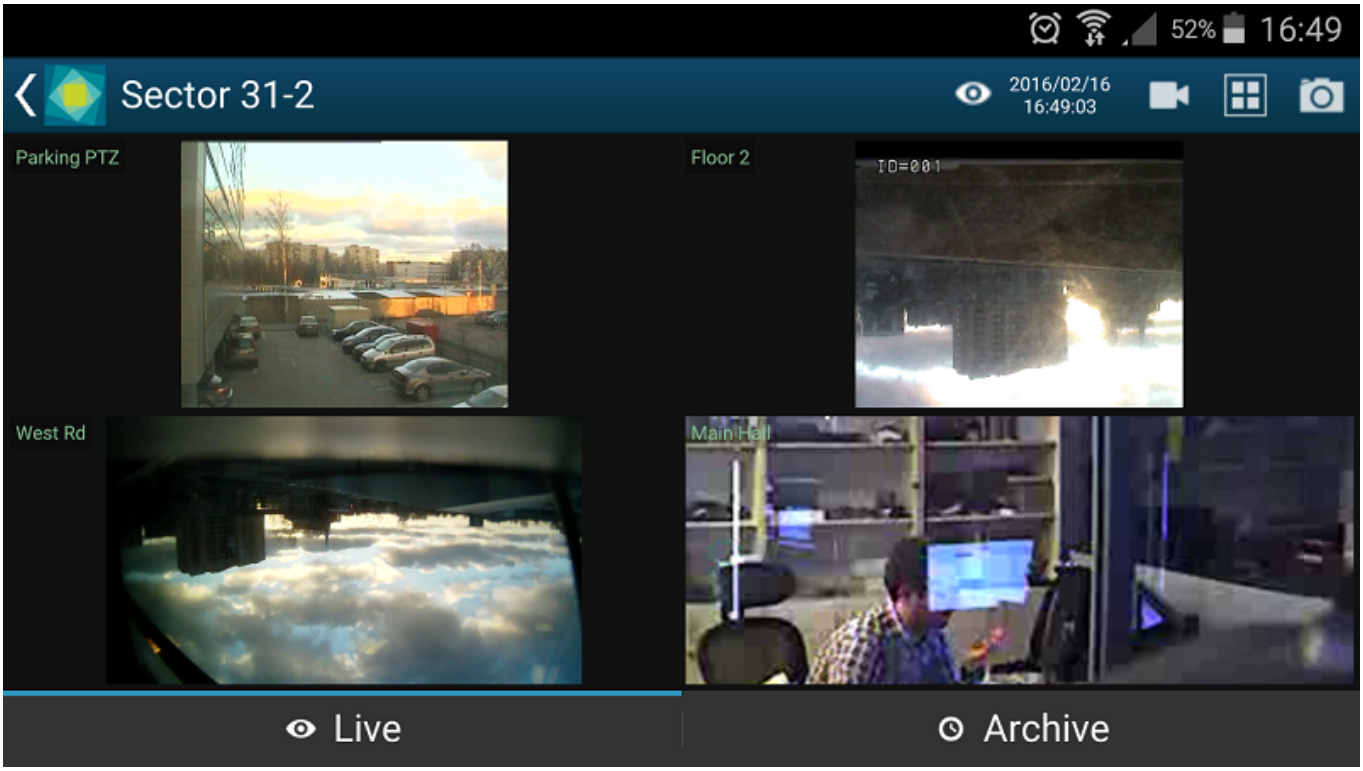

Live view

Swipe left/right (while holding the device horizontally) or up/down (for vertical mode) to scroll the channels. Tap and hold channel live view to bring the available channel list (similarly to the channel selection menu, chosen item will replace the selected channel).

In both single and multichannel view, you can pinch the picture to **zoom** IN/OUT (digital zoom). A tiny picture-in-picture preview will appear in the upper left corner of the channel: tap it to reset the DPTZ to the normal zoom level. Alternatively, double tap the picture to clear the zoom.

Single channel live view

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Tap any channel to replace the currently displayed layout with a single channel view with extra controls. The available controls are:

- Bottom left corner:
    - **Camera icon**: take a snapshot. Tap to save the currently displayed frame onto your device.
    - **Speaker icon**: audio IN (from the camera). Tap once to enable incoming audio (the icon will turn blue), tap once again to stop. The icon will only appear if the target channel has sound enabled.
    - **Microphone icon**: audio OUT (talk to the remote camera). Tap once to start sending audio back to the camera (the icon will turn blue), tap once again to stop. **Note**: you do **not** need to tap and hold the mic icon, like in the regular Ganz CORTROL Client application, simply tap once to enable audio streaming. This icon will only appear if the related functionality is available.
- Bottom right corner - three dots' menu:
    - **PTZ**: toggle PTZ controls (for PTZ capable cameras). While having overlay PTZ controls ON:
        - tap/long tap *inside* the sphere to pan and tilt (the closer you tap to the sphere edge, the faster the PTZ speed will be)
        - tap/long tap the ends of the zoom bar to zoom IN/OUT
    - PTZ **presets**: tap to see the list of available PTZ presets; tap any to make camera go to the specified preset
    - PTZ **tours**: tap to see the list of available preset tours; tap any to start the tour; tap *Stop PTZ Tour* to terminate any currently executed tour
    - **Cast** to device: tap to cast the current channel to one of the available Chromecast devices
    - Maintain **aspect ratio**: toggle aspect ratio (original/stretch to fit); the setting is applied to **all** channels

Tap the picture again to switch to **full screen** (remove extra controls). You can still swipe up/down (or left/right for landscape screen orientation) to switch between channels.

Audio IN, audio OUT and PTZ controls

PTZ *Tours* button will only appear if the target camera has at least one tour configured. PTZ tours can be created and managed via Ganz CORTROL Client application.

While in this mode, you can swipe left or right to load previous or next channel in the list. Long tap on the free space (where there is no stream) or on the stream itself (when PTZ controls are OFF) to bring up the list of all available channels: swipe down and up to browse the list, tap any channel to display it.

Server Menu

You can find the server control buttons in the upper-right-hand corner. For vertical screen orientation, all menu controls (except for the timer) collapse into a single button with drop-down list.

- **Eye icon/timer**: shows current server time. When you tap it, you are given the option to select the time (the app will automatically switch to Archive mode afterwards)
- **Cameras**: tap to select a channel from the list of available ones. Note that every channels can only be mapped once and attempts to map a channel for the second time will result in it being placed in the new position and removed from the old one
- **Views**: tap to open layout selection. The layouts currently available are: 1x1, 2x1, 2x2, 3x2. "Add Current" enables you to save current layout under a specified name. If a larger layout has been selected, existing channels will be mapped automatically and all the extra slots will appear blank. To add more channels, tap the "Cameras" button and pick one; all the slots will become marked with blue frames, tap any of them to place the new video channel there.
- **Make snapshot**: tap to save a snapshot to the gallery.
- **Cast**: stream to Chromecast
- **Stream camera**: send the video stream from your phone's camera back to the Ganz CORTROL server

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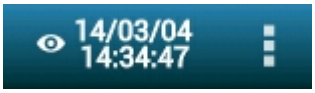
- **Camera to widget**: assign one of the channels to a widget (widget should be added to the phone's desktop beforehand, see below for details)
- **User buttons**: tap a user button to trigger the action assigned to it (see below for details)
- **Events**: push notifications from the target server (configurable via *Event & Action* section in Ganz CORTROL Console)



Stream Camera

It is possible to send the video captured by your phone's main or front camera back to the Ganz CORTROL server for further live view on other connected clients and also for server-side recording. To do so, you need to add your mobile device to Ganz CORTROL configuration and then confirm it in your app.

First, go to your server configuration via Ganz CORTROL Console, go to the *Configuration* section and choose *Devices* from the menu on the left. On the upper panel, click the *+ New device* button in order to create a new device; enter your desired name and set the *Model* to *(Generics) - External Source*, then save. Note the value appearing in the *Code* field: you will need to enter it into your app.

Next, go to your app -> server list -> tap *Settings* in the bottom, find *Camera* in the list and choose your video preferences; the contents of each item may vary depending on your mobile device capabilities:

- **Camera**: back/front (primary/secondary)
- **Resolution**: [the actual list depends on the mobile device capabilities]
- **FPS**: from 10 up to max allowed by device
- **Camera Microphone**: disable/enable sound

Below the settings, you will see the camera preview. Save your preferences and go back to the server list.

> For Android 6.0 and newer, you may need to go to your mobile device's system permissions and explicitly allow Ganz CORTROL Mobile to use the camera in case you were not asked for this permission or if you have chosen to deny access to this components.

Then, connect to your Ganz CORTROL server, tap the menu icon in the upper right corner and choose *Stream camera*. You will see your camera preview and a message in the bottom saying *Click icon to stream*. Click the *Play* button in the bottom right corner to initiate streaming (the button will turn blue); when asked, enter the code from the Ganz CORTROL Console in the *Registration token* dialog box. For example, if your device configuration in the Ganz CORTROL Console says CODE:FZL3XT3L, you just need to enter the FZL3XT3L part in the *Registration token* field.

Ganz CORTROL Mobile will automatically start streaming and you will see the contents of your mobile device stream in all other Ganz CORTROL Mobile and/or Ganz CORTROL Client applications. The message in the bottom line will change to *Streaming* and will show your video stream statistics. In order to stop streaming, tap the *Play* button once again.

You can now manage this stream as a usual channel in Ganz CORTROL Console meaning that you can record both video and audio from it, analyze if for motion etc. To remove this entity, simply delete the device via Ganz CORTROL Console.

> If you re-install the application on your mobile device, you will need to go to the Ganz CORTROL Console and add your mobile device anew, basically, following the algorithm of adding a new device, or go to the device settings and click *Reset* near the *Code* field to generate a new code, then enter the new code in your app.

Once you have registered your phone on the server, you can set up a **panic button** on your mobile device. This button is placed on your hoe screen and, when tapped, **initiates live streaming** to the pre-defined server immediately - you do not need to open the app and search for the server. To set up this panic button, go to the mobile application settings and:

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- define the panic server where the stream should be sent to, then
- create a panic button and place it onto the home screen.

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Archive Playback

To switch to playback mode, tap the *Archive* tab on the bottom panel. Alternatively, tap the eye/timer icon to go to a specific time: choose a point in time to begin playback at, then tap *Set*. **Timer** can be manipulated in the following manner:

- use UP/DOWN arrows or swipe UP/DOWN to change the value of each position
- switch between the *Time* and *Date* tabs by tapping them
- press *Cancel* to go back to Live mode, or tap *Set* to proceed with playback

When switching to Archive mode from a multiple camera view: all viewports will be highlighted blue - tap a camera to select it. Note that this mode enables you to view one camera at a time: selecting a larger layout will result in an automatic switch to live view.

Archive **timeline controls**:

- **green** colour represents data, **maroon** means there is no recorded data for that period
- tap the **Next/Previous Frame** arrows on the sides to go to the next/previous available picture
- use the **Play** button in the centre to start/pause playback
- tap the +/- labels to **jump** back/forward by ten seconds, one minute, ten minutes or an hour
- tap the camera icon in the bottom-left-hand corner to save a **snapshot**
- if the channel has several recorded **streams** (e.g., main and secondary), corresponding choice will appear above the timeline on the left

Archive view

Swipe left/right to switch between cameras within the current layout; tap and hold the image to bring up the available camera list (just as in the camera selection menu, this will exit the current layout and switch to single-camera layout). Use the timeline below to browse the recorded video and use the play/stop buttons to control the playback.

Widgets

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Widgets are information elements that can be placed on the home screen on Android devices and in the Today view on iOS devices. Individual channels that require frequent monitoring can be placed as Ganz CORTROL Mobile widgets with moderate or low (from twice per minute down to four times per hour) refresh rate so that you do not have to open the whole app each time you need to check the channel. For channels accessible via Internet, this means you can monitor them even if you are in a remote location on 3G or 4G: relatively low frame refresh frequency does not use much bandwidth. You can also limit widgets to use WiFi connection only.

General steps to add and use a widget are the following:

- add as many widgets as you need, one widget per channel,
- go to Ganz CORTROL Mobile app settings and set widget update and network usage preferences (for details, see the *Settings* section above),
- assign channels to widgets.

To add a widget on an **Android device**:

- tap on a blank space on the home screen and hold for a couple of seconds until the menus appear,
- tap the *Widgets* menu at the bottom of the screen, locate Ganz CORTROL Mobile widget and then drag to place it onto the desired place. Widget of default size (2x2 cells) will appear with a *Slot not configured* message inside:
    - drag the orange borders to adjust the widget size, then tap outside the widget to exit the adjustment mode (you can change the widget position and size at any time later by long tapping the widget and then moving it)
    - tap the widget once: Ganz CORTROL Mobile application will open, allowing you to choose the channel,
- then, in the Ganz CORTROL Mobile app:
    - go to the app settings before connecting to the server and choose how frequently the widgets will be refreshed, and also their network usage preference (see the *Settings* section above for details),
    - connect to a server of your choice, choose *Camera to widget* from the main menu, then tap a channel to choose it (all channels will be highlighted with blue frames, swipe left or right to load more channels to choose from), and then choose a widget slot from the list by tapping it, too (the slot may be empty or already contain a channel),
- go back to your home screen: the assigned channel should now be present in the widget, with the channel name in the top left corner, slot number in the bottom left corner, and last refresh time in the bottom right corner.

To replace the channel, follow the steps 3-4 above; to remove the widget, simply tap and hold it until the menus appear and then drag and drop it onto the Recycle bin icon. Tapping a widget will result in opening the corresponding app, as described above.

To add a widget on an **iOS device**:

- swipe down over the Home screen, Lock screen or Notification centre to bring the Today view screen, scroll to the bottom to reach for the Edit menu, tap *Edit*,
- locate the Ganz CORTROL Mobile app and tap (+) sign to the left of it: the app will be added to the list above,
- tap *Done* when you have finished; the widget will appear under Widgets, allowing you to add and resize the slots - tap any slot to open the Ganz CORTROL Mobile app,
- then, in the Ganz CORTROL Mobile app:
    - go to the app settings before connecting to the server and choose how frequently the widgets will be refreshed, and also their network usage preference (see the *Settings* section above for details),
    - connect to a server of your choice, choose *Camera to widget* from the main menu, then tap a channel to choose it (all channels will be highlighted with blue frames, swipe left or right to load more channels to choose from), and then choose a widget slot from the list by tapping it, too (the slot may be empty or already contain a channel),
- go back to your Today view: the assigned channel should now be present in the widget, with the channel name in the top left corner, slot number in the bottom left corner, and last refresh time in the bottom right corner.

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You can drag widgets to rearrange them in the Today view; tapping a widget will open the associated app. To remove a widget, go back to the widget list in the Today view, as described above, and tap the (-) sign next to the Ganz CORTROL Mobile name, then tap the *Remove* button. If you remove the widget and then add it anew, it will retain its view (slots).

User Buttons

User buttons are software buttons, controls used in Ganz CORTROL Client and Ganz CORTROL Mobile for manual event triggering: upon clicking or tapping a user button, the action associated with it is triggered. The action, the user button itself and the rule that makes the user button work are all pre-configured via Ganz CORTROL Console; see corresponding sections of the server management manual for details.

If you are connected to a server that has configured user buttons and your user account has permissions to use them, the buttons will be available in the app. To access them, tap the main menu and choose *User buttons* (vertical view) or simply tap the corresponding button on the top panel (horizontal screen orientation). Then, choose the button you want to use and tap it: the associated action will be triggered and you will receive a confirmation in the bottom of the screen.

Events

Ganz CORTROL Mobile app allows you to receive push notifications from the Ganz CORTROL server once they have been set up via Ganz CORTROL Console *Event & Action* management.

In order to do this, create an action of the *Send event to client* type via Ganz CORTROL Console and enable the *Display event in mobile application* option, then attach this action to your desired event in the *Rules* section. When creating the rule, do not forget to set the target channel for it: the notifications will appear for that particular channel and their availability can be controlled via channel access permissions. It is possible to limit the reception of the notifications to certain user profile or user group. You will find more details on how this is done in the *Events & Actions* section, under Actions.

Triggered notifications will immediately appear on the mobile device(s) that have Ganz CORTROL Mobile app installed with the target Ganz CORTROL server configured (connected user account must have permissions for the target channel). The app itself may be not running: events will pop up as regular text message notifications. If the target mobile device is offline, the notifications will arrive shortly after it re-connects to a network that provides required server connection.

Offline Camera

Starting from version 1.7, Ganz CORTROL Mobile allows you to record offline video clips for further upload to the server. The video can be recorded from the device camera in the app and stored as long as required until the server connection is available.

To enable this, you first need to:

- set up the target server connection in the app
- choose your camera preferences
- register your smart device on the Ganz CORTROL server as *External Model* as you would do for live streaming from device camera
- enable Edge Recording for the newly created channel

You only have to do this once for each device (unless you re-install the app). From then on, you will be able to record as many video clips as you wish, and then upload them to the target server.

If you do not have paired your device with the server yet, go to your Ganz CORTROL server configuration via Ganz CORTROL Console, go to the Configuration section and choose Devices from the menu on the left. On the upper panel, click the + *New device* button in order to create a new device; enter your desired name and set the *Model* to *(Generics) - External Source*, then save. Note the value appearing in the *Code* field: you will need to enter it into your app.

Next, go to your app -> server list -> tap *Settings* in the bottom, find *Camera* in the list and choose your video preferences; the contents of each item may vary depending on your mobile device capabilities:

- **Camera**: back/front (primary/secondary)
- **Codec**: H.264/H.265 (depends on device capabilities)

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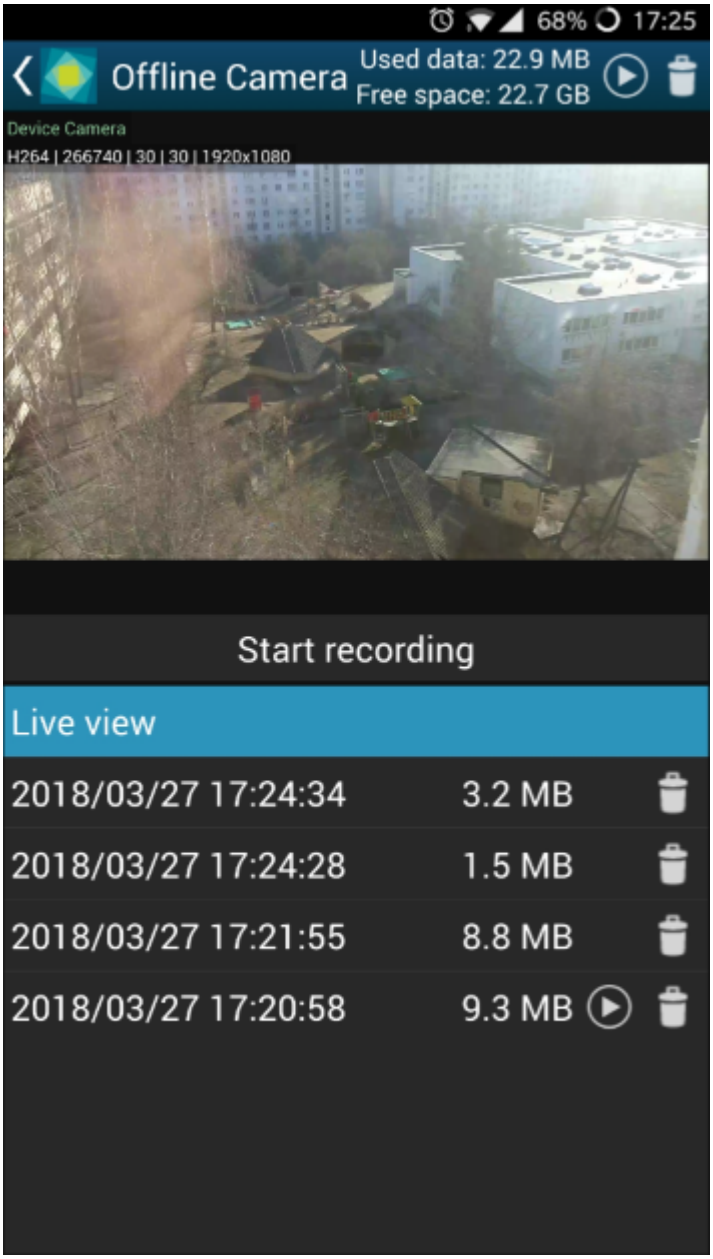
- **Resolution**: [the actual list depends on the mobile device capabilities]
- **FPS**: from 10 up to max allowed by device
- **Camera Microphone**: disable/enable sound

Below these settings, you will see the camera preview. Save your preferences and go back to the server list. Here, tap the *Offline Camera* option in the bottom to open the offline recording mode.



Offline recordings

Rotate your device the way you want to hold it during the process and tap the *Start recording* button: it will turn red indicating that the **recording** is happening. Tap it again to **stop**: a **new file** will appear in the list and the camera preview will return to live.

Tap any file in the list to **play it back**; the play/pause button will appear below the picture allowing you to start/stop the playback. Use the recycle bin icon next to the file name to **remove** individual recordings. The details on the upper right will show how much **storage** space has been used. The *Recycle bin* icon in the top right corner will remove all the recorded videos.

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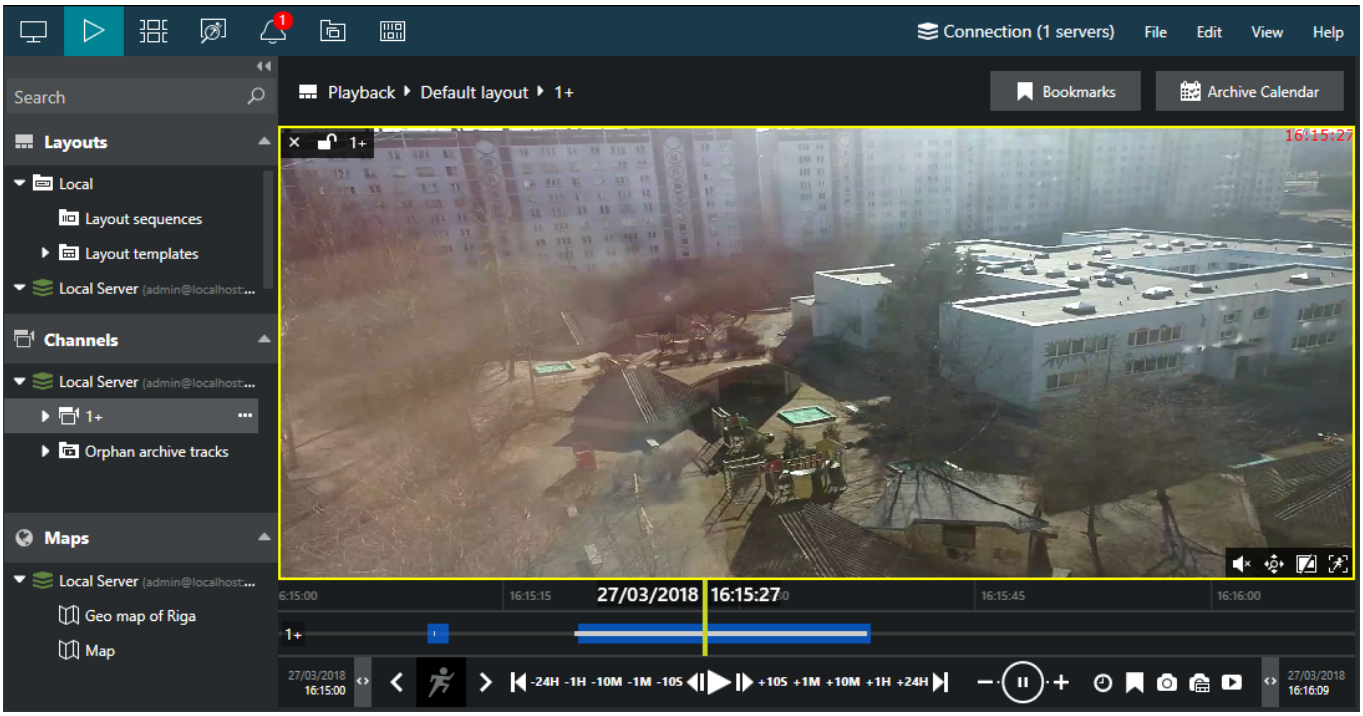
Now, to **upload** the recordings to the server, use the *Play* button: the one in the top right corner will upload all the files; there is also a possibility to upload the last recording only by using the *Play* button next to the file name. You will be presented with file details and server choice: when ready, tap the *Upload* button. The video file(s) will be uploaded to the selected Ganz CORTROL server and stored as **edge stream** for your device's channel. Do not worry if the upload is interrupted due to network issues: the upload will resume as soon as the connection to the target server is available again.

GPS Tracking

Starting from the Ganz CORTROL Mobile version 1.7 and Ganz CORTROL version 1.8.0, it is possible to send the GPS coordinates of the smart device to the Ganz CORTROL server. The coordinates are then displayed on top of the live and recorded video, and they are also used to trace the device on geo maps.



GPS coordinates displaying on top of the video streamed from Ganz CORTROL Mobile

Setup:

- enable sending of GPS data in your app settings
- register your device on the server as described above in the *Stream Camera/Offline Camera* sections so that it exists in the server device/channel configuration
- create a geo map on the server via Ganz CORTROL Console
- place a camera marker on the map, set your smart device as the target channel and enable tracking in the properties

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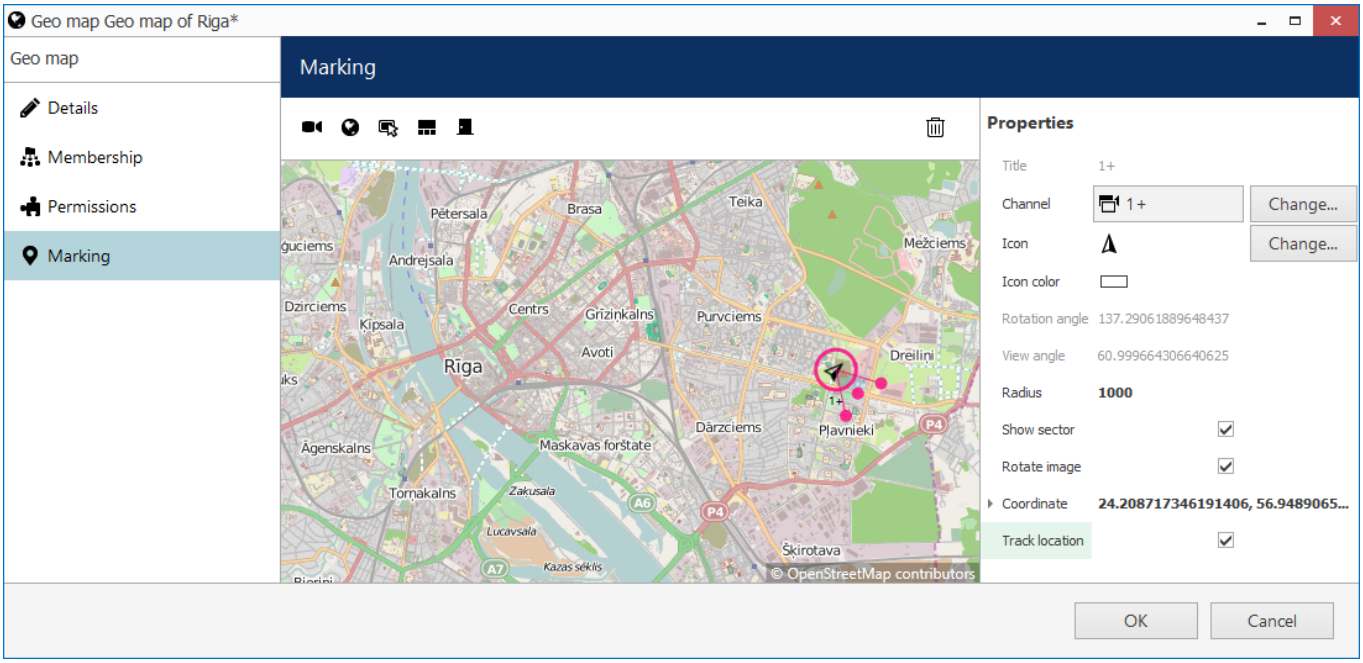

Geo map with a marker that has location tracking enabled

Now, if you move and stream video from your phone to the Ganz CORTROL server, the marker on the map will move as well, displaying your location. GPS coordinates will be also shown on top of the live video stream and also when it is played back. Note that for the offline recorded stream (clips recorded and then uploaded to the server) the coordinates will not be displayed.

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9 Event and Action Overview

Event and action (**E&A**) management is a component of Ganz CORTROL, which provides additional opportunities for handling surveillance system work under certain conditions. The main task is to assign flexible device/server reactions on a user-defined basis. These scenarios may work within a single server, as well as in distributed systems with Ganz CORTROL Global where events originating from one server can trigger actions on one or more different servers.

Events are entities that arise when something happens in the system - namely, when system or system component states changes, for instance, a video stream has been lost, a recording or disk error has appeared etc. These changes can be set up to trigger certain **actions** so that system administrators and/or users are notified and can react to them in a timely fashion. Additionally, there are also extra controlling entities that allow a flexible and advanced setup of event-action rules: conditions, delay times and schedules.

Using event & action management, you can specify your desired outcome for your video surveillance system's operation and determine how software reacts to any event caught on any server and how it turns them into an automated process. Send emails, activate DI/DO, interact with any other software or just bring the attention of the operator to the device that requires their immediate action. The functionality can be used not just for a single event, but on a set of sequenced events to get rid of false alarms and improve the efficiency of the surveillance system.

Possible **E&A scenarios** may be:

- sending alerts through the server based on camera digital input events;
- starting or stopping video recording based on motion in specific regions during specific hours;
- switching to some camera PTZ preset if the door sensors go off at night;
- directing the camera to a specific PTZ preset if another camera registers the same movement;
- etc, etc.

Event & action management offers the following **functionalities**:

- event & action configurator rules
- standard (default) events (available for all servers)
- standard (default) actions (available for all servers)
- custom events of certain types (configurable)
- custom actions of certain types (configurable)
- global events (server-to-server data transmission)
- delay timers (postpone actions)
- special conditions (combine several events)
- schedules (timetables)
- mail server configuration

Each of these components is described in details in the corresponding sections of this document.

Setup in Brief

Actual setup of E&A depends greatly on your system configuration, E&A usage scenarios, required automation level and other things. However, we recommend that, regardless of system scale and architecture, you stick to the following **order of E&A configuration** steps for optimum results:

1. Preliminary actions
    a. Create a plan of your E&A scenarios on paper or in any diagramming/smart draw software - this will ensure you always have a basis to check against
    b. Set up the your Ganz CORTROL system so that you have all the servers, devices, channels, users, external system connections, and optional elements pre-created
    c. Pre-configure all the necessary hardware equipment (e.g., camera IO wires, external physical alarms, buttons) and connect it
    d. Pre-configure all third-party programs/scripts/executable files, if necessary
2. Extra setup in Ganz CORTROL Console
    a. Create User Buttons, if you are going to use them for manual action triggering
    b. Create Maps, Layouts, PTZ Presets if necessary

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3. E&A Management setup per server
    a. Add mail servers if you are going to use e-mail notifications
    b. Add custom events
    c. Add conditions, if needed
    d. Add custom actions
    e. Create rules using all elements; add extra events/rules, if required
    f. Add timers, schedules and conditions to the rules
    g. Check your rule map against your initial plan from 1.1
    h. Test your rules

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9.1 Rules

All rules defined via *Event & Action Configurator* are listed in the *Rules* section. Click the *Change* button near server name to select a different server from the list: for each server, only relevant rules are displayed. You can perform the following actions from the *Rules* section without opening the *E&A Configurator*:

- **view** the complete list of existing rules, per server, and their properties
- **disable** a specific rule or a set of rules by using the *Disable* button on the upper panel
- **enable** a specific rule or a set of rules by using the *Enable* button on the upper panel
- **test** a specific rule (the rule must be enabled)

In order to **add**, **remove** and **modify** the rules, choose the target server and click the *Open Configurator* button on the top panel.

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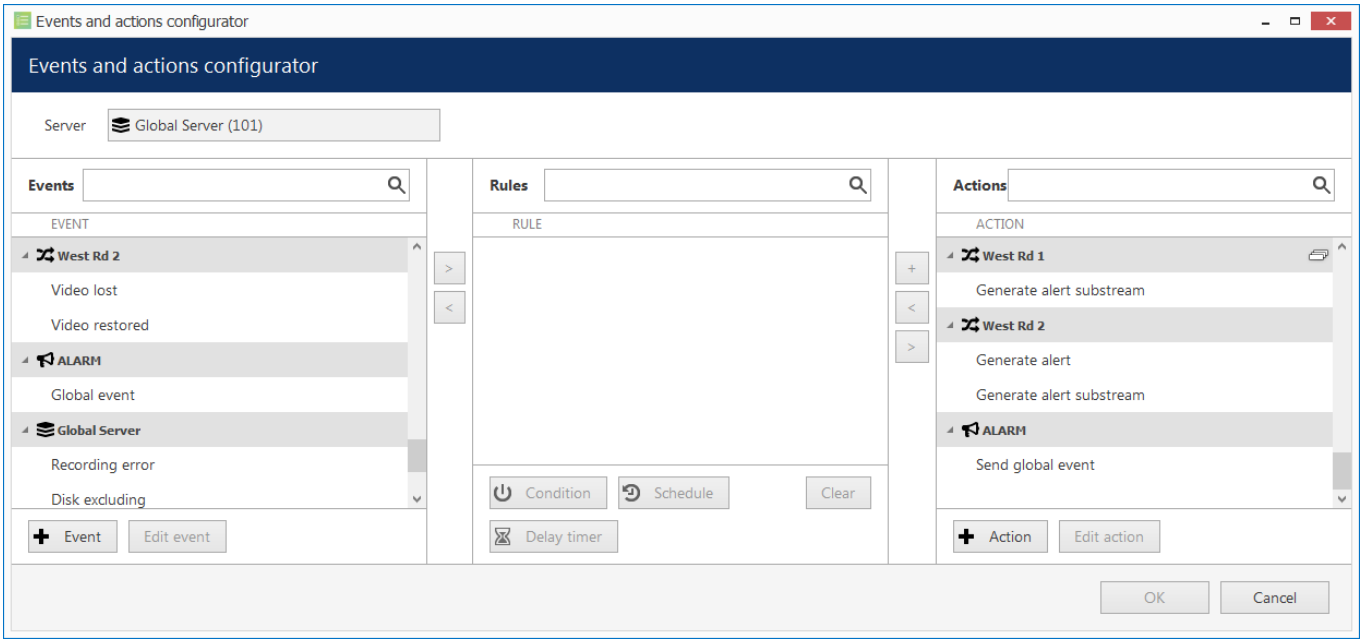
9.2 Add Rules

All existing and added entities of E&A can be combined to create **rules** (rule map) for each server, which will define server behaviour if events are triggered. This section will guide you through related features, explain the meaning and purpose of used items and provide usage examples.

The rule map is created via the ***Event & Action Configurator***: to open it, go to the *Events & Actions* section in Ganz CORTROL Console and then click *Rules* in the menu on the left, then select the target server for which you wish to add the E&A setup, and then click the *Open configurator* button on the upper panel. To change the target server, click the *Change* button next to the server name and then pick one from the available server list.

The *Event & Action Configurator* will open in a new window; by default, no rules are defined.



Event & Action Configurator

You can pre-create all events, actions, conditions and schedules beforehand using the relevant menu sections in Ganz CORTROL Console, or create necessary items as you go from the configurator. Delay timers can only be created as you go for the specified rule and are not saved as independent entities.

Add and Edit Events

Choose the target item from the Events list and then click the + *Event* button below: configuration dialog box will then open with the target device pre-selected. Here you can add alerts from device digital inputs, VCA notifications and other types of events; see the detailed description of how to create events in the Add Events section.

Events are arranged by **sources**. Typical event sources are: channels, channel groups, servers, user buttons, video walls, external services.

> Built-in (default) types of events - lost/restored video, recording errors etc. - cannot be edited. This is also the case for all built-in actions.

Add and Edit Actions

Choose a target item from the Actions list and then click the + *Action* button below: the configuration dialog box will then open with the target device pre-selected. Here you can add different reactions any type of event:

- trigger device digital output
- write to OS Application log

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- activate target device's PTZ preset
- activate main/secondary stream recording profile
- send an email notification
- run a third-party program
- etc.

See the detailed description of how to create and configure actions in the Add Actions section.

Manage Rules

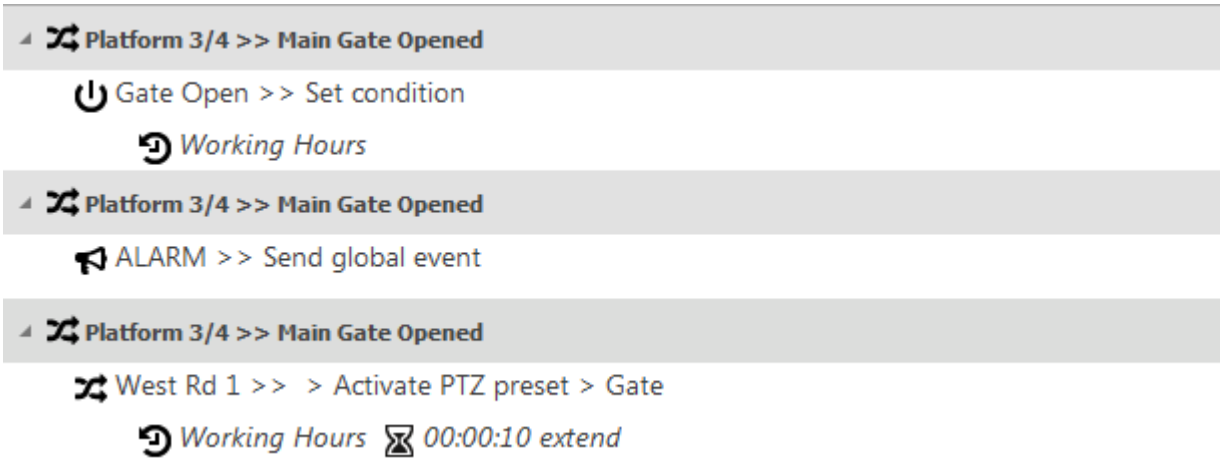
To start combining events, actions and additional controls, simply follow this scheme:

- find your desired **event** in the *Events* list - use search filter on the top panel, if required
- use the < and > arrows or double-click events to add/remove them to/from the *Rules* list
- click free space of the target rule in the *Rules* list (use CTRL or Shift to select multiple ones) - the selected rows will then become highlighted green
- find your desired **action** in the *Actions* list - use search filter on top, if required
- use the < and > arrows or double-click actions to add/remove them to/from the *Rules* list, and the + button to add more than one action for a single event
- select desired actions and add auxiliary controls by clicking buttons on the bottom panel (see description below for details)

Useful tips:

- double-click a device (highlighted grey) to add **all** its events to the rule map
- to **add** an action to an existing rule, use the + button instead of the < button: the original event will be duplicated and new action will be added to the copy
- use the + button between *Rules* and *Actions* lists to add **multiple actions** of the same type to the selected rule(s)
- to clear the *Rules* list, select all rules using Shift or CTRL+A, then press < button on the left to remove all events
- use the *Expand/Collapse list* button on top of each column to hide all contents and only display node titles

The rule header displays the event source and event itself; below, related actions are listed, each with its own set of special controls. Actions of the same type are listed under the same rule header; for all other cases, the events are duplicated, resulting in a separate rule. One condition, one schedule and one delay timer can be attached to **each action**.



Example of a rule set for the same event source

Once the rule map has been created, click the *OK* button in the bottom right corner to **save and exit**. Note that simply closing the *Event & Action Configurator* is analogous to clicking *Cancel*: no changes will be saved.

Conditions, Schedules and Delay Timers

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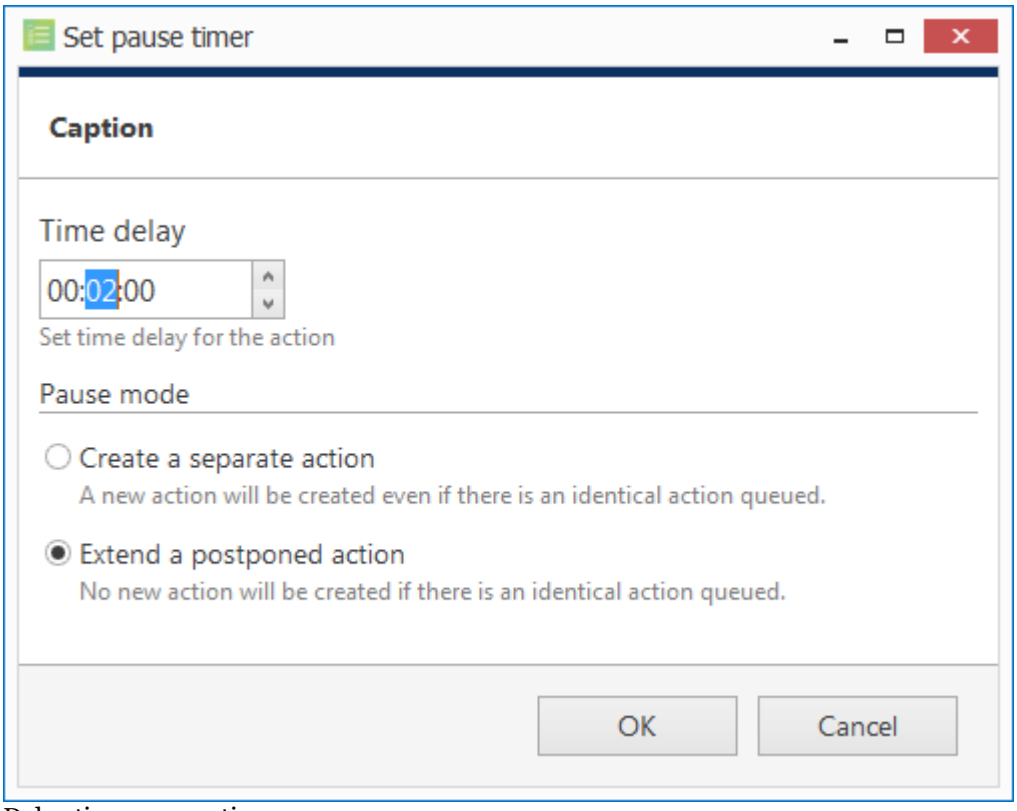
For each event/action pair that is added to the rule map, additional options can be defined in the form of conditions, delays periods and schedules. Select one or multiple target events from the *Rules* list and then click desired control item in the bottom panel.

To remove auxiliary controls from a rule, select it in the *Rules* list and click the *Clear* button on the bottom panel. Note that all defined conditions, timers and schedules will be removed from the target rule, and it is not possible to de-attach them one by one.

Delay Timers

To add a pause timer for specific actions, select one or more of the mapped rules (use *CTRL+click* or *Shift+click* to mark multiple items) subject to delay, and then click the *Delay Timer* button on the bottom panel of the central part of the *Event & Action Configurator*.



Delay timer properties

Set the delay period for the target timer. Time can be adjusted in the following ways:

- click hours/minutes/seconds and then use the UP and DOWN arrows on the right, or
- click hours/minutes/seconds and use the mouse scroll, while still holding mouse cursor over the relevant timestamp section, or
- enter the time manually using the keyboard numpad.

Next, choose the pause mode:

- **Create a separate action**: new actions of the same type will be created regardless of the acting delay timer, and queued in the same way as the original delayed action
- **Extend a postponed action**: new events of the same type will restart the timer, postponing the resulting action for the specified amount of time

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When you have finished, click *OK* to save and exit the dialog box. The newly created delay timer will be assigned to the pre-selected actions.

Extending an action allows you to postpone the action execution repeatedly if more events of the same type arrive within the chosen time period. For example, if incoming events are of a *Recording Error* type, there may come too much of them at once e.g. in case of a major storage issue, causing a lot of triggered actions of the same type, while only a single action may be desirable.

Say, if required action is *Write to application log*, setting a delay timer to *5 minutes + extended action* will postpone the email sending for 5 minutes every time a new recording error appears; when, at a certain point, more than 5 minutes have passed without new incoming events, a single log entry will be eventually created. The **separate action** option, on the contrary, will force logging for every single triggered event.

To remove a delay timer from rule configuration, click the timer to highlight it within the rule, and then click the *Clear* button in the bottom panel. Note that, if there are schedules and/or conditions attached to the same rule, they will be removed as well.

Schedules

Schedules are used when you wish a rule to be active based on a pre-defined itinerary. You can create any number of custom schedules via the *Conditions* section in the Ganz CORTROL Console and then use them for rule control: see Create Schedules section in this document for a detailed explanation of this.

Select one or multiple target events from the *Rules* list and then click *Schedule* button in the bottom panel.

Conditions

Conditions are supplementary variables that can allow or prevent action execution. The decision is taken based on the condition state: if the condition is **ON**, the planned action will be executed; if the condition is **OFF**, the action will not be performed regardless of the frequency of the triggered event. The condition state can be changed as a result of some other event, so ad additional rule should be added to perform this task; alternatively, you can manually set and unset conditions at your will. Thus, conditions allow the activation and deactivation of rules without requiring them to be entirely deleted.

To assign a condition to the rule, choose one or multiple target events from the *Rules* list and click the *Condition* button on the bottom panel, then either select target condition from the list or create a new one.

Please read the Conditions topic of this document if this feature is new to you: it contains detailed description and usage examples.

Source and Target Channels

Some actions participating in the rule creation need a related channel to be specified so that these rules can be properly executed. For such actions, the source/target channel is specified when you create a rule involving such an action: corresponding additional buttons appear on the bottom panel or the rule map section, next to conditions, schedules and delay timers. Each action allows exactly one related channel; if you need, for instance, two snapshots to be sent via email, just add two actions of the same type and specify different source channels.

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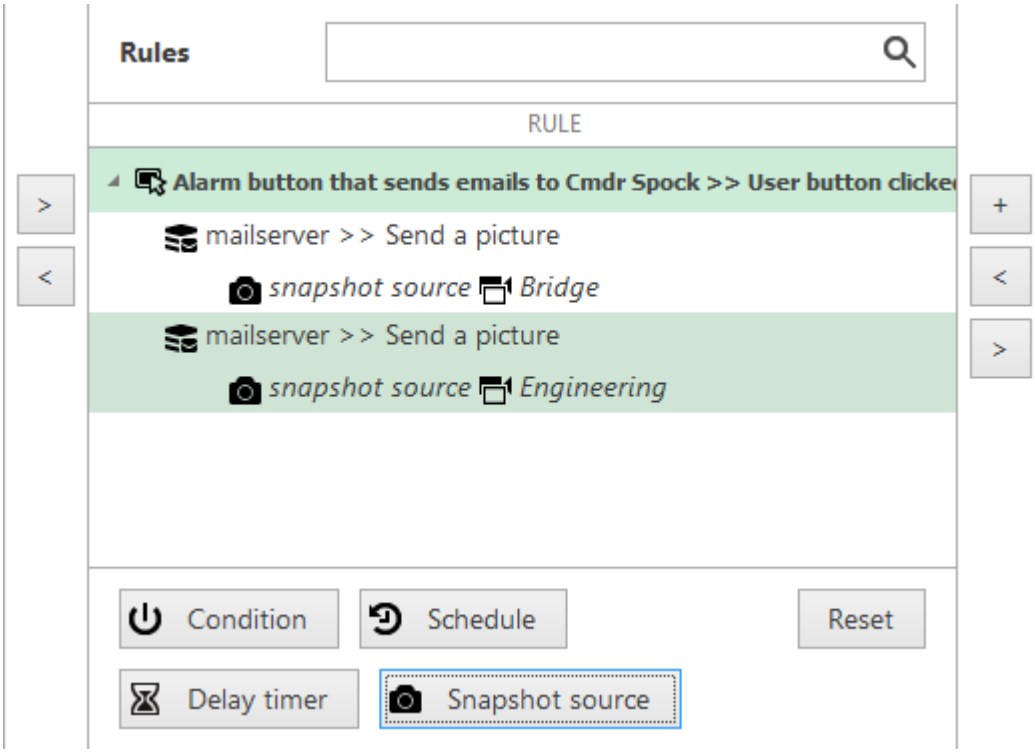


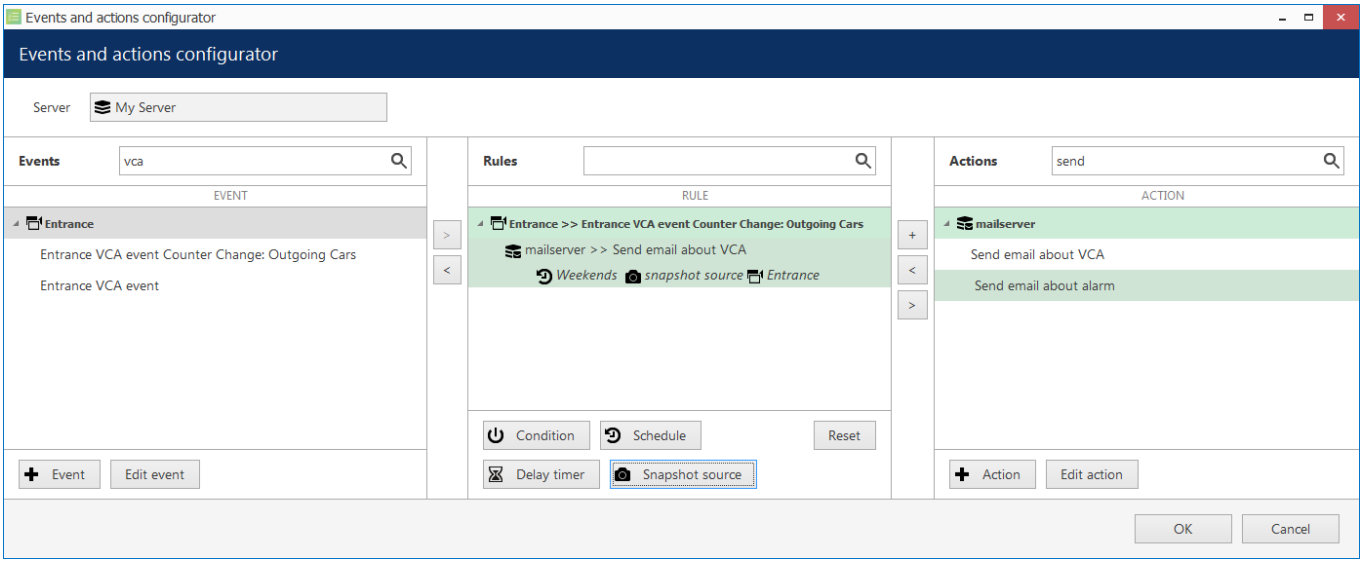
Use the *Snapshot Source* button to attach different snapshots to several actions of the same type

When you combine such actions with events that already are related to some channel (e.g., *Video Lost*, *Motion*, *VCA*, *DI*), that channel is selected automatically for the resulting action. For the rest of events, the channel is not set by default and you need to use the **target/source channel** buttons on the panel below the rules. Also, you can set a different channel instead of the one selected automatically by using the same buttons.

Attaching Snapshots

The *Send Email* action allows you to attach a snapshot from one channel and deliver it together with the email to the recipient. The snapshot can be taken either from the main stream or from the secondary stream (substream), if available. At the action creation time, you just enable the snapshot from either main or secondary stream, and then you will have an option to specify the source channel when creating the rule that involves such an action.

When creating the Send Email action, you can choose to attach a snapshot by selecting the necessary stream option (main/sub) from the drop-down list. The channel itself is not specified at this step as it is not known beforehand, to which channel this action will be applied in future - this makes the action universal, applicable to any target channel.



Specify a snapshot source for the target rule

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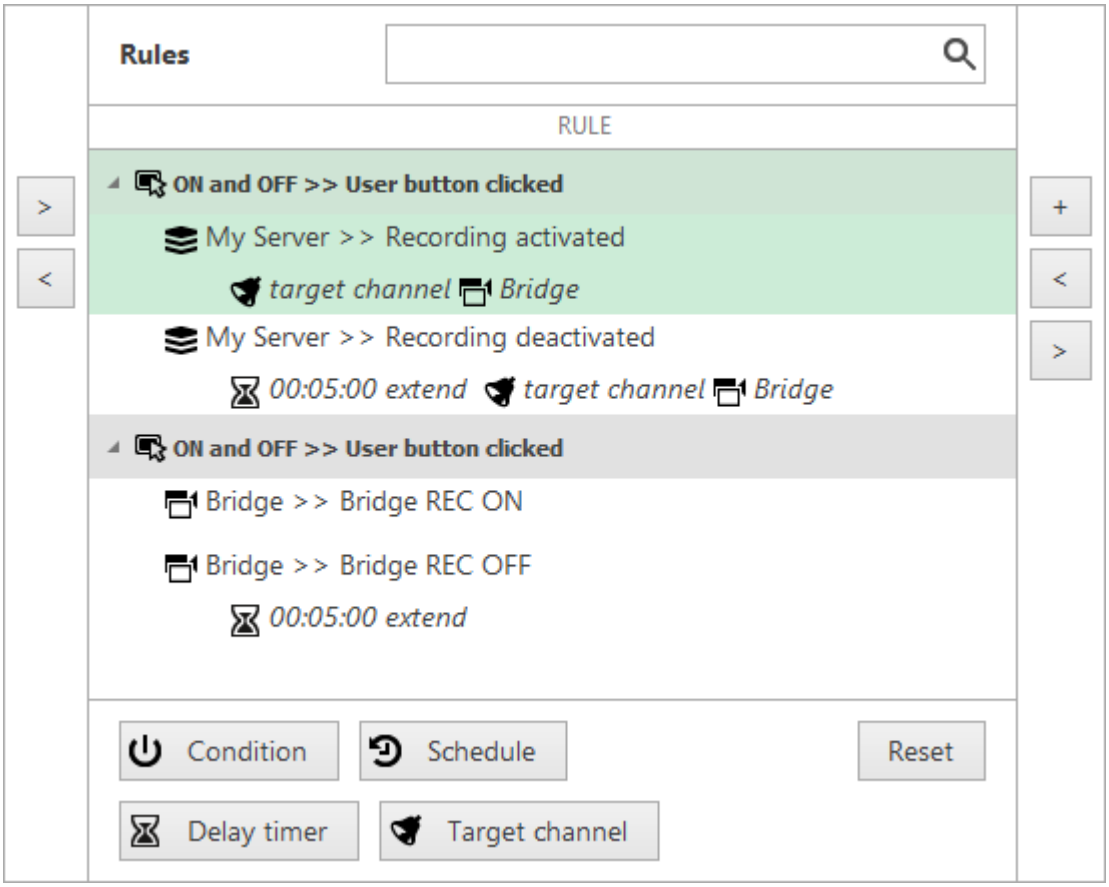
The source channel is specified when you attach the *Send Email* action to an event, i.e., create a rule in the *Event & Action Configurator:*

- if the event in the rule has some channel as a source (e.g., motion, VCA, DI), this channel is set automatically as a snapshot source
- for events having sources other than channels (e.g., user buttons, server events), you can specify the source channel by using the *Snapshot source* button on the panel below the rule map
- you can modify the source channel by using the same button, and also disable snapshot attachment by selecting *none* as the source

Email sending rules can accept any extra modifiers just like any other rules - delay timers, conditions and schedules, each of them once.

Adding Target Channels to Rules

There are other actions, apart from *Send Email with a Snapshot*, that are related to channels and may use them as action targets. These are, namely, *Create Bookmark* and *Send Event to Client*.



Recording changes are logged in the notification area of the target channel

The *Create Bookmark* action requires a channel to add the bookmark to. To add bookmarks to multiple channels simultaneously, add several actions of the *Create Bookmark* type and specify different target channels for each.

The *Send Event to Client* action only needs a target channel to be specified in case the action has the *Display event in notification panel* option enabled: as a result, the pre-defined message will appear in the notification area of the specified channel (overlay area in live view, the same place where the stream errors appear - see Ganz CORTROL Client user manual for more information). Similarly to bookmarks, you can add more than one action of the same type and add different channels as targets in order to display the message in the notification areas of these channels.

Examples

Here are a few examples of the *Event & Action Configurator* usage. You will find more examples in each of the related topics.

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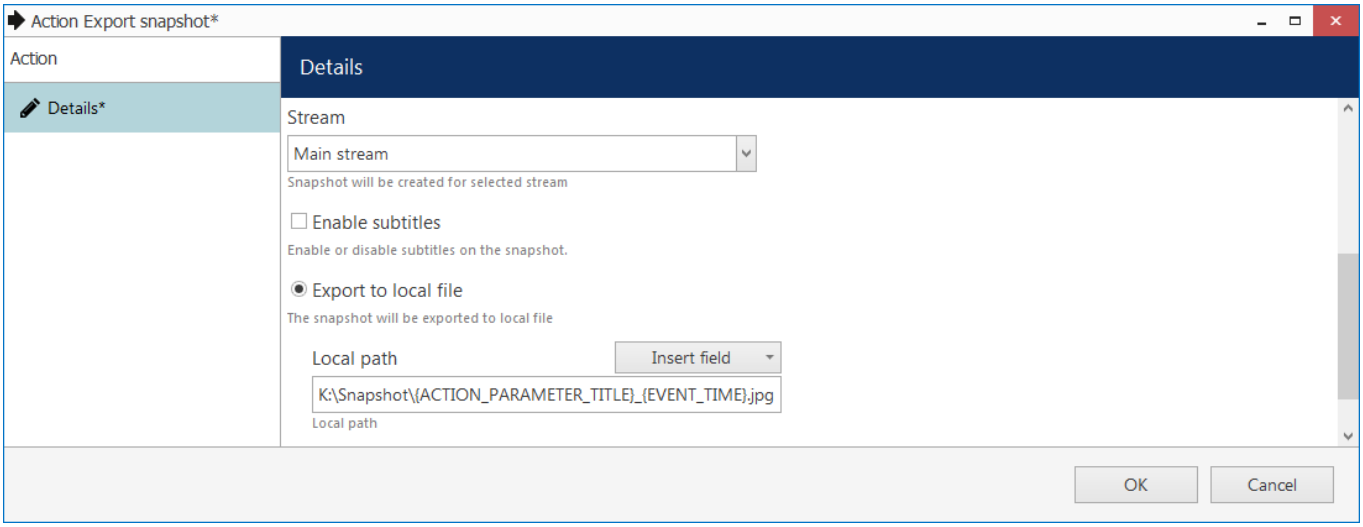
Export Snapshots From All Channels

Task: upon a user button click, save a snapshot from every existing channel on one server.

Preliminary setup:

- create a user button with your desired name
- create an action: export snapshot to a specified location



Export snapshot to a specified location using text macros for the file name

Note that the action itself does not contain any fields for the channel to serve as the snapshot source. Thus, the action is universal and can be used repeatedly for many rules; the target channel for the snapshot is then to be specified for each rule in the E&A Configurator.

Use the text macros in the file name and/or path: this is necessary for each snapshot to have a unique name. Otherwise, the snapshots in the same directory will overwrite each other. {ACTION_PARAMETER_TITLE} here is the best option here to differentiate between channels because the originating event (user button clicked) and the action target (server) are the same for all rules. For example, here are two different applications for the same macros:

K:\Snapshot\{ACTION_PARAMETER_TITLE}_{EVENT_TIME}.jpg - each file name contains channel name (snapshot source specified at the rule creation step) and a timestamp

K:\Snapshot\{ACTION_PARAMETER_TITLE\{EVENT_TIME}.jpg - directories with channel names are created, and all snapshots from the same source are put into the same folder and have timestamps as their names

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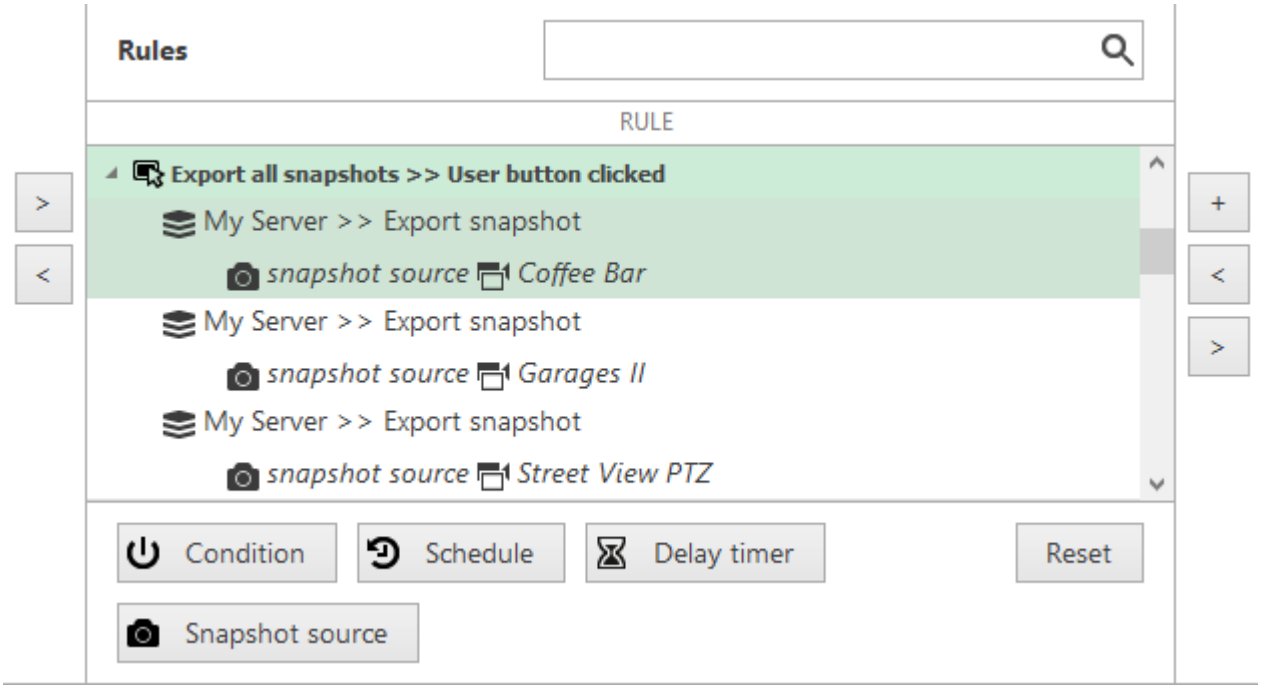

Each rule has its own snapshot source

Rules:

- add the *user button click* event once, click it so that it is selected (highlighted green)
- add the *export snapshot* action multiple times for all channels using + button (the rule will be copied automatically)
- define the *snapshot source* (=channel) for each rule using the button in the bottom

As a result, when the user button is clicked in the Ganz CORTROL Client or in the Ganz CORTROL Mobile application, snapshots from all available (those having video) channels will be saved into the specified location.

Email Notification on Video Loss

Task: send an email notification when the video stream from certain channel(s) is not available for more than five minutes.

Preliminary setup:

- in the channel settings, set the video loss timeout to 300s (five minutes) for each target channel (select multiple channels and use the *Bulk Edit* button on the upper panel to modify several channels at once)
- configure a mail server with your desired parameters
- create an action: send email to the responsible person using the pre-configured SMTP server

Rules:

- the *Video lost* event from each of the target devices triggers the *Send email* action

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Email Notification on Video Loss

Note that you do not need to create the *Video lost* event as it is already exists by default for each channel.

Pop Up Channel on Video Analytics Event

Let's see how to pop up video channels if built-in video analytics (VA) trigger a line cross event. Such rules let you efficiently load operators' monitors, so that they only see relevant video instead of tons of static channels.

Task: if video analytics on Channel X detect a person crossing a line, pop up Channel A on all operators' screens.

Preliminary setup:

- Channel A: enable VA, add a crossing line, add a line event of the *Crossed* type with the *Person* class enabled

Rule for Channel A:

- *VCA rule* with the *Line crossed* parameter triggers the *Pop up on screen* action

If you want to limit the popup to a specific video wall display, simply create an additional action of the *Popup object* type. In the action properties, you will be able to specify the video wall display and even viewport index as the channel destination.

Global Handling of Recording Errors

This example will cover a use case with a **global event**, showing how multiple servers within a single system can be involved in a more sophisticated chain of events and actions.

Task: if there are recording errors on Server A, log this event locally and also add corresponding entry to Windows Application log on the central server. The *Recording error* event is there by default and so there is no need to create it.

Preliminary setup:

- Server A: *Write to A Application log* action
- Central Server: *Write to CS Application log* action
- Global event *Recording Error on Server A*

Rules for Server A:

- *Recording error* event triggers local *Write to A Application log* action
- *Recording error* event triggers *Send global event* action for the *Recording Error on Server A* event

Central Server rules:

- *Recording Error on Server A* global event triggers its own *Write to CS Application log* action

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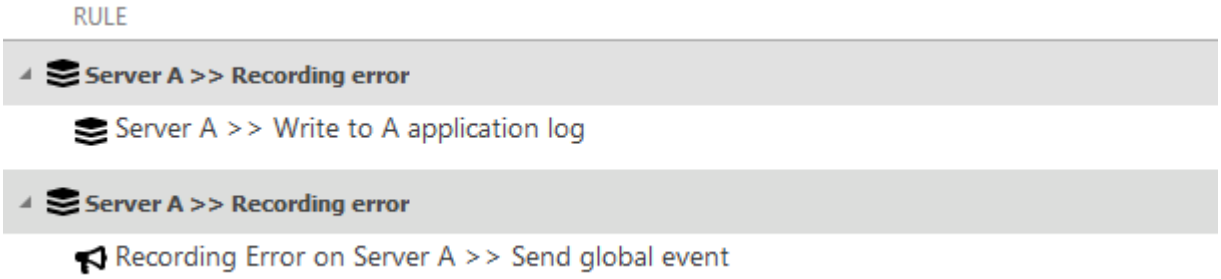
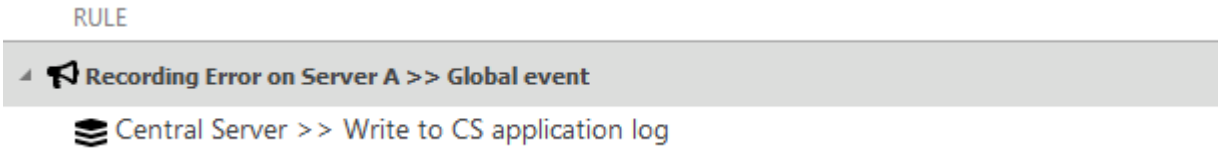


Rules for the Server A

Server A generates a global alert and sends it to all servers in the system.



Rules for the Central Server

The Central Server is subscribed to the global alert and therefore reacts with the assigned action.

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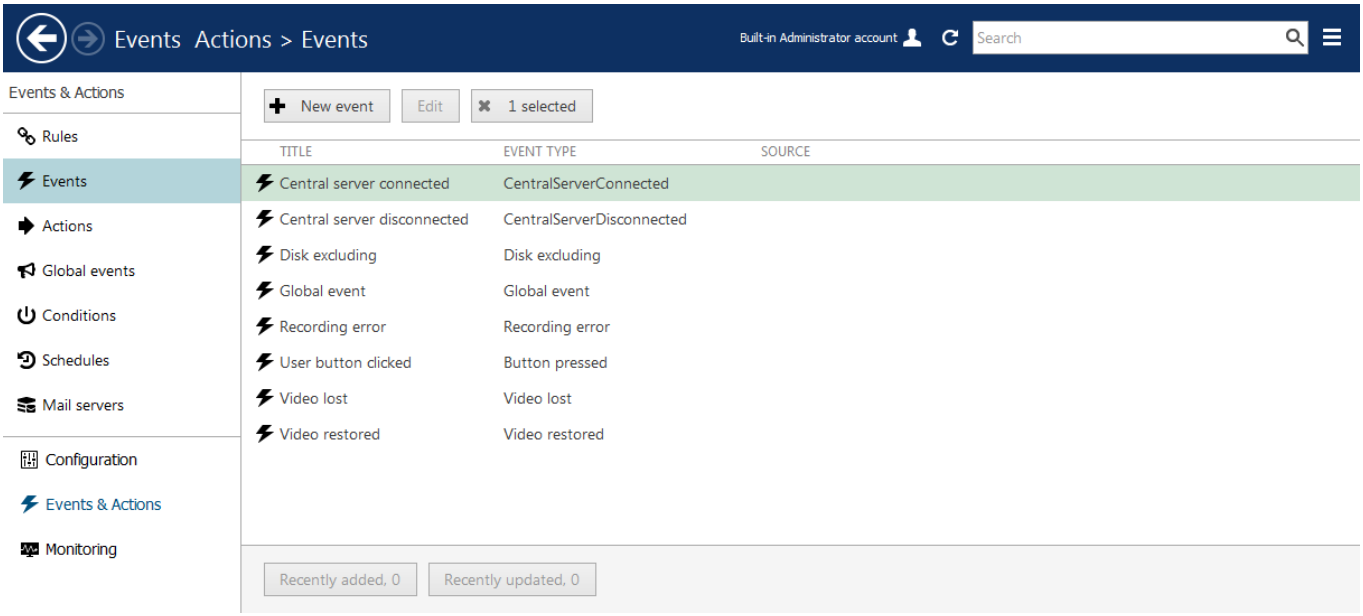
9.3 Default Events

Events are entities that appear when something happens in the surveillance system - namely, when the system or system component state changes. These changes can be set up to trigger certain actions so that system administrators and/or users can react to them in a timely fashion.

For each Ganz CORTROL server, there are a set of default events, which behave in an identical way on all servers and cannot be altered or deleted. These are:

- **Central Server Connected**: the connection with central server has been restored; event is available for non-central **servers**
- **Central Server Disconnected**: the connection with central server marked as unavailable because the timeout defined in the server settings has been reached; event is available for non-central **servers**
- **Disk Excluding**: one of the storage locations has been marked as unusable and has been excluded from the recording configuration; event is available for every **server**
- **Failover Activating**: a recording server has failed and has been automatically replaced by a failover node
- **Fallback Activating**: main storage has failed, server has automatically switched to fallback storage; event is available for each **server**
- **Global Event**: global (system-wide) event from one of the servers has been fired; event is available for all defined global events and on all servers with Ganz CORTROL Global
- **Motion**: motion has been detected; event is available for each **channel**
- **Motion Started**: some motion has been detected (single motion event has occurred); event is available for each **channel**
- **Motion Stopped**: no more motion is being detected; event is available for each **channel**
- **Recording Error**: problem encountered while recording video data to the storage; event is available for each **server** and for each **channel**
- **Recording Recovered**: server has recovered from the recording error; available for each **channel**
- **User Button Clicked**: user button was pressed; event is available for all created **user buttons**
- **Video Lost**: no video stream available for this specific channel for the defined amount of time, which is set in the channel settings; event is available for each **channel**
- **Video Restored**: video stream connection re-established; event is available for each **channel**



Default events

Default events are available in the *Event & Action Configurator* and can be used in the same way as user-defined events, except for they cannot be edited. Events are arranged by **sources**. Typical event sources are: channels, channel groups, servers, user buttons, video walls, external services.

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9.4 Add Events

Events are entities that appear when something happens in the system - namely, when system or system component state changes. These changes can be set up to trigger certain actions so that system administrators and/or users can react to them in a timely fashion.

In addition to the the default set of events, certain types of events can be added manually and customized. Continue reading to learn about event types and their settings.

To access event management in Ganz CORTROL Console, select the *Events & Actions* section and then select *Events* from the menu on the left.

To create an event, click + *New event* button on the upper panel; event configuration dialog box will open. It is also possible to add events as you go, from the *Event & Action Configurator*. Fill in the settings, then click *OK* to save and close the dialog box. The newly created event will appear in the item list under *Events* and will be available for setup in the *Event & Action Configurator*.

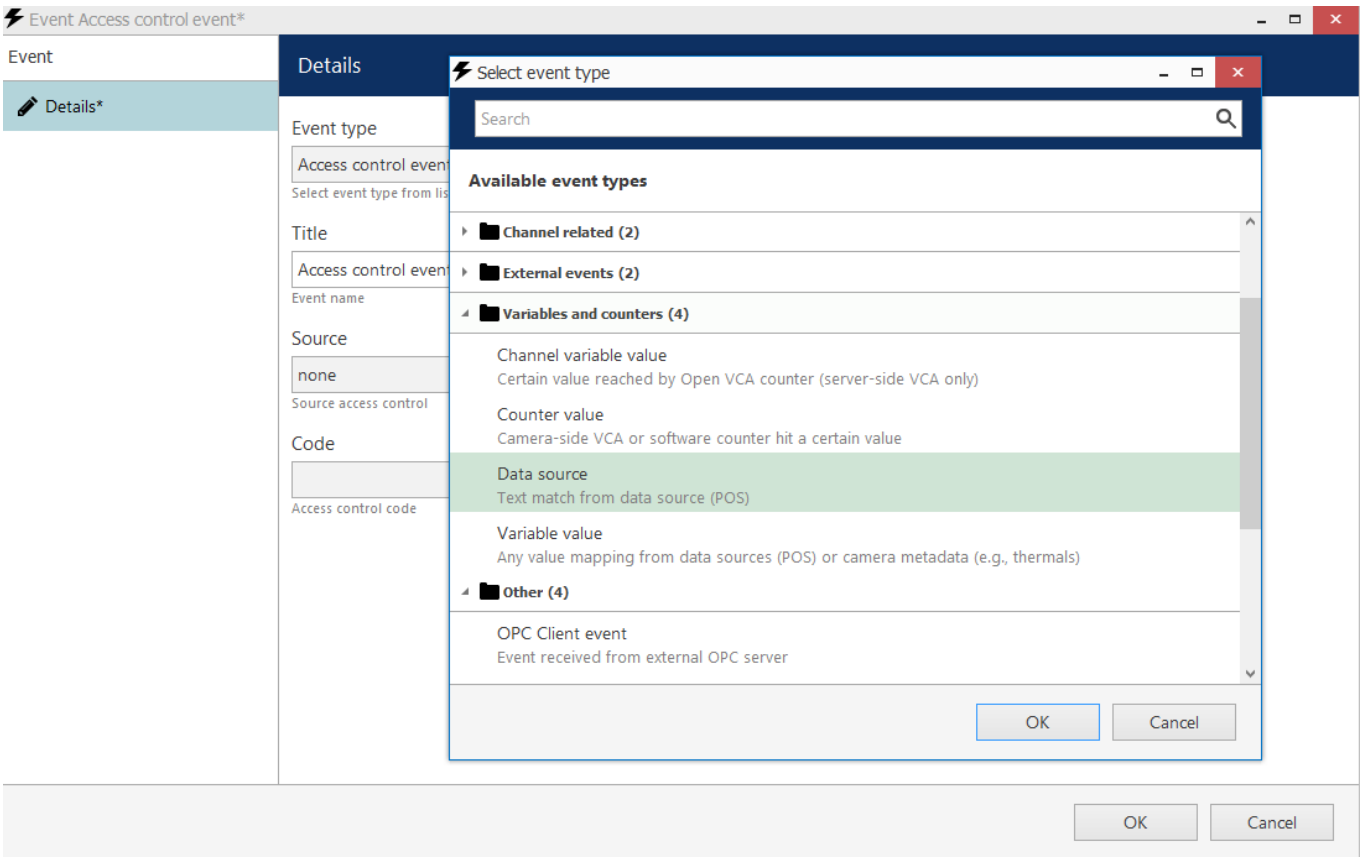
Once you have created an event, it is impossible to change its type, only its source and properties.

Below, you will find explanations about every available event type.

Before creating events from camera DI, VCA source, or external services, make sure to:

- enable alert generation in channel settings via Ganz CORTROL Console for device digital inputs (DI);
- enable and set up rules via camera Web interface for edge VCA and set up rules via channel settings for software-side Open VCA;
- set up the External Service event generation logic for external services (license plate recognition, face recognition etc.)

Without these settings, the event source will be not available for the target device in the event settings.



Choose event type

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Prior to software version 1.17.0, events and actions were simply listed alphabetically. Starting with v.1.17.0, events and action are additionally grouped for your convenience.

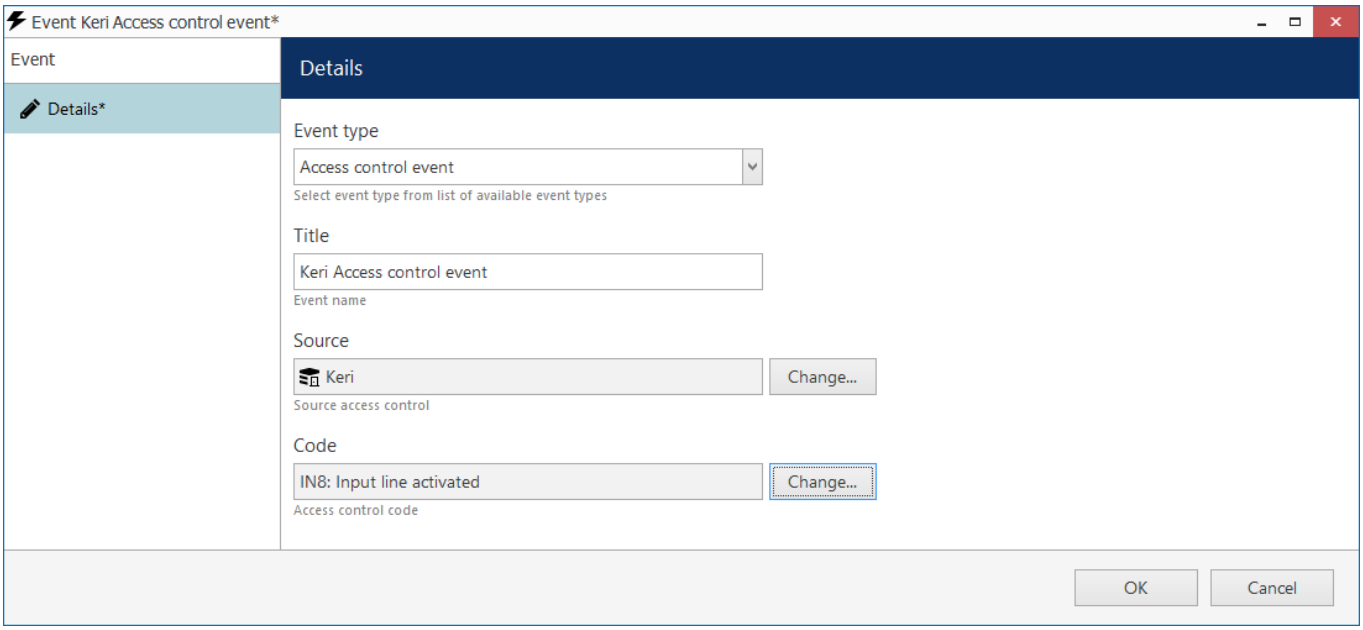
Access Control Events

Events in this group originate from connected access control systems.

Access Control Event

This type of event is triggered by the status code coming from the access control integration, whenever the status code is not related to any door (making it impossible to use *Door event*). The codes are vendor-specific and will vary depending on the access control suite type.

- **Title**: user-defined event name, as it will appear in the *E&A Configurator*
- **Source**: access control server that will send the status changes
- **Code**: vendor-specific event code



Access control event

For successful event generation, the target access control system must be connected and running.

Door Event

This type of event is used to set up Ganz CORTROL server reactions based on door status changes, which are received from the integrated third-party access control software.

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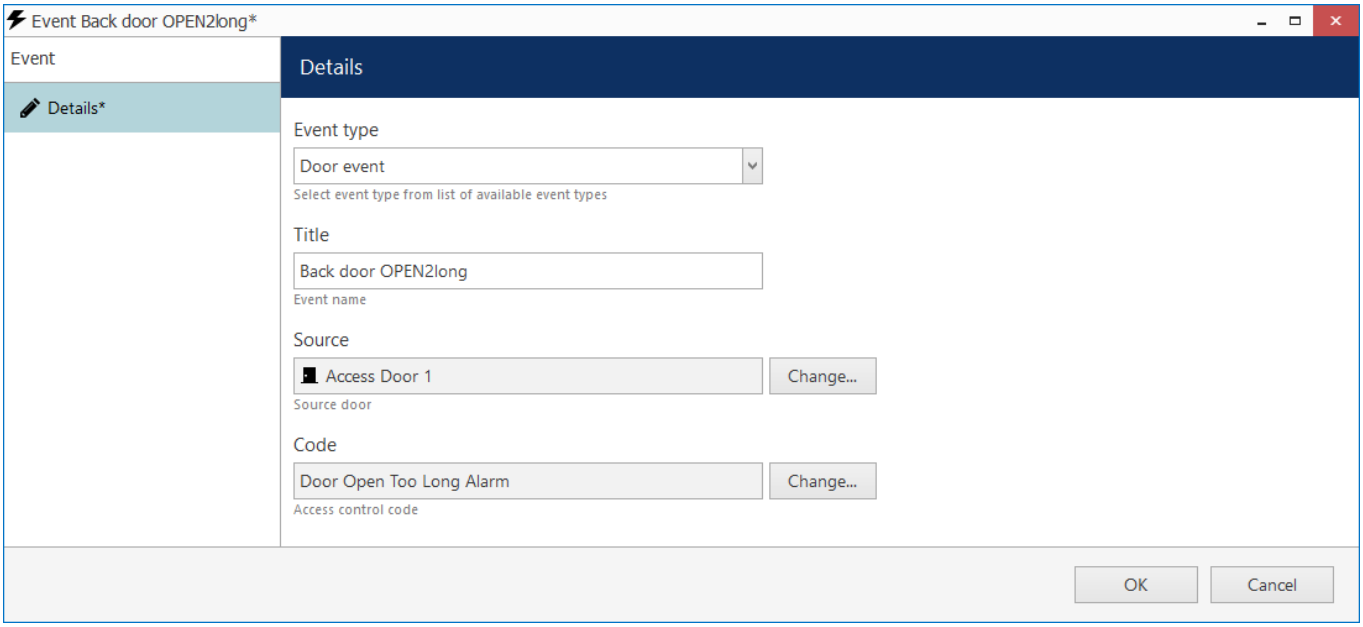
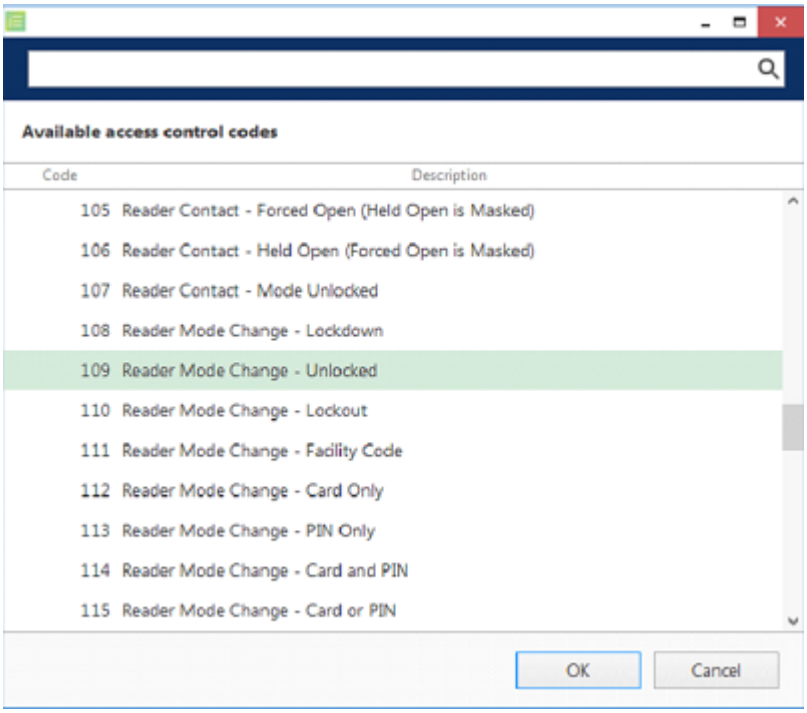


Door event

Settings:

- **Title**: user-defined event title
- **Source**: a door from the access control module (choose from list)
- **Code**: received status or error code from the access control module (choose from list)



Door codes fetched from the access control module

The list of codes will differ depending on the access control type. For details about each code, please refer to your access control software documentation.

Channel Related Events

Events in this category have channels as sources.

Before creating such events - from camera DI or VCA source - make sure to:

- enable alert generation in channel settings via Ganz CORTROL Console for device digital inputs (DI)

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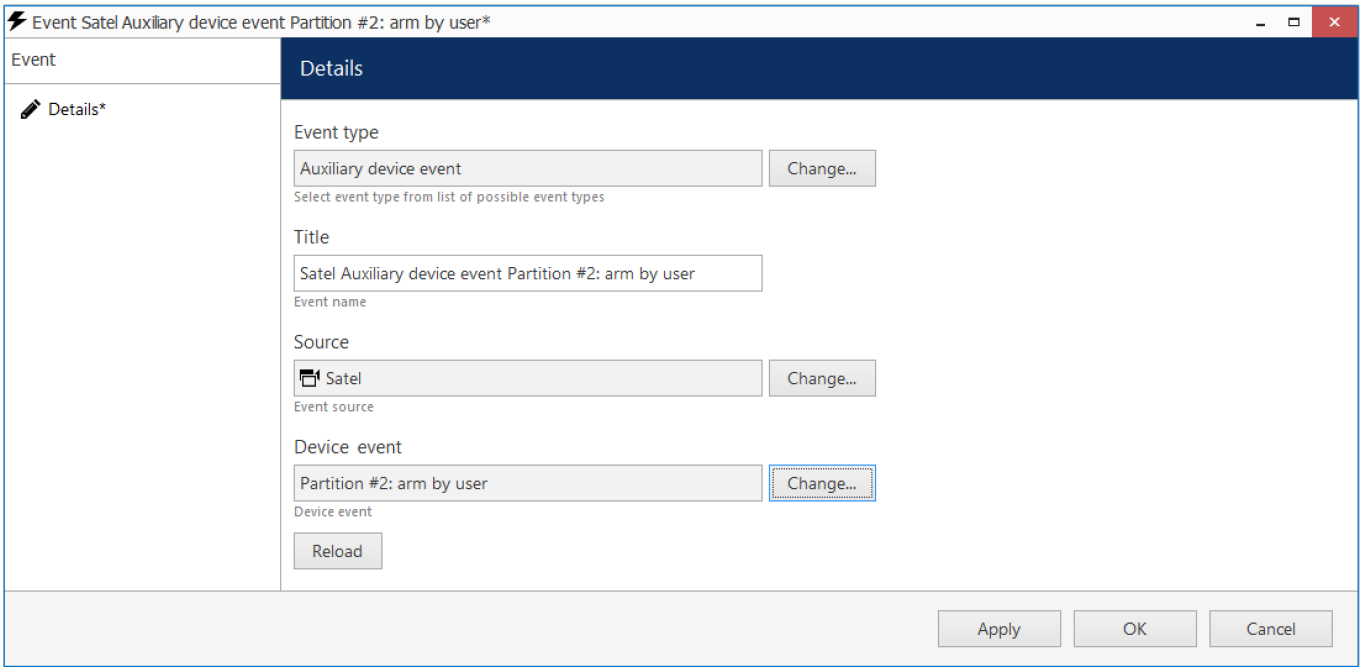
- enable and set up rules via camera Web interface for edge VCA, or set up server-side analytics rules

Without these settings, the target channel will not have corresponding DI or VCA items available in the event settings (the item list will be empty).

Auxiliary Device Event

This type of event is similar to *VCA Event* and designates some event that happens on the device side, with the difference that the auxiliary device event comes from a non-video device. Auxiliary device events may come from alarm control panels, various sensors, audio detectors etc. These events are received directly via device integration (not via OPC/MQTT/...) and are not directly reported as DI/DO events either.

If your device falls into this category but the auxiliary event list is empty, try the *VCA event* type.



Auxiliary device event settings

Available settings:

- **Title**: user-defined event name that will appear in the E&A Configurator
- **Source**: source device (e.g. Satel alarm control panel)
- **Device event**: event type on the device side

Digital Input

This event is triggered when a device's DI (digital input) state is changed. Before creating the event, make sure you have enabled DI event generation in the device channel's properties.

The following settings are available for *Digital Input* event:

- **Title**: user-defined event name
- **Source**: choose the device from which the DI event originates; event generation must be enabled in the channel settings
- **Digital Input**: select one of the DIs of the target device to serve as event trigger; the number of inputs depends on the total available and configured inputs
- **Digital Input Mode**: the binary input state to trigger alert; must conform with the DI state set up in the channel settings

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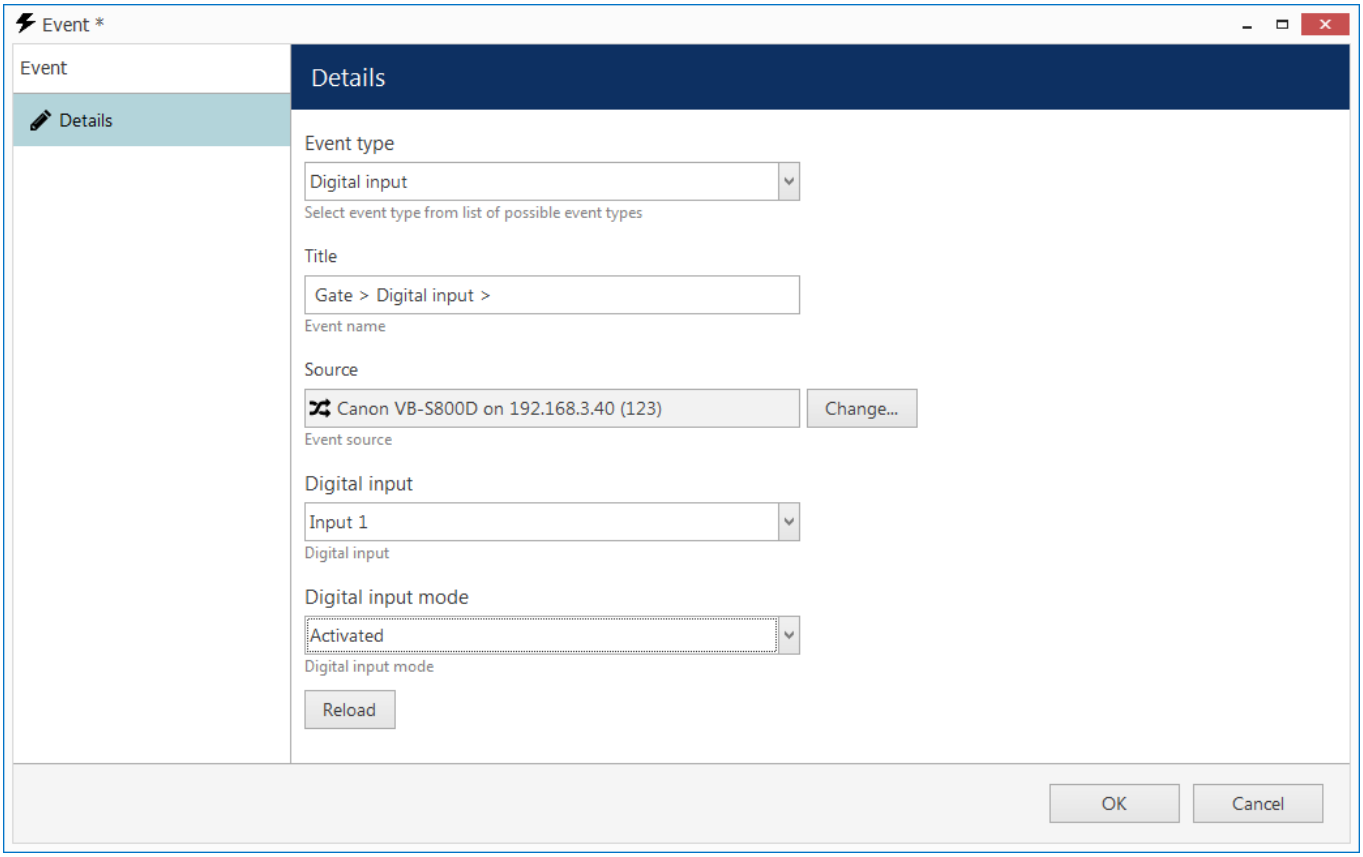

Settings for the *Digital Input* event type

VCA Event

For **camera-side VCA** and software-side **Open VCA** events. Note that this event only covers triggered VCA **rules**, and not counters. In order to set up reactions for VCA counter changes, use the *Channel variable value* event (for Open VCA) or *Counter value* event (for camera-side counters).

The available settings are:

- **Title**: user-defined event name
- **Source**: choose a channel from which the video analytics event originates; analytics rules must be enabled via the camera Web interface (some cameras have basic VCA events enabled by default, e.g. volume detection) or pre-configured using the Ganz CORTROL Console for the software-side Open VCA module (see corresponding documentation for configuration details)
- **VCA Rule**: video analytics rule to trigger event alert; may come from the camera side, Open VCA engine, or built-in VA engine; available rules depend on device model, capabilities and VCA configuration

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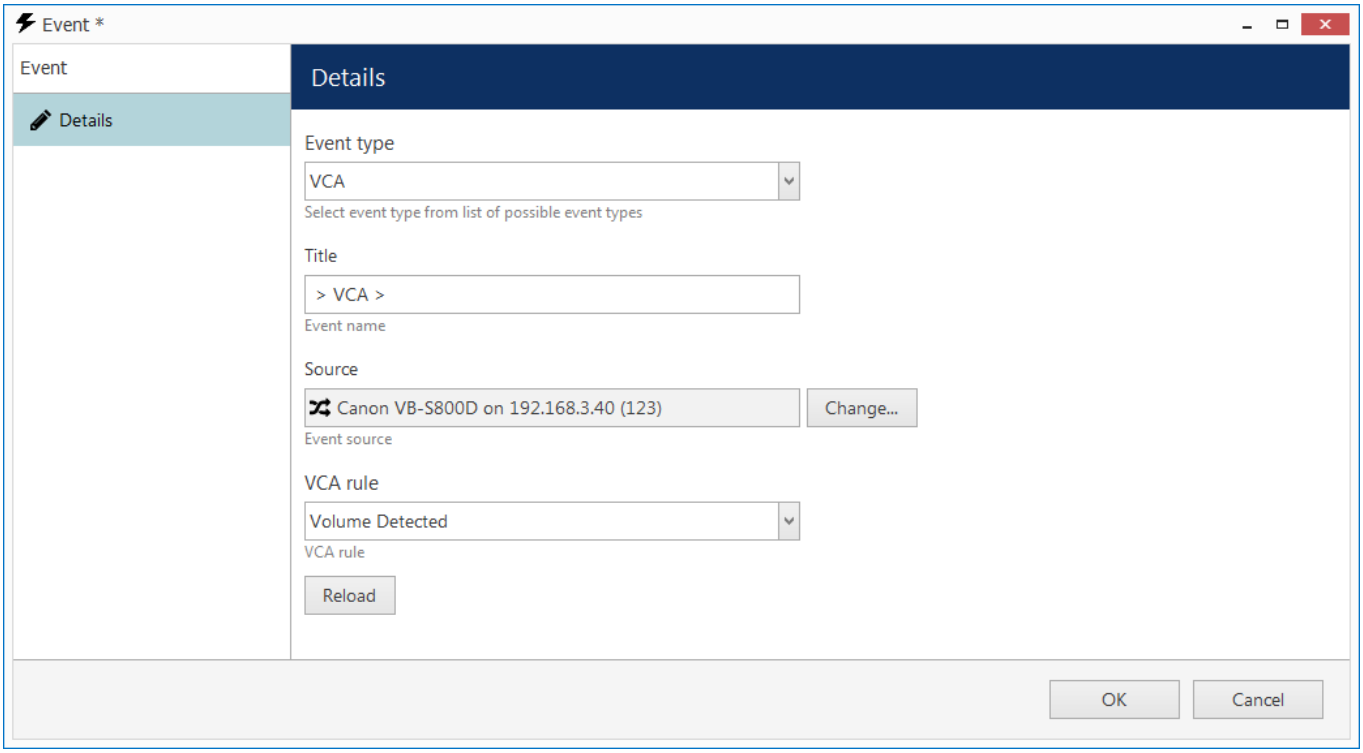

Settings for *VCA* event type

If you do not see a recently created VCA event in the drop-down list, try clicking the *Reload* button: this will refresh the source event list. For guidelines on how to enable and configure Open VCA, please see the related document.

External Events

These events come from all kinds of external systems.

Event Triggered by MQTT Notification

This event is triggered by incoming MQTT messages from a third-party broker. The message may be an exact text match, or you can evaluate it using a regular expression (regex) and catch a keyword or a part of the message.

- **Title**: event name that will appear in the E&A Configurator, corresponds to the macro {EVENT_TITLE}
- **Source**: MQTT client that will subscribe to the current topic and act as event source. Leave empty if you want the event to be visible for all existing MQTT clients
- **Topic**: MQTT topic to subscribe to
- **Text**: incoming message that will trigger the E&A event. If empty, any message will trigger the event. The field cannot be empty if marked as regular expression!
- **Regular expression**: enable this option to enter a regular expression in the Text filed instead of plain text
- **QoS**: required level of quality of service

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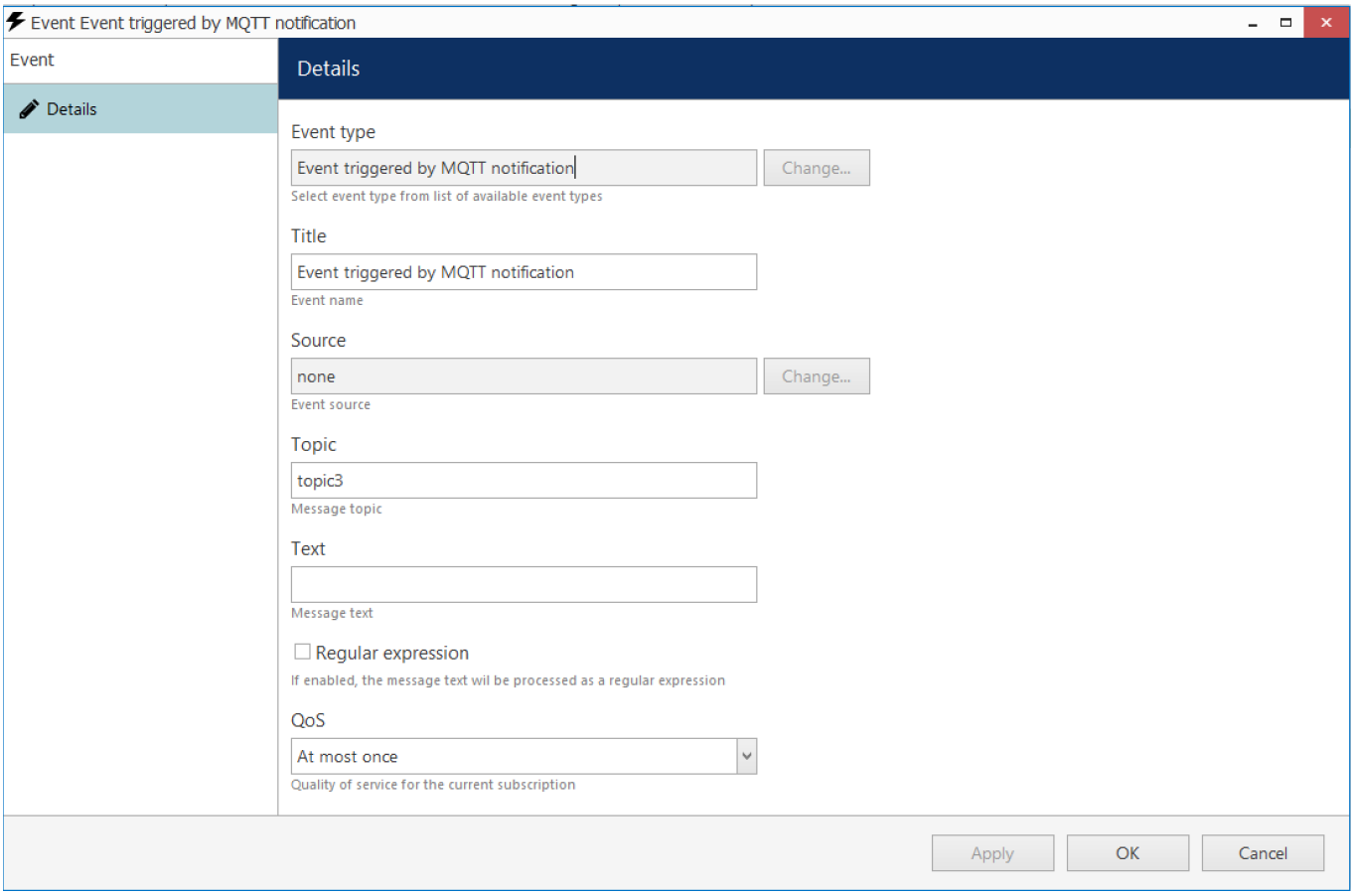

Event triggered by any MQTT message received with topic=topic3 by any MQTT client

Fields *Source* and *Text* may be left empty. Empty source means that the event will be created for every existing MQTT client. Empty message text means that the event will be triggered by any message having the defined topic; however, you cannot leave this field empty if you wish to use regex. If the Regular expression option is enabled, the Text field must contain an evaluating expression to analyze the message text.

