CBC AMERICA
GANZ CORTROL
Video Analytics
Administration Guide

CORTROL Video Analytics Guide
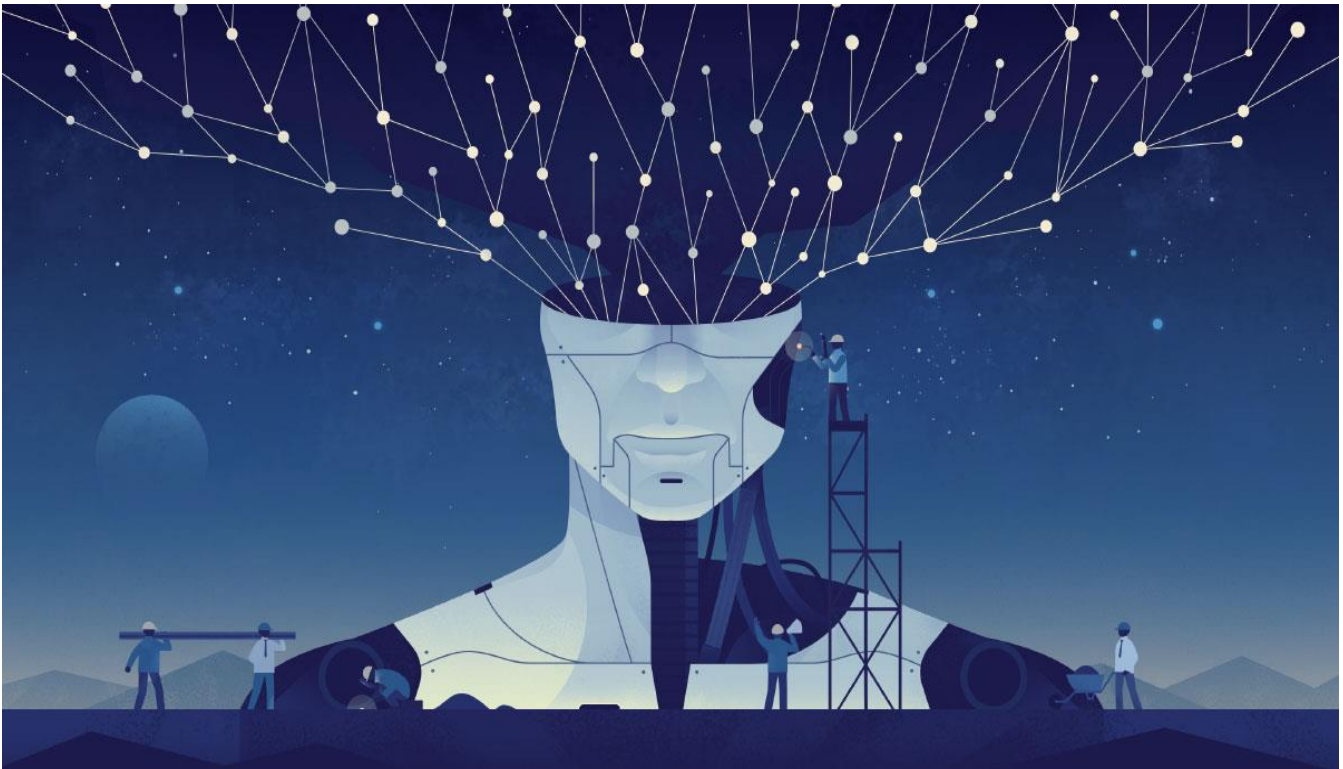
Table of Contents

1. Introduction

Computational neural network (CNN) video analytics (VA) is a real-time video analytics engine that uses neural networks to turn video into actionable intelligence. The VA engine is seamlessly built into the GANZ CORTROL software and is a part of the unified GANZ CORTROL licensing system. At the core of the product there is an ultramodern object tracking engine that detects and classifies objects, and continually tracks moving and stationary targets. The tracking engine features built-in robustness to environmental nuisance conditions such as changing illumination, precipitation, moving foliage, rippling water, etc.

GANZ CORTROL CVA offers:

- Object **detection** and **classification** (both generic and professional classification engines)
- New object **detection events** for the Event & Action rules
- Unique **object counting** using built-in software counters
- CVA **zones** and **lines** with counters
- **Rule** triggering

With only a few settings to adjust, it is possible to quickly and easily define the rules that generate real-time alerts when triggered. This user guide will help you get the Ganz CORTROL Video Analytics quickly configured and lead you through advanced features provided by the product.

CORTROL CVA is a part of the Ganz CORTROL core, therefore:

- CVA is a component of the Ganz CORTROL server installation and requires no additional installation
- CVA cannot operate on its own without the Ganz CORTROL server
- Channel-triggered rules can be used in the Event & Action scenarios in Ganz CORTROL Premier and Ganz CORTROL Global to create complex and flexible automated behavior patterns
- CVA metadata overlay is present in the Ganz CORTROL Client for the user to see the tracked objects both in live view and playback

CORTROL CVA features niche video analytics engines like the Personal Protective Equipment detector and others. Please see the appendixes to this document for complete guides.