External Service

External Service type events are messages from modules that are operating via Ganz CORTROL HTTP API and are listed in Ganz CORTROL Console as external services. By default, license plate recognition and face recognition services are integrated, and any other third-party integrations can be connected.

The following settings should be defined:

- **Title**: user-defined event name
- **Source**: the channel that is used by the target external service
- **Service group**: the group the external service belongs to in Ganz CORTROL Console settings
- **Target event**: service-specific result type, e.g., recognition result
    - *Known*: recognition result has a match within the external service database (black/white list in LPR, subjects' database in FR), matching any tag
    - *Unknown*: recognition result has no matches within the external service database
    - *Tags*: recognition result was found in the external service database and it has a specific tag assigned to it

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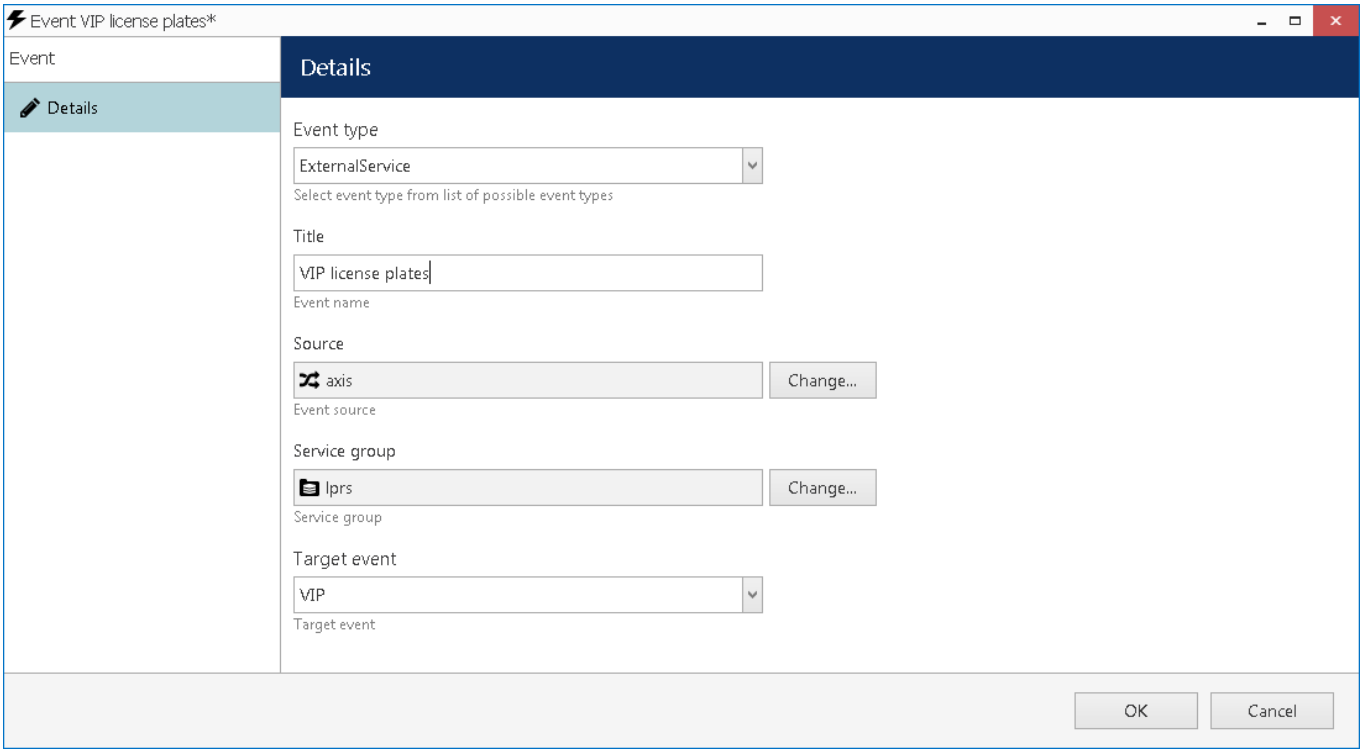
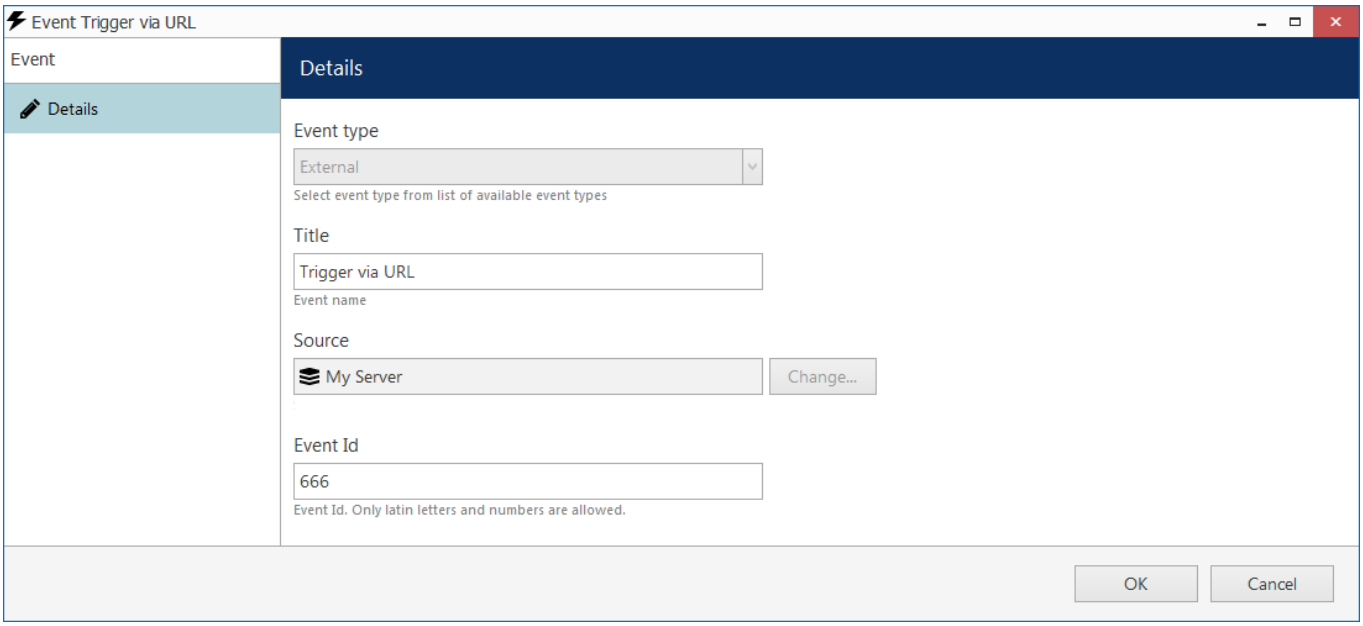


External Service event from the License Plate Recognition module

The example event here accepts events from the License Plate Recognition (LPR) module and will report plates recognised from the specified source channel if these results are present in the known plates' list with a *VIP* tag.

External

External events are HTTP requests from third-party software: integrations, scripts, Web browsers etc. These are a basic example of Ganz CORTROL HTTP API: an **URL** is used to trigger the event.



Event triggered by an external HTTP request

For the external request to trigger an event, create the event with a pre-defined identifier on your desired Ganz CORTROL server:

- **Title**: user-defined event name
- **Source**: Ganz CORTROL server that will accept the HTTP request

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- **Event ID**: alphanumeric event identifier, **only** Latin letters [a-zA-Z] and digits [0-9] allowed

The request link is built as follows:

http://<server_address>:<http_port>/externalEvent/activate?id=<event_id>, where

- **<server_address>** is the target server's IP address or hostname (in Ganz CORTROL Global systems, use the exact Ganz CORTROL Recorder address, not Ganz CORTROL Global server address)
- **<http_port>** is the server's HTTP port (8080 by default)
- **<event_id>** is an alphanumeric identifier of the event, which is defined at the event creation step

Example: *http://192.168.1.99:8080/externalEvent/activate?id=666*

Variables and Counters

Events in this category are triggered by certain **value changes**. These values can be text variables, software or VCA counters, mappings from data sources (POS or other serial text), channel metadata etc. Each event is dedicated to a specific kind of variable or counter.

- *Counter value*: for camera-side VCA counters and also software counters
- *Data source*: text match from Data sources
- *Open VCA counter value*: server-side VCA (Open VCA) counters
- *Variable value*: pre-defined variable value analysis

Counter Value

Solely for **camera-side counters** and **software counters** (server-side, NOT VCA).

Software counters can be created in Ganz CORTROL Console to count any events in the system. Camera-side counters are only available for certain integrations (e.g., Dahua with smart tools).

This event is similar to the previous one, with the difference that you do not have to set the data type, bur rather simply select a pre-created counter. Counters from the cameras must be also explicitly added in Ganz CORTROL Console under *E&A > Counters > New VCA Counter*.

- **Title**: user-defined event name
- **Source**: choose one of the pre-created software or camera-side counters
- Condition: define what the counter value will be compared to
    - **Conditional operator**: choose the comparison type - greater, less, equal, etc.
    - **Value**: an integer value for the counter to be compared to

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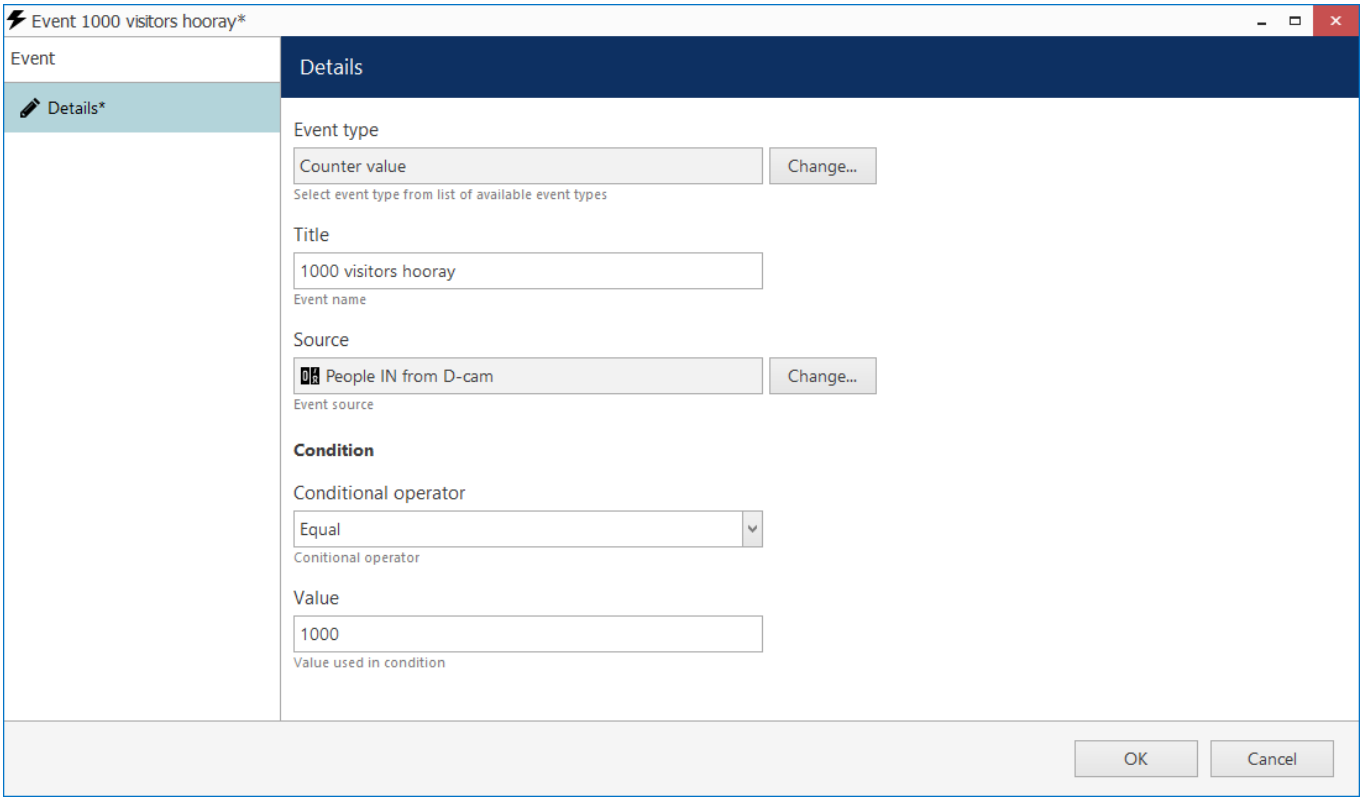
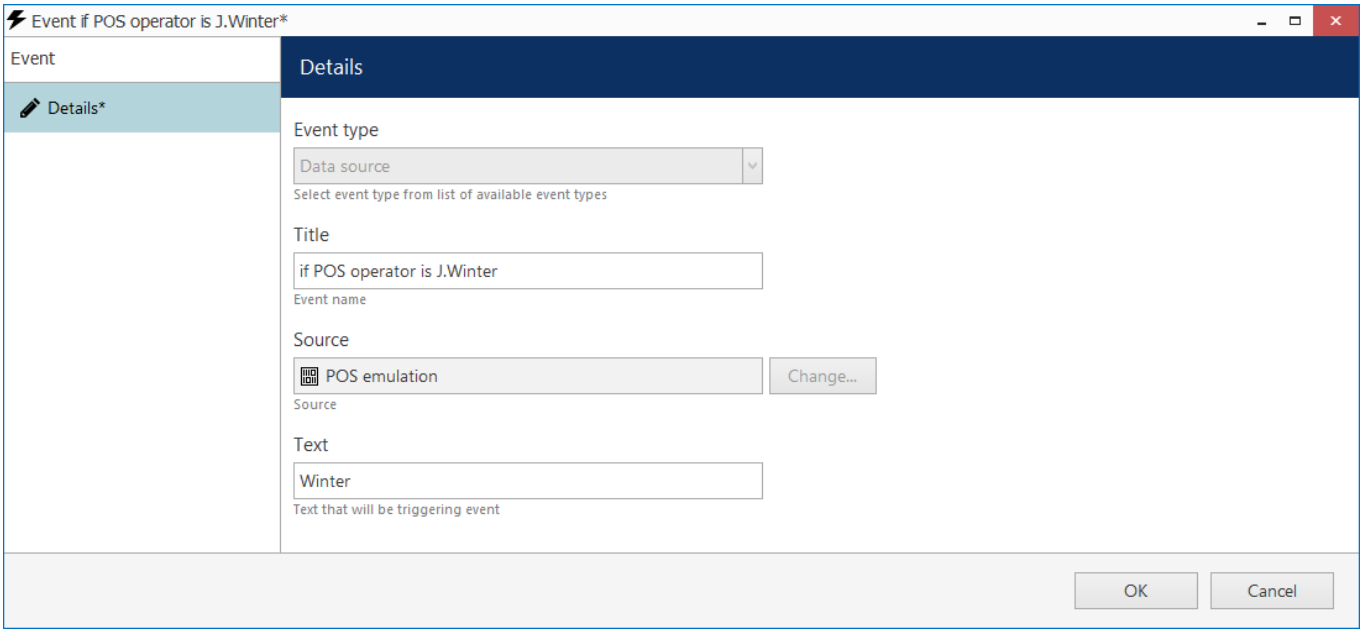


Event triggered when camera-side counter reaches 1000

For actions further linked to this event, you can **pass the counter value** by using the **text macro** (field) *{ADDITION_INFORMATION}* (you can insert it in any textual action by right-clicking the text area or by clicking the *Insert field* button). The format will be [counter_name]=[counter_value]. For example, for a counter named *Total* hitting a value of five, the macro will show *Total=5*.

Data Source

The server will monitor incoming text from Data sources, triggering an event in case the specified **string** (textual value) is received. This can be used to react to certain keywords from POS terminals and any other serial data sources. The string for comparison is defined in free **text** form (not regex). The server will be looking for an **exact match**, i.e., the field is case-sensitive and all extra symbols (commas, spaces) are accounted for.



Trigger events based on incoming POS data

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Available settings:

- **Title**: user-defined event name
- **Source**: data source to be used as event source; text from data provider will be analyzed for matches
- **Text**: case-sensitive keyword or key phrase; when an exact match is found in the text, the event will be triggered

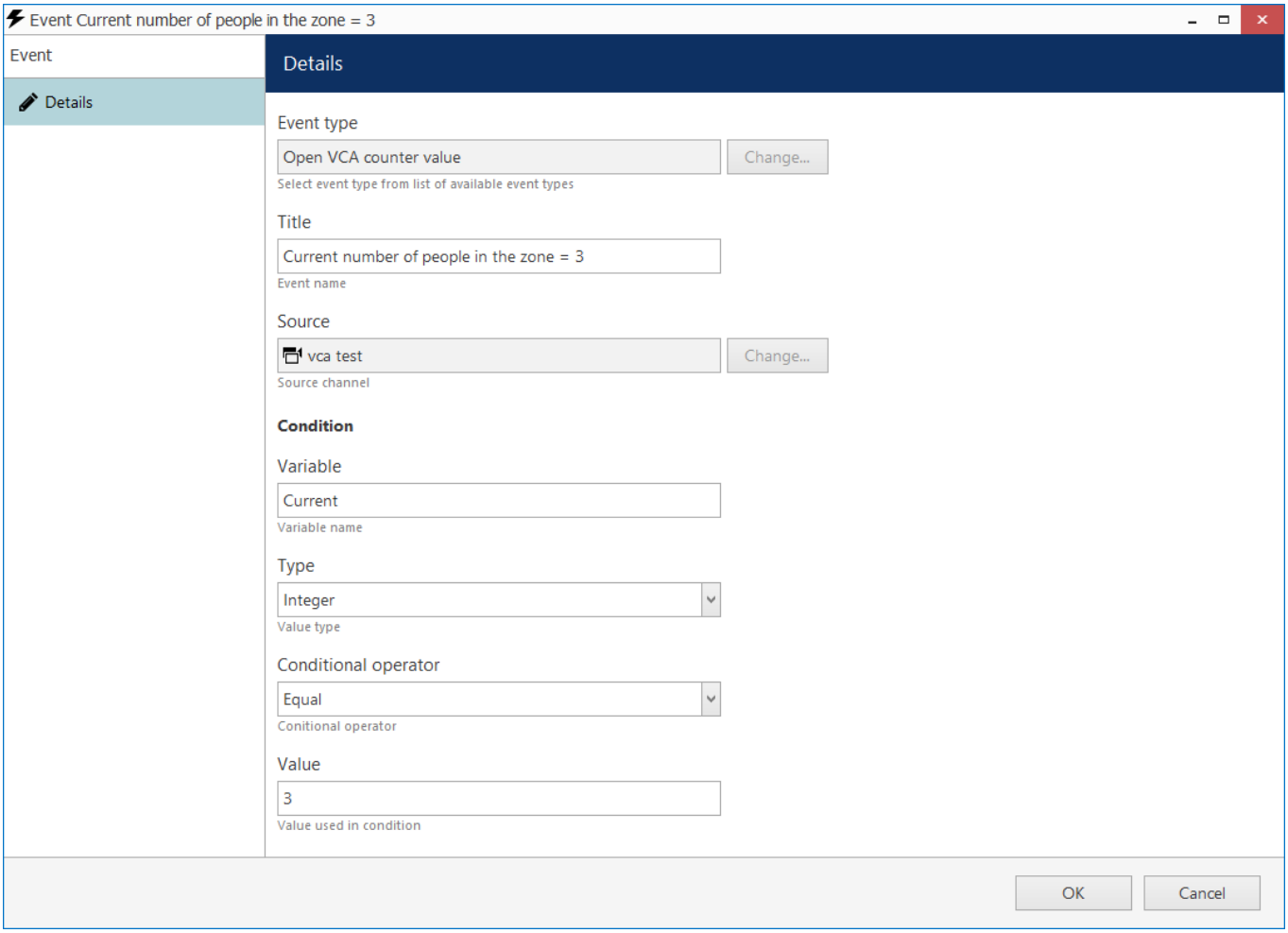
For the event to operate, it is **not necessary** for the target data source to be bound to any channel. Associating data sources with channels only affects video overlay in the Ganz CORTROL Client application; text detection will work on the server side, and therefore the data source may be independent.

Open VCA Counter Value

This event is dedicated to Open VCA **counters** (those set up on the server side for a specific channel). Each counter value update triggers a comparison of the integer counter value to the pre-defined value. The comparison operation is carried out using two integer data types and returns true (event is triggered) if the condition is true. The available conditions are: equal/not equal, greater/less, greater/less or equal.

To react to Open VCA rules, use the *VCA Event* under channel-related events.

- **Title**: user-defined event name
- **Source**: a channel that has Open VCA enabled and at least one counter set up
- Condition: define what the counter value will be compared to
    - **Variable**: Open VCA counter name
    - **Type**: must be **integer** (other types are listed to ensure event compatibility with older software versions)
    - **Conditional operator**: choose type of comparison - greater, less, equal, etc.
    - **Value**: an integer value for the counter to be compared to



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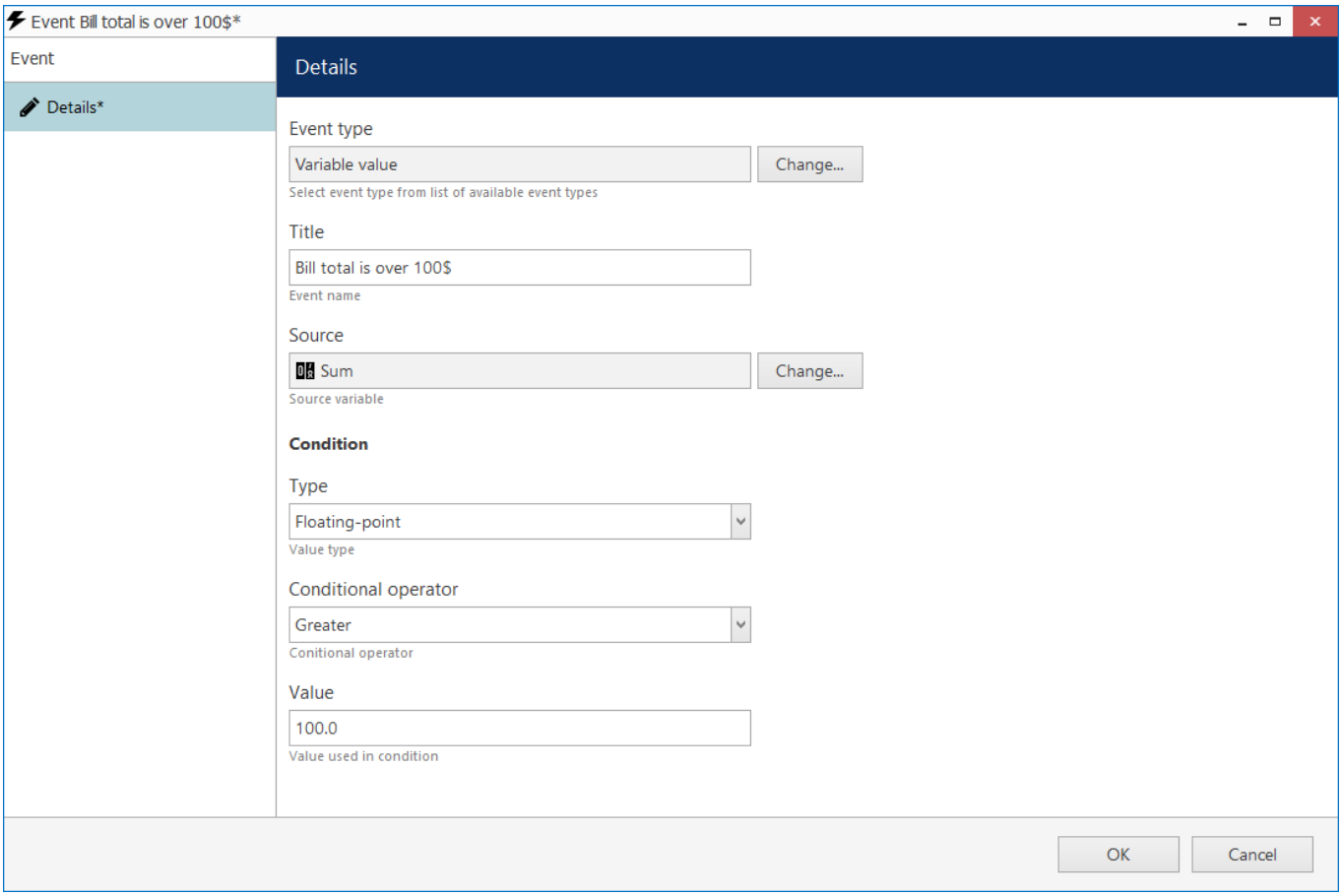
Event triggered if the counter named *Current* is equal to 3

For actions further linked to this event, you can **pass the counter value** by using the **text macro** (field) *{ADDITION_INFORMATION}* (you can insert it in any textual action by right-clicking the text area or by clicking the *Insert field* button). The format will be [counter_name]=[counter_value]. For example, for a counter named *Total* hitting a value of five, the macro will show *Total=5*.

Variable Value

If you have some **variables** set up in the E&A section, you can use E&A manager to trigger events when these variables meet some specific condition. Mostly, these variables are mappings from Data sources: thus, this event supplements the previous *Data Source* event by matching **any data type** (not just text).

The second purpose of this event is analysis of **metadata** received **from cameras** (or other devices). A typical example of this is variables from **thermal cameras** containing exact temperature measurement. To use this feature, first create channel variables under *Variables* in the E&A section. Then, use them as



An event is raised when the *Sum* variable is strictly greater than 100.0

This event has the following settings:

- **Title**: user-defined event name
- **Source**: a channel to be analysed for the variable (which is set in the corresponding data source profile or has VCA configured); if none selected, the event will be visible for all channels
- **Variable**: variable name, must match the mapping name in the data sources profile or the VCA counter name
- **Type**: variable type; may be integer, double or string for a data source mapping, and integer for VCA counters
- **Conditional operator**: depends on the variable type
- **Value**: value that will be compared with the variable value

⚠ For VCA counters, there are a few special requirements:

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- type must be **integer**
- **event source** must be selected (the channel that has VCA configured, either camera-side or software side)

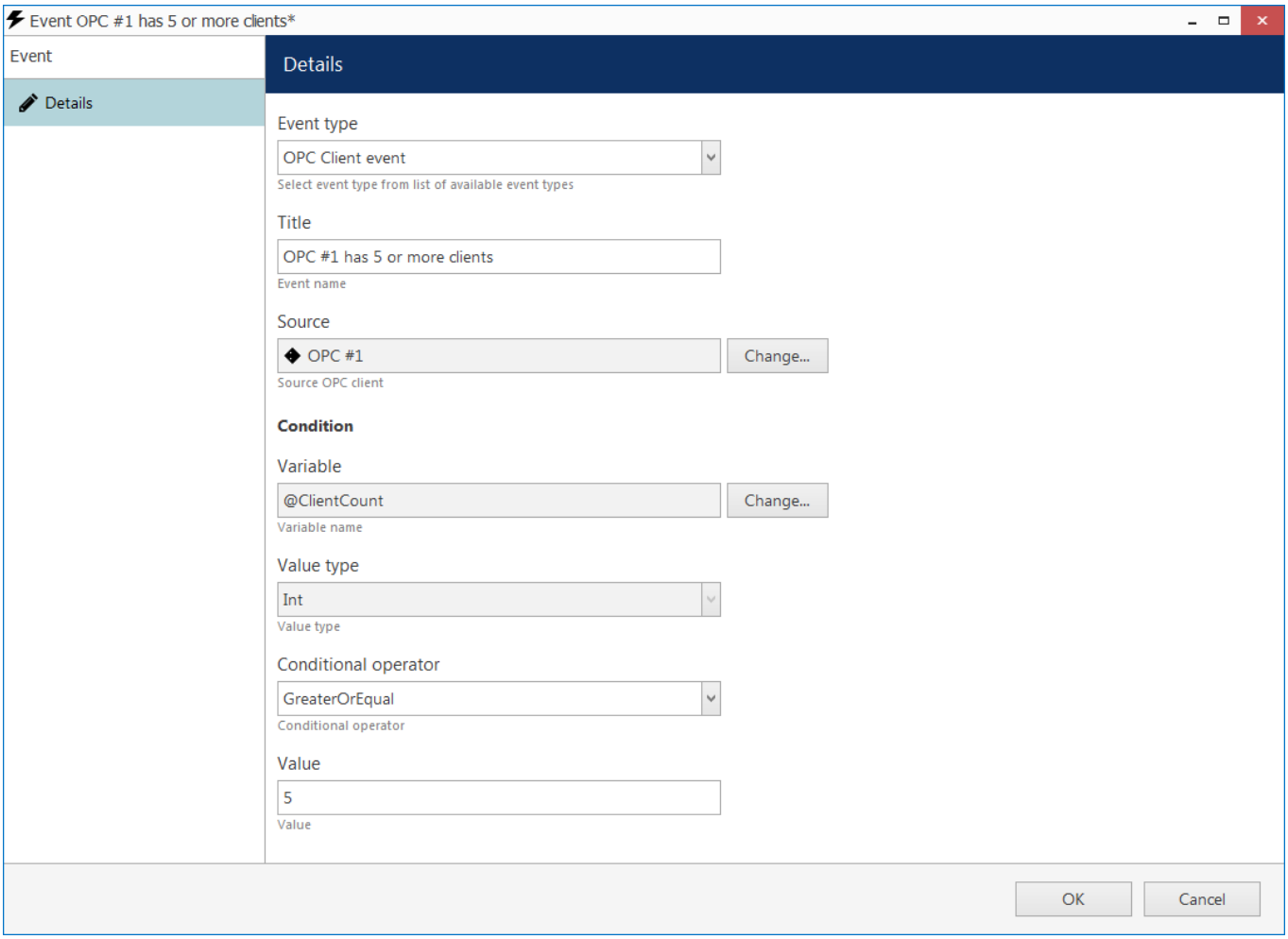
Other Events

Events having no special category (or, at this point, unique), are grouped under *Other events*.

OPC Client Event

Data received from OPC servers can be analysed - compared to specified values using conditional operators - so that an event is triggered when the target OPC node value meets the defined condition.

For this type of event to work, there should be at least one OPC server configuration available with at least one data node.



This event will be triggered if the target OPC server has 5 or more connected clients

Settings:

- **Title**: user-defined event name
- **Source**: OPC client configuration (connection to an OPC server)
- **Condition**: defines a requirement for the OPC data item that will trigger the event
  - **Variable**: OPC data node, must be of compatible type and have a read permission
  - **Value type**: one of the standard data types, auto detected
  - **Conditional operator**: list of possible conditional operators, depends on the data type
  - **Value**: value to compare the variable to, must match the variable value type

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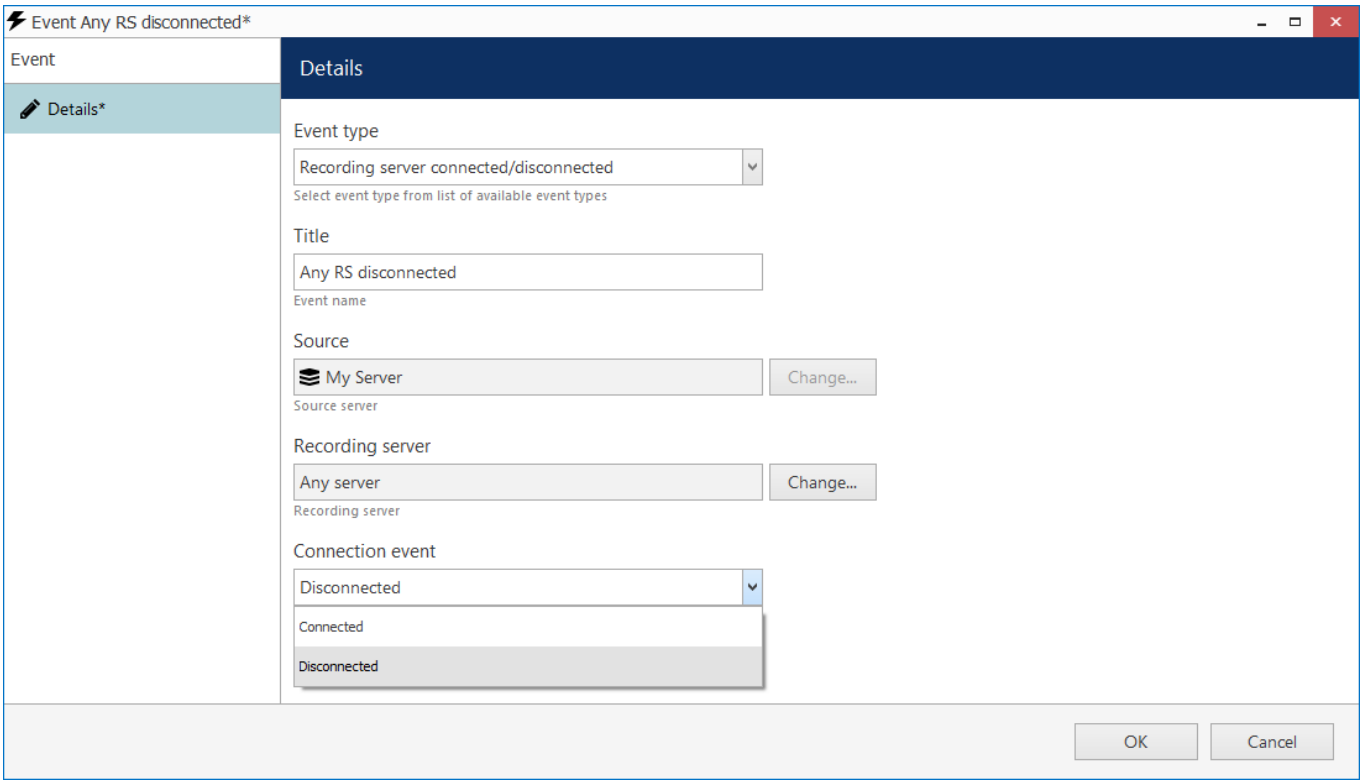
For some conditional operators, the *Value* field may be different, e.g., represent a range, a regular expression, or a bit mask. This depends on the selected data type and conditional operators available for it.

Recording Server Connected/Disconnected*

In the Ganz CORTROL Global system, when a recording server goes down, this event will be triggered on the central management server. (Built-in events only include central server disconnection and failover activation events.) You can add both connection and disconnection events, or either one, for every recording server in the system.

Settings:

- **Title**: user-defined event name
- **Source**: central management server (unchangeable)
- **Recording server**: target secondary server to trigger the event, or *Any* to enable this event for all recording servers
- **Connection event**: connected/disconnected (one at a time)



Event: recording server offline

So, if you need to get a notification about a particular server going offline or online, choose that server in the event properties. To cover all recording servers with a single event, choose *Any* in the Recording server field: if your associated action is textual (email, alert, etc.), use the {ADDITION_INFORMATION} macro to display the name of the recording server in question.

From each recording server's side, there also exist two default (built-in) events: *Central server connected* and *Central server disconnected*. You do not need to add them manually, they will appear for each existing recording server.

*This feature is only available in Ganz CORTROL Global software edition.

Scheduled Event

The server can create automatic events on a daily or weekly basis, or at certain intervals. Such an event does not have any underlying source to originate from, it is simply generated by the system in the specified moment(s) of time. Note that the time defined here is server time.

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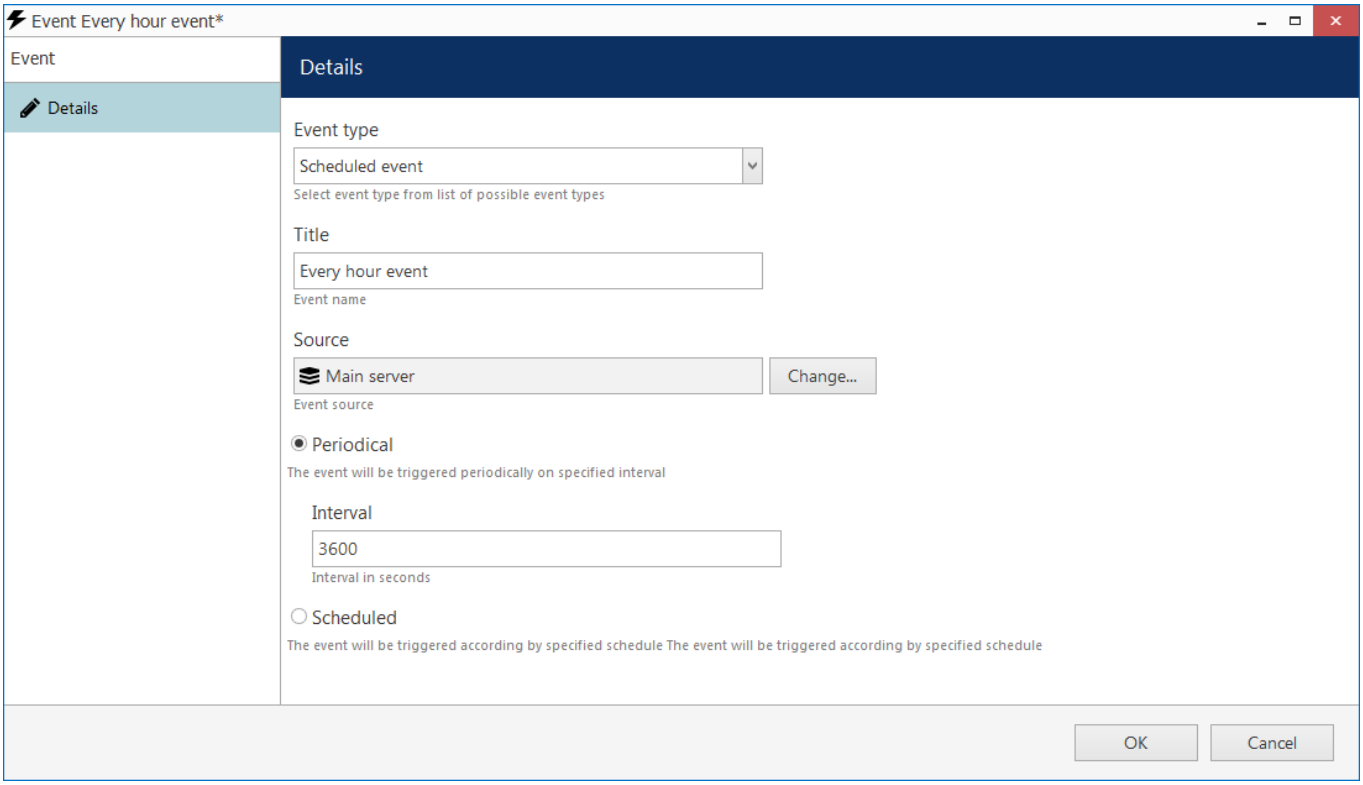

A scheduled event that occurs every hour

The are two types of automatic events: periodical and scheduled. Periodical events arise at the specified intervals, e.g., every hour or every ten minutes. Scheduled events follow the specified timetable, e.g., are triggered at 8AM every day.

For a scheduled event, you need to define:

- **Title**: user-defined event name
- **Source**: target server to generate the event on
- **Periodical**: choose this type if you need the events to be generated every N seconds
    - **Interval**: time interval in seconds between two automatically generated events, minimum interval is fifteen seconds
- **Scheduled**: choose this mode if you wish to build a timetable to serve as a basis for the event generation
    - **Event schedule**: weekly timetable for the event generation

Minimum time interval for the periodic event is 15 seconds and maximum is 86400 seconds (which is equal to 24 hours).

To add a schedule, simply click the *Add* button below and append as many items as you like. You can add multiple moments per day as well.

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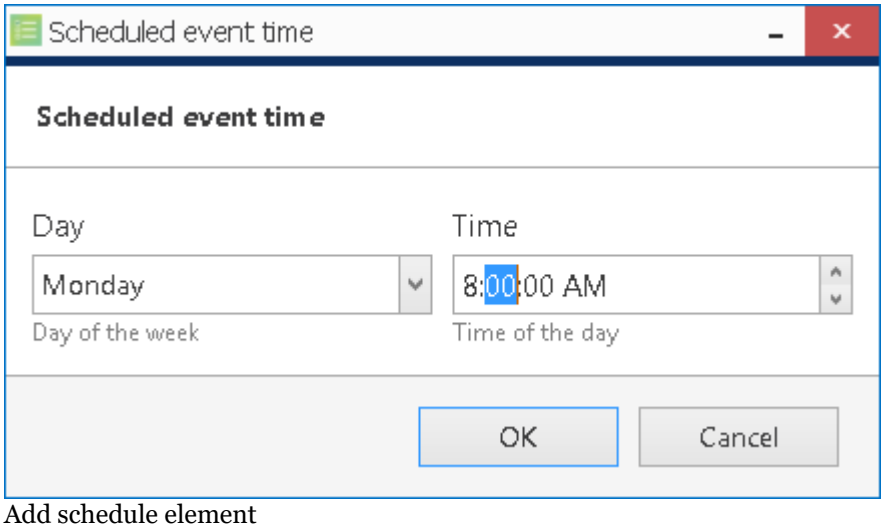

Add schedule element

Remember that you can enter the time either manually from the keyboard or by clicking the timestamp elements and then using your mouse wheel, while still hovering your mouse cursor over the element that is being adjusted. To edit any of the items, select one and click *Edit*, or simply double-click an item; to remove, select one or many (use *CTRL+click* or *Shift+click* to select multiple items, or also *CTRL+A* to select all) and then click *Remove*.

Video Wall*

This type of event is raised when the **video wall state is changed**. This happens when objects are sent to video wall from the resources' menu in Ganz CORTROL Client, when they pop up automatically based on another event, or when users manage the video wall via dedicated tab in the Ganz CORTROL Client application. Note that events of this type are **not generated** if screen contents is changed directly via **local** screen management - drag-and-drop or double-click.

Advanced options let you specifically define the nature of that change, the video wall screen and even the target viewport.

This event can happen on three levels, depending on the defined scope:

- any part of the video wall (video wall is defined, other settings set to *any*)
- specific video wall screen (video wall and its screen are defined, leaving viewport choice to *any*)
- specific viewport in the video wall screen (all settings defined)

The triggered events for all these areas will differ slightly (see examples below).

Available settings:

- **Title**: user-defined event name
- **Source**: video wall
- **Mode**: the type of changes
  - *Updated*: **any change** in the specified location (any or a specific object has been placed on or removed from the target location)
  - *Added*: the target object has been added to the specified location for the very **first time**
  - *Removed*: the target object has been **completely removed** from the target location
- **Video wall screen:** target video wall display
- **Viewport index:** number of the port to trigger the event, set 0 (zero) for any viewport
- **Object:** any object (if *updated*), or a specific map/channel (*updated/added/removed*)

Note that the target object must be specified for *added/removed* modes: there are no events for "any object added" or "any object removed". These two modes are intended to be used with concrete objects. If you do not care, which object was added or removed, use the *updated* mode.

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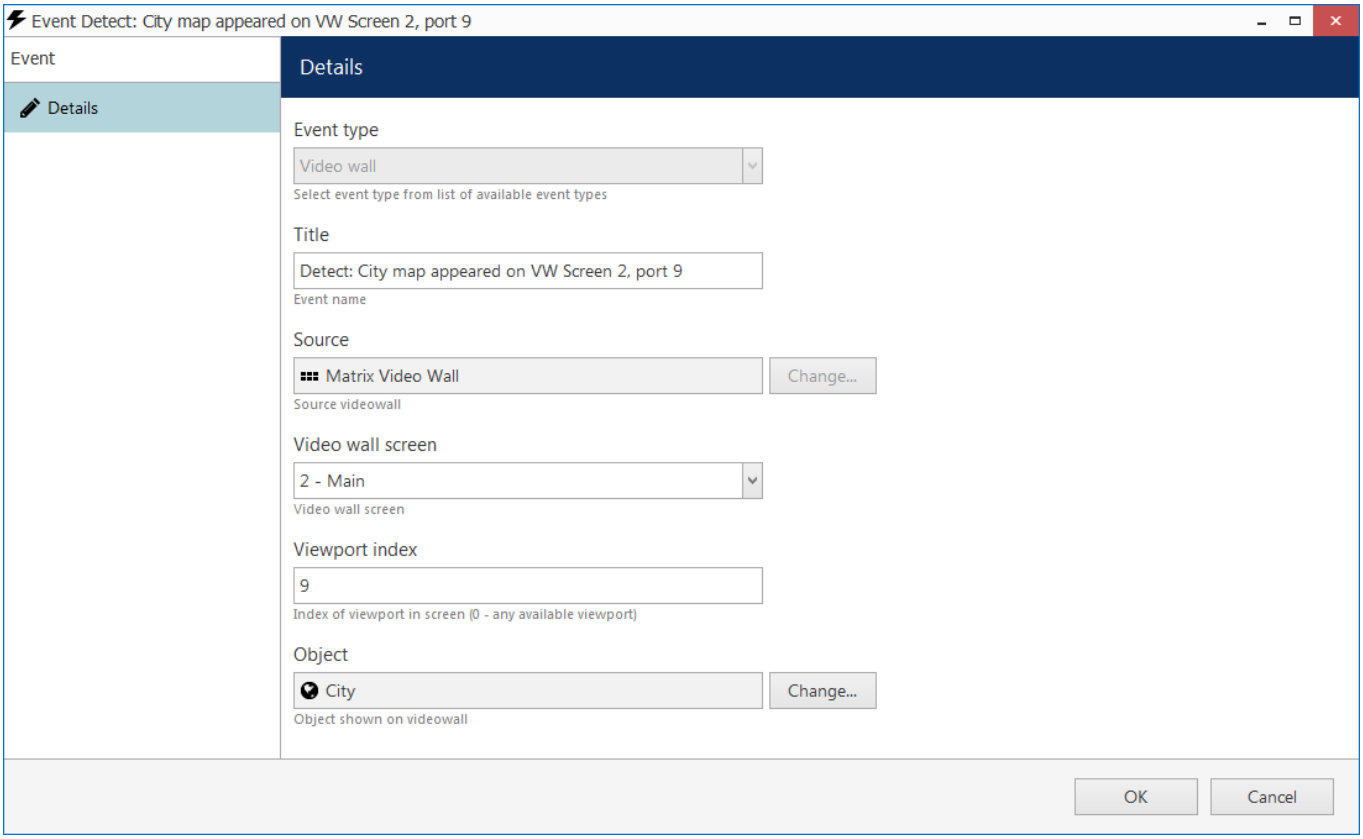

Video wall event example

The viewports are numbered starting from 1, from top to bottom and from left to right. Zero index means the event will be triggered, when the target object appears in any viewport of the target video wall display.

Examples:

1) An event is set to be produced when Channel S is *removed*. Depending on the defined settings, the event triggering will differ in the following way:

- if only **video wall** is defined without any details: event will be triggered after all instances of Channel S are removed. In other words, if Channel S is present several times on different video wall screens, the *Removed* event will only be triggered after the last instance of Channel S is removed, and the exact video wall screen or viewport do not matter.
- if a **video wall screen** is defined: same behaviour but limited to this specific screen. If Channel S is currently displayed on other video wall screens, its presence is ignored. The last Channel S instance removed from the target screen will trigger the event.
- if a specific **viewport** is defined: the event will be triggered every time Channel S is removed or replaced by any other channel.

2) Event settings are set to maximum precision: video wall, video wall screen, and viewport are specified. In this case, the event area is limited to the **viewport**, and replacing Channel E with Channel X will trigger the following events (if they have been set up):

- *Removed* event for Channel E
- *Added* event for Channel X
- *Updated* event (no object needs to be specified)

3) The event is set to be generated when Channel Y is *added*. Consider the following scenarios:

- only video wall or video wall screen is defined for the event; the target video wall screen has a 2x2 layout, and:
    - Channel Y pops up in any viewport, filling in an empty space or replacing any other channel: event is **triggered**
    - Channel Y pops up again in the same viewport, replacing itself (so there are no changes): event is **not triggered**

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        - Channel Y is then displayed in another viewport (so that it now appear in two viewports): event is **not triggered**
    - video wall, its screen and a viewport index are defined:
        - every time Channel Y pops up or is placed into the target viewport, the event is **triggered**

*This feature is only available in the Ganz CORTROL Global software edition.

⚠ Removing and adding event sources again (e.g., deleting and creating edge VCA rule with the same name) may render them **unusable** if they are already included in the *Event & Action* configuration. Make sure to verify the event operability and then re-create and re-insert the event after modifying it, if necessary.

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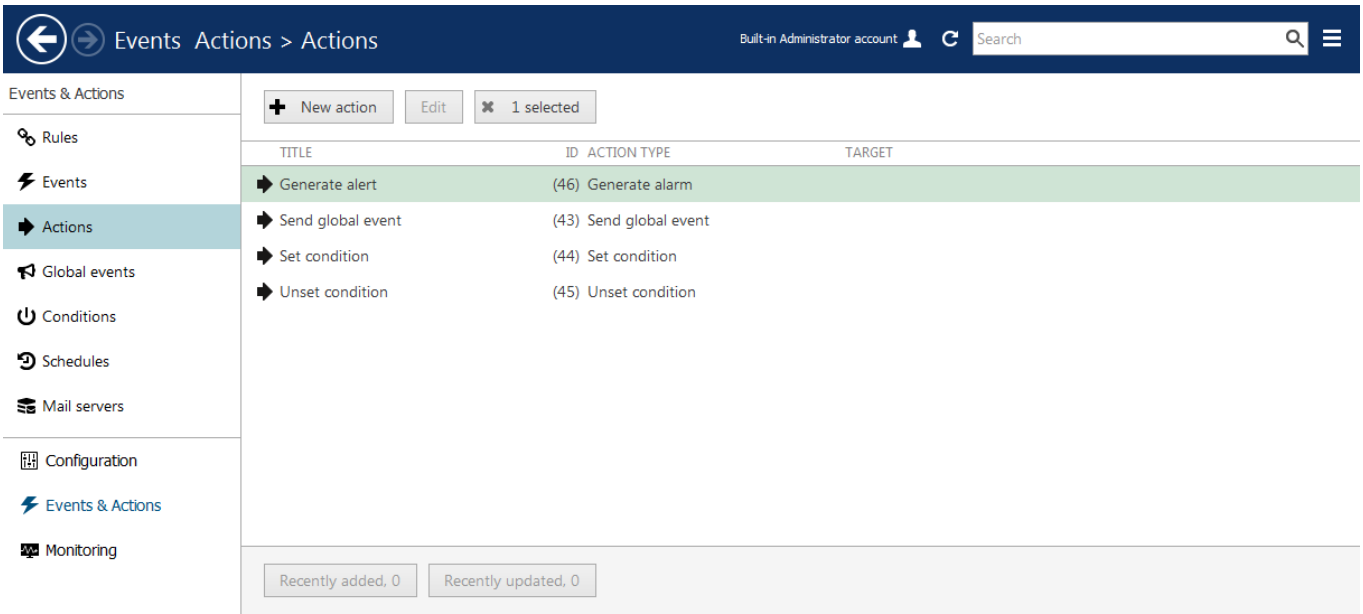
9.5 Default Actions

Each item - server, channel, or other resource - has a set of default actions that have identical behaviour on all servers and cannot be altered (edited) or deleted. These are:

- **Generate Alert**: generate an alarm that can be used as recording basis in recording profiles; this action is available for each channel
- **Generate Alert Substream**: generate an alarm that can be used as recording basis in recording profiles; this action is available for each channel substream
- **Send Global Event**: send a global event notification to all servers; this action is available for each defined global event
- **Pop-up On Screen**: display the object on all Ganz CORTROL Client windows that accept pop-ups of the target object type; action is available for channels, maps and shared layouts
- **Pop-up Playback On Screen**: display instant playback for a channel in Ganz CORTROL Client application while keeping the live view mode; action is available for all channels
- **Disable channel**: change the target channel state by disabling it; the action is visible on each server, allowing you to choose the target channel when creating the event rule
- **Enable channel**: change the target channel state by enabling it*; the action is visible on each server, allowing you to choose the target channel when creating the event rule
- **Toggle channel disable/enable**: change the target channel state to opposite*; the action is visible on each server, allowing you to choose the target channel when creating the event rule
- **Set Condition**: change the target condition state to *ON*; this action is available for each condition
- **Unset Condition**: change the target condition state to *OFF*; this action is available for each condition
- **Increment/Decrement/Reset**: change counter value; this action is available for each software counter
- **Send global event**: broadcast a global notification to all servers; this action is available for every global event

*Make sure your license has enough free channels for this action to work properly.



Default actions

When you generate an **alert** for main stream or substream, all channels having alert-based recording enabled will start recording for the duration of time period defined in the profile as **post-recording time**; after that, the profile operation will be terminated and target channel will return to its normal recording configuration.

Default actions are available in the *Event & Action Configurator* and can be used in the same way as the user-defined actions. These actions are not listed under *Actions* as they are not configurable.

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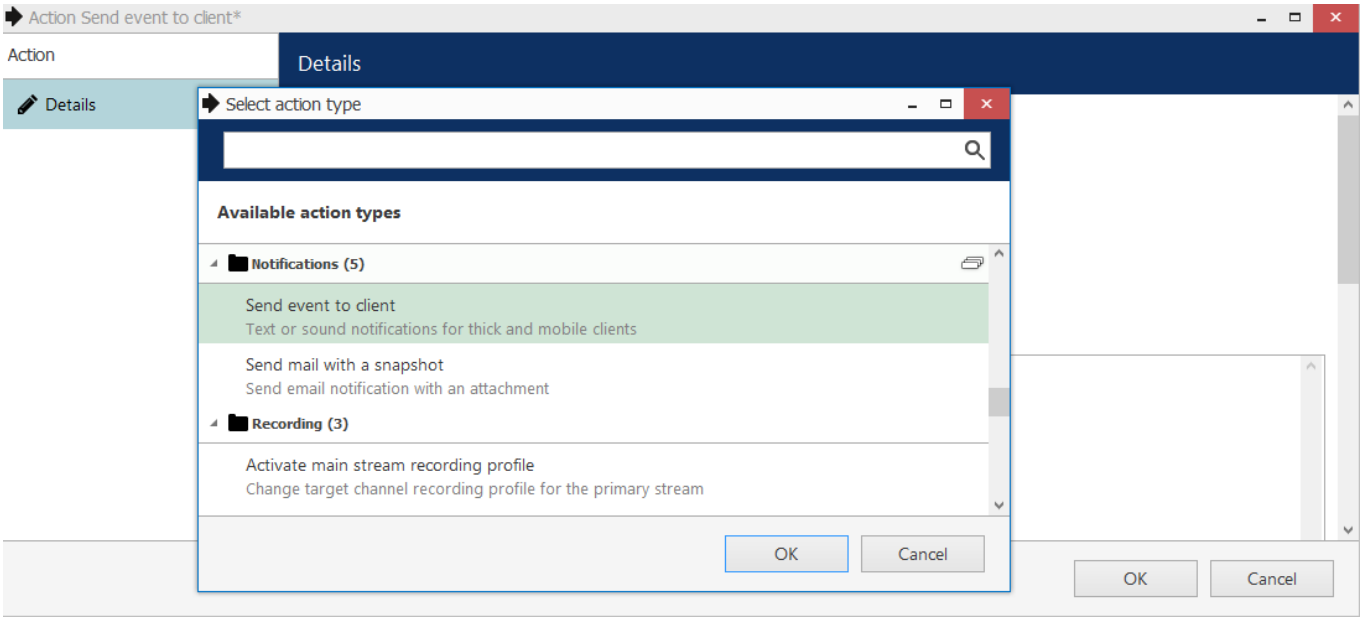
9.6 Add Actions

In addition to the default actions, certain types of actions can be added manually and customized.

To access action management in Ganz CORTROL Console, choose the *Events & Actions* section and select *Actions* from the menu on the left. In order to create an action, click the + *New action* button on the upper panel; an action configuration dialog box will open. It is also possible to add actions as you go using the *Event & Action Configurator*.



Choose action type

All available actions are grouped according to their purpose. Choose your desired action type from the list to see action-specific settings.

Access Control Actions

Actions in this sections are related to the access control integrations. Typically, these are used to control the door state.

Door Action

If you have a third-party access control module connected, you can change the door state from here. You must have at least one door added in the access control profile to make this work.

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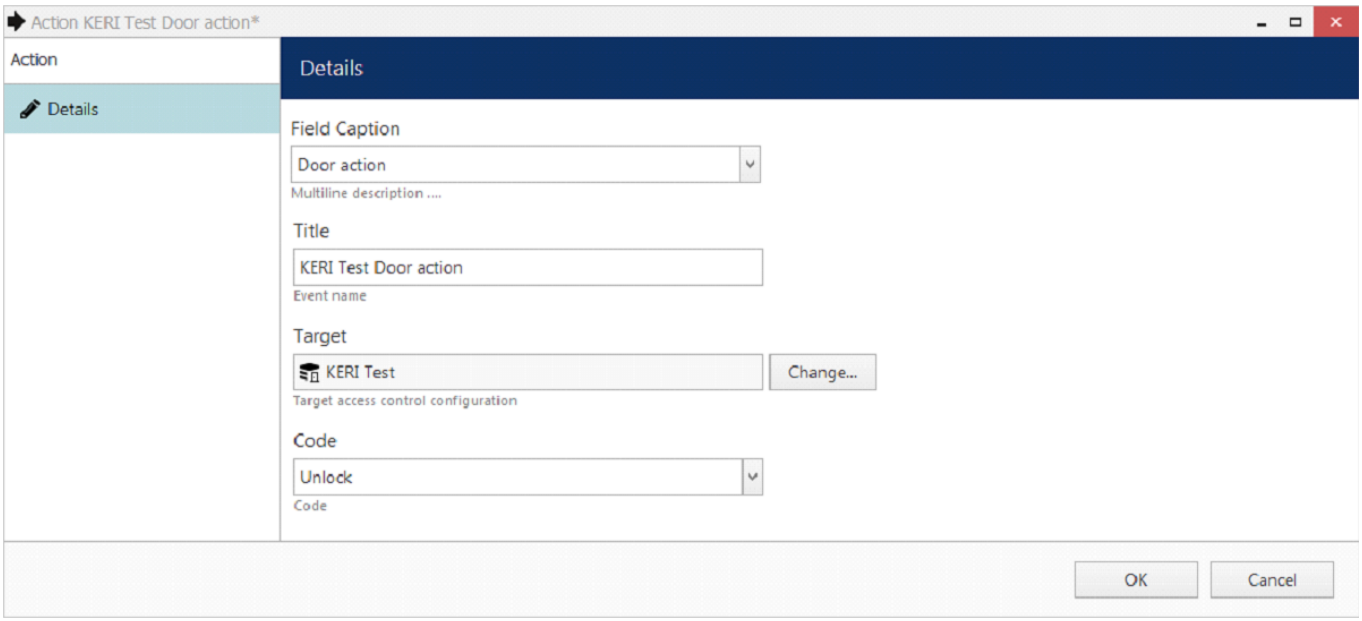

Action example: unlock a door using access control integration

As a **target**, specify the access control configuration added earlier. The specific door for this action will be chosen at the rule creation step, allowing you to use this action for many different doors within the same Keri configuration.

Available **action codes** here are: lock, unlock, temporarily unlock, and lock down (standard access control door states). Once the action is triggered, the corresponding command will be sent to the access control software.

Channel Related Actions

Actions in this category have direct relation to channels, e.g., PTZ presets and tours, digital output (DO) state change etc.

Activate PTZ Preset

This action type allows you to make a PTZ camera go to a specific pre-configured preset. You just need to specify:

- **Title**: a user-defined action name
- **Target**: the target device which is to accept the PTZ command
- **PTZ priority**: priority to execute PTZ action with (0 = lowest, 10 = highest, higher priority will override tours and user commands*)
- **Preset**: pick one of the automatically loaded target device presets from the drop-down list (you might need to create some first via Ganz CORTROL Client)

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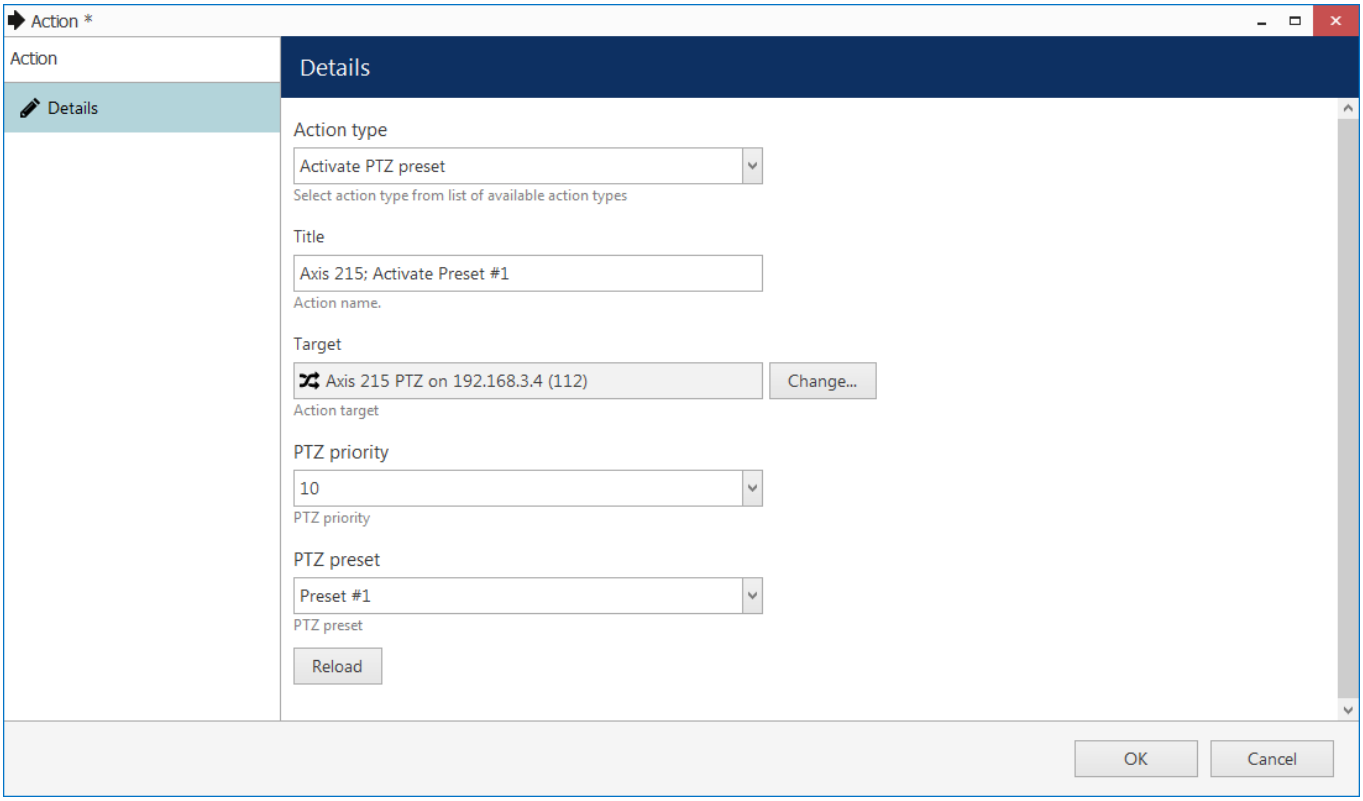

Action: activate PTZ preset

*PTZ priority parameter is used when two or more simultaneous PTZ command requests (either from action or from direct user input) are sent at the same time. When this happens, request with a higher priority is fulfilled while request with a lower priority is delayed for ten seconds. Default **PTZ priority** for all actions is equal to **five** (medium priority), which also coincides with the **default per-user** PTZ priority. You can assign any action a higher PTZ priority (six to ten) or a lower one (four to zero) by editing the *Activate PTZ Preset* action properties. All PTZ tours have zero priority.

Use the *Reload* button to refresh the list of presets: this will be useful if you have created new presets while keeping the action creation dialog box open.

Activate PTZ Tour

This action is similar to the previous one but instead of activating a single PTZ profile you run a series of presets called a PTZ tour. PTZ tours must be pre-created via Ganz CORTROL Client application. For each tour, you define the order of presets and their duration.

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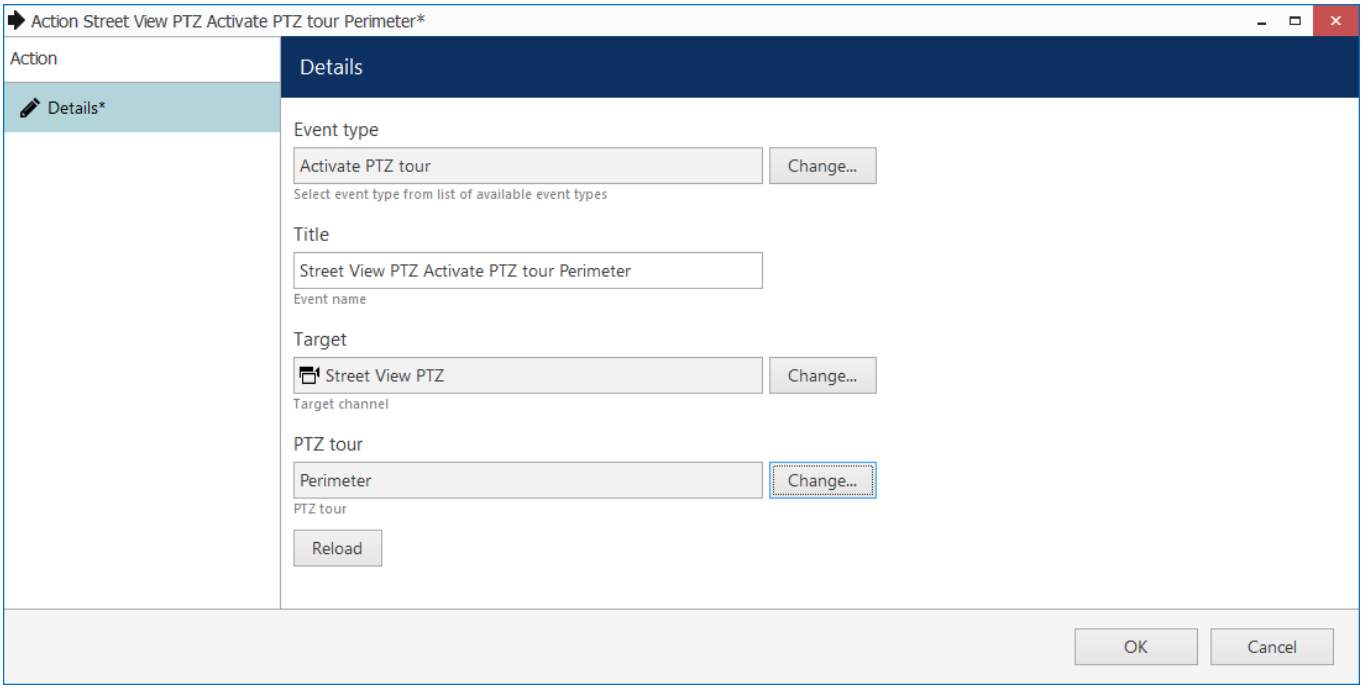

Action: activate a custom pre-configured PTZ tour

- **Title**: the user-defined action name
- **Target**: the target channel that has a pre-configured PTZ tour
- **PTZ tour**: the target PTZ preset sequence to be activated

When this action is executed, the target PTZ tour is activated and looped endlessly. You can stop the tour manually via Ganz CORTROL Client or Ganz CORTROL Mobile application. Tours that do not have the autostart property will also be stopped when the Ganz CORTROL server is restarted.

Control Digital Output

Devices having relay (digital) outputs (DOs) can have them triggered as a result of the *Control digital output* action. You are asked to enter the following details for this action type:

- **Title**: user-defined action name, by default it is > *Activate PTZ preset* >, suggesting that before and after >> arrows you can insert the camera name and DO number/target - or, alternatively, re-define the whole title according to your own naming convention
- **Target**: the target device which is to accept the digital input control command
- **Digital Output**: pick one of the available DOs of the target device to be triggered
- **Digital Output Mode**: choose whether an activation or deactivation command is sent to the target relay output

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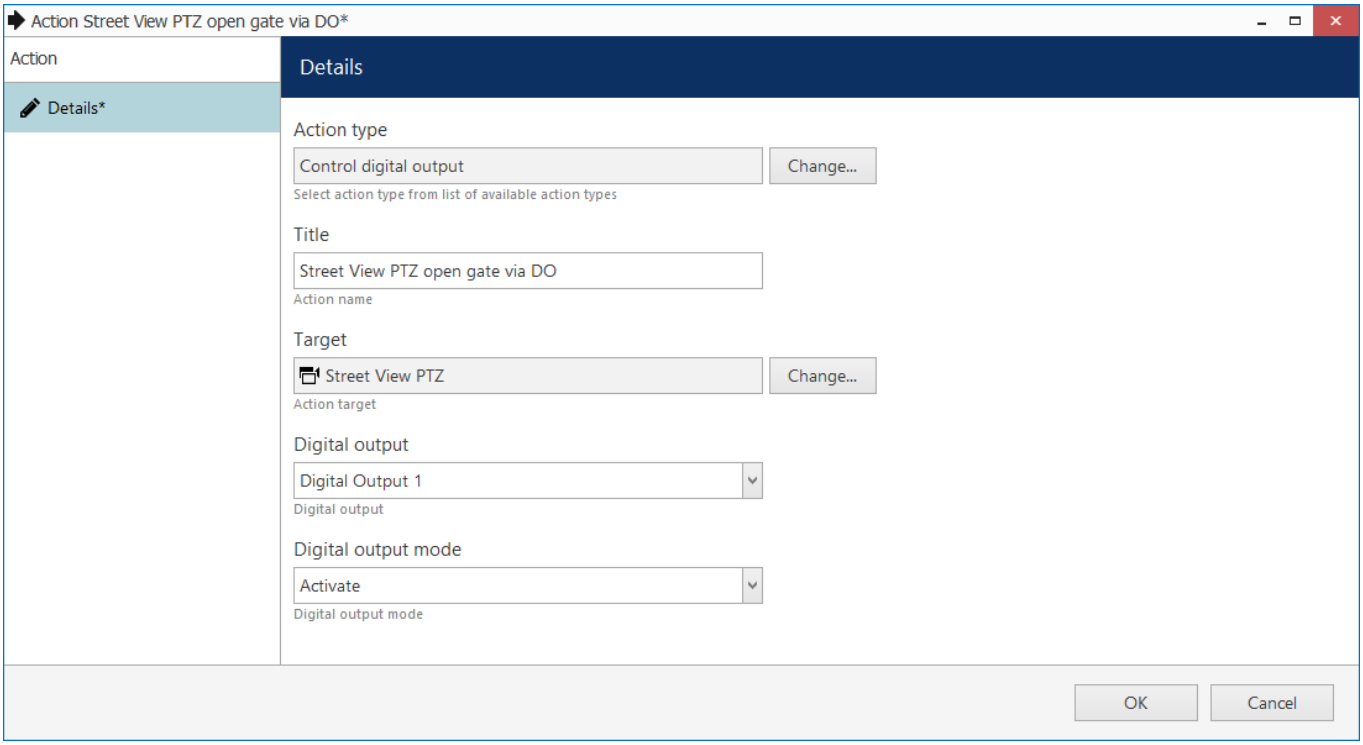

Action: change digital output state

Digital output(s) must be enabled in channel settings for the target camera; otherwise, you not will see any available DOs in the drop-down list after selecting the target device. Also, make sure that digital output operation has been allowed via device Web interface.

Device Action

This action is reserved for special device-side actions like wiper control, arm/disarm, lights ON/OFF etc. This functionality depends on the device integration.

- **Title**: the user-defined action name
- **Target**: the target channel to accept the command
- **Device action**: integration-specific device action
- **Parameter**: command-specific parameter, if required (e.g., alarm code for arming/disarming alarm panels)

Currently, device actions are only supported for few devices. If you do not see any available action for your device, try using the *Send HTTP Request* action described further: that action allows you to enter a CGI/HTTP command from device API.

The *Parameter* field is integration-specific. For example, when working with Satel devices, you can use device action to arm/disarm the panel, providing the code in the *Parameter* field.

Export Snapshot

A snapshot from the main or secondary stream of any channel can be saved as a result of an action. The file can be saved either locally (on the target server) or to a remote server (FTP).

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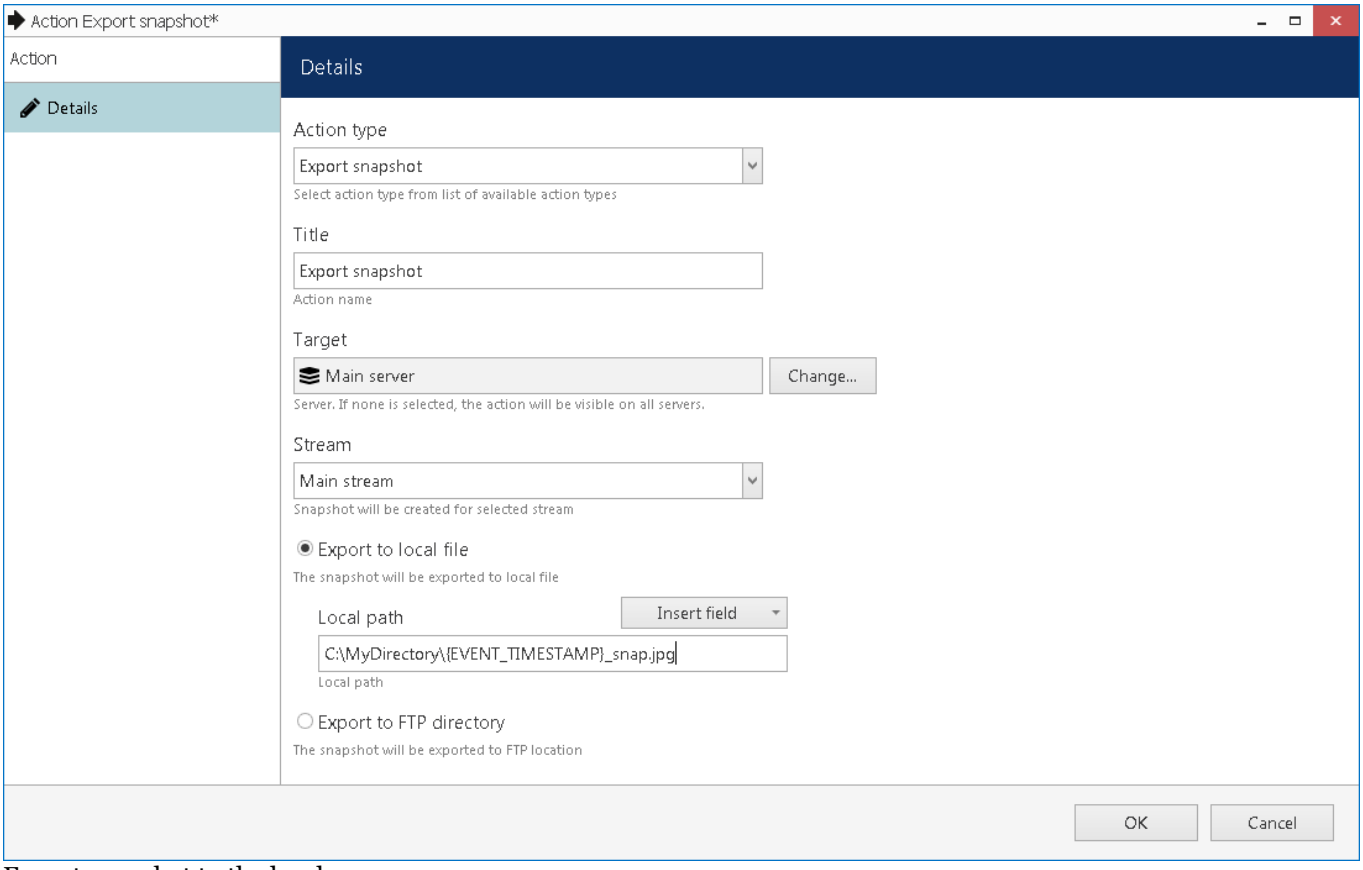

Export snapshot to the local server

The following settings are to be defined here:

- **Title**: user-defined action name
- **Target**: the server to execute this action on
- **Stream**: main stream or substream of the target channel (the channel is to be defined at the action rule creation step)
- **Enable subtitles**: enable this setting to activate subtitles and expand additional settings
    - **Text**: subtitle text (plain text and/or macros)
    - **Position**: subtitle alignment (top/bottom, left/right, corners)
    - **Font**: subtitle font (choose from the system dialog)
    - **Colours**: background (transparent by default), foreground (text itself), shadow (text shadow)
- **Export to local file**: the snapshot will be saved to the target server chosen above using the specified path
    - **Local path**: full path and filename, e.g., C:\MyDirectory\{EVENT_SOURCE_TITLE}_{EVENT_TIMESTAMP}.jpg
- **Export to FTP directory**: the snapshot will be saved onto a different machine that is not a part of the system
    - **FTP path**: full path and filename
    - **Host**: target machine's IP address or domain name
    - **Port**: port to be used for FTP connection
    - **Username**: user account name to connect to the remote server
    - **Set password**: specify a password, if required to log into the remote server

You can include text macros in the filename, for example, insert timestamps and event source title automatically to create files with different names every time the action is executed.

Start Playing an Audio File

It is possible to send an audio file to the connected device in case it has a built-in or a connected speaker: Ganz CORTROL server can use a .wav file to send audio to the remote camera or video server.

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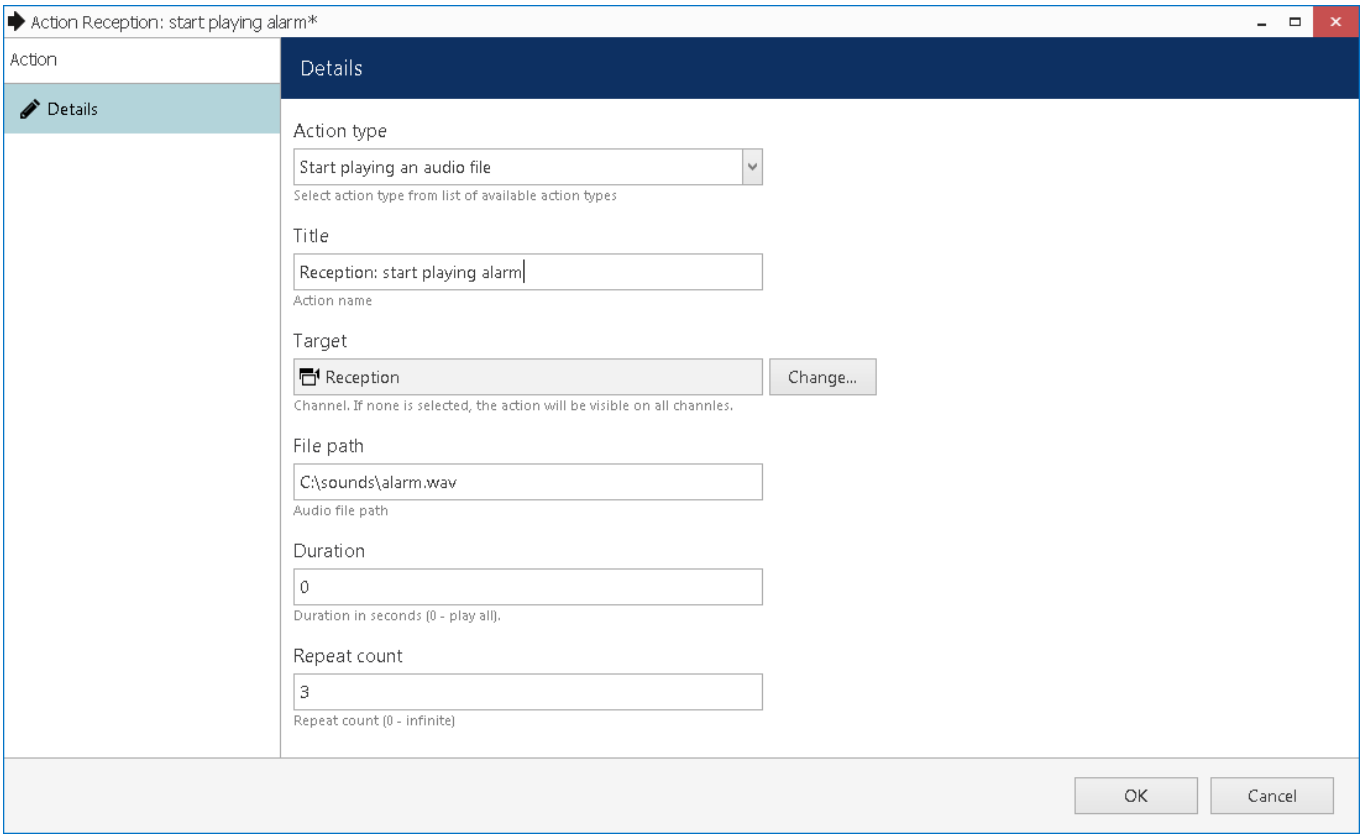

Send a pre-defined audio recording to the camera

You need to specify:

- **Title**: user-defined action name
- **Target**: the channel for the sound to be sent to (if none selected, the action will be available for all channels)
- **File path**: full path to the local ***.wav** file that should be used for audio output
- **Duration**: the amount of time for the audio to be played (set zero to play the whole file)
- **Repeat count**: the number of times for the audio file to be repeated (set zero for the file to played non-stop)

If you need the audio to be played continuously until another event stops it, set the *Repeat count* parameter to zero and use the *Stop playing an audio file* action to terminate the playback.

Stop Playing an Audio File

This action is used as a complement for the *Start playing an audio* file action: it stops the audio transmission in case you need to force stop it earlier than specified in the *Start playing an audio file* action, e.g., if the starting action lets the audio file to be played infinitely.

The following settings are available here:

- **Title**: user-defined action name
- **Target**: target channel (leave *none* for the action to be available for any channel)

Logging

In addition to default audit log, you can choose custom events to be appended to the Ganz CORTROL server audit log or to Windows application log.

Write to Application Log

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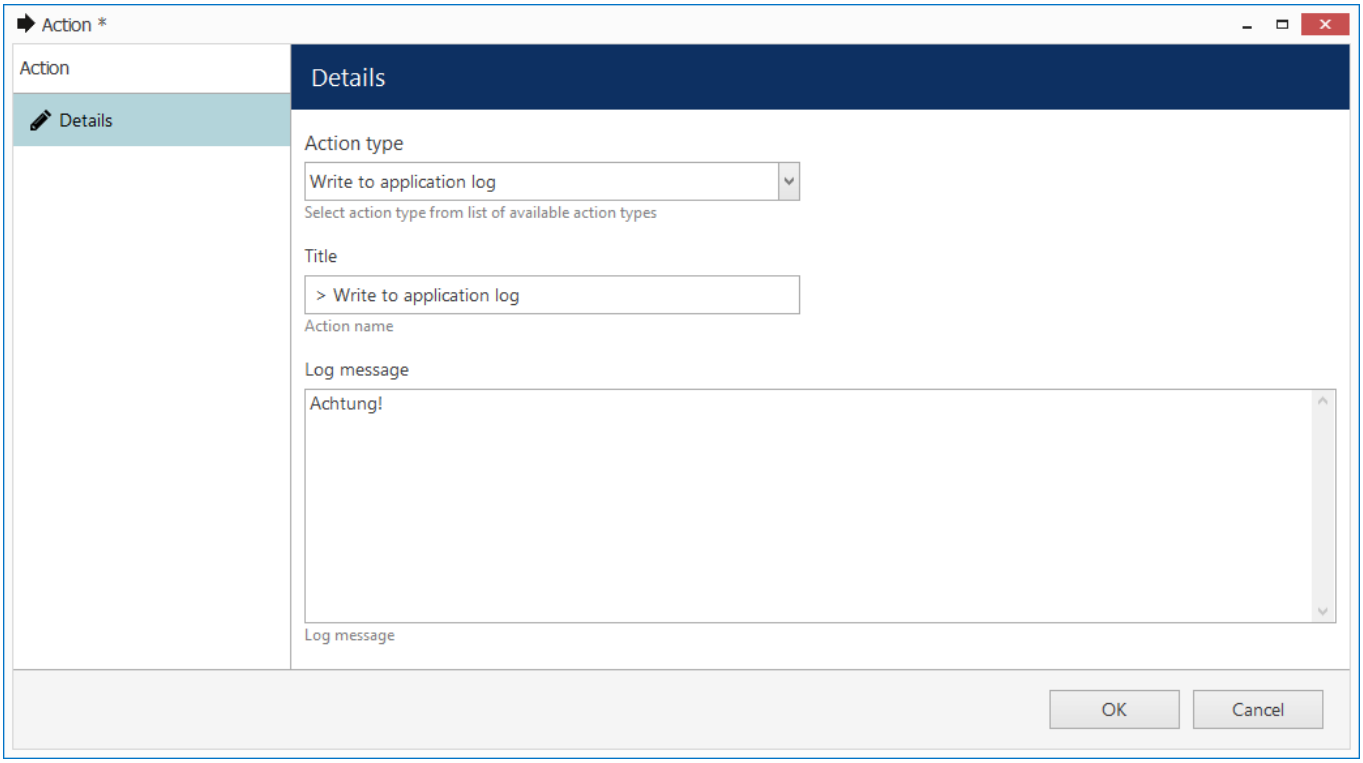
The *Application log* action type allows you to write a log entry into the Windows Application log, which will be accessible via Windows Event Viewer. The log entry level is *Information* and entry source is Ganz CORTROL Server. You can define:

- **Title**: a use-defined action name inside the Ganz CORTROL Console; by default it is *Write to Application log*
- **Log Message**: the message text to appear in Windows Application log



Action: write to application log

Use the *Insert Field* button on the right-hand side (it appears when you have clicked inside the text area) or right-click the text area and choose *Insert* to add a text macro (see *Action Parameters* further in this topic for details).

Write to Audit Log

The *Audit log* action type is similar to that of *Application log*: it allows you to write a log entry into the Ganz CORTROL own Audit log, which will be accessible via Ganz CORTROL Console, in the *Audit* section. The log entry is added in the Server audio section and its event type will be *User defined*. You can set:

- **Title**: a use-defined action name inside to be used in E&A; by default it is *Write to Audit log*
- **Log Message**: the message text to appear in the Audit log

Use the *Insert Field* button on the right-hand side (it appears when you have clicked inside the text area) or right-click the text area and choose *Insert* to add a text macro (see *Action Parameters* further in this topic for details).

Notifications

Actions in this section allow you to send all kinds of alerts to clients and also email notifications.

Highlight On Map

If your target item appears on one or more maps, you can visually accent it on the map as a result of the triggered event. It is possible to define one particular map or make the device become highlighted on all maps where is has been placed.

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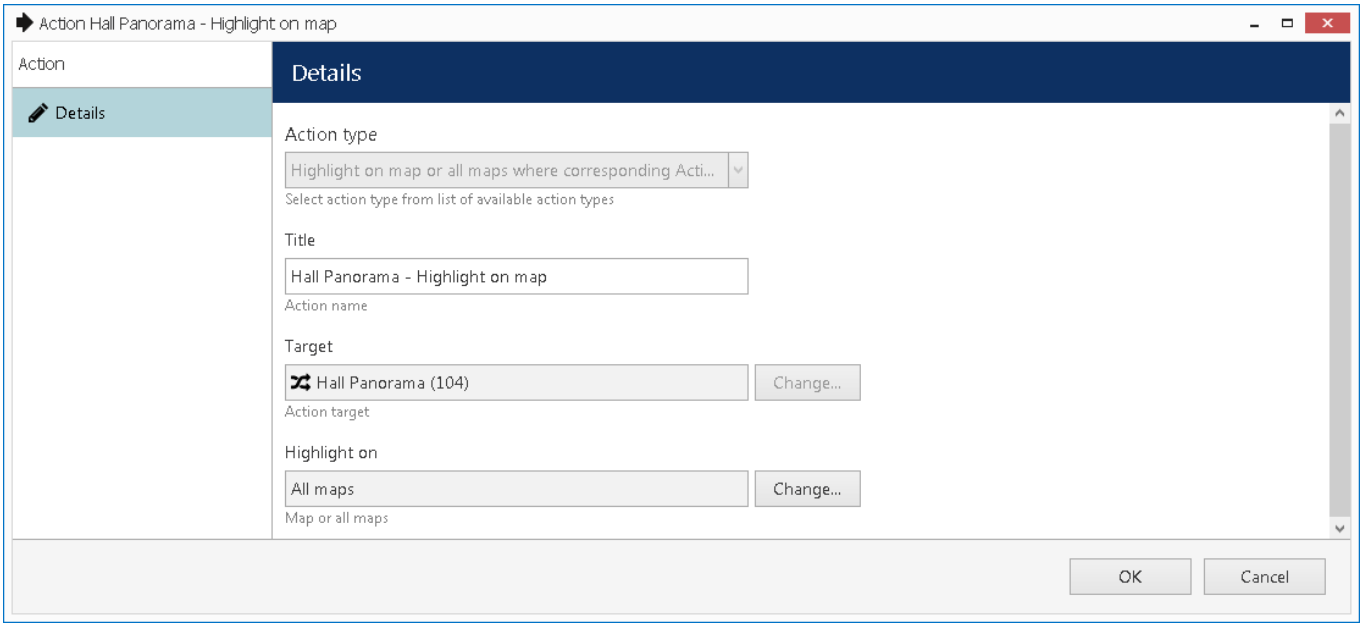

Action: highlight target device on a map

The following objects are supported for this action as targets:

- **Channels** (channel markers will be highlighted)
- **User buttons** (user button markers will be highlighted)

Pop Up Object On Screen

You can set up individual channels, maps and layouts to appear on a specific **video wall** display as a result of some triggered event, e.g. motion detected in certain regions. If you wish an object to pop up in all connected Ganz CORTROL Client applications without using video walls, use the built-in (default) event of the *Pop up on screen* type.

Additional setup is required from the Ganz CORTROL Client application side:

- shared layouts should be pre-created in order to be used in action creation
- target Ganz CORTROL Client window must be allowed to accept either channels/maps or layouts
- target Ganz CORTROL Client window must be set to be a part of the target video wall

What you need to specify in the action properties is:

- **Title**: user-defined action name, by default it is *[channel] Pop up and object on screen [Video wall name]*
- **Target**: a channel, map or a pre-created shared layout to appear on the screen
- **Video wall**: target video wall for the object to appear on
- **Video wall screen**: a specific display in the video wall layout for your object to appear on
- **Viewport index**: the exact position of the video output cell in the grid (starting from 1, left to right, top to bottom), leave 0 to use the first available viewport

If you do not care, which viewport is used for popup, leave the viewport index parameter equal to 0. This will send the popup object to the first empty viewport; if all viewports are occupied, the object will pop up to the first non-locked one. When all viewports are occupied and locked and the viewport index is set to 0 (=any viewport), the popup will not work on that screen.

If the target viewport is set (is different from 0) but it is is occupied and locked on the Ganz CORTROL Client side, the target channel will force pop up anyway, and the viewport state will stay locked.

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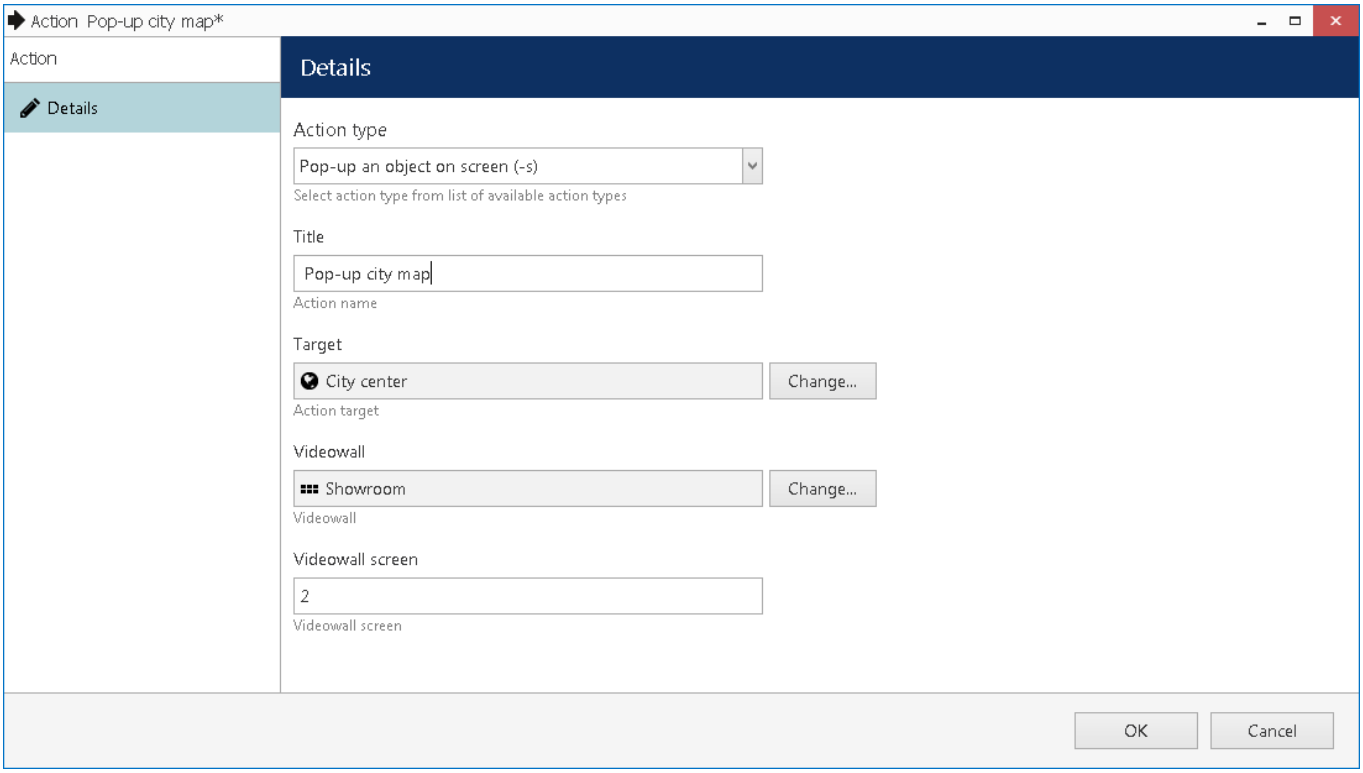

An action that will pop up a map on the specified video wall display

You can create new maps, geo maps and layouts right from the object selection dialog in case you have not created them beforehand.

Send Email

In order to send an email notification, you are requested to define the following values in the action settings:

- **Title**: a user-defined action name; by default it is *<mailserver> Send email*, you can insert the device name and target email address - or, alternatively,you can re-define the whole title according to your own naming convention
- **Target**: specify the SMTP server to be used for email sending; if none are selected, the action will be available for selection on any of the existing configured mail servers when creating a rule
- **To**: notification recipient email address
- **Subject**: email notification subject (use the *Insert field* button to add text macros)
- **Body**: email notification body text (use the *Insert field* button to add text macros)

Configure your SMTP server(s) before creating email-related actions.

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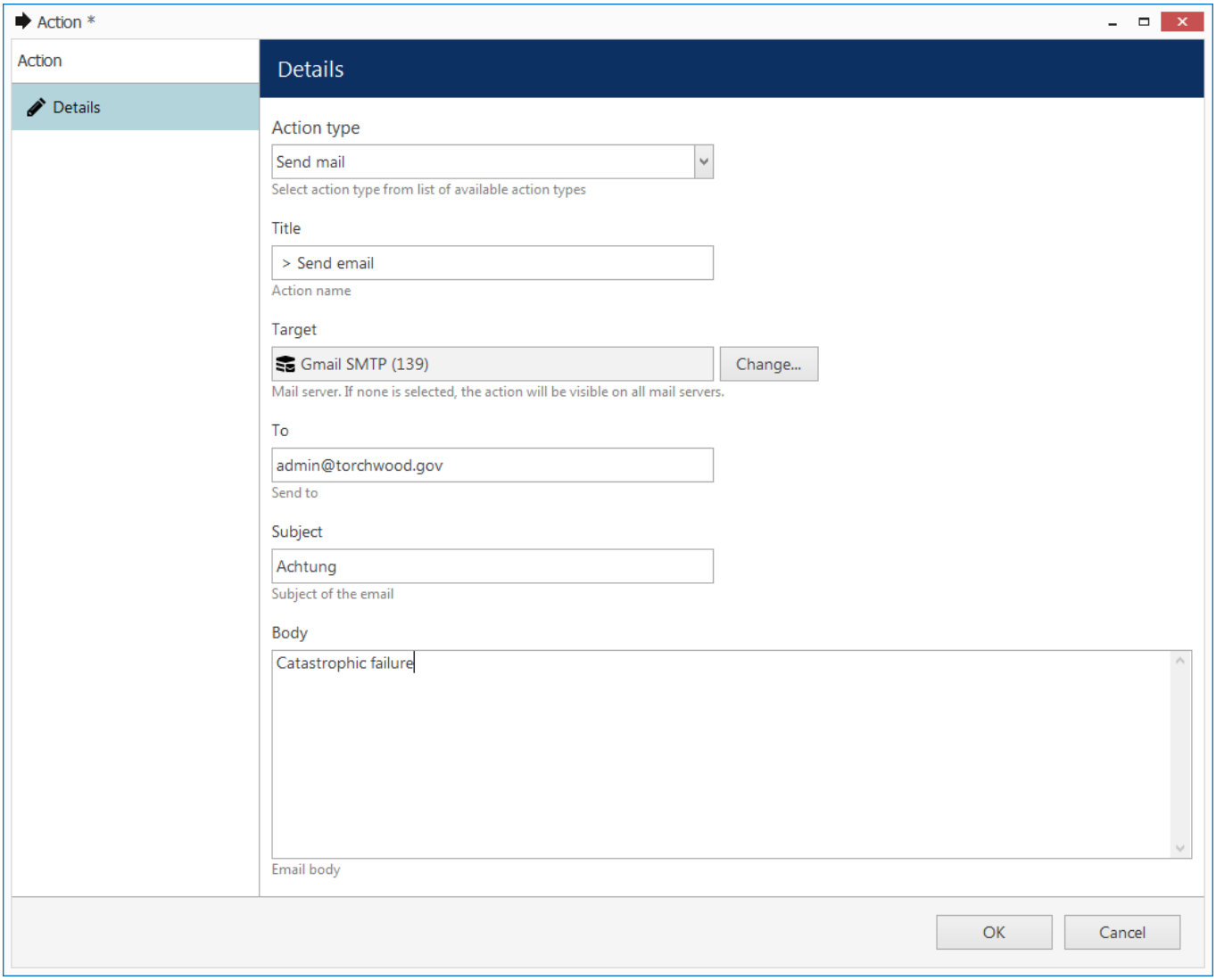

Action: send email

Send Email with a Snapshot

This action is similar to the *Send Email* action described above, with all the settings being the same plus snapshot adjustments: attach a snapshot from a channel and send it together with the email. The channel is specified when creating a rule with this action.

Additional settings:

- **Attach snapshot**: choose if you want to take a snapshot of main stream or substream of a channel and deliver it together with the message
- **Snapshot title**: user-defined file name, e.g., *Snap.jpg*, or *Snap_{EVENT_TIME}_from_{ACTION_PARAMETER_TITLE}.jpg*
- **Enable subtitles**: enable this setting to activate subtitles and expand additional settings
    - **Text**: subtitle text (plain text and/or macros)
    - **Position**: subtitle alignment (top/bottom, left/right, corners)
    - **Font**: subtitle font (choose from the system dialog)
    - **Colours**: background (transparent by default), foreground (text itself), shadow (text shadow)

The subtitles will be hard merged with the exported image.

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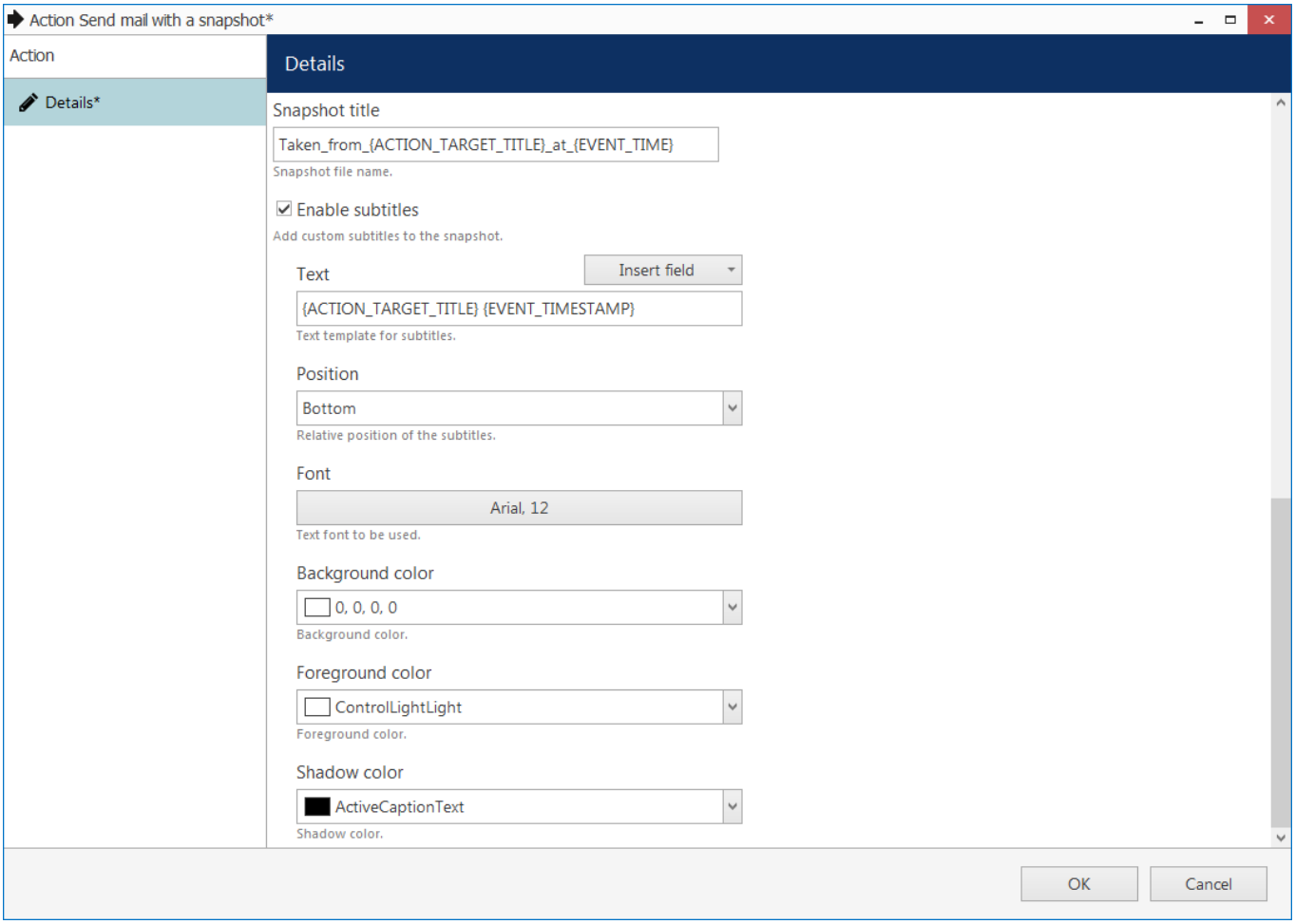

Subtitle settings

In the *Send Email with a Snapshot* action, you only need to define whether this specific action will take a snapshot from the main or from the secondary stream. Actual channel for the snapshot to be taken from will be defined when you create a rule involving this action:

- if the source event originates from some channel, that channel will be automatically used as a snapshot source; you will be able to change the target channel using the *Snapshot source* button below the rule map in the E&A Configurator
- if the source event does not come from a channel (e.g., user button click event), you will have an option to define the target channel using the *Snapshot source* button below the rule map in the E&A Configurator

If you specify no snapshot source when creating the rule, a regular email will be sent. You will find more details on attaching the snapshot in the Rules section of this document.

Send MQTT Notification

This action uses a pre-configured MQTT Client to publish MQTT messages. You must have at least one MQTT Client in your server configuration, and a running MQTT broker to accept and broadcast the message. Message/connection settings are typical MQTT message properties; make sure your broker supports the settings you enter here.

Available settings:

- **Title**: action name that will appear in the E&A Configurator
- **Target**: pre-configured MQTT client; leave empty for the action to be available for all existing MQTT clients
- **Topic**: MQTT topic to be published
- **Text**: MQTT message text to be published

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- **QoS**: required level of the MQTT quality of service

You can use macros in all text fields to pass parameters like {EVENT_TIMESTAMP} or {EVENT_TITLE}. To insert those, right-click the text field or use the *Insert text field* button.

Send Event to Client

This event allows to send a push notification to all or specific Ganz CORTROL Client applications. This may be just a pop-up message, or an event in the channel notification area with a sound, or all of these combined.

Available settings:

- **Title**: user-defined (custom) action name that will appear in the E&A Configurator
- **Message**: notification body text (use the *Insert field* button to add text macros)
- **Display event in alerts**: mark this if you want a message to be appended to the Ganz CORTROL Client log in the *Alerts* section
- **Display a warning message box**: mark this if you want a **dialog box to pop up** on the Ganz CORTROL Client side (to be closed by the user)
- **Display event in notification panel**: the message will be shown in the **notification panel** of the live view of a specific channel (you will have to set the channel when creating the rule)
- **Display event in mobile application**: the message will be sent as a push notification to all **Ganz CORTROL Mobile clients** that have the target server configured
- **Play audio notification**: play a sound on the Ganz CORTROL Client side; sounds themselves are defined in each Ganz CORTROL Client application
    - **Audio notification**: sound notification number, from 1 to 10 (here, you just specify the number, actual sound is defined per client and may not coincide in different application instances)
- **Send event to specific user or user group**: show the notification only to a specific user or user group

Recording Related Actions

Several actions are related to recording: these can change main and secondary stream recording profiles, as well as append new items into the archive, such as bookmarks.

Activate Recording Profile

Any of the existing recording profiles can be activated for the channel of your choice as a result of a triggered event. You can separately activate **main** stream and **substream** recording: use the *Activate Recording Profile* action for main stream and the *Activate Substream Recording Profile* action for secondary stream. Enter action details as follows:

- **Title**: the user-defined action name
- **Target**: the target device for which recording is to be activated
- **Recording profile**: the pre-configured recording profile to be activated as an action; you will find profile configuration tips further in this section of the manual

The recording profiles are changed within the channel's recording configuration. Thus, for example, if the channel's recording configuration has a 3-second pre-recording duration, it will stay 3s for any recording profile you activate via E&A.

The recording profile is activated permanently; to switch to a different recording profile, use another action of the same type and different target profile.

Example of emergency recording scenario: create a user button and bind 2 actions to it, one action activating continuous recording, and the other one activating no recording (will activate the recording default profile). Then, add a delay timer to the second action with a required duration, e.g., 1 minute. You will be able to trigger the emergency recording manually from both Ganz CORTROL Client and Ganz CORTROL Mobile applications.

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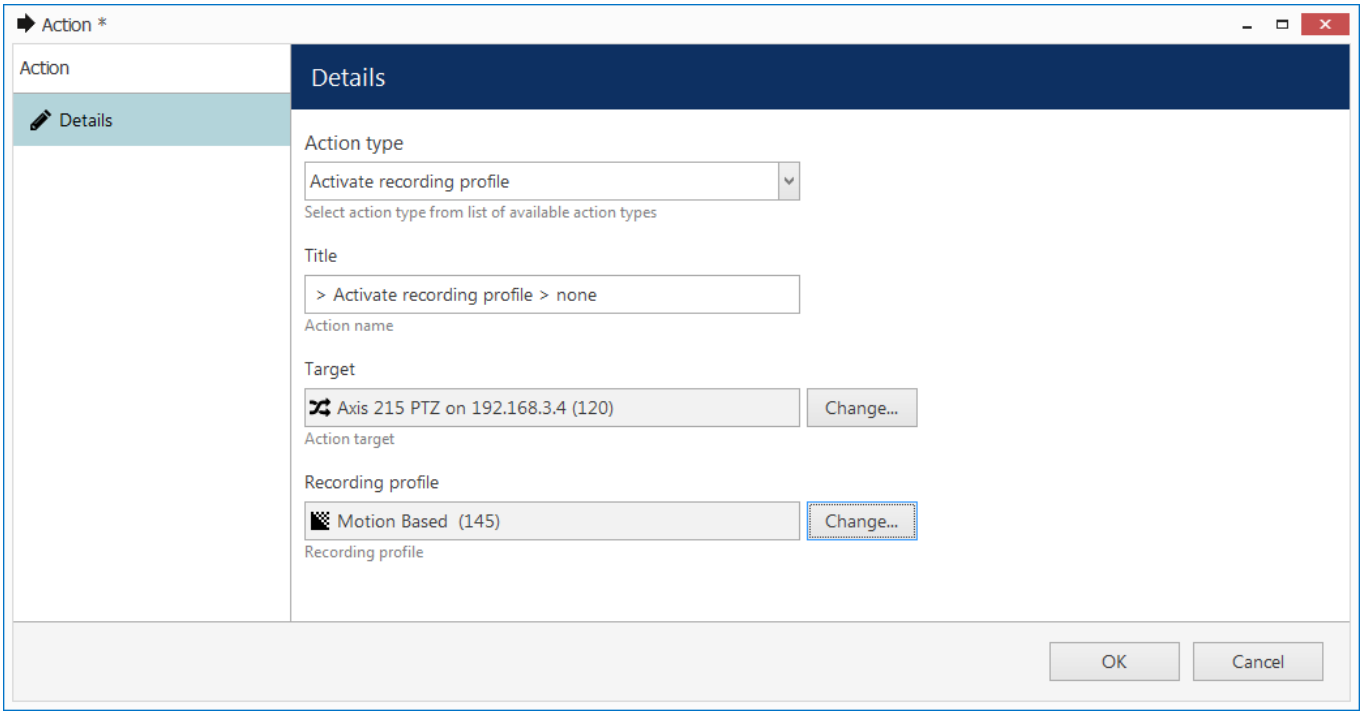

Action: activate recording profile

Recording profile activation **cannot call off** the default recording configuration (the one currently assigned to the target channel); rather, **this action can only add more** recordings. Thus, channel default recording configuration must define the minimum required recording scheme (based on a single profile or on a schedule) and E&A scenarios will add to that.

Example: a channel is set to record based on motion. There are two user buttons: one of them sets the channel to *Constant recording*, and the other sets the *No recording* profile. Triggering the first button will activate constant recording, and triggering the second button will return channel recording to its default state (which is *Recording by motion*) instead of disabling the recording at all.

Recording Triggering Examples

When channel recording profile includes **alert-based** recording, recording can be activated as a result of a *Generate Alert* type action and its engagement time is determined by the profile's *post-recording time* parameter. In this case, actual recording profile is not changed and the current recording profile is used (the one assigned to the channel through its recording configuration). The default (built-in) recording profiles have post-recording intervals of 10 seconds, which may be fine when conducting, e.g., motion-based recording (video is recorded for 10s after motion event), but may not be suitable for other types of events. In such case, you can pre-configure any number of different recording profiles and use them for action setup.

If a recording profile is triggered by an *Activate Recording Profile* type action, the recording profile used for the target channel is complemented with the profile triggered from E&A, and recording duration can be controlled using action delay timers.

Scenario 1. The camera's recording configuration is normally motion-based. The action is intended to be used for recording based on digital input events, which are triggered when someone opens main entrance door; starting from that point, the video and audio streams will be recorded continuously for one minute.

- channel base recording configuration: motion-based video recording
- actions triggering recording profiles:
    - action #1 triggers a recording profile with continuous video + audio (e.g., built-in Continuous Recording profile)
    - action #2 triggers the built-in *No Recording* profile: as a result, channel recording is returned to its default (configured) state
    - action #2 is delayed for one minute using a Delay Timer

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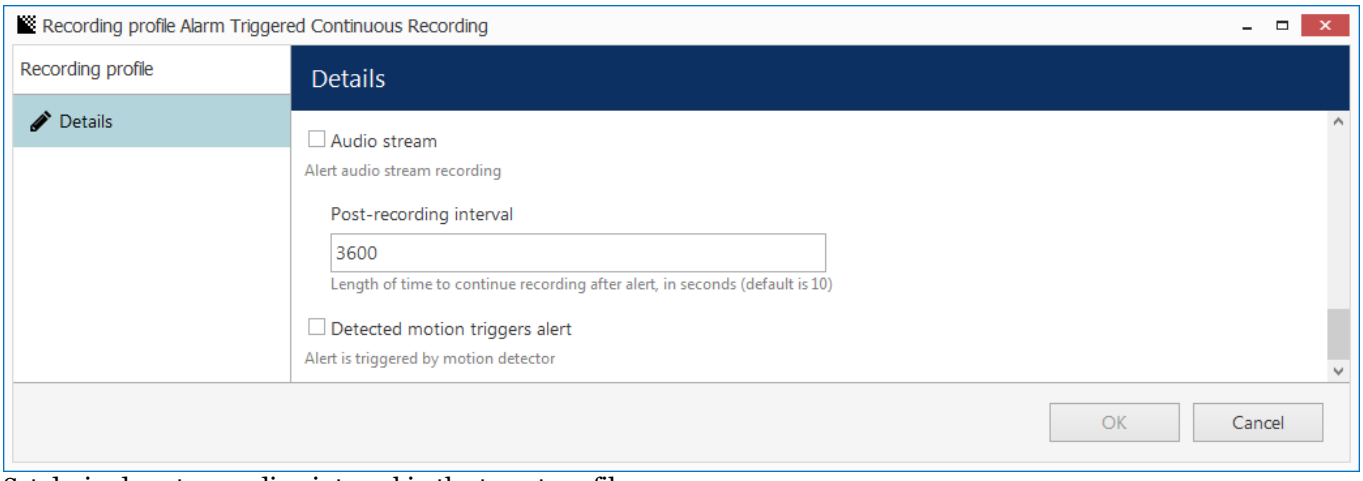
Scenario 2. The camera normally records continuous video with low FPS during the daytime, and does not record anything at night and during weekends. If camera VCA detects fire or smoke in the area, continuous recording at full frame rate will be conducted for 30 minutes.

- channel base recording configuration: based on schedule, continuous recording at restricted FPS + no recording
- action triggering recording profiles:
    - action #1 triggers continuous video recording without frame rate limitation
    - action #2 triggers the built-in *No Recording* profile: as a result, channel recording is returned to its default (configured) state
    - action #2 is delayed for thirty minutes using a Delay Timer



Set desired post-recording interval in the target profile

Create Bookmark

Bookmarks can be created by the server, based on any available event. This can be done either completely automatically or complemented with user input - from the users who are connected via Ganz CORTROL Client application.

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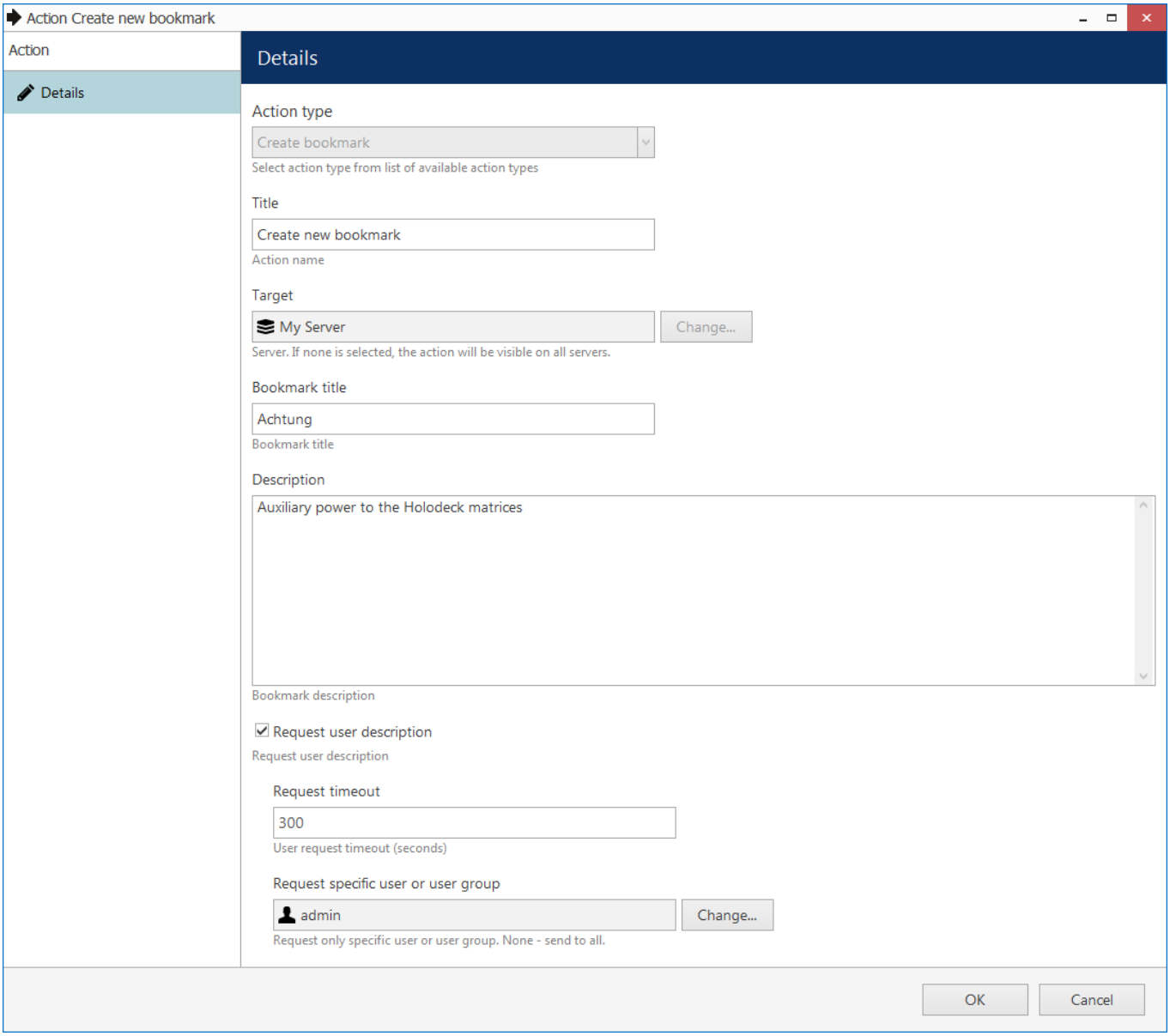

Action: add a bookmark with user confirmed description

Available settings:

- **Title**: custom (user-defined) action name
- **Target**: server to add the bookmark on (select *none* to make the action visible on all servers in the system)
- **Bookmark title**: name that will appear in the archive and also displayed to users, if user description is requested (use the *Insert field* button to add text macros)
- **Description**: extra information to be stored with the bookmark (use the *Insert field* button to add text macros)
- **Severity**: bookmark severity level (info = lowest, critical = highest); you can change the severity level colours via server settings, *Bookmark policy* tab
- **Request user description**: enable this if you want to obtain bookmark description from Ganz CORTROL Client users - this comes useful when you require feedback from users and/or when the description may differ from time to time
    - **Request timeout**: defines for how long the description request will be displayed on the Ganz CORTROL Client side
    - **Request specific user or user group**: display confirmation dialog box only to the target user or user group; if not defined, the request will be sent to all connected users

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Note that the target channel is not specified at this step: you will have an option to specify it using the *Target Channel* button when you create a rule with this particular *Add Bookmark* action. If the source event of such a rule is channel-specific (e.g., *Video Lost*, *Motion*), the channel will be set automatically. Please see the *Add Rules* section for examples.

Scenario 1: fully automated

In the *Add Bookmark* action settings, do not enable the *Request user description* option. Instead, specify desired bookmark title and description. Now, when you use this action in a rule, a bookmark will be added automatically with the pre-defined description.

Scenario 2: bookmark with user confirmation

Enable the *Request user description* option and specify the bookmark title: make sure to make the title comprehensible as it will be displayed to the Ganz CORTROL Client user when prompting for the comment. Optionally, you can specify the description - it will be used when no user input is specified (users ignored or missed the description dialog box).

After you have added the action, you can go ahead and use it in the E&A Configurator: there, upon adding a rule, you will have an option to specify the **target channel** for the bookmark to be added to.

Other Actions

Actions having no special category are listed here.

External Service

For external services that have their own events (e.g., third party integrations via HTTP API), it is possible to trigger these as actions from Ganz CORTROL servers. You need to specify:

- **Title**: user-defined action title
- **External service**: external service (connected to the Ganz CORTROL system via HTTP API) to accept the data
- **Target action**: choose one from the list of available items (availability is ensured on the external service side)

This type of action is handy when you have your own service integrated via Ganz CORTROL HTTP API.

OPC Client Action

This action type uses an existing OPC client configuration to send write commands to an OPC server, thus changing values of its nodes.

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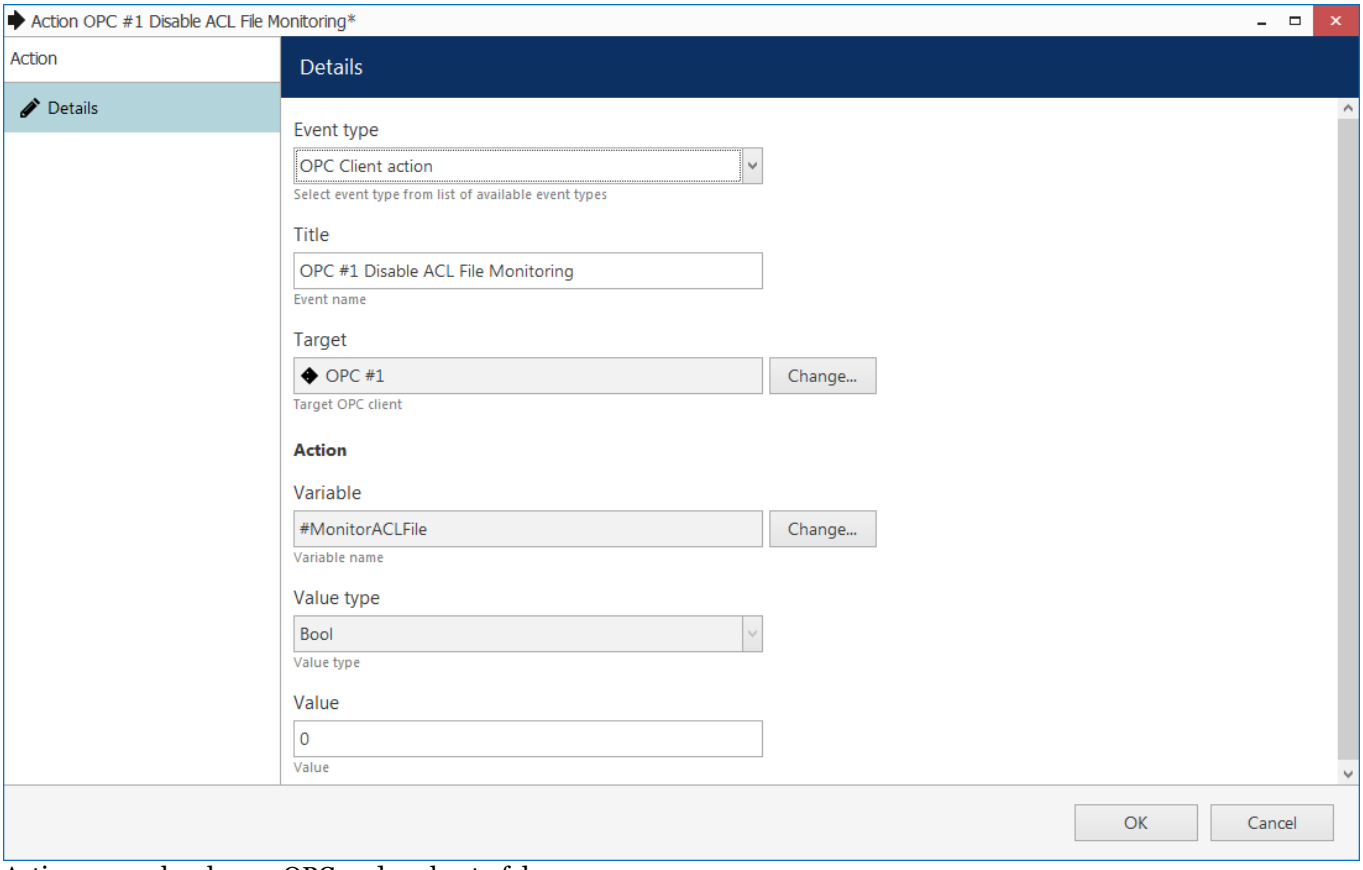

Action example: change OPC node value to false

You need to define:

- **Title**: user-defined action name
- **Target**: OPC client configuration (connection to an OPC server)
- **Action**: operation to be performed with the data node value
    - **Variable**: target OPC server data node (choose one from the list), must be of compatible type and have a write permission
    - **Value type**: one of the standard data types, auto detected
    - **Value**: new value to be assigned to the variable, must match the variable value type

Run Program

The *Run program* option gives you the opportunity to define an executable file (script, batch or a GUI application) that will be launched as a reaction to defined events.

The following parameters should be specified:

- **Title**: a user-defined action name
- **Target**: target Ganz CORTROL server to execute program on
- **File Path**: full path to the executable file
- **Parameters**: input parameters, if the program launched accepts any (e.g., a batch file) (use the *Insert field* button to add text macros)
- **Run Mode**: execution mode - hidden (silent, invisible to server user), minimised (minimised to taskbar) or normal (program will run in its default state)

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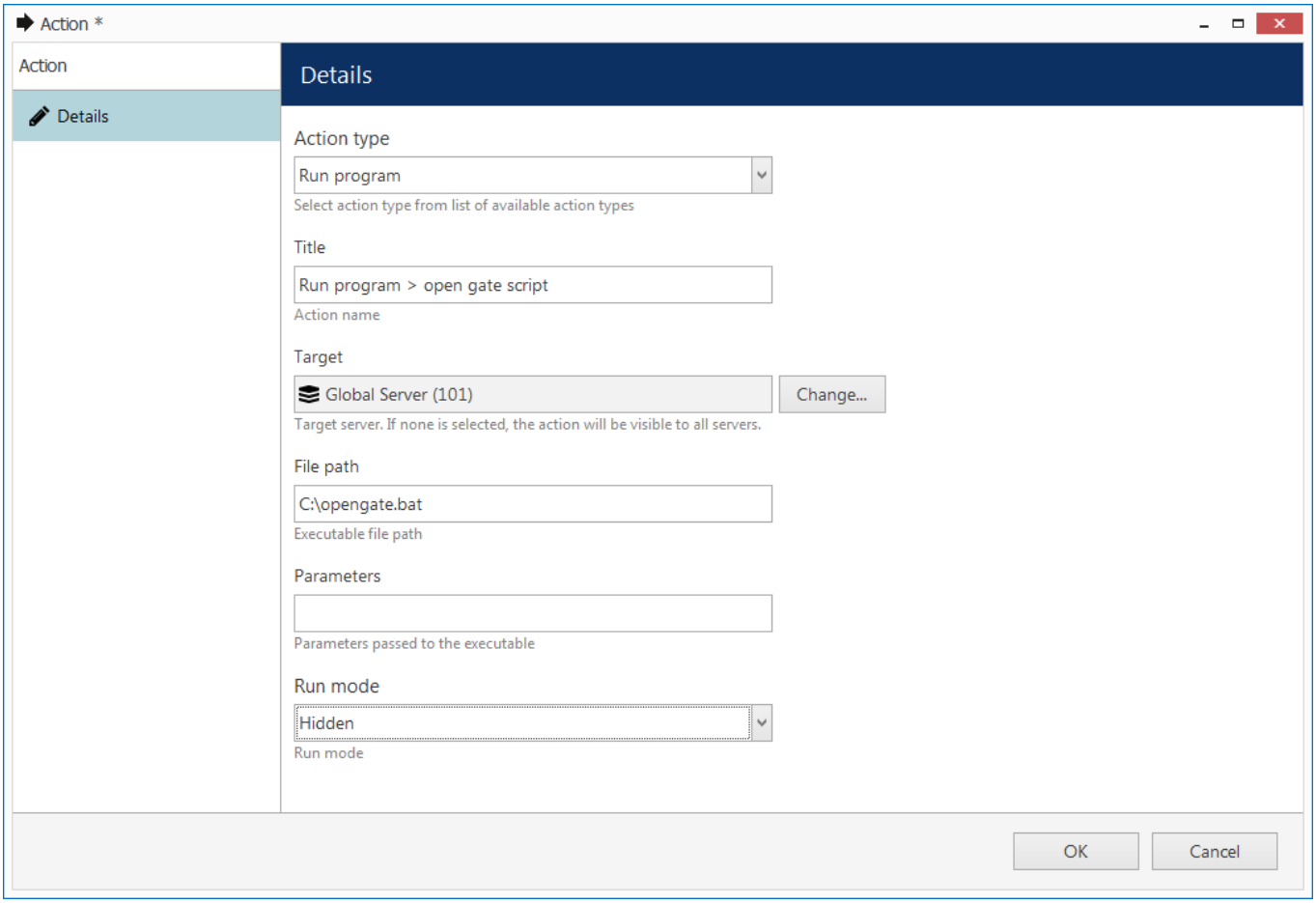

Action: run third-party program

Use the *Insert Field* button on the right-hand side (it appears when you have clicked inside the text area) or right-click the text area and choose *Insert* to add a text macro (see *Action Parameters* further in this topic for details) into the *Parameters* field.

Send HTTP Request

As a result of a triggered event, HTTP/CGI requests can be sent from Ganz CORTROL servers to any third-party servers or devices that can accept such commands. The target devices can be third-party software, Web servers, cameras or any access control hardware. This event is similar to the previous one, with the difference that here there is a single HTTP request, while using the *Run Program* action you can program multiple requests with necessary delays and internal logic.

This action supports both HTTP and HTTPS. For secure HTTP, use port 443 as default, or whichever port is configured on the remote service.

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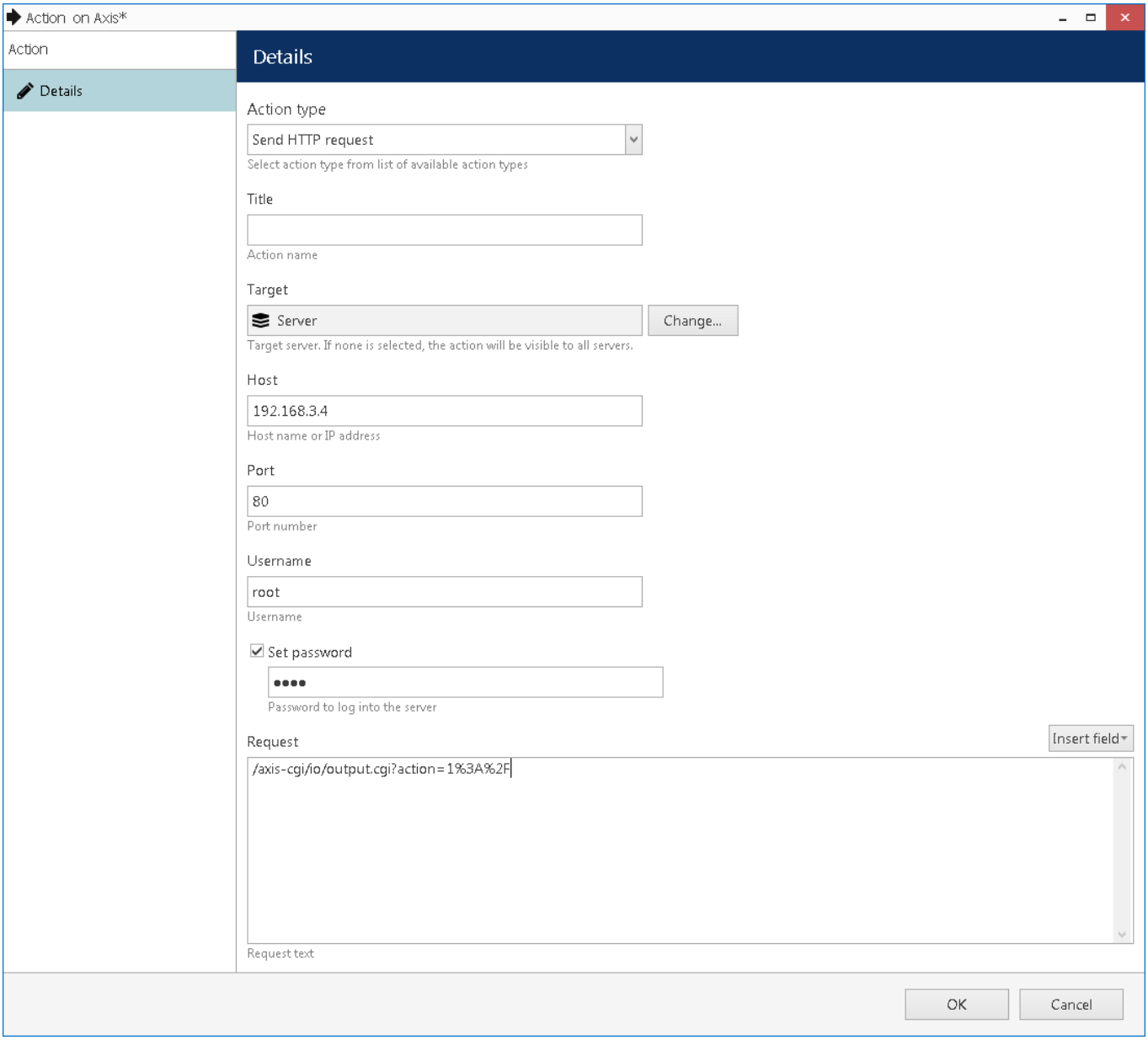

Send a HTTP request to open the digital output circuit on a camera

Things to be defined:

- **Title**: user-defined action name, by default it is *Send HTTP request [target host]*
- **Target server**: a server for the action to be available on; if no server is defined, the action will be available on all servers
- **Host**: an IP or hostname that will be accepting the HTTP request
- **Port**: port number to accept the request, port 80 is default
- **Username**: a username to log into the target host, if necessary
- **Password**: a password to log into the target host, if necessary; to change the password when editing the action, put a check mark on the *Set password* and define a password below
- **Request**: HTTP command string

The resulting request link will be formed as a combination of the host and request fields with the specified port, plus username and password, if specified.

Use default port 80 for HTTP and 443 for HTTPS.

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Use the *Insert Field* button on the right-hand side (it appears when you have clicked inside the text area) or right-click the text area and choose *Insert* to add a text macro (see *Action Parameters* further in this topic for details) to be passed as a parameter in the HTTP request.

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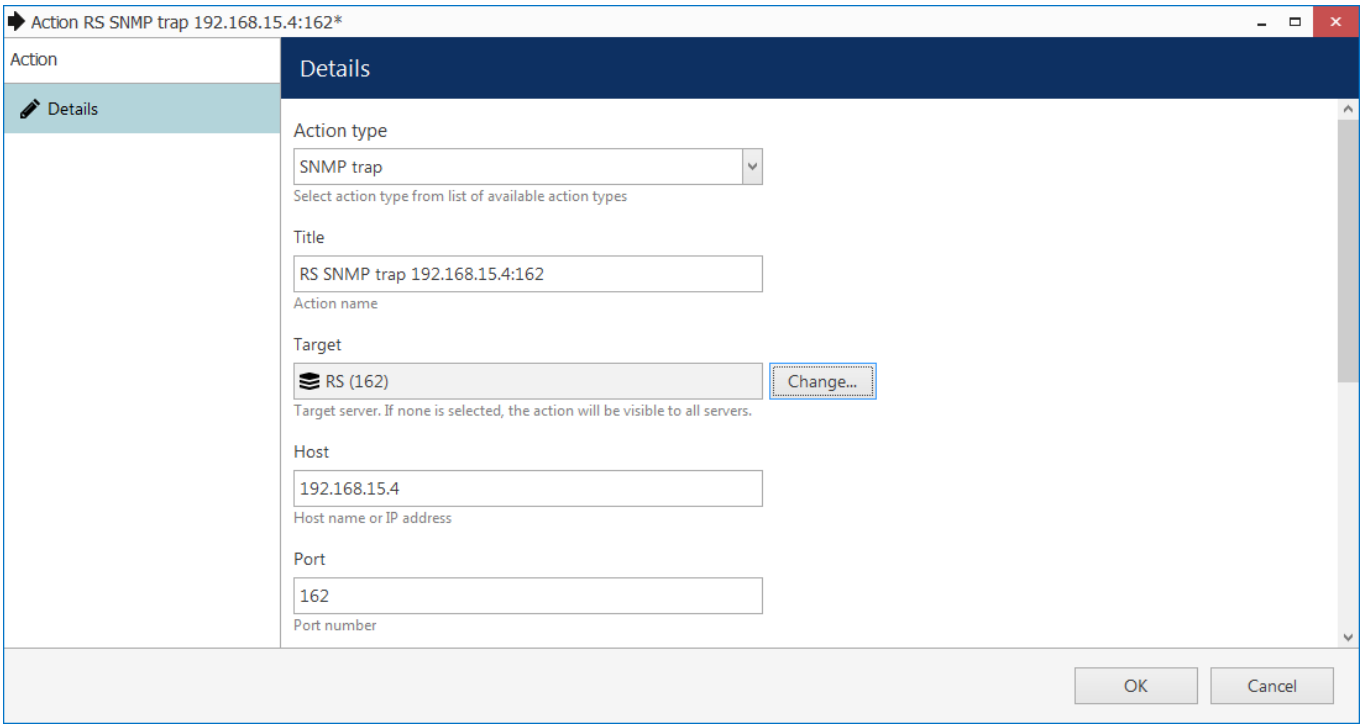
SNMP Trap

This event allows Ganz CORTROL server to act as an SNMP **agent** and generate and send trap messages to a **third-party SNMP manager**.



SNMP trap type action

You need to define:

- **Title**: user-defined action name, by default it is *[server] SNMP trap [host] [port]*
- **Target**: Ganz CORTROL server for the action to exist on; if none selected, the action will be visible on all servers
- **Host**: target SNMP manager address
- **Port**: target port
- **Community**: SNMP community expected by the SNMP manager
- **Trap ID**: automatically generated ID
- **Message**: text message to be sent

Use the *Insert Field* button on the right-hand side (it appears when you have clicked inside the text area) or right-click the text area and choose *Insert* to add a text macro (see *Action Parameters* further in this topic for details) to be passed as a parameter.

Action Parameters (Macros)

Actions that handle text information (log messages, send emails and run third-party program) can accept macro commands. Currently, the available parameters are:

- {EVENT_ID} - internal identifier of the triggered event
- {EVENT_TITLE} - user-defined name of the triggered event
- {EVENT_SOURCE_ID} - internal identifier of the event source
- {EVENT_SOURCE_TITLE} - user-defined name of the event source
- {EVENT_UTIME} - event UTC time
- {EVENT_UDATE} - event UTC date
- {EVENT_TIME} - event local time
- {EVENT_DATE} - event local date
- {EVENT_TIMESTAMP} - event UTC timestamp in a system-independent format YYYY-MM-DD hh:mm:ss.ms

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- {ADDITION_INFORMATION} - extra information for *Disk Excluding, Fallback activating* and *Recording Error* events
- {ACTION_ID} - internal identifier of the action
- {ACTION_TITLE} - user-defined name of the action
- {ACTION_TARGET_ID} - internal identifier of the action target (usually, a server)
- {ACTION_TARGET_TITLE} - user-defined name of the action target (usually, a server)
- {ACTION_PARAMETER_ID} -internal identifier of the additional action parameter (e.g., target channel defined in the rule)
- {ACTION_PARAMETER_TITLE} - user-defined name of the additional action parameter (e.g., target channel defined in the rule)
- {VALUE} - number plate value from the *Tag Matched* event
- {CHANNEL_RECORDING_ID} - channel recording identifier, as displayed in the channel details when IDs are enabled in the Ganz CORTROL Console app settings; channel ID is used

Example of a text string containing a macro: "{EVENT_TITLE} event occurred on {EVENT_UDATE} at {EVENT_UTIME}".

Event sources are listed for every rule in the *Rules* section of *Events & Actions*; typically, these are servers, devices and other resources capable of generating events (e.g., user buttons). **Action parameter** is a supplementary item added to the rule, e.g., *target channel* for the text notification, *source snapshot* for the attaching snapshots to emails or exporting them.

The {ADDITION_INFORMATION} macro has support for parameters. These depend on the originating event. For example, for **LPR events**, try the following ones:

- {ADDITION_INFORMATION:Plate} for the license plate number;
- similarly, use Speed for the estimated vehicle speed
- and Confidence to get the recognition accuracy,
- Info1/Info2 fields are available for the CBC AMERICA LLC LPR external service.

For the **face recognition** events, additional parameters may be equal to Subject and Tag, as well as SubjectSimilarity (if a person was found in the DB)

When you have finished, click *OK* to save and close the dialog box. The newly created action will appear in the item list under *Actions* and will be available for configuration.

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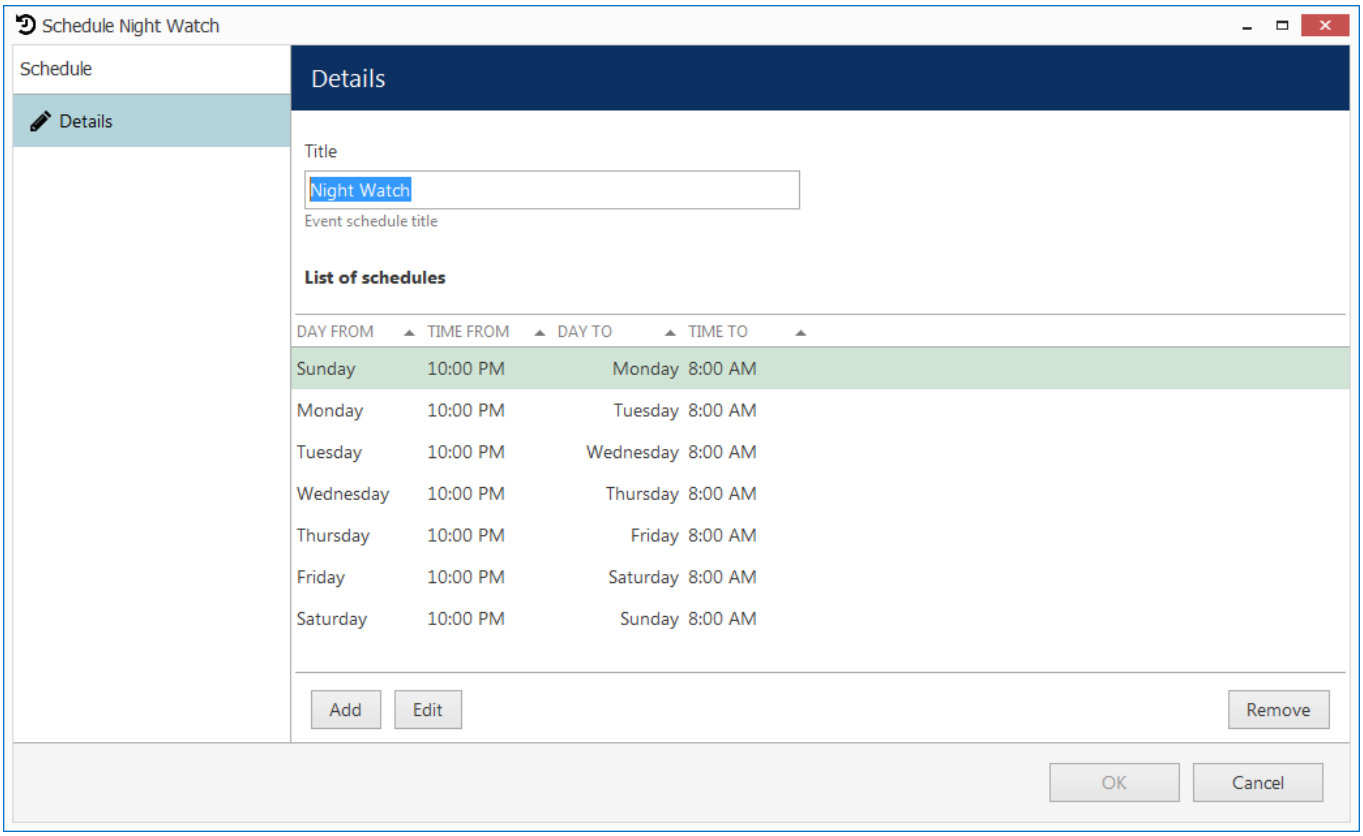
9.7 Create Schedules

Apart from conditions and delay timers, there are **schedule** elements that determine if a rule has been executed based on a pre-defined itinerary.

To add, remove and manage event and action schedules in Ganz CORTROL Console, go to *Events & Actions* section and choose *Schedules* from the menu on the left. Schedules can be also added as you go from the Event & Action Configurator.

Click the + *New schedule* button on the upper panel to bring up schedule configuration dialog box.



Add new schedule

Enter a user-friendly **title** for the new schedule and then add one or multiple time intervals to form the timetable. Manipulate **schedule items** with the button in the bottom panel.

For each time interval, you can define its starting point (day and time) and ending point (day and time).

Days can be selected from the drop-down list; time can be entered manually or adjusted using the arrows on the right; you can also manipulate time by selecting (highlighting) the hours/minutes/seconds and scrolling your mouse wheel up/down, while still hovering your mouse cursor over the relevant highlighted value.

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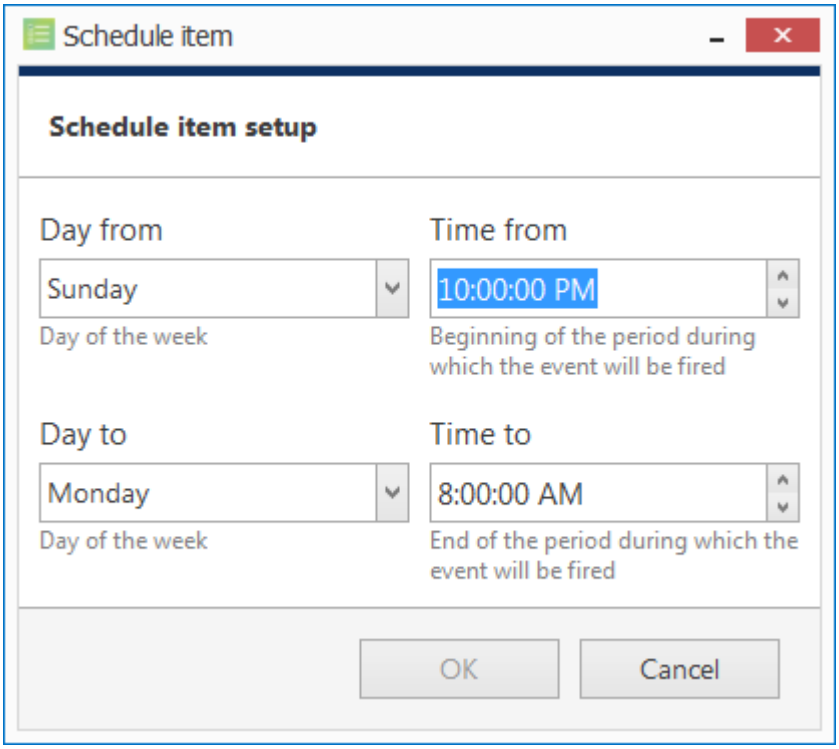
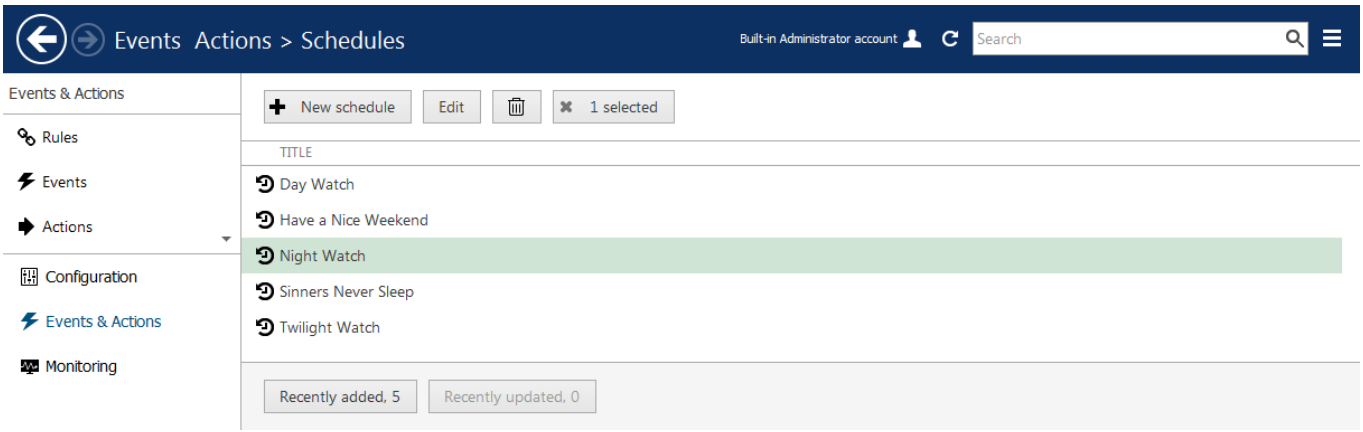


New schedule item

Click *OK* when you have finished to save and close the dialog box. The newly created schedule will appear in the item list and will become available for selecting in the *Event & Action Configurator*.

Use the buttons on the upper panel to edit and remove the existing schedules; the filters on the bottom panel will help you load recently added or recently edited items.



Multiple schedules

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9.8 Understanding Conditions

Conditions are auxiliary controls for event/action rule operation: these are **condition variables**, 'locks' for the defined event/action mappings.

Each condition can only be in one of two states: **OFF** or **ON** (0 or 1, *false* or *true*, to put it in terms of formal logic). When applied to a rule, the condition serves as an additional clause for the action execution: the action will only be performed if attached condition is ON, and is never performed if condition is OFF - regardless of whether the event has been triggered. The condition **state** can be manipulated using the *Set condition* and *Unset condition* **actions** (these exist by default for each and every created condition), which, in their turn, can be set off by some other events.

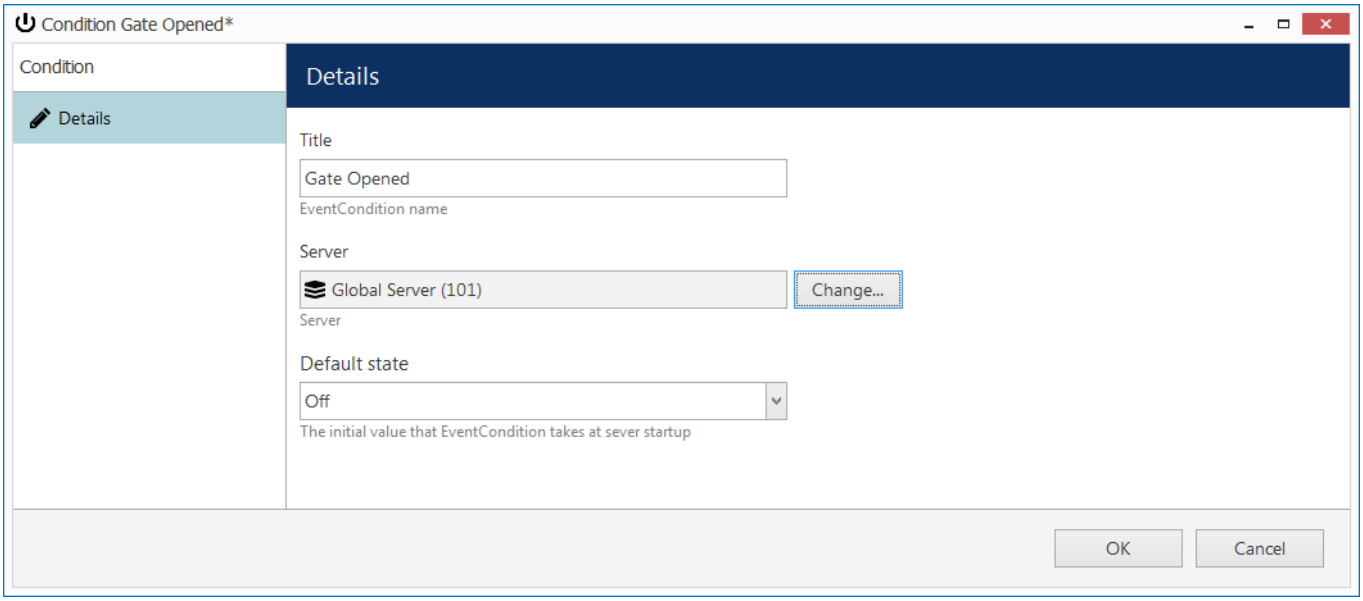
The conditions are available in the *Event & Action Configurator*: click the *Conditions* button in the bottom part of the *Rules* section to load the existing condition list or create a new one.

Add Condition

To add, remove and manage the conditions in the Ganz CORTROL Console, go to the *Events & Actions* section and choose *Conditions* from the menu on the left. Conditions can be also added as you go from the Event & Action Configurator.

Click the + *New condition* button on the upper panel to bring up the condition configuration dialog box. Here you have to:

- enter an comprehensible **title** for the condition - usually, the best ones are those which express a state, e.g., camera offline, motion present, door opened etc.
- choose the **target server** - conditions, as non-global events, are local and operate within a single server
- set condition **default state**, i.e., the state it is in before it is set or unset for the first time; this can be either ON or OFF



New Condition dialog box

When you have finished, click *OK* to save and close the dialog box; the newly created condition will appear in the item list and will become available in the *Event & Action Configurator*.

Use the buttons on the upper panel to edit and remove the conditions; the filters on the bottom panel will help you load recently added or recently edited items.

Condition Usage Examples

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Consider a system that has three cameras installed: *Camera A* overlooking area A, *Camera B* overlooking area B that is just next to area A, and *Camera C,* which is a supplementary PTZ device and can be turned to view both areas and even more, and overlooks area C by default. If a person walks into area A, he/she will be detected by *Camera A's* video analytics; if he moves on, he will enter area B and the security guard will see him on *Camera B*.

Now, imagine that *Camera B* suddenly goes offline. The security guard is OK with that, until there is someone in area B; he notices some motion in area A and takes control of *Camera C*, and makes it overlook area B, but the person of interest is long gone by that time, and there is no footage of him being present in area B. So, the task is to automate the process so that *Camera 3* serves as a backup while *Camera B* is offline; the configuration in such a case may look as follows:

- Event 1: *VCA*, source: *Camera A*
- Event 2: *Video Lost*, source: *Camera B*
- Condition: *Camera B Offline,* default state: *OFF*
- Action 1: make *Camera C* go to preset *Area B*
- Action 2*: Set Condition,* target: condition *Camera B Offline*

Rules:

- Event 2 triggers Action 2 (that switches the state of condition *Camera B Offline* to ON)
- Event 1 triggers Action 1 upon the condition *Camera B Offline*

Thus, Action 1 (go to the PTZ preset) is only actually triggered then and then only if *Camera B Offline* condition state is ON, which is not possible while *Camera B* is online.

Now, we need this to work both ways, i.e., we want to return *Camera C* to its home position and reset condition state back to *OFF* when *Camera B* comes online again. New configuration elements will be added:

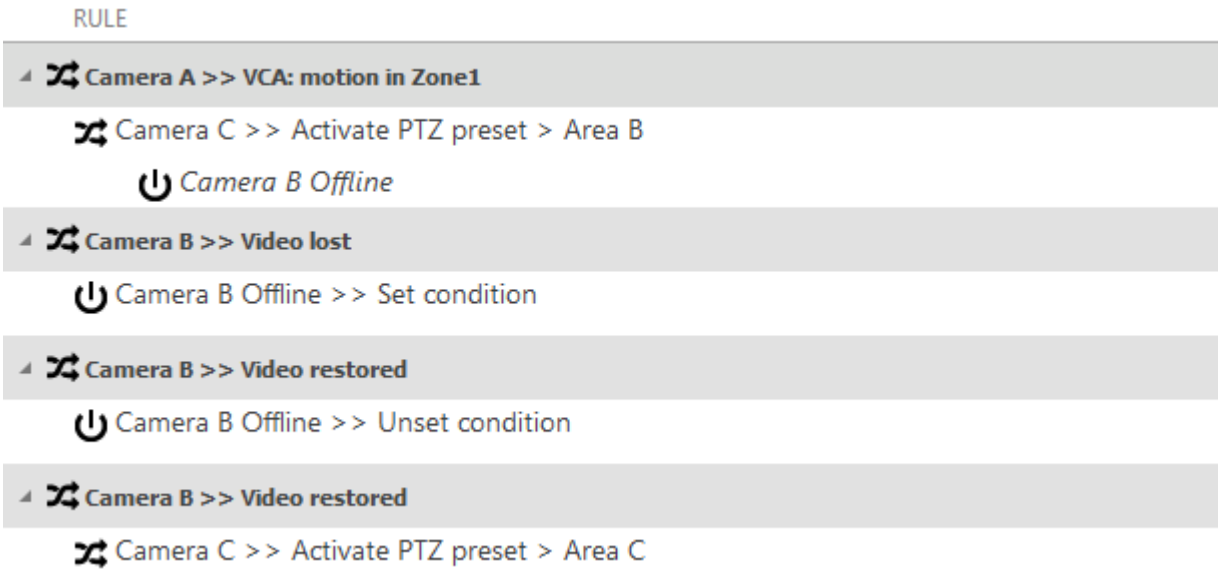
- Event 3: *Video Restored*, source: *Camera B*
- Action 3: *Unset Condition*, target: condition *Camera B Offline*
- Action 4: make *Camera C* go to preset *Area C*

Rules:

- Event 3 triggers Action 3 (that switches condition state to OFF)
- Event 3 triggers Action 4

These new rules ensure that, once *Camera B* is streaming again, *Camera C* will go back to its original position, thus terminating it as a backup device; and the condition is *OFF*, meaning that the triggering of VCA rules in area A will not make *Camera C* move.

The whole setup in *Event & Action Configurator* is as follows:



Sample rules

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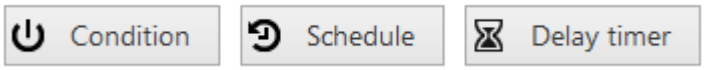
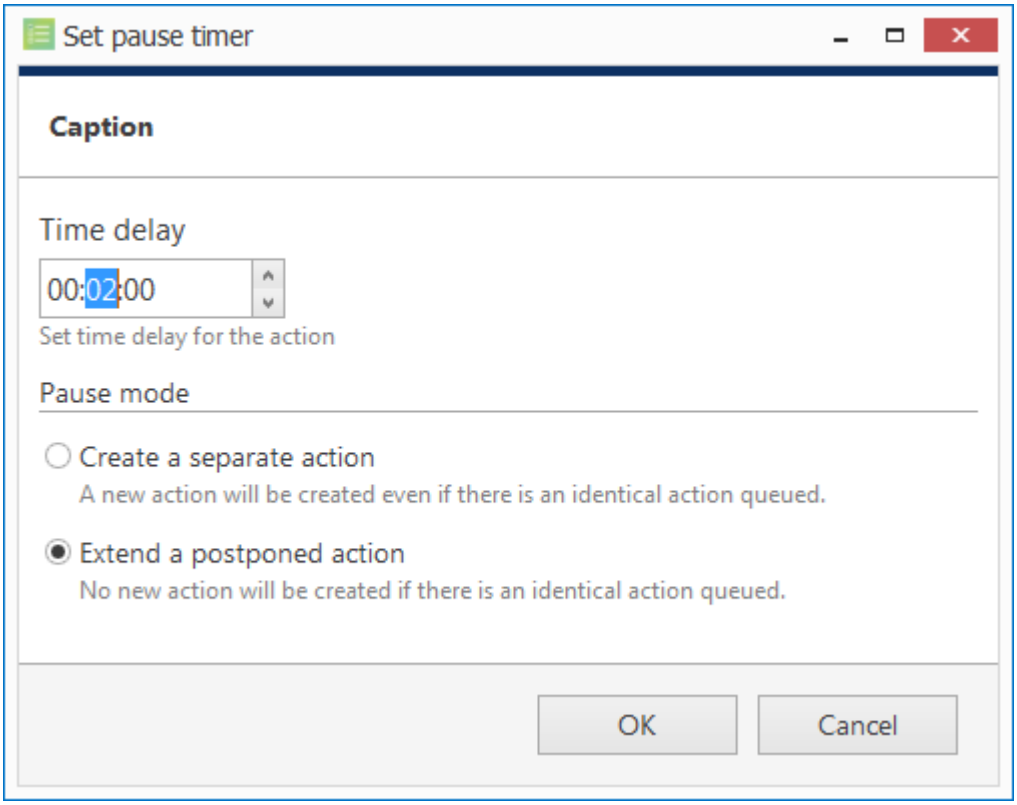
9.9 Delay Timers

Delay timers are supplementary entities for controlling action launching. Unlike conditions and schedules, timers cannot be pre-created in the main Ganz CORTROL Console *Events & Actions* section, but rather are defined as you go for each rule with the *Event & Action Configurator*, which is available via the *Rules* section.



Delay Timer button in the *Event & Action Configurator*

To add a pause timer for specific actions, select one or more of the mapped rules (use *CTRL+click* or *Shift+click* to mark multiple items) subject to delay, and then click the *Delay Timer* button on the bottom panel of the central part of the *Event & Action Configurator*.



Delay timer properties

Set the delay period for the target timer. Time can be adjusted in the following ways:

- click hours/minutes/seconds and then use the UP and DOWN arrows on the right, or
- click hours/minutes/seconds and use the mouse scroll, while still holding mouse cursor over the relevant timestamp section, or
- enter the time manually using the keyboard numpad.

Next, choose the pause mode:

- **Create a separate action**: new actions of the same type will be created regardless of the acting delay timer, and queued in the same way as the original delayed action
- **Extend a postponed action**: new events of the same type will restart the timer, postponing the resulting action for the specified amount of time

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When you have finished, click *OK* to save and exit the dialog box. The newly created delay timer will be assigned to the pre-selected actions.

Extending an action allows you to postpone the action execution repeatedly if more events of the same type arrive within the chosen time period. For example, if incoming events are of a *Recording Error* type, there may come too much of them at once e.g. in case of a major storage issue, causing a lot of triggered actions of the same type, while only a single action may be desirable.

Say, if required action is *Write to application log*, setting a delay timer to *5 minutes + extended action* will postpone the email sending for 5 minutes every time a new recording error appears; when, at a certain point, more than 5 minutes have passed without new incoming events, a single log entry will be eventually created. The **separate action** option, on the contrary, will force logging for every single triggered event.

To remove a delay timer from rule configuration, click the timer to highlight it within the rule, and then click the *Clear* button in the bottom panel. Note that, if there are schedules and/or conditions attached to the same rule, they will be removed as well.

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9.10 Counters, Indicators and Variables

Apart from actions, events and rules, the *Event & Action* section of Ganz CORTROL Console contains additional resources, which can be used for building even more versatile automated scenarios.

Software Counters

Software **counters** are entities that contain a certain integer value, which can be altered based on some occurred event. These can be used in Ganz CORTROL, for example, to count events that do not originate from VCA and therefore cannot be accounted for using VCA counters.

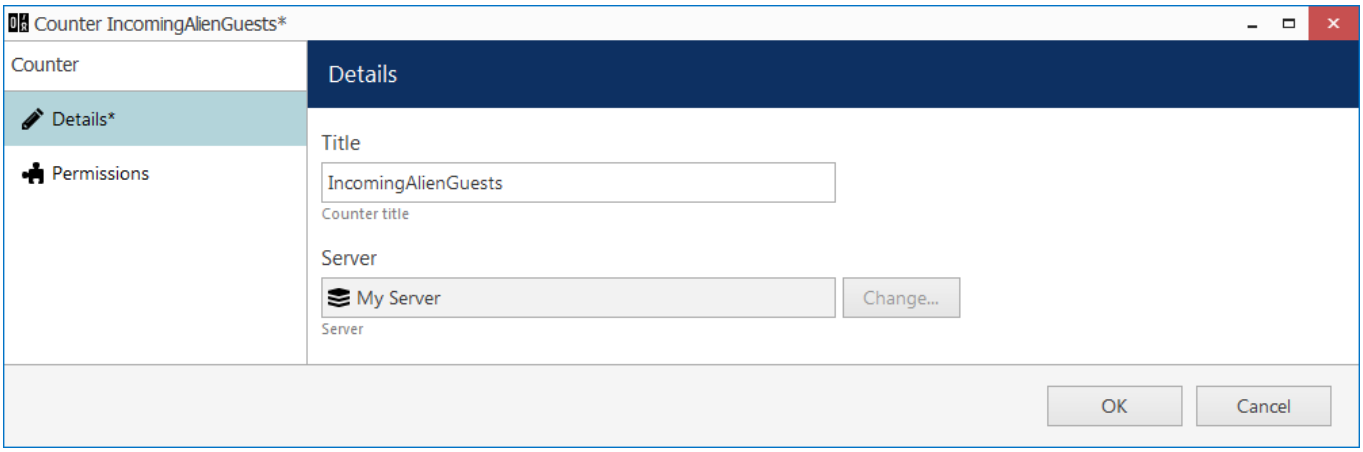
Counters can be created in the Events & Actions section of Ganz CORTROL Console, under the *Counters* subsection. Each one has a title and a server where it resides (as the *Event & Action* scenarios are defined per server; use global events to transfer events from one server to another - for Ganz CORTROL Global installations).

Reports can be then built based on the software counter values, along with VCA counters: automatic reports are available for configuration in Ganz CORTROL Console, and manual reports can be created in the Ganz CORTROL Client application. Both modes also permit report export in PDF format.

Add and Remove Counters

To add, remove and manage the software counters in the Ganz CORTROL Console, go to the *Events & Actions* section of Ganz CORTROL Console and choose *Conditions* from the menu on the left. Click the *+ New counter* button on the upper panel to bring up the counter configuration dialog box. Here you have to:

- enter an comprehensible **title** for the counter - e.g., what is going to be counted
- choose the **target server** - counters, as non-global entities, are local and operate within a single server



A counter creation example

In the *Permissions* tab, you can grant **access** to this counter's **data** to individual users and user groups. Anyone with the rights to access archived VCA metadata for the target counter will have it in the Ganz CORTROL Client application in the *Reports* section. If the *Access archived VCA metadata* permission has been granted for the **whole server**, the target user or user group will have access to **all counters** on that server, regardless of the individual counter permissions.

When you have finished, click *OK* to save and close the dialog box; the newly created counter will appear in the item list and will become available in the *Event & Action Configurator*. You can create any number of software counters.

Use the buttons on the upper panel to edit and remove the counters; the filters on the bottom panel will help you load recently added or recently edited items.

How to Change Counter Values

Counter values can be changed based on any event in the Event & Action scenarios, when building rules. Counter value changes can be a separate action or an additional one to serve for counting the number of times when the rule was triggered.

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There are three **built-in actions** that are available by default for any created counter:

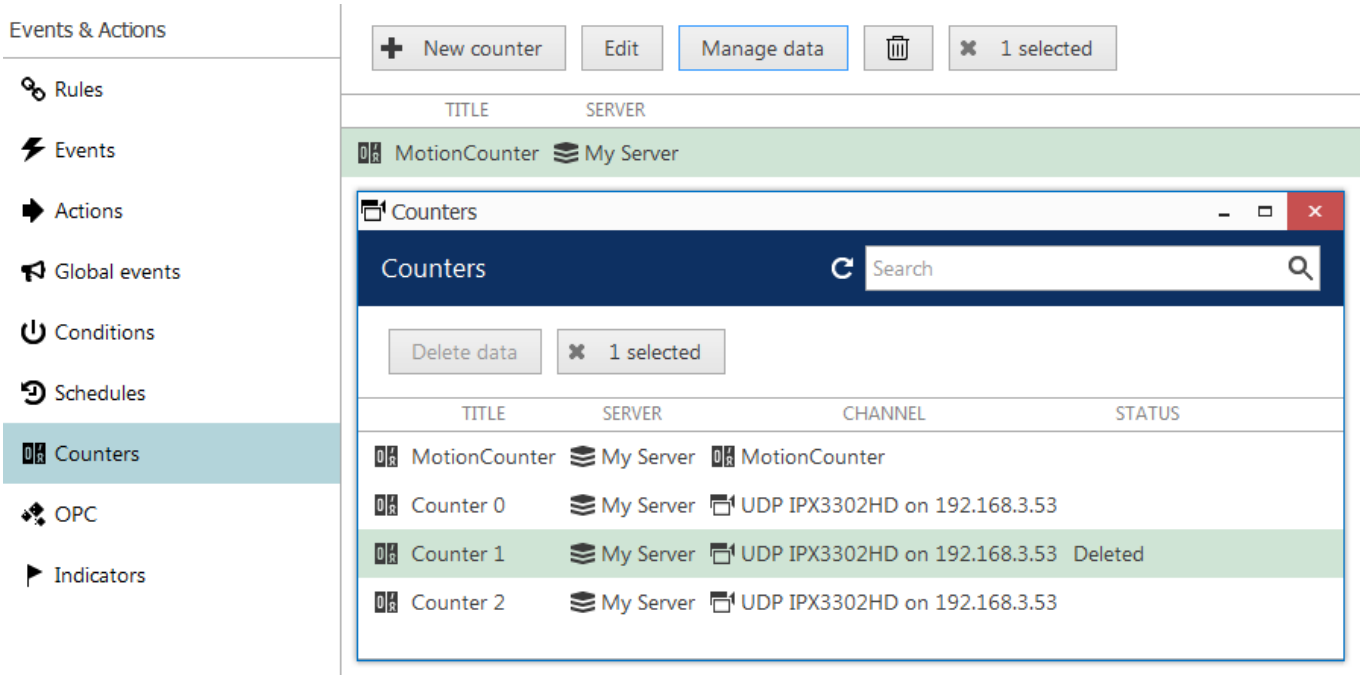
- **Increment**: increase counter value by one
- **Decrement**: decrease counter value by one
- **Reset**: set the counter's value to zero

The initial state of any newly created counter is zero.

Manage Counter Data

Internal Ganz CORTROL counters can be removed at will at any point: select all redundant counters and click the *Recycle bin* button on the upper panel.

However, only software (user-created) counters can be deleted in this way. Counters originating from VCA cannot be deleted in this way, as they exist in the VCA configuration (either camera-side or server-side video analytics). Those entities do not even appear in the list in the *Counters* section. To view them, press the *Manage data* button on the upper panel: an additional dialog box will pop up, displaying **all counters**, both user-defined and VCA imported.



Hidden menu with data for all counters

Here, you will see **all counters** with **some value**, including those, which have been removed from VCA configuration and are therefore out-of-date. Select the unnecessary items and press *Delete data* above: all information about the target counter will be then removed from the database:

- for software counters, this means that only the past counter values are wiped out; the counter itself stays in the list (you can remove it from the list as described above)
- for VCA counters, the counter itself is deleted from the database, too (but not from the VCA configuration)

> Removing the counter's data does not reset it to zero.
>
> For example: there is a VCA counter for incoming cars, which is currently equal to 100. If you delete its history and the next day new data are received from VCA, the counter's value will be consistent with the previous data, i.e., equal to 101.

If there are no new incoming data for the removed counter, it will disappear from *Reports* shortly - both in Ganz CORTROL Console and Ganz CORTROL Client. If it still exists and Ganz CORTROL continues receiving data from the target counter, it will re-appear in this list automatically. So, in other words, the *Manage data* dialog box reflects the current state of the counter's database.

Usage Example

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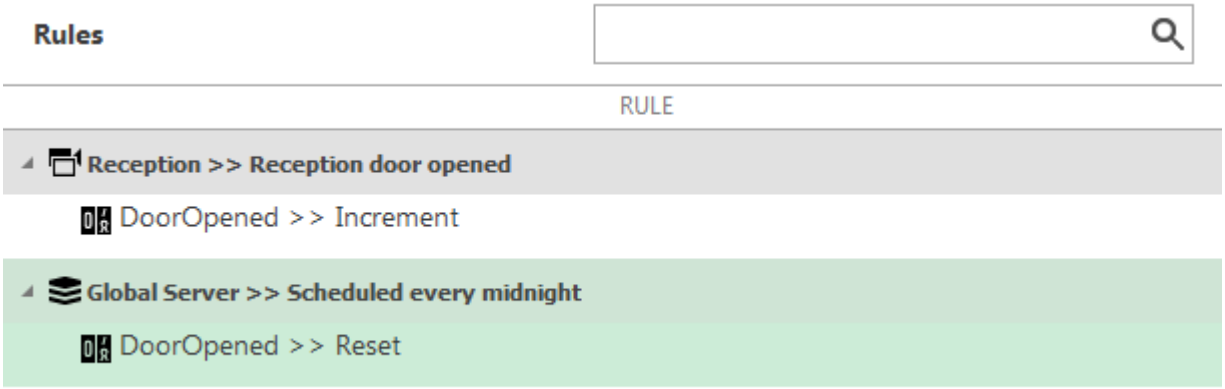
Consider a use case where it is required to count how many times during the day the office door was unlocked; the door is opened by an access control module, which is also wired to the digital input of a camera so that the system is notified when the door is unlocked.

Required E&A items in this case are:

- Event 1: *Digital Input*, source: corridor camera
- Event 2: *Scheduled event*, type: scheduled, every day 12:00AM
- Counters: *HowManyTimesDoorWasOpened*
- Action 1: *Increment*, target: counter *HowManyTimesDoorWasOpened*
- Action 2: *Reset*, target: counter *HowManyTimesDoorWasOpened*

Events 1&2 are not default and should be added, and the counter has to be created as well. Actions associated with the counter will be added automatically so there is no need to create these.



Rules that control the counter state

The final set of rules for this scenario looks as follows:

- Rule 1: Event 1 triggers Action 1
- Rule 2: Event 2 triggers Action 2

Thus, every time the door is opened, this event is accounted for by the software counter; the counter is reset based on schedule every midnight. Using the counter data, it is possible to build a report and see, for example, most and least popular times, the average number per week etc.

Indicators

Indicators are objects with several **states**. These states (conditions) can be changed based on any events in the *Event&Action Configurator*. Indicators can be placed on **maps**, thus helping you build an interactive dashboard.

You can create indicators in the *Events & Actions* section of Ganz CORTROL Console, under *Indicators*, then place them onto maps - either regular or geo maps. The indicator state and colour can be then changed based on E&A events: once you create an indicator, it is automatically added to the *Actions* section of the E&A Configurator and actions for changing its state are created.

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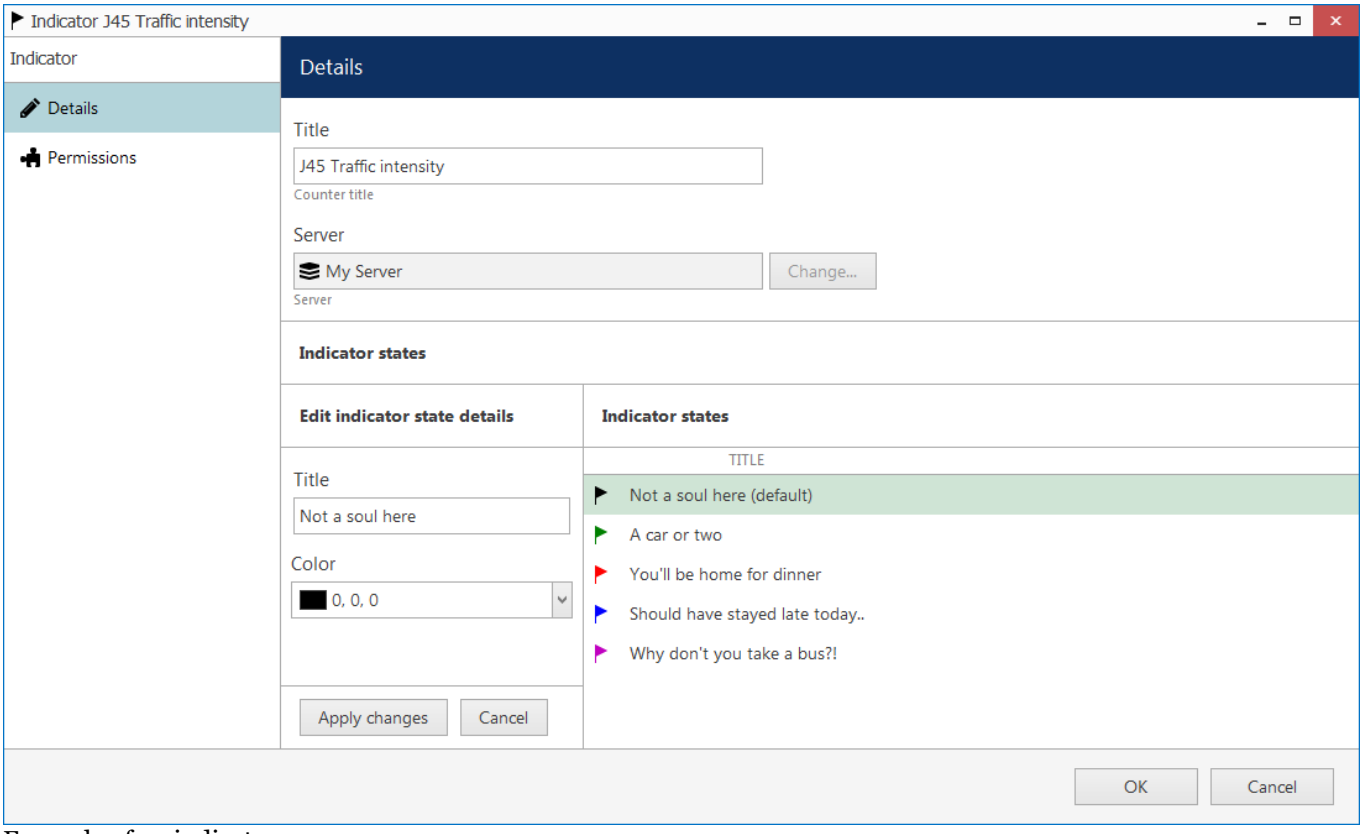

Example of an indicator

Create and Manage Indicators

To add, remove and manage the indicators in the Ganz CORTROL Console, go to the *Events & Actions* section of Ganz CORTROL Console and choose *Indicators* from the menu on the left. Click the *+ New indicator* button on the upper panel to bring up the counter configuration dialog box.

The following settings are available here:

- **Title**: user-defined name
- **Server**: Ganz CORTROL server, to which the indicator belongs (related actions will be only available in the target server E&A Configurator)
- **States**: 5 different indicator conditions with custom names and colours

When adjusting the state details, do not forget to hit the *Apply* button for the changes to take effect.

Change Indicator State

The indicator state can be changed based on any event in the Event & Action scenarios, when creating rules. The indicator state can be changed as a separate action, or it can be combined with any other one, thus helping visualize the state of other items.

There are five **built-in actions** for every indicator that allow to set the indicator to any of its states. If you only need two or three, simply do not trigger other conditions. The actions will appear automatically after you create the indicator.

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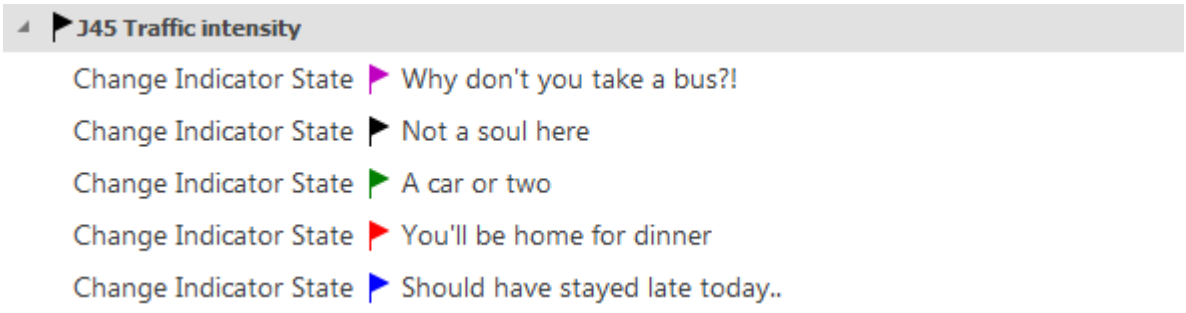
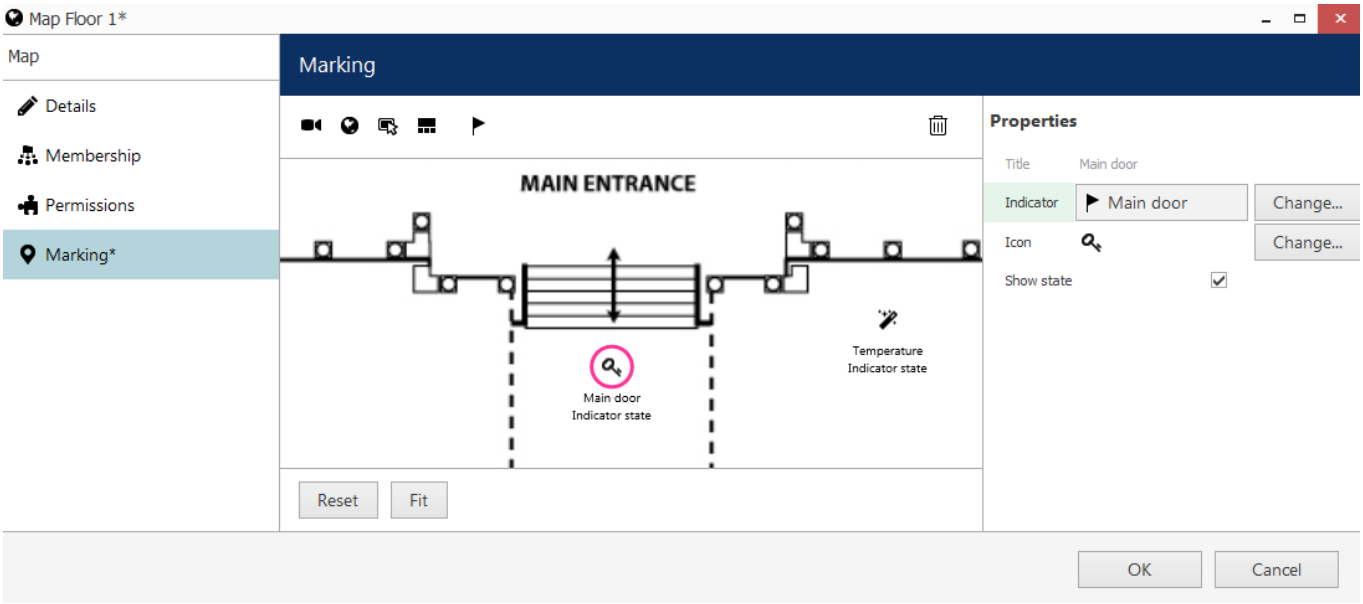


Maps

When placed onto maps, indicators change their colour and display the comment according to their state. Both regular and geographic maps have an **indicator marker** available on the panel above the map, alongside with other markers. Thus, you can build interactive panels that will reflect the condition of the system.



A map with two indicators on it

Usage examples

Depending on your needs, indicators can help in many different scenarios.

Use case #1: external sensors are sending temperature data. Based on the value, the indicator state is set to very low/low/normal/high/very high.

Use case #2: conditions are used throughout the system for door status (open/locked). The indicator is used to visualize the condition state (in this case, only 2 out of 5 states are involved).

Variables

Variables in Ganz CORTROL are entities having a certain value that changes over time. Create variables if you wish to set up reactions (via E&A) to certain variable values, e.g., certain temperature readings from thermal cameras.

To access the variables management in Ganz CORTROL Console, choose the *Events & Actions* section and switch to *Variables* in the menu on the left.

Variables differ by source. Currently, there are two groups of sources: devices (IP cameras or other) and data sources.

Channel Variables

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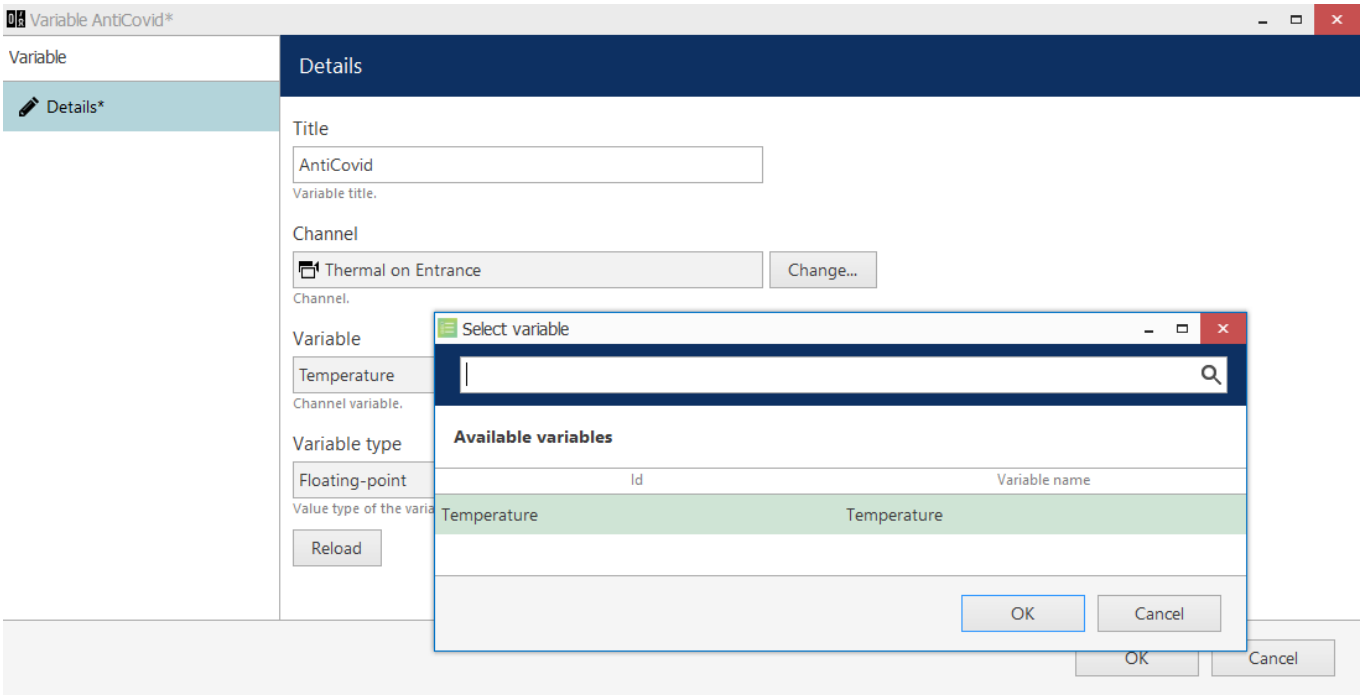
Some device integrations support receiving certain variable values from cameras. For example, some thermal devices send the temperature measurements as floating point numbers. In order to "catch" the data on the server side, simply create variables for these cases. Afterwards, you will be able to use these variables in events: for example, trigger events if the value is greater or less than certain threshold.

To create a new item, click the + *New channel variable* button on the upper panel. In the dialog box, choose the source channel and fill in the settings.

- **Title**: user-defined variable name
- **Channel**: source channel (device integration must be supporting variables, please contact cortrol@cbcamerica.com for details)
- **Variable**: choose one from the list of available items (if none are available, the device has none or the integration does not support variables)
- **Variable type**: variable data type

For most variables, the data type is fixed, so you only need to choose the variable source and give it a name.



Temperature variable from a thermal camera

Click *OK* when done; the newly created variable will be appended to the list.

After you have added the channel variable, use the *Variable value* event to define the value range you want to trigger the event-action rules.

Data Source Variables

Data source variables are based on the pre-defined data source mappings. First, create some regex mappings for your data sources as described in the corresponding section of this document. Then, create a data source variable in the *Variables* subsection by clicking the drop-down arrow un the upper panel and selecting the + *New data source variable* option.

The following settings are to be defined:

- **Title**: user-defined variable name
- **Data source**: choose one of your existing (pre-configured) data sources
- **Variable**: choose one of the pre-configured mappings
- **Variable type**: choose the data type of the selected variable (for further comparison in events)
- **Data ID**: enter your POS identifier in case the data source delivers data from multiple terminals or other sources

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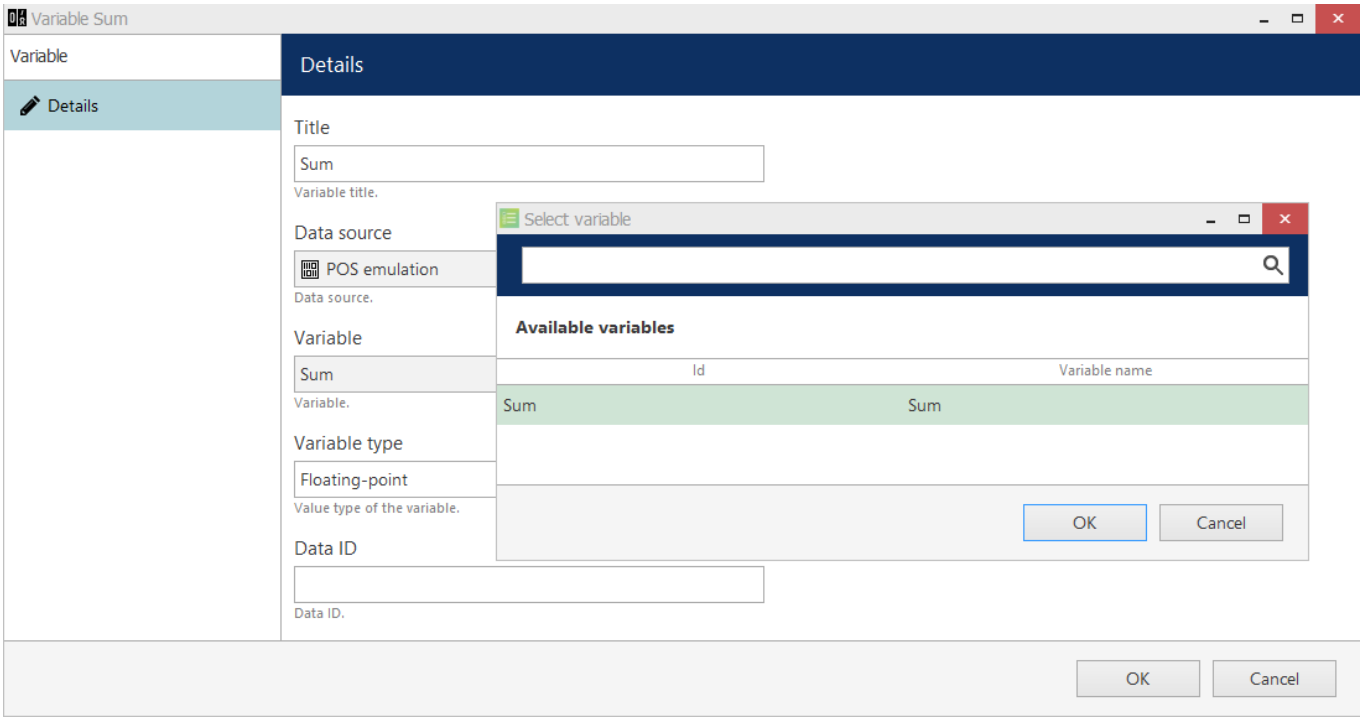
The *Data ID* field is optional and is only required if your data source has combined streams from multiple sources. If there is only one data stream, leave the *Data ID* field empty.



A new variable from a data source mapping

Click *OK* when done; the newly created variable will be appended to the list.

After you have added the data source variable, use the *Variable value* event to define the value range you want to trigger the event-action rules.

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9.11 Tags and Subjects

Ganz CORTROL offers a possibility to create **tags and subjects** for LPR and FR black/white lists, respectively. You can use these in combination with the Event&Action rules to roll our desired automated scenarios. Tags and subjects in Ganz CORTROL Console are not exported or imported to/from tags and subjects in LPR/FR services; they can act as a supplement or a replacement of these.

> Tags and subjects here are not synchronized or somehow related to those in Ganz CORTROL LPR or FR modules. If you already have tag lists in the LPR module, you can continue using it with E&A events.

> At this point, is it only possible to add tags and subjects from Ganz CORTROL Console. The option to add tags from the Ganz CORTROL Client application only refers to external LPR/FR service tags.

The recognition itself may run on an edge device (e.g., ANPR camera) or be provided by an external service. The idea is that the recognition results are received by Ganz CORTROL and then matched with the local tag/subject database.

Subjects are expected license plate or facial recognition results. For ANPR, a subject is a car number plate, and for FR each subject is a person.

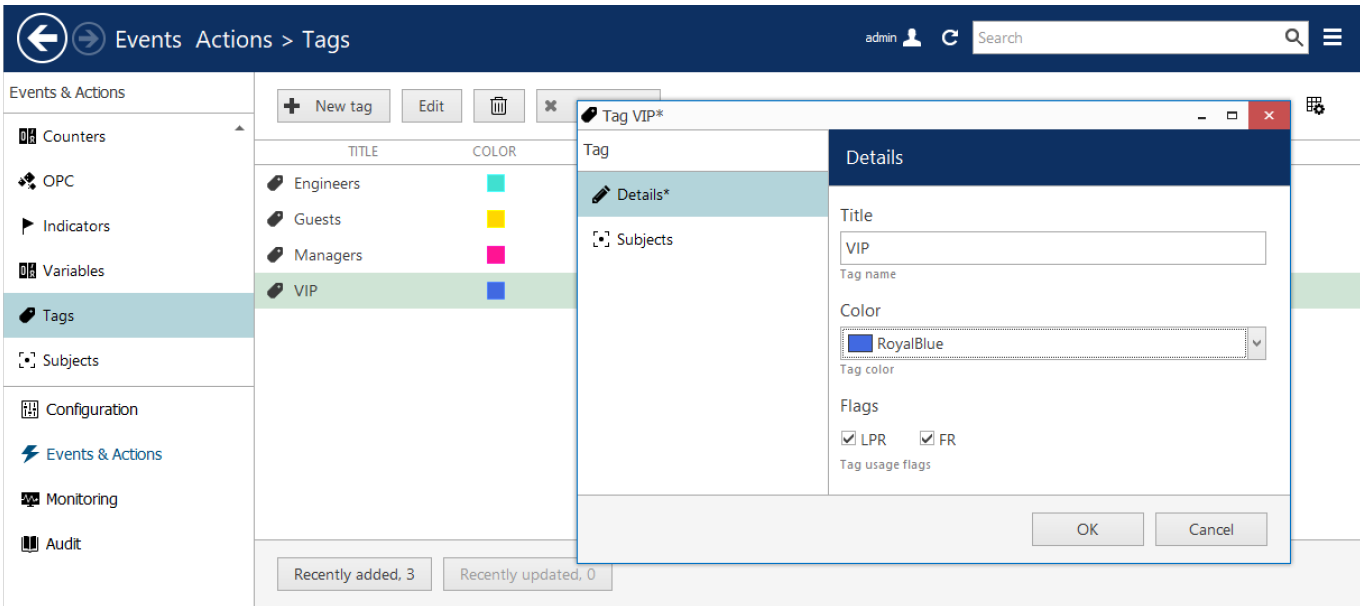
Tags are used as marks for the LPR/FR subjects. One or more subjects with the same tag form a **list**, and you can use tags to trigger events and event chains. Each tag can be used for all types of services, which is convenient, for example, to handle access for a group of people and their cars.

Create Tags

To create tags in Ganz CORTROL Console, switch to the *Events&Actions* section. Choose *Tags* on the left, then click the *+New tag* button on the upper panel.

For each tag, you can choose:

- **Title**: user-defined tag name that will appear in rules and in Ganz CORTROL Client
- **Colour**: will also appear in Ganz CORTROL Client to mark entries with this tag
- **Flags**: choose if you want to use this tag for FR lists, LPR lists, or both



Tags can be used for LPR or FR, or both services

When finished, click *OK* to save and close the dialog box. The newly created tag will appear in the item list; you can edit any tag by double-clicking it in the list, or by selecting a tag and clicking the *Edit* button on the upper panel. Remove tags by selecting one or more items and then clicking the *Recycle bin* icon on the upper panel.

Create Subjects

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Creating subjects is similar. To create subjects in Ganz CORTROL Console, switch to the *Events&Actions* section. Choose *Subjects* on the left, then click the *+New LPR subject* or *+New FR subject* button on the upper panel.

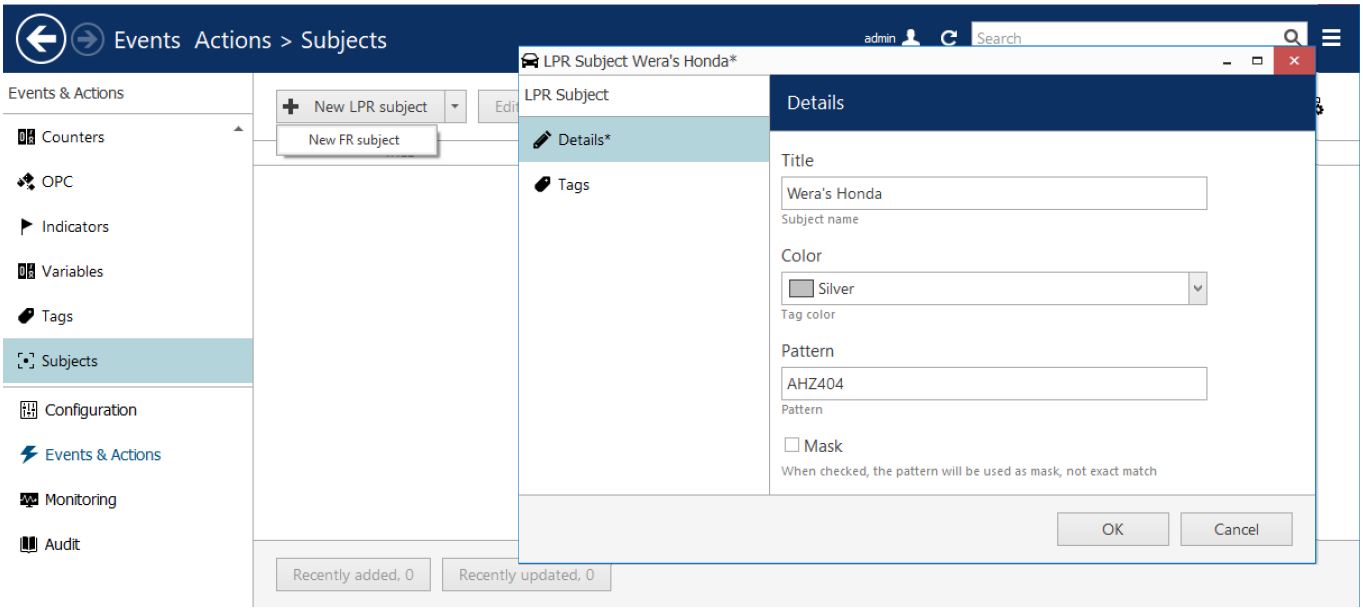
For each subject, the following settings are available:

- **Title**: user-defined tag name that will appear in rules and in Ganz CORTROL Client
- **Colour**: will also appear in Ganz CORTROL Client to mark this subject's recognitions (if the subject is tagged, the subject colour will be replaced by tag colour)
- **Pattern**: exact plate number or a mask (e.g., D* to match all plates starting with D and having any length)
- **Mask**: enable this to enter a mask instead of the exact match in the pattern field above

Patterns for masks: use * for any number of unknown characters, and ? for exactly one unknown character. For example:

- F* will match all license plates of any length starting with F
- F????? will match all license plates starting with F with a total length of 6 characters
- F?* means there's F and then one or more unknown characters

Use query **testing** (see below) to check if an expected recognition value is "caught" by the mask.