2. Getting Started

CORTROL CVA operates as a part of the Ganz CORTROL core, so no extra installation is required, yet there are certain prerequisites.

To get up and running as fast as possible, do the following:

- Ensure that you have installed your Ganz CORTROL server, version 1.18.x or newer
- Ganz CORTROL 64-bit server version is required
- Make sure the server hardware is enough to run the desired number of CVA channels
- Activate your Ganz CORTROL server with a license key that allows CVA usage
- Every license for CORTROL 1.18.x or newer includes 1 CVA channel for free by default
- Additional channels can be purchased by contacting us at how-to-buy-ganz-products
- Add video sources to be analyzed (please check with the main Ganz CORTROL manual for details)
- Enable and configure CVA for the desired channels
- Configure any E&A rules, if necessary
- Enjoy

💡 Ganz CORTROL CVA is enabled and configured via the Ganz CORTROL Console. After you set it up, it is possible to add Event & Action scenarios based on the CVA detections in the Ganz CORTROL Console and see the CVA metadata overlaying the video in the Ganz CORTROL Client.

Once you finish with these steps, you will have an option to use the CORTROL CVA detection as a basis for the event rules in the Event&Action Configurator in the Ganz CORTROL Console, as well as see CVA metadata overlaying the video streams in the Ganz CORTROL Client. Combine CVA with other event sources to automate your routines and turn them into a smart ecosystem.

3. Prerequisites

Hardware Requirements

This section defines the minimal system requirements for CVA operation. The listed hardware must be provided on top of the Ganz CORTROL server requirements. The OS load is not considered.

Hardware

- CPU: i3, i5, i7, i9, Xeon processor with AVX/AVX2 support (produced after 2011)
- One physical core at 3.0GHz or greater per 1 CVA channel
- 1GB RAM per 1 CVA channel
- DDR4 RAM or better strongly recommended

> ⚠ Support for the AVX/AVX2 instruction set is mandatory! Please check your CPU model before installation if you intend to run CVA on the server.

Some of the analytics engines may have more specific requirements, please check further info in this document and related documentation.

> ⚠ We strongly do not recommend using CVA on laptops with Intel Gen.12 CPUs due to extremely mediocre performance.

OS and Software

The requirements here are the same as for the Ganz CORTROL server itself, please refer to the main product administration guide for details.

- Microsoft Windows operating system (7 SP1, 8.1, 10, 11, Server 2012 R2, Server 2016, Server 2019, Server 2022)
- Microsoft Windows operating system running on server hardware or in a virtual machine environment
- A 64-bit Operating System (CORTROL Video Analytics utilize 64bit libraries)

> ⚠ To enable GPU usage for video analytics, please install the NVIDIA CUDA toolkit redistributable package, which is NOT a part of the Ganz CORTROL server installation. You can download the toolkit from the Ganz Security website or request it from a Ganz representative or via Ganz CORTROL support at cortrol@cbcamerica.com.

Engine-Specific Hardware

For the CVA PPE Detector:

- Intel processor Coffee Lake or newer, with four cores per channel
- Two cores per channel detection interval does not exceed 500ms
- MS Windows 10 or newer.
- Note that CVA PPE does not currently support GPU computing.

Camera Position

The neural network behind the CVA engine has been trained on different datasets that use a common (human-like) point of view as a basis. This means, for the best results of, e.g., person detection, your camera should see people like human-like silhouettes; *a top-down (from above) view will produce poor results*.

For PPE Detector: the engine is optimized to work with color images in a well-lit environment; avoid glares and backlight, as well as obstructions between the camera and target objects.