Create a new LPR subject using the car plate number

When finished, click *OK* to save and close the dialog box. The newly created subject will appear in the item list; you can edit any subject by double-clicking it in the list, or by selecting a subject and clicking the *Edit* button on the upper panel. Remove subjects by selecting one or more items and then clicking the *Recycle bin* button on the upper panel.

Add Tag Matching Events

A special event type is available for the built-in tags. This event is triggered **when a recognition result has a matching tag** profile: this may mean one of the required tags is present or absent, and other scenarios.

To add the **tag matching event**, switch to the *Events* subsection and click + *New event* button on the upper panel. Set the event type to *Tag match*. The following settings are available:

- **Title**: user-defined event title that will appear in the *E&A Configurator*
- **Source**: a channel that will serve as a recognition source
- **Tag match mode**: choose what kind of match you want (see more detailed explanation below)
- **Flags**: choose one or more if you want this tag event to be triggered for specific recognition type
- **Tags**: choose a set of tags that will be used for comparison

Recognition may be LPR or FR and it may run on the camera side or as an external service.

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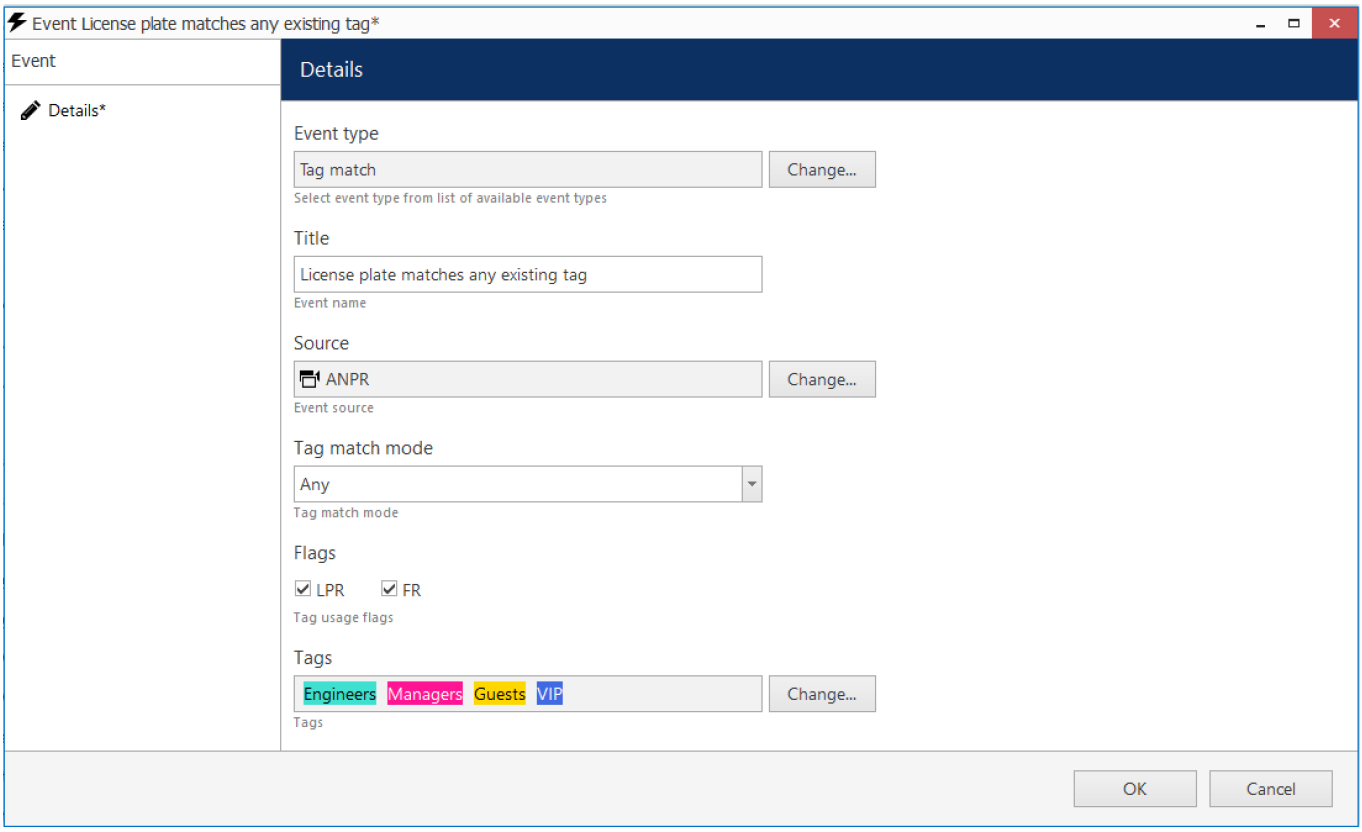

An example of a tag matching event with LPR recognition

Possible tag **match modes**: event will be triggered if..

- **NoTags**: recognition result does not have any tags (the license plate/subject is not present in the database)
- **Any**: recognition result tag matches one or more tags in the list (at least one)
- **All**: recognition result matches all defined tags (possibly more, but at least those listed)
- **NotAny**: doesn't match any of the specified tags

For example: in the snapshot above, the event is triggered when recognition result matches *Engineers*, *Managers*, *Guests*, or *VIP* tag.

Create Rules

As soon as you have created tag-based events, you can match them with any actions to create automated scenarios in the *Event & Action Configurator*.

Rule examples:

- open a gate based on staff car entering (action: change DO state, prerequisite: DO wired to the gate)
- notify operators with a sound (action: send event to client, option: play audio notification, prerequisite: audio notifications enabled on the client side)

Test Tags and Subjects

From the *Subjects* section, you can **check if the whole scenario works** for a specific **recognition result**. Simply click the *Test* button on the upper panel, enter the desired parameters, and click *Run*. The test query is not bound to any specific subject entry so it does not matter which item is selected in the item list.

The test validates if the entered recognition value has any matching subjects and, therefore, tags, and also checks if it triggers any events. Events are only checked if there are active rules using these events!

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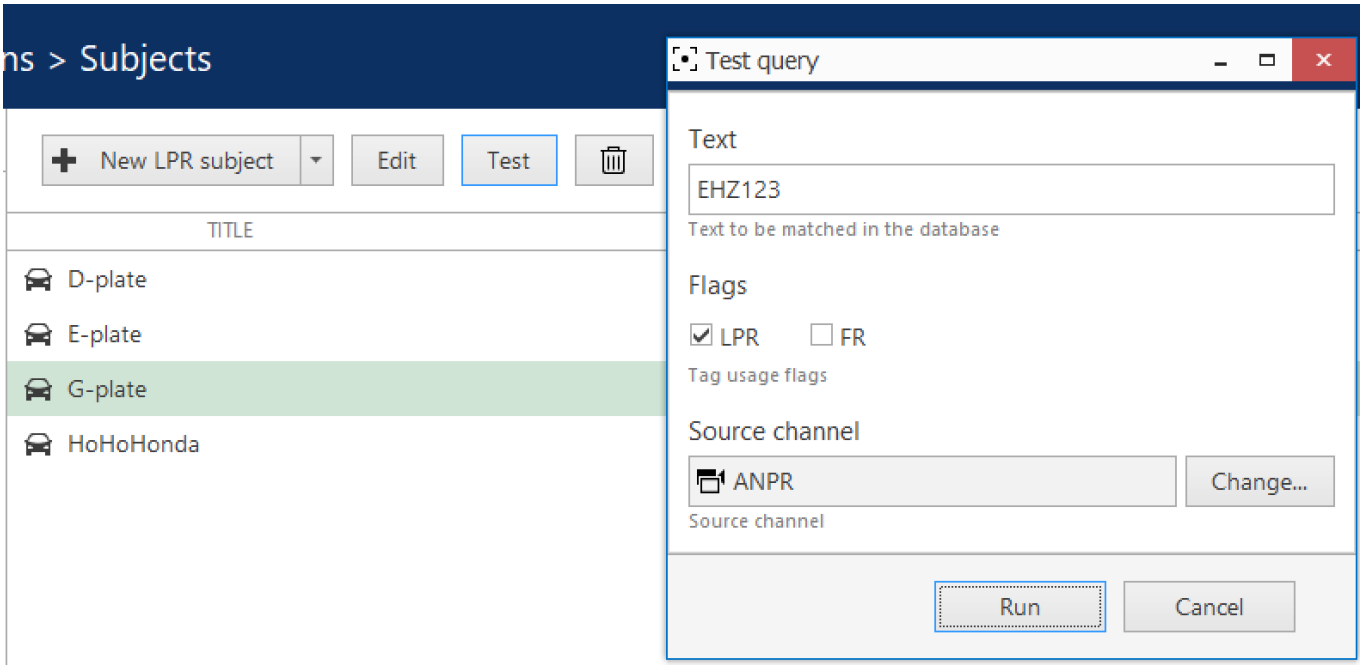
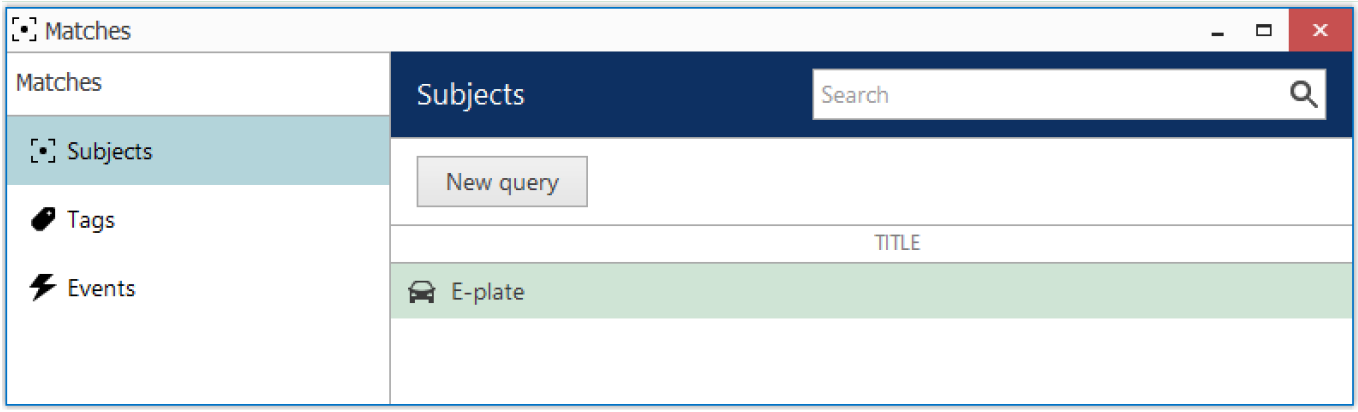


A test that would show which subjects and events would be triggered if the recognition result is equal to EHZ123

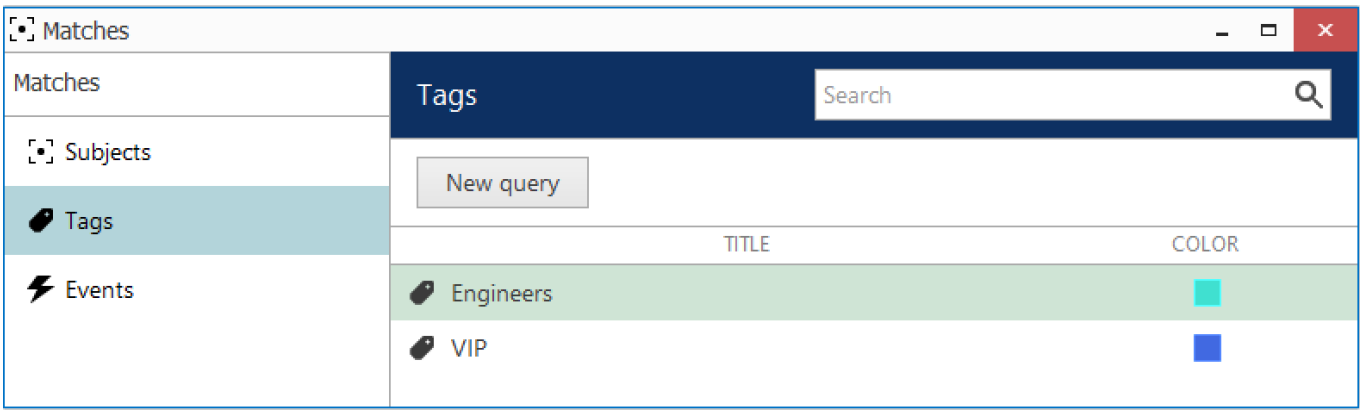
As an example, let's see the test results for the test above. The dialog box with the results will have several tabs.

In the *Subjects* tab, all matching **subjects** will be listed. In the example here, E-plate matches the recognition result because this subject is defined as a mask E*, matching any license plate starting with E.



Pattern EHZ123 corresponds to one subject named E-plate

In the *Tags* tab, all matching **tags** will be listed with their corresponding colours.



Pattern EHZ123 matches two tags

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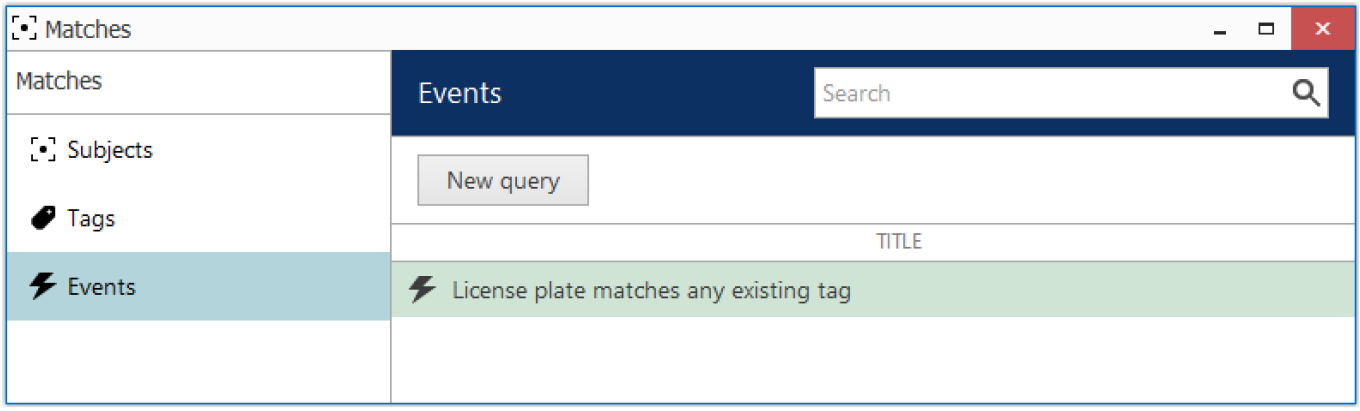
Finally, in the *Events* tab, you will see, which **events** would be triggered by the test pattern.



Pattern EHZ123 would trigger one active event

Note that the event list will be empty if there exist some relevant events but there are no rules using them!

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10 Other Resources and Functionality

Apart from the main video management system resources - video channels - Ganz CORTROL provides miscellaneous types of auxiliary resources and object types like maps and user buttons, and video walls for Ganz CORTROL Global edition.

This chapter contains documentation on additional resource types, their properties, and related tools.

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10.1 Webpages and CrossLink Channels

Ganz CORTROL servers can work with several types of **interactive resources** - meaning that the user can not just watch and record the feed, but also control its contents from the Ganz CORTROL Client application. These resources are called CrossLink channels. CrossLinks can provide a direct interactive interface to SCADA, access and flight control, radars and lidars, other VMS software, and other applications. tHis means a straight-away front-end integration without any additional implementation.

CrossLinks require a special license and are represented by **interactive web applications** and by interactive **desktop applications**. Depending on the setup, these allow capturing, recording, and controlling the remote contents in an intuitive manner.

CrossLink Types

How to choose the required resource type based on your use case scenario:

- webpage device: the interactive device is created on the server side (like for any camera) to allow live & recording
- direct webpage: there is no device on the server side, live Web contents goes directly to Ganz CORTROL Client, allowing multiple independent sessions
- remote desktop: the interactive device is created on the server side (like for any camera) to allow live & recording
- non-interactive webpage device: static video feed to the server for recording and non-interactive display (does not require CrossLink license, just a regular channel)

Basically, you need to determine whether you want to

1. Have a remote **Web interface** (website, Web server) or a **workstation**.
2. In case it is a Web application, choose if
    a. The user should only be able to **control** the remote contents, or
    b. It also needs it to be **recorded** on the server side.

Below, you fill find more detailed information about each type and step-by-step configuration guidelines.

Prerequisites

For all interactive contents, you need a special license channel type called **CrossLink**. The required number of CrossLink channels is added to your license alongside regular channels and VA channels. There are two different types of **CrossLink licences**:

- **Basic**: interactive Web with or without recording
- **Advanced**: interactive Remote Desktop (server-side device)

Advanced CrossLink license includes Basic CrossLink options as well, meaning you can use an Advanced CL license for creating a Basic CL item (webpage).. For non-interactive Web devices, a regular channel license is used, and there is no need to obtain a CL license of any kind.

Feature	Regular Channel	CrossLink Basic	CrossLink Advanced
Display and record live web pages without user interaction	+	+	+
Display interactive webpages	-	+	+
Record interactive webpages as channels	-	+	+
Display and record interactive desktop applications as channels	-	-	+

For every remote **workstation** you wish to add under CrossLink Advanced, you need to install any **VNC server software** on the remote side and ensure its accessibility via given IP/host and port. (For Mac computers, simply enable it in the settings.)

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We strongly recommend using visual groups for CrossLink Advanced channels, so that the users can differentiate between video streams and interactive contents.

CrossLink Basic: Interactive Web Device

CrossLink Basic provides access and interaction with **Web applications**. These may be websites, device interfaces, or Web services, and you can stream and record any of these. Special device model, *(CrossLink) Interactive URL*, is reserved for this. Each device of this kind uses 1 (one) CrossLink Basic channel license.

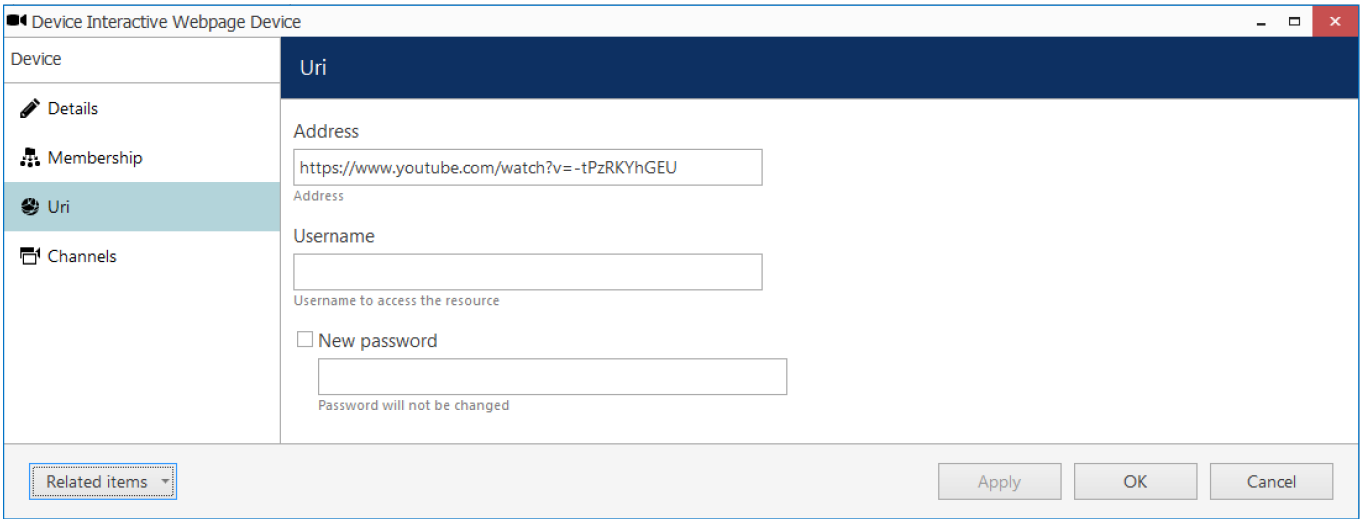
To create an interactive web device in Ganz CORTROL Console, go to the *Configuration* section in the bottom left panel, choose *Devices* on the left, then click the + *New device* button in the upper panel to bring up the item creation dialog box.

In the model list, choose the **(CrossLink) Interactive URL** model**.** Then, switch to the *Uri* tab and fill in the settings:

- **Address***: full target URL
- **Username**: if required
- **Password**: if required

*Note that **redirects** from the specified domain are not allowed. Therefore, the specified link must not be a shortened URL (e.g., youtu.be, or goo.gl).

⚠ No redirects from the specified domain are allowed for security reasons.



Enter the target URL for the Interactive URL device

Click *Apply* to save the settings, them switch to the corresponding channel using the *Related items* button in the bottom left corner or the dialog box.

Basic channel settings are the same as for the traditional channels with the following elaboration:

- recording can be configured for **both main and secondary** streams
- **audio** is not available
- remote control **permission** is granted using the *PTZ Control* permission
- **video parameters** can be set up in the *Video configuration* tab:
  - choose between JPEG (higher quality, bigger size) and VP8 (smaller recording size at the expense of picture quality) **compression**
  - select **resolution** (but be careful when combining VP8 with lo-res and low bitrate, it may make the text unreadable)
  - set bitrate and target frame rate

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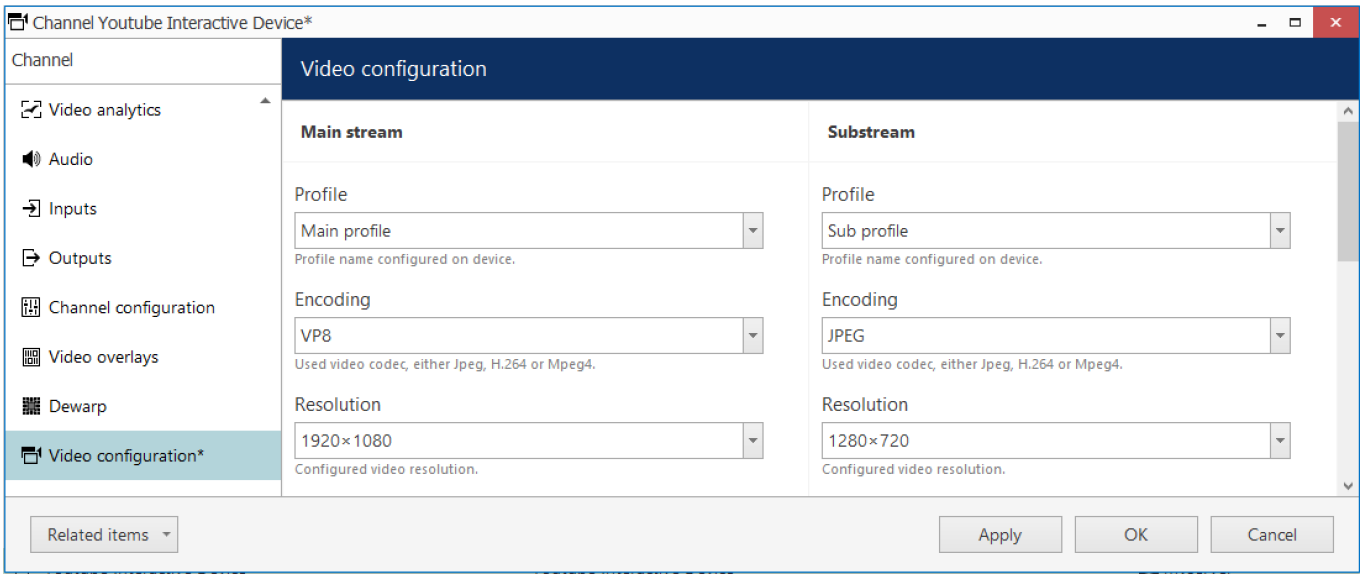
Use VP8 cautiously as it may decrease image quality dramatically, and render the text unreadable on smaller resolutions. Larger resolutions will increase CPU usage on the server side and may produce sluggish image display. The main advantage of using VP8 is that it uses much less storage space thanks to compression, so the recommended usage profile would be to use one stream with VP8 for recording, and another one with JPEG for live view and interaction. You will be able to switch between streams in the Ganz CORTROL Client application.

When setting VP8 with a specific bitrate, keep in mind that it will be the maximum possible bitrate, not the target bitrate.



Stream settings in the CrossLink channel settings

There is also a **dedicated tab** with CrossLink-specific settings. The following settings are available here:

- **Ignore certificate errors**: if enabled, invalid certificates will be ignored, and the page will be opened even if something is wrong with the site certificate (only do this if you trust the page certificate!)
- **Auto refresh interval**: enable this if the remote Web contents is dynamic and you want the page to be refreshed even without user interaction

As Web contents poses certain threats, we do not recommend ignoring certificate errors unless you trust the page completely. Also, the following **rules** will apply to **browsing**:

- **no redirects** from the specified **domain** (sub-domains are allowed)
- **no pop ups** (including floating windows and new pages opened in a new tab)
- **no downloads** or **copy-paste**

Keep this in mind when configuring your interactive URL device. You will get a corresponding error message in the **channel's notification panel** inGanz CORTROL Client if some of these restrictions are activated.

Example: the link to *youtu.be* will not work as it is a shortened link and it redirects to another domain, *youtube.com*. Use the full URL in the device configuration.

CrossLink Basic: Interactive Web

If you do not need to record the web contents, but would rather like to **access the Web page directly** from Ganz CORTROL Client, you do not need to add a device: instead, simply create a Webpage in Ganz CORTROL Console, and it will go directly to the Ganz CORTROL Client application. This item requires one CrossLink Basic license.

You can use this type of resource for:

- configuration of IP cameras
- configuration of any Web services
- remote control of any non-integrated, or advanced setup of integrated devices
- providing variety of resources while in kiosk mode (operator instructions etc.)

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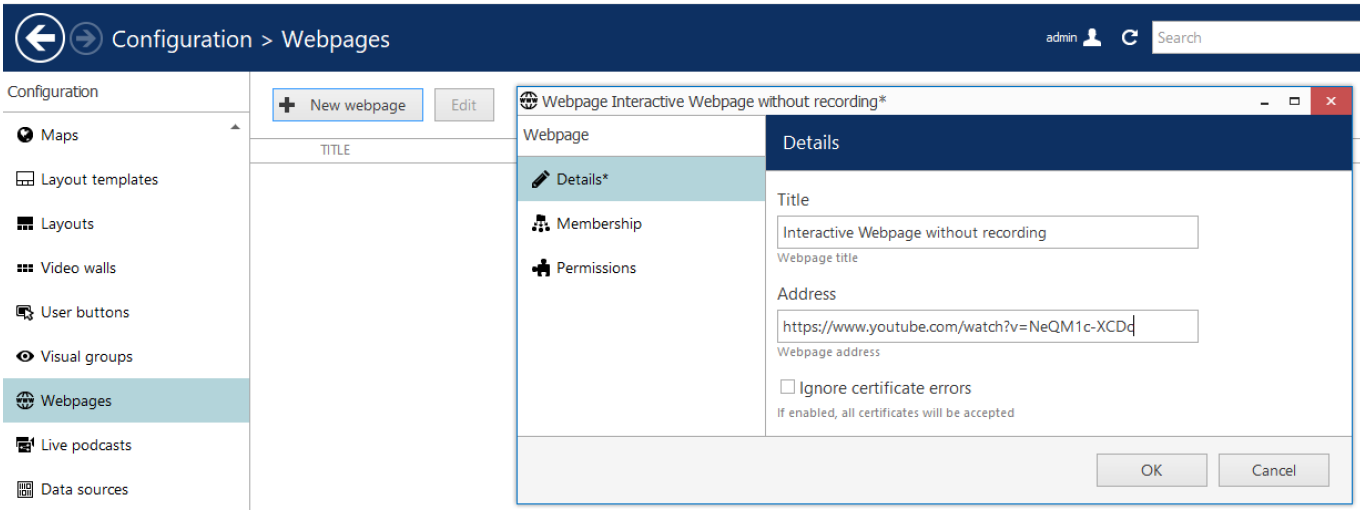
To create the webpage, go to the *Configuration* section of Ganz CORTROL Console, choose *Webpages* on the left, then click the + *New webpage* button on the upper panel.



Enter webpage channel name and target URL

Settings:

- **Title:** webpage name that will appear in Ganz CORTROL Client
- **Address**: full webpage URL (no shortened links!)
- **Ignore certificate errors**: if enabled, invalid certificates will be ignored, and the page will be opened even if something is wrong with the site certificate

Click *OK* to save and close the window. The newly created webpage will appear in the list. Your Ganz CORTROL Client application will now have an extra section in the *Resources* panel (on the left) containing webpages.

As Web contents poses certain threats, we do not recommend ignoring certificate errors unless you trust the page completely. Also, the following **rules** will apply to **browsing**:

- **no redirects** from the specified **domain** (sub-domains are allowed)
- **no pop ups** (including floating windows and new pages opened in a new tab)
- **no downloads** or **copy-paste**

Keep this in mind when configuring your webpage. You will get a corresponding error message in the ***Alerts* tab** inGanz CORTROL Client if some of these restrictions are activated.

Example 1: you cannot configure the webpage to google.com and let the user search: they will be unable to navigate to a specific result as it involves domain change.

Example 2: you can add a Wiki webpage and let user choose the language, as it will redirect them to the third-level domain (say, en.wikipedia.org or de.wikipedia.org), which is OK.

CrossLink Advanced: Remote Desktop

On top of the previous features, CrossLink Advanced adds the opportunity to remotely control any workstation from Ganz CORTROL Client. The target machine may run Linux or macOS, the one requirement is that the remote party must have VNC server software (any) up and running.

Using one CrossLink Advanced license, you can configure any of the interactive channels - be it a webpage, webpage channel, or a remote workstation channel.

⚠ Be careful when you grant access to this kind of device, as it gives the user **full control** of the remote PC. You may want to use **additional security**, e.g., ask user for a password on behalf of the OS.

Usage examples:

- remote access to Linux workstations with non-integrated software
- access to other VMS software running on an older or embedded version of Windows
- recording of operator workstations running Ganz CORTROL Client or any other software

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Each Remote Desktop channel will use one CrossLink Advanced license. If your license only includes Basic CrossLink channels, you will not be able to add a new device of this kind.

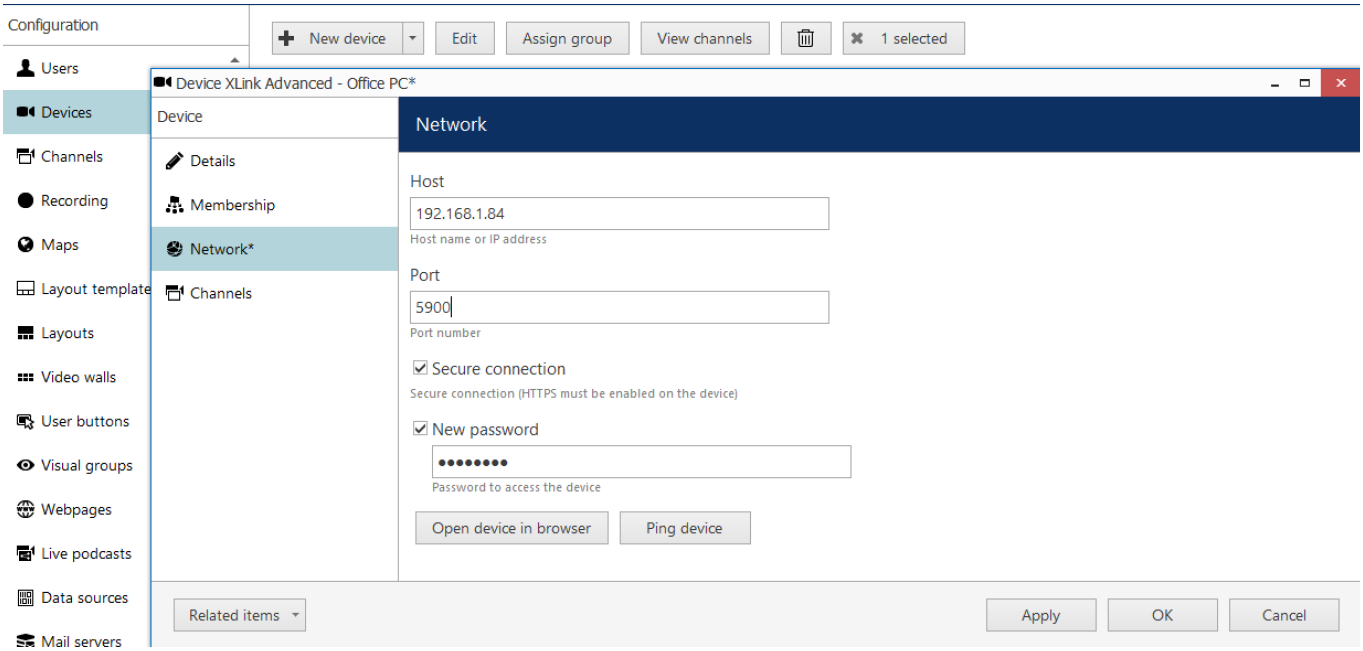
Add Device

To create an **remote desktop** controlling device in Ganz CORTROL Console, go to the *Configuration* section in the bottom left panel, choose *Devices* on the left, then click the *+ New device* button in the upper panel to bring up the item creation dialog box.

In the model list, choose the **(CrossLink) Remote Desktop** model**.** Then, switch to the *Network* tab and fill in the settings:

- **Host**: target machine IP or hostname
- **Port**: the port for VNC connection (5900 by default)
- **Secure connection**: enable to use HTTPS (must be enabled in the VNC server settings), or leave empty for insecure connection
- **Password**: enter the password, as defined on the remote side

Use the *Ping device* button below to check the remote workstation availability.



Enter the connection settings matching the remote VNC server configuration

When you have finished, click *OK* to save and exit; the newly created device share will appear in the item list, and its channel also immediately appear in the Ganz CORTROL Client application(s) for eligible users.

> ⚠ If your created *Remote Desktop* device does not work and you think all settings are correct, install a local VNC client on the Ganz CORTROL server and see if you can reach the remote machine this way.

To edit any of the previously created devices, double-click it in the item list or select any with single mouse click and then hit the *Edit* button on the upper panel. Use the *Search* field in the upper-right-hand corner to quickly find the existing items, and the *Disable* button to **disable and enable** channel sharing. Use the 🗑 recycle bin button in the upper-right-hand corner to remove one or multiple items: hold *CTRL* or *Shift* to select several items at once, or *CTRL+A* to select all.

Filters in the bottom panel allow you to load recently added/modified items.

Channel Configuration

Most of the channel settings are the same as for the traditional channels with the following elaboration:

- recording can be configured for **main stream** only, as there is no secondary stream

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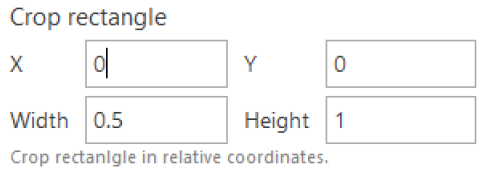
- **audio** is not available but you can combine the video with audio stream from a camera (use the *External* option in the *Audio* tab and choose the source channel)
- remote control **permission** is granted using *PTZ Control* permission
- **video parameters** can be set up in the *Video configuration* tab:
    - choose between JPEG (higher quality, bigger size) and VP8 (smaller size at the expense of picture quality) compression
    - select resolution (but be careful when combining VP8 with lo-res and low bitrate, it may make the text unreadable)
    - set bitrate and target frame rate

Frame rate will be **dynamic** during remote control and recording, meaning that FPS will be low while nothing happens, but it will grow if the remote user starts doing something or if there is video playback.

Optimal interactive video configuration for most use cases is JPEG @1080p.

Output Area

CrossLink Configuration is a dedicated tab for CrossLink-specific settings. Currently available settings include **cropping** setup, which allows you to select the region that will be displayed in the Ganz CORTROL Client application. In other words, you can crop the whole incoming image and only show/record a specific area. This comes useful, for example, when the remote workstation has multiple displays. Cropping affects both Ganz CORTROL Client **display and recording**.



By default, the output area is full - X=0, Y=0, Width=Height=1. The coordinates and size are relative. Crop examples:

- Full image: X=0, Y=0, Width=1, Height=1
- Display 1 of 2: X=0, Y=0, Width=0.5, Height=1
- Display 2 of 2: X=0.5, Y=0, Width=0.5, Height=1

If the remote workstation is configured to ask for a **password**, and you intend to control it remotely from Ganz CORTROL Client (not just record), make sure you can see the right display.

Remote control does not allow to send **system key combinations** (e.g., CTRL+Alt+DELETE) to the remote workstation; local OS will catch these key combinations. Therefore, make sure to disable the “Press Ctrl+Alt+Del to Log on” option on remote Windows workstations.

Non-Interactive Web Device

If you want to record and use non-interactive webpages in Ganz CORTROL Client, use a special device driver type called HTML Source. These represent static webpages, which are available for recording as any other channels, and are visible in the Ganz CORTROL Client application. As this type of device is non-interactive, no CrossLink license is used: HTML source devices require a **regular channel license**.

Usage examples:

- Display media contents for marketing purposes
- Digital signage
- Statistics and dashboards

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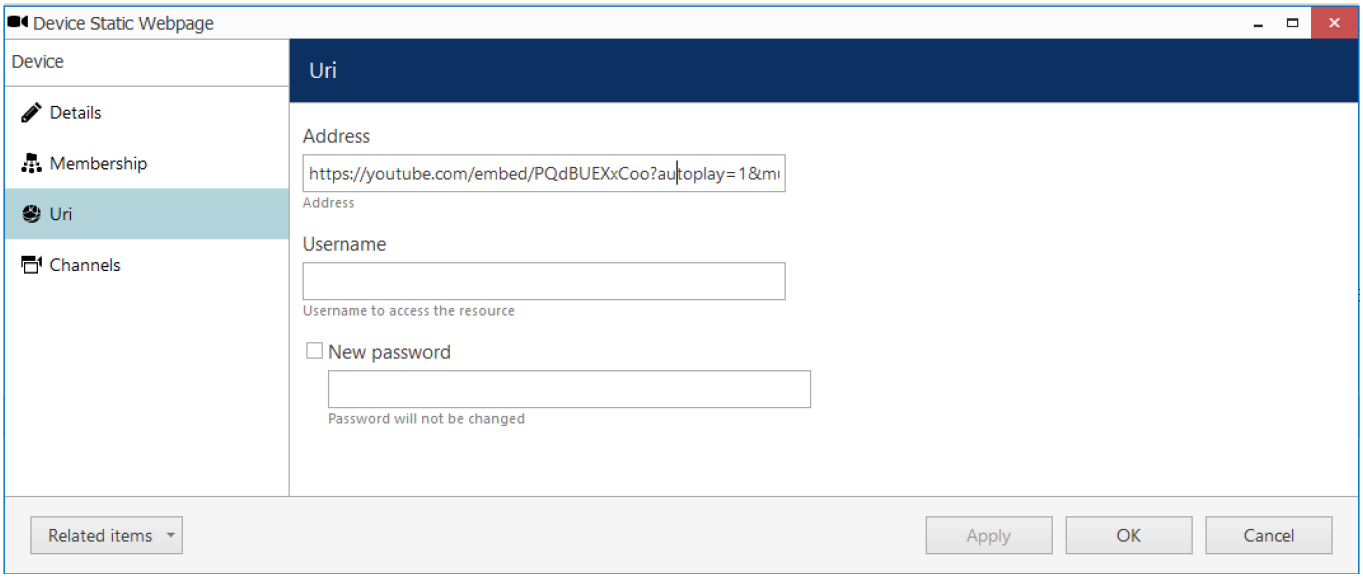
To create a non-interactive page, create a new device and set its model to **HTML Source (view only)**, then assign it to the desired server. Similarly to interactive webpage, set the **target address** in the *Uri* tab. The user will be unable to navigate away from this address, so make sure you specify the full and exact URL. If the target page requires **authentication**, enter the username and password in the device properties.



Available settings for the static webpage device

Next, click the *Related items* button and switch to the channel edit dialog box.

As the webpage contents will be static in the Ganz CORTROL Client application, you need to take care of the **contents transition**. To force refresh contents from the Ganz CORTROL side, use the auto refresh parameter in the channel properties.

In the *HTML source configuration* tab, you can edit the following **settings**:

- **Ignore certificate errors**: if enabled, invalid certificates will be ignored, and the page will be opened even if something is wrong with the site certificate
- **Auto refresh interval**: enable this if the remote Web contents is dynamic (e.g., graphs) and you want the page to be refreshed without user interaction (set 0 to disable auto-refresh)

There is no need to set auto-refresh for video contents; however, you may wish to enable video auto-replay.

In the example here with YouTube streaming, the video is looped by adding URL parameters; the final link will look as follows:

https://www.youtube.com/embed/VIDEOID?autoplay=1&mute=1&loop=1&playlist=VIDEOID - video added in such a way will be played on repeat indefinitely.

This link is formed by clicking the *Share* button next to the YouTube video and adding the parameters. This ensures that nothing but the video is displayed in the viewport (no comments or other stuff present in the regular YouTube page). Similarly, if you wish to use video from other websites, make sure to provide the exact link to the video itself, not to the whole page containing the video.

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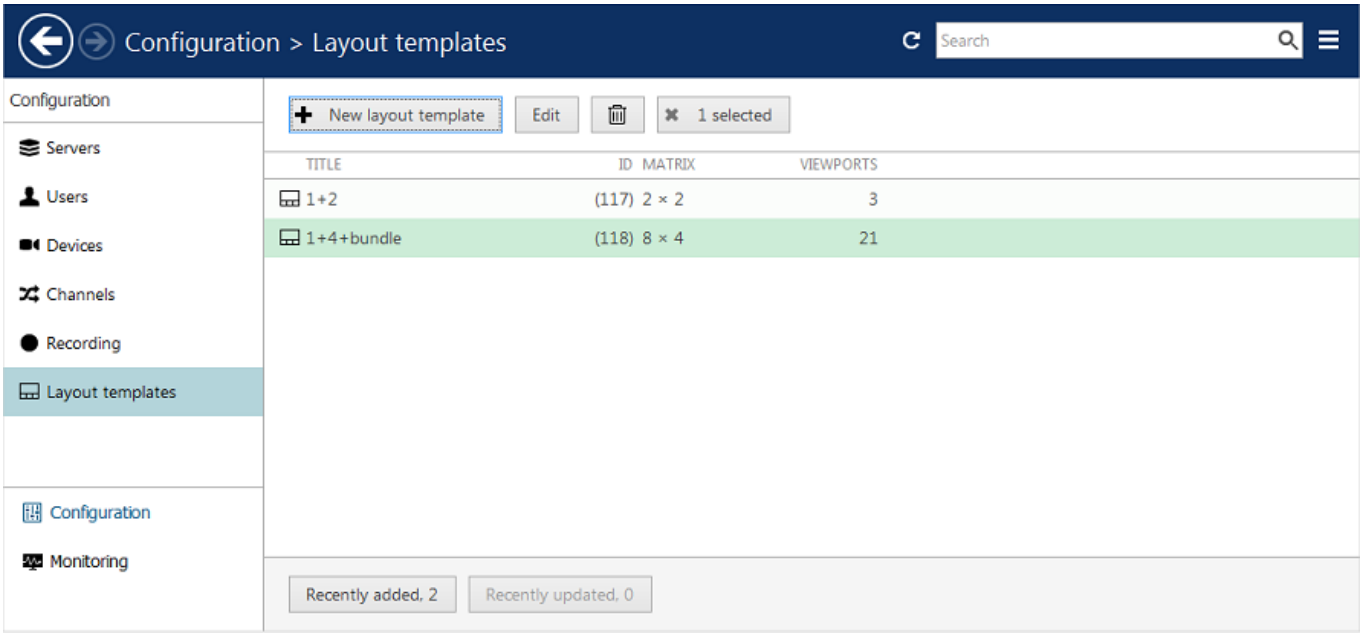
10.2 Layout Templates

Layout templates are arrangements of empty viewports. These can be later filled with channels and maps in your Ganz CORTROL Client application and later saved as layouts. Each template can be used any number of times for creating both local or shared layouts.

You can create your own, **custom layout templates** and then use them in any Ganz CORTROL Client applications connected to the target server.

To access layout templates via Ganz CORTROL Console, go to the *Configuration* section in the bottom left panel and select the *Layout templates* component in the menu on the left. Use the *Search* field in the upper-right-hand corner to filter existing items; press *Refresh* button to reload the item list.



Layout templates

Click the + *New layout template* button on the upper panel to bring up the configuration dialog box.

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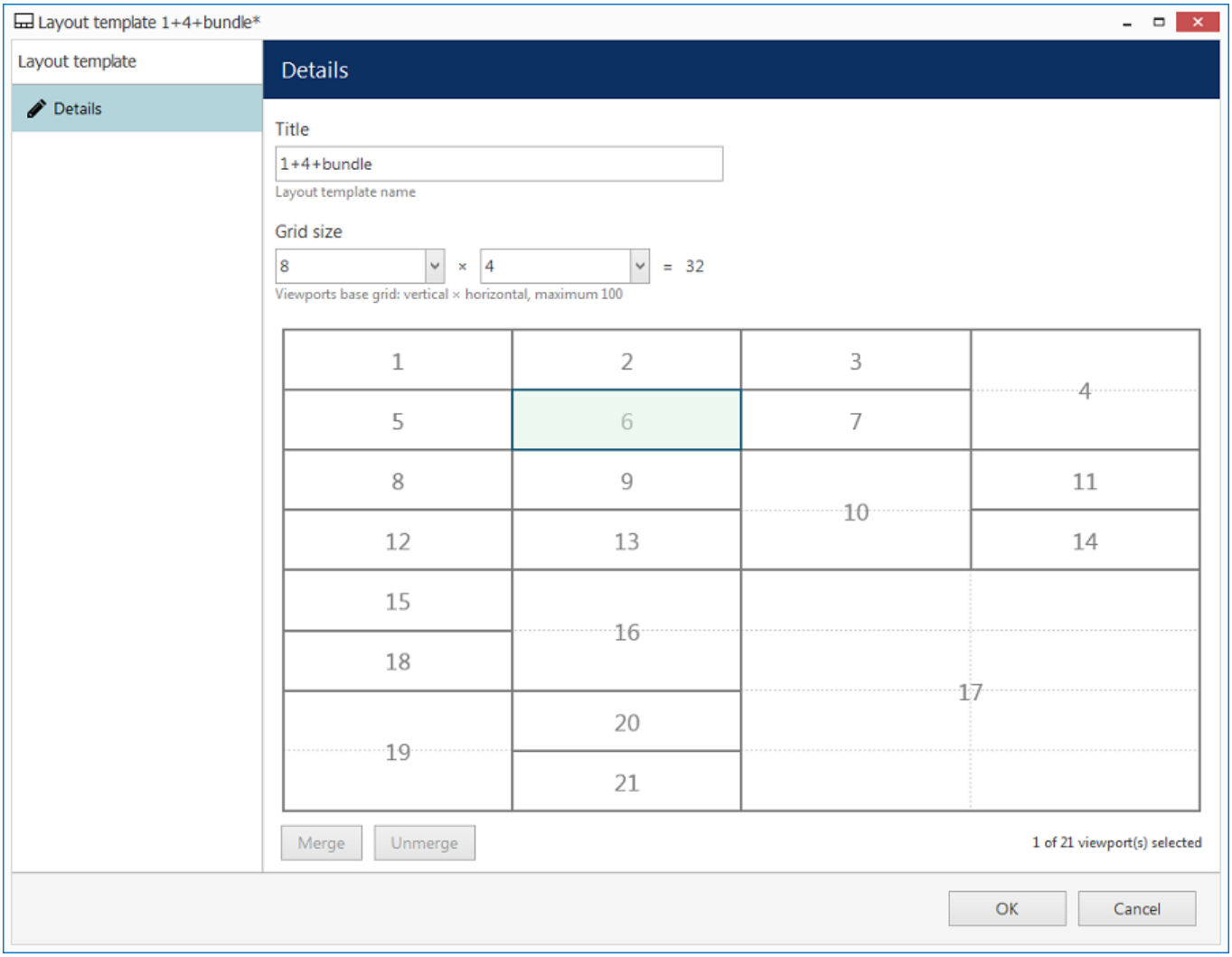

Create new custom layout template

Enter the template **name**, choose **grid size** and then **modify the grid**, if desired: you can select multiple cells at once with your mouse and then use the *Merge* and *Unmerge* buttons below to create custom cell combinations. Note that you can only create rectangular regions, not just any polygonal areas.

- For corridor view cameras, merge several cells vertically, so that the image fits the target viewport without much stretching/distortion
- For surround view cameras or 180/360-degree dewarp, merge a row of cells

When you have finished, click the *OK* button; the newly created layout template will appear in the item list and it will also appear in any connected Ganz CORTROL Client applications after synchronisation.

Use the *Edit* button to alter any template at any time: modifications will immediately be synchronised with Ganz CORTROL Client after you save the changes and modified templates will be available for use. However, if the modified layout was already in use, its current output will not be altered, allowing you to save the old layout in Ganz CORTROL Client. Drag and drop the new layout template to the Ganz CORTROL Client live view display to load the updated template version.

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10.3 Shared Layouts

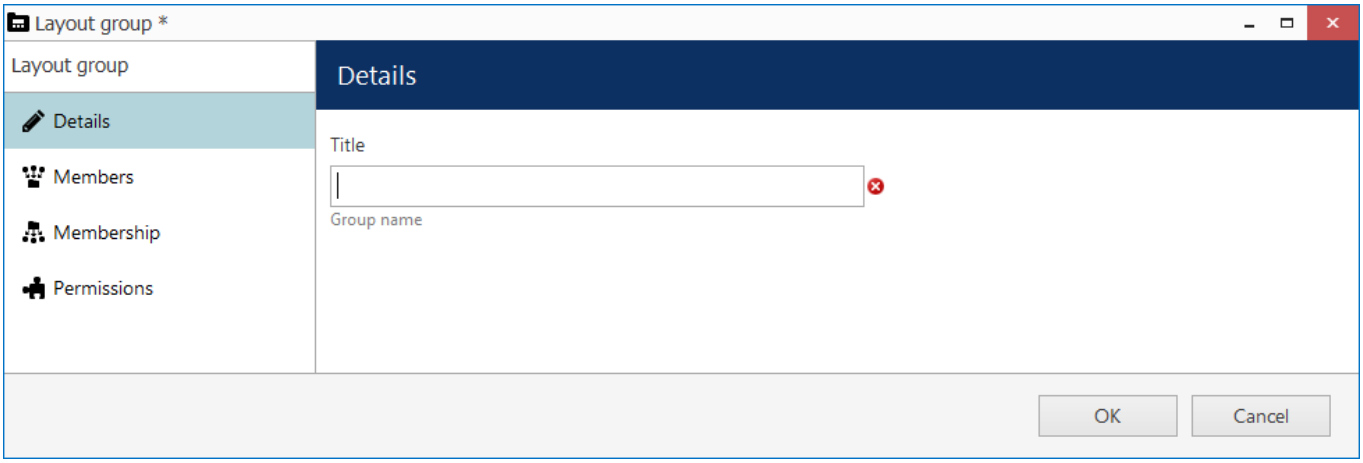
Layout is a pre-configured viewport configuration with channels assigned for live view and archive playback.

Layouts are created in the Ganz CORTROL Client application by filling a layout template with video channels. There are two main groups of layouts: **local**, which are created and stored locally on the same computer where the Ganz CORTROL Client is installed, and **shared,** server-side layouts, which are are kept on each server and are available for all users that are connected to the same server from other client computers. If the license or server policy limits the number of max client connections to 1, layouts can still be shared between non-concurrent client connections from different machines.

Layouts themselves are created via Ganz CORTROL Client application but layout sharing should be pre-enabled from Ganz CORTROL Console. In order to make server users able to share and access this resource, **shared layout groups** should be pre-created on the server side. Groups are used for handling user permissions and also for logical arrangement of the shared layouts.

> If **no layout groups** exist in the server configuration, layout sharing will be disabled for the target server from the Ganz CORTROL Client side.

To create a new group in Ganz CORTROL Console, open the *Configuration* section and choose *Layouts* from the menu on the left. Click the *+ New layout group* button in the upper panel to bring up the shared layout group creation dialog box.



New shared layout group

In the *Details* tab, enter a user-defined name for the target layout group. This name will appear in all connected Ganz CORTROL Client applications when creating a shared layout.

Use the *Members* and *Membership* tabs to create nested groups; *Members* tab will also allow you to manage group contents after some layouts have already been created.

In order to **allow access** to specific shared layout groups for selected users, go to the *Permissions* tab:

- *Administer* permission grants access to the layout group in Ganz CORTROL Console and allows the user to share layouts via this group (put new layouts into target group
- *View* permission allows users to see the contents of the group, i.e., shared layouts, when they connect to the target server from the Ganz CORTROL Client application, and use these layouts in Ganz CORTROL Client

> All users with the *View* permission will be able to see and use the shared layouts from the target layout group. However, visibility of the contents of each layout will depend on each user's channel and map permissions.

Shared layouts can be used in *Layout Sequences* in Ganz CORTROL Client independently or combined with regular layouts as well.

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10.4 Maps

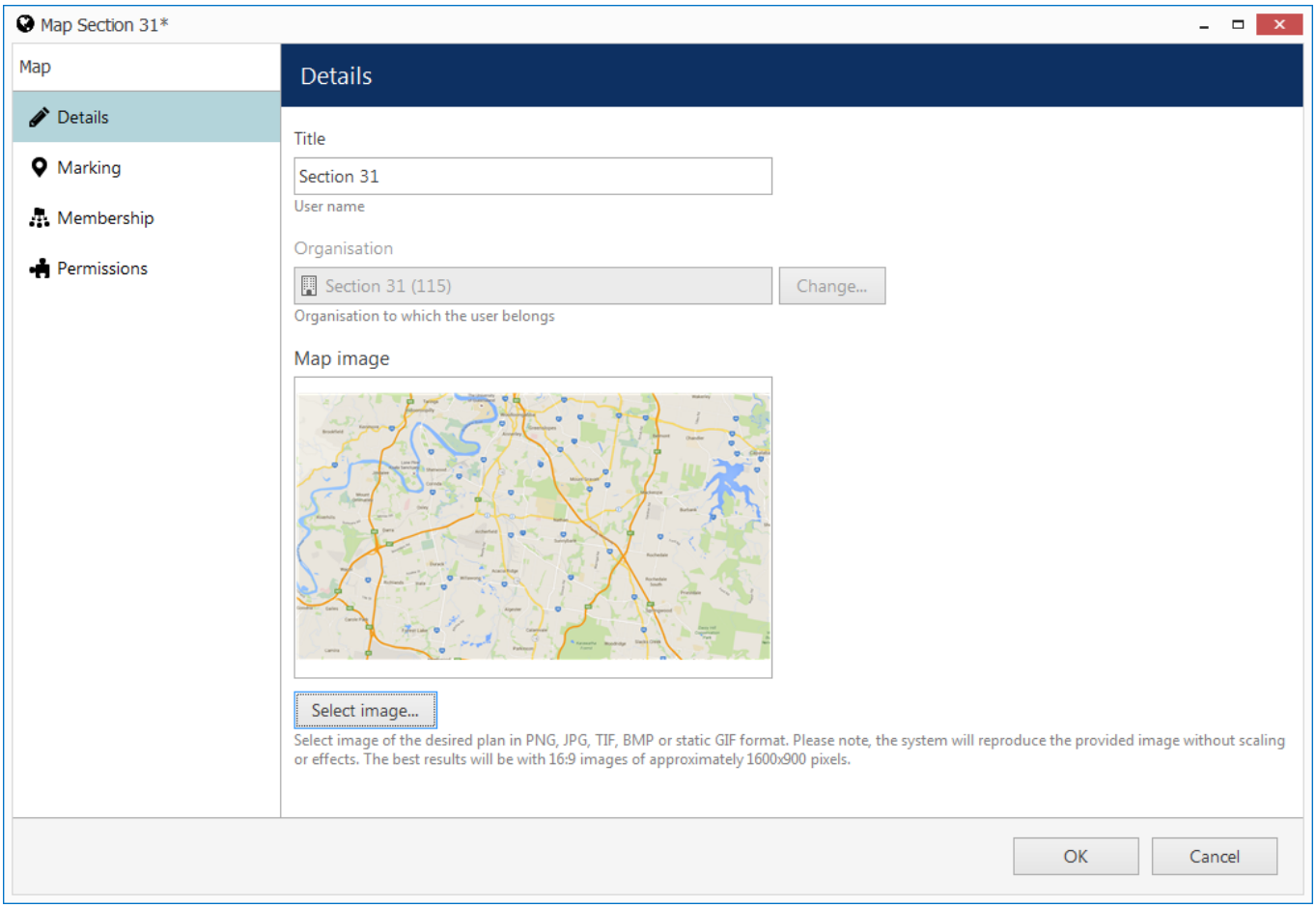
Maps are resources that allow you to use an image of the building plan or some area and place interactive markers on it. Cameras, doors, user buttons, and other items put on maps can then be clicked in the Ganz CORTROL Client application to provide the desired interaction and facilitate the operators' work. Links to other maps help create multi-layered building plans for better navigation.

To access map management via Ganz CORTROL Console, select the *Configuration* section from the bottom-left-hand menu and then click *Maps* in the menu on the left.

Two types of maps are available at this point: regular **maps** based on user image, and **geo maps**.

Create Map

Click the + *New map* button on the upper panel to bring up the map configuration dialog box.



Map details

On the map *Details* tab, enter a user-friendly name for your new map, then select the organisation it represents, if applicable, and upload a picture that will be used as plan basis. All major raster picture formats are supported: JPG/JPEG, BMP, PNG, TIF/TIFF and GIF.

> ⚠ There are the following limitative requirements for the pictures loaded as maps:
>
> - picture resolution should be less than 8.25MP
> - file size should be less than 5MB
>
> Files not meeting these limitations will not be uploaded.

Place Camera Markings

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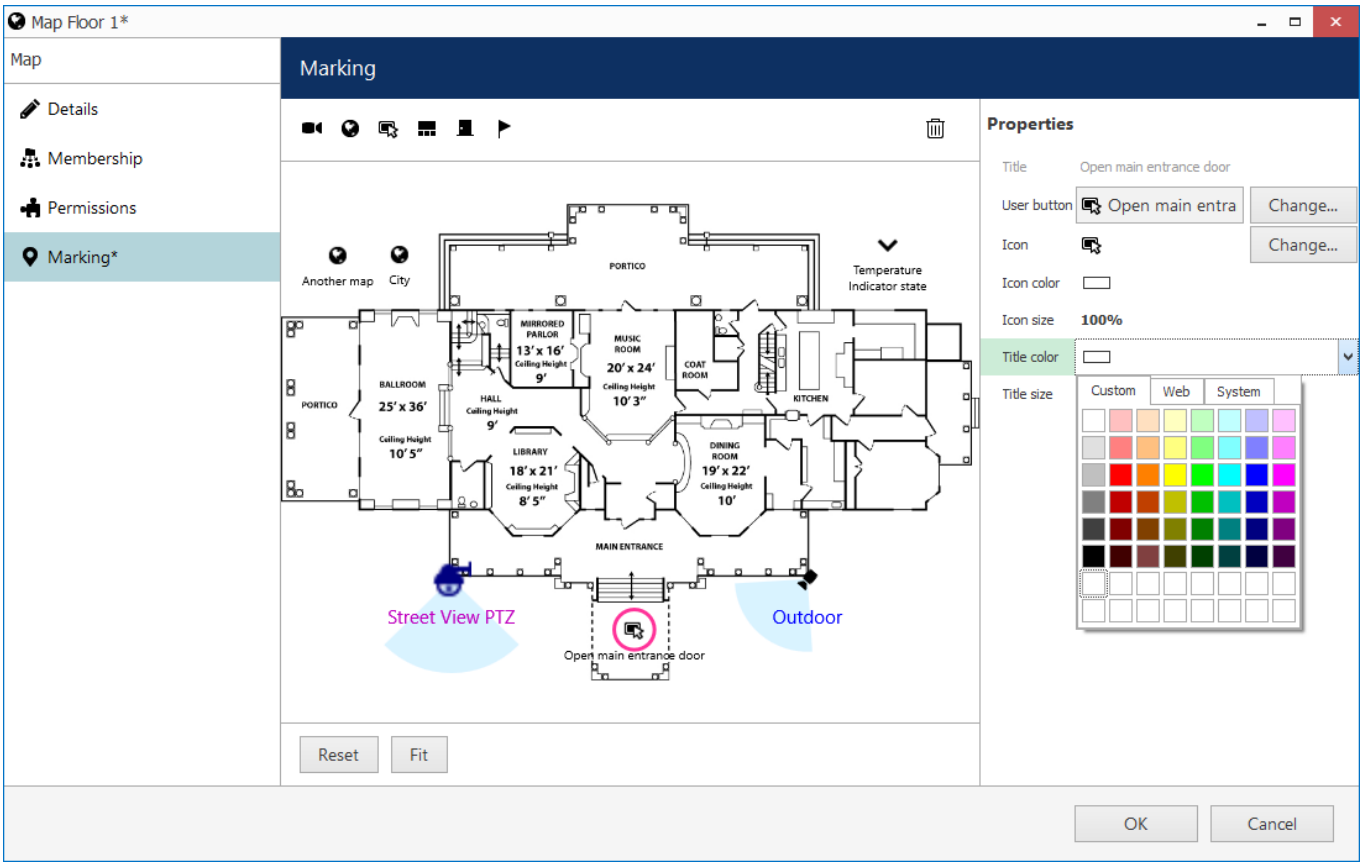
Switch to the *Marking* tab to place cameras on the map.



Map marking

Manipulate your map picture by zooming IN and OUT with the mouse wheel, dragging the picture with the left mouse button and using the *Reset* and *Fit* buttons below. *Reset* a shows non-zoomed 100% size picture (or a picture fragment, if it is larger than the window), and *Fit* zooms your picture so that it fits into the preview window.

To place a **camera marker**, drag the camera icon from the upper-left-hand corner and drop it on the scene. Camera markers will allow you to pop up channels by double-clicking the markers in Ganz CORTROL Client. They will also have a **red mark** on them in the Ganz CORTROL Client application if the target channel is **offline** (if the *Video lost* event has been triggered): the channel's *Video loss* parameter is used as a timeout, which is 15s by default. The following actions are possible:

- select the camera by clicking the camera icon on the plan (and **not** the blue sector representing the viewing area)
- move the camera around by dragging it (the sensitive area is within the pink circle)
- change coverage sector by dragging two pink dots on the sides of the blue sector: drag to the sides to adjust the vertical angle up to fisheye (full circle)
- correct camera position: drag the central pink dot to the sides to rotate camera, drag to/from the centre to change radius
- remove the marking by selecting it and pressing the *Delete* button on your keyboard or the recycle bin button on the upper panel

The properties window on the right enables you to:

- choose target device for the currently selected marking
- view information about marking angles and radius
- turn ON/OFF displaying of coverage area
- change the marker icon colour and size
- adjust the marker title colour and size

Other Markings

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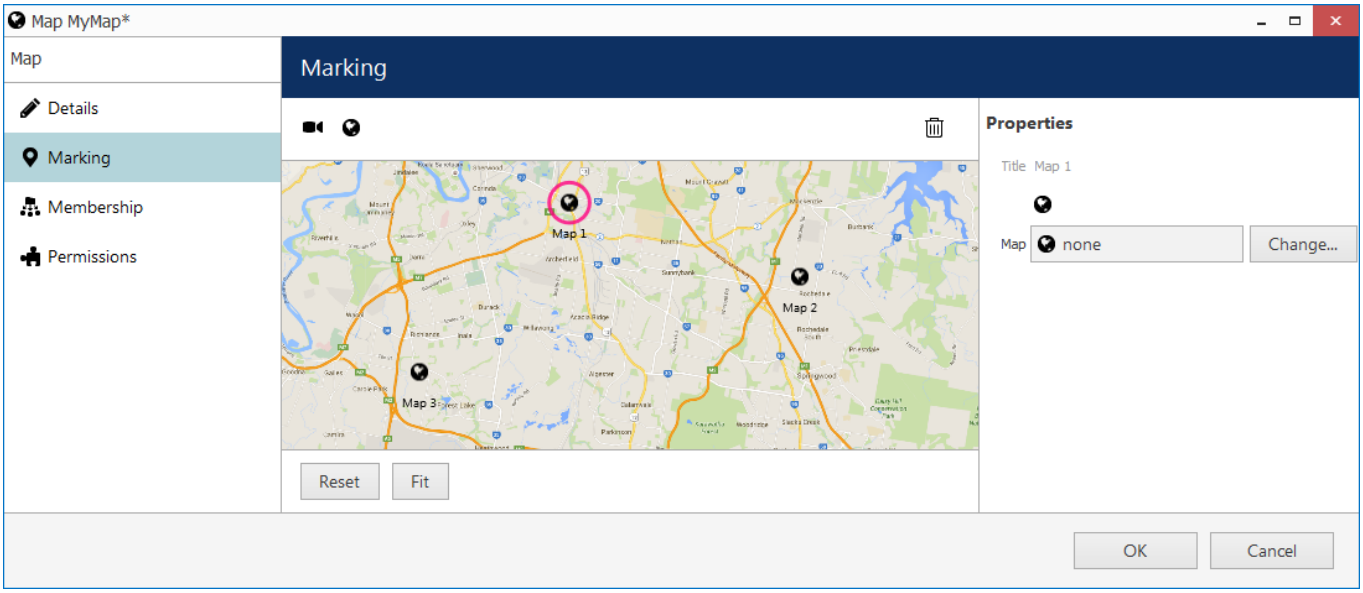
Several other marker types turn your map into a fully featured control panel.

Add **map markers** and use them as shortcuts to other maps: target maps will pop up when the corresponding map markers are clicked in Ganz CORTROL Client. To place a map marker, drag the map icon from the upper-left-hand corner and drop it onto the scene.

Click a map marking and use the properties window on the right to browse for a map that you wish to be a target for the current shortcut. Remove markers by selecting them and then hitting the *Delete* button on the keyboard.

In the same way you can also add **user buttons** to your map and trigger assigned actions by double-clicking the buttons in Ganz CORTROL Client. Select your desired user button on the map and then use the properties section on the right to bind a user button to the marking.



Map markers

Similarly to individual channels, it is possible to place **layout markers** for shared layouts to be displayed when double-clicked on the map in Ganz CORTROL Client. The target shared layout and the icon style can be defined in the properties section on the right.

Door markers are intended to be bound to doors from the access control integration: door statuses are then displayed on the map in the Ganz CORTROL Client application. The target door and icon styles for different door stated is to be defined in the properties section on the right.

Finally, **indicators** are multi-state entities that can change their state - and, therefore, their colours on the maps - based on events. These may be temperature ranges, condition states, or any other system component states that have related events.

Membership and Permissions

Just as other resources, maps can be grouped and assigned user permissions.

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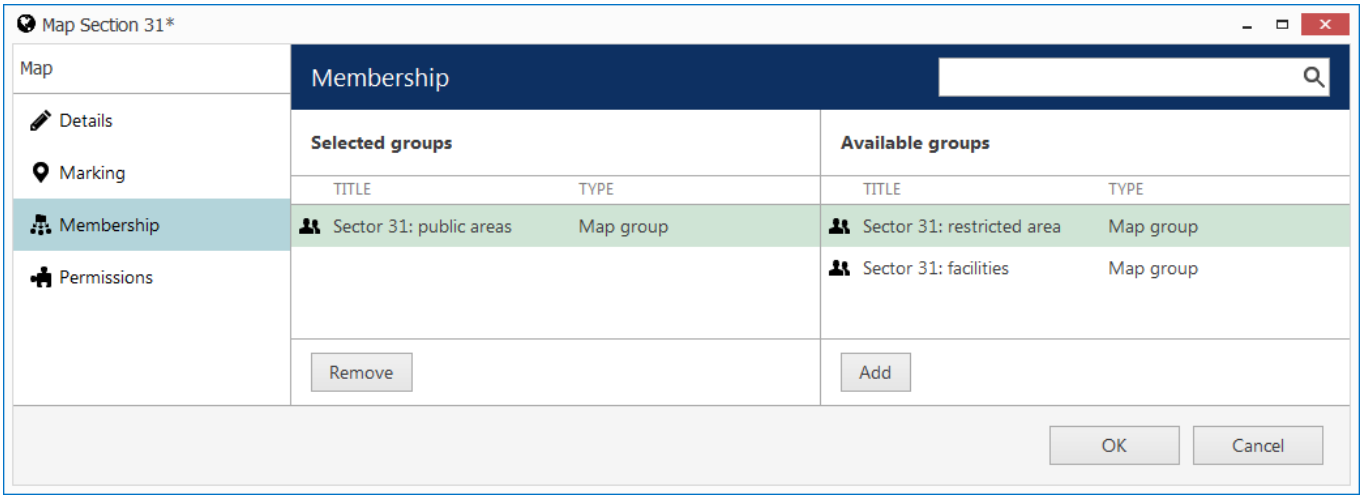
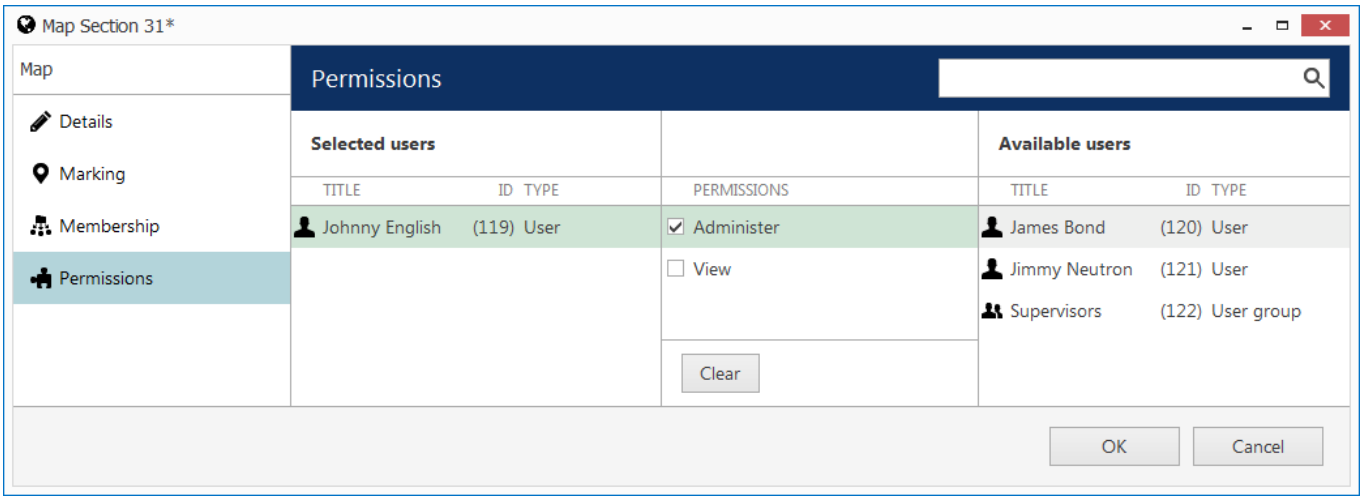


Map membership

In the *Membership* tab, you choose groups for this map to become a member of: select groups by double-clicking items in both columns or by using the *Add/Remove* buttons below.



Map permissions

Permissions tab enables you to choose the users and user groups that will have access to this resource. Select at least one permission to select a user/user group; uncheck all manually or using *Clear* button below to deselect. *Administer* permission means user will be able to see, open and edit map via Ganz CORTROL Console, and *View* only allows user to load the map in Ganz CORTROL Client.

When you have finished, click *OK* to save and close the dialog box. The newly created map will appear in the item list of the *Maps* section.

Use the buttons on the upper panels to perform item-specific actions: remove, edit and quickly assign map group; the filters on the bottom panel will help you switch between recently created/updated items and display maps/map groups only.

Create Geo Map

It is also possible to use any part of the **world map** instead of user-defined pictures to put the markings on it. To create a new geo map, click the drop-down arrow near the *+ New map* button and select *New geo map* to bring up the geo map creation dialog box.

⚠ Geo map functionality requires that constant **Internet connection** is present in order the world map to be loaded from the remote server. Internet connection is required from Ganz CORTROL Client as well to load the map and present it to the end user.

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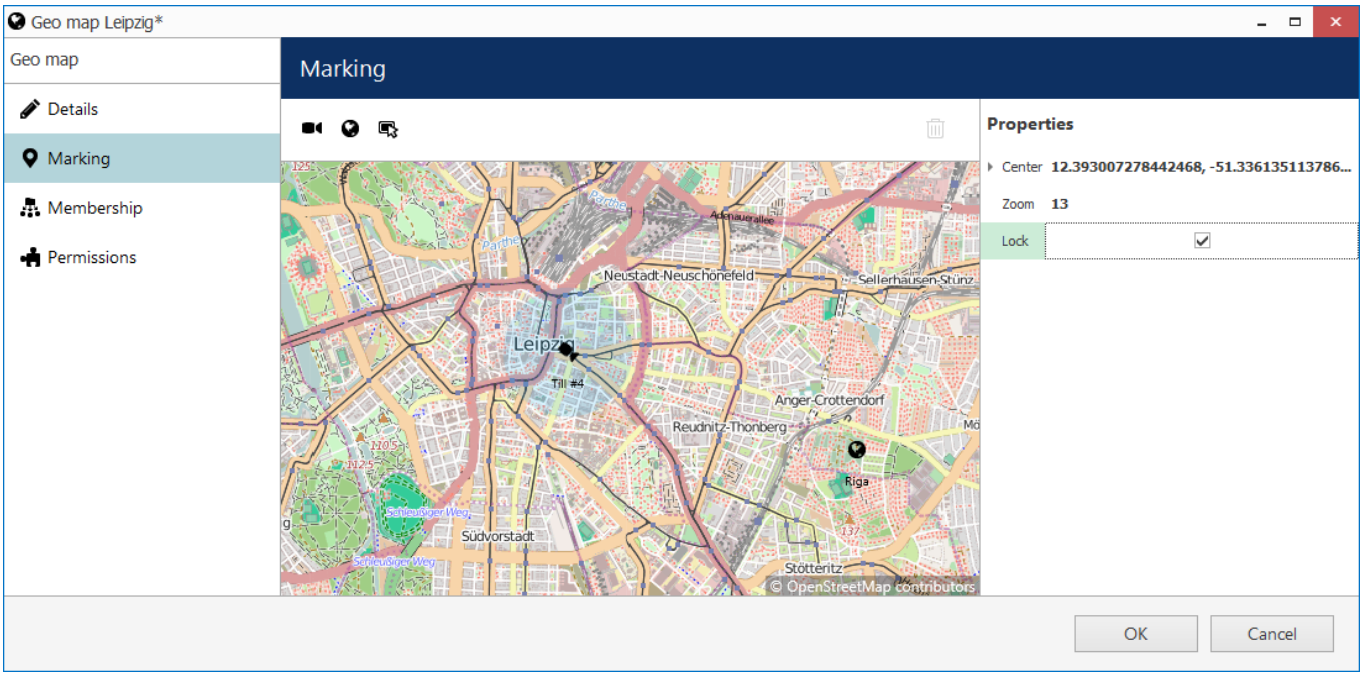
Geo map creation is similar to the creation of a regular map, with the difference that you do not need to specify the image to be used: instead, the world map is loaded from the server provided by CBC AMERICA LLC. You just need to find the right place on the map by zooming IN/OUT and moving the map:

- use your mouse wheel to zoom IN and OUT
- click and drag with your left mouse button to move the map around



Markers on a geo map

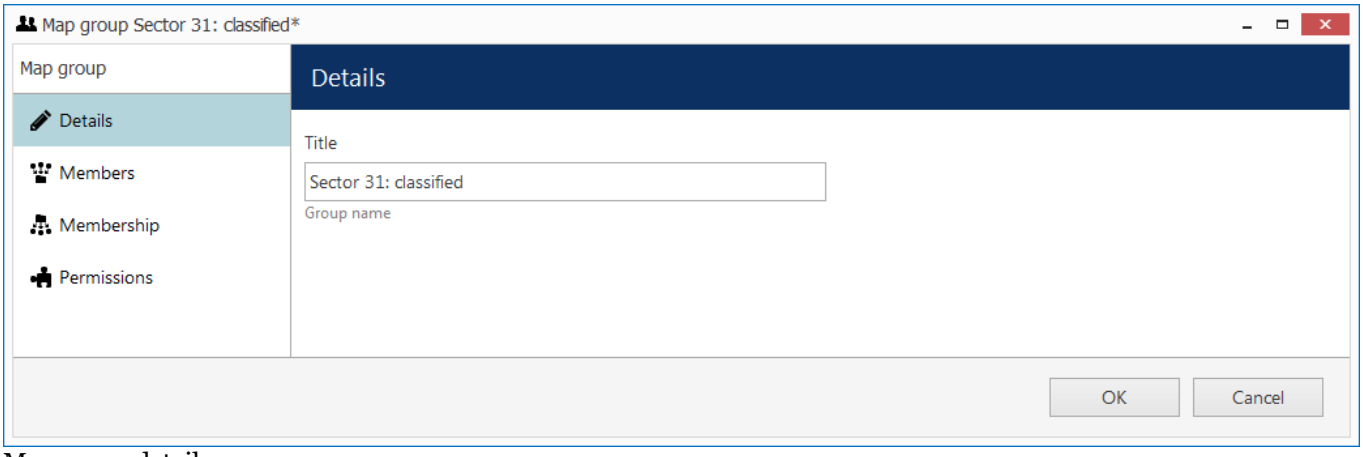
Markers of all available kinds can be placed on the geo map in the same manner as with the regular map, and the rest of the tabs also provide the same functionality.

> Use the *Lock* option in the right-hand-side panel to prevent users from moving or zooming the map IN/OUT in the Ganz CORTROL Client application.

Create Map Group

Map groups can be used for easier management in Ganz CORTROL Console. Note that map groups are not displayed in Ganz CORTROL Client; to group maps and geo maps in Ganz CORTROL Console, use Visual Groups.

Click the drop-down arrow near the + *New map button* and select *New map group* to bring up the map configuration dialog box.



Map group details

Enter group name on the *Details* tab and proceed with selecting maps for this group on the *Members* tab.

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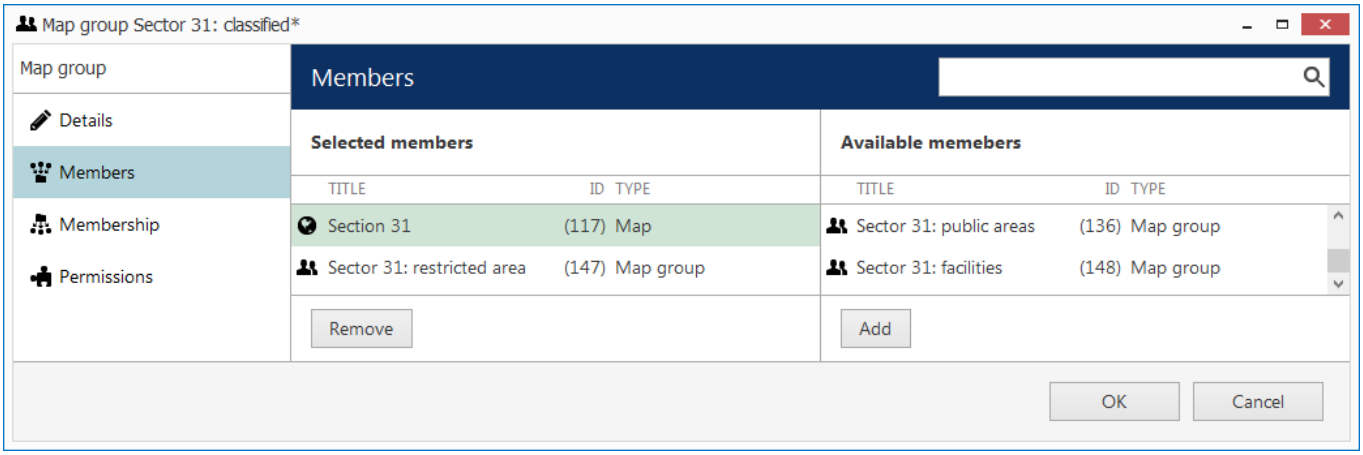
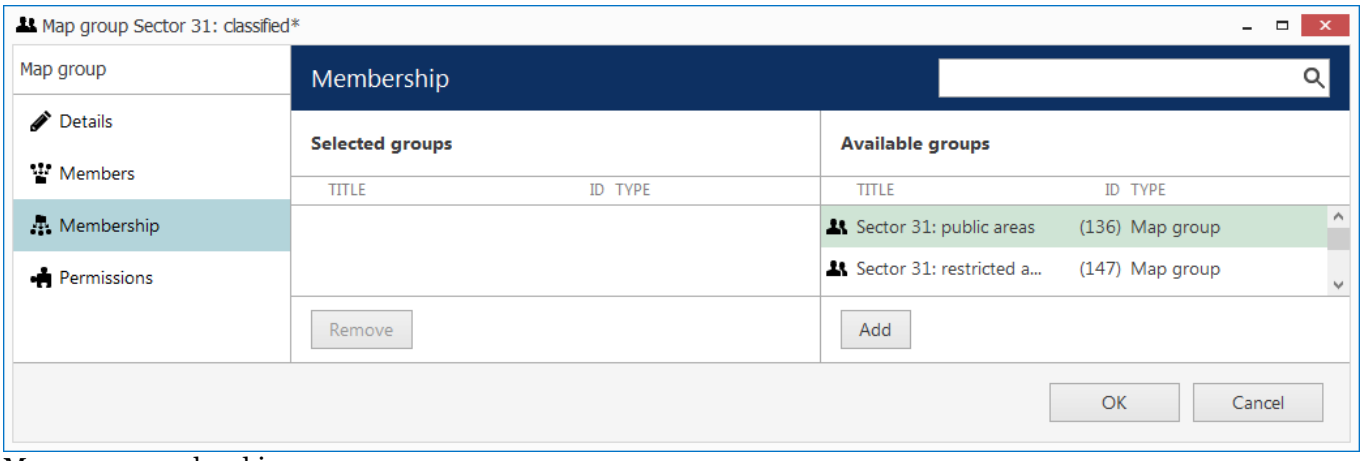


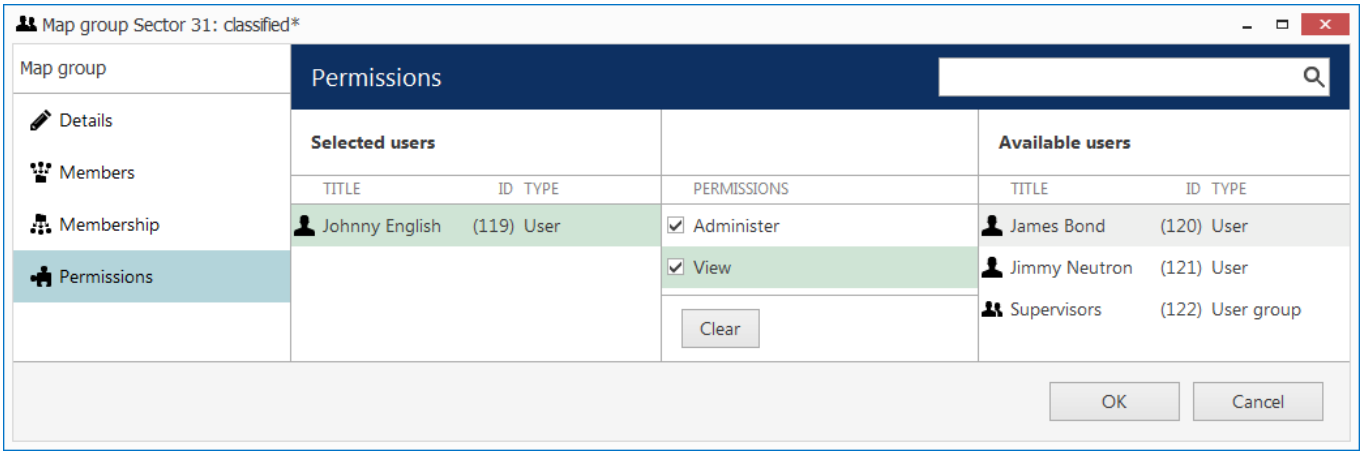
Choose members for the target map group

You can select both maps and map groups to be members of any map group.



Map group membership

On the *Membership* tab, choose groups to contain target map group as a member, thus creating nested groups.



User permissions for map group

Switch to the *Permissions* tab to assign user privileges for the target map group. Select at least one permission to select user/user group; deselect by unchecking manually or by using the *Clear* button below to remove all. *Administer* permission means user will be able to see, open and edit all maps in this and nested groups via Ganz CORTROL Console, and *View* only allows user to load the maps in Ganz CORTROL Client.

When you have finished, click *OK* to save and close the dialog box. The newly created map group will appear in the item list in the *Maps* section. Use the buttons on the upper panels to perform item-specific actions: remove, edit and quickly assign map group; filters on the bottom panel will help you switch between recently created/updated items and load maps/map groups only.

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10.5 User Buttons

User buttons are visual controls used in Ganz CORTROL Client and Ganz CORTROL Mobile for manual event triggering. Once you create a user button, it will become available in the Event & Action Configurator and you will be able to **assign actions** to the *User button clicked* event.

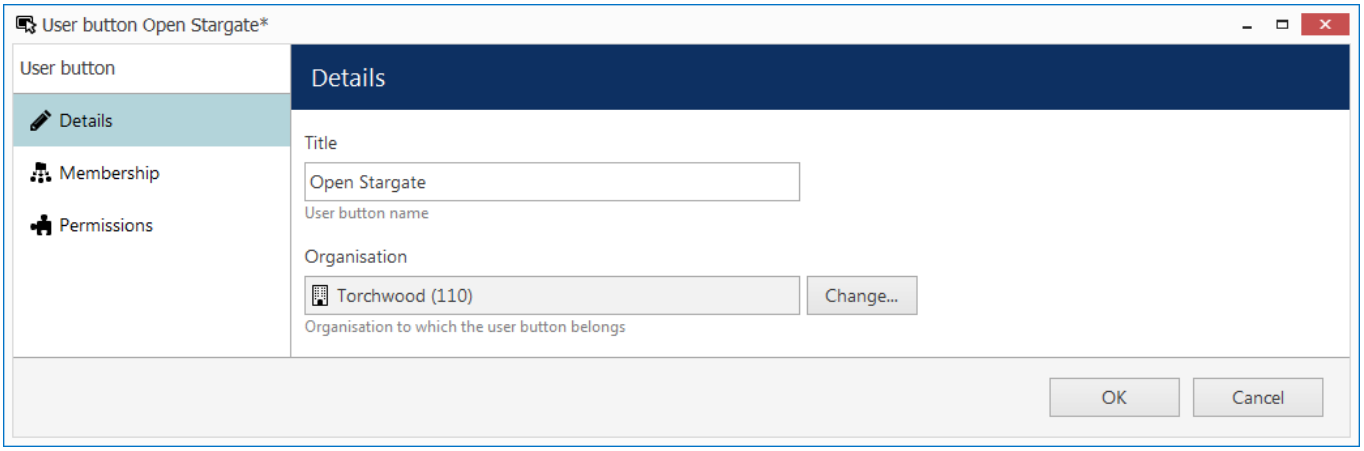
After a user button has been created and associated with at least one action, you will be able to use it in the following ways:

- bind the user button to a channel or channels so that it appears as a live video overlay control in the Ganz CORTROL Client application
- place the user button marker onto maps
- trigger it from the Ganz CORTROL Client application from the user button list, from any map or from the channel overlay controls
- highlight it on a map or all maps where the corresponding marker is present
- trigger it from the Ganz CORTROL Mobile application

To access user button management via Ganz CORTROL Console, select the *Configuration* section from the bottom left menu and then click *User buttons* in the menu on the left.

New User Button

Click the + *New user button* on the upper panel to bring up the configuration dialog box. On the *Details* tab, enter a name for the resource and choose organisation attachment.



Enter title for the user button

Switch to the *Membership* tab to choose groups for this user button to become a member of: select groups by double-clicking items in both columns or by using the *Add/Remove* buttons below. Apart from grouping, this tab allows you to bind user buttons to particular channels.

Starting from the software version 1.5.0, user buttons can be **bound to one or more channels** for their presentation in Ganz CORTROL Client. This means that once such a channel is put into a viewport, the related user button automatically appears with it. The same user button can be also manually put into other viewports and also removed from the bound channels in the live view without any limitations. Multiple user buttons per channel are allowed.

In order to set this up, open the target user button for editing, go to the *Membership* tab and add the desired channel(s) from the right-hand column (the same one that contains user button groups).

The *Permissions* tab allows you to choose which users and user groups will be privileged to have access to this resource. Select at least one permission to select the user/user group; deselect by unmarking manually or using the *Clear* button below.

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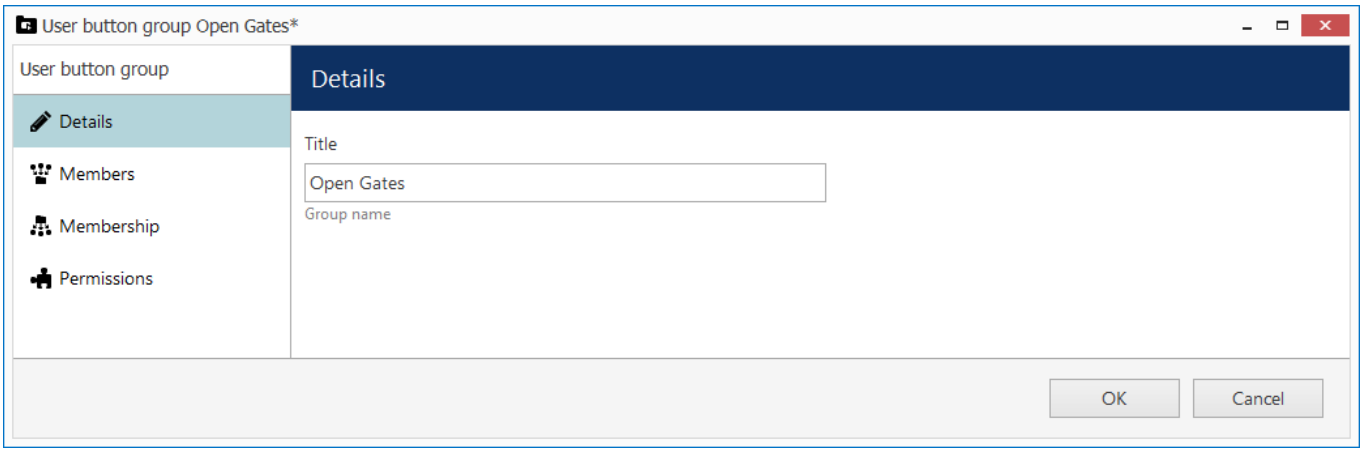
When you are finished, click *OK* to save and close the dialog box. The newly created user button will appear in the item list. Use the buttons on the upper panels to perform item-specific actions: remove, edit and quickly assign user button group; filters on the bottom panel will help you switch between recently created/updated items and load user buttons/button groups only.

New User Button Group

For easier management, user buttons can be grouped together. Click the drop-down arrow next to the *+ New user button* and select *New user button group* to bring up the configuration dialog box.



Enter the title for the user button group

Switch to the *Members* tab to choose resources for this group. Double-click items or use the *Add/Remove* buttons below to manipulate resources; use the *Search* field in the upper-right-hand corner to quickly find entries in the list.

Using the *Membership* tab, you can choose groups for this user button to become a member of; select groups by double-clicking items in both columns or by using the *Add/Remove* buttons below.

Permissions tab allows you to choose users and user groups privileged to have access to this resource. Select at least one permission to select the user/user group; deselect by unchecking manually or using the *Clear* button below to remove all permissions.

When you have finished, click *OK* to save and close the dialog box. The newly created user button will appear in the item list. Use the buttons on the upper panels to perform item-specific actions: remove, edit and quickly assign user button group; filters on the bottom panel will help you switch between recently created/updated items and load user buttons/button groups only.

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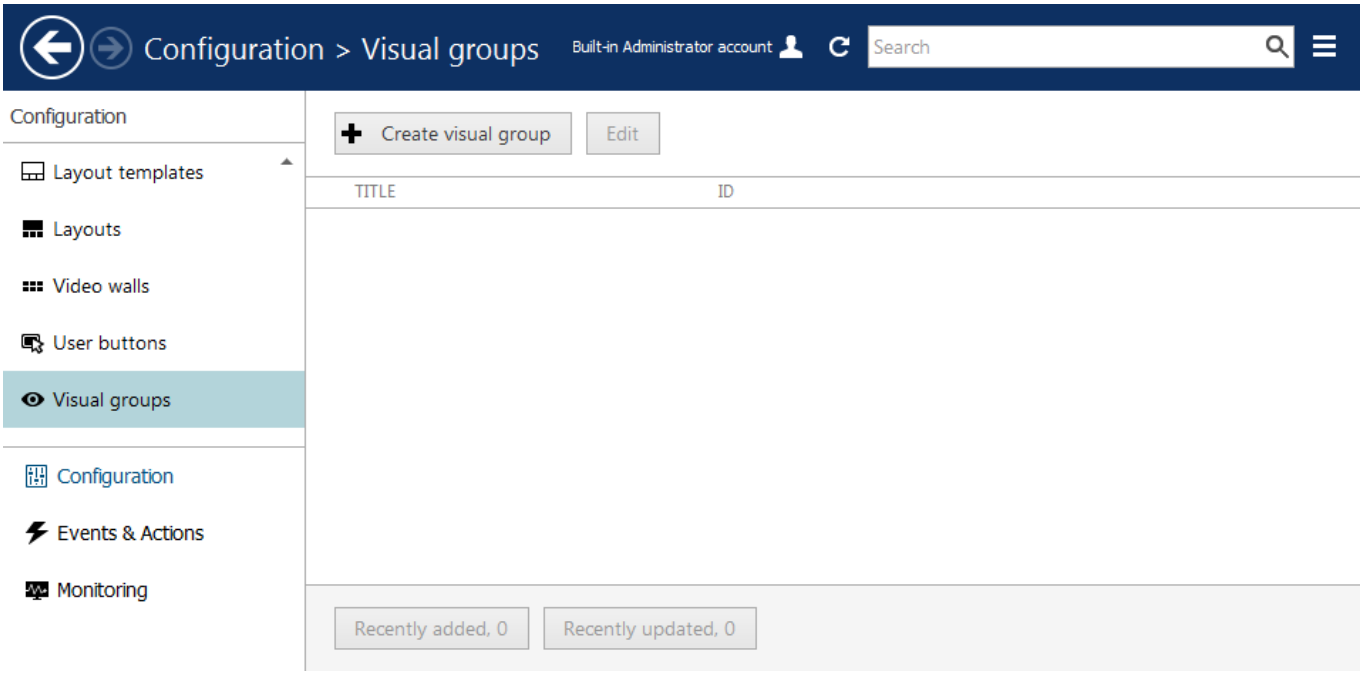
10.6 Visual Groups

Device, channel and map groups are used solely for management and are only accessible in Ganz CORTROL Console.; in order to set up resource arrangement for Ganz CORTROL Client, **visual groups** are used. They allow custom grouping for channels and maps displayed in the connected Ganz CORTROL Client applications. You can create single-level or **multi-level** (nested) visual groups by putting them inside one another. Nested visual groups will also appear in the *Resources* section of the Ganz CORTROL Client application.

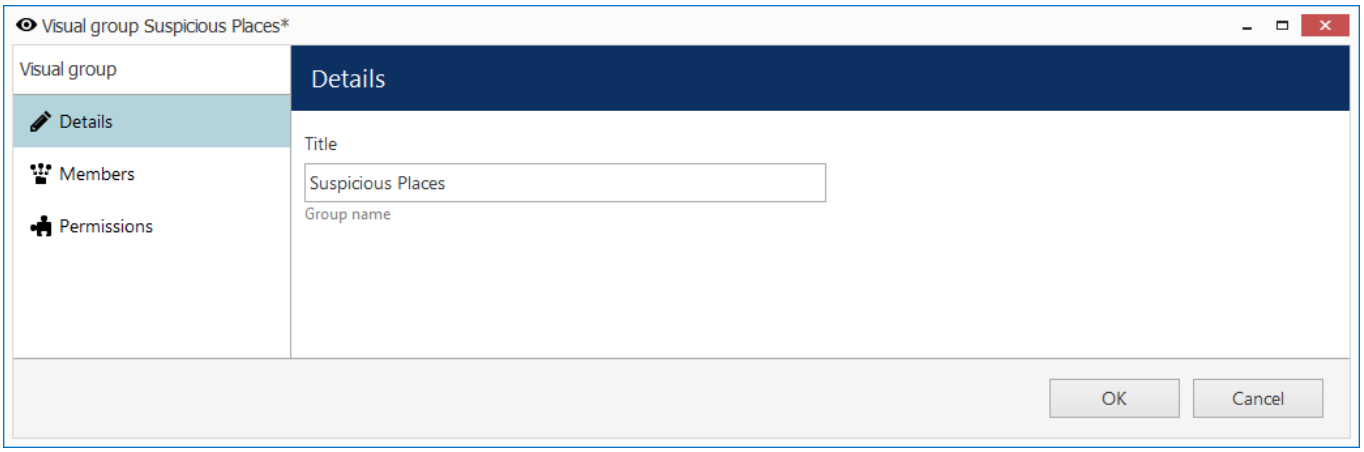
Starting from software version 1.17.0, visual groups are also available in the Archive Backup Wizard.

To access visual group management in Ganz CORTROL Console, go to the *Configuration* section in the bottom left panel and select the *Visual Groups* component in the menu on the left.



Configuration -> Visual groups

Click the + *Create visual group* button in the upper panel to bring up visual group creation dialog box.



Enter title for the new visual group

In the *Details* tab, enter a user-defined name for the target visual group. This name will appear in connected Ganz CORTROL Client applications.

Switch to the *Members* tab to choose resources for this group. You can create nested visual groups (i.e., group inside group) - they will appear as a tree in the Ganz CORTROL Client application.

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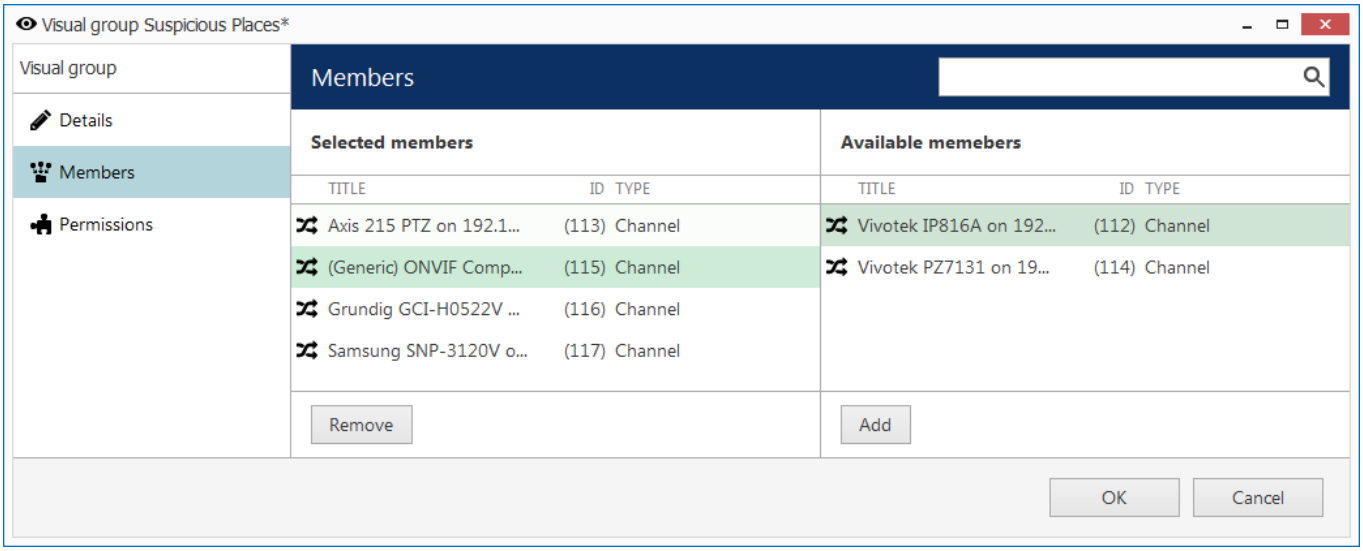
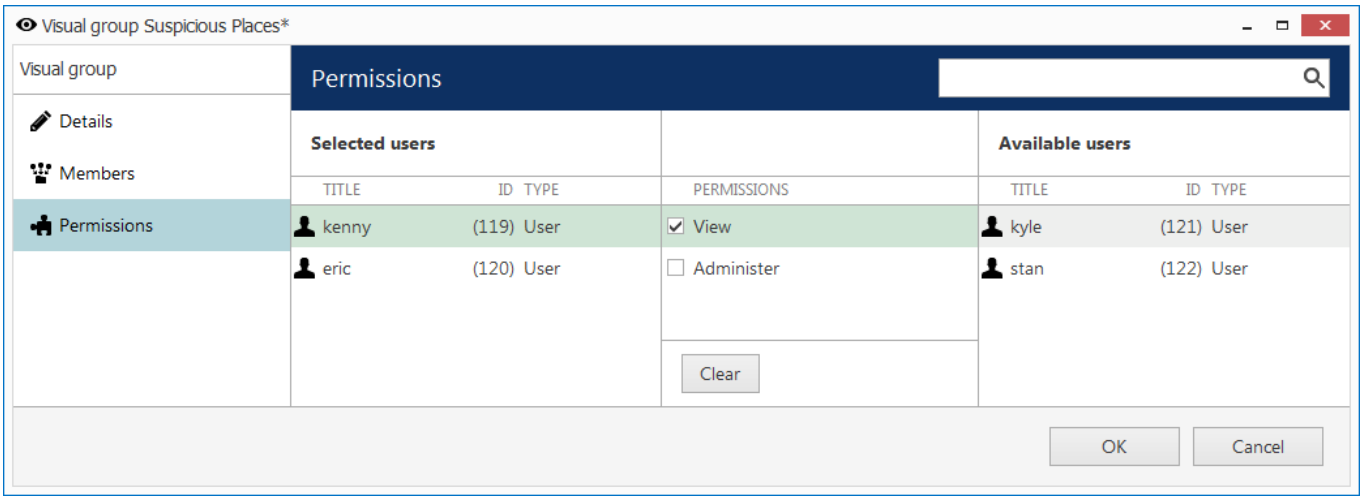


Choose channels to participate in this group

Double-click items or use the *Add/Remove* buttons below to manipulate resources; use the *Search* field in the upper-right-hand corner to quickly find entries in the list.



Add user permissions for the target visual group

Switch to the *Permissions* tab to allow user access to this visual group. There are two available permissions types:

- **View**: users have access to this resource in Ganz CORTROL Client
- **Administer**: user are permitted to edit this group via Ganz CORTROL Console

When you have finished, click *OK* to save and exit; the newly created visual group will appear in the item list.

To edit any of the previously created visual groups, double-click it in the item list or select any with single mouse click and then hit the *Edit* button on the upper panel. Use the *Search* field in the upper-right-hand corner to quickly find the existing items; the filters in the bottom panel allow you to load recently added/modified items. Use the recycle bin button in the upper-right-hand corner to remove one or multiple visual groups: hold *CTRL* or *Shift* to select several items at once, or *CTRL+A* to select all.

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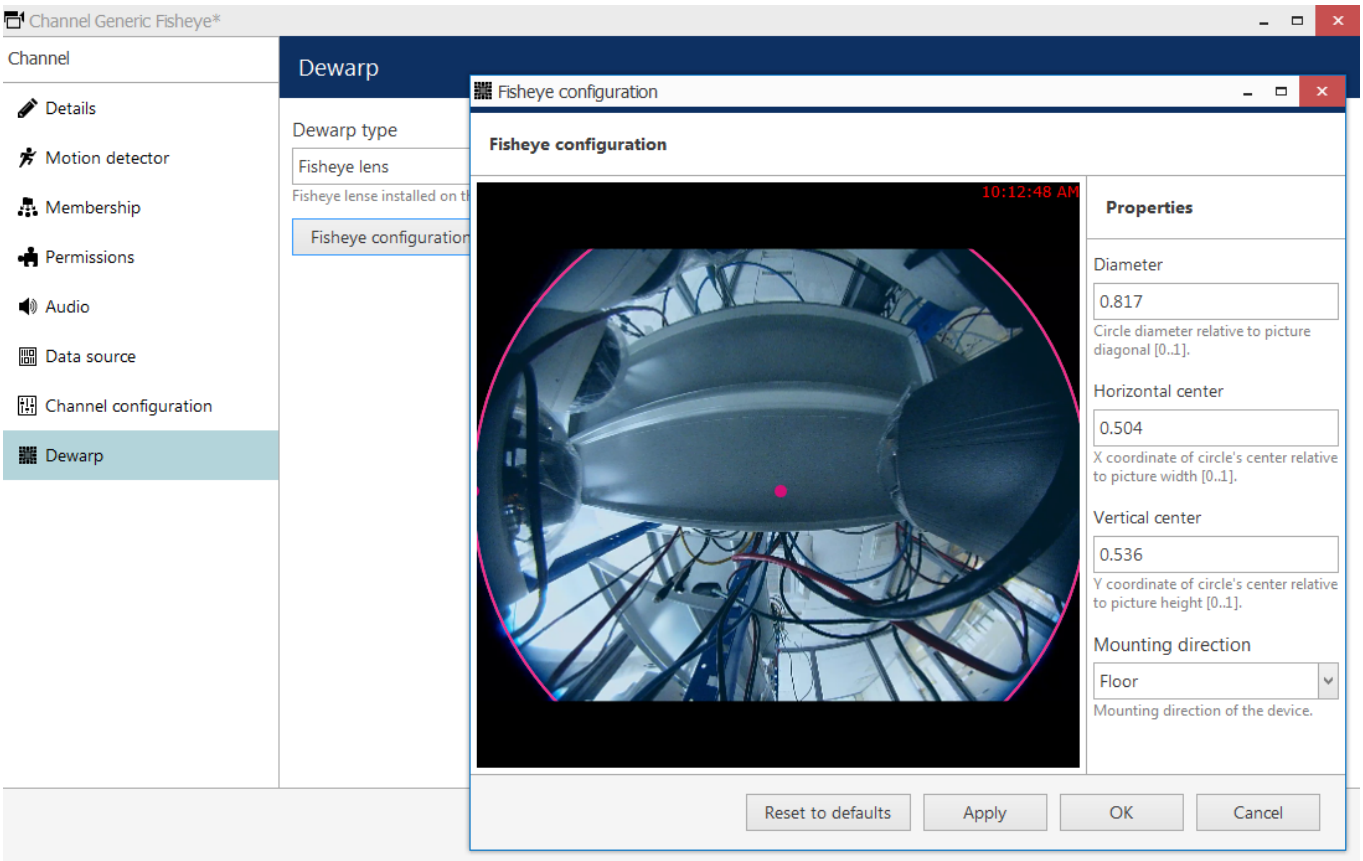
10.7 Dewarp For Fisheye Cameras

Fisheye lens is an ultra-wide-angle lens that produces a wide panoramic image at the cost of strong visual distortion. Usually, devices with such lenses capture a 360-degree geometrically distorted image and projects it as a circle within the image frame. Fisheye lens can be either built-in by design or purchased separately and installed on your desired camera. Ganz CORTROL dewarp feature allows to correct the perspective and obtain several "normal" views from a single distorted fisheye picture.

In order to access dewarp settings via Ganz CORTROL Console, open the *Configuration* section and choose *Channels* from the menu on the left. Find the channel you wish to dewarp in the list (use *Search* or filters, if necessary) and double-click it in order to open it for editing (alternatively, use the *Edit* button on the upper panel to open the dialog box), then switch to the *Dewarp* tab.

Please note that the location of dewarp settings has changed starting from the product version 1.5.0. For previous software versions, the corresponding settings can be found in the general *Channel Properties* dialog box.



Dewarp settings

You have the following options here:

- **Regular lens**: choose this option if you wish to disable the dewarp engine (selected by default)
- **Immervision Enables® lens**: choose this option if your camera has a Panomorph lens installed (you can check this in the camera specification)
- **Fisheye lens**: choose this option if your camera has a regular 360-degree view lens
- **Fisheye lens (large resolution)**: dewarp engine optimised for image resolutions of 6MP+

If your fisheye image has a resolution of **6 megapixels or higher**, it is better to use the last option in the drop-down list - fisheye lens **optimised for high resolutions**. This mode will provide smoother DPTZ experience with the dewarped image. If your graphics card supports **OpenCL version 1.2** or higher, this dewarp driver will use GPU (you can check this in your video driver properties, or request info from the video card manufacturer). Otherwise, more CPU time will be required, compared to the basic fisheye mode. We recommend that you do not use this driver for smaller resolutions, as it may use more CPU yet there will be no difference for the user.

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For devices having a Panomorph lens, choose the lens model from the drop-down list - you can find this information in your camera specification or request it from the device manufacturer. You do not need to define any parameters manually in this case; rather, you only need to choose your camera mounting position, and the dewarp engine will automatically produce a correct dewarping result.

Note that the dewarp engine will fail to operate if you choose a wrong Panomorph lens model. Check with your camera documentation and manufacturer for the precise lens model information.

For a generic fisheye lens, you are requested to define the fisheye sphere size and camera position by using the **overlay controls** and settings on the right side:

- Hemisphere **diameter**: click and drag any of the small pink circles on the overlay sphere to change its size and align it with the actual fisheye sphere in the picture
- **Horizontal** and **vertical** centre: automatically positioned in the picture centre, to change it click and drag the small pink circle inside the sphere
- **Mounting** direction: select camera mounting position from the drop-down list (wall/ceiling/floor)

For your convenience, the defined parameters are also displayed in the numeric form on the right side of the dialog box. Use the button below the preview to **reset** all dewarp settings to the default ones.

In case you change the stream resolution at some point, its **aspect ratio** may also be changed and this will affect dewarp operation. Therefore, check the dewarp settings after changing the resolution and adjust the parameters, if necessary.

Note that all **dimensions** are given not in pixels but in reference to the video stream size, therefore, **relative values** are used instead of absolute ones.

When finished, click *OK* to save the changes and close this dialog box and return to the general channel configuration. Dewarp results will immediately become available in the Ganz CORTROL Client application; you can find the details on usage in the corresponding section of the Ganz CORTROL Client documentation.

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10.8 Audio

Ganz CORTROL is capable of receiving audio streams from cameras, recording and playing them back, as well as sending audio back to the cameras from Ganz CORTROL Client stations. It is also possible to bind an external audio source to a video channel.

There are a few conditions stipulating audio feature availability:

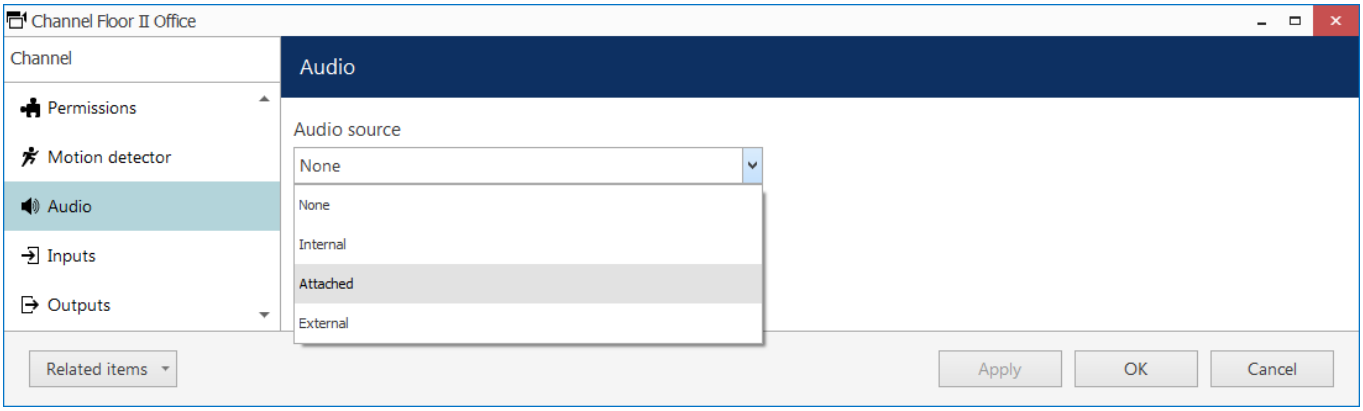
- the target device should be capable of sending/receiving audio
- relevant additional equipment should be plugged into the device (microphone and/or speakers), if necessary (if these are not built in by design)
- one-way or two-way audio should be enabled and set up on the device side so that it is available via device Web interface
- G.711 should be selected as audio codec on the target device side
- audio should be enabled in the channel settings via Ganz CORTROL Console (see below)
- feature should be supported by Ganz CORTROL integration for the target device (see the list of supported devices and features provided by CBC AMERICA LLC)
- in order to send audio to the device, Ganz CORTROL Client workstation must have a microphone connected to it - either a built-in or an external one
- if you plan to use an external audio source, relevant audio capturing equipment should be plugged into the server, to which the target device is connected, and enabled via Windows audio settings

⚠ G.726 and AAC audio codecs, which are often implemented on the camera side, are not supported at this point, so please always select the **G.711** option. Setting other codecs on the device side may result in Ganz CORTROL being unable to decode the incoming video stream.

Enabling Audio

If you plan to use camera-side audio and have not checked audio configuration on the camera side yet, go to the device Web interface and adjust the audio settings, then make sure that audio is operable in the browser preview (you may need to install an ActiveX control in order to get it working; please check with your device's user guide for tips and browser requirements).

To **enable audio** for your desired device in Ganz CORTROL Console, open the *Configuration* section and choose *Channels* from the menu on the left. Then, open your target channel for editing - either by double-clicking it or by selecting it with a single click and clicking the *Edit* button on the upper panel. In the channel properties dialog box, switch to the *Audio* tab by selecting it on the left.



Access *Audio* tab in the channel properties

Here, you have 4 options. Depending on your selection, additional fields may appear.

- *None*: **disable** audio functionality for the target channel (default), no additional settings
- *Internal*: enable audio reception **from the device** side and sending the reverse audio to the device
  - choose an audio input from the drop-down list, if the target device has multiple ones
  - if there are none configured or available on the device side, the list will appear empty (this also refers to cases when audio is not supported for the selected device)

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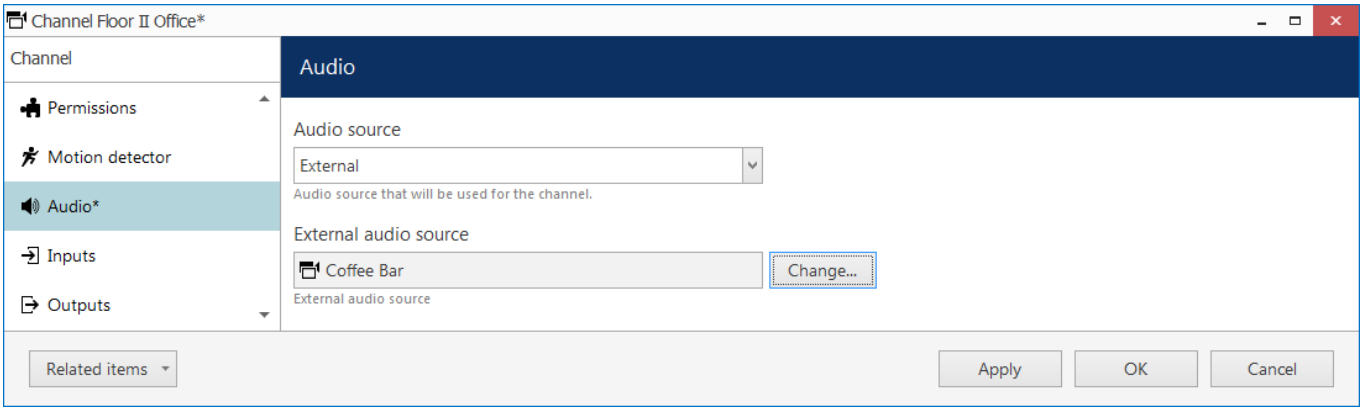
- *Attached*: use an external audio source **connected to the** same **server** as the device, from which the target channel originates
    - choose an audio input device from the drop-down list, if the target server has multiple ones connected to it
    - all microphones recognised by Windows will appear here
- *External*: use **another channel's audio** as audio for the current channel (see below for more details)
    - choose a channel to serve as audio source

When you have chosen your preferred option, click *OK* to save and close the *Channel settings* dialog box. You should now be able to listen to live audio, record it along with the video stream and talk back to your camera via Ganz CORTROL Client and Ganz CORTROL Mobile applications.

Combining Video and Audio Sources

Ganz CORTROL allows channels to use audio coming from a different channel in case the target channel does not have its own incoming audio, or in case you wish to combine audio and video data from different sources. Such combinations are used for both live and recording. A common example of this method is to use audio from intercom channels in combination with nearby video cameras.

In order to do this, double-click the target channel (the one without audio) in the channel list to open it for editing, then choose the *Audio* tab on the left.



Choose another channel as audio source

Choose *External* from the drop-down list, then select a channel to be used as the new audio source: click the *Change* button to see the list of channels and choose the one that you want audio to be coming from. Hit *Apply* or *OK* to save your changes.

⚠ Audio must be configured for the channel used as an external audio source via channel configuration as described earlier. Both cameras and audio-only devices (intercoms) can be used as external audio sources.

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10.9 Reports

Ganz CORTROL Console application provides an opportunity to send automatic reports. There are two types of them:

- Reports based on the counter data, which has been recorded with the video stream(s). Depending on the collected information context, these reports can be used, for example, to estimate the average number of customers during specific hours, compare the number of passing cars to the number of trucks etc. Counter information is collected from Ganz CORTROL **Open VCA** video analytics, **camera-side VCA** (for certain manufacturers) and software counters.
- Reports based on the facial recognition (FR) module data. These include the counted detections (by tag) and miscellaneous estimators (age, gender, temperature, sentiment, etc.).

The report configuration process is similar to the manual procedure of reporting in the Ganz CORTROL Client application, with the difference that here the settings are defined once and then are used by the Ganz CORTROL servers for automatic report generation.

There are three report types: **bar**, **line** and **pie** diagram. Regardless of the chosen type, all reports are based on the **counters** and have configurable report interval and days and times of interest. Counter values are compared for the given period and with the specified scale, and the results are then reflected in the chart of the selected type. Reports can be configured to be created **automatically** on a **daily**, **weekly** or **monthly** basis and then **emailed** to the specified email address.

⚠ Regardless of the report settings, the report will be emailed after the selected report interval has ended.

Example 1: the report interval is previous day with time filter set to 8AM to 6PM. The report will be emailed next day 12:01AM.

Example 2: the report interval is previous week with only working days selected (weekends deselected). The report will be emailed 12:01AM next Monday, i.e., when the week is over.

Prerequisites

Reporting in Ganz CORTROL Console is primarily aimed at automatic report sending via email. In order to achieve this, you need to **configure** a mail server for the emails to be sent through, according to the steps explained in the corresponding section of this document. You can do this prior or after the report setup. If you need a one-time report for a custom time interval, you are welcome to use the reporting function in the Ganz CORTROL Client application.

For a counters report to be created successfully, there must be some counter data present in the database. You can use Open VCA, camera-side VCA (for certain manufacturers) or software counters. Open VCA setup in Ganz CORTROL is described in a separate document provided by demand.

For the FR report to be created, you must have at least one channel being analyzed by facial recognition module for the specified period, and the target FR service must be connected.

Report Configuration

In order to start report setup, go to the *Configuration* section of Ganz CORTROL Console and choose *Reports* from the menu on the left. Press the + *New report* button on the top panel to bring up the report configuration dialog box. There are two options: **new counters report** and **new external service report**. These two types differ slightly.

Reports Based On Counters

This type of report is based on camera-side VCA, Open VCA, or software counters. The configuration options are similar to those in Ganz CORTROL Client when you create a graph in the *Reports* section.

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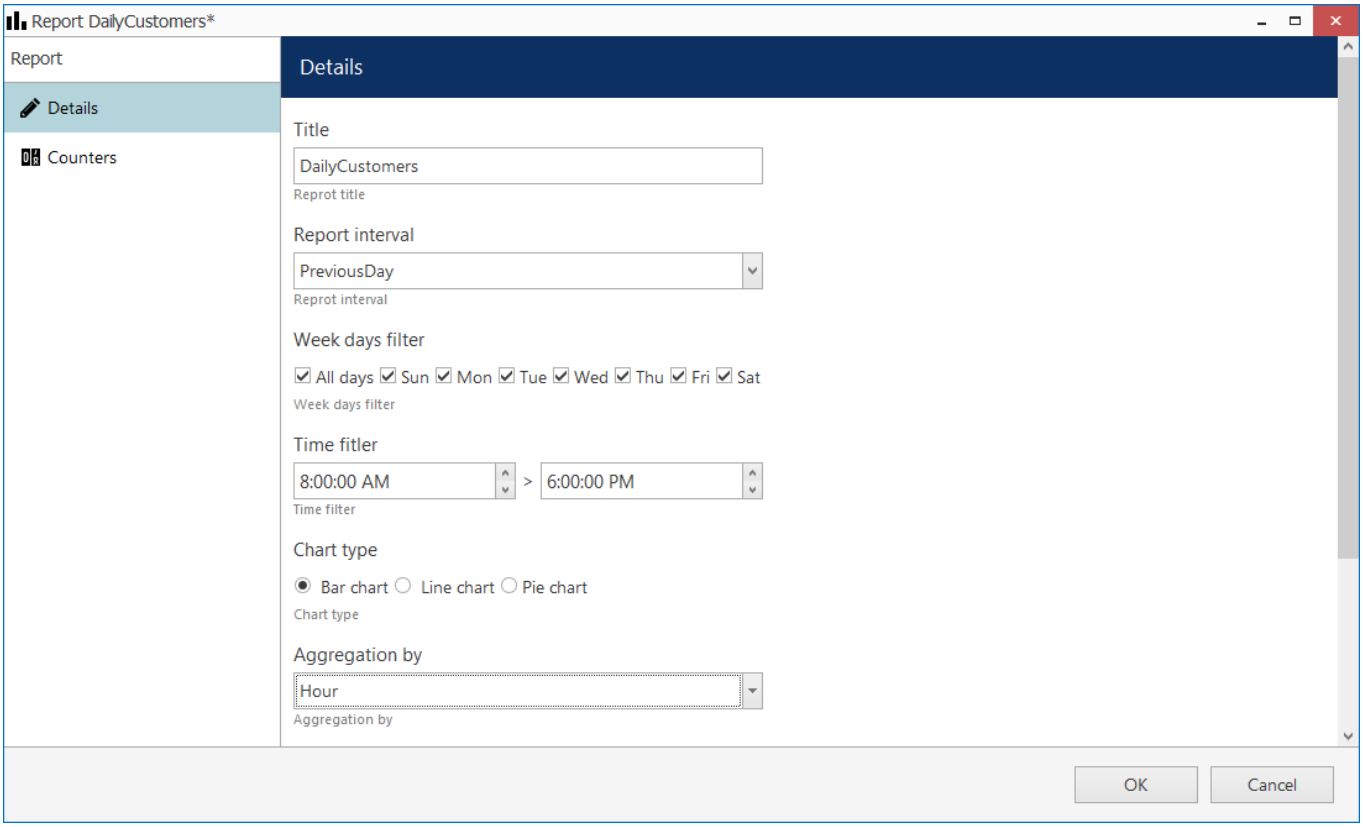

Edit counters report dialog box

Specify the **reporting criteria** in the *Details* tab; the following settings are available:

Setting	Description	Default Value
Title	User defined title for the report	[empty]
Report interval	Time interval to be represented in the report; can be previous day, week or month	Previous day
Week days filter	Days of the week to be included in the report (e.g., ignore weekends)	All days
Time filter	Target audit interval to be analysed for each of the selected days	12AM > 12AM (whole day)
Chart type	Diagram type: bar, line or pie	Line chart
Aggregation by	Scale factor for the target diagram - results can be presented for months, weeks, days, hours or minutes (also, the data can be aggregated by counters if the selected chart type is pie diagram)	Day
Value	Counter value to be taken for each report time interval on the X axis (day etc.): • Absolute: actual counter value • Relative: difference compared to the previous interval • Average: arithmetic mean of the given interval • Minimum: minimal value during the given interval • Maximum: maximal value during the given interval	Absolute
Sum counters	Choose whether you want each counter to be represented separately or all counters are to be added up (for bar and line type diagrams only)	Disabled
Show labels	Display value labels on the chart	Disabled

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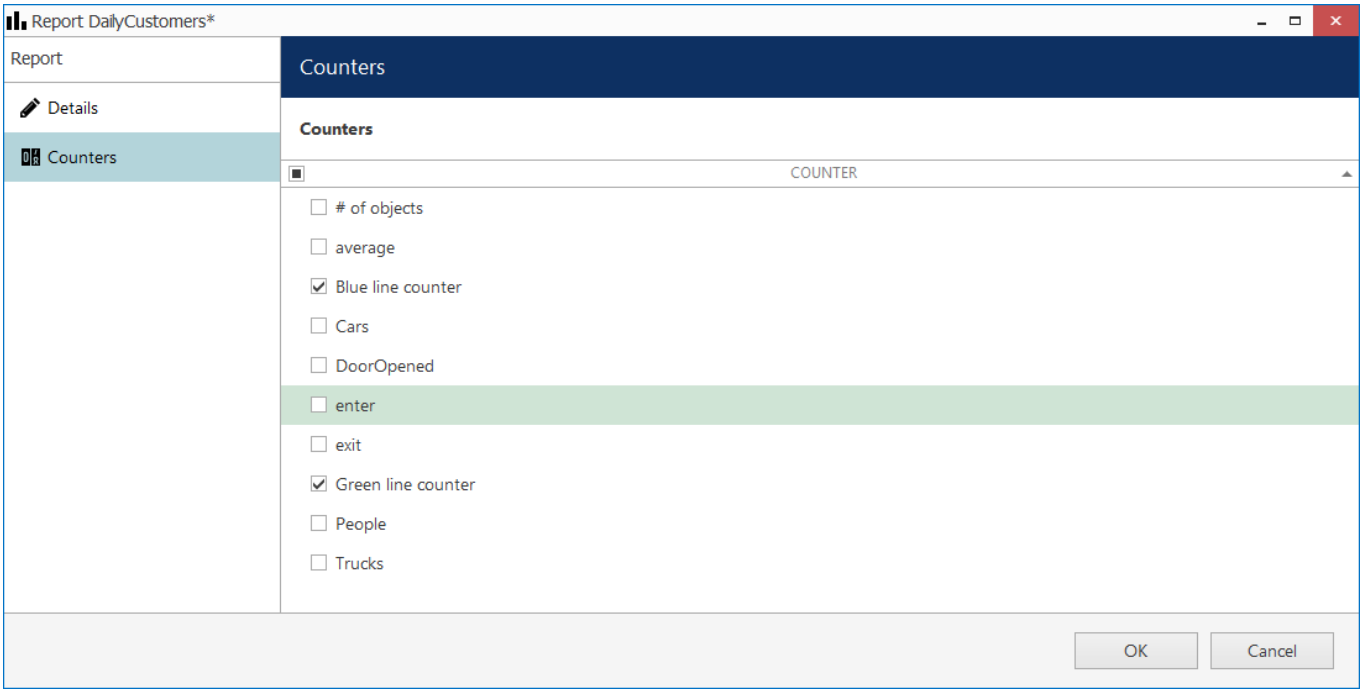
File type	Choose whether you want the report to be in PDF of CSV format	PDF
Automatic	Generate the report and send it automatically to the specified email	Disabled
Mail server	A pre-configured SMTP server to be used for email sending (the setting is revealed when automatic report sending is enabled)	[none]
To	Email recipient the report to be emailed to; enter exactly one valid email address here (the setting is revealed when automatic report sending is enabled)	[empty]

Next, switch to the *Counters* tab: here, you can select the required counters from the list.



The list of counters available for report

All the counters available in the system are listed here - from Open VCA, camera-side VCA (for certain manufacturers) and software counters as well - in case their data is present in the database.

> For the exact list of supported camera-side VCA counters, kindly contact our support engineers at cortrol@cbcamerica.com.

When ready, hit the *OK* button in the bottom to save the report configuration based on your selected criteria. To edit and remove reports, use the corresponding buttons on the upper panel.

Reports Based External Service Data

This type of report is based on the data received from external services (specifically, **detections and attributes from the facial recognition** module instances). The configuration options are similar to those in Ganz CORTROL Client when you create a graph in the *FR* section. The logic is analogous to that of the counters reports, yet the settings are a bit different.

Specify the **reporting criteria** in the *Details* tab (other settings like target week days are available in the *Filters* tab). The following settings are available:

Setting	Description	Default Value
Title	User defined title for the report	[empty]
Report interval	Time interval to be represented in the report; can be previous day, week or month	Previous day
Chart type	Diagram type: bar, line or pie	Line chart

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Group by	Main report values (targets): can be tags, temperature, age, sentiment, or gender estimation	Tag
Aggregation by	Results can be aggregated by months, weeks, days, hours or minutes (for bar and line type diagrams only)	Day
Sum values	Choose whether you want each target group to be represented separately or all values are to be added up (for bar and line type diagrams only)	Disabled
Show labels	Display value labels on the chart	Disabled
File type	Choose between PDF or CSV	PDF
Automatic	Generate the report and send it automatically to the specified email	Disabled
Mail server	A pre-configured SMTP server to be used for email sending (the setting is revealed when automatic report sending is enabled)	[none]
To	Email recipient the report to be emailed to; enter exactly one valid email address here (the setting is revealed when automatic report sending is enabled)	[empty]

The choice between absolute/relative/min/max/avg value is not present here; all values are **relative**, i.e., the chart reflects the value change since the previous aggregation interval.

Next, switch to the *Channels* tab: here, you can select the target channels. The report will include the recognition data from the specified channels.

On the *Filters* tab, you can limit the report sample range by (de)selecting various options. The filters include days, time of the day, and attributes from the external service detections:

- **Tags** from FR
- Temperature range from the readings that were received by FR (works for certain camera integrations; please refer to our for the exact vendor list)
- **Age**, **gender**, and **sentiment** estimators
- **Week days**: select **days of the week** that you want to be included in the report (e.g., ignore weekends) (all days are selected by default)
- **Day time interval**: choose the target **audit interval** to be analysed for each of the days in the selected report interval

When ready, hit the *OK* button in the bottom to save the report configuration based on your selected criteria. To edit and remove reports, use the corresponding buttons on the upper panel.

Report Preview

After you have created a report, you can check how it will look like by using the *Preview* and *Test* buttons on the upper panel. The **preview** button will generate a report and display it on your screen; the **test** option will create a report and email it to the specified address in PDF format immediately. In either case, the report preview will be based on its configured time interval, so, if you get an empty report, make sure that counter data are present for the previous day, week or month, whichever specified.

When you have created a new report and wish to test it, please wait about 10-30 seconds before pressing the *Test* button: this time is required to retrieve the counter information from the database.

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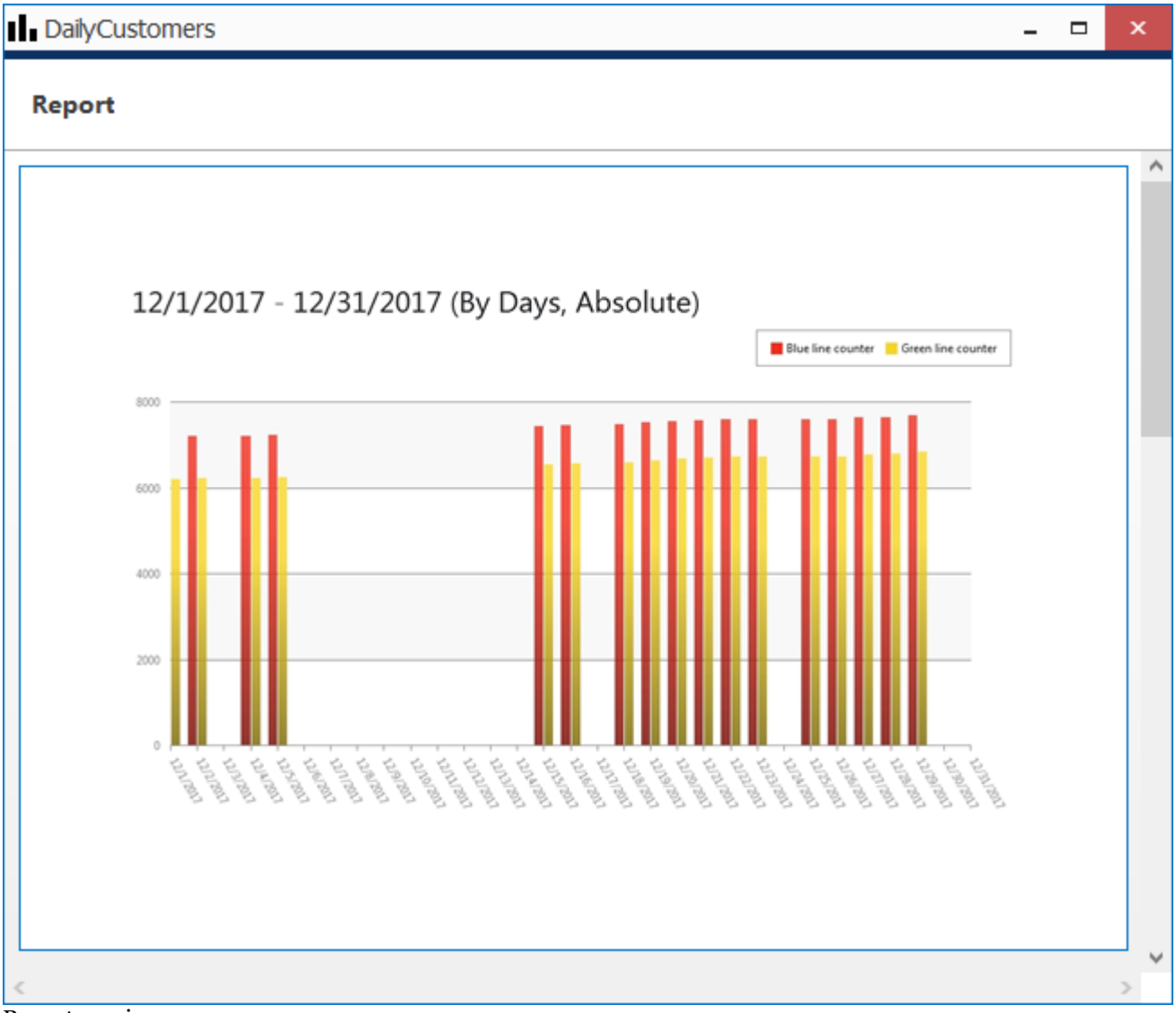

Report preview

On each diagram, the **horizontal axis** (X) represents time in the specified scale, and the **vertical axis** (Y) reflects counter values. The counter values for each time interval are calculated based on the selected setting and can reflect absolute, relative, average, minimum or maximum counter value for the given interval. In the **pie diagram** type, each sector can represent either a time interval or a counter, depending on the aggregation setting parameter.

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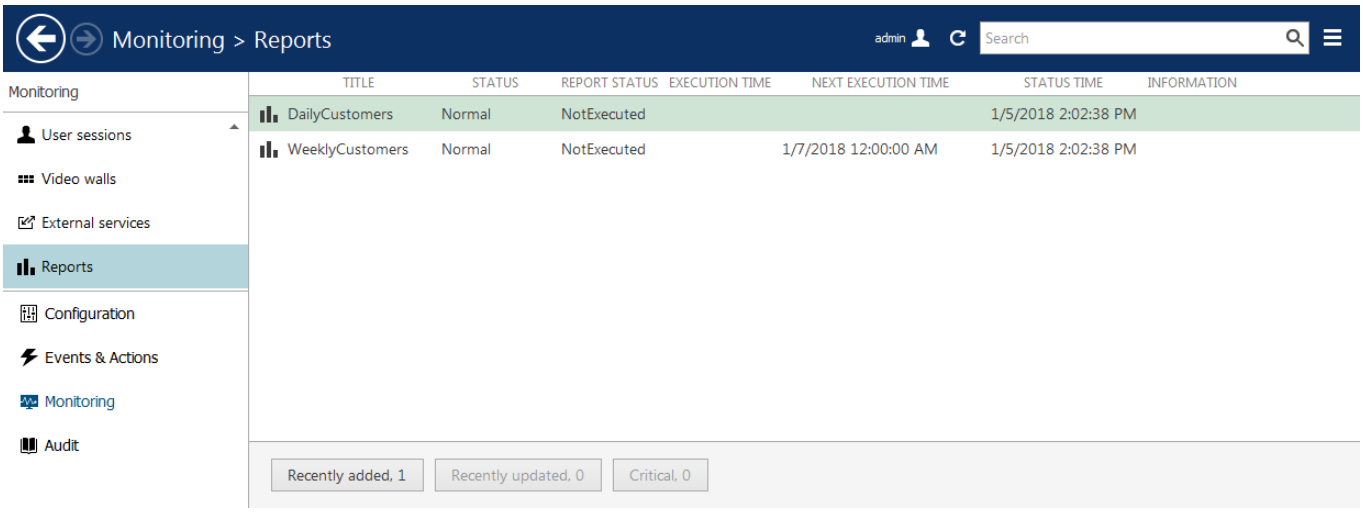
Each chart also contains a **legend** that provides information about colours used in the diagram:

- if you have selected to analyse every counter separately, each counter will be represented with its own colour and the legend will reflect counter titles
- if you have chosen to sum the counter values:
    - bar diagram will have just one column for each interval, every column consisting of specified counters and its total height reflecting the total
    - line diagram will contain graphs for each individual counter and the total
- pie chart will reflect the counter sum for each time interval if aggregation by time intervals is chosen, so the legend will contain timestamps; if aggregation by counters is selected, the pie will reflect the proportion of the counter values for the whole selected audit interval

Apart from the diagram itself, each report in PDF format will also contain a table with the reference counter values.

Report Status Monitoring

Report execution status can be tracked from the *Monitoring* section of Ganz CORTROL Console, by choosing *Reports* in the menu on the left.



Report status

If a report has been sent at least once (by schedule, not as a test), the last execution time is shown here. For the reports that are currently set to be emailed automatically, the next (scheduled) execution time is also displayed.

Math Behind Counters

Different **counter value** settings will produce different results, so you need to understand which value to select in order to get the appropriate result. Below, you will find some details on how **these values are calculated** inside Ganz CORTROL.

For each and every selected interval, five counter values are calculated: **absolute, relative, min/max, and average**. The minimal internal interval is equal to **1 (one) minute**; no matter how the counter value changes during that minute, these five values are recorded into the database. For longer periods (hours, days, etc), these values are calculated using the intermediate results.

In the snapshot below, there is an example of how the counter value might change during one minute, and what values are calculated based on these changes.

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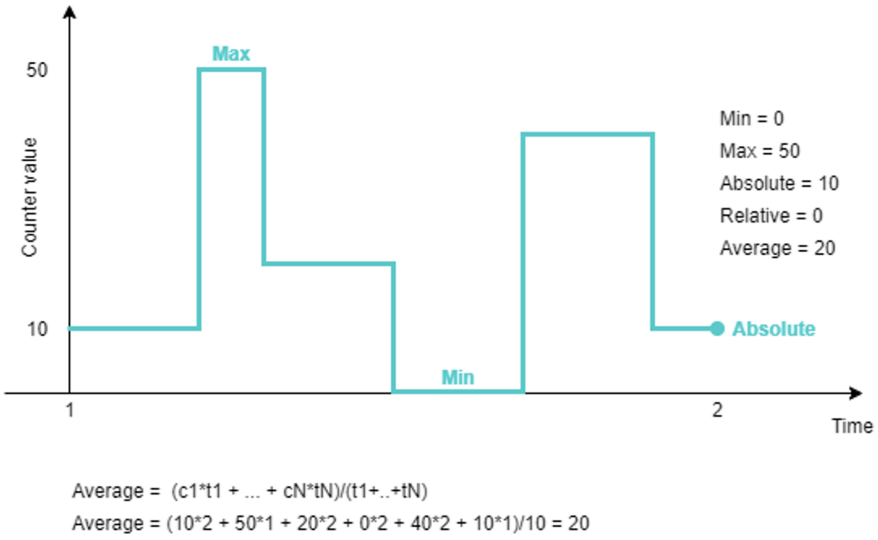

An example of counter changes within report interval with corresponding peak values

For correct report results, it is also essential to keep in mind whether the counter in question is increment-only, or if it is both incremented and decremented based on some events.

1. Absolute

Absolute counter value is its exact value at the **end** of the measurement period. E.g., If the interval is 1h, the absolute counter value is equal to the absolute counter value for the last minute of that hour.

Usage examples:

- increment-only: estimate the total people flow, e.g., incoming customers
- increment/decrement: current number of people in the zone/building

2. Minimum and maximum

Here, Ganz CORTROL simply takes the min and max value from the aggregation interval. For longer intervals, min/max are selected from the list of min/max of smaller periods (regular min/max function).

Note that min/max has nothing to do with absolute value: the counter value may peak inside the aggregation period with the total change (absolute value) being zero. The latter, of course, is only possible for the counters that are both incremented and decremented over time. For increment-only counters, max value will be equal to absolute value.

3/4. Relative

Relative counter value is the sum of all relative changes for the given period, or, even simpler, the difference between the current absolute value and the previous one. Relative value shows how much the counter value has changed for the given period compared to the previous one.

5. Average

Average counter value is counted as weighted arithmetic mean, with the duration serving as weight.

Simple arithmetic mean would not be as useful as it does not take into account the value duration.

Consider the two examples in the snapshot below: two counters have the same absolute and relative values for the given period. Their arithmetic mean would be very similar (25 vs 26.6), while it is obvious that the first (green) counter value stayed higher for a longer period, and this should be taken into account.

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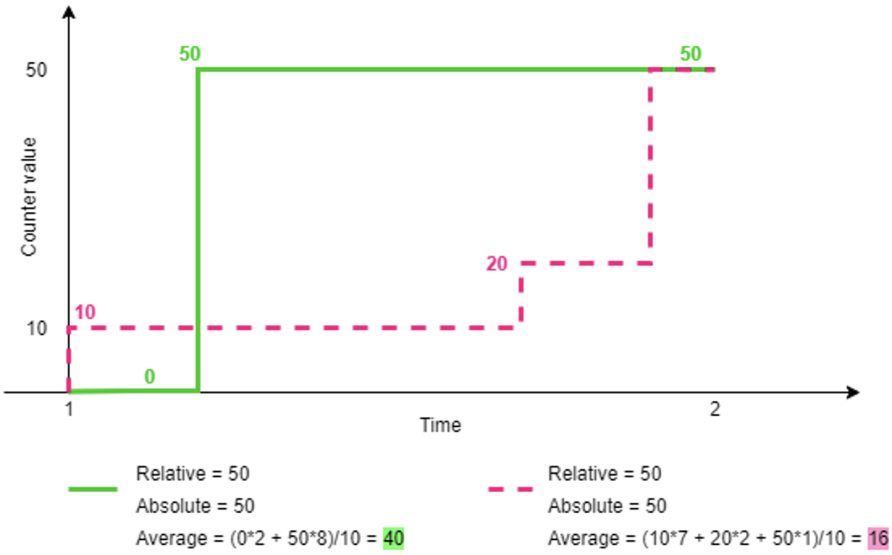

Example of two counters with the same absolute values and different average

Usage example: average number of customers in the store per hour, average check total for estimating effectiveness.

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10.10 Live Podcasts

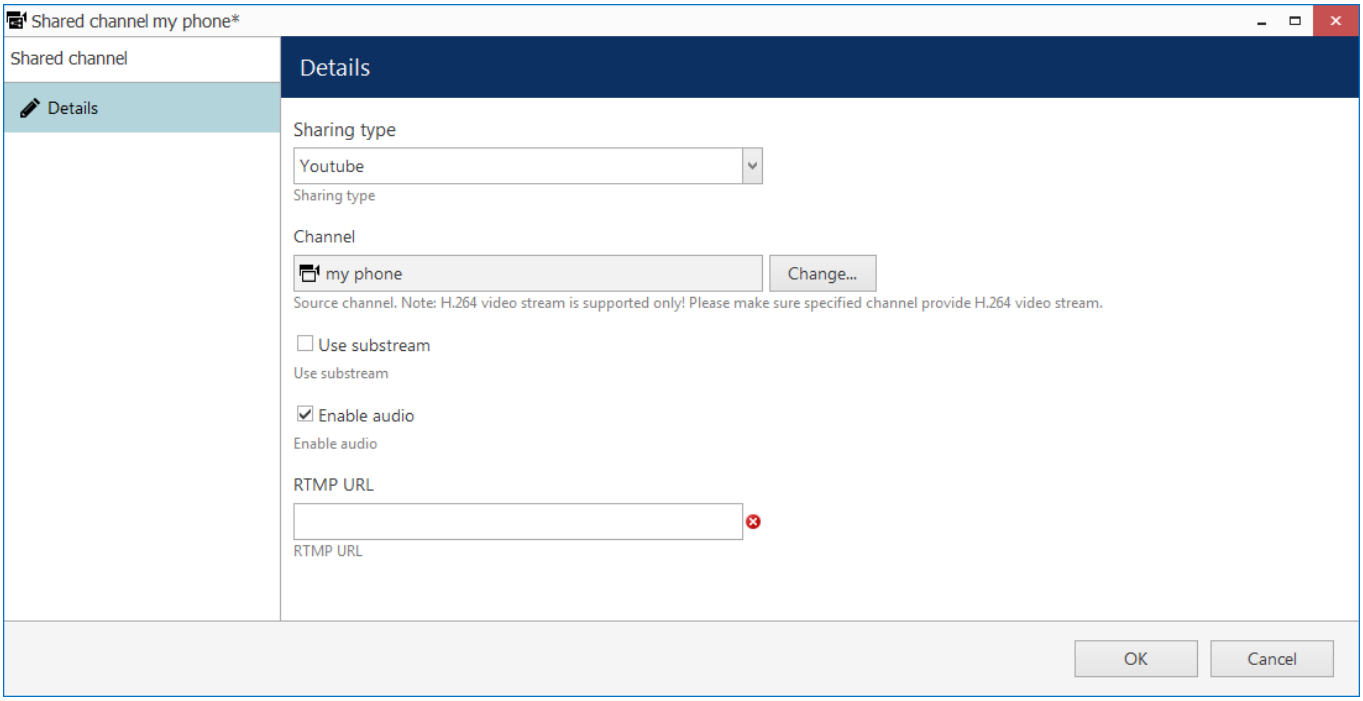
Ganz CORTROL channels can be shared by streaming over RTMP and thus be used for live casting - either with popular streaming services or with your own RTMP server. This manual covers examples of how to set up live streaming for Youtube and Wowza live casts - working with other RTMP servers is similar.

> ⚠ Before sharing a channel, check its settings and make sure that:
>
> - the channel is enabled in the configuration and video is available,
> - stream codec is **H.264** (other codecs will not work!),
> - if you want to use substream and/or audio, make sure you have enabled them in the channel properties.

> ⚠ Ganz CORTROL Prime free edition only allows 1 (one) podcast per server.

To access **shared channel management** in Ganz CORTROL Console, go to the *Configuration* section in the bottom left panel and select the *Live Podcasts* component in the menu on the left.

Click the + *New live podcast* button in the upper panel to bring up the shared channel creation dialog box.



Sharing a channel for Youtube live streaming

First, choose where you are going to stream the channel: it can be a specific public service or generic RTMP streaming to a service that is not listed, including your own RTMP server; depending on your choice, settings may vary to suit the specific service. Then, enter streaming configuration.

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The table below explains the settings in details.

Setting	Description	Default value
Sharing type	Choose between Youtube, Wowza or generic RTMP streaming	Generic RTMP
Channel	Target channel to be streamed	[none]
Use substream	When not enabled, main (higher resolution) stream will be used; enable this option if you want to cast the lower resolution stream	Disabled
Enable audio	Enable this option to include sound for the shared channel, works both for main and secondary streams	Enabled
RTMP URL	Full URL to be used for casting, the link is normally provided by the RTMP streaming engine	[empty]

Youtube Live Streaming

Youtube live casting can use RTMP streams from your Ganz CORTROL server for further streaming.

In order to set up live streaming with Youtube, log in to your account on youtube.com and go to Creator Studio tools -> Live streaming -> Stream now. If you have never created any live casts before, you may have to verify your account - just follow the guidelines on the website.

> ⚠ You need to have a valid Youtube (Google) account in order to be able to use this type of streaming, and comply with Youtube live streaming conditions. CBC AMERICA LLC is not responsible for the third-party service operability and policies.

Scroll down to the *Encoder Setup* section: you will need the link and the secret stream key in order to build the RTMP link.

In Ganz CORTROL Console, open the *Shared Channels* section and add a new shared channel, fill in the settings as follows:

- **Sharing type**: Youtube
- **Channel**: target channel from the list of existing channels
- **Use substream**: up to you
- **Enable audio**: up to you
- **RTMP URL**: *rtmp://<server_URL>/<stream_key>*, where
  - *rtmp://* indicates that RTMP protocol will be used for streaming
  - *<server_URL>* is Server URL link provided by Youtube, e.g., *a.rtmp.youtube.com/live2/*
  - *<stream_key>* is Stream Name/Key generated by Youtube in the form of xxxx-xxxx-xxxx-xxxx

Wowza Streaming

Alike Youtube, Wowza streaming engine can receive video feeds from Ganz CORTROL server and stream them out to any device. You need to install Wowza Streaming Engine first and then configure live streaming as described below.

> ⚠ Ganz CORTROL does not include any installation files or licenses for Wowza Media Systems software. Wowza engine is used as a third-party agent capable of receiving RTMP streams; all installation, setup and management of this engine is to be handled by you or your Wowza administrator, and CBC AMERICA LLC is not responsible for the third-party engine operability and policies.

First, go to your Wowza Streaming Engine Manager and create a **new application** of the *Live* type.

> ⚠ Once you have created a new application, go to the *Source Security* settings of that application in your Wowza Streaming Engine Manager and set **RTMP Sources** security to **Open** (no authentication). This is required as Ganz CORTROL currently does not support authentication for RTMP streaming.

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Then, go to Ganz CORTROL Console, open the *Shared Channels* section and add a new shared channel, then fill in the settings as follows:

- **Sharing type**: Wowza
- **Channel**: target channel from the list of existing channels
- **Use substream**: up to you
- **Enable audio**: up to you
- **RTMP URL**: *rtmp://<ip>:<port>/<app_name>/<stream_name>*, where
    - *rtmp://* indicates that RTMP protocol will be used for streaming
    - *<ip>* is Wowza Streaming Engine server address - either IP or domain name
    - *<port>* is target (remote) RTMP port, 1935 by default
    - *<app_name>* is the name of the application you have created in Wowza
    - *<stream_name>* is a custom name for the RTMP stream (can be any name, use underscores instead of spaces), will appear in Wowza automatically

When you have finished, click *OK* to save and exit; the newly created channel share will appear in the item list and Ganz CORTROL server will attempt to stream the data to the target URL at once. If you wish to pause the streaming, use the *Disable* button on the top panel. After sharing the channel, you should be able to view the stream on the RTMP server side and start the casting, if it has not started automatically.

If you have trouble receiving the stream on the RTMP server side, check the following:

- make sure all used software is allowed through the firewall(s),
- restart the RTMP server,
- refresh connection list on the RTMP server side or refresh the webpage;
- remove the shared channel in Ganz CORTROL Console and try sharing the channel anew.

To edit any of the previously created channel shares, double-click it in the item list or select any with single mouse click and then hit the *Edit* button on the upper panel. Use the *Search* field in the upper-right-hand corner to quickly find the existing items, and the *Disable* button to **disable and enable** channel sharing. Use the recycle bin button in the upper-right-hand corner to remove one or multiple shares: hold *CTRL* or *Shift* to select several items at once, or *CTRL+A* to select all (actual original channels will not be affected).

When you remove the original channel (with or without its originating device), all shared channels based on it are removed from the configuration automatically as well.

Filters in the bottom panel allow you to load recently added/modified items.

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10.11 Data Sources

This Ganz CORTROL server functionality allows you to receive information in textual form from **third-party serial data providers** like Point of Sale (POS) systems, bank machines and a multitude of other devices capable of delivering data strings over the following connection types:

- UDP port (remote connection)
- TCP port (remote connection)
- COM port (direct hardware connection to the server)

The **procedure of configuring** the data reception from these sources is briefly as follows:

- create a data source, then
- create a data source profile, then
- go back to the data source settings and use the data source profile as a basis for the data source, and then
- assign the data source to the desired channel(s).

Gathered data is then stored and displayed embedded with the video stream from the channel(s) you choose to associate with it.

Add Data Source

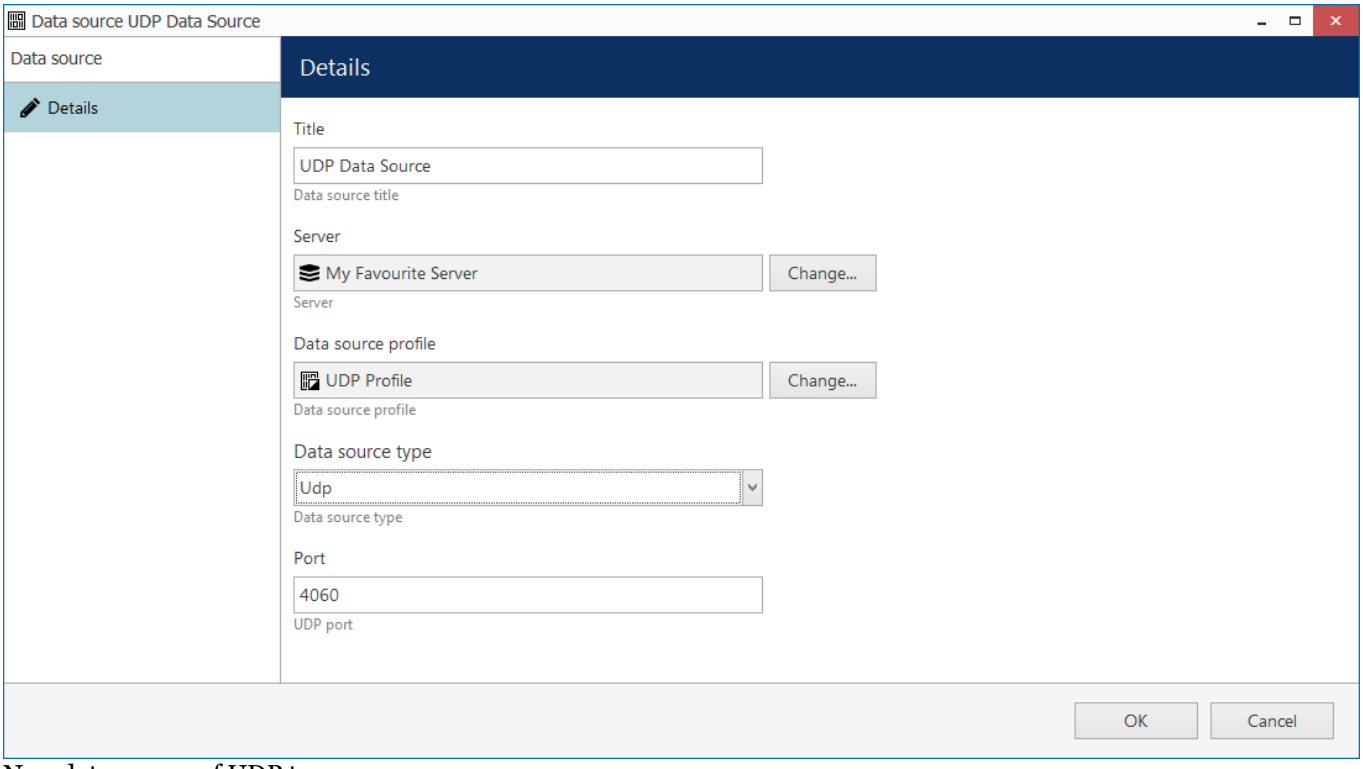
First, go to the *Configuration* section of Ganz CORTROL Console and choose the *Data Sources* component from the menu on the left. Then, click the *+ New data source* button on the upper panel to open the data source creation dialog box.

Give your data source a comprehensive name. Then, choose the server that is going to be accepting the serial data. Leave the *Data source profile* field **empty** for now and select the desired transport for the data connection. You will need to return here and choose the profile after you create the profile itself.

There are three possible connection types: UDP port, TCP port and COM port.

TCP/UDP Connection

Choose this option if your data provider is configured to feed the textual data into a specific TCP or UDP port.



New data source of UDP type

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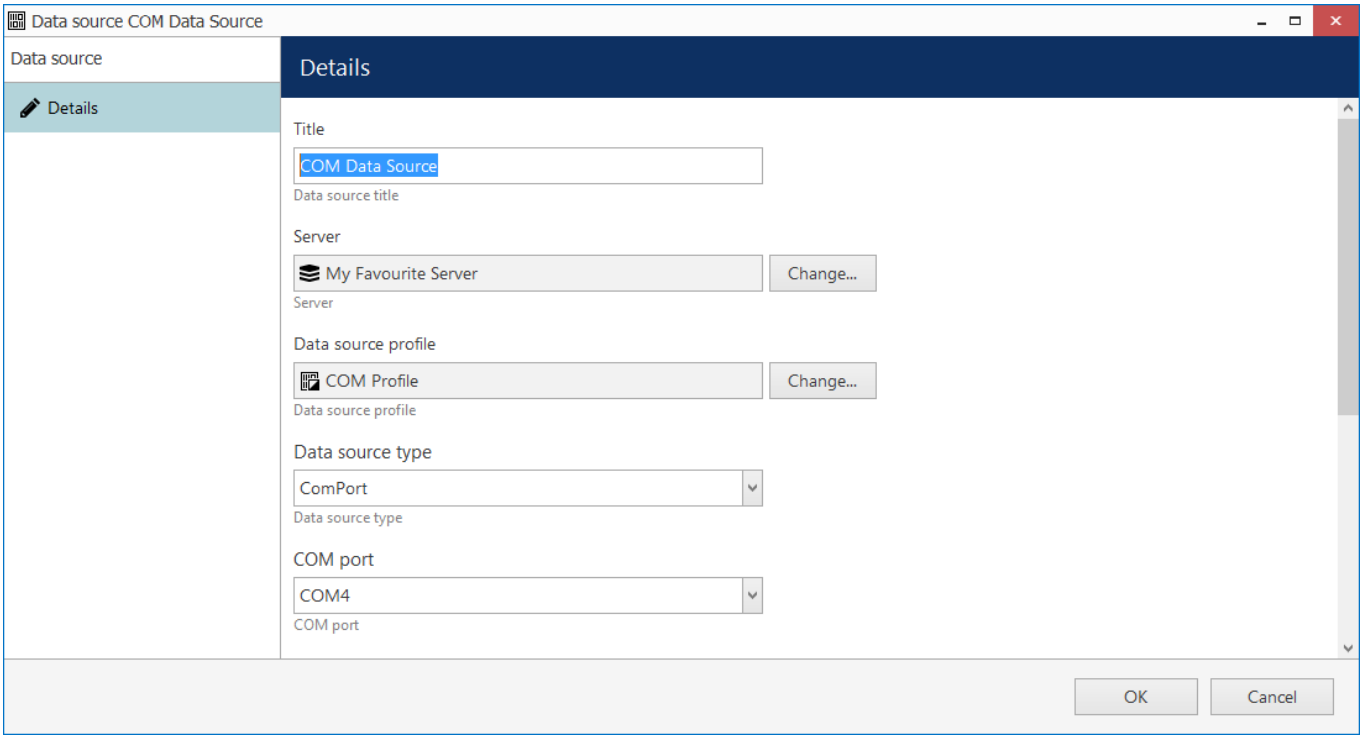
You simply need to specify the incoming port for the server to listen to in the settings here. Make sure the port is opened on all intermediate firewalls and not used by any other software on the server machine.

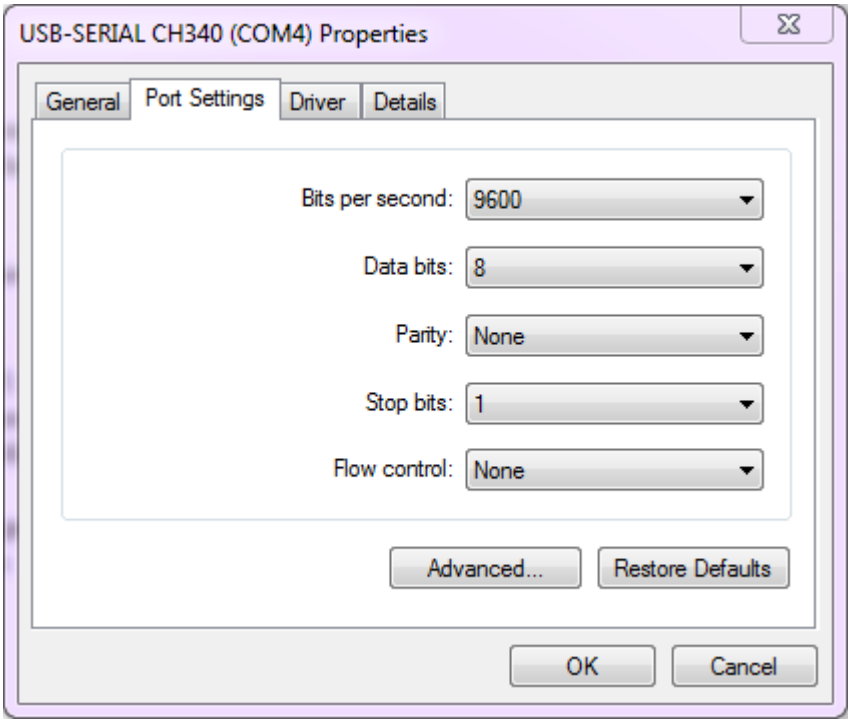
COM Port Connection

Choose this connection type if your data provider is connected directly into the Ganz CORTROL server's COM port.



New data source of COM port origin

For this configuration, you need to match the serial connection settings with those used from the device side. Normally, this can be checked via Windows Device Manager for your target COM port.



COM port settings in the Windows Device Manager properties

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The following serial port settings should be specified:

- **COM port**: serial port to read the data from, choose from the list of active ports
- **Baud rate**: information transfer rate (9600 by default)
- **Data bits**: the number of bits transmitted over the serial interface (8 by default)
- **Stop bits**: the number of bits to specify the end of a byte; if you select data bits to be 6, 7, or 8, then the default value is 1 and the other available choice is 2; if you select data bits to be 5, then the only correct choice for the stop bits is 1.5
- **Parity**: how the parity is checked (no parity by default)

Other serial port parameters are not required for the Ganz CORTROL server.

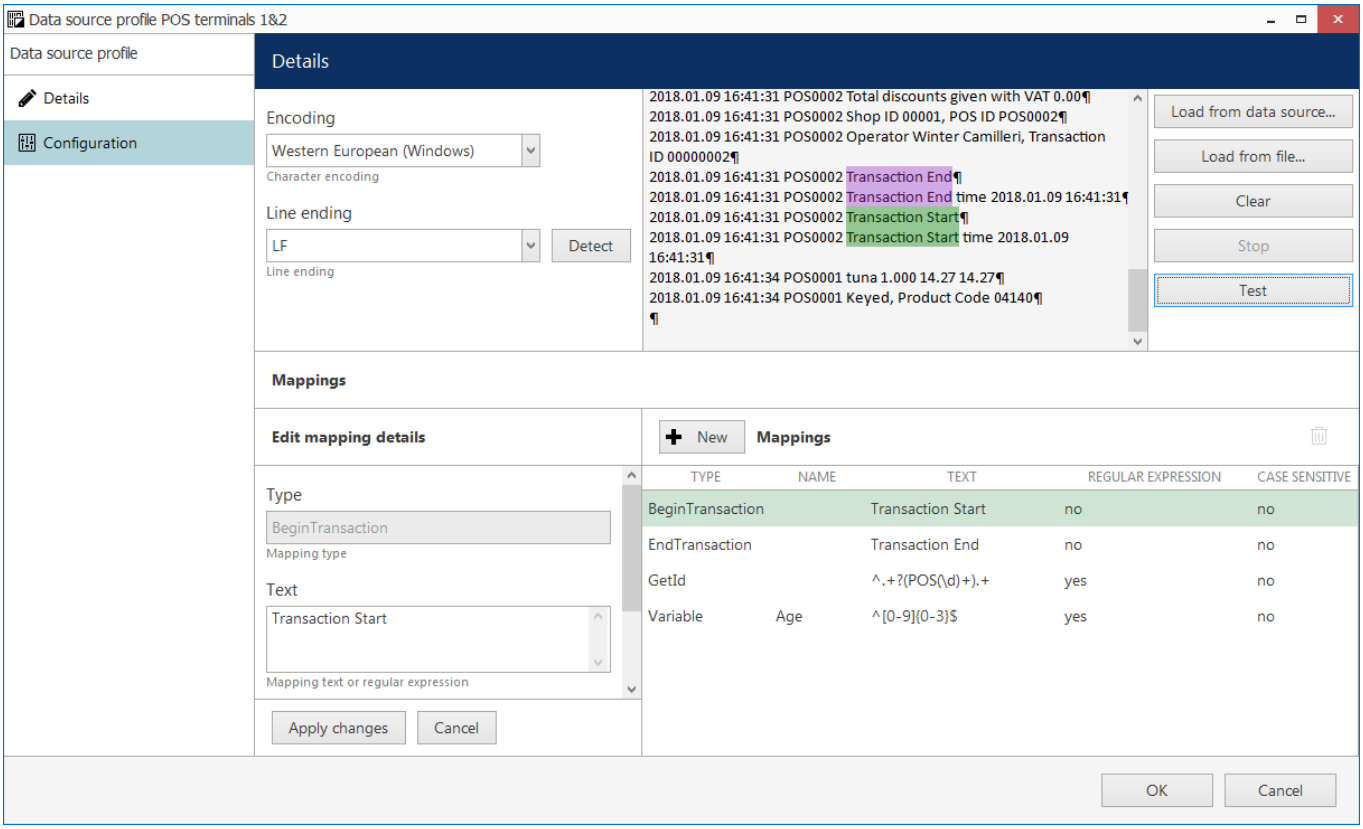
Click *OK* to save and close the data source creation dialog box. The next step is to create a data source profile to help the server determine how the textual data should be parsed.

Add Data Source Profile

In the *Data Sources* section, click the little arrow next to the data source creation button and choose the *+ New data source profile* from the list. In the *Details* tab, enter a custom name for your data source profile and switch to the *Configuration* tab.

It is now necessary to use an example of the data strings to set up the profile. This part of the setup is the same regardless of what type of data source you have.

You can either use the **actual data source** you have configured on the previous step, or use a **text file** that contains the lines of data in the expected format (note that the same encoding should be used). Use the buttons on the right side of the text field to load the sample from either source. Use the *Stop* button to finish displaying new text from the data source (do this if you see that the loaded data lines are sufficient to facilitate the configuration process); use the *Clear* button to erase whatever is in the preview window before loading a different file or strings from a data source.



Load a text sample to configure the data source profile

Based on the loaded sample, set the required parameters on the left:

- **Encoding**: pick the correct encoding to ensure your text is readable
- **Line ending**: choose what character(s) represent the end of the line, available options are:

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- CR - carriage return
- LF - line feed
- CR+LF - both together
- Custom - user-defined symbol or group of symbols

If line delimiter in use is one of the standard non-printable ones (LF, CR or CR+LF) but you are not sure, whichever is used, press the *Detect* button for the software to identify automatically, which delimiter is present in the pre-loaded text. If you know that the provided serial data does not include any standard delimiters, choose the *Custom* option in the drop-down list and define your own delimiting character.

Mappings

Mappings are pre-defined character combinations expected in the data flow, which can serve different purposes. There are three built-in mappings (existing by default and non-removable):

- **Transaction start**: specify text that designates the beginning of the data block (transaction)
- **Transaction end**: the very last data line of the expected data block
- **Data ID**: use a regular expression to break a single data source profile into multiple data streams based on some field (e.g., POS ID) and assign each one to different video channel

For the transaction start and end, you can specify a **regular expression** (regex rule) to define the start/end pattern instead of static text. You can also copy and paste the strings for transaction start and end directly from the sample preview field.

Additionally, you can create any number of mappings of the **user variable** type: this mapping uses a regular expression to extract a specific piece of data into a variable for further usage in the **E&A event** *Variable Condition*. Variables can be used, for instance, to detect exceptions in the cash operation in case the data source is a Point-of-Sale system. To create a **new variable**, click the *+ New* button in the *Mappings* section, fill in the settings on the left and click *Apply changes*. The following settings are available:

- **Type**: variable (cannot be changed)
- **Name**: user-defined variable title
- **Text**: a regular expression that defines what character combination should be extracted into the variable
- **Case sensitive**: enable this if uppercase/lowercase is important (disabled by default)

Use the *Test* button to check if your settings work: if everything is fine with the setup, lines should be detected correctly, transaction start and end marked as such and variables extracted as specified.

Click *OK* to save and close the profile configuration dialog box. The next step you need to take is to **go back to your data source settings** and specify the newly created data source profile that was missing in the initial configuration. You can use a single data source profile for different data sources.

Assign Data Sources to Channels

Finally, go to the *Channels* section and pick a channel that needs to be associated with the a data source. Double-click the channel to open it for editing and switch to the *Video overlays* tab. Click the *Configure video overlays* buttons to bring up an additional dialog box.

Here, different kinds of video overlays can be configured. The *Data overlay* element is already present by default. On the right side, you will have the available **settings**.

Click the *Change* button and select one of your pre-created **data source** for this channel. If the serial data is currently arriving, you will see the text appear in the frame. Then, adjust settings on the right to define where and how the text should appear on top of the video stream.

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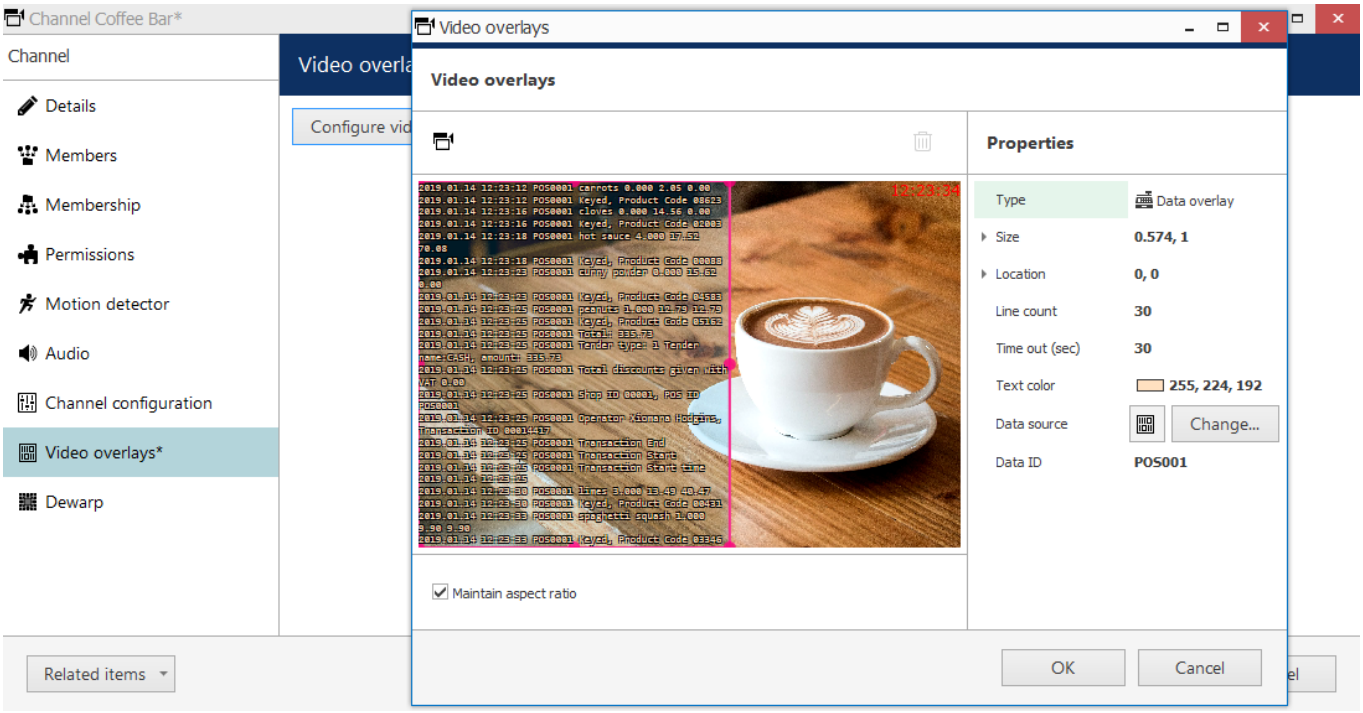

Set up overlay text alignment in the viewport

Use the visual control - the pink rectangle - to specify the **text output area** within the video stream viewport. There are other types of video overlay elements available in the same window, but the one you need is called *Data overlay* and it exists by default, so you do not have to add it. There are also numerical coordinates on the right side of the preview for your reference: you do not have to edit them manually.

Also, note that the visual control cannot be removed from the configuration; if there are no data to display, this element simply will not exist in the Ganz CORTROL Client application. The visual control is only present in this configuration window for your convenience. There is exactly one *Data overlay* element per viewport, meaning that each channel can only have text output from a single data source.

⚠ Make sure the video from the target channel is available before setting up the text overlay in order to ensure correct text placement.

Additional settings:

- **Line count**: set the desired number of text lines to be fitted into the overlay area (default value is 20); this will affect the text font size
- **Timeout**: the amount of time in seconds for every line of data to stay on the screen at maximum (older text will disappear and text will be shifted upwards)
- **Text colour**: choose a colour for the overlay text from the standard palettes (default is white)
- **Data ID**: data source identifier, if present (leave empty if not used)

In the *Data ID* field, you can enter the source identifier in case the serial data is being **split** between two or more channels; leave the field **blank** if this channel is the only destination for all the data received from the selected data source.

💡 If there are data from multiple devices combined in a single *Data source* feed so that the text comes from the same IP and port via the same protocol, it is possible to use the **Data ID field** in the *Data source profile* configuration to differentiate between the transactions based on their source identifier and split the text between multiple channels for further overlay.

Example: if the feed contains serial data from multiple Point-of-Sale terminals and their identifiers look like *POSxxxx* where *xxxx* contains the terminal number so that the identifiers are POS0001, POS0002 and so on, the following **regular expression** can be used to extract these IDs: **^.+?(POS\d+).+**

In this case, the *Data ID* field in every channel configuration is to contain the actual POS ID: POS0001, POS00023, POS6592 etc.

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When ready, click *OK* to save and close the data overlay dialog box, then click *OK* to save and close the channel configuration window.

Now your textual data from the data provider will be displayed overlaying the video stream in Ganz CORTROL Client and both live view and in the instant/regular archive playback mode in case the corresponding option is enabled in the recording profile for the target channel; also, it will be possible to search through the recorded data.

If you wish the serial data to be available in the video **playback** mode in Ganz CORTROL Client application, make sure to set the *Data stream* to be recorded in the corresponding recording profile.

The overlay text will only be visible in live view and regular/instant playback, and will not be displayed in other views (e.g., smart search). In order to export video from the archive with the text overlay, use MKV file format + VP8 compression + hard or soft subtitles.

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10.12 Manage Mail Servers

Several Ganz CORTROL components require an SMTP server in order to be able to send emails to a specified address. Specifically, these are:

- email sending actions in E&A and automatic reports
- two-factor authentication on top of the regular login

A **pre-configured mail server is required** for these features to be operational.

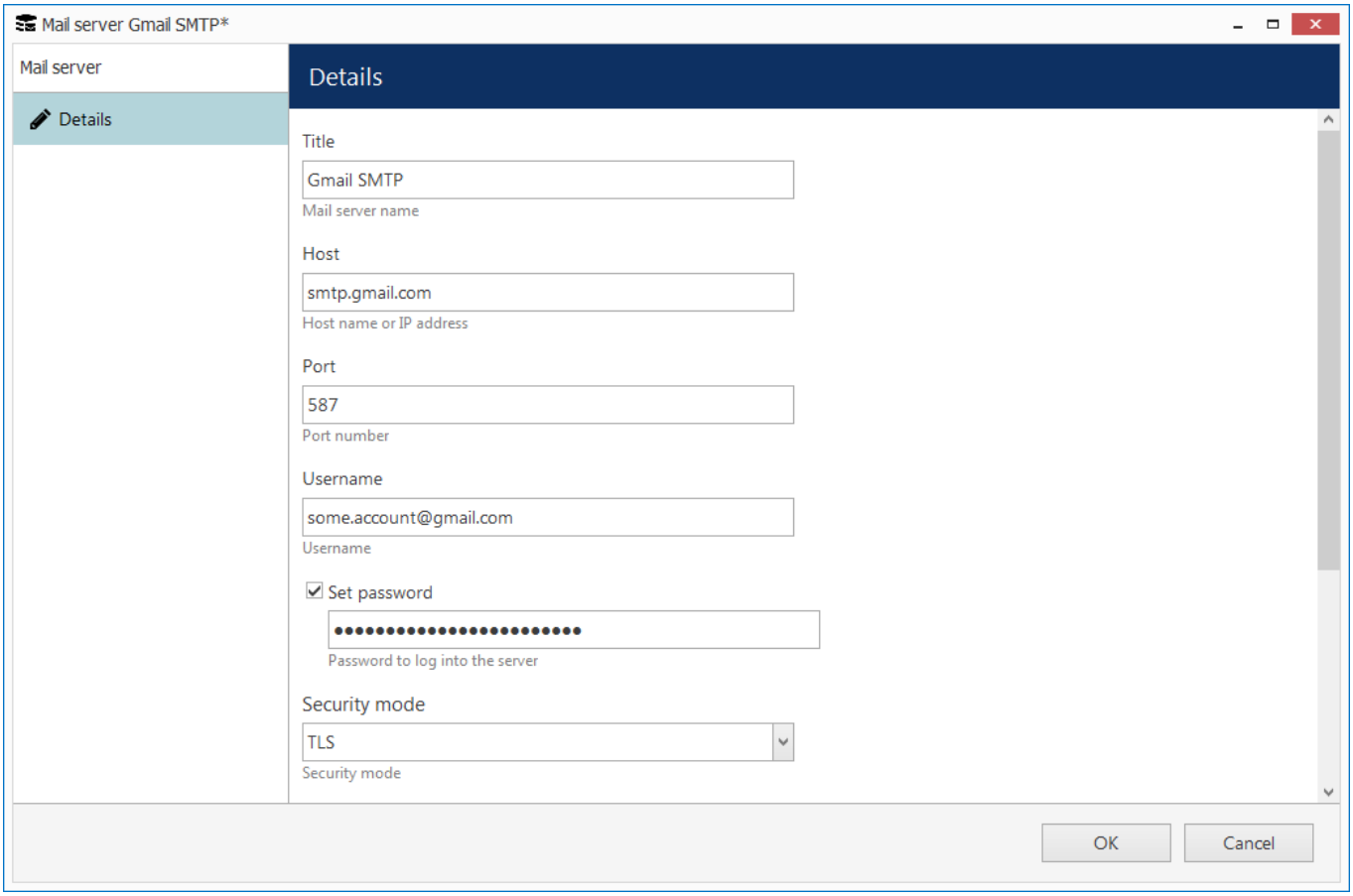
One or multiple different outgoing SMTP servers can be configured in order to send notification emails through them. You can use/set up your own SMTP server, if your organisation already has one and/or it is affordable for your organisation; alternatively, free Internet services can be used for this purpose.

> SMTP servers provided by popular free services and/or ISPs usually have limitations on the number/frequency of emails going through them daily. Make sure you check with SMTP service provider to learn about this.

To access mail server setup via Ganz CORTROL Console, open the *Configuration* section and select *Mail servers* from the menu on the left. Click the + *New mail* server button on the upper panel or double-click an existing mail server from the item list to open the configuration dialog box.

> Prior to Ganz CORTROL version 1.7.0, mail server configuration was accessible via *Events & Actions* section of Ganz CORTROL Console.

Note that there are not any default (pre-configured) mail servers.



SMTP server settings

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Setup here is similar to configuring an email client. The table below contains detailed information on the available settings.

Setting	Description	Default Setting
Title	User-defined mail server name	[empty]
Host	Outgoing SMTP server IP address or hostname	[empty]
Port	Outgoing SMTP server port; common ports are 25 and 587, and 465 for encrypted connections	0
Username	Enter valid user account details to log onto the target SMTP server	[empty]
Password	Enter valid user account details to log onto the target SMTP server	[empty]
Security Mode	Logon authentication type according to the SMTP server configuration requirements (STARTTLS, SSL (TLS version 1.2), or no security)	none
Sender	Email address on whose behalf emails will be sent	[empty]
Aggregation* Count	Max number of notifications to be aggregated into a single email	10
Aggregation* Time	Max time period in seconds during which notifications are collected together to be sent in a single email	10

*Email aggregation can be used to accumulate alert notifications and send them in bunches rather than one at a time. This decreases SMTP server load and does not 'spam' your notification inbox, making it easier to search and analyze alerts, and is thus especially useful if the number or frequency of events is high.

Maximum [time/number of occurrences] in this context means that it will not be exceeded under any circumstances. The actual time or number of occurrences may be either max or less - depending on which aggregation parameter is triggered first.

Example: aggregation time is set to 60 seconds and aggregation count - to 15. If the notifications arrive frequently, and 15 items are collected in under one minute, the email will be sent immediately. If there is just 1 or 2 notifications but 60 seconds have passed, an email will be sent, too.

Click *OK* to save mail server settings; newly created configuration will appear in the item list. Your mail server is now ready to be used for sending notifications and reports.

Some mail servers require additional settings to be changed on the server side to allow third-party applications to send emails through their SMTP service. For example, Google security requires that you log into your account via a browser using the server that will be utilising the SMTP service in order to enable account access from that computer.

If you can successfully use SMTP settings to send emails from the same computer, Ganz CORTROL will also have no trouble sending your notifications.

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10.13 Manage GSM Modems

Apart from email servers, Ganz CORTROL supports GSM modems. These modems with your pre-installed SIM cards can send and receive SMS (short messages), which can be used for the following scenarios:

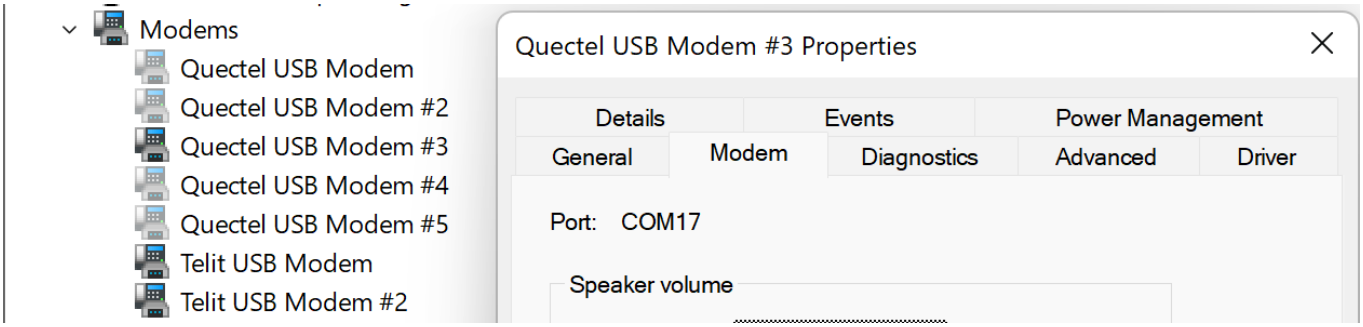
- send custom SMS notifications from Ganz CORTROL servers
- use SMS verification for 2FA
- receive SMS to trigger internal Ganz CORTROL events

If the modem doesn't work in, please try with a third-party app/utility. If the external utility does not work, Ganz CORTROL servers will also be unable to work with that modem. Microsoft offers a free tool called Microsoft Messaging, which you can get in Microsoft Store.

> ⚠ Modem hardware may apply delays (60+ seconds) for SMS receiving. Please make sure that resulting SMS read frequency from the mobile operator is acceptable for your scenario.

Connect and Set Up Modems

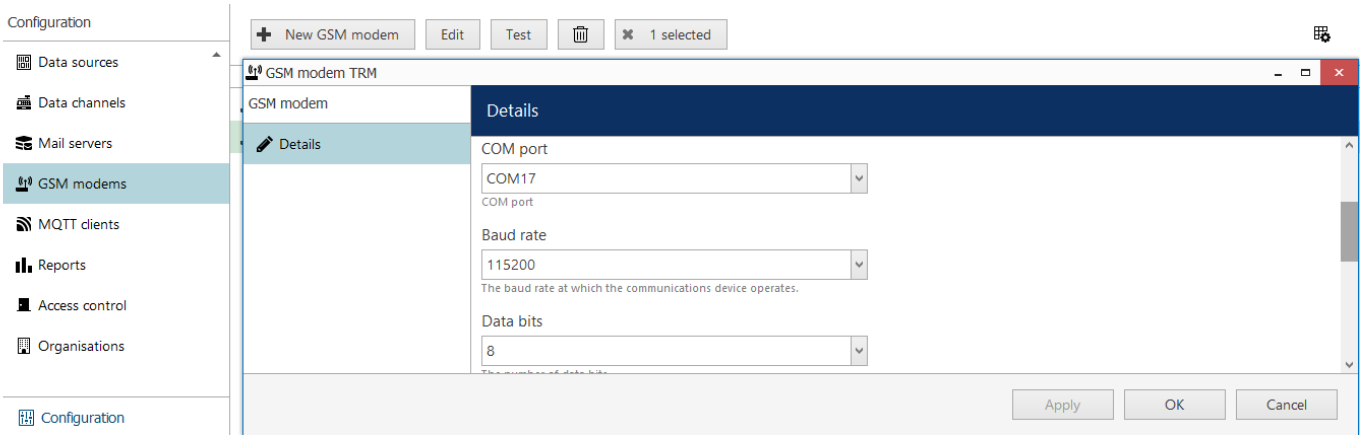
First, plug in your GSM modem as instructed in its manual - usually, modern devices use a USB connector and a virtual COM port. The modem should appear in the Windows Device Manager - if the drivers are installed automatically, you will see it appear under *Ports* > *Modems*, occupying one or several serial ports. Check the **modem properties** to view the occupied port. Some of the ports may be hidden; you can view the hidden entries by clicking the Device Manager main menu > *View* > *Show hidden devices*. Normally, you will not have to do this, as active (non-hidden) modems will be used in Ganz CORTROL.



Modem properties in the Windows Device Manager

> ⚠ If you are unplugging the modem, make sure to connect it to the same USB port next time; otherwise, the modem may use a different COM port, and will stop working because the Ganz CORTROL Console settings cannot be updated automatically. If you do insert the modem into a different physical port, make sure to check the new port and re-select it in the modem properties in Ganz CORTROL Console.

Then, in Ganz CORTROL Console, in the *Configuration* section, choose *GSM Modems* on the left. In the upper panel, click the + *New GSM modem* button to open the dialog box, and enter the modem settings. All COM parameters must match those on the modem side.



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New GSM modem configuration

Available settings:

- **Title**: user-defined modem name that will appear across Ganz CORTROL Console
- **Server**: Ganz CORTROL server that has the modem hardware attached to it
- **COM port**: choose the port used by the target modem
- **Baud rate**: must match the modem setting
- **Data bits**: must match the modem setting
- **Stop bits**: must match the modem setting
- **Parity**: must match the modem setting
- **SMS mode**: choose TEXT mode unless you need (and know how) to use special characters that are only supported in PDU mode (GSM7 encoding only)
- **SMS encoding**: GSM7 (special ASCII for GSM) or USC2 (special version of Unicode for GSM)

For correct COM port, check the modem port under *Modems* in the Device Manager as displayed above; depending on the modem driver, there may be multiple ports, including hidden ones. Some of these are usable by Ganz CORTROL, and some may be auxiliary: after creating the modem, use the *Test* button in the upper panel to test the connection and check if you have picked the right one.

If you use GSM-7 (ASCII) and your message shows full of ? of other odd characters, try switching to USC2.

After filling in the setttings, click *OK* to save: the newly created modem connection will appear in the list. Click the *Test* button to verify the connection: if the status retrieval fails, try selecting a different COM port. If none of the ports work, ensure that the serial port settings (baud rate etc.) match the settings on the modem side exactly.

The *Test* dialog box has two functions:

- modem status: verified automatically
- test SMS: enter phone number and text to send the message

Ganz CORTROL pings the modem every 30 seconds for the status update, and every 3 seconds for new messages. If you experience delays in message reception, these are most probably introduced by the modem hardware, and are not related to Ganz CORTROL server setup. Use the modem with 3rd party tools and compare the delay to verify.

To test against a specific phone number, enter the phone number - either in the international format (including the country code using either + or 00 prefix), or without the country code if the number is local for the SIM operator. Click OK to attempt sending the short message. If the number is incorrect, you will get a failure notification. If everything is fine, you will get a success message, and the message will arrive shortly (usually, instantly) to the target phone.

Wherever you need to enter a phone number in Ganz CORTROL Console, we recommend that you do it in the international format: first + (or 00), then the country code, and then the number itself. The number must not include any spaces, dashes, or parentheses.

Example:

- number in the local format: (555) 555-0155
- the same number converted into the international format: +15555550155

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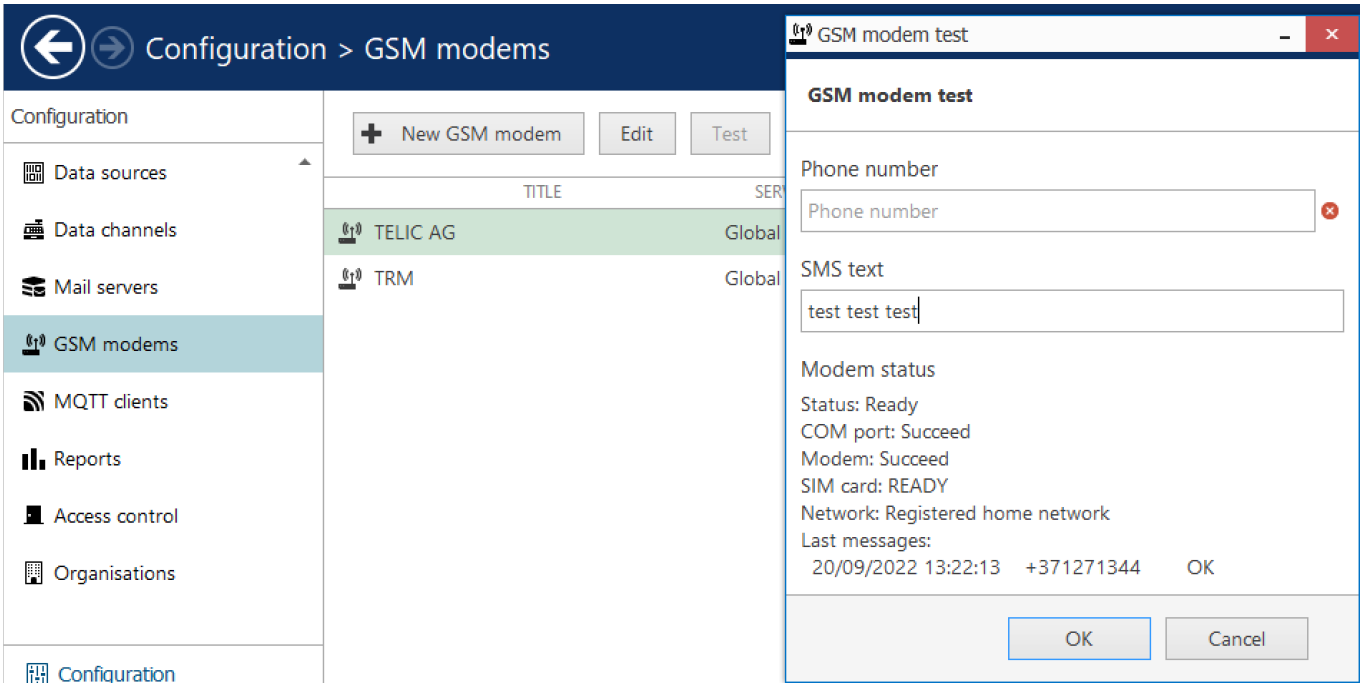


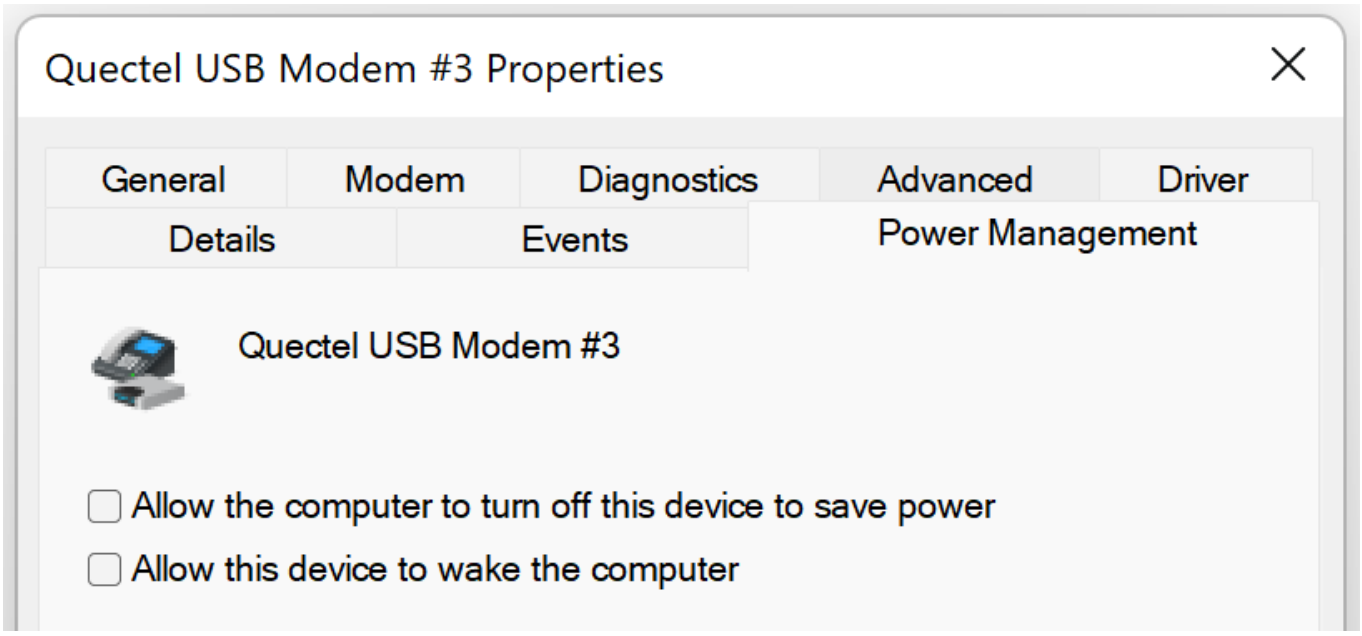
Modem status check and test SMS

The billing for the messages will be as per your SIM card plan.

> ⚠ CBC AMERICA LLC is not responsible for any losses due to additional mobile operator fees. It is solely your responsibility to keep track of and control the message flow and the event frequency in case the SMS is sent based on an E&A event.

If you respond to that test SMS, the modem will receive it and you will see it appear in the modem status summary under *Last messages*. The exact time of the message reception may vary depending on the modem hardware and settings; Ganz CORTROL does not introduce any additional delays.

Important! Make sure your modem does not go to sleep. To do this, go to the Windows Device Manager, find your modem under Modems, and check the *Power Management* tab for related settings. Do not allow the PC to turn OFF the modem to save power.



Modem power settings in the Device Manager

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Configured modems will appear in the corresponding tab of the *Monitoring* section.

Receive SMS

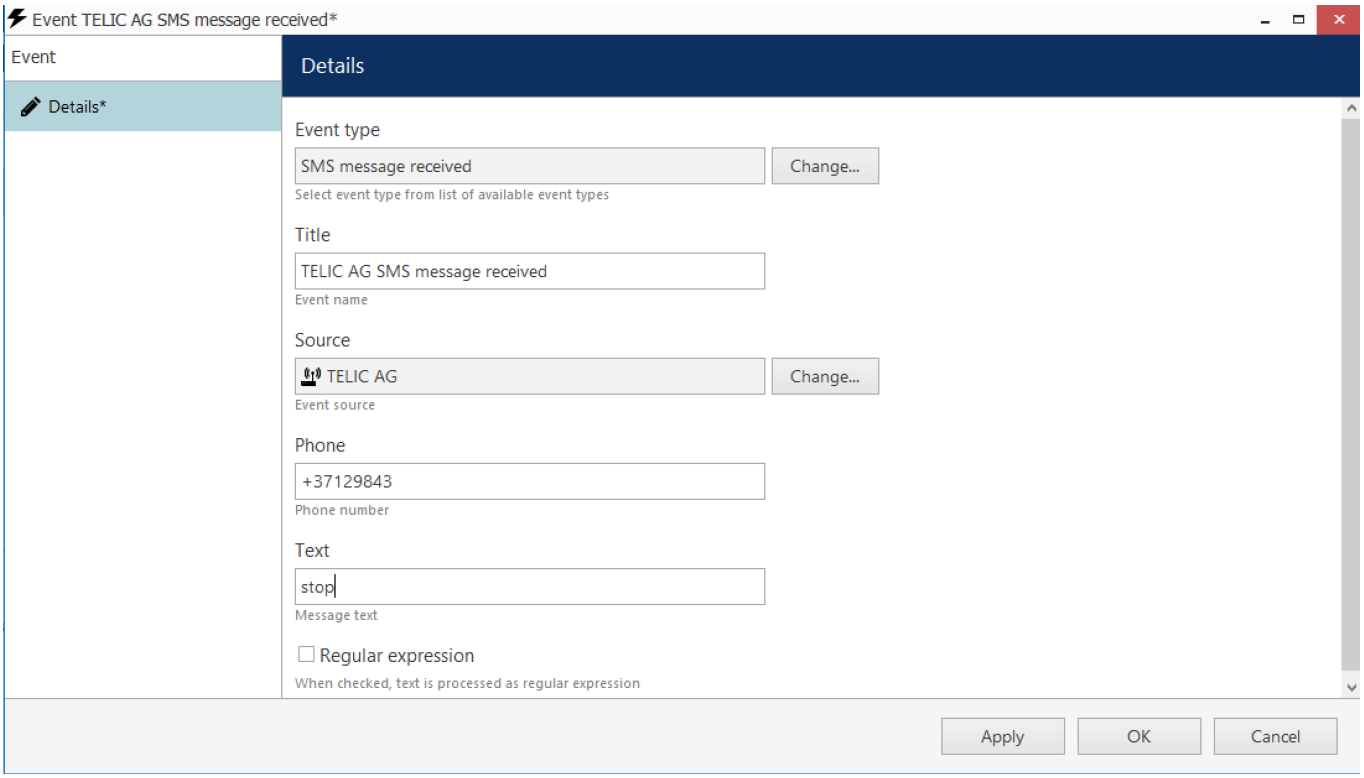
Once you add a modem, you will be able to receive SMS and use it for event triggering on Ganz CORTROL servers.

Modem Events

To create an SMS event, switch to the *Events & Actions* section of Ganz CORTROL Console, and choose *Events* on the left (you can also create new events right from the E&A Configurator). In the top panel, click the + *New event* button, then select the *SMS message received* event type in the dialog box, and then fill in the rest of the settings:

- **Title**: user-defined event name
- **Source**: existing modem hardware to accept the message
- **Phone**: sender's full phone number*; leave empty for any number
- **Text**: SMS text to trigger the event, case-sensitive; leave empty for any text to trigger the event
- **Regular expression**: enable if you wish to evaluate the incoming text with **regex**, e.g., use placeholders

*The phone number must be in the **international format** (with leading + or 00 and a country code) for ALL numbers, even local ones. The event will not work properly without the country code.



Event triggered by incoming SMS

Click *OK* to save and close the dialog box. The newly created event will appear in the list.

Once you have created the event, you can use it to build event rules in the Event & Action Configurator, as usual. For example, you can send SMS to trigger start/stop recording, to open doors and gates, or to create alarms and bookmarks.

⚠ Please note that modems may introduce **delays** when receiving SMS due to periodic SMS reading approach (messages are received from the mobile operator at certain intervals). Please test your modem hardware and ensure that the resulting SMS reception frequency is acceptable for your event scenario. The Ganz CORTROL software does not add any delays and is not responsible for the delays on the hardware side.

Send SMS

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Similarly, modems can send SMS to the pre-configured phone numbers. Ganz CORTROL servers can utilize this in two scenarios:

- send messages based on the triggered events - E&A **actions**
- send codes via SMS for two-factor authentication (**2FA**)

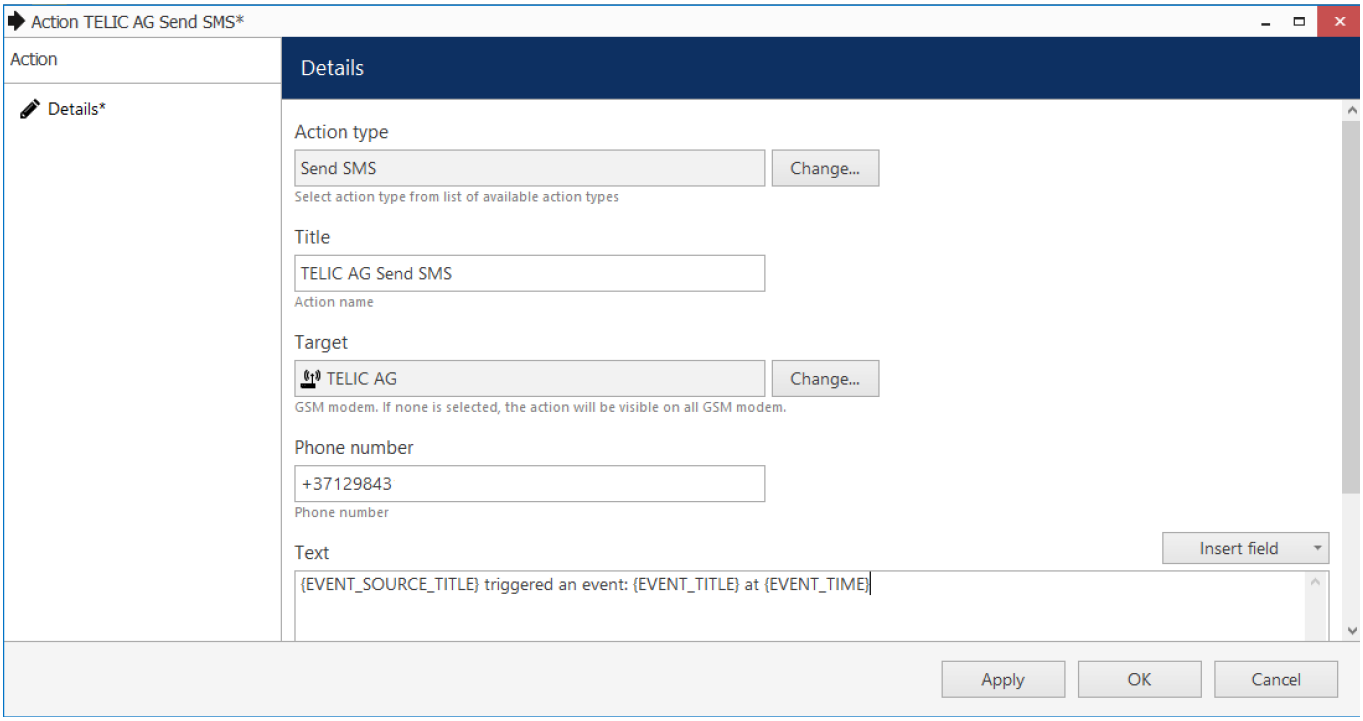
Note that you cannot create actions or 2FA notification providers without actually having a working modem, so make sure to add and test the modem first.

Modem Actions

To create an SMS sending action, switch to the *Events & Actions* section of Ganz CORTROL Console, and choose *Actions* on the left (you can also create new actions right from the E&A Configurator). In the top panel, click the + *New action* button, then select the *Send SMS* action type from the *Notifications* group in the dialog box, and then fill in the rest of the settings:

- **Title**: user-defined action name
- **Source**: existing modem hardware to send the message
- **Phone**: the recipient's phone number*; leave empty for any number
- **Text**: SMS text to be sent, right-click to insert text macros

*If the phone number does not have a country code defined, the local country code of the SIM card operator will be appended to the number. If you want to guarantee the number correctness and the message delivery, please enter the number in the international format with a country code and a leading +/00.



Action: send SMS notification

Depending on your modem settings and chosen language, each message may be split into several ones. Before setting up the notifications on production servers, verify the setup and make sure you are getting the desired results.

Two-Factor Authentication (2FA)

Before enabling 2FA:

- add a valid modem and test it
- ensure all users who will use 2FA have a valid and full phone number specified in their account properties in Ganz CORTROL Console

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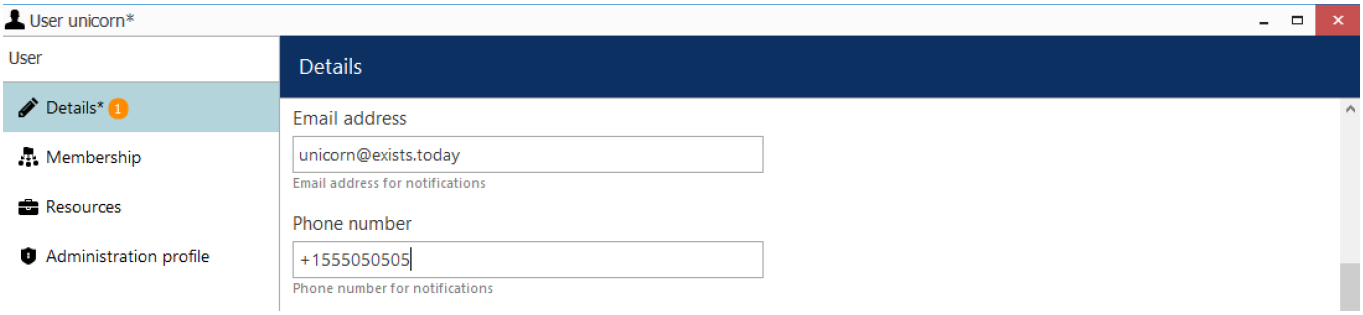
The phone number setting is new (comes with the modem support) so you will need to go the each user's properties and enter their phone number to make sure they can receive SMS for the verification.



User's phone number and email for 2FA notifications

To set up 2FA, go to your Ganz CORTROL server settings (for Ganz CORTROL Global systems - go to the central management server properties, as this a is system-wide setting) > *Two-Factor Authentication* tab > add a new notification provider and specify the rest of the settings as described in the corresponding chapter about 2FA.

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11 External Services

External modules are modules that have been integrated with Ganz CORTROL, including these, which have been designed to work with Ganz CORTROL - license plate and face recognition engines. They operate either independently or based on streams received from Ganz CORTROL server, and Ganz CORTROL server can receive event metadata from these modules and then use these events for Event & Action configuration, as well as provide the opportunity to view these events in both live and investigation mode in the Ganz CORTROL Client application.

All the external modules can be connected using the same logic, the main important steps being as follows:

1. Prepare channels to be used for the target external module
2. Install the target external module
3. Connect to the Ganz CORTROL server from the external module and enable HTTP notifications in it, if such an option is explicitly available - this will make the external service automatically appear in Ganz CORTROL Console
4. Create a group for external services in Ganz CORTROL Console and add your external service to the group
5. External service will now be available for E&A configuration and its events will be visible in Ganz CORTROL Client

> Important notice for Ganz CORTROL Global systems: prior to Ganz CORTROL version 1.15.0, external services only operate via central management server.
>
> Starting with 1.15.0, you can link external services **directly to recording servers** (Ganz CORTROL Recorder instances). Note, however, that this functionality will not be covered for failover servers in case the target Ganz CORTROL Recorder goes offline. When your external service is linked to Ganz CORTROL Global, streaming will automatically switch from/to failover.
>
> This works for all kinds of external services, except for Camio, which is integrated in a slightly different way.

This administrator's manual covers an example on how to connect to the LPR (License Plate Recognition) module. Other external services are added in a similar way, the only difference being the external module interface. Also, you will find more details in LPR/FR own user guides.

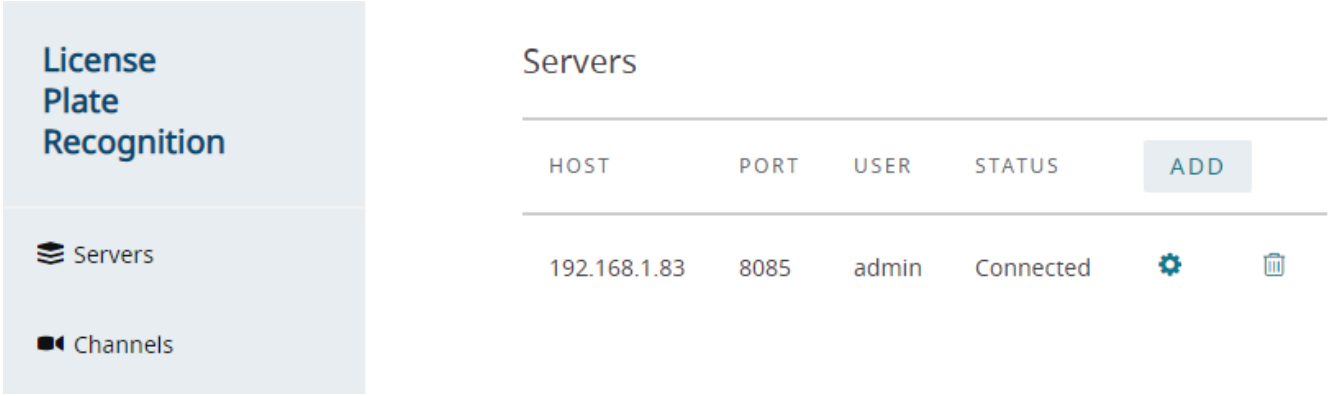
Install External Module

Start LPR installation by double-clicking the installation package, and go through the wizard's steps. Activate LPR using your purchased LPR license and run the software with empty configuration.

> Please use LPR version 2.x with Ganz CORTROL. If you already have an older LPR installation that works with ZNSNVR, you will need to re-install it to make it work with Ganz CORTROL or use a separate LPR installation.

Set Up External Module

In the LPR module, add a new server connection and enter your Ganz CORTROL server connection details. Make sure that the target HTTP port is reachable and that the user account has the *Login via HTTP* permission granted.



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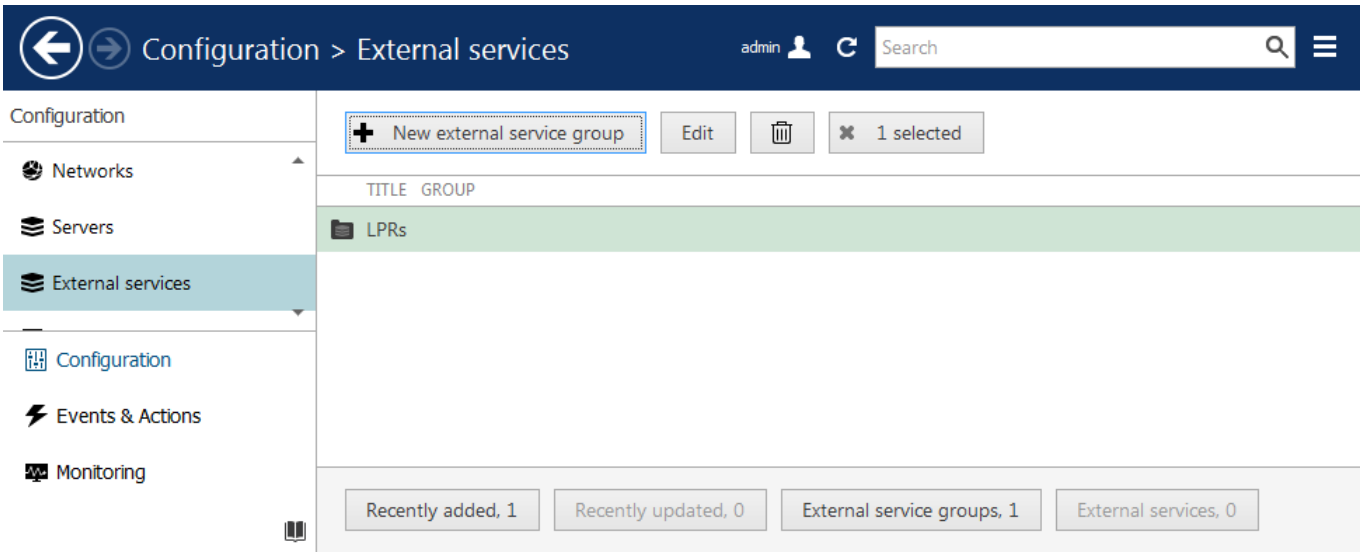
Add new server connection via LPR Web interface

Then, add your desired channels for LPR analysis and set up license plate recognition as usual. For details on the setup, please refer to the LPR user manual.

Add External Service

In Ganz CORTROL Console, go to the *Configuration* section and choose *External Services* from the left-hand-side menu. On the upper panel, press the + *New external service group* button; in the dialog box, enter a group name and click *OK* to save. The newly created group will appear in the item list.



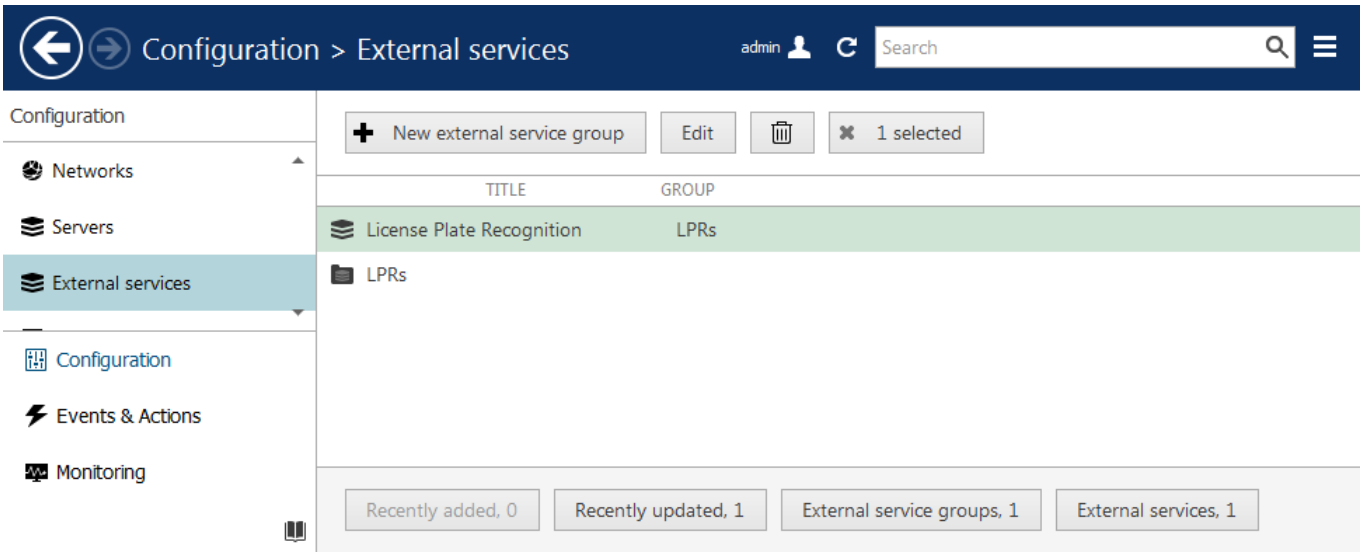
External services group

After you have set up LPR to send VMS notifications, as described above, the target service should automatically appear in the *External Services* list. Double-click it to bring up the service settings:

- **Title**: you can either keep the default (auto generated) name, or change it
- **Server**: target server for the external service to connect to (must match server address in the external service configuration)
- **Group**: add it to the group you have just created

Click *OK* to save and close the dialog box.

In the additional tabs - *Events and actions*, *Related resources* - you will see some relevant data, all in one place. *Events and actions* will display actions linked to the target service events, while *Related resources* will reflect the list of channels used by target service (in this case, LPR).



LPR service with its corresponding External Service group

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From now on, your configured external service will become available in the Event & Action Configurator, and its event streams will also become available for investigation in the Ganz CORTROL Client application. Please refer to the Ganz CORTROL Client and LPR user guides for details on the investigation mode.

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11.1 Access Control

Starting from version 1.8., Ganz CORTROL has an integration with **access control systems**. Ganz CORTROL server is now capable of receiving events from and sending requests to third party access control software.

> The current integration includes the following **access control software**: Keri, Feenics, Gallagher, Roger RACS 5, and Visual Access System by GSF Corporation.

Ganz CORTROL obtains the **list of doors**, their **statuses** (opened/closed, locked/unlocked), **cardholder list** and relevant events, and enables you to lock and unlock the doors based on internal Ganz CORTROL server events (e.g., user button pressed) and also from the Ganz CORTROL Client application. Information about doors, their events and cardholders is searchable from Ganz CORTROL Client application as well.

Supported functionality overview:

- Receive events, door list and their status, list of cardholders (users)
- Change door status by sending corresponding commands back
- Live door status with linked video channels
- Interactive markers on the maps and geographical maps
- Notifications and other actions based on door events
- Search event history based on doors, cardholders, and time
- Get mobile app notifications
- Lock and unlock doors from the mobile application

Integrations with different access control software are similar. However, there may be nuances in configuration. If you encounter any difficulties with the setup, feel free to contact our support engineers at cortrol@cbcamerica.com.

Ganz CORTROL Configuration with 3rd Party Access Control

This topic briefly describes the configuration necessary to make use of the access control software integrations with Ganz CORTROL software.

Prerequisites

Keri uses port 11000 as default and ports 11000 through 110xx for connections so these should be opened and forwarded on the intermediate routers and firewalls.

Ganz CORTROL connection to the Doors.NET system uses a certain license type – **OnSSI**. Make sure that your Keri license includes this type of client license (at least one) and that it is not used by other client connections.

> In earlier Ganz CORTROL versions, a different Doors .NET license connection - RollCallClient - was used. It still works but Kery Systems strongly recommend using the OnSSI license instead.

For Keep by Feenics, there are no special requirements. You just set it up as usual, and Ganz CORTROL servers already have a connection to api.feenicshosting.com via HTTP hard-coded. Make sure to allow this connection on your local firewalls.

For Roger RACS 5, there are also no special configuration requirements, set up your VISO as usual. Just make sure you have applied a valid **license** to the access control software. Without it, the integration services on the Roger side will be inactive. You can check the license status by running the RACS Services Manager and then selecting *License service*.

Add Access Control Configuration

In Ganz CORTROL Console, open the *Configuration* section and choose *Access Control* in the menu on the left. Here, you need to create a connection to the Keri server: click the *New access control configuration* button on the upper panel and fill in the settings, then click *OK* to save:

- User-defined **title**
- **Type**: select your access control software name
- **Host**: access control server IP address (required for some types)

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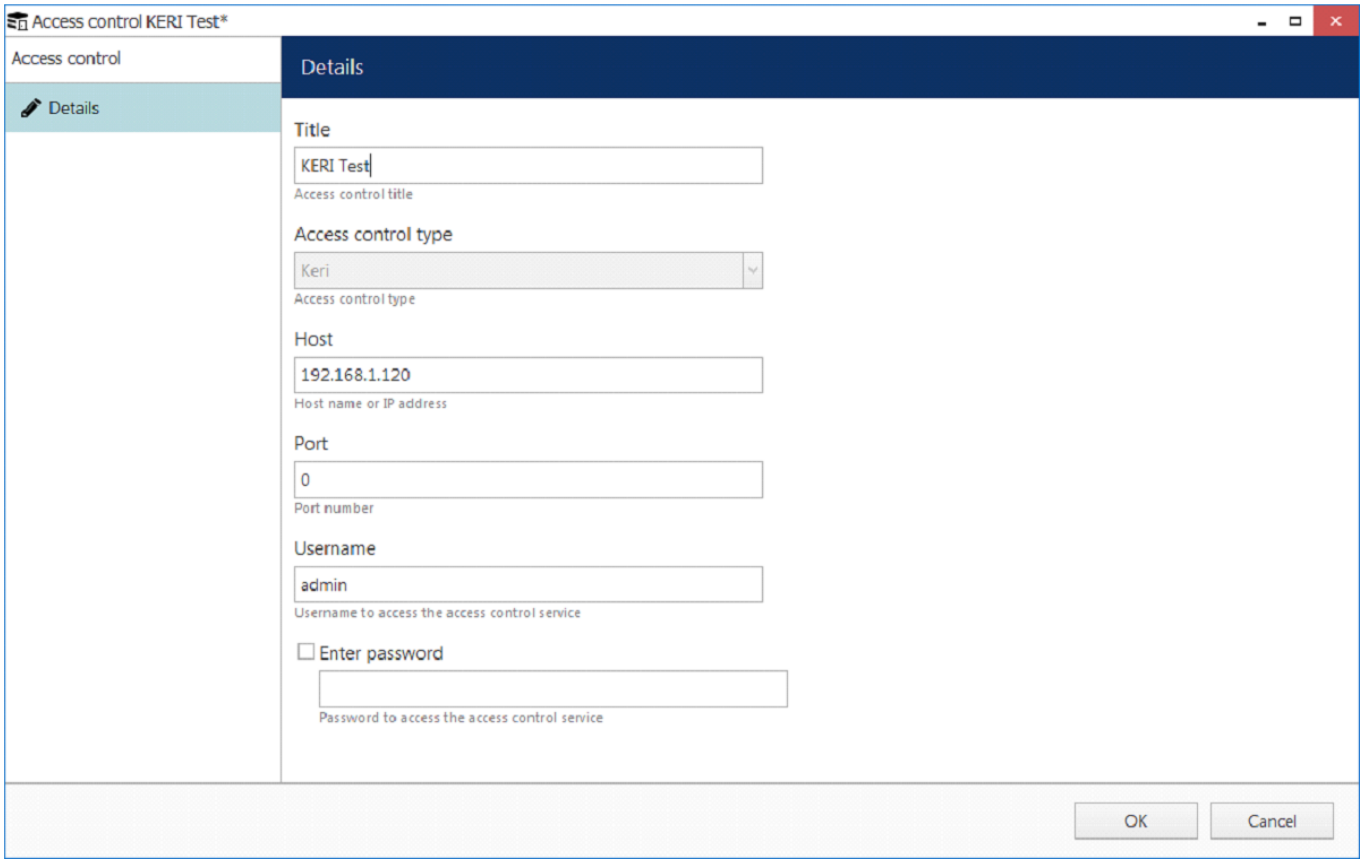
- **Instance**: instance name for Feenics (defined on the Keep side)
- **Port**: access control server port
    - Keri: the default port is 11000, ports 11000 through 110xx can be used otherwise, depending on the Keri configuration
    - Roger: leave 0 to use the default port of 8892
- **Username** and **password** to connect to the access control server
- **Merge**: enable this option if you have multiple access control systems and you want to have them all in a single tab in the Ganz CORTROL Client application



Access control configuration example for Keri Doors .NET

For Roger RACS 5, you check and change the service IP address and port by running the RACS Services Manager and then selecting *Integration service*.

For Gallagher access control, there is a special pairing procedure with additional settings, please see the corresponding topic of this document for more details.

Add Doors

Next, click the arrow next to the *New access control configuration* button and select *New door* in the drop-down list. Choose the access control configuration created on the previous step.

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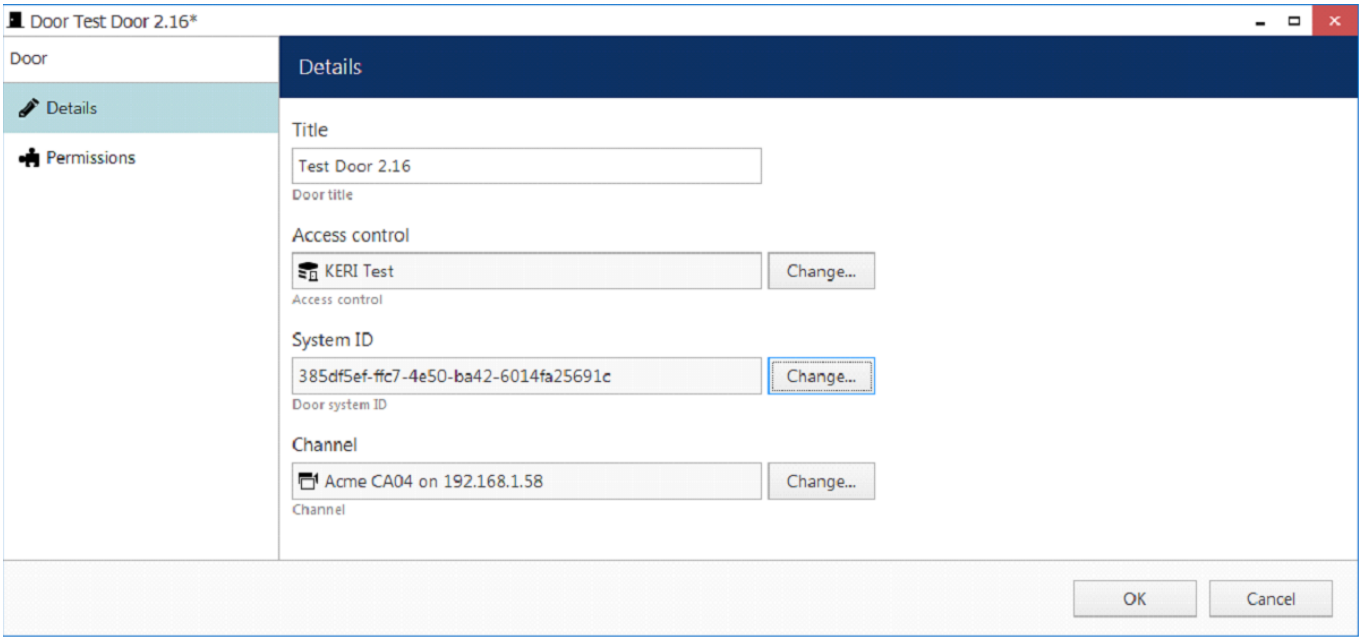
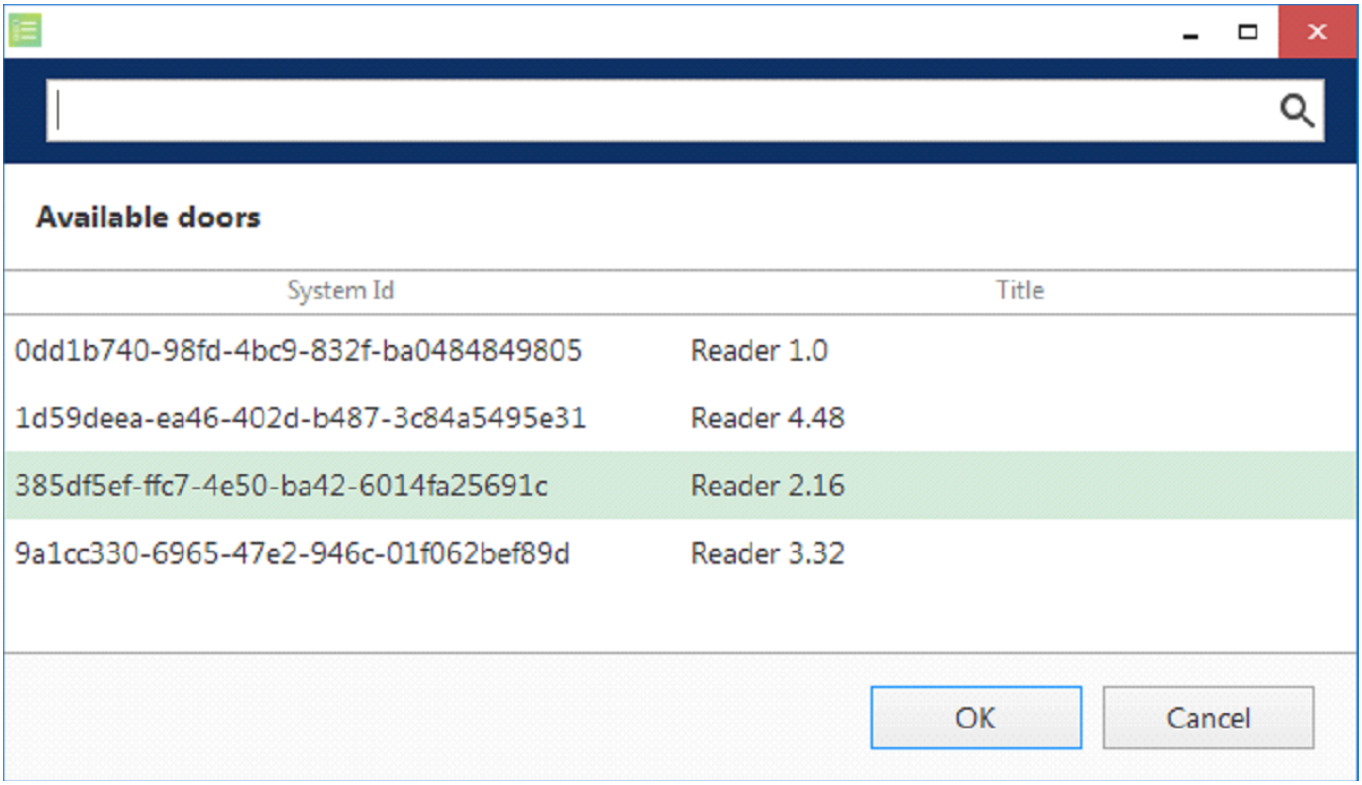


Add new door

Click the *Change* button next to the *System ID* field to view the list of available doors: if the access control configuration is correct, Ganz CORTROL server will successfully fetch it from the Keri server. Choose the required door and click *OK*.



List of available doors fetched from Keri

If you wish to bind a video channel to a door, choose a channel in the corresponding field. This channel will appear when viewing events from that door in the Ganz CORTROL Client application, and the event list will be bound to the recorded footage.

Monitoring

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For all the doors that have been added it is possible to view their current states in the Ganz CORTROL Console application: to do so, switch to the *Monitoring* section and select *Access Control* in the list on the left.

Door status monitoring

The following information is available from Doors.NET:

- **Open state**: opened/closed
- **Lock state**: locked/unlocked
- **Alert flags**: additional information, if any
- **Status time**: last status update time

Use the *Search* field in the top right corner to filter the door list, and the *Refresh* button (or F5) to reload it.

Maps

Apart from the dedicated *Access Control* sections in Ganz CORTROL Console, it is also possible to place door markers onto maps – either regular ones or geo maps. Markers on the map will reflect door open state and lock state.

To do this, select *Maps* in the *Configuration* section of Ganz CORTROL Console and create a map or open an existing one. On the *Marking* tab, place as many markers as you need – the ones looking as doors – from the top panel. Click any marker to edit its settings on the right side of the dialog box: assign a door to it and adjust colours and icons for different door statuses.

For more details, please see the Maps section of this document.

Events and Actions

After the necessary connection and door(s) have been added, it is possible to use the door status changes as events in the *E&A Configurator* and also send commands to the access control server as door related actions.

To add events and actions in Ganz CORTROL Console, switch to the *Events & Actions* section and choose *Events* or *Actions* on the left; click the *New <item>* button to add a new entry. Alternatively, you can add new events/actions right from the *E&A Configurator* by clicking the *+ New <item>* button in the bottom of the leftmost and rightmost columns.

There are two events related to the access control integration:

- *Access control event*: items not related to doors but still coming from the access control side (vendor-specific; e.g., other components' status change)
- *Door event*: codes related to door status (i.e., bound to specific nodes)

Door Event

This event category is triggered when the specified code is received from the access control server. Choose the target door as the event source here (the door must be added to the Ganz CORTROL server configuration beforehand), then select the code you wish to set up the reaction for.

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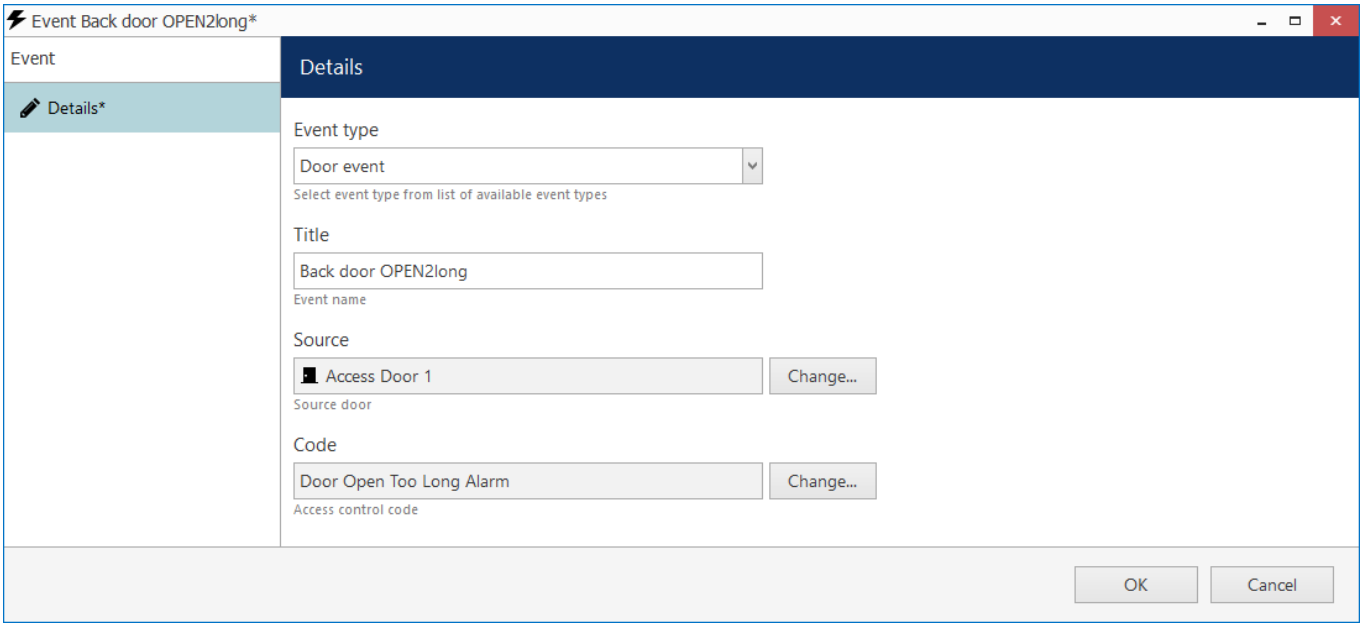
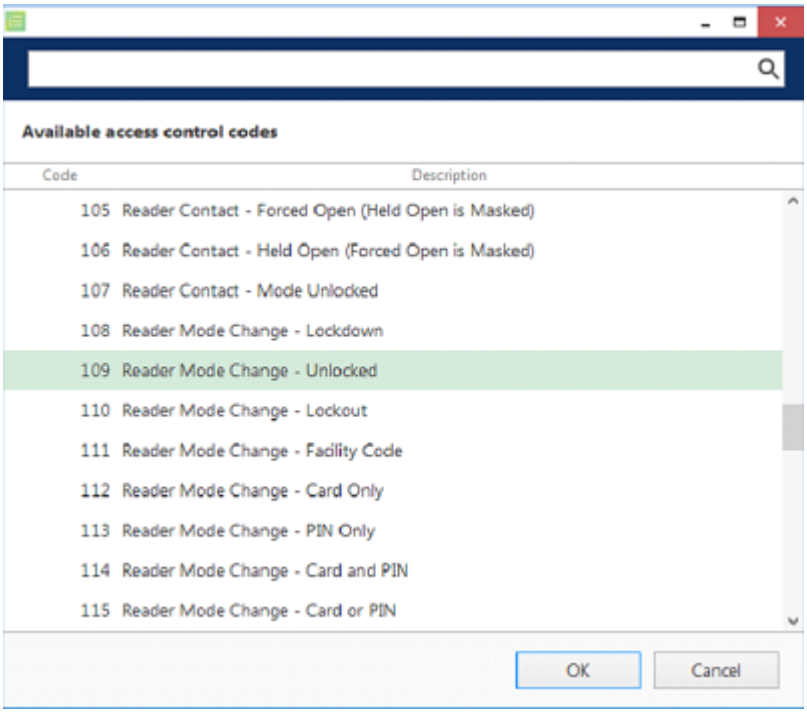


Door event

The **code list** is retrieved from the access control software and contains possible event types that can be received and understood by Ganz CORTROL server. Choose the one you want to set up a reaction for.



Door codes fetched from Keri

Access Control Event

Use this event type if the notifications from the access control are not door-specific.

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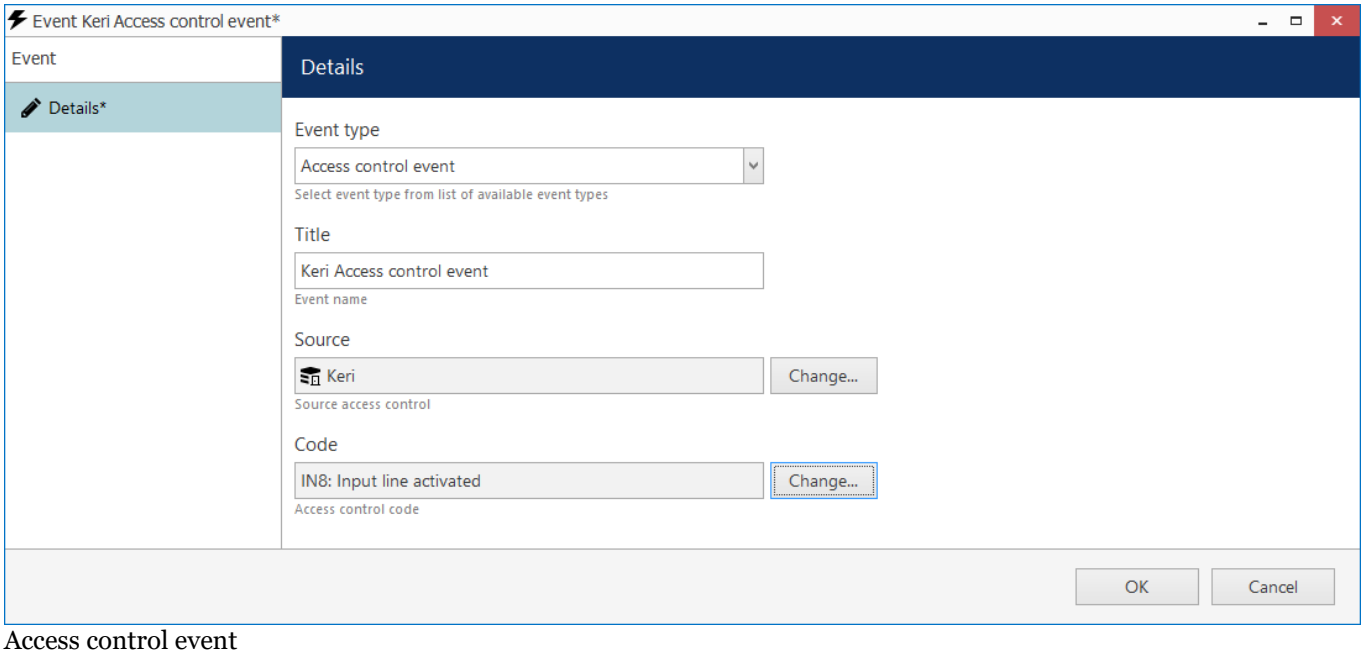
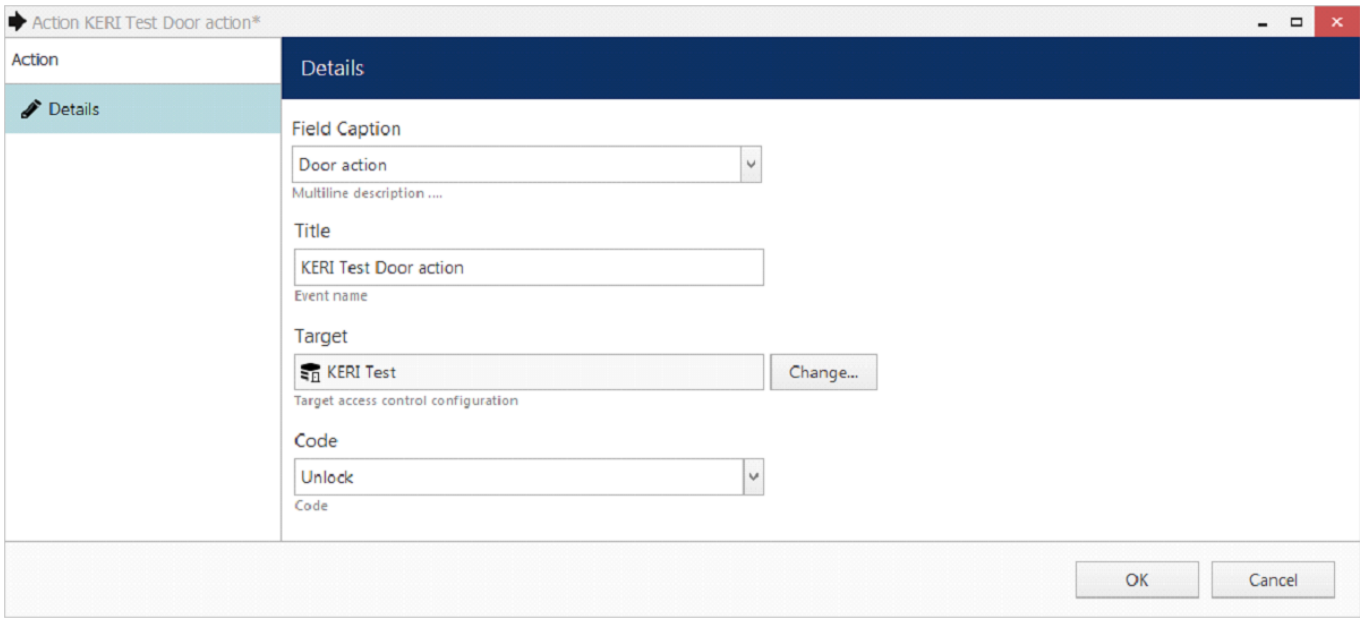


Access control event

The exact list of event codes here depends on the vendor; some access control integrations may not support this kind of message.

Actions

Similarly, you can send notifications to the access control servers based on Ganz CORTROL events. To do this: in Ganz CORTROL Console, choose *Actions* in the Events & Actions section and create a new one by pressing the *New action* button on the upper panel. Alternatively, press the + *New action* button on the *E&A Configurator*. You will need the *Door action* type.



Door action

As a target, specify the access control configuration added earlier. The specific door for this action will be chosen at the rule creation step, allowing you to use this action for many different doors within the same access control configuration.

Available **action codes** here are: lock, unlock, temporarily unlock, and lock down (standard access control door states). Once the action is triggered, the corresponding command will be sent to the third party access control module.

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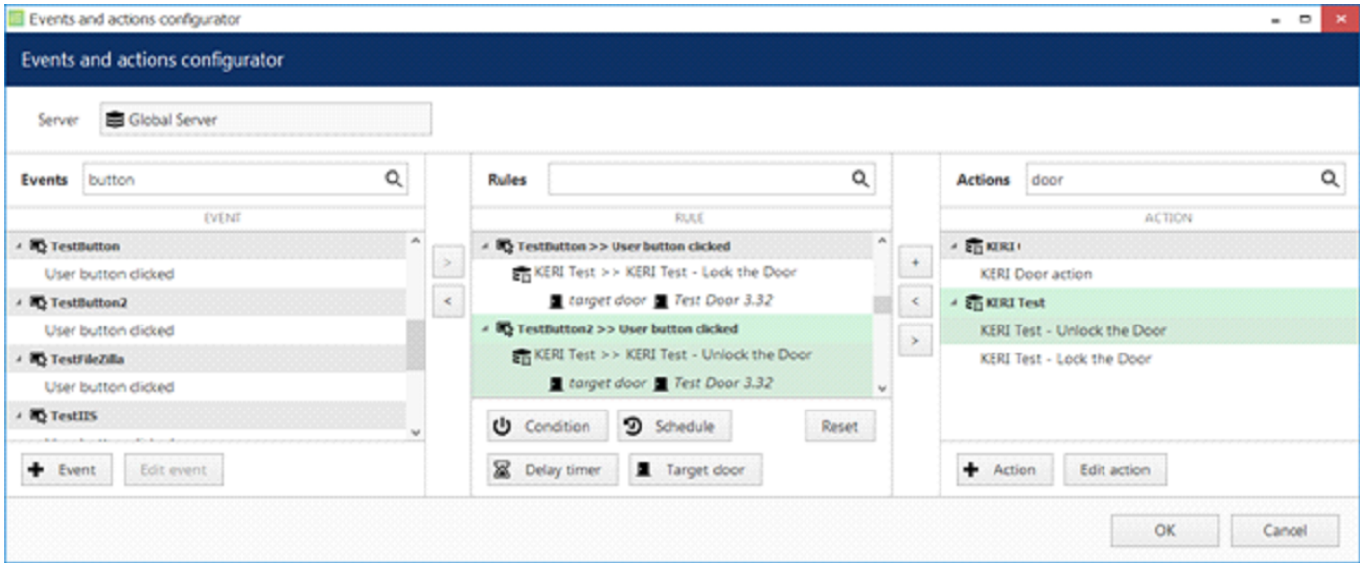
E&A Rules

Once you have created necessary events and actions, combine them into rules in the *E&A Configurator*. For door related actions, remember that you need to specify the target door by using the *Target door* **button** in the bottom of the middle column.



Combine events and actions into rules

Selected door status changes will trigger events in Ganz CORTROL, and actions triggered by internal Ganz CORTROL events will change door state, which will also be reflected in the access control UI.

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11.2 Gallagher

Ganz CORTROL has several integrations with third-party access control software suites. This part of the documentation provides details on how to make Ganz CORTROL work together with your **Gallagher Command Centre**.

The integration ensures two-way information exchange between Ganz CORTROL servers and access control software servers:

- Ganz CORTROL server receives **events**, **door** list and status, and **cardholder** list
- in Ganz CORTROL Console, you can see door status, add them to maps and geo maps, as well as create door-related events and actions
    - E&A events help monitor the changes in the door status
    - E&A actions and maps allow you to change the door status (lock/unlock)
- in Ganz CORTROL Client, you can search door and cardholder events for the desired period

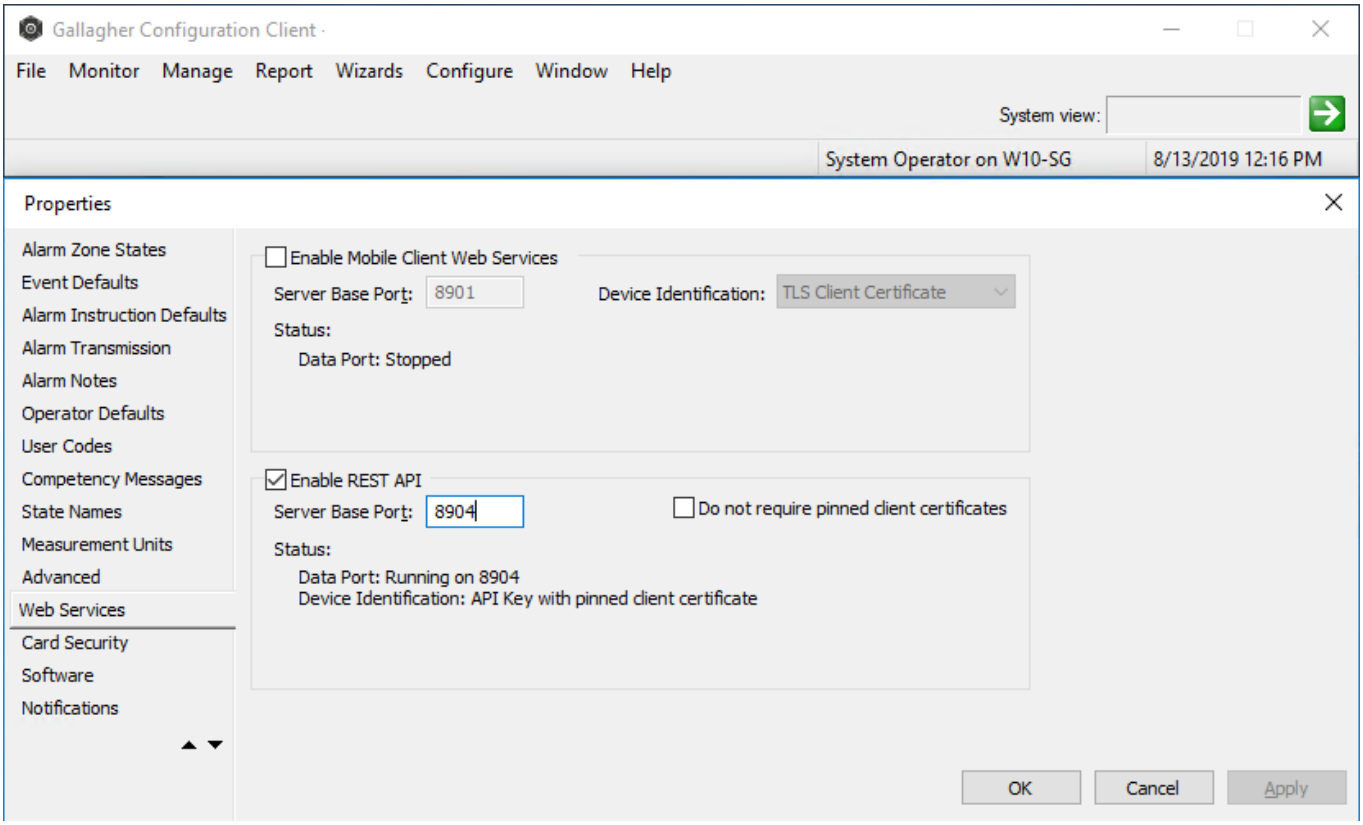
The details below will help you set up Ganz CORTROL to work with the Gallagher software. It is presumed that you already have the Gallagher Command Centre up and running, and are familiar with its initial configuration process. For details on the Gallagher software setup, please see its own supporting documentation.

Gallagher Configuration

For the two servers to be able to communicate, a few things should be first set up on the Gallagher side. The integration operates over secure HTTP, therefore, from Gallagher's point of view, Ganz CORTROL will act as a REST API Client. The steps here describe the necessary settings in the Gallagher software.

Run Gallagher Configuration Client and log in using your username and password.

In the panel containing the main menu, go to *File* > *Server Properties*, and select *Web Services* on the left. Here, turn ON the *Enable REST API* setting, and specify a HTTPS **port** for server-to-server communication.



Enable REST API and specify a HTTPS port

Next, go to the main menu *Configure* > *Services & Workstations*. In the dialog box that appears, right-click anywhere and select *New* > *REST Client*.

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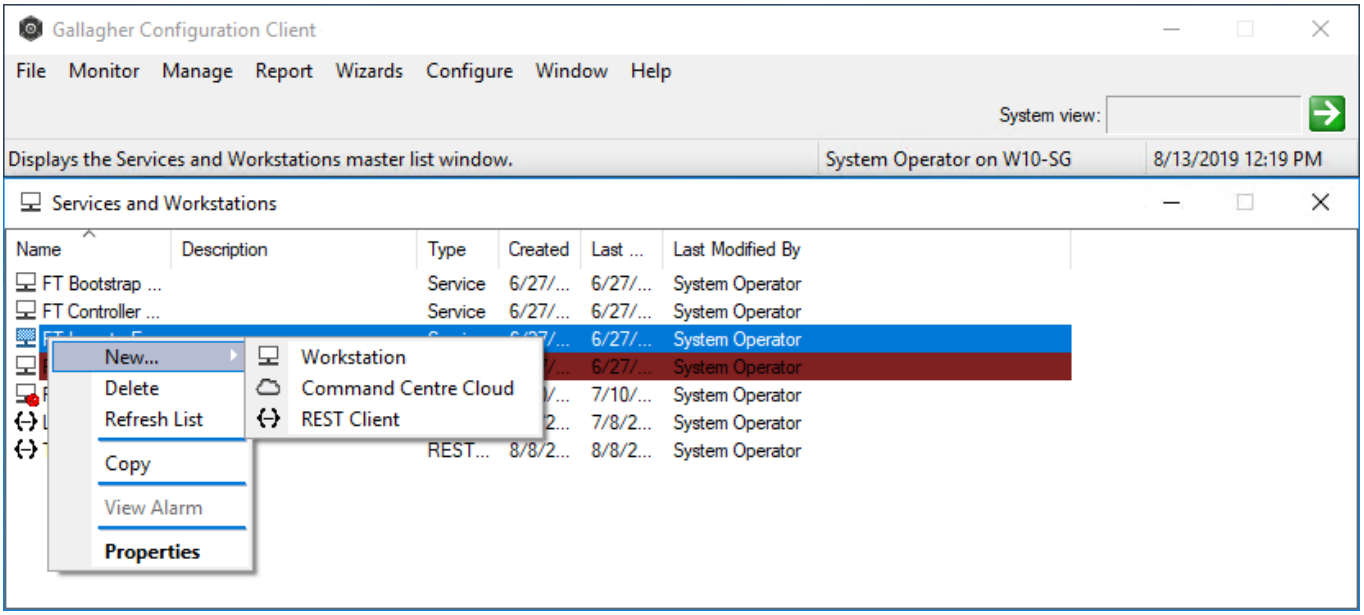
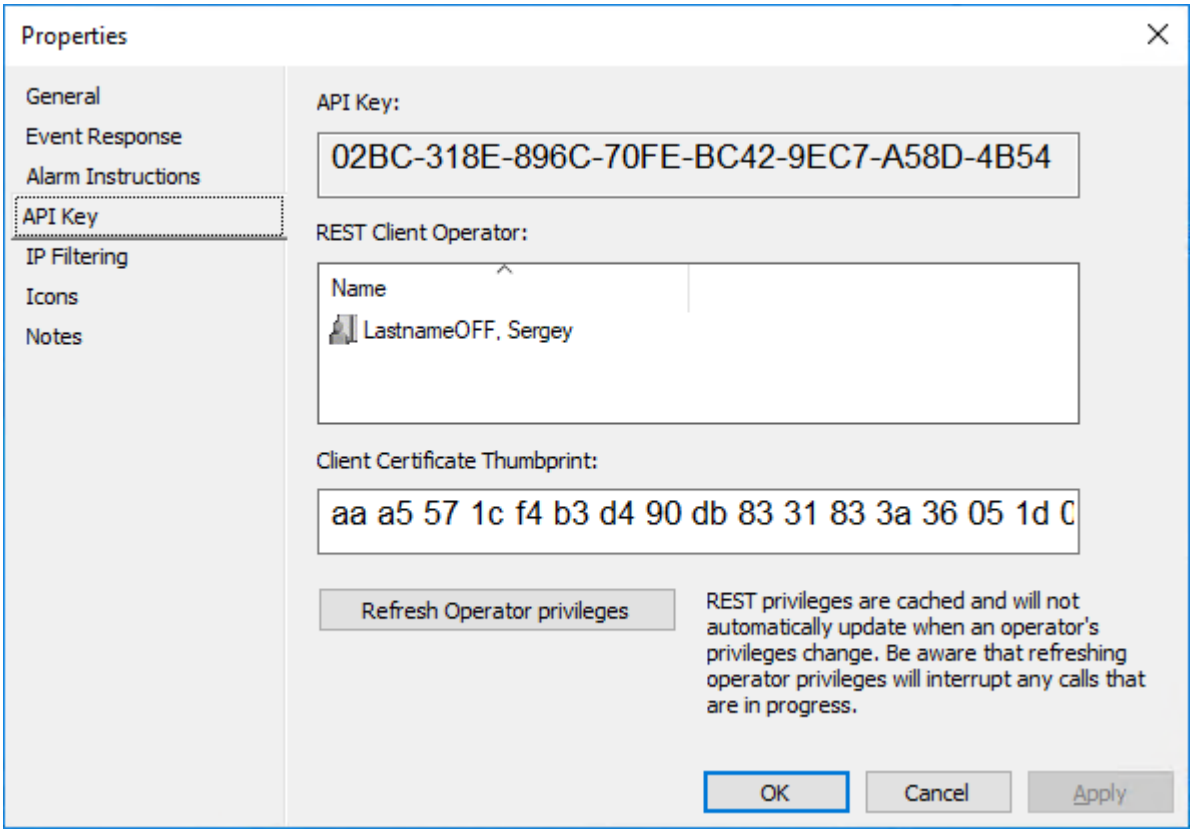


Add a new REST API Client

All settings here are up to you or default, except for those in the *API Key* tab. Here:

- Copy the **API Key** from the read-only field and paste in into Ganz CORTROL Console later, as described below
- Drag and drop your desired **operator*** into the *REST Client Operator* field from the main menu *Manage > Cardholders*
- Copy the *Client Certificate Thumbprint* from Ganz CORTROL Console (see below)



Copy API key from the REST API Client settings to Ganz CORTROL Console

The certificate thumbprint is hard-coded into Ganz CORTROL and CBC AMERICA LLC is responsible for it renewal. You do not have to obtain your own certificate; simply copy the alphanumeric string from the Gallagher configuration dialog box in Ganz CORTROL Console.

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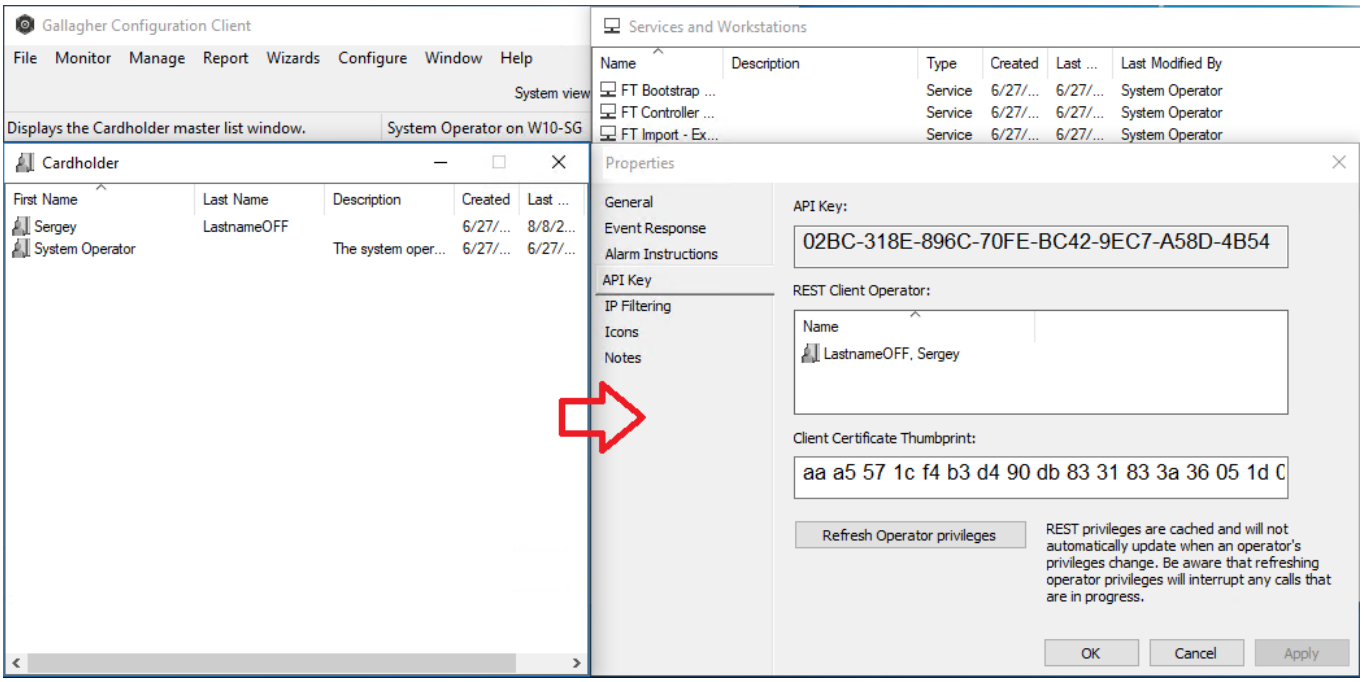
⚠ *For the REST API integration to work properly, the cardholder acting as operator here **must have** the *Advanced user* **privilege**.

The rest of the settings here are default/up to you.



Drag cardholder to the REST API Client settings

Ganz CORTROL Server Configuration

The rest of the setup will be on the Ganz CORTROL Console side. Ganz CORTROL server must have a Ganz CORTROL Global or a Ganz CORTROL Server license applied to it for you to have the *Access Control* tab. If you are running Ganz CORTROL Global, make sure to connect to the central server, and use a privileged user account.

Create New Gallagher Connection

In your Ganz CORTROL Console, open the *Configuration* section and choose the *Access control* component on the left. Click the *New access control* configuration button on the upper panel and fill in the settings in the dialog box.

- **Title**: user-defined service name, which will appear in Ganz CORTROL Console
- **Access control type**: Gallagher
- **Host**: IP or hostname of the Gallagher server
- **Port**: server base port from the REST API settings (as specified above)
- **API key**: copy from Gallagher configuration, as shown above
- **Client certificate thumbprint**: copy and paste it into Gallagher REST API Client settings, as described above
- **Merge**: enable this option if you have multiple access control systems and you want to have them all in a single tab in the Ganz CORTROL Client application

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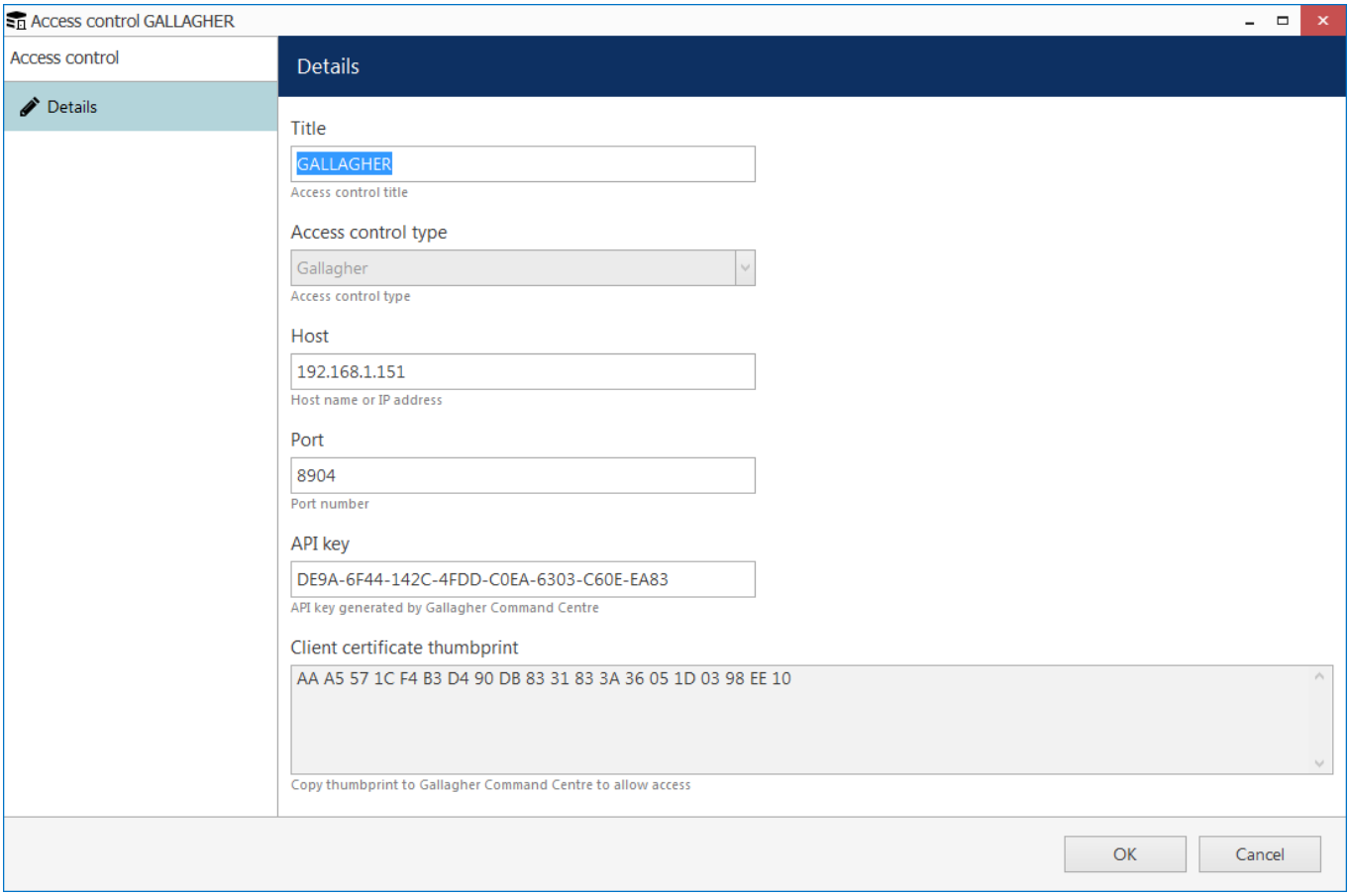

Create new Gallagher access control connection

When done, click OK to save the settings and close the dialog box. The newly created connection will appear in the list. Use the buttons on the upper panel to alter the connection details and to disable it temporarily, if required.

Add Doors

Once the Gallagher connection is created, you can start adding **doors**. To do so, stay in the same section of Ganz CORTROL Console (*Configuration* > *Access control*), click the drop-down list icon (down arrow) next to the *New access control* configuration and select the *New door* option. A dialog box will pop up, allowing you to enter the door configuration.

Note that an active connection to the target Gallagher instance must be present for Ganz CORTROL to be able to retrieve the current door list.

The following settings should be specified for each door:

- **Title**: user-defined door name, which will appear in Ganz CORTROL
- **Access control**: select your Gallagher connection from the list
- **System ID**: door identifier in the access control software; select one from the list
- **Channel**: select one of your video channels to associate it with the target door (they will appear linked in Ganz CORTROL Client)

If the door list appears empty, check that:

- the doors are present in the Gallagher configuration
- you have added a REST API Client wit a privileged operator, and that it has the certificate thumbprint copied from Ganz CORTROL Console, as described above
- you have copied the correct API key from that REST API Client into the Gallagher configuration in Ganz CORTROL Console

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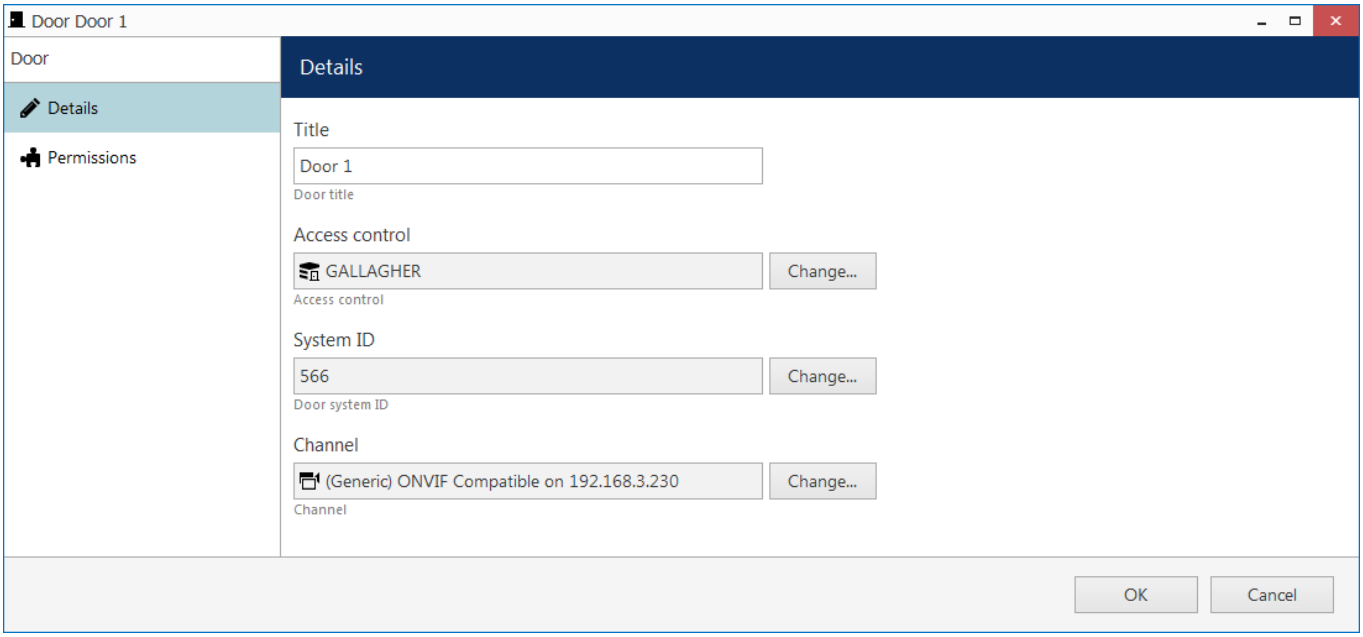
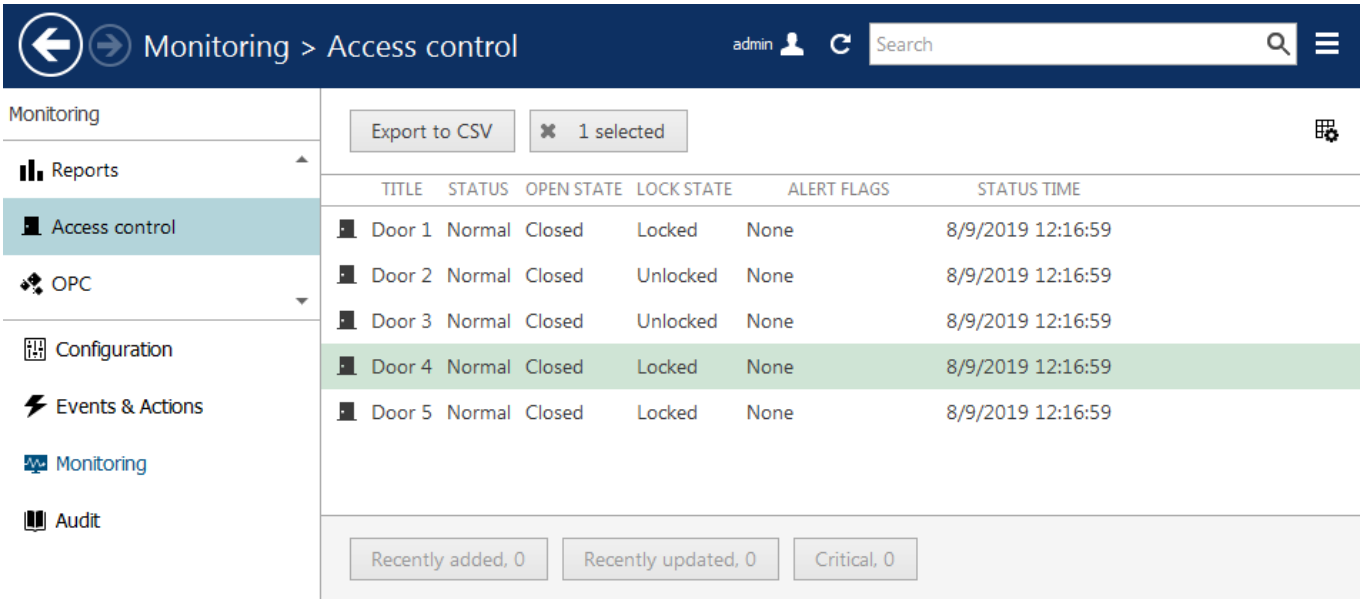


Add a new door

Use the *Disable*/*Enable* button on the upper panel to temporarily turn OFF the connection and restore it. The recycle bin button will remove doors and/or access control connection entries from the Ganz CORTROL configuration.

To see the **status of the doors** you have added into the Ganz CORTROL server configuration, go to the *Monitoring* section of Ganz CORTROL Console and select the *Access control* component on the left. You will be able to see the **current** door lock **state**, as well as related **alert flags**. Pay attention to the status **update time**. If a door status shows *Unknown*, it means either the Gallagher service is not connected, or the door may have been removed from the Gallagher configuration.



Check door status in Ganz CORTROL Console

Use Doors in Ganz CORTROL

After you have added Gallagher doors to the Ganz CORTROL server configuration, there are several applications for them.

Add Doors to Maps

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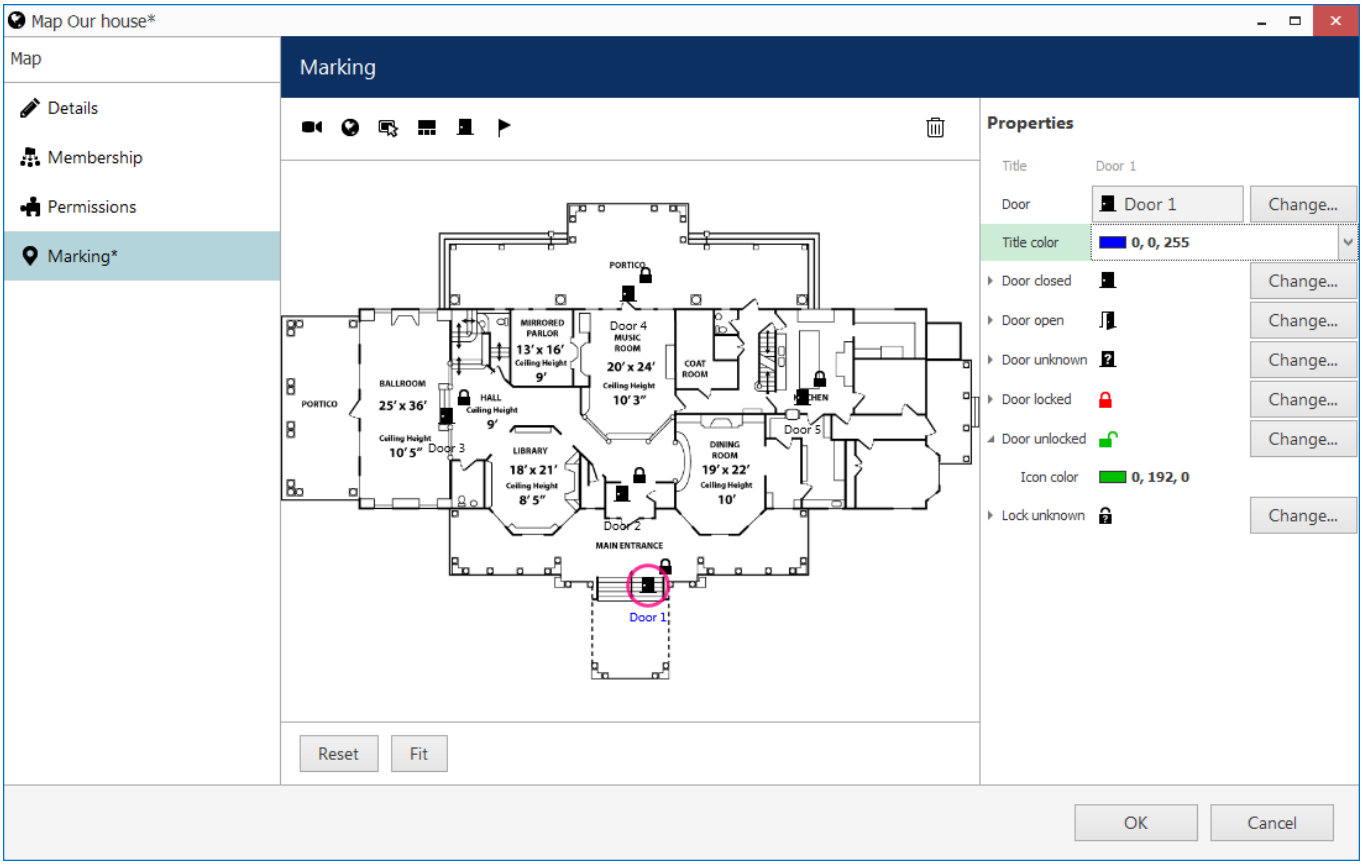
You can place **door markers** onto maps and geo maps. These markers will reflect the current **door status** in the Ganz CORTROL Client application, and provide interactive **actions** upon single or double click.



Add door markers to maps or geo maps

To put a marker onto the map, **drag and drop** it from the panel above. In the settings on the right, select the **target door** from the list. You can also adjust the **marker appearance** for each door state by selecting the target icon and its colour.

Events & Actions

Ganz CORTROL Event & Action Manager (E&A) provides support for both door events (status changes) and actions (change door state).

Changes in the door status are sent from Gallagher to Ganz CORTROL. You can set up different reactions for different codes via Ganz CORTROL E&A. Later, these events can be used for building rules, e.g., for logging the events in Ganz CORTROL, bookmarking them, automatically interacting with other system components etc.

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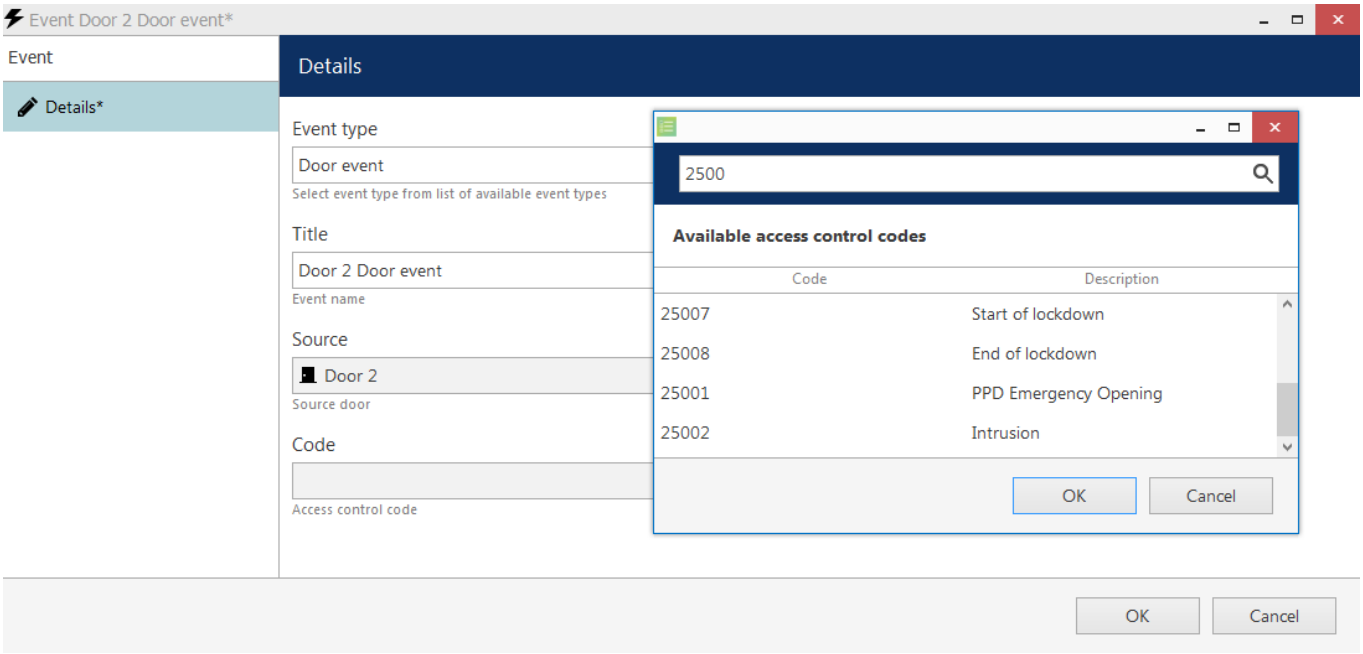
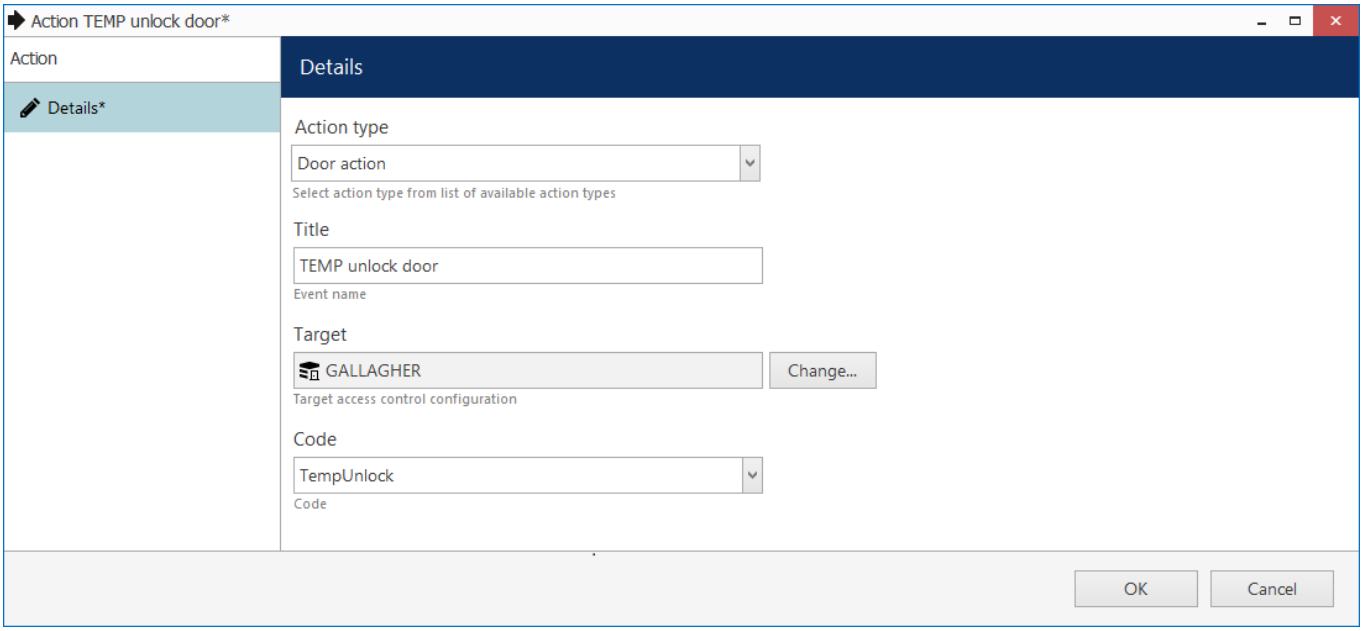


Add door event in E&A

To create a new **door event** in Ganz CORTROL Console, go to the *Events & Actions* section > *Events* > click the + *New event* button on the upper panel. In the appeared dialog box, fill in the settings:

- **Event type**: Door event
- **Title**: user-defined event name to be used in E&A Configurator
- **Source**: select a door from the list
- **Code**: desired door status change code received from Gallagher, select one from the list

Thus, such events will be triggered each time the corresponding code is received from Gallagher. One event corresponds to one code from a specific door: create multiple events if required.



Add door action in E&A

Correspondingly, door action can be created from the *Events & Actions* section > *Actions* by clicking the + *New action* button from the upper panel. Available settings:

- **Action type**: Door action
- **Title**: user-defined action name, which will appear in E&A Configurator

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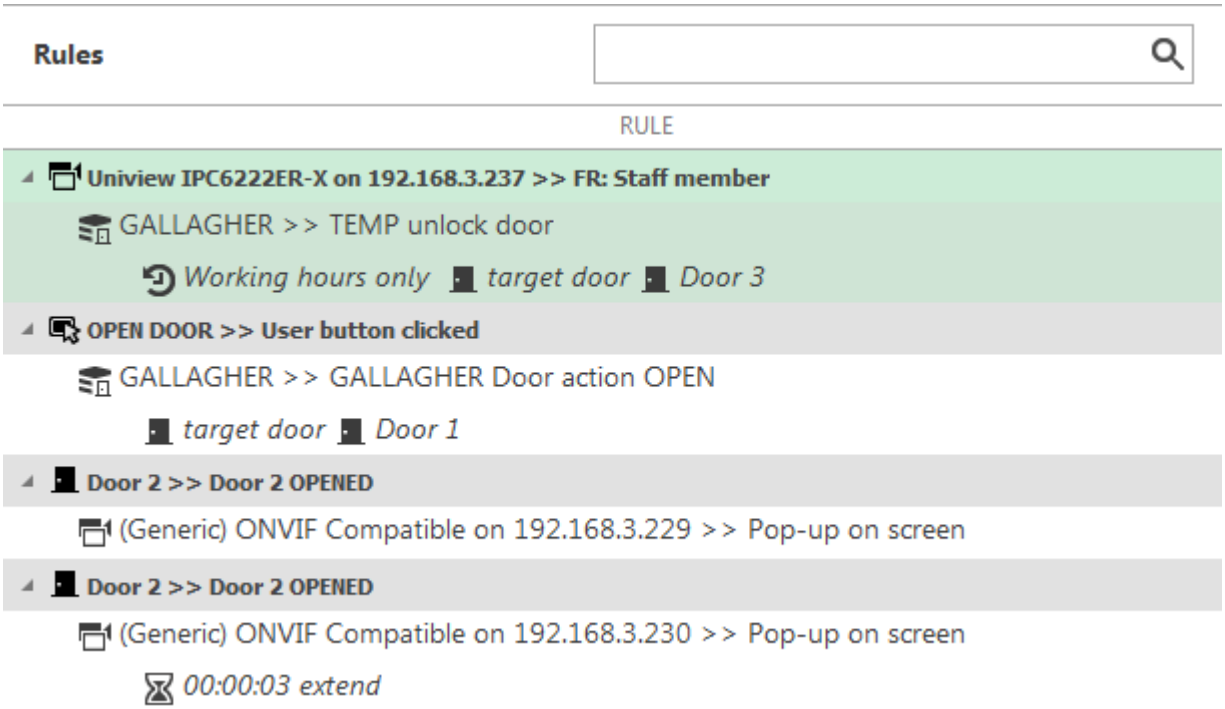
- **Target**: your Gallagher connection
- **Code**: select the desired action from the list
    - *Lock*: change the door state to *Locked*
    - *Unlock*: change the door state to *Unlocked*
    - *TempUnlock*: open (unlock) the door temporarily, then lock it back after ~5s

The *Lock* and *Unlock* actions will only operate if the target door is the only **one** in the target **access zone** in Gallagher configuration. If there are multiple doors in the same access zone, these actions will still be available in Ganz CORTROL Console but will not actually work. For **multi-door** areas, use the *TempUnlock* action (open the door and close it automatically after a short timeout).

Finally, go to the Events & Actions section > choose Rules on the left > click the Open configurator button on the upper panel to bring up the E&A Configurator dialog box.

Here, you can use all your events and actions, including those related to Gallagher, to build automated scenarios. Every rule can also have modifiers: a delay timer, a condition, and a schedule.



Create rules using door events and actions

Example: you can temporarily unlock a door by clicking a user button, or make it open automatically when a face from the staff database is recognized.

Gallagher in Ganz CORTROL Client

Once your Gallagher service is paired with Ganz CORTROL, you will see a new tab appear in the Ganz CORTROL Client application. If you do not, make sure you are connected to the correct Ganz CORTROL server.

Switch to the *Access control* tab to start working with its contents. Similarly to other access control integrations, there are three subsections here:

- **Events**: all events received from Gallagher
- **Doors**: the door list and related actions
- **Cardholders**: the list of cardholders

Note that the door list here will be loaded according to the user permissions. There are two user permissions for each door resource in Ganz CORTROL Console:

- *View*: see the door and its status in Ganz CORTROL Client
- *Door actions*: have the Lock/Unlock/Temporarily Unlock buttons in Ganz CORTROL Client

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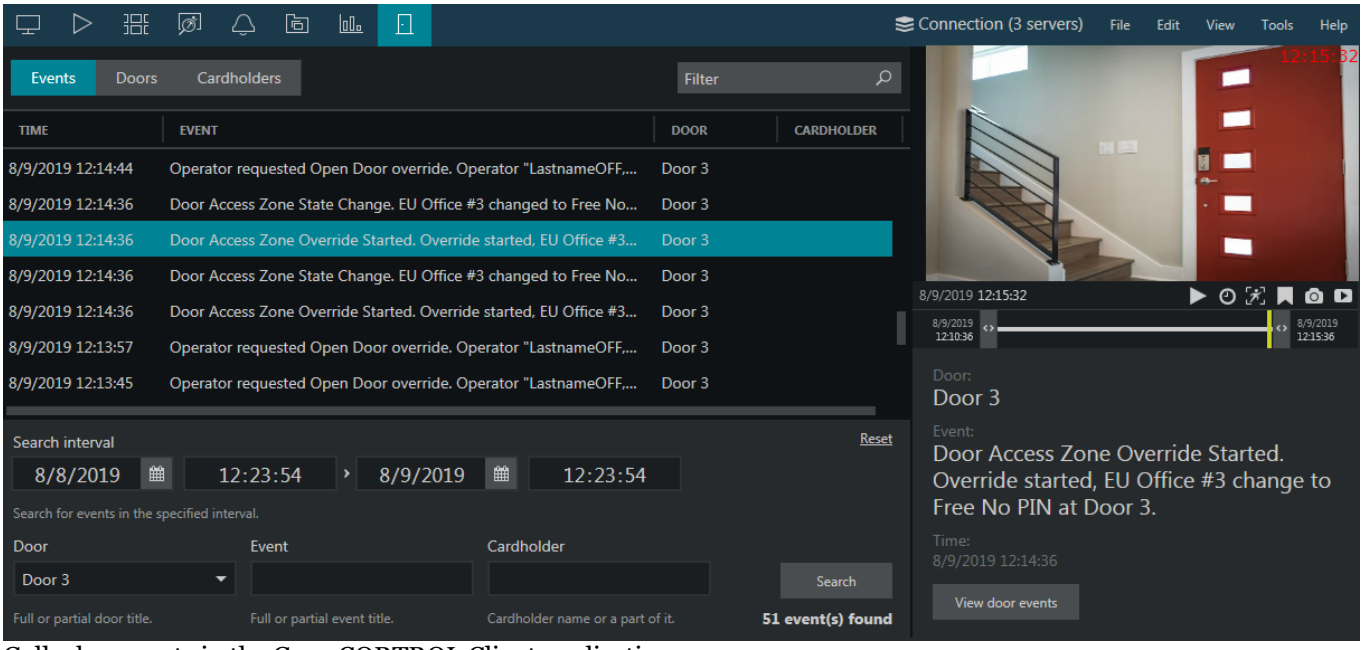
Apart from this permission management via Ganz CORTROL Console, you can hide the *Access control* tab from all users via Ganz CORTROL Client Restrictions (main menu *Tools* > *Administration Tool*).

Events

This section is almost identical to the *Event Trail* section in Gallagher Command Centre. Here, you will find door **events** - status changes, lock/unlock operations etc. - as well as other Gallagher events, such as: database maintenance notifications, configuration changes (e.g., new cardholder added), etc.

Enter the search **time range** and **criteria** in the bottom and click *Search*. The results will appear as a list. Use the *Reset* button to **discard** any entered criteria and use the default search settings (any event type, past 24h).



Gallagher events in the Ganz CORTROL Client application

Click any event in the list to see **details** on the right. If the clicked event is related to a door, you will see the linked channel's video appear in the **instant playback** mode. Click the *View door events* button below to view the target door events for the past 24h.

Doors

This tab contains the **list of doors** retrieved from Gallagher. Each door will have its current state reflected in the *Status* tab.

Click any door to see more details on the right:

- see the live video from the associated video channel
- click the *Lock*, *Unlock*, or *Temporarily Unlock* buttons to perform the corresponding action (similarly to E&A actions, *Lock/Unlock* will only work for single door zones)
- click the *View door events* button to switch to the *Events* tab: target door events for the past 24h will be shown automatically

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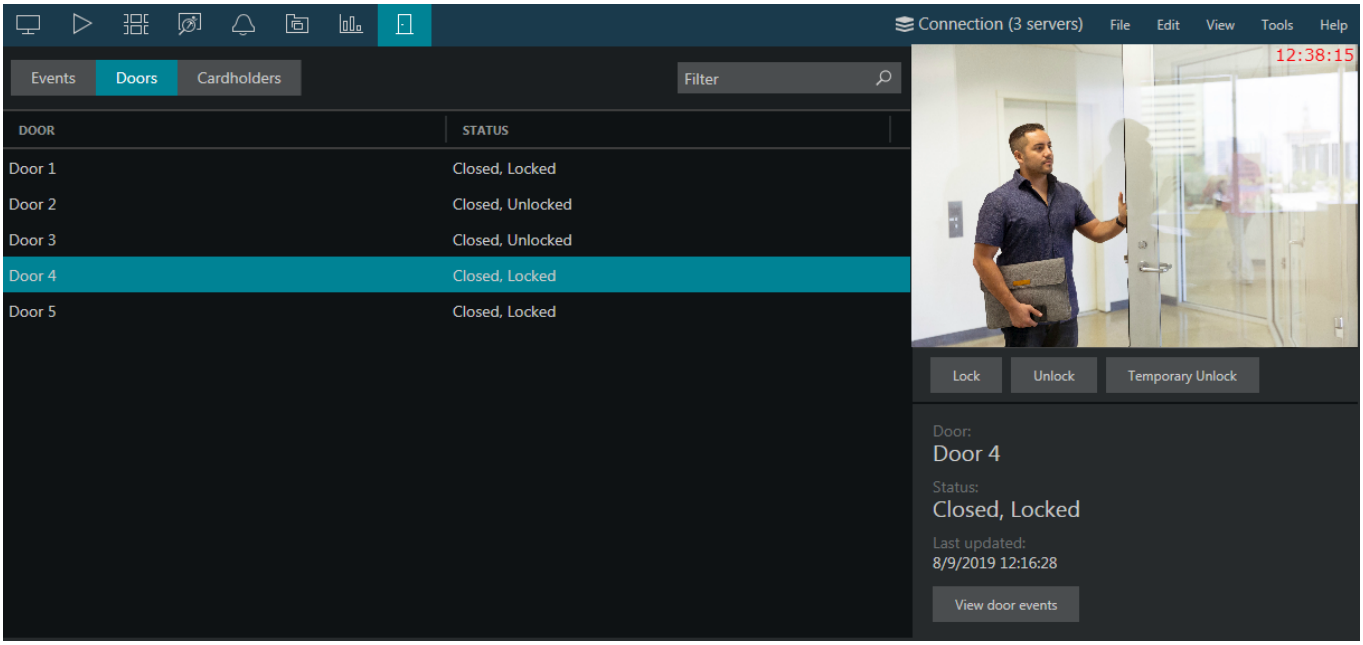
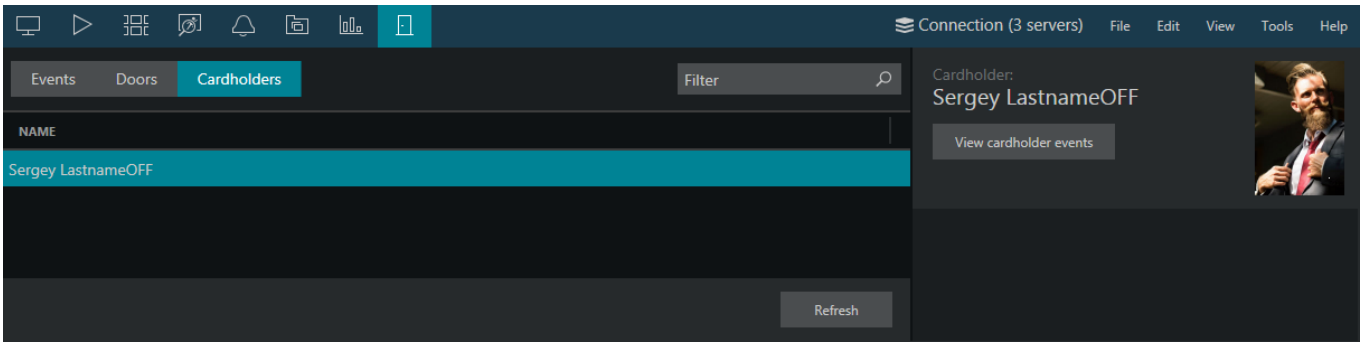


Door list in the *Access Control* tab

Cardholders

You will see all existing **cardholders** fetched from Gallagher here. As there are no cardholder associated actions, the extra details here will be the name and picture.

Click the *View cardholder events* button to switch to the *Events* tab and see the related events for the past 24h. Use the *Refresh* button in the bottom to **reload** the cardholder list and details - this comes useful if there have been changes on the Gallagher side, which have not been synchronised with Ganz CORTROL yet.



List of cardholders

Maps

If you have created **maps** with **door markers** on them, you will be able to use these maps in the *Live* and *Playback* tabs, as usual. Each door marker, when clicked (or double-clicked, depending on your application setting), will provide an opportunity to lock, unlock, or temporarily unlock the target door. This functionality is identical to door actions in E&A and door buttons in the *Access control* tab.

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11.3 Camio

Camio video analytics is a cloud service that can do intelligent video analytics based on the provided video stream. Its integration with Ganz CORTROL is built using REST API. To link Ganz CORTROL server to your existing Camio account, add it as an external service by following the steps below.

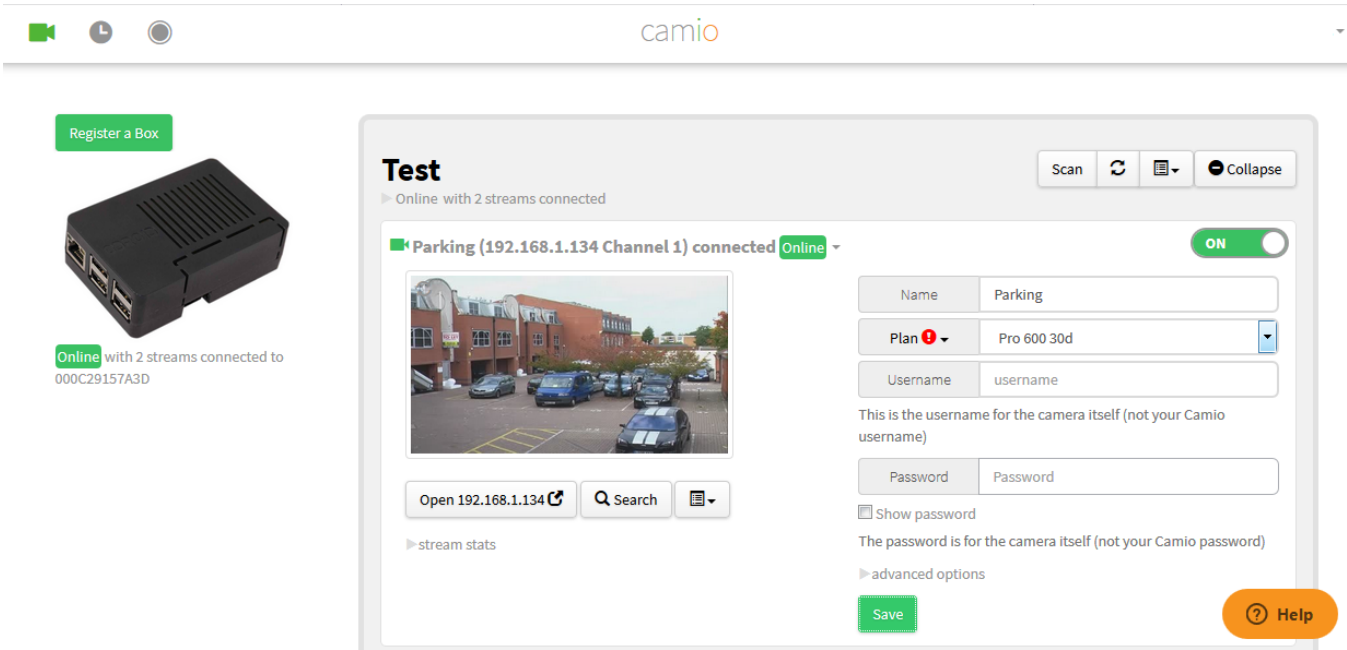
Ganz CORTROL already has the Camio cloud service address. All you need to do is make sure you have added your Camio box to the service Web interface, then add the service connection in Ganz CORTROL Console and configure a channel (or channels) to be processed. Ganz CORTROL will then receive analytical events and will also allow searching the result database. The architecture is such that your Ganz CORTROL server connects to the Camio cloud service. Then, Camio boxes accept H.264 RTSP streams from Ganz CORTROL for video analysis. Whenever there is an event, the box sends it to the Camio cloud service, and then it is forwarded to the Ganz CORTROL server.

The steps described below will help you connect to Camio from your Ganz CORTROL server and take advantage of its video analytics. Note that this document does not provide detailed details on Camio services. For elaborate Camio configuration and usage guidelines, please refer to its own supporting documentation and/or technical support.

Prepare Camio

Log into your Camio account via Web browser and add a **box**. You can do this by clicking your account name in the upper right corner and then by clicking the *Register Box* button. This will allow you to add Ganz CORTROL channels in Ganz CORTROL Console later.

> ⚠ Your Camio **box** must be in the **same network** as your Ganz CORTROL Server or Ganz CORTROL Global server.



Camio Web interface

One more preliminary step here is to generate a **token** for the Ganz CORTROL connection. To do this, click your account in the upper right corner and go to *Settings* > *Integrations*, then click the *Generate Token* button in the API section. Save your token somewhere: you will need to enter it when creating a Camio connection in Ganz CORTROL Console. If you forget/lose the existing token, you will have to generate a new one, and all current connections using the old token will cease to function.

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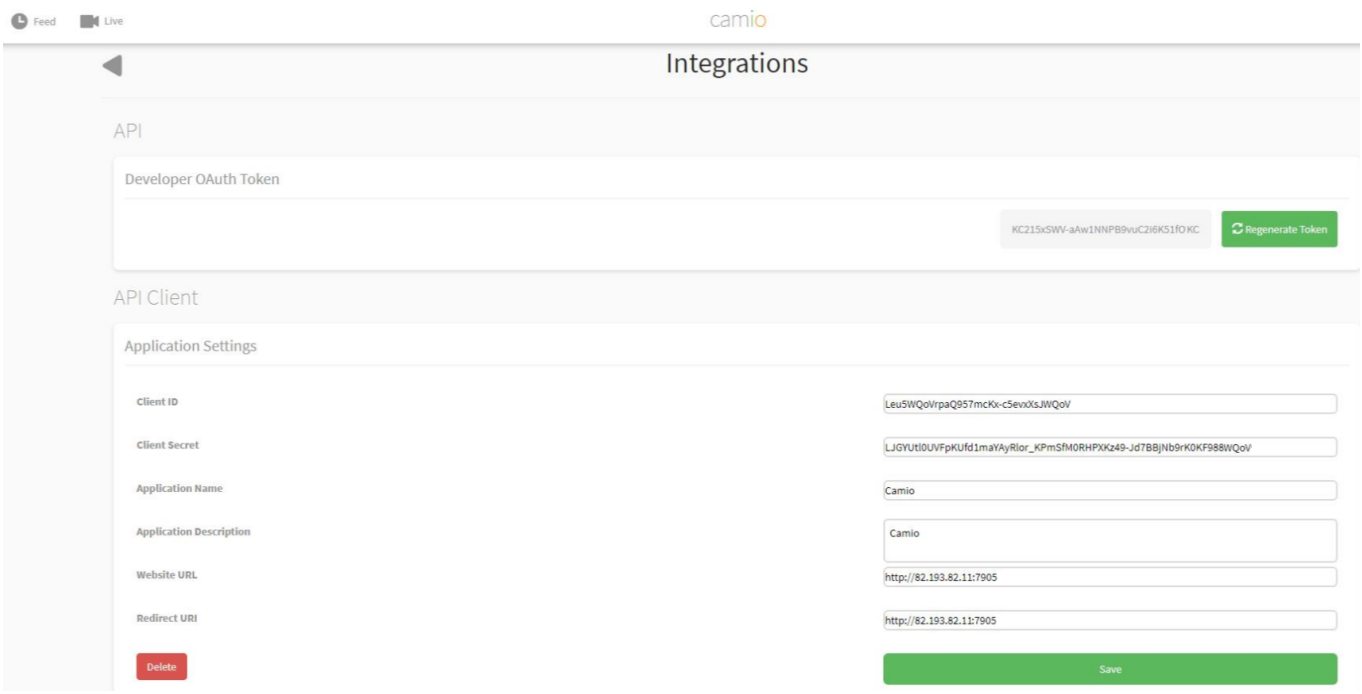

Ganz CORTROL server address and HTTP port in the Camio Web interface settings

From the Ganz CORTROL server side, make sure you have the external server address (**Internet address**) specified, internet HTTP **port** enabled (different from zero) and opened on the firewall/router. A simple test to check if the configuration is valid is to try entering your Ganz CORTROL server URL into the browser address bar: you should be able to see the streaming server interface. Use this **address and port in the Camio Web** interface to pair it with Ganz CORTROL server.

Example: if your Ganz CORTROL address is 82.193.82.11 and internet HTTP port is set to 7865, enter http://82.193.82.11:7865 into your browser (better test it from another computer, and another network) and verify that you can see the Ganz CORTROL Web client. If successful, use the same address for Camio Web.

⚠ Make sure that your **port forwarding** setup works and that your Ganz CORTROL server is **reachable** from the **Internet** via **HTTP**. (You should be able to open the Ganz CORTROL Web UI from other PC over the Internet, otherwise, Camio will be unable to connect, and it will not work.)

In other words: Camio can connect to Ganz CORTROL servers only using the HTTP API, which is available at the same URL as the Ganz CORTROL Web interface. So, in order for the system to function correctly, specify the Ganz CORTROL Web interface URL and the HTTP port in the Camio settings under API Client, on the same screen where the token is generated.

Add External Service

The next step is to add Camio **connection** into the Ganz CORTROL server configuration. This integration supports Camio as an external service, with a slight difference: external services like LPR and FR appear in Ganz CORTROL Console automatically while Camio service must be added **manually**. For Ganz CORTROL Global systems, Camio works only with the central server, and not with any of the recording servers directly.

Connect to your Ganz CORTROL server via Ganz CORTROL Console. Open the *Configuration* section and select *External services* on the left. Add a new connection by clicking the *New Camio service* button on the top panel.

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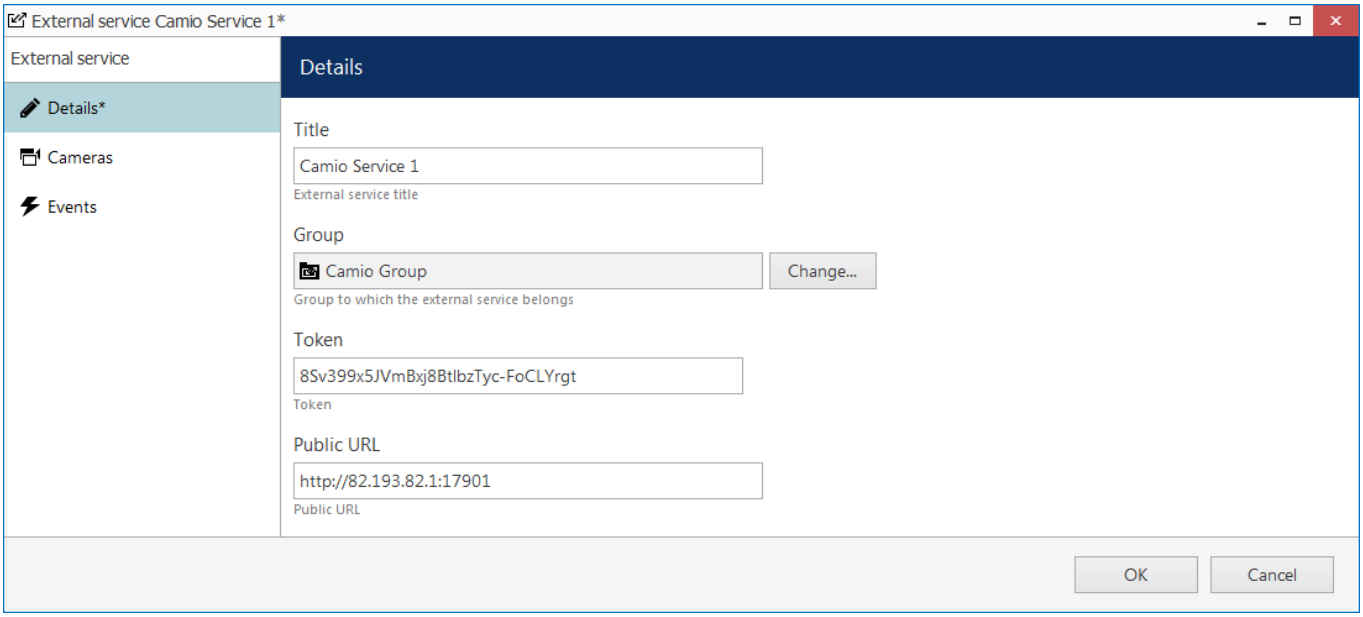

Create a new Camio service connection

The following settings are to be specified here in the *Details* tab:

- **Title**: user-defined service name, which will appear in Ganz CORTROL Console and Ganz CORTROL Client
- **Group**: external service group, mandatory*
- **Token**: copy and paste the token generated in the Camio Web interface (as described above)
- **Public URL**: external Ganz CORTROL address (IP/hostname and HTTP port) for the Camio cloud connection**
- **Server:** local IP address of the Ganz CORTROL Server server (this field is ONLY for Ganz CORTROL Server)

*You will need to create an external service group to put the Camio connection into. The group is necessary for the permission management and also ensures that the service appear in the Ganz CORTROL Client application. Without the group, your Camio connection will not be visible in Ganz CORTROL Client. If there are multiple Camio connections, you can either create a new group for each one, or put all similar external services into one group. Do not mix different external services by putting them into one group.

**Simply forward your Ganz CORTROL server HTTP port to an external port, and/or open this HTTP port on your router firewall. Camio services are not available without the Internet connection, as the company only provides cloud services.

When done, click *OK* to save and close the dialog box. Your new Camio connection will appear in the list. To check the service status, go to the *Monitoring* section in Ganz CORTROL Console and select *External services* on the left.

Add Channels For Analysis

Camio can use HTTP connection with or without authorization, and Ganz CORTROL can work with either option.

1) To set up a connection **without authorization**: Ganz CORTROL has a special built-in *Anonymous user* account for such situations. All you need to do is **enable** the **anonymous user** and then allow him to receive **live video** for the required channel(s).

- Enable the **anonymous user account**: *Configuration* > *Users* > select *anonymous* in the list > *Edit* (or double-click the user in the list) > *Enable* > *OK*.
- Add **permission**: *Configuration* > *Channels* > click target channel > *Edit* (or double-click it in the list) > *Permissions* > select the *anonymous* user account on the right > grant the *View live video* permission.

2) A more secure way is to specify the Ganz CORTROL **user** and use **digest authentication** with Camio. For this, specify the internal Ganz CORTROL **user name** and **password** in the camera details (see below).

Back in the *Configuration* section > *External services*, double-click your Camio service, or select it and click *Edit* on the upper panel. Select the *Cameras* tab on the left.

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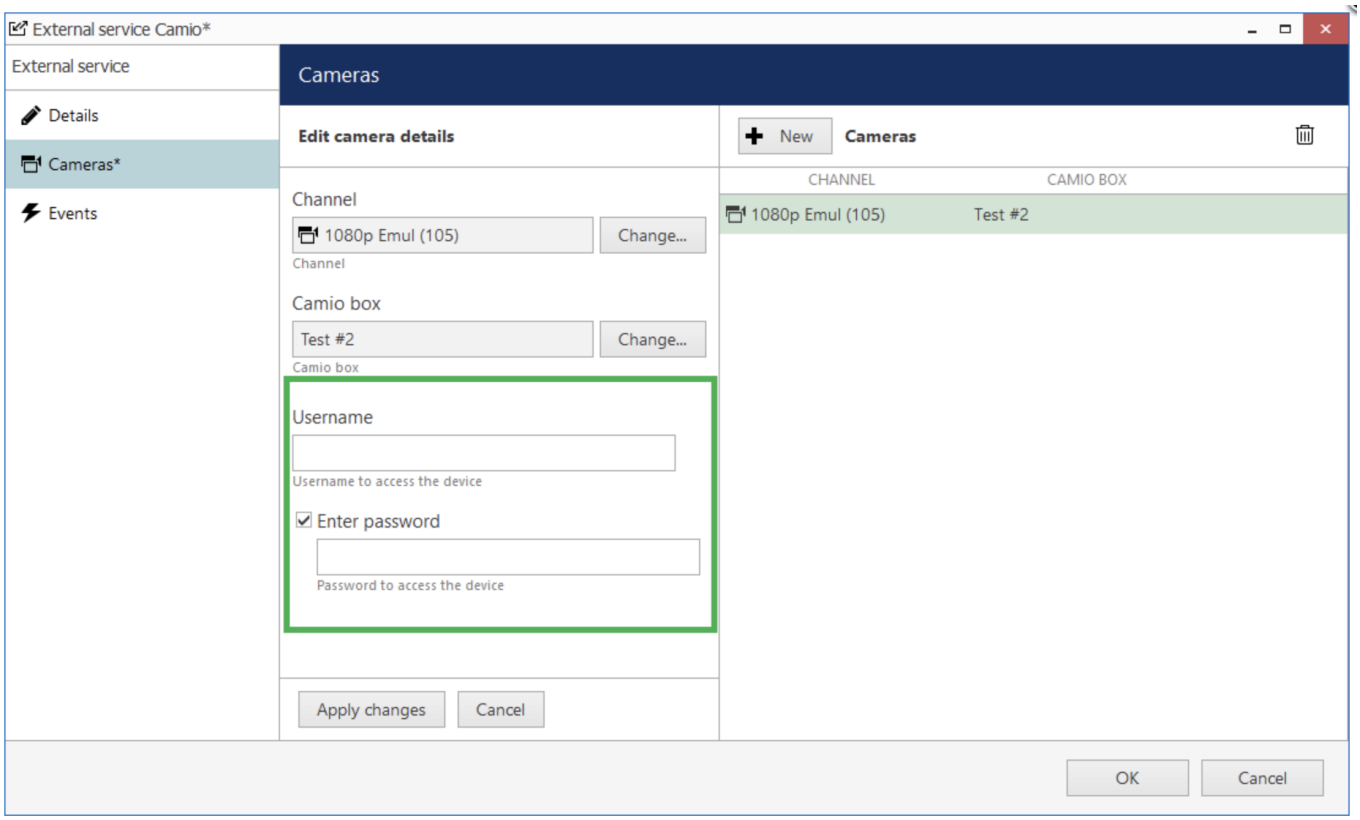
Here, click the *+New* button and **fill in the camera details**. Basically, you need to bind an existing Ganz CORTROL channel to one of your Camio boxes. To do this, first select the channel, and then specify the Camio box by selecting it from the list. Click *OK* to save and close the dialog box.

⚠ Camio only supports H.264 RTSP streams. HEVC (H.265) or JPEG streams will have an error in the service Web interface and will not be analysed.

⚠ Make sure the channel name does **not** have any special characters, especially **backslashes**, otherwise Camio will be unable to parse the channel name.

If the box list appears empty, double-check your Camio connection parameters: the token may be incorrect. If the connection does not work and you know the token is correct, try generating a new token via service Web interface and then pasting the new token into Camio connection in Ganz CORTROL Console.



Add video channels to be sent to Camio for analysis

Next, make sure your Camio channel is set to **continuous recording** in Ganz CORTROL Console.

Then, go to the Camio Web interface: your channel will appear **live** in the *Boxes* section. This will happen **automatically**, you do **not** need to add the camera manually in the Web interface.

⚠ If you did everything right, your channel will appear on Camio Web **automatically**. Do not add it in Camio UI!

All is left to do is select a **plan** for the target channel (you may have to purchase it from the Camio provider). If the channel is inactive, click the ON/OFF toggle button on the right to activate. The ON position (green) indicates that the channel analysis is activated.

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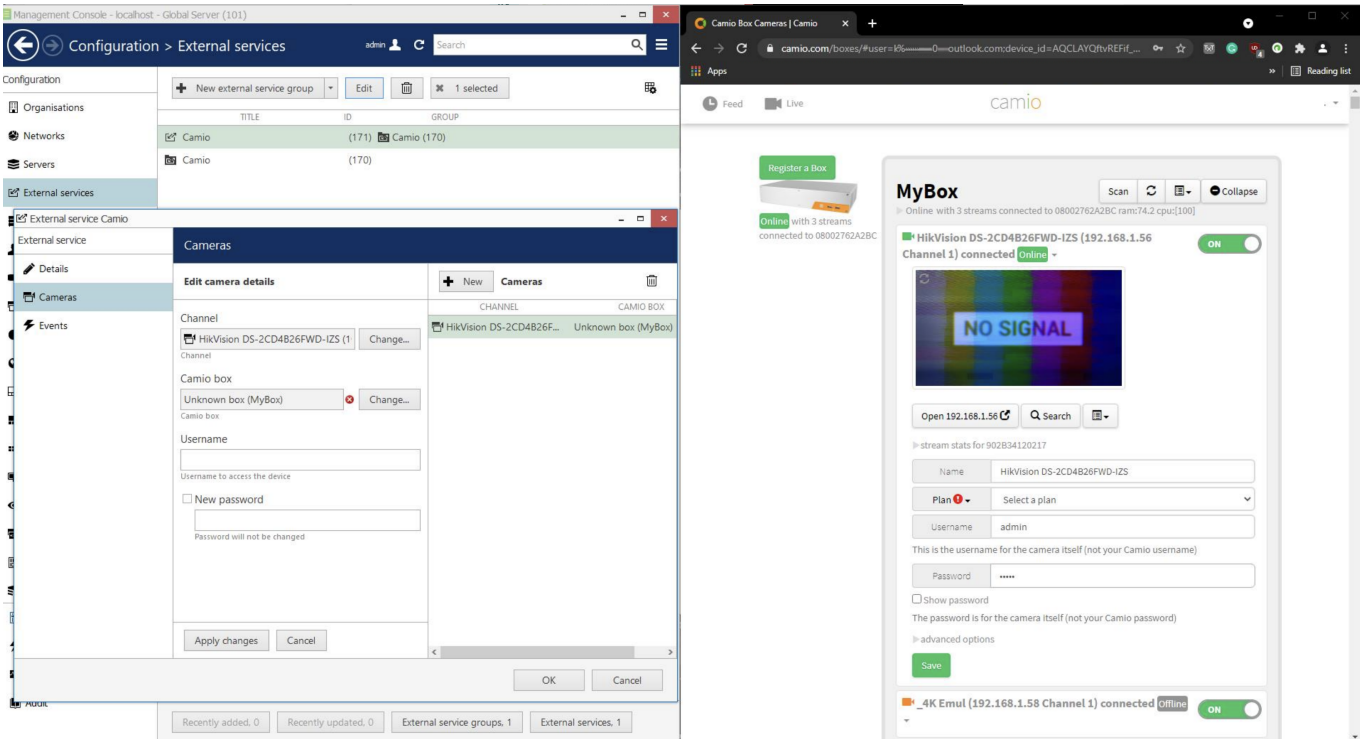

*Configuration result: if everything is correct, the channel will appear in Camio Web UI as the **first** one in the list*

Next to the channel title, you will see its **status**: if the video is coming through, the status should be *Online*. If you disable the channel in Ganz CORTROL Console or there is no actual video, the channel status will appear as *Offline*. Click the *Stream stats* under the live preview to see the video parameters. If something is wrong (e.g., stream codec is not supported), you will see a red exclamation mark: click on it to see more information.

> Some channels may not have the live preview video alongside with the ON/Online status, no errors, and video presence in Ganz CORTROL Console and Ganz CORTROL Client. This does not depend on Ganz CORTROL. Usually, this does not affect video analysis and you are able to see the search results. For troubleshooting this and other Web-related issues, kindly contact Camio support.

Camio will now start analysing your video stream and send the results back to Ganz CORTROL. You can also search the event archive on the service Web.

Web Search

On Camio Web, click the *Search* button below the channel live preview to enter the search mode. The Web search for your Ganz CORTROL channels works in the same way as for any other channels in Camio.

If Web search does not work, kindly contact Camio technical support.

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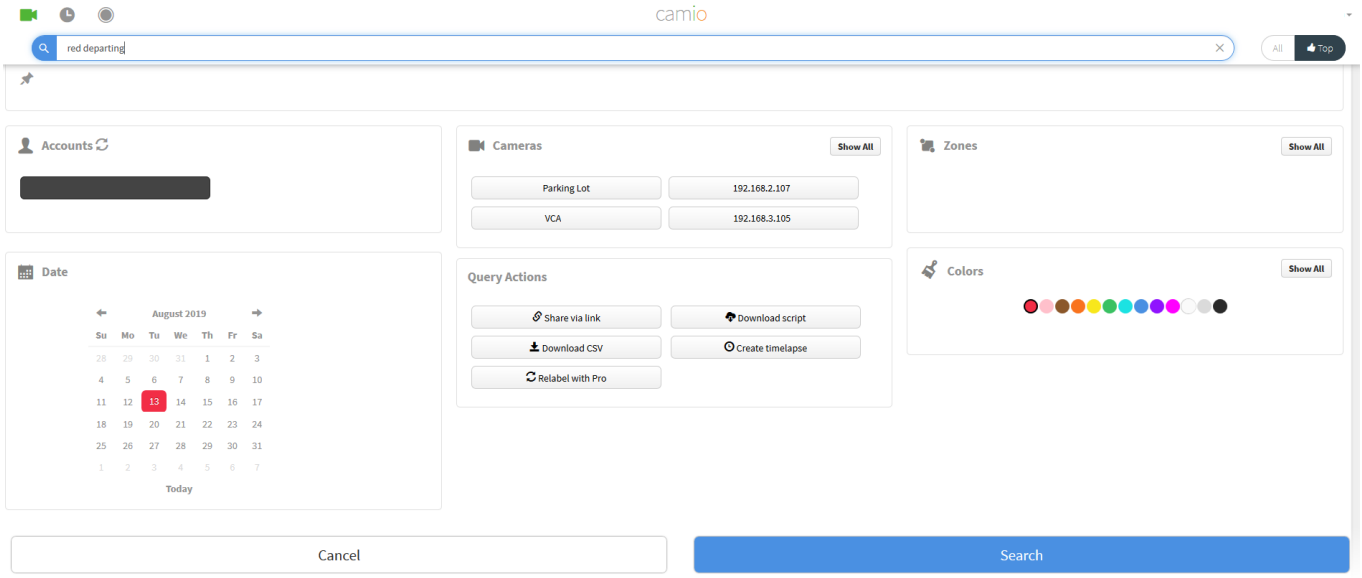


Use Web based search for your channel

Ganz CORTROL Client Search

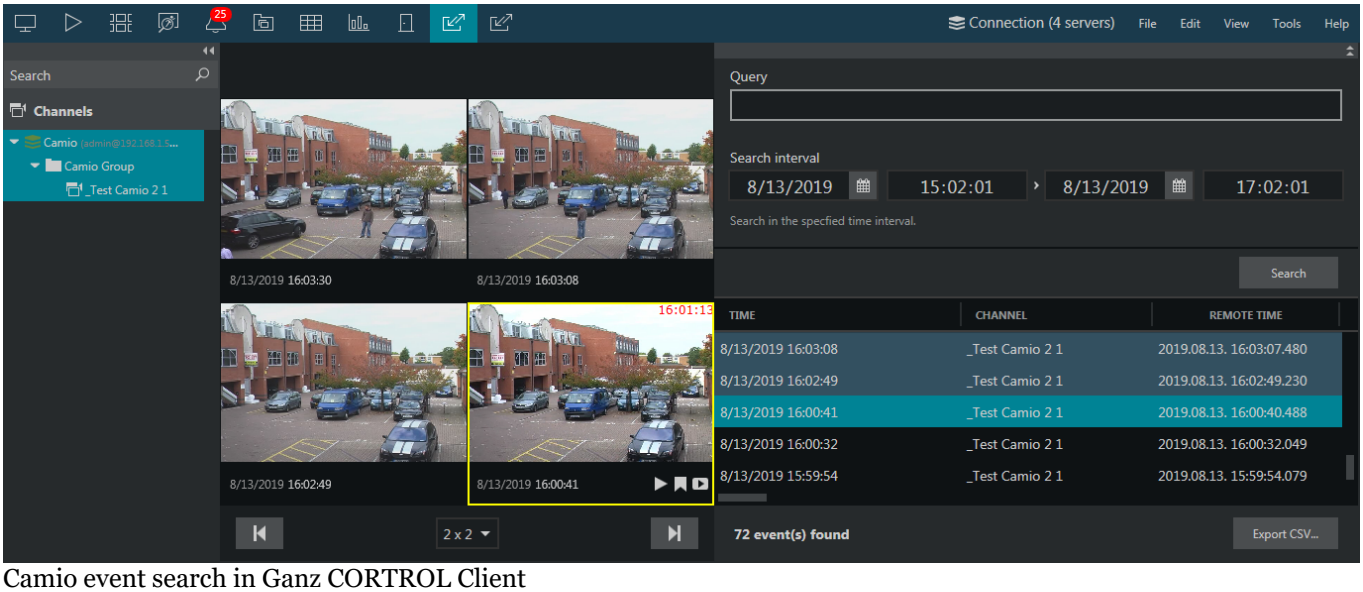
The current integration allows searching the Camio events from the Ganz CORTROL Client application.

Open your Ganz CORTROL Client application and connect to any Ganz CORTROL server that is linked with Camio. You will see an extra tab on the upper panel named after your Camio external service group.

The search logic is similar to that for other external services:

- in the *Resources* panel on the left, click the + (plus) icon next to the channels you wish to see results from: the **selected** channel(s) will be marked **blue**
- in the right-hand-side panel, enter the **search parameters**:
    - **Query**: text tag to search for, e.g., car, human, truck, also colours
    - Search interval: the time range to be searched for events

When ready, hit *Search*. If there are any **results** for your request, they will appear in the list below and in the grid in the central area. Click any picture to play back the corresponding portion of the video archive. The video clip will be played in a loop.



Camio event search in Ganz CORTROL Client

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You can change the grid size by selecting it from the drop-down list below the grid. The available options range from 1x1 and up to 6x6. The single viewport option will provide you will fully functional instant playback, and the rest of the options (2x2..6x6) are similar to the result preview in *Smart Search* mode., allowing you to add bookmarks, export the result video clips, and switch to the regular playback mode.

Use the arrows |< and >| to load the previous/next portion of the results. You can also do the same by browsing the result list: upon clicking a result from the faraway time range, the target results and its neighbours will be placed onto the preview area.

> ⚠ If the search produces **no results** at all, try the same request on Camio Web: if there are no results on the **Web**, too, kindly contact Camio technical support.

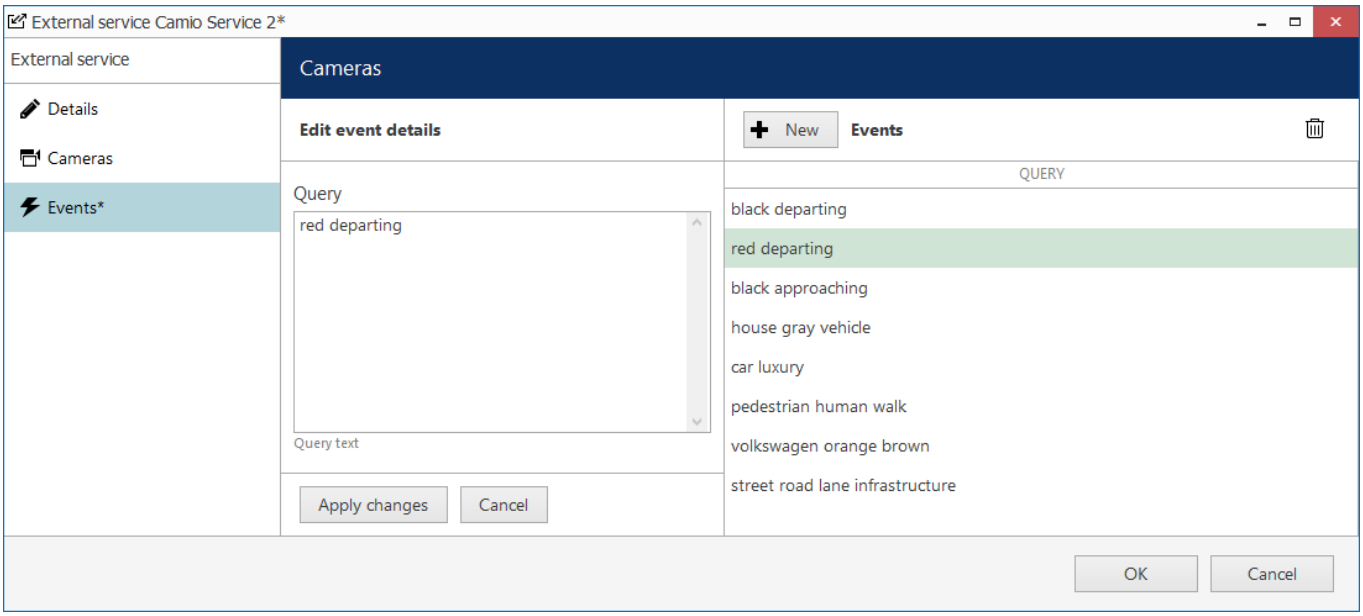
You can also **save** the list of your **search results** by clicking the *Export CSV* button in the bottom right corner.

Events & Actions

Ganz CORTROL E&A Manager provides a powerful mechanism to automate things in your CCTV ecosystem. There are **Camio-specific events** supported by current integration that include reactions to certain keywords. The whole configuration is done via Ganz CORTROL Console. First, you pre-set the **keywords** (tags) of interest in the Camio service settings, and then set up events using these tags in the Event & Action Configurator. These events can be later added to E&A rules, as usual.

Preliminary event setup: in Ganz CORTROL Console, go to the *Configuration* section > *External services* > open your Camio service for editing > switch to the *Events* tab.

Click the + *New* button and enter a keyword or a keyword combination that should trigger the event. Click *Apply changes* to save the current entry, or click cancel to discard the changes. To add another one, click the + *New* button again and repeat. To remove any entry, use the recycle bin button in the upper right corner (also works for several items selected using *CTRL+click*).



Camio event preparation

Main setup: switch to the *Events & Actions* section > choose *Events* on the left. Click the + *New event* button on the top panel to bring up the dialog box.

Set event type to *External service* and fill in the parameters:

- **Title**: user-defined event name
- **Source**: video channel that serves as the event source
- **Service group**: select your Camio service group
- **Target event**: choose one of the keyword sets you have specified earlier

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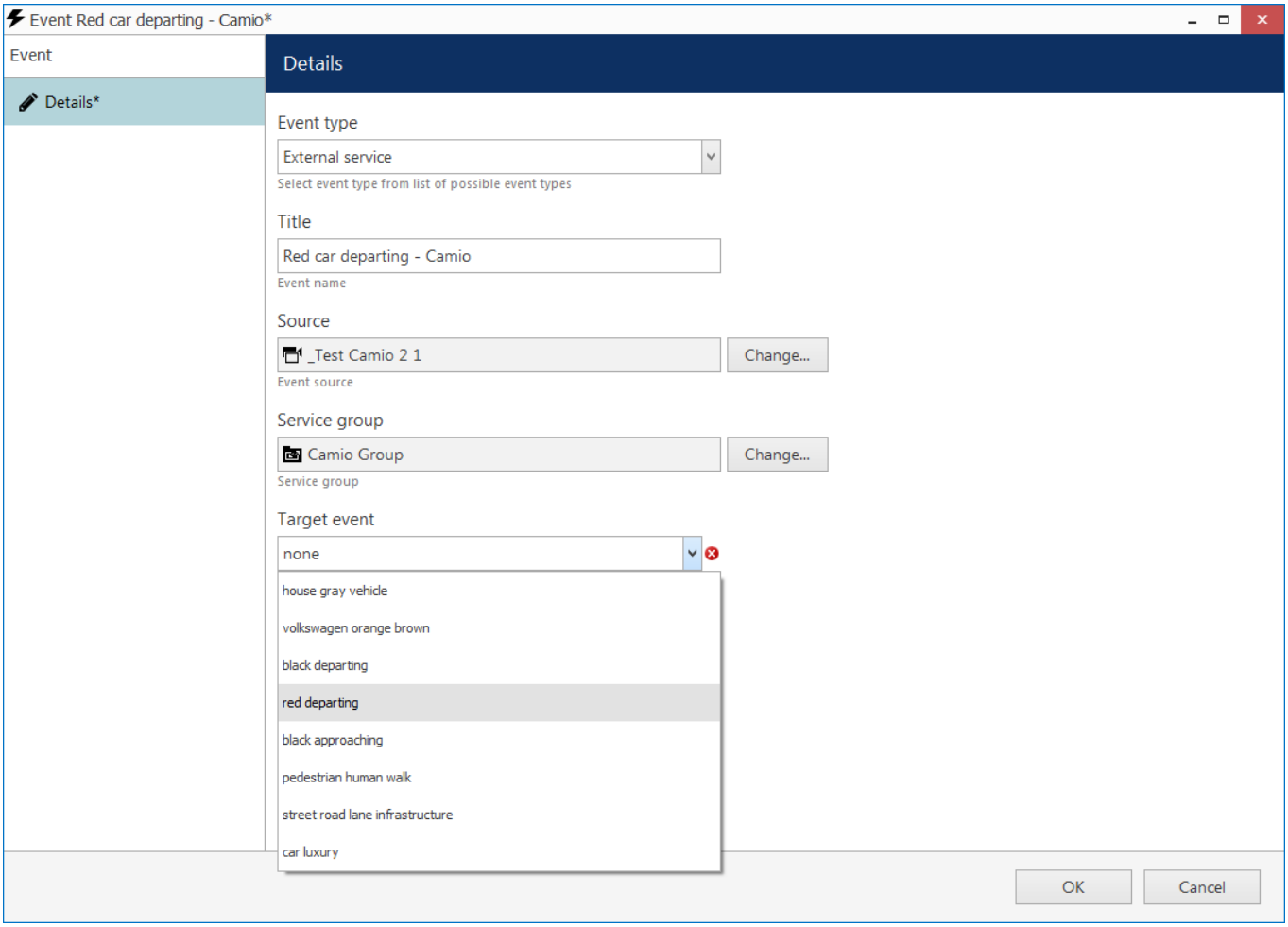
If the group list is empty, make sure you have followed the steps above to create both external service and a group for it, and that one field above you have selected a channel that is actually used by that service group. And, if the event list is empty, follow the steps above to add the keywords of interest in the external service settings.



New Camio event

When done, click *OK* to save and close the dialog box. The newly created event will appear in the list, and also in the E&A Configurator (for the server containing the target channel). Now you can use this event for building your automated scenarios.

Events from Camio service arrive with a **30-60s delay**. This does not depend on the Ganz CORTROL software. Please keep this in mind when configuring rules with Camio events.

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11.4 External Metadata

Any external system can send **analytics metadata** to Ganz CORTROL servers. These may be individual cameras with edge analytics, or third-party analytics engines; these can operate independently but it makes sense to send the metadata along with the analysed video stream to the Ganz CORTROL server. The Ganz CORTROL server can then **overlay** the metadata in both **live and archive** playback, use the data for for the Event & Action **rules**, as well as provide the opportunity to **view and search** these events based on the various recognition attributes.

A simple example of such integration is: ANPR camera sending license plate recognition results with the video stream.

At this point, Ganz CORTROL servers support two metadata classes: LPR and FR (license plate and facial recognition).

This functionality does not require previous integration or API connection of the external service.

Prerequisites

You will need to configure the external analytics source to send the metadata in JSON format over HTTP/HTTPS. The only accepted type is an array of JSON objects named "objects" containing the following properties:

- **x** and **y** - relative coordinates, [0; 1], float
- **width** and **height** - relative object size, [0; 1], float
- **classId** - internal Ganz CORTROL class identifier, string
    - 4 = FR, 17 = LPR
- **id** = object ID, string; used to distinguish between objects and to ensure correct moving object drawing across frames; if not specified and there are multiple objects, they will not be drawn correctly
- **className** - optional user-defined class name, string
- **accuracy** - recognition accuracy, optional, [0; 1], float
- **value** - mandatory parameter, recognition value (plate number or Subject name/surname), string
- **attributes** - optional value attributes delimited by comma, e.g., car colour, make, model, year etc., string

If the data is even partially incorrect, the server will return an error. If everything is OK, you should expect the *HTTP/1.1 204 No Content* response.

If **classId** is not equal to 4 or 17, the metadata will be accepted and displayed as overlay but you will be unable to **search** it.

Example

```
{
"objects":[
    {
        "x":0.15,
        "y":0.4,
        "width":0.5,
        "height":0.6,
        "id":"01",
        "classId":"4",
        "className":"Face",
        "value":"Guy Julius Caesar",
        "accuracy":"0.95"
    },
    {
        "x":0.25,
        "y":0.09,
        "width":0.2,
        "height":0.17,
        "id":"LPR0013",
        "classId":"17",
        "value":"桂GZ1729",
```

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```
        "attributes":"silver,серый,Honda,sedan,2007"
    }
]
}
```


Configuration in Ganz CORTROL Console

The Ganz CORTROL servers accept metadata automatically starting from software version 1.21.0.

The metadata is partially stored and displayed in the **archive**, and is represented by a wide semi-transparent line on the archive timeline. Namely, all **bounding boxes** (colourful rectangles) are stored in the video archive. The rest of the data - recognition results, attributes, etc. - are stored in a **separate database**. Without the database, you will only be able to see the data overlay in playback, without event values and properties.

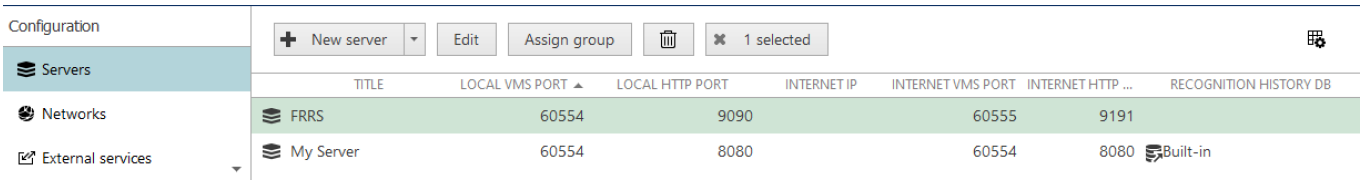
The external recognition data is stored as follows:

- **bounding boxes**: in the video archive, always
- events data with **values and attributes**: in a separate database, if the DB is enabled in the server settings

In Ganz CORTROL Console, you can change the **database** that will be used for storing metadata. By default, a built-in database (SQLite) is enabled for all clean installations. To change the database settings (limits etc.), go to the *Configuration* section > choose *Servers* on the left > select *External databases* tab > click *Change* > select a database and click the *Edit* icon.

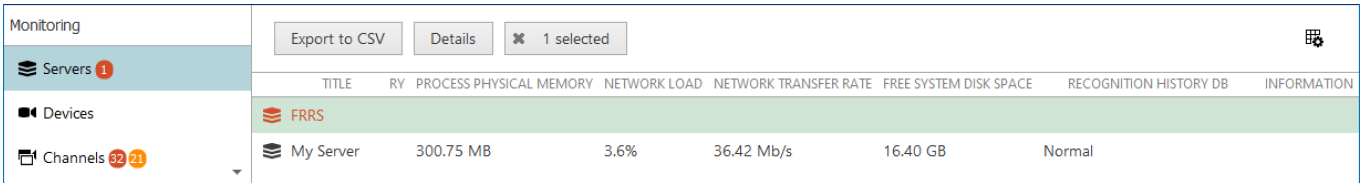
A built-in VA metadata database is enabled for all **new/clean installations** of any Ganz CORTROL server. For software upgrades, **no database** is selected (*none*) for enhanced compatibility, but you can enable it manually.

To check the DB configuration, in the *Configuration* section > *Servers*, scroll horizontally and check the *Recognition history DB* column. If there is no such column, add it to the displayed columns by editing the item grid using the *Edit columns* button in the upper right corner.



Configuration status of the Recognition history database for two servers: none and built-in

To verify that the **data is recorded** into the database, switch to the *Monitoring* section > choose *Servers* on the left > check the *Recognition history DB* field. If there is no such column, add it to the displayed column list by configuring the table using the *Edit columns* button in the upper right corner.



Recognition history database status in the Monitoring section of Ganz CORTROL Console

External Metadata Display in Ganz CORTROL Client

The metadata is displayed as **video overlay** - colourful bounding boxes with parameters - in live and regular/instant playback, as well as in 1x1 view in the dedicated external service tabs. In the middle of the rectangle, object **value** will be displayed. (X) in the corner means that the metadata source is external, and it is accompanied by other parameters (e.g., **className**).

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You can perform the **object-based search** in the dedicated tabs (LPR, FR) using the panel on the right-hand-side:

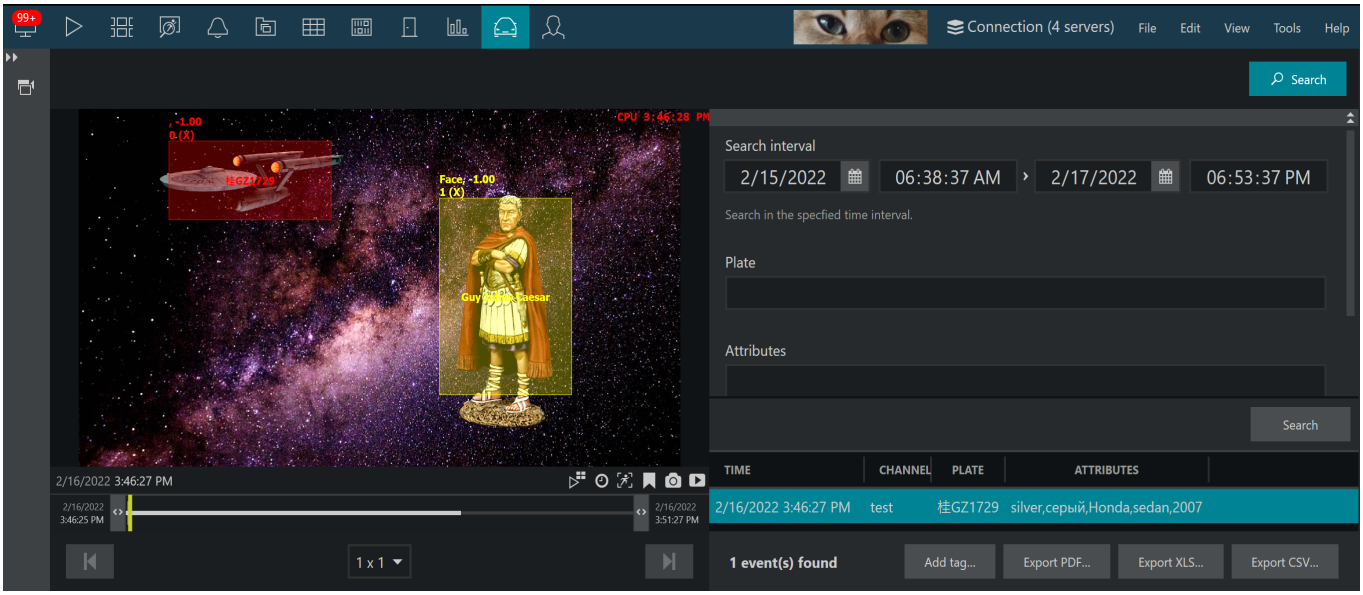
- **Search interval**: start and end of the search period
- **Plate**: enter full or p*rtial value
- **Attributes**: one of more attributes to search for
- **Tag**: Ganz CORTROL tag, if configured

> ⚠ If there is no configured VA database, there will be no dedicated tab and you will be unable to perform value-based search.

Attribute search can be performed in two modes:

- OR: use commas or spaces between attributes to include results that have ANY of the listed attributes
- AND: use + between attributes to display results that have ALL attributes

For example, entering "black sedan" will display all black cars and all sedans, while searching for "black+sedan" will only output black sedans.



External metadata event search in the LPR tab

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11.5 OPC Client

Ganz CORTROL servers can act as OPC clients and connect to different OPC servers, which communicate with various industrial hardware devices. In this way, Ganz CORTROL servers support thousands of devices from different manufactures without even knowing what those devices and their models are at any particular moment of time: OPC servers take care of that. Once the connection is established, Ganz CORTROL can receive data from OPC servers, compare it to pre-defined values and trigger events based on specific changes in these values; also, Ganz CORTROL can send commands to change the data on the OPC servers, which, in their turn, pass the commands to the hardware devices.

This topic describes how OPC client functionality is configured and used within Ganz CORTROL.

> OPC servers provided by different vendors can be used with Ganz CORTROL. The present document does not cover OPC server installation and configuration, as well as related Windows settings necessary for valid OPC client-server connection setup: these are vendor-specific and can be found in the OPC server documentation.

OPC Functionality

Any Ganz CORTROL server can connect to a third-party OPC server, thus acting as an **OPC client**. These connections are then used within the E&A Configurator to create events and actions based on OPC data (variables): events compare the variable contents to pre-defined values in a specified way; actions change the variable contents to a pre-defined value.

Communication with OPC servers can be maintained in one of two ways: **synchronous** and **asynchronous**. When in synchronous mode, Ganz CORTROL server polls an OPC server and receives updates with the latest data set as a result; this happens every few seconds. In the asynchronous mode, Ganz CORTROL server "subscribes" to the updates and then waits for a list of updated items from the OPC server.

> Asynchronous reading and writing is a preferred method and is typically more efficient. However, some modifications of Windows security policies and DCOM permissions might be required for this connection mode to work, and these are vendor- and use-case specific. Please follow the guidelines in your OPC server documentation carefully to ensure the operability: there are no settings on the Ganz CORTROL side that could affect your OPC server connection availability.

Before getting to OPC setup on the Ganz CORTROL side, install and configure your OPC server with hardware devices, and adjust Windows settings (if required). Configuration instructions below imply that you have done so and a remote OPC server with some data is reachable and operational.

Create and Manage OPC Client

OPC client configurations are located in this section as main OPC integration purpose is event and action scenarios (rules). In your Ganz CORTROL Console, switch to the *Events & Actions* section and choose OPC in the list on the left.

To add a new configuration, click the + *New OPC client configuration* button in the upper panel.

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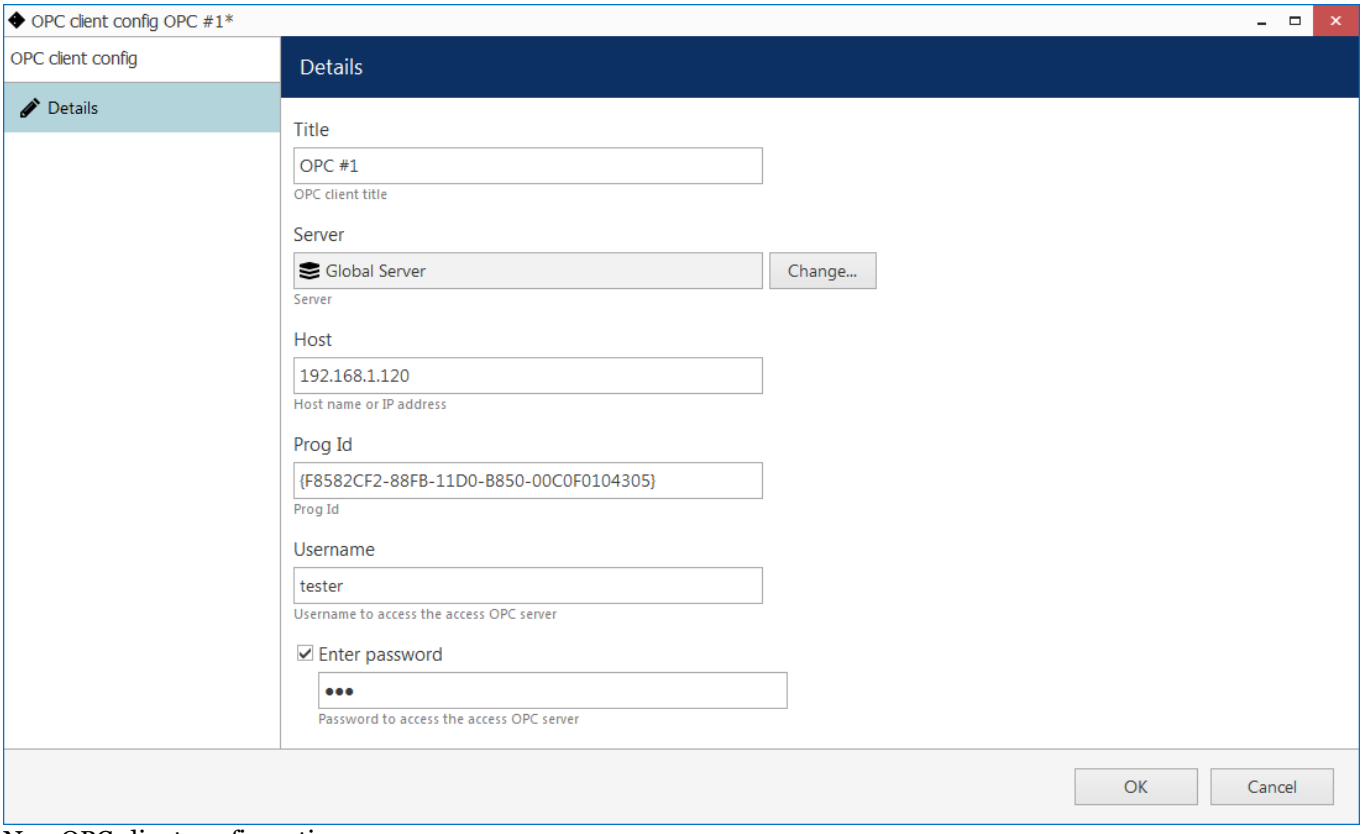

New OPC client configuration

The table below details the available settings.

Setting	Description	Default value
Title	User-defined configuration name	[none]
Server*	Ganz CORTROL server that will act as OPC client (you will be unable to change the server once it has been set!)	[none]
Host	OPC server host name or IP address	[none]
Prog ID**	OPC server program ID, vendor-specific	[none]
Username	User name from the Windows account to connect to the OPC server computer	[none]
Password	Password from the Windows account to connect to the OPC server computer	[none]

Fill in the settings and click *OK* to close the configuration dialog box and save.

⚠ *Once you assign the OPC client configuration to a **server**, the *Server* field will become greyed out, meaning that you **cannot change this setting anymore**. In other words, it is impossible to move an OPC client configuration between servers. To do this, you will need to create a new OPC connection for another server.

💡 **The **Prog ID** parameter is mandatory and it is supplied by your OPC server. Typically, it is available in the OPC server settings; check your OPC server configuration manual for the exact information.

The newly created profile will appear in the list. Select it and hit the *Test* button on the panel above to **validate** the configuration; the following **responses** may be received:

- *OPC client test passed*: asynchronous connection with the configured OPC server has been successfully established
- *Code 22020100 (asynchronous data mode not available)*: connection established successfully but only synchronous mode is available
- *Code -2147023174 (OPC server is unavailable)*: connection unavailable due to invalid OPC client settings (e.g., incorrect target host name or IP), Windows settings or connectivity issues

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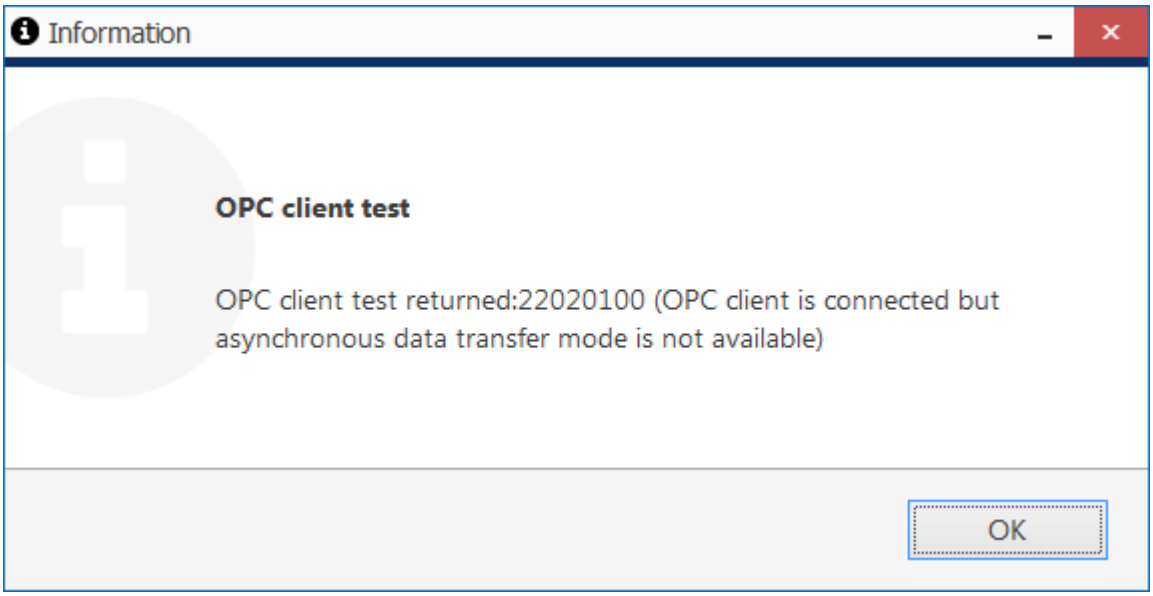
- *Code -2147024809 (parameter is incorrect)*: incorrect OPC client configuration (e.g., no username was entered while expected)
- *Code -2147024891 (access denied)*: OPC server denied connection due to lack of permissions (e.g., invalid user name and/or password was used)
- *Code -2147221164 (class not registered) or code -2147221005 (invalid class string)*: typically, incorrect program ID format or program ID itself

The first two responses indicate successful connection with synchronous or asynchronous read/write mode; other codes mean no connection has been established so it is necessary to review the settings and troubleshoot. Other codes may appear as well in case of miscellaneous Windows configuration and/or connectivity issues.



OPC client test detected that synchronous connection mode is available

Use the *Disable/Enable* button on the upper panel to disable the OPC client temporarily and then enable it again: this is useful when OPC server is offline so Ganz CORTROL audit log is not flooded with errors. You can create any number of OPC clients and any number of events and actions based on them.

Events and Actions

Once you have created an OPC server connection, Ganz CORTROL server can retrieve the list of existing data items (nodes) from the OPC server and work with it. All the available nodes, their attributes and their values are listed when you create an event or an action of the *OPC Client* type.

Events allow you to create conditions - react to specific changes in the node values by applying conditional operators: for example, if variable type is Boolean, you can check if it is equal to 1 (=true) or 0 (=false). For other variable types, there are other (corresponding) conditional operators.

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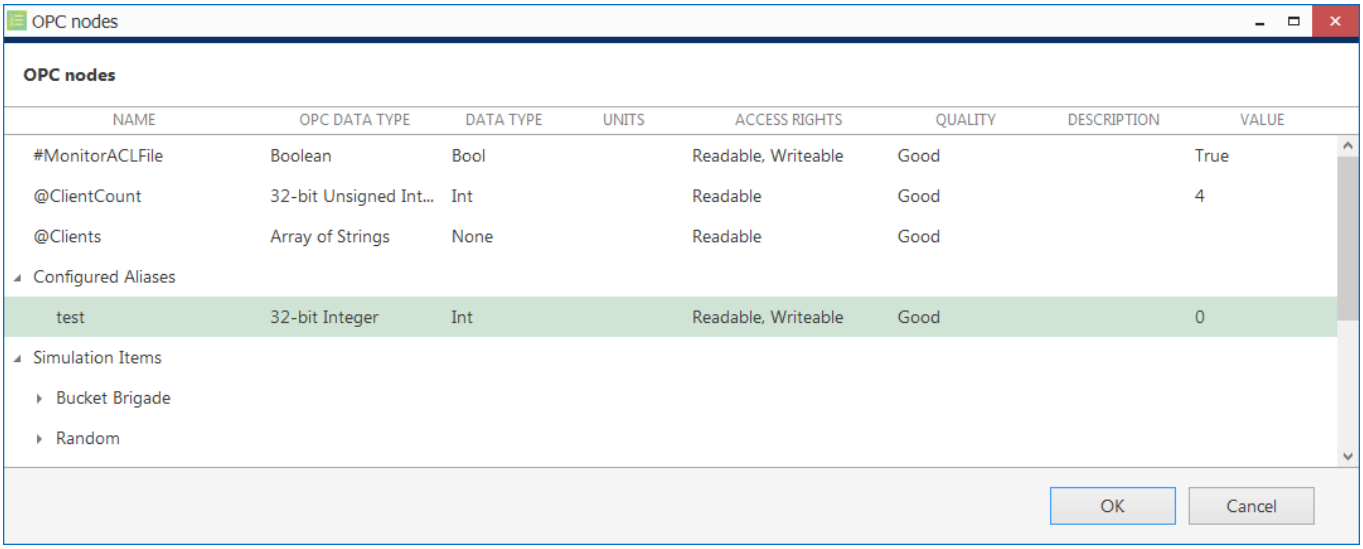

OPC nodes retrieved from an OPC server

Actions triggered from Ganz CORTROL servers send write commands to the OPC server, in this way replacing the node value with the pre-defined one. Value of the nodes, which have non-compatible types or do not have the write permission, cannot be changed.

OPC **data types** are converted to standard data types for further use in Ganz CORTROL: for example, both 16-bit and 32-bit integers are converted to the *Int* (integer) type. Some of the data types are not converted (e.g., currency, date&time, miscellaneous arrays) so it is not possible to use them as variables in the events and actions.

Pay attention to the **access rights** of the nodes: for events, it is enough to have the read permission; for actions, the node must be writable, otherwise you will not be able to select it as the target action variable.

For detailed information on the creation of events and actions, please refer to the corresponding topics of this document.

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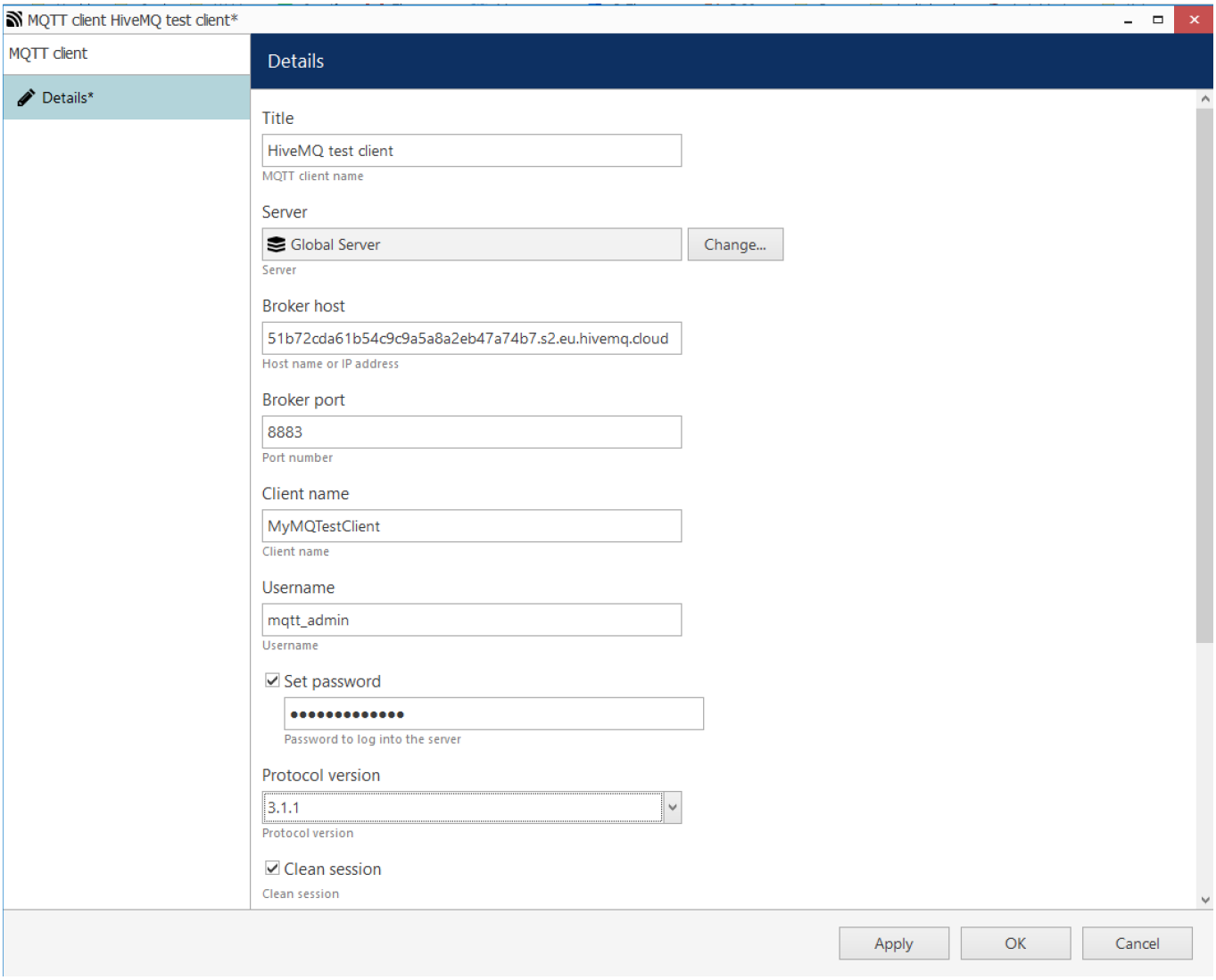
11.6 MQTT Clients

MQTT (MQ Telemetry Transport) is an OASIS standard messaging protocol for the Internet of Things (IoT) that describes how IoT devices (embedded devices, sensors, industrial controllers, etc.) communicate over the Internet. MQTT features clients and brokers; Ganz CORTROL servers have the ability to host MQTT clients, which can connect to existing third-party MQTT brokers, subscribe to topics and publish their own MQTT messages.

On each Ganz CORTROL server, you can create MQTT client(s), and then use it connect to MQTT broker(s) and subscribe to the desired topic or topics, and publish messages. Thus, Ganz CORTROL MQTT clients act as regular MQTT clients, "talking" to the MQTT brokers of your choice. The Ganz CORTROL server installation does not include an MQTT broker, nor does CBC AMERICA LLC provide such modules as an extra. Before using this functionality in Ganz CORTROL, you need to have a running broker with connected devices.

Create an MQTT Client

To create a new MQTT client in Ganz CORTROL Console, go to the *Configuration* tab and choose *MQTT Clients* on the left. On the upper panel, click the *+ New MQTT Client* button to open up the dialog box.



The available settings are summarized in the table below. Note that the connection settings here must match the allowed connection profile in the MQTT broker configuration. For example, if your broker does not support insecure connections, you must enter relevant secure connection settings matching those on the broker side.

Setting	Description	Default value

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Title	User-defined client name that will be used everywhere in Ganz CORTROL Console	[none]
Server	Ganz CORTROL server, to which the MQTT client will be bound. If none are selected, the client will be available on all servers in the Ganz CORTROL Global system	[none]
Broker host	MQTT broker host name or IP address for the client to connect to	[empty]
Broker port	MQTT broker port to be used for client connection	[empty]
Client name	MQTT client name that will be broadcasted. Broker settings may require this field to be set explicitly or allow it to be empty.	[empty]
Username and password	User name and password to authenticate (leave blank if broker allows anonymous connections, allow_anonymous is true)	[empty]
Protocol version	Must be supported by MQTT broker; older version, 3.1.1, is more likely to be supported	3.1.1
Clean session	If enabled, the broker will not queue messages for the Ganz CORTROL server while it is offline	Enabled
Keep alive interval	A ping message will be sent to broker at least at this interval if there is no other traffic occurring	30 seconds
SSL/TLS version	Choose the secure protocol version or leave an insecure connection	none
Certificate	For secure connections, enter the contents of the ca.crt certificate file here (copy from the broker certificate)	[empty]
Enable last will and testament	The message to be sent by broker to other clients in case of a disgraceful disconnect. Specify the message itself, the message topic, QoS*, and choose whether the message should be retained** by broker.	Disabled

*QoS - quality of service - has three levels:

- At most once: no delivery guarantee
- At least once: guarantees that the message is delivered at least once
- Exactly once: highest guarantee, safest and slowest QoS

**The retain flag tells the MQTT broker to always keep the last received message from the client and forward it to every new subscriber. You can retain the LWT message to notify other clients about your MQTT client status.

```
907
908  # listener for mutual authentication
909  listener 8883
910  protocol mqtt
911  require_certificate false
912  allow_anonymous false
913
914  cafile C:\Program Files\mosquitto\certs\ca.crt
915  certfile C:\Program Files\mosquitto\certs\server.crt
916  keyfile C:\Program Files\mosquitto\certs\server.key
917  #tls_version tlsv1.2
918  tls_version tlsv1.3
919
920  password_file C:\Program Files\mosquitto\passwords
921  #per_listener_settings false
922
923
924  #acl_file C:\Program Files\mosquitto\my_acl.acl
925
```

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Mosquitto MQTT broker configuration file example

After entering the MQTT client configuration, click *OK* to save and close the dialog box. The newly created client configuration will appear in the list. However, the actual MQTT client will **not** be created not to waste the systems resources: Ganz CORTROL server will create the MQTT client after you use it in an event rule.

> The MQTT Client will only appear in the Monitoring section when there exists a related active (enabled) rule involving an event or an action bound to that client.

Use MQTT Client to Trigger Events

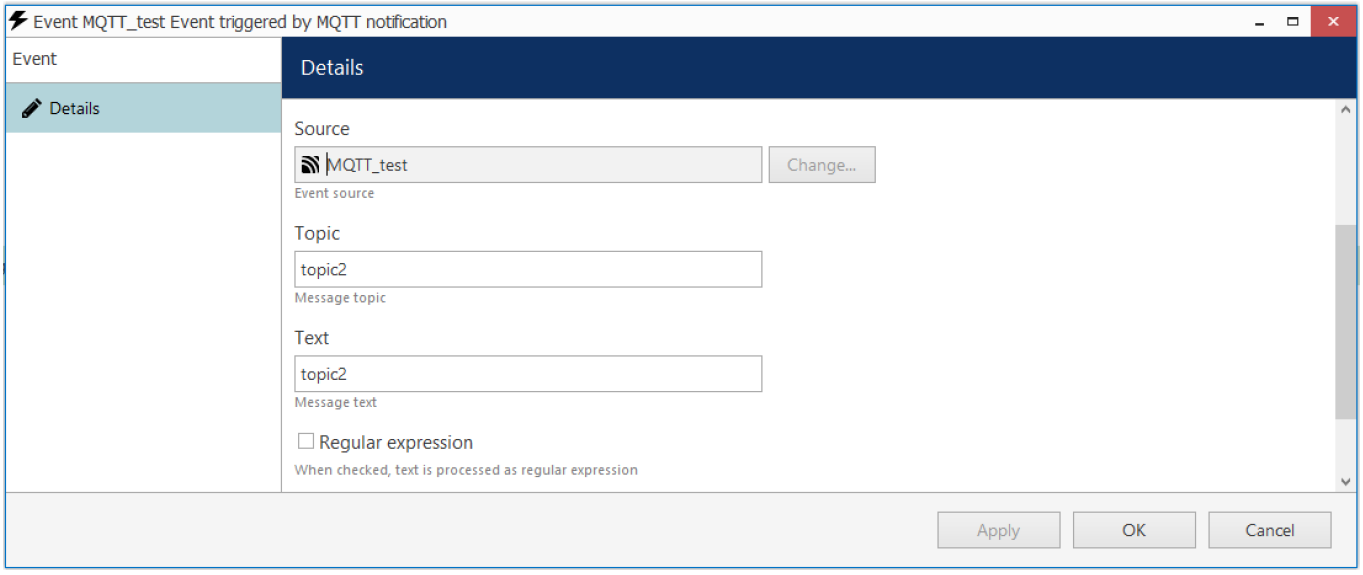
Once you have created one or more MQTT clients, you can use them to subscribe and publish messages to the topics of your choice. For each topic of interest, you need to create one event or action and choose the previously created MQTT client as agent.

To create a new event: in the *Events&Actions* section of Ganz CORTROL Console, under *Events*, add a new event and set its type to *Event triggered by MQTT notification*. Fill in the settings as you would do for your usual MQTT client when subscribing to other clients' messages:

Available settings:

- **Type:** Event triggered by MQTT notification
- **Title**: event name that will appear in the E&A Configurator, corresponds to the macro {EVENT_TITLE}
- **Source**: MQTT client that will subscribe to the current topic and act as event source. Leave empty if you want the event to be visible for all existing MQTT clients
- **Topic**: MQTT topic to subscribe to
- **Text**: incoming message that will trigger the E&A event. If empty, any message will trigger the event. The field cannot be empty if marked as regular expression!
- **Regular expression**: enable this option to enter a regular expression in the Text filed instead of plain text
- **QoS**: required level of quality of service

If you don't know what the exact incoming message will be but you know the format, feel free to enter a **regular expression** in the *Text* field.



Create a new MQTT client event

After you create the event and use it in an active (enabled) rule, the created MQTT client entity will appear in the *Monitoring* section of Ganz CORTROL Console under *MQTT Clients*.

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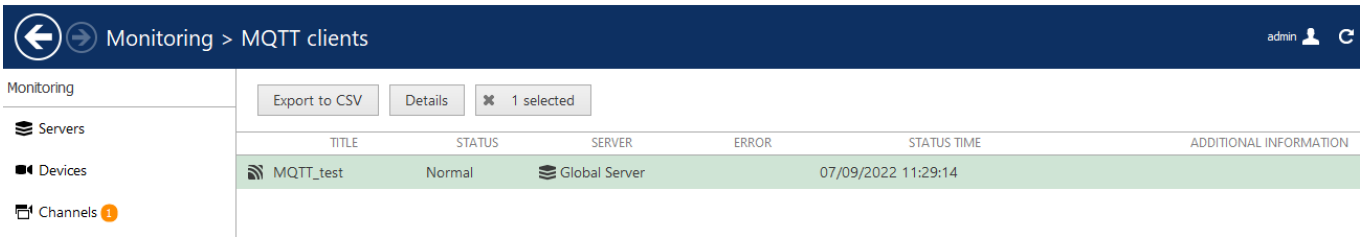
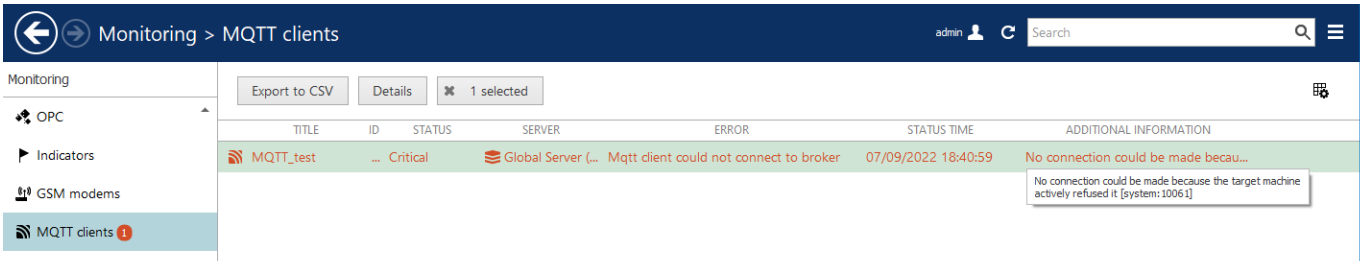


Active MQTT Client with running normally

If the MQTT client configuration is invalid, the broker is not running/available, or there are other issues, you will see the corresponding error in the *Monitoring* section of Ganz CORTROL Console. For example, if the broker connection settings are incorrect, the MQTT client status will state that it cannot connect to the broker.



Error: MQTT client cannot connect to the broker using current settings

You will also see a relevant message in the *Audit log*, in the *Server* section.

Send MQTT Messages

If you wish to send MQTT messages to for other MQTT clients in your system, all you need to do is create an action of the corresponding type in the Event & Action Configurator, and then use it in a rule.

To create a new action in Ganz CORTROL Console, choose *Actions* in the *Events&Actions* section, then click the + *New action* button on the upper panel. Fill in the settings:

- **Action type**: Send MQTT notification
- **Title**: action name that will appear in the E&A Configurator, corresponds to the macro {ACTION_TITLE}
- **Target**: MQTT client pre-configured on the current server; leave empty for the action to be available for all MQTT clients
- **Topic**: MQTT topic
- **Text**: MQTT message text to be published (right-click to insert macros)
- **QoS**: required level of the MQTT quality of service

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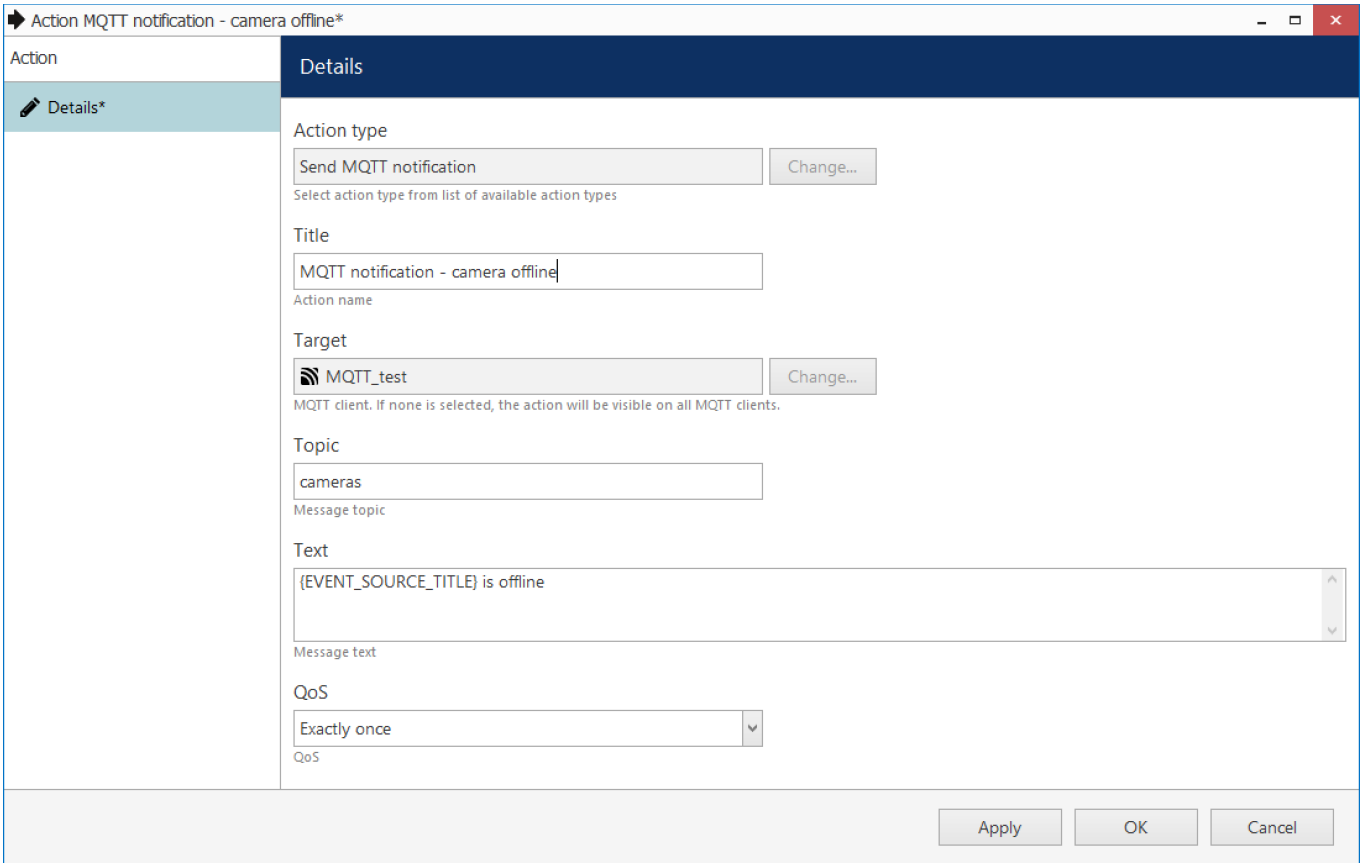

Click *OK* to save and close the dialog box; the newly created action will appear in the action list. In the E&A Configurator, the action will appear in the right-hand column, under the MQTT client defined as the action target. If you have not specified the client, the action will appear for every existing and new MQTT clients in your Ganz CORTROL Console configuration.

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12 Health Monitoring

Ganz CORTROL provides **health monitoring data** for servers, devices and channels, as well as **live status** of connected user sessions and other resource information. In the *Archive statistics section*, it is possible to view the stream details and also **un-protect** footage that has been locked via Ganz CORTROL Client application.

To access the live monitoring data in Ganz CORTROL Console, choose the *Monitoring* section in the bottom-left-hand panel and switch between components using the menu on the left. Use the *Search* field in the upper-right-hand menu to filter the records; press the *Refresh* button or **F5** on your keyboard to **reload** the item list. The statistics are not refreshed automatically, so do not forget to reload the list tin order to obtain the most recent information.

The contents of any subsection in *Monitoring* can be exported in **CSV** (comma-separated value) format using the button on the upper panel.

Each section here contains a number of columns with miscellaneous information. Not all of them are available by default; to modify the displayed details and their layout, use the grid icon in the upper right corner: an additional configuration window will pop up. You can hide the fields you do not need, and also freeze the leftmost columns for convenient horizontal scrolling. Hidden fields cannot be used for search or sorting.

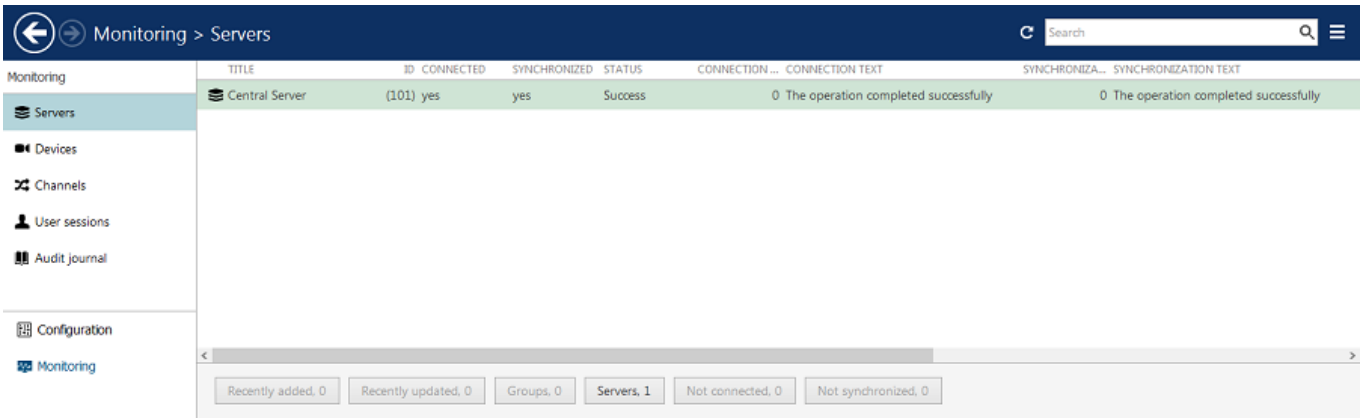
The *Details* button (available for some of the sections) on the top panel allows you to view **detailed information about important events** related to the target resource. For example, you can view the list of recent connection and VCA license errors for every channel. The details are discarded after each server reboot.

All information written in plain black is informative. When things go wrong, there are two levels of errors here: **critical** and **warning**. Critical errors are marked red; those usually indicate important stuff like missing main stream video, no connection to services etc. Warnings are yellow and are used to highlight minor issues like missing secondary stream, too long GOP period, or not enough space on the disk. You can ignore warnings by right-clicking the selected items and selecting *Ignore > (preference)*. This helps if the warning is irrelevant, e.g., if you do not use substreams. Critical errors cannot be ignored as they need to be fixed for correct server operation.

Further in this chapter you will find a brief description of each information field.

Servers

The server status includes information about connection and synchronisation: both have numeric status code and corresponding textual status.



Servers live monitoring

Devices

The device summary provides configuration update status and the time of the last communication between the server and device.

The following fields are available:

- **Title**: device name
- **Status**: current device condition
    - *Normal*: the device is functioning properly

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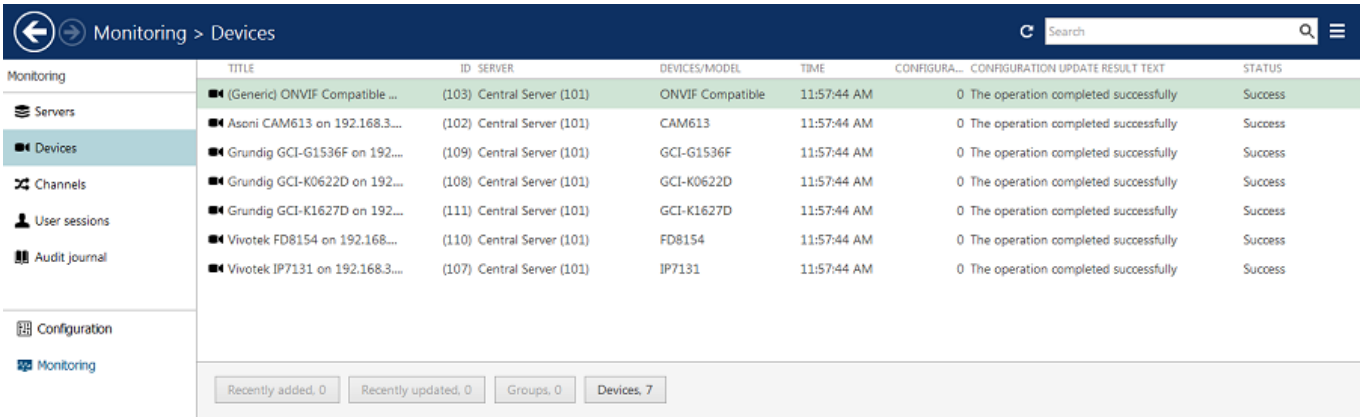
    - *Unknown*: the device's channel is disabled, or the device core has not been loaded yet (may appear shortly after server startup)
- **Server**: current server that has this device assigned (may be regular recording server or failover)
- **Devices/model**: device type or model
- **Status update time**: last sync/connection attempt timestamp
- **Information**: additional information, if any, will be displayed here (usually, errors; normally, the field is empty)
- **Host**: device IP address or hostname
- **Port**: device HTTP/HTTPS port (from device settings, used to exchange service information, not data)



Devices live monitoring

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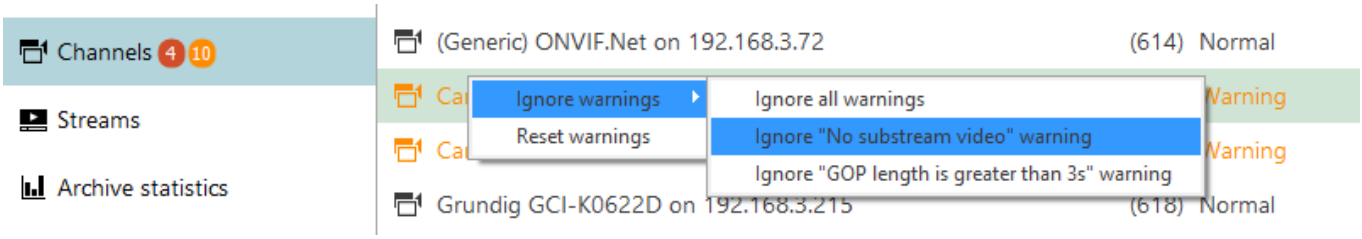
Channels

The channel monitoring section contains details about channel streams. Wherever relevant, there is information about both main and secondary video streams in separate columns.

Channels can have critical errors (red) and/or **warnings** (yellow). Warnings usually appear due to minor issues - e.g., missing substream, too big GOP length etc. You can **ignore** them by right-clicking item(s) and selecting *Ignore warnings > (preference)*. If you want the warnings to be shown again, right-click the items and select *Reset warnings*. To **reset** all warnings, go to the Ganz CORTROL Console application settings (main menu > Settings) and select the corresponding option.



4 critical errors and 10 warnings for channels in the *Monitoring* section

- **Title**: channel name
- **Server**: the server currently handling the target channel's device
- **Device**: the name of the underlying hardware piece for the target channel
- **Device model**: underlying device type
- **Organisation**: if the channel belongs to an organisation, if will be displayed here
- **Status**: current channel condition (e.g., Disabled means the channel has been turned OFF in the *Channels* section)
- **Status update time**: timestamp of when the channel status was last checked
- **Online**: shows channel uptime in percents compared to the total server run time
- **Video loss duration**: shows if the video stream is not available; if yes, for how long the video stream has been lost
- **Kbit/s**: stream bit rate (Kbits per second), separate columns for the main and secondary streams
- **FPS**: stream frame rate (frames per second), separate columns for the main and secondary streams
- **Resolution**: frame size in pixels, separate columns for the main and secondary streams
- **Codec**: stream compression, for both main and secondary streams, separate columns for the main and secondary streams
- **GOP size**: key frame interval, for both main and secondary streams (only if recording is activated), separate columns for the main and secondary streams
- **Recording**: recording status ON/OFF (activated/not activated)
- **Recording error**: if any
- **Frame cache**: the amount of memory allocated for pre-recording of the target channel (total for all channel streams)
- **Stream storage**: destination storage, for main, secondary, and edge streams
- **Information**: additional information, if any, will be displayed here (usually, errors or warnings; normally, the field is empty)
- **Motion detection mode**: currently used motion detection setting (disabled/camera-side/software-side high accuracy mode/software-side high performance mode)
- **IP**: device IP address or hostname
- **Port**: device HTTP/HTTPS port (from device settings, used to exchange service information, not data)
- **Jitter**: frame latency; shows delay (in milliseconds) between expected and actual frame arrival time, separate columns for the main and secondary streams
- **Error**: the latest error related to the channel (same as in *Details*, reset upon server restart)
- **Error date**: the latest error timestamp

For any channel, you can press the *Details* button on the upper panel to see the list of all **channel-related errors**, starting from last the server start. This list is purged upon server restart.

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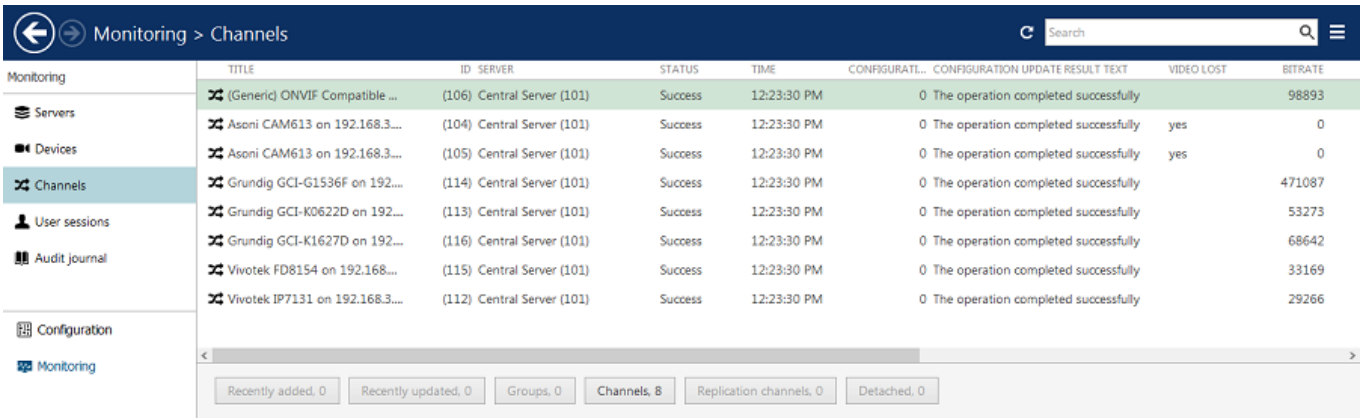
Only channels attached to servers are shown here.

Note that *Not activated* recording status may both mean either that recording is not configured (disabled) or that recording has not been activated according to a schedule. The *Activated* status will appear if at least one of the channel streams is set to be recorded based on any configuration apart from *No recording*.

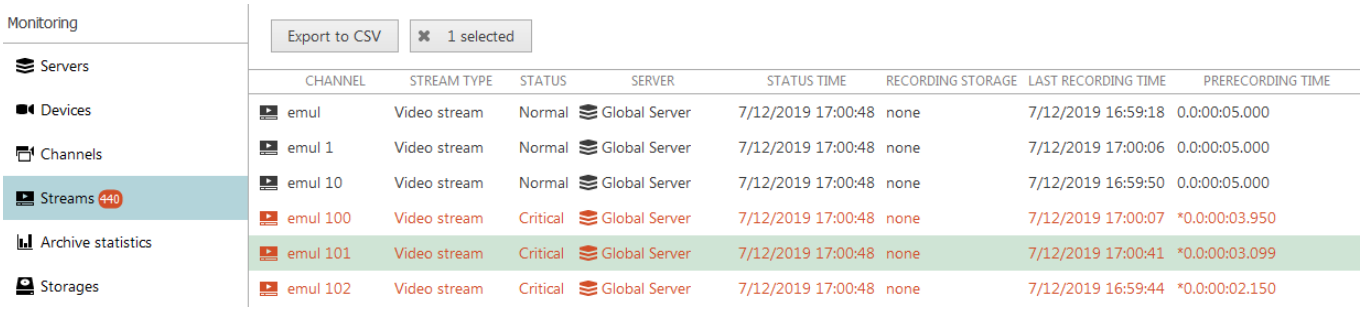


Channels live monitoring

Streams

This section displays the properties of **every recorded stream** separately. For example, if a channel has both main an secondary streams with audio activated, there will be three entries. Replication streams are also displayed separately.

- **Channel**: stream source, one of the existing enabled channels
- **Stream type**: video, audio, motion, external data (from data sources), or VCA metadata
- **Status**: current stream condition
- **Server**: originating server
- **Device**: originating device
- **Status time**: last status update timestamp
- **Recording storage**: target storage title
- **Recording directory**: one of the target storages on the corresponding server
- **Last recording time:** timestamp of the last recorded frame (useful for troubleshooting the recording)
- **Prerecording time**: actual number of second held in the pre-recording buffer (may be lower then the setting if not enough memory, or 0 when not required)
- **Information**: additional information, if any, will be displayed here (usually, errors; normally, the field is empty)



Streams with reduced buffer size will have *Critical* status

Note that the **pre-recording** time here may differ from your pre-recording setting in the recording configuration. Ganz CORTROL server applies smart logic here and traces situations when larger buffer is not necessary, or even preventing the system from normal operation. Thus:

- if the currently used recording profile does not involve any pre-recording (e.g., *Continuous recording*, or event-driven with no defined E&A events), the buffer size will be reduced to 0
- if there is not enough memory for all channels (the server is overloaded), the server will reduce pre-

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recording buffers; channels with largest frame cache size will have their buffers reduces first pf all
- upon server startup, the buffer size is increased gradually for smoother start

⚠ Removed and disabled channels will not be shown under this section: only active recorder tasks are displayed here.

Archive Statistics

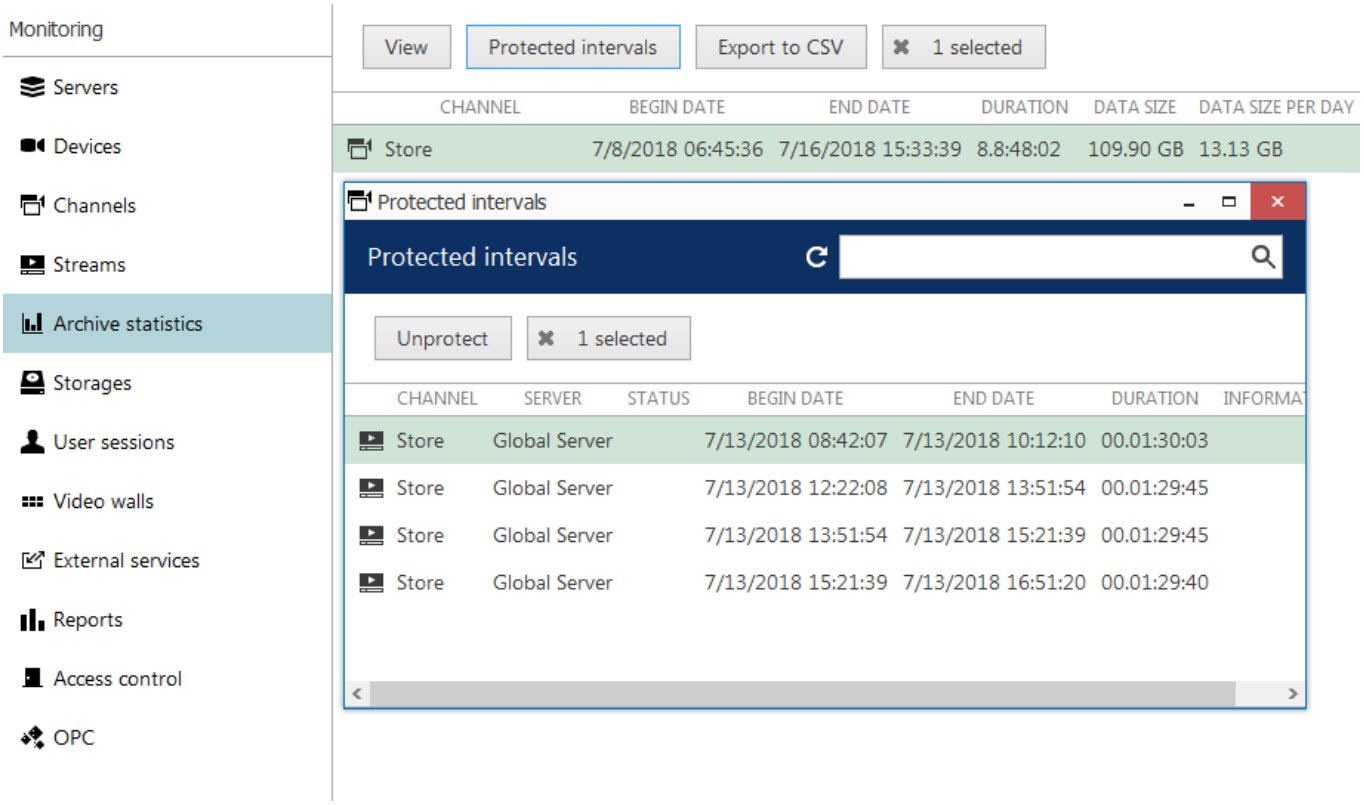
Here, you can see recording statistics for every channel (all streams and all storages included):

- **Channel**: configured channel title
- **Begin date**: the time of the very first recording for the target channel
- **End date**: the time of the very last channel's recording
- **Duration**: total archive duration for each channel
- **Data size**: total archive size per channel, based on the time boundaries mentioned above
- **Data size per day**: an estimate of how much space one day's recordings will take (average per day, calculated based on existing archive size)
- **Protected interval**: total duration of the archive, which has been marked as protected, and will not be removed (erased)
- **Protected data size**: total size of the protected archive

Double-click any entry or use the *View* button on the top panel to display details for each channel: view the recording statistics per storage and with detailed information on every stream including audio, motion, VCA and external data feeds.

To review and unlock the footage that has been protected from erasing via Ganz CORTROL Client application, select the target channel(s) and click the Protected intervals button on the top panel.

From this dialog box, you can unlock the previously protected parts of the archive. If these recordings fall under quotas (storage or duration, server wide or individual), they will be erased immediately.



Archive statistics and protected archive intervals

Storages

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Statistics, properties and status for each storage unit are displayed here.

Some of the storages may have **warnings** (marked yellow) in case there is not enough space on the disk. In that case, check your assigned quotas in the storage management, and make sure you do not have too many protected intervals in the *Archive statistics* (see above).

- **Title**: storage label, either built-in or user-defined
- **Status**: operation status of the target storage
    - *Normal*: the storage can be used for recording and there are no issues detected
    - *Critical*: the storage cannot be used for recording due to one or more serious errors, check the Information column for description
- **Status update time**: last time the storage status was obtained (use the *F5* button on your keyboard to refresh the list)
- **Path**: storage path on its server of origin
- **Encrypted**: yes/no
- **Free space**: how much free space in gigabytes is left on the disk
- **Free space %**: same but shown as percentage in reference to the total storage size
- **Total space**: entire storage size
- **Information**: additional details, if any (e.g., storage related errors)
- **Disk queue length**: number of read/write requests (local storage only)*

All storage information is retrieved through the API of the underlying operating system. If you think some of the information may be incorrect, check the same statistics via Windows interface - Task manager, Resource monitor, or other utilities.

*The *Disk queue length* column is useful for assessing the **storage condition**. It reflects either the current or the average queue length (whichever is higher) per disk. Generally, 5+ requests per disk indicate a bottleneck in the disk subsystem. 2+ requests per disk for a long period of time may also indicate bottlenecks. For RAID storages, the queue length is summarized, so, for example, for a system with 8 disks the queue length should not exceed 16. A value of 0 means the storage is not overloaded. An absent value (**empty**) means it cannot be retrieved: the field will be empty for network storages and for unreachable disks (e.g., server offline).

If one or more storages have issues (e.g., incorrect password), the corresponding section will have a red circle with the number of detected issues next to the section name. Inaccessible storage units will have no total and free space information.

User Sessions

This monitoring area displays currently active incoming Ganz CORTROL Client connections via both TCP and HTTP ports with the following details:

- user account
- remote address
- remote (outgoing) port
- session start time
- type (Ganz CORTROL Console/Ganz CORTROL Client)

Disconnected sessions will automatically disappear from the list.

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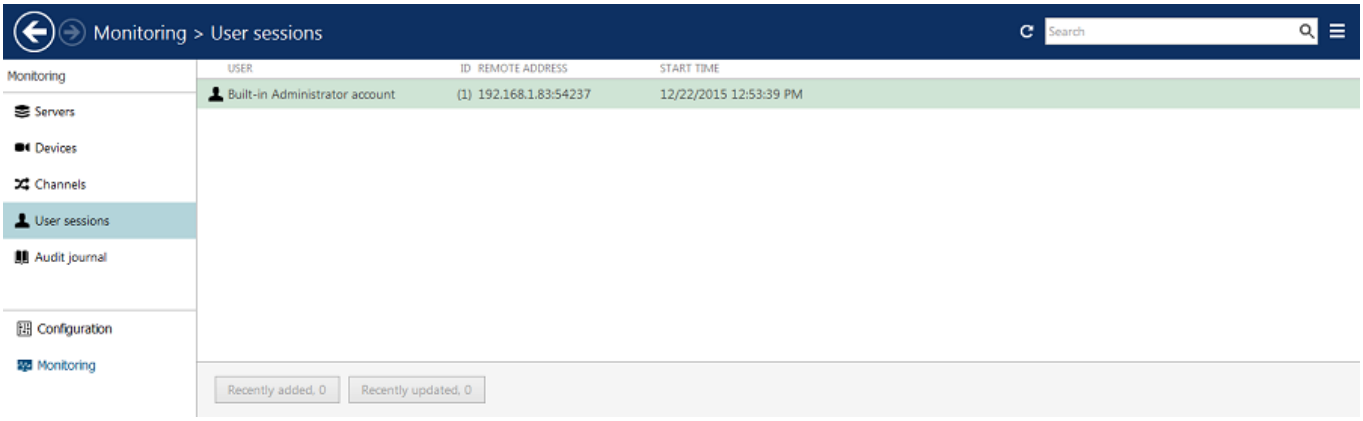


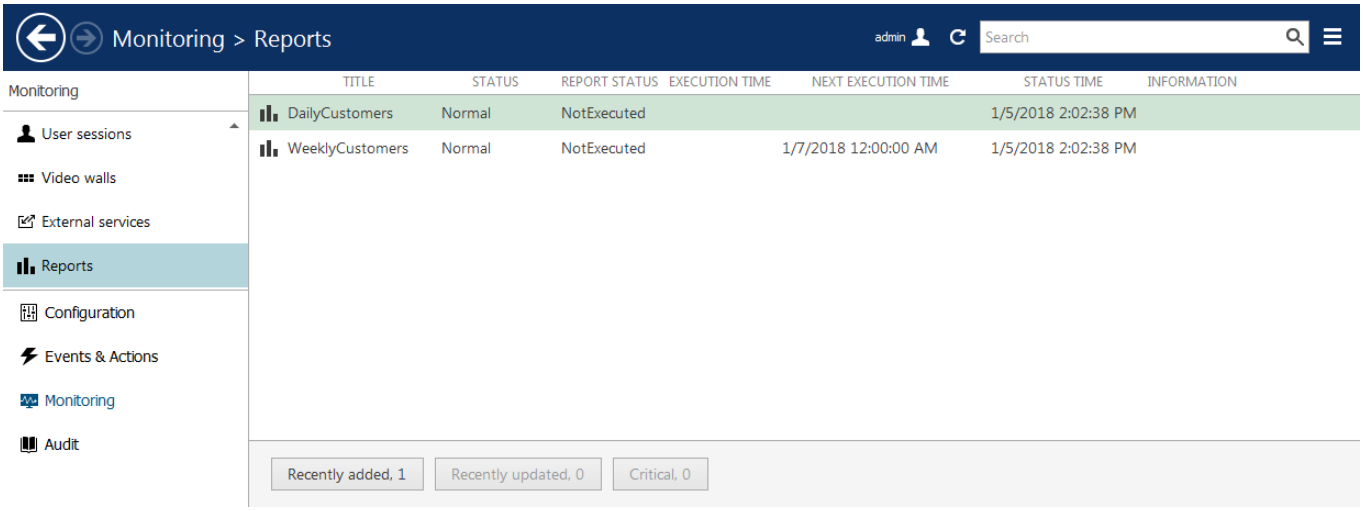
User Sessions live monitoring

External Services

If License Plate Recognition, Face Recognition and/or other external services are connected, their session properties will be displayed here: service name, remote address and used user account.

Reports

This section contains health monitoring data for automatic VCA and software counter reports.



Report status

If a report has been sent at least once (by schedule, not as a test), the last execution time is shown here. For the reports that are currently set to be emailed automatically, the next (scheduled) execution time is also displayed.

Access control

If any third-party services are connected, their connection properties and status will be displayed here.

OPC

If any third-party OPC servers are connected, their connection properties and status will be displayed here.

Indicators

All indicators configured in your system will be displayed here, so that you can see their status - all in one place.

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12.1 Audit

To access the global audit log in Ganz CORTROL Console, choose *Audit* section in the bottom-left-hand panel.

The audit log contains detailed information about the most important user activities and server events. Events are organised in a way similar to the Windows Event log, and can be filtered and sorted by any field just by clicking on the relevant field. By default, entries are sorted by time, with latest on top. Use *Search* field in the upper-right-hand menu to filter the records; press *Refresh* button to reload the item list.

> Please note that your actual audited events may vary depending on the software license edition.

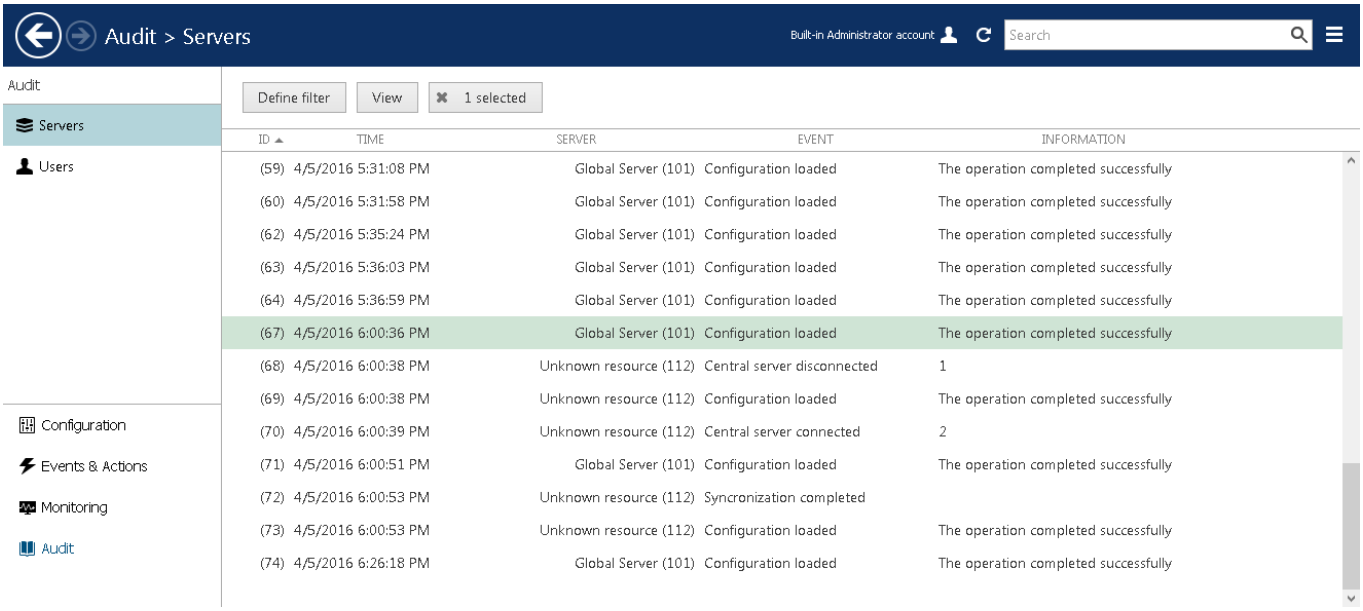
The log has two sections: *Servers* and *Users*; these can be accessed by clicking the corresponding items in the menu on the left, when in the *Audit* section.

Servers

Each event contains the following values:

- **Time**: event timestamp in the system locale-specific format
- **Server**: name of the server from which the event originates
- **Class/subclass**: event category
- **Event**: a brief description of the event; see below for the detailed information about the logged event types
- Other relevant fields - **user**, **resource**, **data**, **info**, misc. **ID**s, : additional information relevant to the event, e.g., error details, target resource type

Double-click any event in the list to view the full information.



Audit log, *Servers* section

The following **events** are logged in this section:

- **Internal server events**
  - **Audio output action completed**: an E&A action to send audio to device was executed
  - **Automatic backup failed**: an automatic backup was scheduled but failed for some reason
  - **Automatic backup succeeded**: a scheduled backup copy of the databases was successfully created
  - **Central server connected**: central server has successfully connected to the target recording server
  - **Central server disconnected**: central server has disconnected from the target recording server because the target server is offline, unreachable, has been removed from the central

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server configuration or has invalid configuration
- **Configuration loaded**: configuration has been successfully loaded from the database and applied to the target server
- **Configuration reset failed**: an attempt to reset the recording server configuration was made but failed for some reason
- **Configuration reset requested**: recording server configuration reset was requested via Ganz CORTROL Console (this message will be normally followed by another entry reflecting the rest status)
- **Configuration request succeeded**: recording server configuration was successfully reset
- **Configuration saved**: server configuration was saved to the database
- **Connected to mirroring server**: central server successfully connected to its configured mirror
- **Connected to recording server**: central server successfully connected to a recording server
- **Disconnected from mirroring server**: central server disconnected from its configured mirror (e.g., because the mirror is no longer available)
- **Disconnected from recording server**: central server disconnected from a recording server
- **Event action failed**: an E&A action execution attempt was made but failed, double-click the event entry for details
- **Event action succeeded**: an E&A action was successfully executed, double-click the event entry for details
- **External users added**: an attempt to add new external users via AD/LDAP was made, see additional information for status details
- **External users removed**: external users were removed from the server configuration
- **External users updated**: AD/LDAP user list was synchronised
- **Failover node activated**: failover server changed its state from *Idle* and received configuration to act instead of a recording server
- **Failover status changed**: server was included or excluded from a failover cluster, or its status changed from/to *Unknown* (see server health monitoring for details)
- **Number of external users exceeded maximum allowed**: the number of imported AD/LDAP users exceeds maximum allowed by the license
- **Open VCA notification received**: server VCA engine event (e.g., VCA license error)
- **Remote update initiated**: remote software update was initiated via Ganz CORTROL Console
- **Server restarted by watchdog**: server was restarted by the watchdog service (double-click the event entry for the details about restart reason)
- **Server started**: Ganz CORTROL server service started
- **Server stopped**: Ganz CORTROL server service stopped
- **Synchronisation completed**: central server has successfully synchronised configuration data with the target recording server

- **Resource access**
  - **Archive**
    - **Bookmark added**: a bookmark was added to the target channel on behalf of the server (via E&A action, no user interaction)
- **Uncategorized**
  - **Permissions updated**: user permissions were edited, double-click the event entry for details

Double-click any event to open it in a separate dialog box with **additional information** about event source, such as: backup file path for the *Automatic backup* event, error code for the *Open VCA notification* event etc.

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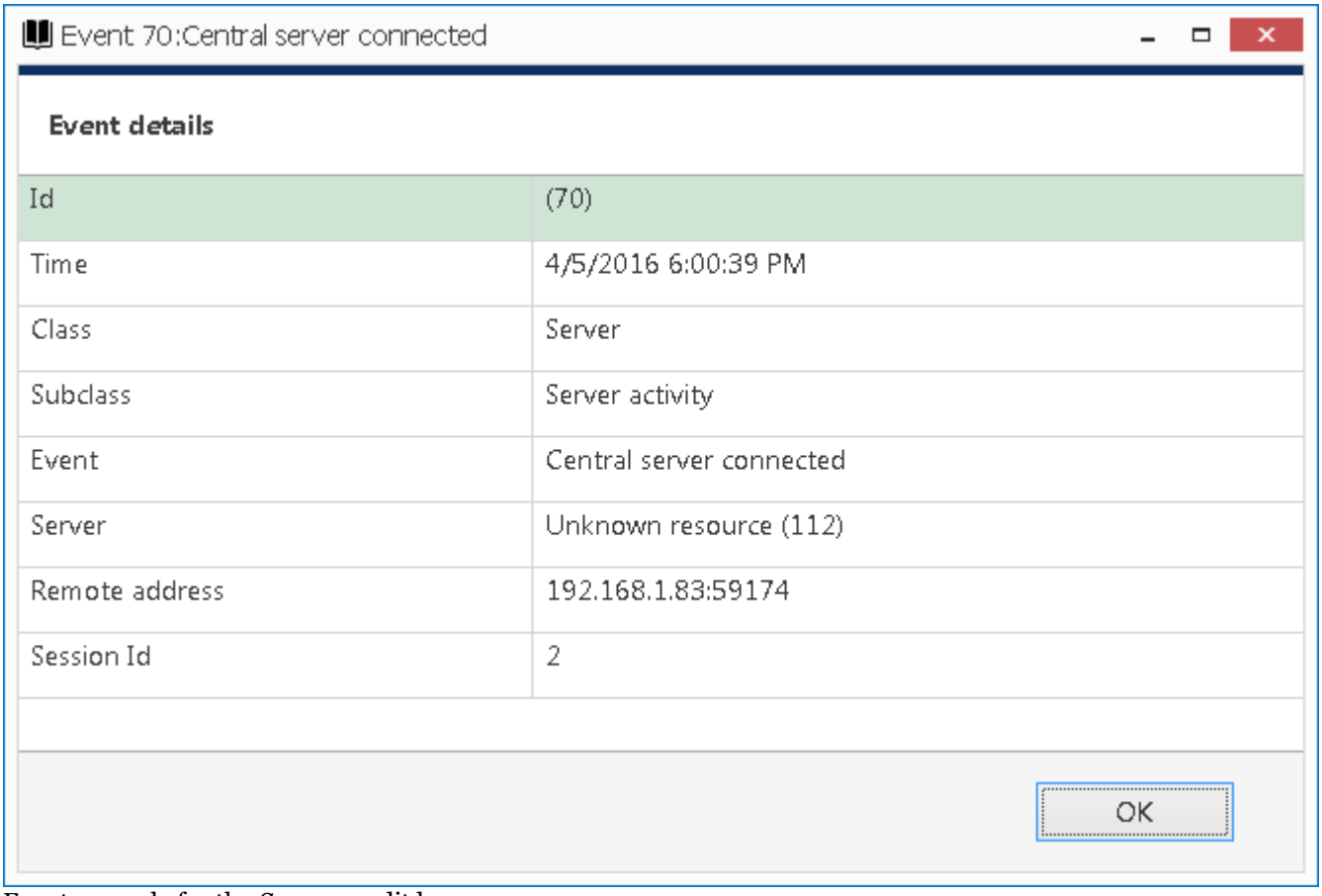

Event example for the *Servers* audit log

Users

The events related to user input (configuration via Ganz CORTROL Console, resource access via client applications) are available here. Some of these (mostly configuration related) are triggered by user actions in Ganz CORTROL Console and some (mostly related to resource access) are based on user actions in Ganz CORTROL Client. The following **events** are logged in this section:

- **Events & Actions**
    - **Rule modifiers**: events related to rule schedules and conditions
        - Event **condition** added/removed/updated: a condition was modified
        - Event **schedule** added/removed/updated: a schedule was modified
        - Event **schedule item** added/removed/updated: an individual schedule item was modified
    - **Action** added/removed/updated: an E&A action was modified
    - **Event** added/removed/updated: an E&A event was modified
    - Event-action **rule** added/removed/updated: a rule in the E&A table was modified
    - **Global event** added/removed/updated: a global event was modified
    - **Mail server** added/removed/updated: an SMTP server in E&A configuration was modified
- **External services**: events associated with external services operating via HTTP API, such as FR, LPR and third-party software integrations
    - **External service** added/removed/updated: external service connection was modified
    - **External service group** added/removed/updated: a group for external services was modified via Ganz CORTROL Console
- **Failover management**
    - Failover cluster added/removed/updated: failover cluster settings were modified via Ganz CORTROL Console
- **Installation**: events related to software installation and upgrade

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        - Remote update requested: a user has requested remote server update via Ganz CORTROL Console (usually followed by the *Remote update initiated* event entry in the *Server* audit section)
- **Recording**: changes to recording setup via Ganz CORTROL Console
    - Recording **configuration** added/removed/updated
    - Recording **profile** added/removed/updated
    - Recording **schedule** added/removed/updated
    - Recording **schedule item** added/removed/updated
- **Resource access**: user actions concerning all types of resource access from connected clients
    - **Archive**: playback related events triggered from different Ganz CORTROL Client playback modes
        - Archive **replication** accessed: recordings from a channel replica were accessed
        - Archive **search** accessed: recordings from a channel were
        - Archive **snapshot** exported: a single or multichannel snapshot was exported from one of the archive playback modes
        - Archive **timeline** accessed: archived data was accessed in a playback mode that has timeline
        - Archived **data accessed**: available recordings from a channel were played back
        - Archived **data exported**: a video clip was exported (double-click the event entry for details)
        - **Bookmark** added/removed: a new bookmark was appended to the channel timeline or deleted from it
        - **Bookmark popup** confirmed: bookmark popup caused by E&A action was approved by a user via Ganz CORTROL Client application
        - **Bookmark search** accessed: bookmark were searched from the Ganz CORTROL Client playback mode
    - **Live**
        - **Audio input** received from device: audio IN was activated from live view
        - **Audio output** sent to device: audio OUT was activated from live view
        - **External data** accessed: information from *Data sources* was streamed with live video
        - **Layout** added/removed/updated: a layout was modified in Ganz CORTROL Client
        - **Live data** accessed: live video stream was displayed
        - **Motion data** accessed: motion information was streamed with live video
        - **VCA data** accessed: Open VCA metadata was streamed with live video
    - **PTZ**: pan, tilt, zoom, focus, iris related actions, as well as PTZ presets and tours for the target channel
        - **Navigate**: PTZ event from older database versions (backward compatibility)
        - PTZ **auto-focus/auto-iris** activated: device automatic focus/iris feature was activated
        - PTZ **focus/iris** started/stopped: device manual focus/iris capability was used
        - PTZ **pan/tilt started**: device was panned/tilted
        - PTZ **pan/tilt stopped**: this event is generated after five seconds after the last pan/tilt command (after the PTZ control was released)
        - PTZ **preset** saved/activated/deleted: PTZ preset was accessed
        - PTZ **tour** saved/activated/deactivated/deleted: PTZ tour was accessed
        - PTZ **zoom started**: device zoom IN/OUT capability was used
        - PTZ **zoom stopped**: this event is generated after five seconds after the last zoom IN/OUT command (after the PTZ control was released)
    - **User defined**: this event is generated when an audit entry is created based on a user-defined E&A action *Write to audit log*
    - **Video walls**: events based on video wall related user actions in Ganz CORTROL Client via *Resources* panel and/or *Video Walls* section
        - Video wall **current layout saved as startup**: the currently displayed layout was set

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as startup for the target video wall display via video wall management
- Video wall **layout saved as startup**: a layout was set as startup for the target video wall display
- Video wall **layout sequence paused**: the layout sequence currently assigned to a video wall display was stopped
- Video wall **layout sequence set**: a pre-saved layout sequence was assigned to a video wall display
- Video wall **layout set**: a pre-saved layout was assigned to a video wall display
- Video wall **object popped up**: an E&A action that displays an object (channel/map/layout) an a video wall screen has been executed
- Video wall **viewport** updated: an individual viewport contents was changed within a layout of a video wall display

- **Copied exported items**: exported files were copied from the Ganz CORTROL Client library to an external destination
- **External data search** accessed: archived information from *Data sources* was searched from Ganz CORTROL Client
- **External service search** accessed: archived external service data was searched from Ganz CORTROL Client
- **Live snapshot** exported: a snapshot was saved from the Ganz CORTROL Client live view mode
- **VCA search** accessed: archived VCA data was searched from the Ganz CORTROL Client playback mode

- **Resource administration**: resource related events caused by user actions in Ganz CORTROL Console management application
  - **Channels**
    - Channel added/removed/updated: target channel was modified in the described manner
    - Channel attached/detached: target channel was attached to/detached from its device
    - Channel enabled/disabled: target channel was activated/deactivated
    - Device channel group added/removed/updated: a channel group was modified in the described manner
  - **Data sources**
    - Data source added/removed/updated: a serial data source was modified in the described manner
    - Data source profile added/removed/updated: a profile for the data source was modified
  - **Devices**
    - Administer: device management event from older database versions (backward compatibility)
    - Device added/removed/updated: a device was modified in the described manner
    - Device group added/removed/updated: a device group was modified in the described manner
  - **Layouts** and layout **templates**
    - Layout template added/removed/updated: a layout grid was modified
    - Layout group added/removed/updated: a group for shared layouts was modified
  - **Live podcasts**
    - Live podcast added/removed/updated: a live broadcast was modified
    - Live podcast enabled/disabled: a live broadcast was activated/deactivated
  - **Maps**
    - Geo map added/removed/updated: a map based on the world map was modified
    - Map added/removed/updated: a picture-based map was modified
    - Map group added/removed/updated: a map/geo map group was modified
    - Map item added/removed/updated: an individual map item (e.g., channel marker) was modified on a map/geo map

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- **Networks**
    - Network added/removed/updated: a network connection was modified
- **Organisations**
    - Organisation added/removed/updated: an organisation was modified
- **Servers**
    - **Connection** updated: server connection (IP, port, SNMP settings) was modified (it is added/removed together with the server)
    - **Server** added/removed/updated: a server was modified in the Ganz CORTROL Global configuration
    - Server **configuration backed up**: server configuration was backed up manually via wizard (this event is only logged if the backup was run while Ganz CORTROL server was stopped)
    - Server **configuration restored**: server configuration was restored manually via wizard (this event is only logged if the wizard was run while Ganz CORTROL server was stopped)
    - **Server group** added/removed/updated: a server group was modified
- **Software counters**
    - Software counter added/removed/updated
- **User buttons**
    - User button added/removed/updated: a user button was modified
    - User button group added/removed/updated: a user button was modified
- **Video walls**
    - Video wall added/removed/modified: a video wall was modified
    - Video wall group added/removed/updated: a video wall was modified
- **Visual groups**
    - Visual group added/removed/modified: a visual group was modified
- **Access control** added/removed/updated, enabled/disabled
- **OPC client** added/removed/updated, enabled/disabled

- **Server security**: events related to server security, access and permission/policy/user management
    - **Administration permissions** updated: administrative permissions for Ganz CORTROL Console access were modified for a user or a user group
    - **Audit log** accessed: the *Audit* section of Ganz CORTROL Console was accessed
    - **Confirmed server warning** notification: a popup warning from the server E&A action was confirmed in Ganz CORTROL Client
    - **External user group** added/removed/updated: AD/LDAP user group was modified
    - **Client connection** permissions updated: administrative permissions related to remote client access were modified
    - **Log in**: a user has successfully logged into the target server
    - **Log out**: a user has logged out of the server or his session timed out
    - **Monitoring data** accessed: the *Monitoring* section of Ganz CORTROL Console was accessed
    - **Object added** to group: some object in the server configuration was added into a group of the corresponding type
    - **Object removed** from group: some object in the server configuration was deleted from a group of the corresponding type
    - **Permissions** added/removed: user permissions were modified
    - **Security policy** added/removed/updated: server security policy was modified
    - **Unsuccessful log in**: a user has attempted to log into the server without success
    - **User** added/removed/updated: a user account was modified
    - **User group** added/removed/updated: user group settings were modified

Double-click an event entry to see **details** about the related resource, such as: resource name, the user who did the changes or executed the action, destination path for the copied exported files etc.

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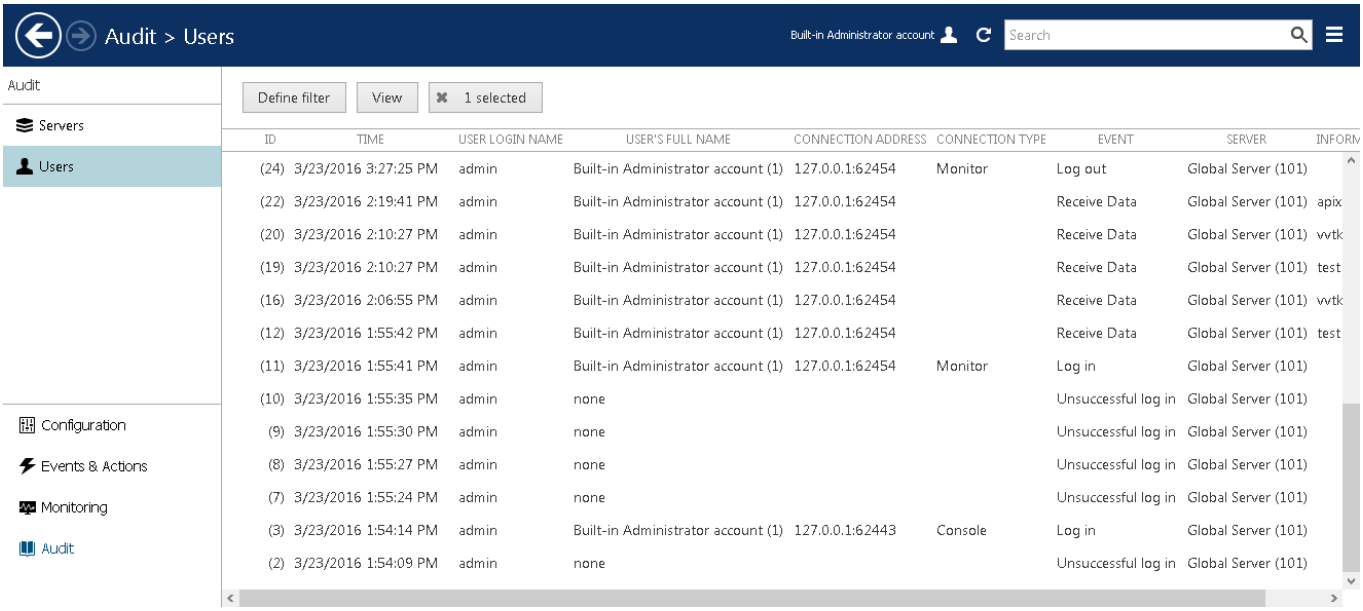


Audit log, *Users* section

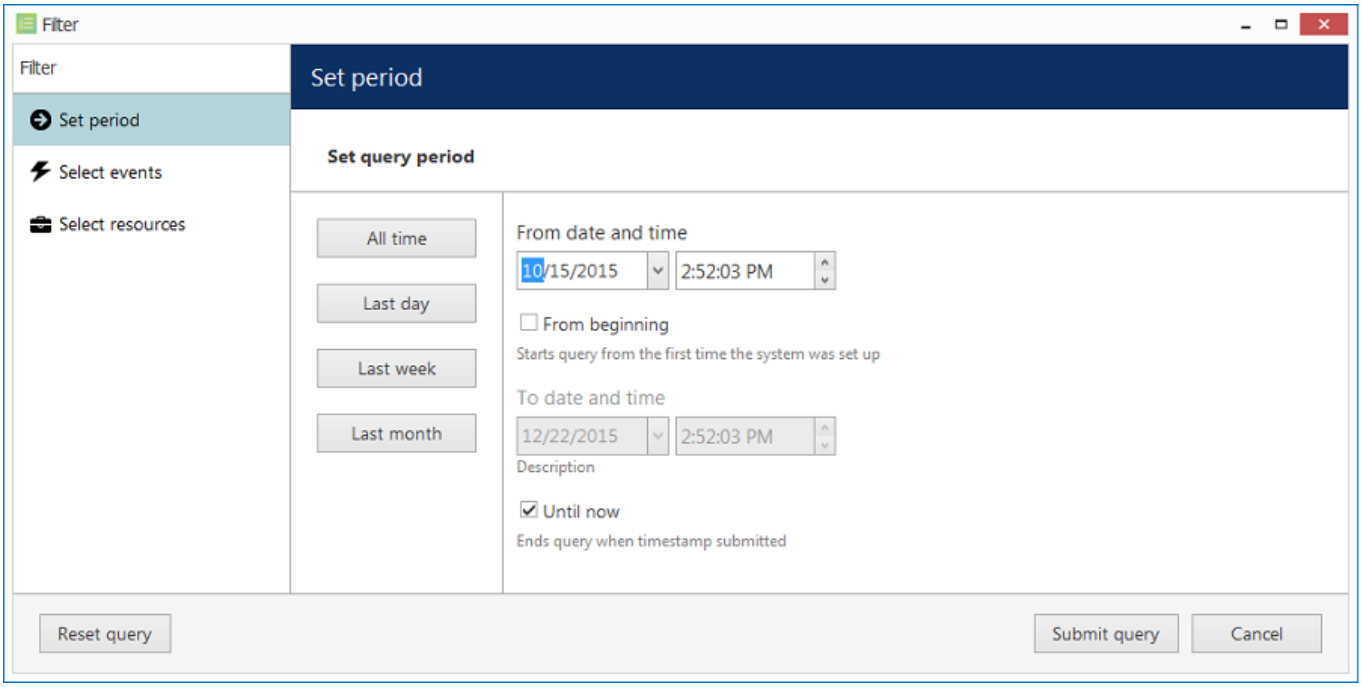
Define Filters

Audit logs can be filtered for easier analysis. Click the *Define filter* button on the upper panel to bring up the dialog box.

Available filters:

- by period
- by event
- by server
- by resource
- by user (only for the user-initiated events, *Users* tab)

In the *Set period* tab, specify the time limits for log output. You can set the date and time manually or use automated controls for preset time boundaries: last day/week/month, the whole time, and also set start/end boundaries equal to the log beginning/end.



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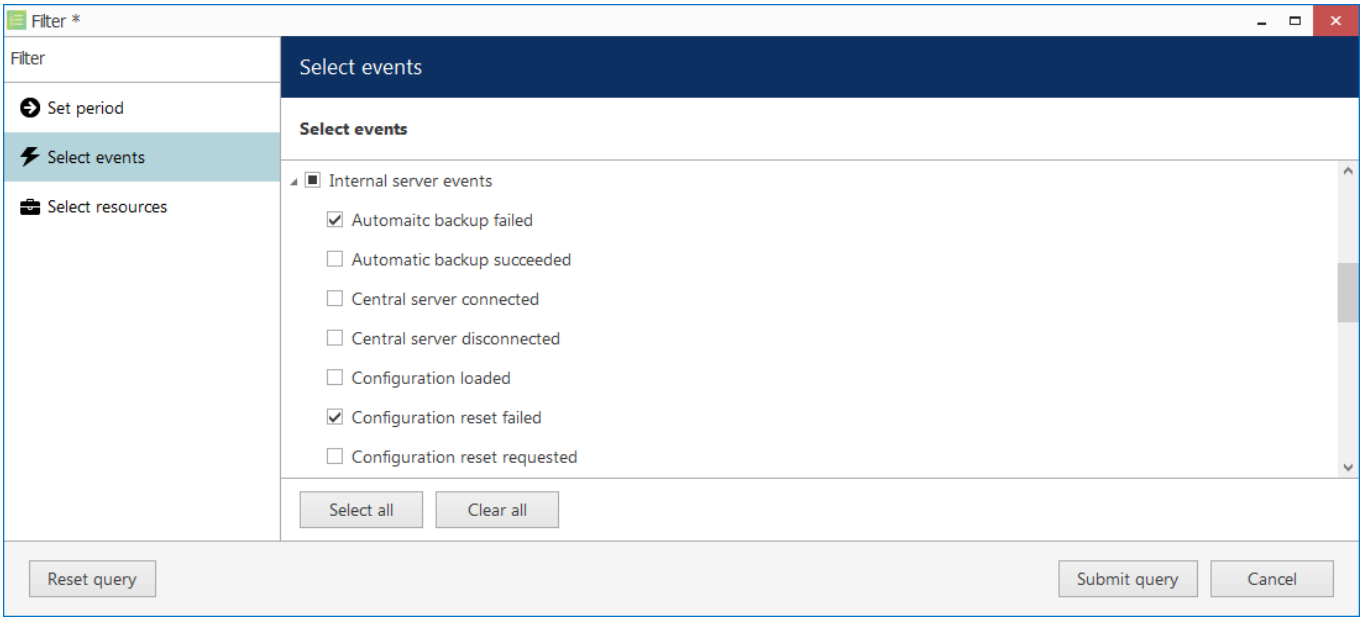
Set the time boundaries for audit log output

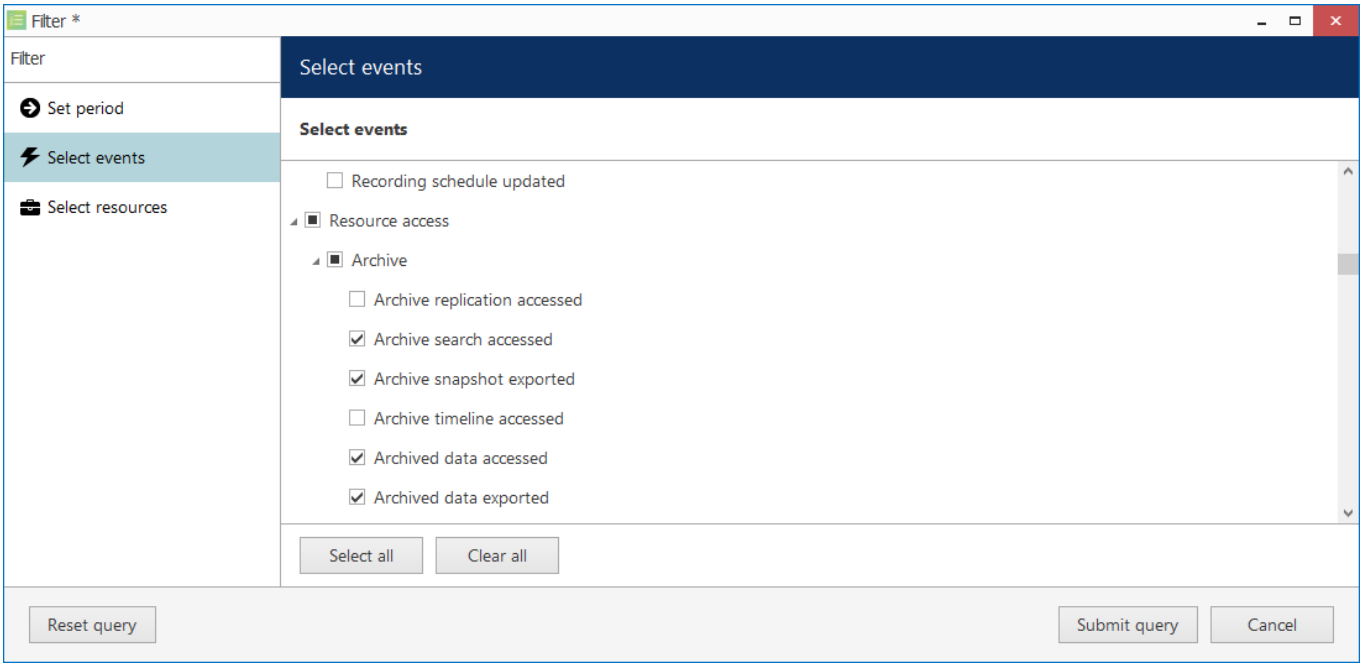
In the *Select events* tab, choose specific event types to narrow down the search. Note how the choice differs for the *Servers* and *Users* log filters.



Specify event types for the *Servers* audit log output

In the *Select users* and *Select servers* tabs, you can choose target servers and users, who initiated the event. Note that if you want to search for events where a user was a target (e.g., user permissions changed), you need to select that user in the *Select resources* tab.

Selecting **resources** will search for them in the additional event fields (i.e., events where these resources were a target). If you want to see events that were initiated by a specific **user** and/or on a specific **server**, choose them in the corresponding tabs - *Select servers* and *Select users*.



Specify event types for the *Users* audit log output

In the *Select resources* tab, you can choose which resources will be mentioned in the log entries. Note that if multiple resources are chosen, the filter will apply *OR* logic, meaning that output log will only be displayed if it contains log entries for **at least one** specified resource, and not for the combination of all specified resources.

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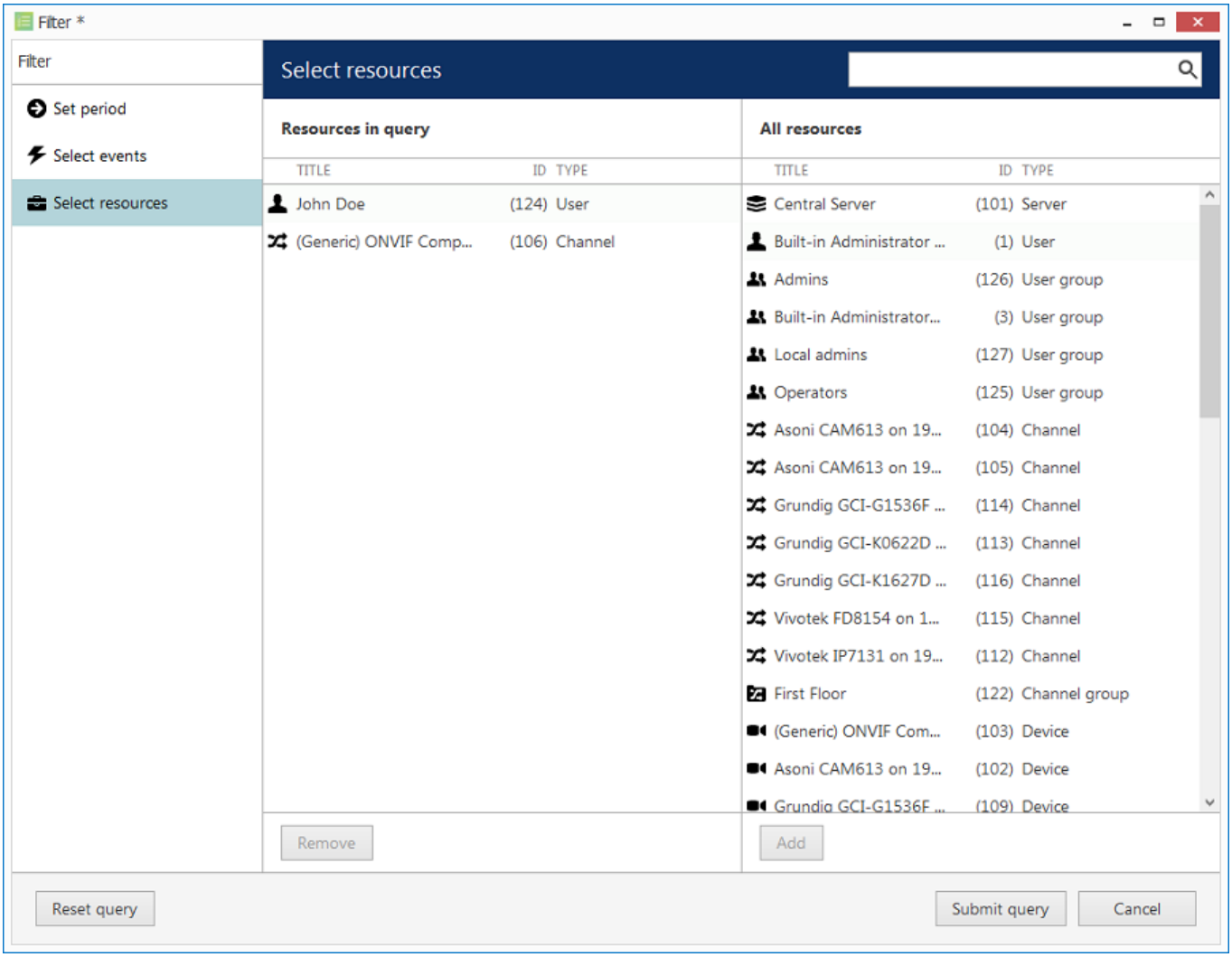

Narrow down your search by specifying resources

Use the *Search* field to filter the resource list; both the list of *Resources in query* and general *All resources* will be affected by the *Search* filter. Press the *Reset query* button in the bottom left corner at any time to restart filter configuration; when you have finished, click *Submit query* to view the results. To discard filtering, simply switch to a different section in the menu on the left and then switch back to your desired section.

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13 Tools and Wizards

This chapter describes additional tools and wizards that are installed with the Ganz CORTROL server software.

See also earlier in this document: license manager, server setup wizard, quick configuration wizard.

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13.1 Archive Backup Wizard

Ganz CORTROL offers an option to **back up** any recordings from any server manually, in the proprietary Ganz CORTROL archive format. **Video, motion information, audio, VCA data streams**, as well as **external serial data** can be extracted from the original archive and saved elsewhere, with an option to include the **portable player** tool so that the downloaded recordings can be played on any Windows-based computer, even if it has no Ganz CORTROL installed.

The wizard is included with any Ganz CORTROL installation, including Ganz CORTROL Console management application and Ganz CORTROL Client application, and allows connection to **local and remote servers**.

The archive will be copied to the computer that has *Archive backup wizard* running on it. Thus, if you are connecting to a server remotely via *Archive backup wizard*, the archive copy will be **downloaded** to your computer from the server. As footage may be of significant size, make sure you have the required bandwidth available.

Start the Archive Backup Wizard from the Windows Start menu: *Start -> All Apps -> CBC AMERICA LLC -> Archive Backup Wizard* (in Windows 7 and older versions, use *Start -> All Programs ->* software installation folder *-> Tools -> Archive Backup Wizard*); alternatively, use *Search* to locate *Archive Backup Wizard* in the programs menu.

From the Ganz CORTROL Client application, the wizard can be launched via main application menu by opening *View -> Archive Backup Wizard* and choosing the server (one of the connected ones). The address of the server, and also the username and password, will be taken from the currently configured server connection.

Using Archive Backup Wizard

First, you will be asked to log into the target server: your user account must have an administrative permission to make archive backups plus permissions to back up footage from individual channels/channel groups. You can create archive backups from the local server or from any remote server (login procedure is analogous to Ganz CORTROL Console login), including individual recording servers. If you run the wizard from the Ganz CORTROL Client application, you will not be asked to log in; instead, your configured server connection will be used.

After you log in, you will be presented with the list of available recordings, grouped by channel and, if present, by visual group. Select the channel(s) and/or visual groups you need by putting a checkmark next to each one; specify the required time range above the channel list and click *Next*.

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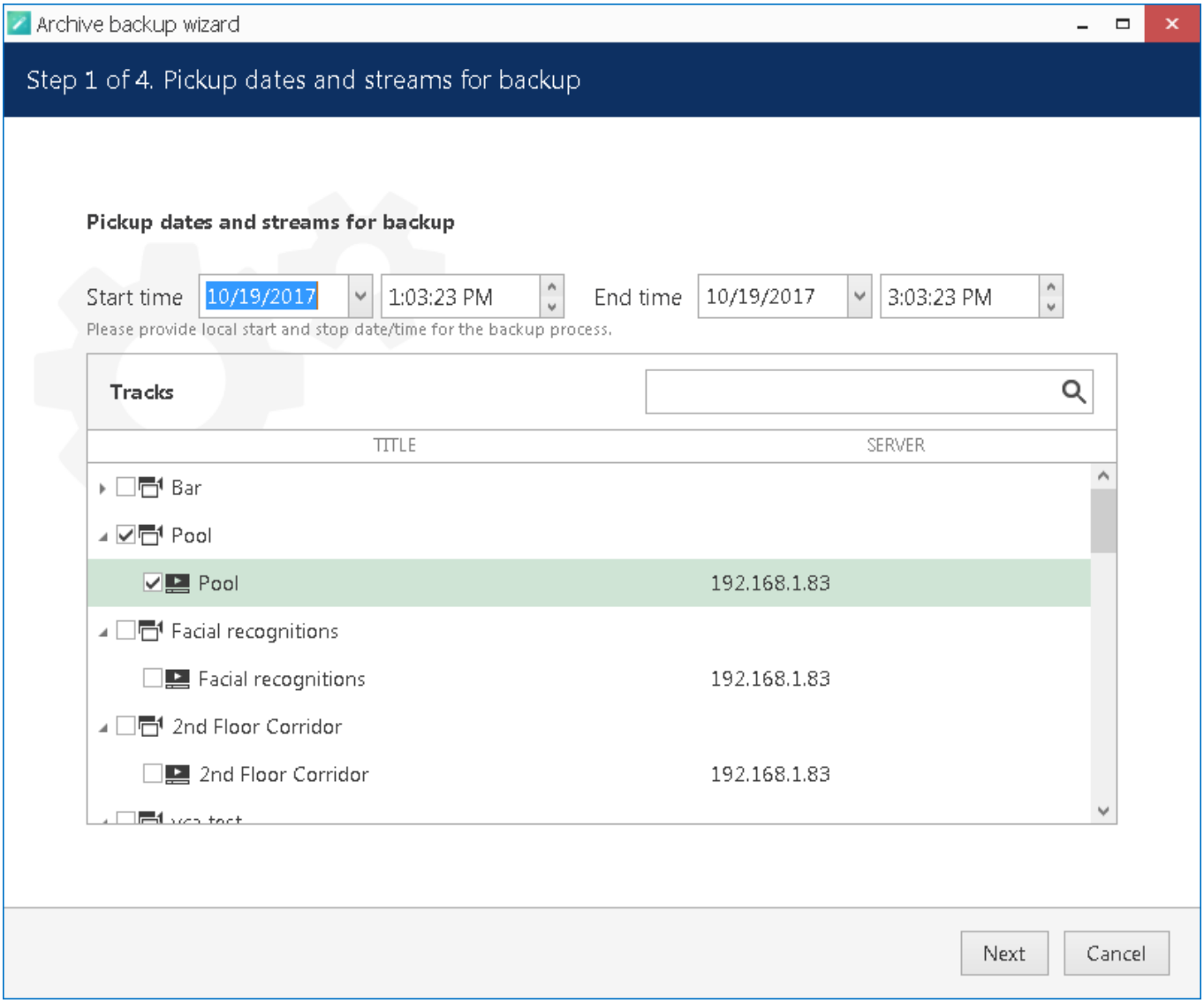

Choose the target time interval and required channels

Depending on the number of selected channels, their footage size, storage speed and connection latency, it may take a few moments to retrieve the stream information. Once it is done, you will be presented with a list of streams for each of the selected channels.

The **following tracks can be backed up**, depending on the channel recording settings and, therefore, stream availability:

- main video stream, substream and edge recordings
- video motion information
- audio stream
- VCA metadata
- external serial data from *Data sources*

Archive bookmarks and external service data (e.g., LPR/FR recognition results) are not available for backup.

Additionally, you can append the **portable player** tool with the copied part of the archive so that you can play the archive without having to install Ganz CORTROL server on another machine. Guidelines on the portable player usage are available in your Ganz CORTROL Client user guide.

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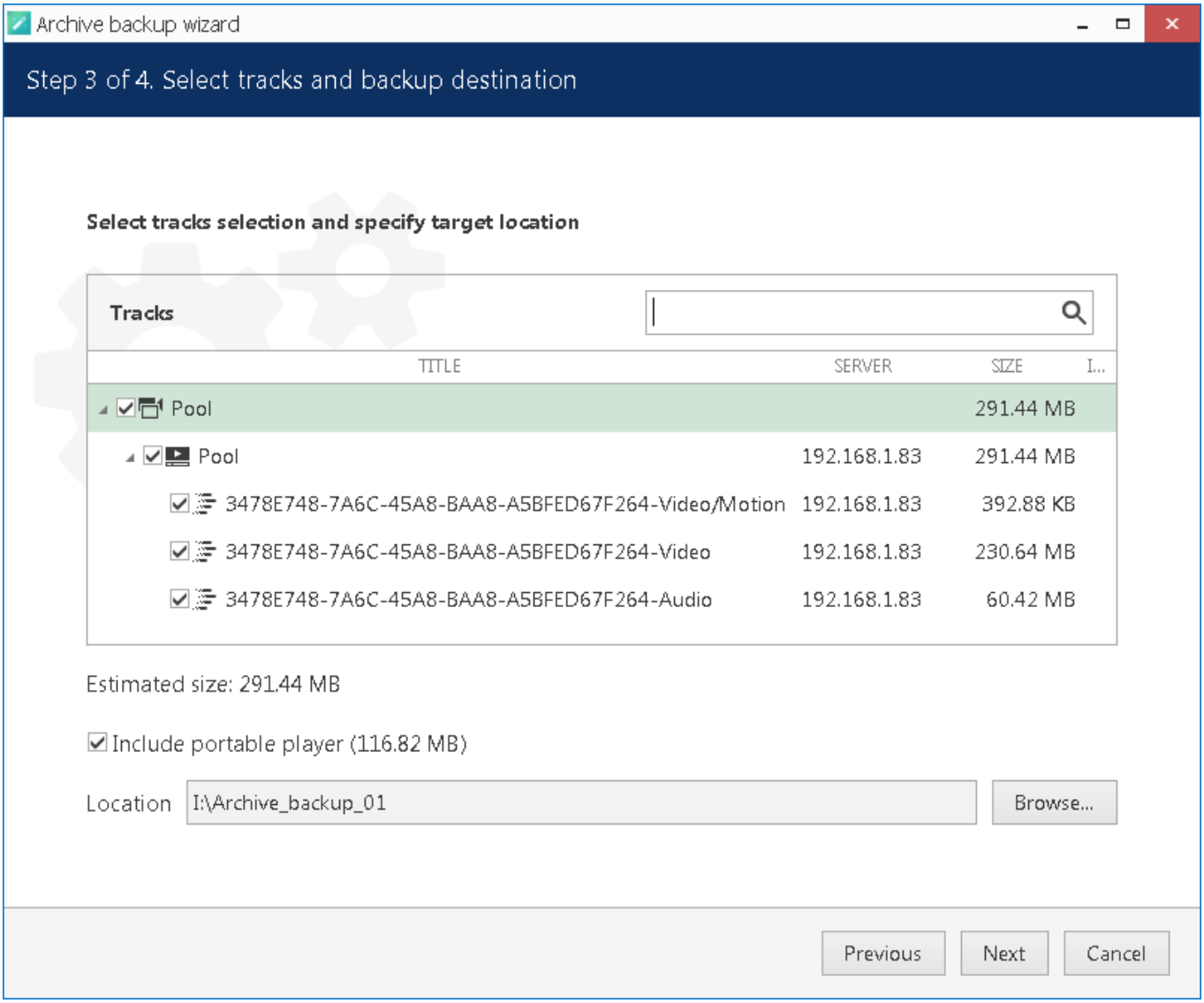

Choose data streams and include portable player, if required

Here, you also need to specify a directory for the archive to be copied to: it may be a local hard disk, a shared network storage, or an attached USB drive. You are asked to choose an **empty folder** as a backup destination, so you may need to create a new folder from the standard *Select folder* dialog.

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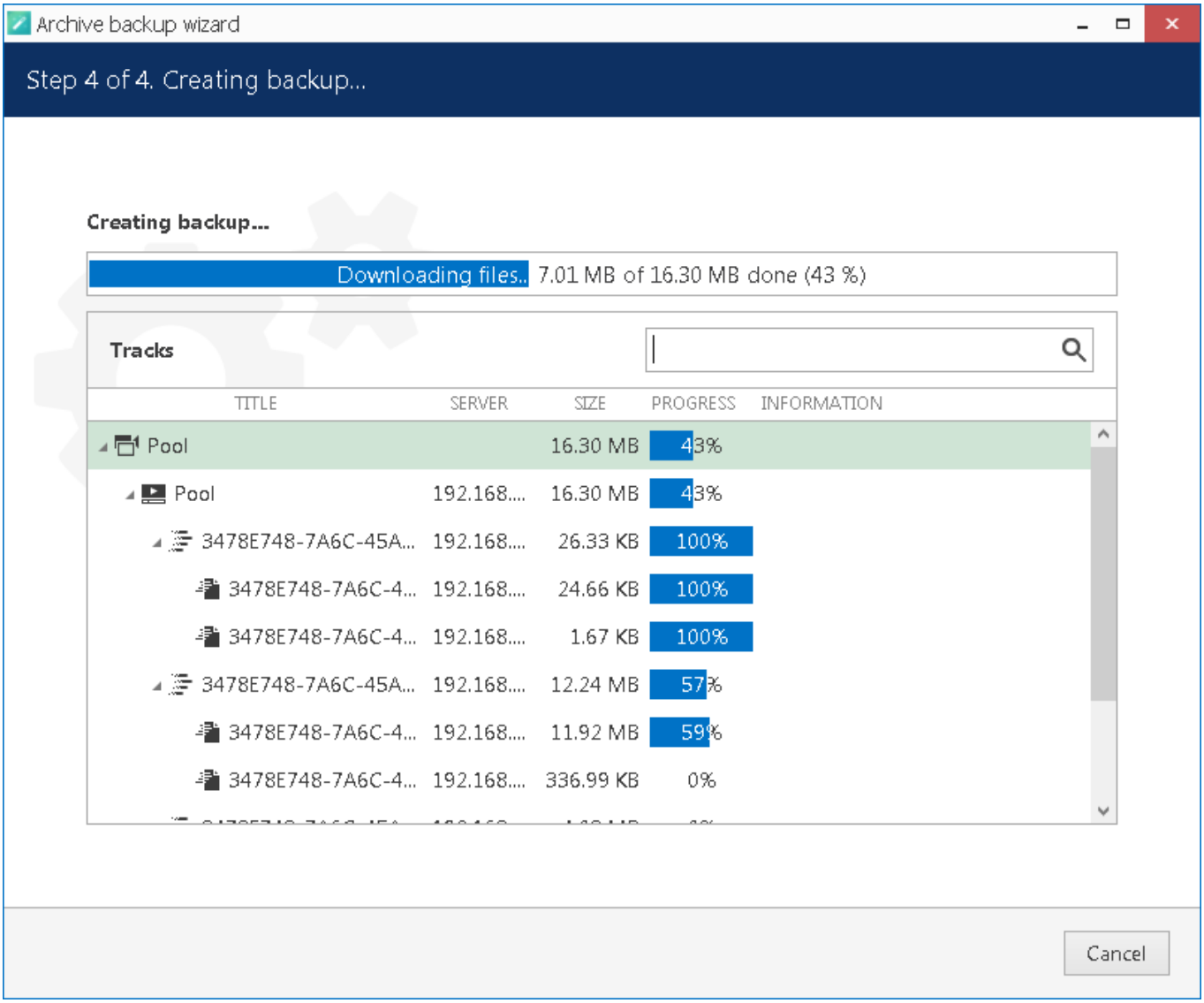

Backup progress

When ready, hit *Next* for the wizard to proceed with backing up the selected information. Depending on the size of the selected archive, the backup procedure may take some time and its progress will be displayed in the wizard window. When it is finished, you will get a confirmation with a short description of what has been done.

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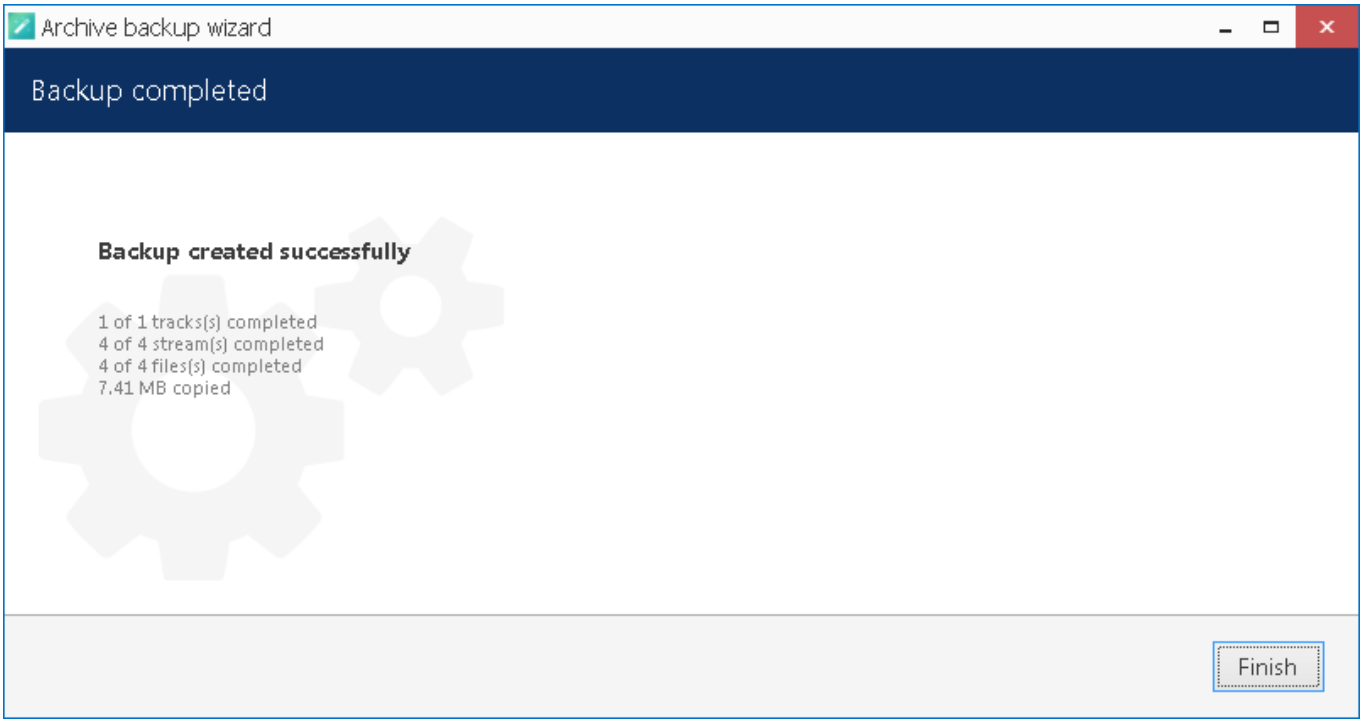

Archive backup succeeded

If you wish to back up more recordings, start the wizard again and follow the described procedure once again.

Postpone Your Archive Backup

If, during the backup progress, you decide to **stop** it for some reason, simply hit the *Cancel* button in the bottom right corner. You will then be presented with several options of how the wizard can proceed:

- save the task and files: save your current backup progress and preserve the wizard state until the next time you run it; you will be able to continue with the current backup item(s) then
- save files only: leave the files that have been downloaded so far but discard the wizard settings so that the next time you run it you will be presented with default choice
- remove files: discard current backup task completely and remove the downloaded files
- continue to download: go back and continue with the selected backup

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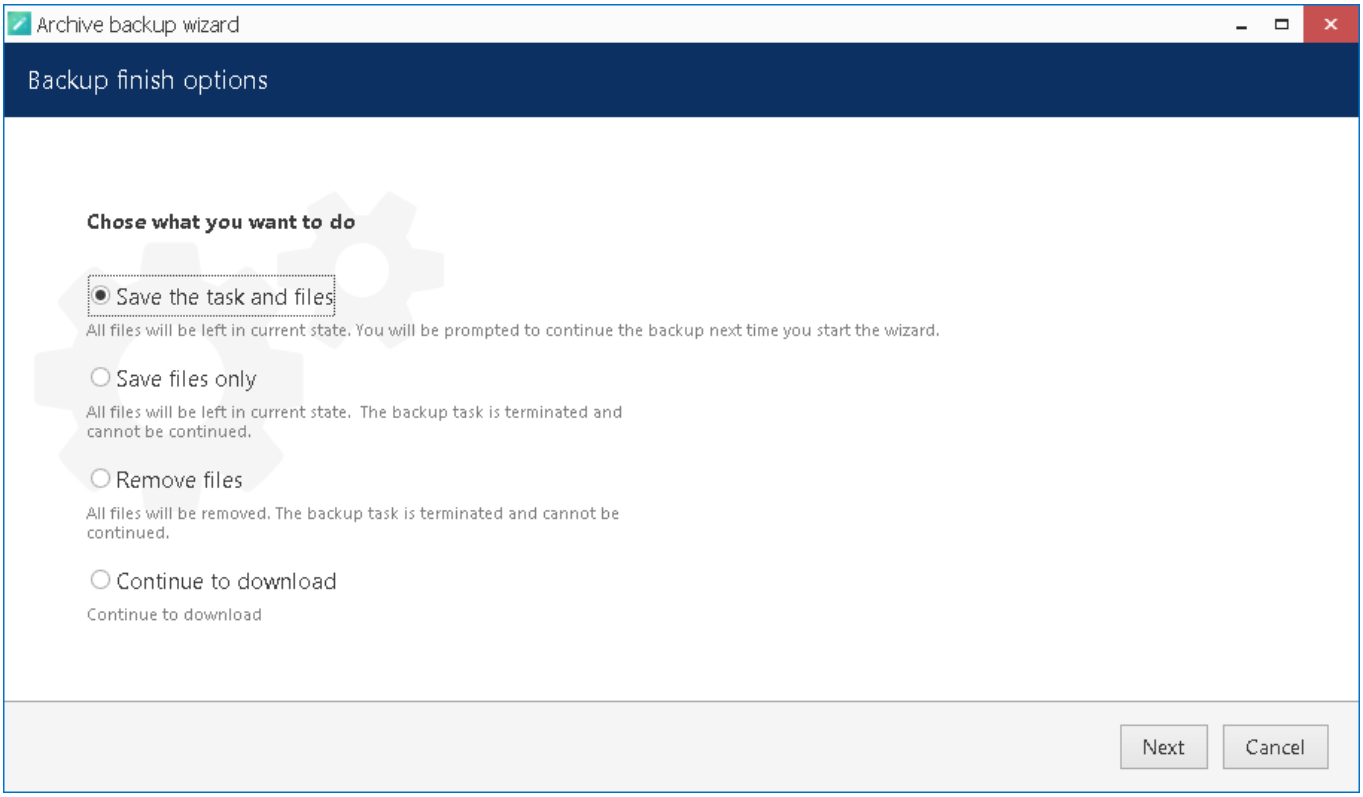
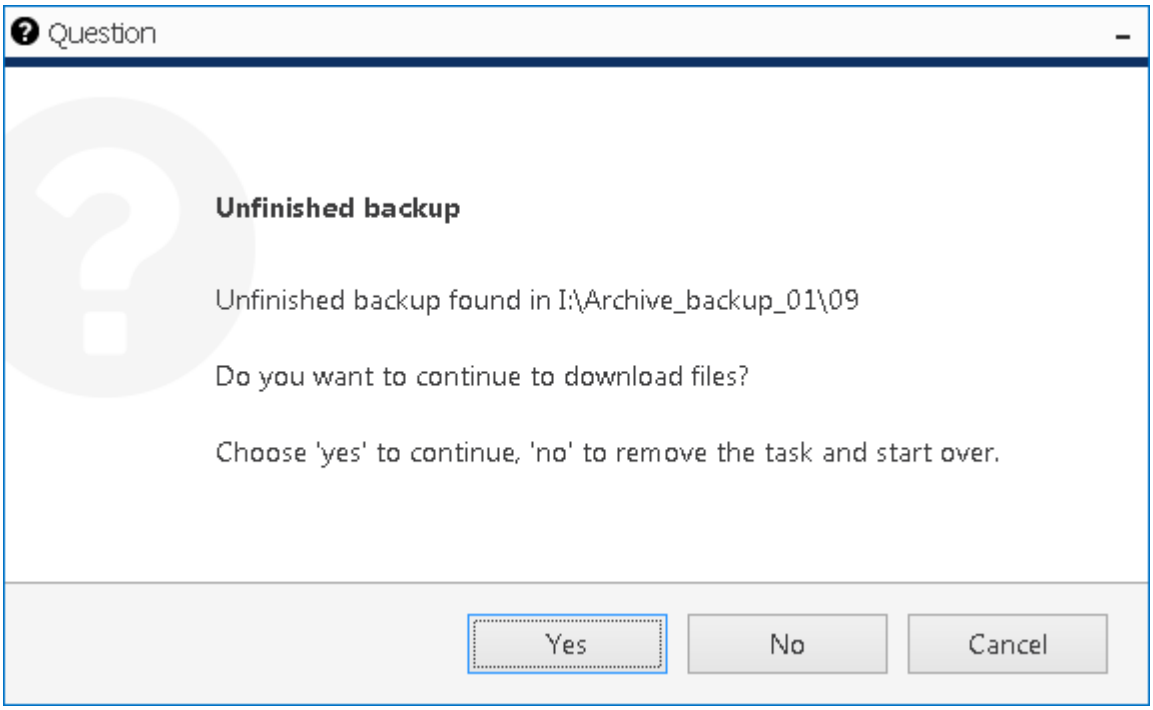


Archive backup termination options

If you have chosen to save both the task and the files, next time you start the wizard you will be reminded of the unfinished backup job and offered to continue with it. If you click *Yes* to proceed with the unfinished task, it will be started automatically right after you provide your user credentials for the server login.



Continue with an unfinished backup task

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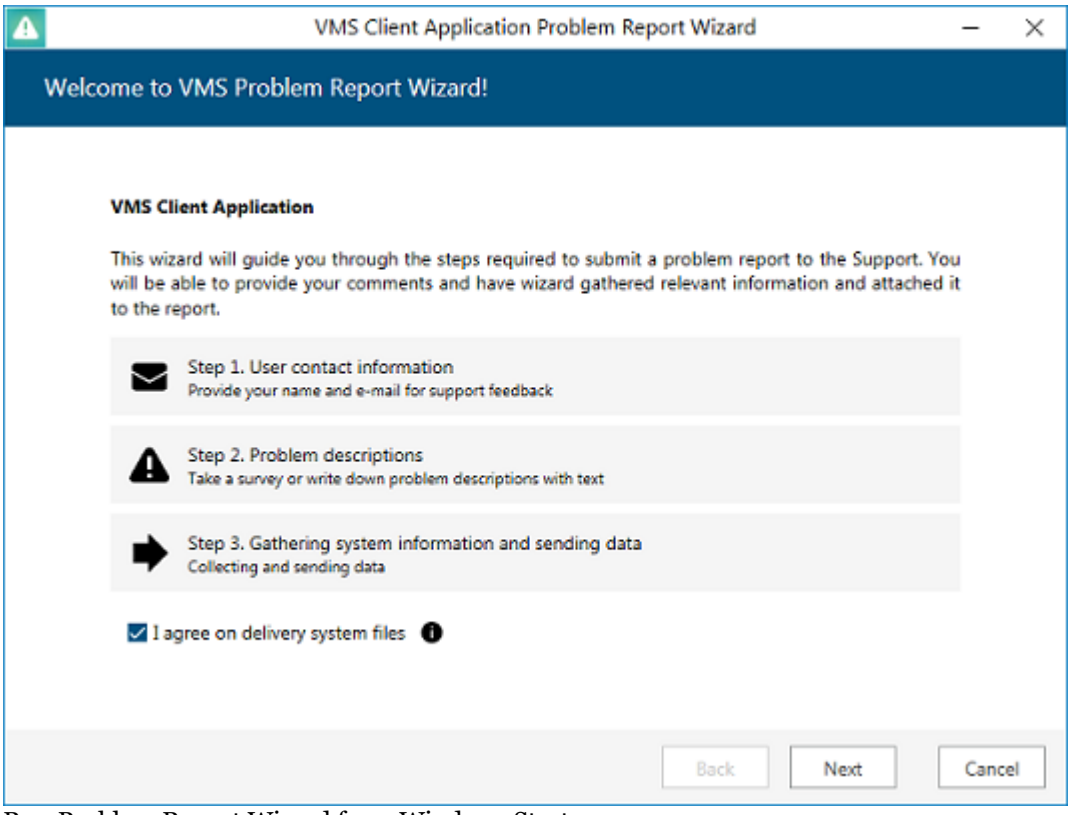
13.2 Problem Report Wizard

Ganz CORTROL features a comprehensive wizard-like tool for structured and detailed problem reporting. The tool is automatically installed at the same time as the the product and is thus available on any machine, where Ganz CORTROL software is installed.

Access Problem Report Wizard via *Start -> All Apps -> CBC AMERICA LLC -> Problem Report Wizard* (in Windows 7 and older versions, use *Start -> All Programs -> software installation folder -> Tools -> Problem Report Wizard*). Alternatively, use Windows Start Menu *Search* to locate the Problem Report Wizard in the programs menu.

⚠ Make sure you run the Problem Report Wizard on the right computer: it gathers information from the machine it has been launched on, and **not** from any of the servers connected via Ganz CORTROL Console or Ganz CORTROL Client.



Run Problem Report Wizard from Windows Start menu

Agree to deliver system files to CBC AMERICA LLC support and hit *Next*. You can check which files are being taken from your system by clicking on the information button next to the agreement checkbox. Note that CBC AMERICA LLC will not transfer your data to any third-party companies; all the information gathered is required to help CBC AMERICA LLC efficiently resolve the reported problems.

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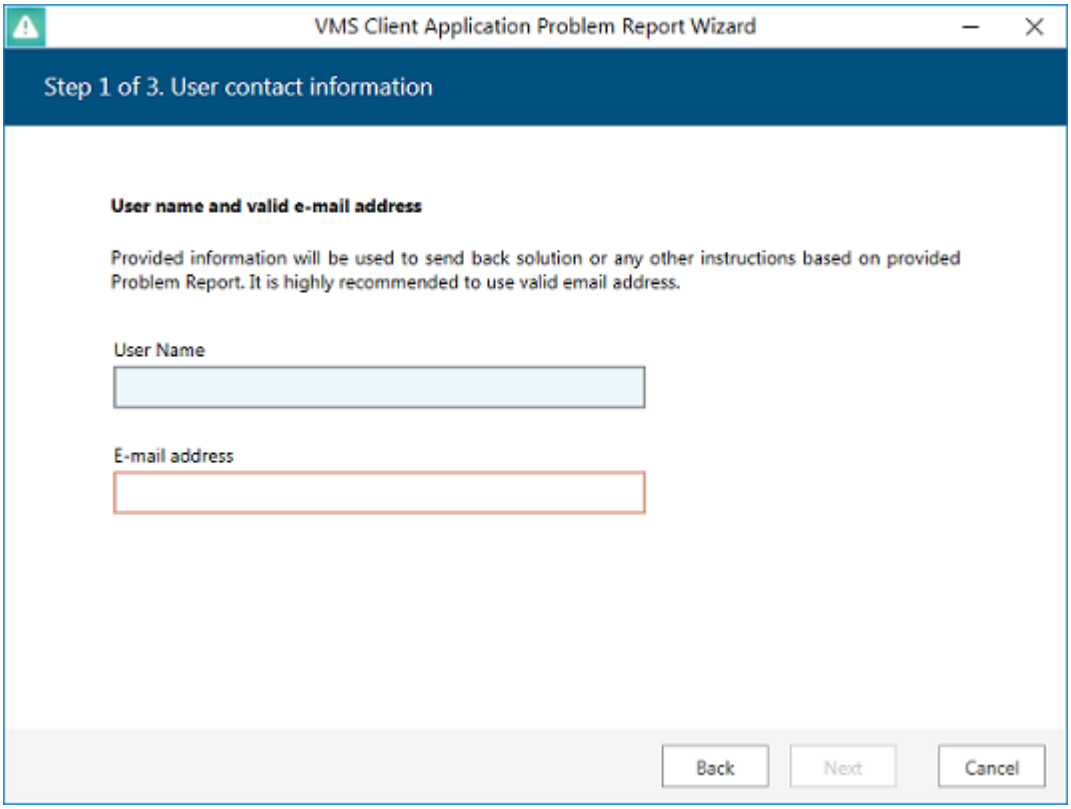
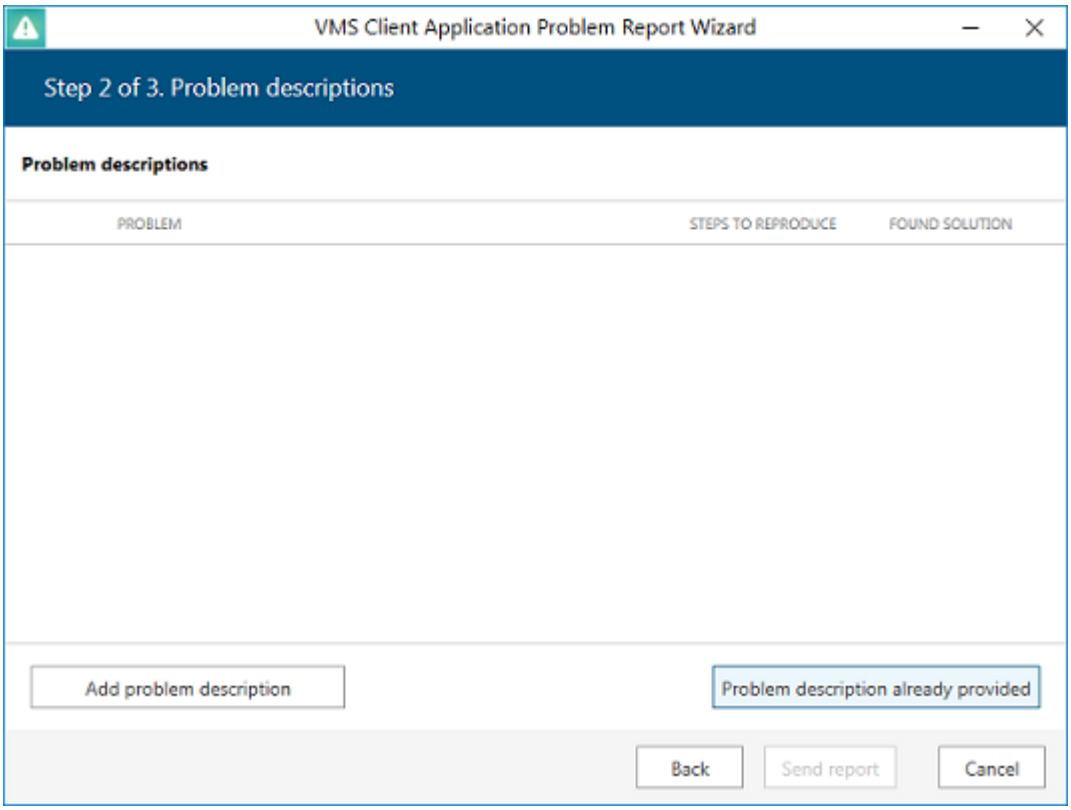


Enter your contact information

Enter your name and your email address so that the CBC AMERICA LLC support team can contact you. Click *Next* to proceed.



Problem description

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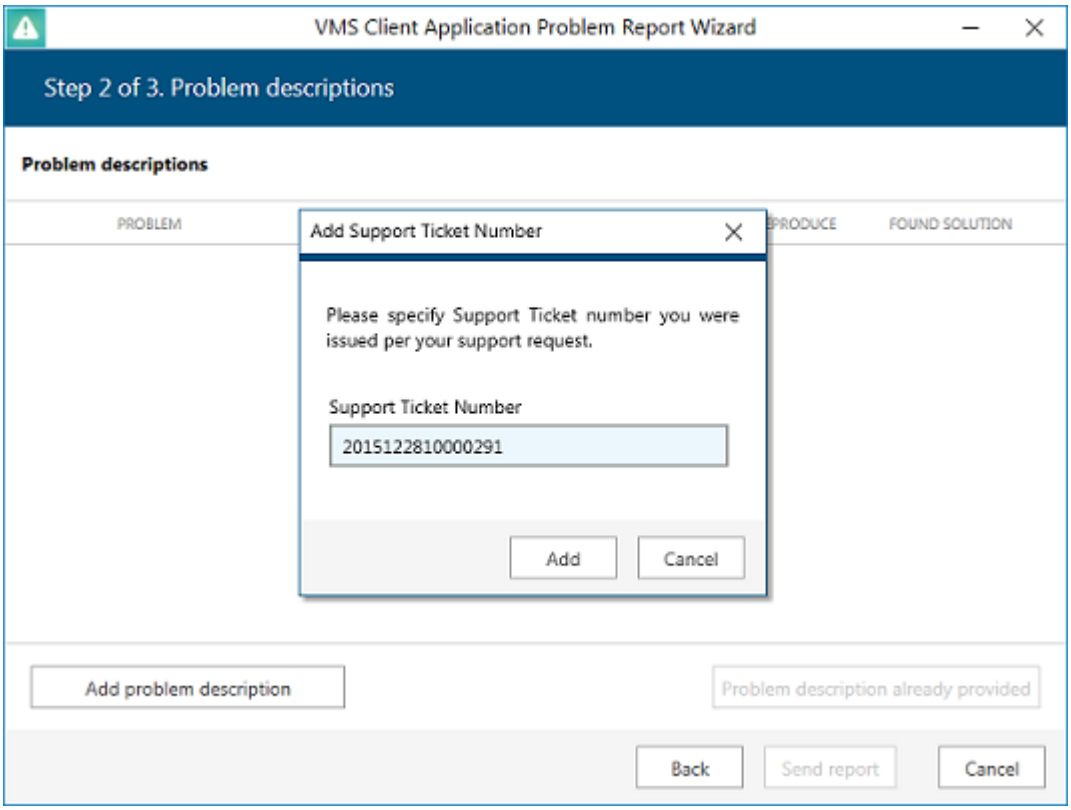
If you were asked by support team to generate a problem report, copy the **ticket ID** from the email communication and add it to the report by clicking the *Problem description already provided* button. This will help the support team to classify your report faster, and it will also guarantee that your report will go directly to the team member responsible for the thread.



Insert ticket number

If you are applying a new, unreferenced problem report, click the *Add problem description* button.

A short comprehensive wizard will guide you through the main issue categories, allowing you to choose the ones that are most applicable to your situation. You will be given the chance to enter error messages/codes, if there are any, and to attach snapshot(s). Make sure you provide the maximum amount of relevant information about the issue you are experiencing; always include **snapshots** if they are available.

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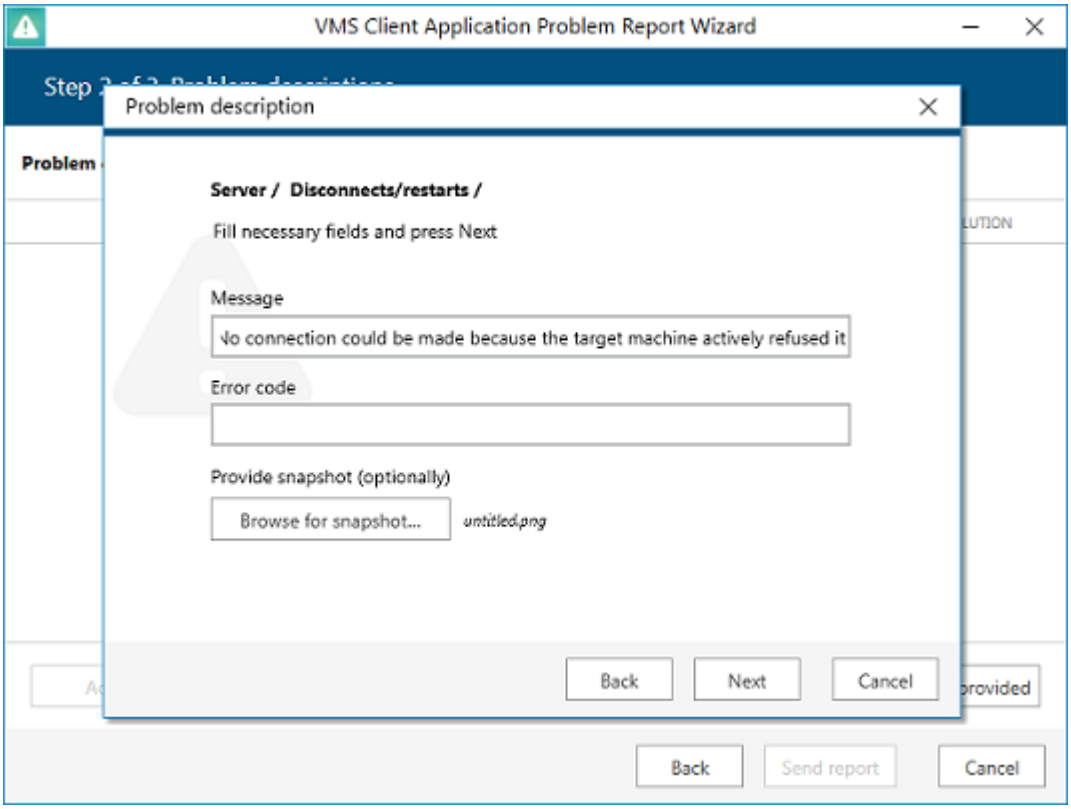
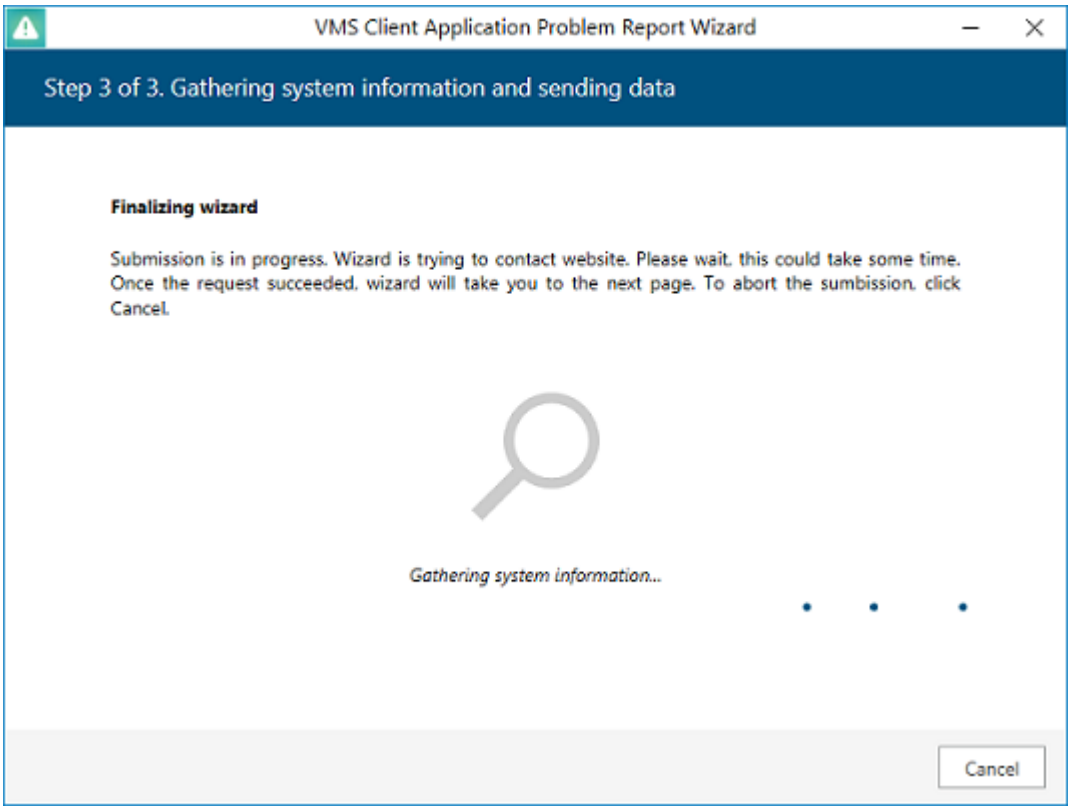


Enter problem classification and relevant details

You can add **multiple** descriptions to a single report. When you are ready, press the *Send report* button; the wizard will then try to send the report automatically.



Submitting report

If the server is offline, wizard will not be able to submit the report to CBC AMERICA LLC; instead, you will be invited to save the generated report locally. Press the *Finalise wizard without upload* button to finish.

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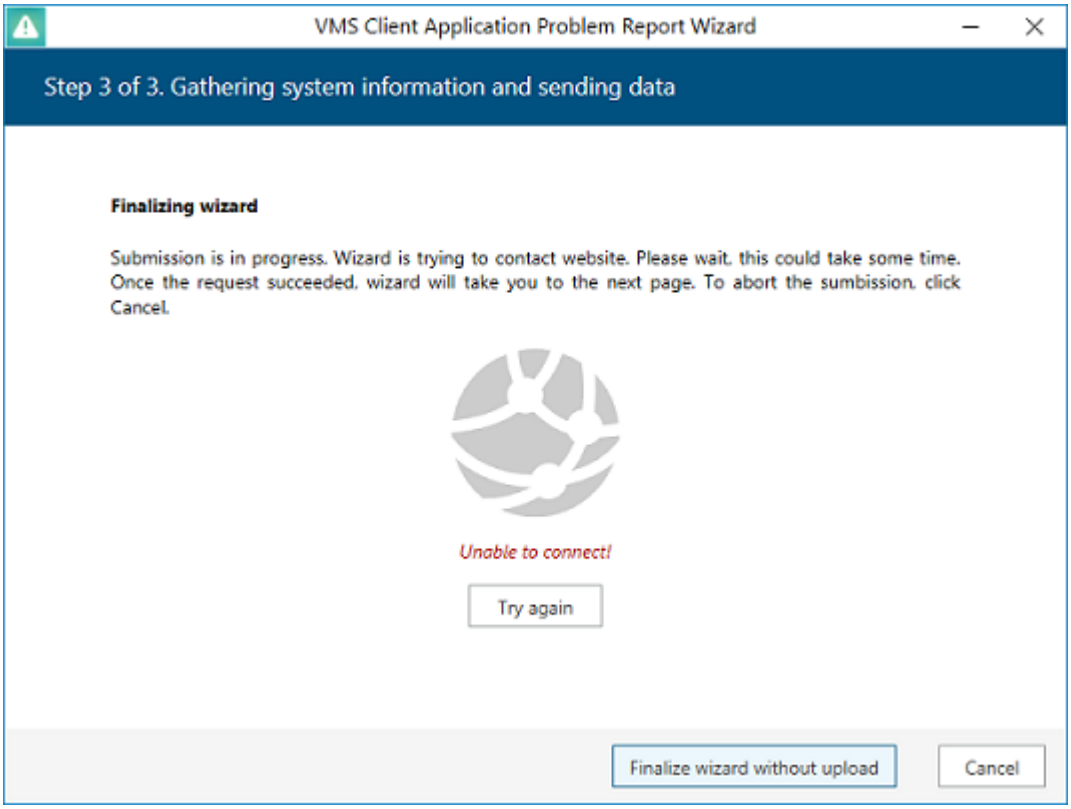

Retry report submission or finish the wizard

Click *Save report as file* to save the compressed report on your computer; you are welcome to send it manually from any other computer to cortrol@cbcamerica.com. Click *Exit* to close the wizard.

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13.3 Renderer Test Utility

Ganz CORTROL can utilize GPU for some operations in order to decrease the CPU load. To enable GPU acceleration, run the *Renderer Test Utility* from the Ganz CORTROL suite on the Ganz CORTROL Client workstation.

There are two supported GPU operations are:

- frame **decoding** on Ganz CORTROL Client side
- **rendering** on Ganz CORTROL Client side

> ⚠ GPU acceleration limitations:
>
> - Only Windows 10 and corresponding Windows server OS editions (2016, 2019).
> - Only H.264 and H.265 streams for live view and digital PTZ in live view
> - For fisheye image dewarp, only Fisheye-II is supported (choose the *Fisheye lens (6MP and larger resolution)* option in Ganz CORTROL Console)
>
> All other cases will use CPU for decoding/rendering operations.

Before configuring GPU acceleration, make sure you have installed the latest official **drivers** for all your graphics cards. We also recommend having more **memory** for GPU (the more, the better). For integrated video cards, you can change this setting in BIOS. For discrete graphics, choose ones with more onboard memory (1GB per display or more).

For H.265: decoding is only available for the graphics cards that have HEVC support. Please check with the video card manufacturer for the specifications.

GPU Test and Configuration

On every client workstation where you want to enable GPU usage, launch the *Renderer Test Utility* by locating it in the *Start* menu, or simply by typing a part of the name in the Windows search. You can also run this wizard from the Ganz CORTROL Client application itself via main menu *Tools* > *GPU configuration wizard*. The client application will be closed during the test and then re-opened.

The first wizard screen is a **summary**. Here, you can select, which graphics cards will be used for decoding and for 3D rendering. To be able to do so, first run the GPU test so that Ganz CORTROL can learn about your GPU capabilities and determine the maximum possible load. During the test, each GPU is consequently loaded with test videos of different resolutions, starting from bigger ones. As a result, a value list is created for each GPU, which is then used by the Ganz CORTROL Client application for load balancing.

> 💡 We recommend that you **re-run** the GPU test after each system change that may be related to graphics, as well as major OS updates (like feature updates) and Ganz CORTROL software upgrade.

To run the **performance test**: hit the *Test GPU* button in the bottom left corner. In the list, mark all GPUs that you wish to engage by putting check marks in the *Test* column. Then, select the target codecs, and click the *Test* button below.

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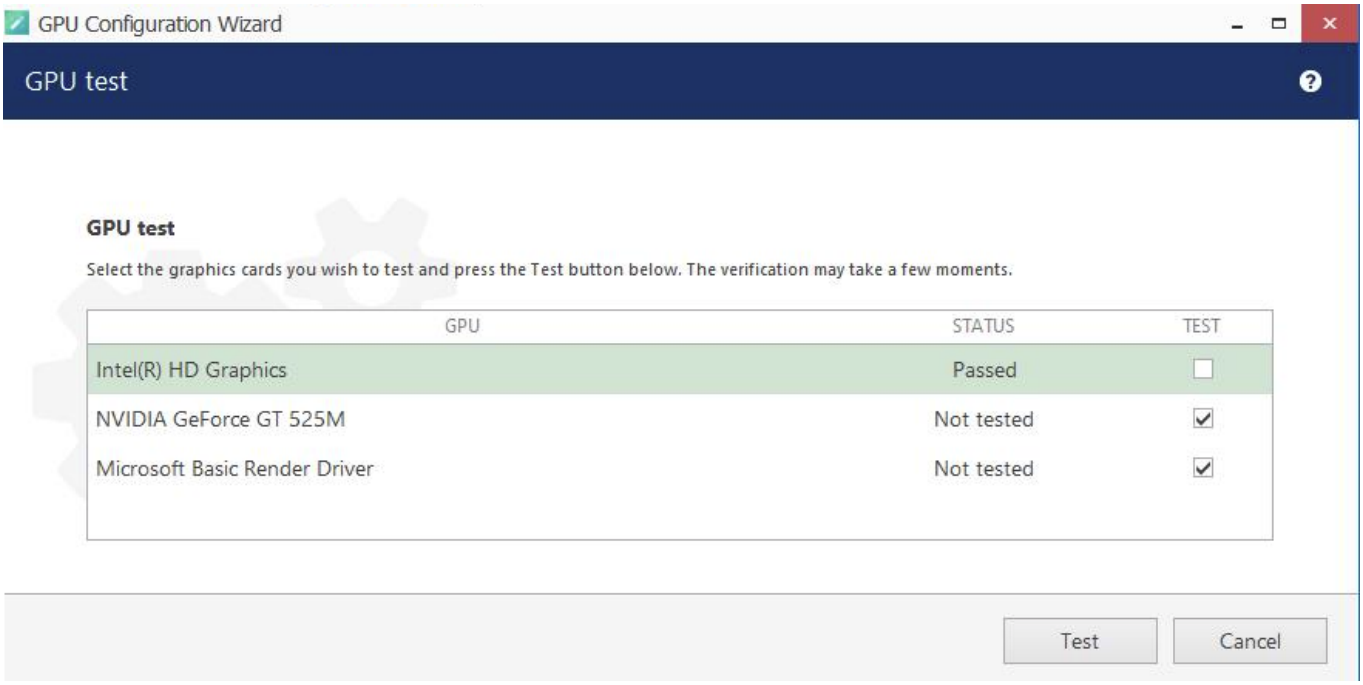
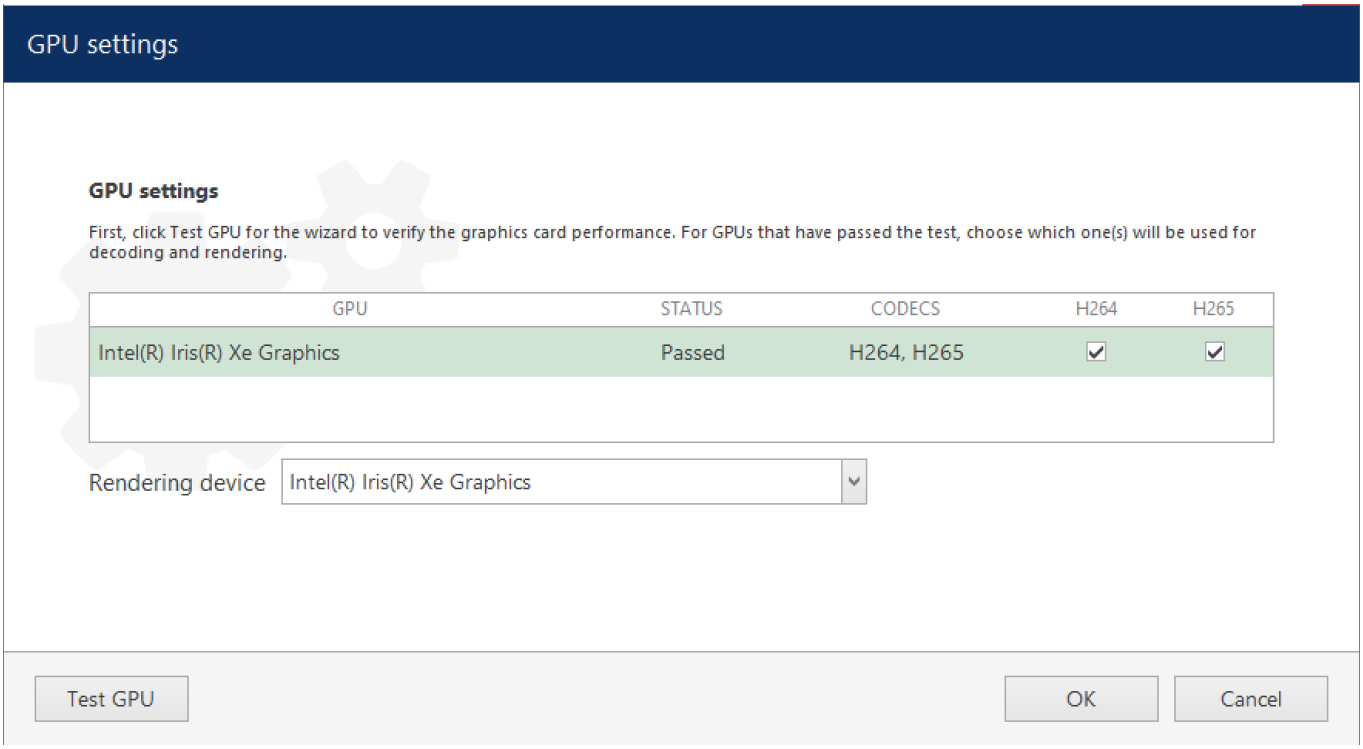


Select graphics cards and run the test

If you have already launched the test earlier, the *Status* column will reflect the last test results. For the GPUs that have passed the test, there is no need to re-launch it, unless you have made changes to that video card configuration (e.g., added memory for the integrated card, installed a different device driver etc.). The test may take some time. If your Ganz CORTROL Client application is open, the wizard will ask you to close it and re-open later (and offer to do so automatically).

During the test, click the *Show log* button to see how the test is going. After the test is finished, the wizard will automatically switch to the previous screen, and you still will be able to view the last test log.



An example of Intel graphics card that has successfully passed the test for both h.264 and h.265 decoding.

Log colours:

- red: most important (errors, failures)

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- yellow: warnings
- blue: information
- black: default
- gray: trace, details or low importance

Flags used in the test log indicate GPU capabilities:

- supported: graphics card is supported
- unsupported: hardware decoding is not supported by OS for this GPU
- legacy: video card is old or has old drivers, max resolution will be limited to 1080p
- canDecode: the GPU is OK to be used for decoding
- canRender: the GPU is OK to be used for rendering

As a result, the previously *Not passed* GPUs will change their status. GPUs that have passed the test, will be available for **decoding** (putting a check mark in the *Decode* column). Below the table, you can choose, which GPU will be used for **rendering**.

If you graphics card can decode both H.264 and H.265, you will have both codecs enabled after the test. However, you can deselect H.265 if you do not wish it to be decoded by GPU. Do not forget to restart Ganz CORTROL Client if you have just opened the wizard to change the settings (without running the test).

Video output process on the Ganz CORTROL Client side consists of two stages: decoding frames and rendering for displaying them. After decoding, the frames are converted and passed for rendering. If decoding and rendering operations happen on different GPUs, CPU is used in between so its load may grow a bit. Therefore, if only one GPU is used for decoding, it may be wiser to use the same GPU for rendering. Same logic is to be applied for cases when one GPU takes the most decoding load (this can be deduced from the GPU test log). But, if you happen to have a GPU that does not support decoding, you may want to use it for rendering, so that the total load is split between GPUs.

In general, according to our tests, **Intel GPUs have better decoding capabilities** (more channels can be decoded by them), and Nvidia GPUs (hi-end) are good at 3D rendering.

Click *OK* to **save** the settings and exit. If you close the wizard by clicking *Cancel* or *X*, the GPU settings will not be saved.

If you open the wizard and change **any settings** without running the test, please manually **restart** the **Ganz CORTROL Client** application for the changes to take effect.

You can re-open the wizard at any time to run the test again and/or change the settings.

Usage in Ganz CORTROL Client

After you have enabled GPU settings via wizard, the Ganz CORTROL Client application on the same machine will be able to use the GPU capabilities. Using GPU acceleration will significantly decrease the CPU load and will allow you to output more channels simultaneously on the same workstation. By combining GPU acceleration with substream usage you can gain even more, as using lower resolution streams for multichannel output is more efficient.

Ganz CORTROL Client will automatically use GPUs enabled via wizard, you do not have to enable anything else in the application settings. Limitations:

- **live** view and **DPTZ**
- **fisheye dewarp** (supported dewarp mode must be set in Ganz CORTROL Console, as described above)
- stream codec must be **H.264** or **H.265**
- stream **resolution** must be supported (see GPU test log for details), e.g., legacy GPUs will not be used for resolutions greater than FullHD

If you want to check whether the decoding is currently performed by GPU, enable rendering info in the Ganz CORTROL Client application settings. In the main menu, choose *Edit* > *Settings* > select the *Usability* tab > enable the *Show decoder information* option > *Save*.

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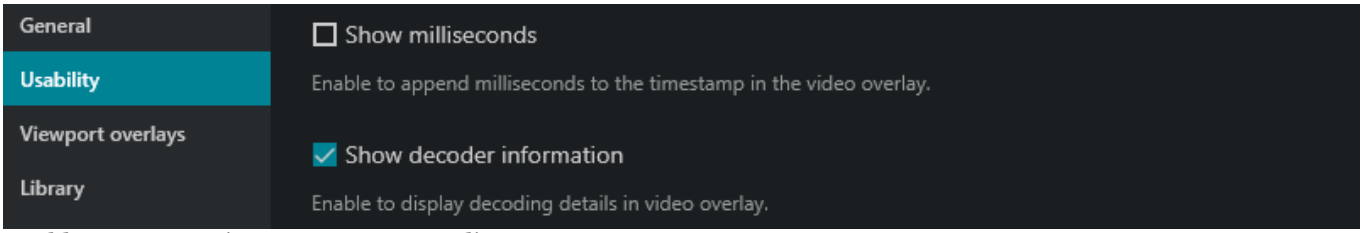

Enable GPU status in Ganz CORTROL Client

After you have enabled this setting, each viewport in the live mode will have a **label next to the timestamp** (upper right corner):

- **CPU**: decoding is performed using CPU (GPU is not configured or overloaded, or stream codec/resolution is not compatible)
- GPU: the corresponding graphics card type will appear as a label - **Intel**, **Nvidia**, **AMD**, or **other GPU**.

Ganz CORTROL Client will automatically switch to CPU decoding if the configured GPU is **overloaded** (more than **80%** of its decoder, renderer or memory is used).

Make sure you have at least 512MB of dedicated video memory per display (recommended minimum is 1GB per display).

Troubleshooting

If, immediately after enabling hardware acceleration, your Ganz CORTROL Client application behaves strangely, crashes, or causes other problems, try running it **without GPU** decoding. To do so a single time - for troubleshooting - use the *Ganz CORTROL Client without GPU decoding* shortcut from the Start menu (similar icon but in gray colours). This shortcut activates a so-called "**safe mode**" for the Ganz CORTROL Client application, which completely **ignores** the GPU settings configured via GPU test utility.

After launching the Ganz CORTROL Client application in "safe mode", check if the issue is gone. If the no-GPU mode helps, disable GPU decoding via *Renderer test utility* by de-selecting GPUs in the list (remove the check mark in the *Decode* column). If you have multiple graphics cards, the issue may be caused by one of them, so a wise approach would be to enable/disable the graphics adapters one by one in order to find out, which one is causing problems.

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