For vehicle detection, a view field of 1-2 lanes is recommended. Environments with a lot of non-essential objects and interference may affect CVA accuracy. For advice on CVA fine-tuning, kindly contact cortrol@cbcamerica.com.
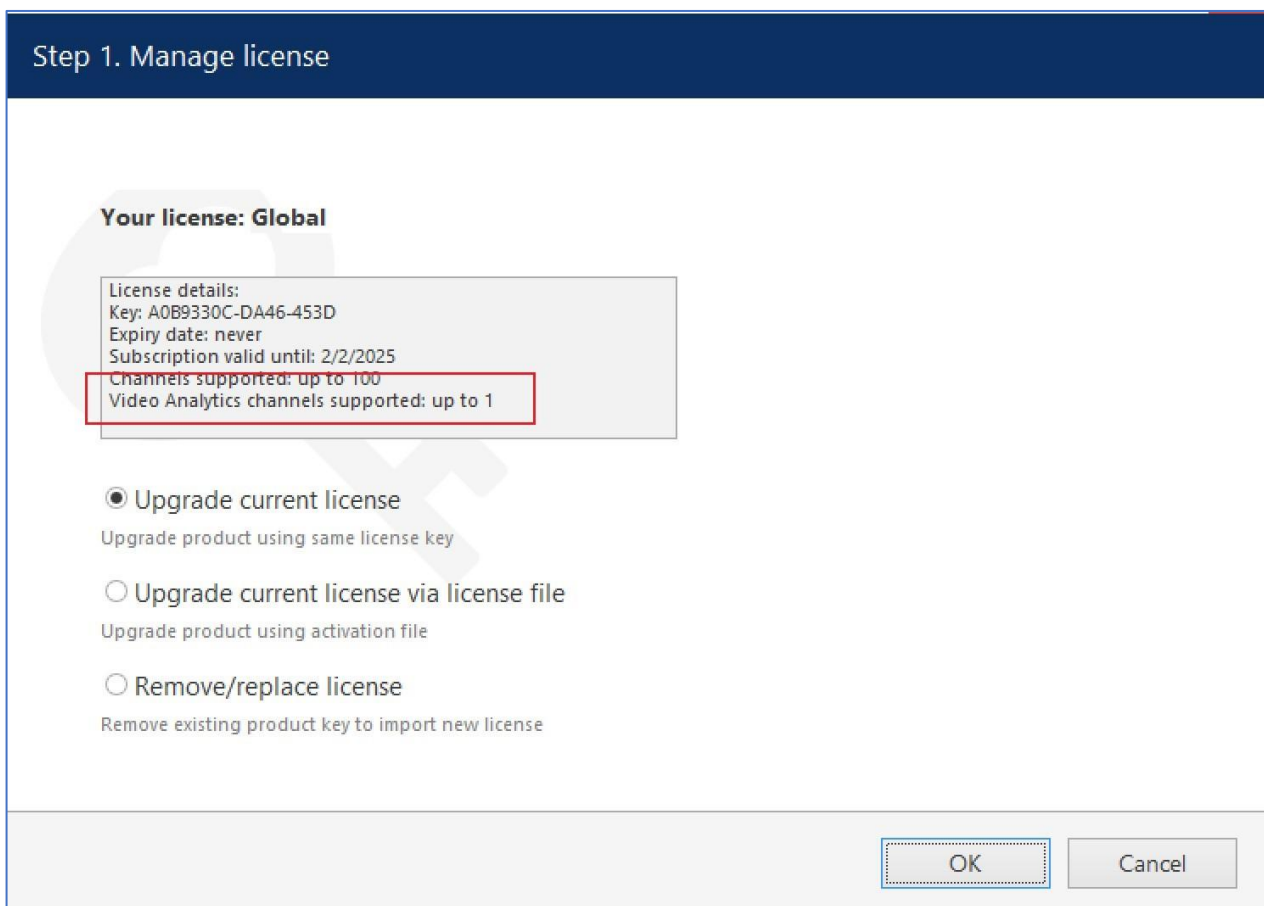
4. Activation

Each Ganz CORTROL license already includes 1 (one) generic video analytics channel for free, and you can use it on any video channel in the system. One CVA license channel can be used on one video channel at a time.

> ⚠ Some CORTROL licenses (e.g., custom evaluation licenses) may not include CVA by default, so make sure to specify your needs when requesting the demo license.

> ⚠ CORTROL license options also include **special CVA types** (e.g., PPE Detector). These are licensed separately, so make sure to specify the required analytics type when purchasing/requesting a license.

To obtain more CVA channels, purchase a **license upgrade** by contacting your distributor or Ganz representative directly, or apply for the upgrade via the Product quote request. Upgrades are available for the Ganz CORTROL Premier and Ganz CORTROL Global license editions!

After that, run the Activation Wizard on your Ganz CORTROL server and upgrade the license. The activation manager will connect to the CORTROL activation server and fetch the new license contents. If you are purchasing a new Ganz CORTROL license, you can order a certain number of channels to be included with it, so you will only have to activate it once.

Step 1. Manage license

Your license: Global

License details:
Key: A0B9330C-DA46-453D
Expiry date: never
Subscription valid until: 2/2/2025
Channels supported: up to 100
Video Analytics channels supported: up to 1

◉ Upgrade current license
Upgrade product using same license key

○ Upgrade current license via license file
Upgrade product using activation file

○ Remove/replace license
Remove existing product key to import new license

OK   Cancel

A Ganz CORTROL license including one CVA channel

To **run** the **activation manager**, locate the *Activation Wizard* in the Windows start menu. Alternatively, right-click the Ganz CORTROL server tray icon and select *About*, then click the *Manage License* button. All license management operations can only be performed locally.

5. Configuration

Enabling Video Analytics

After the license has been applied, you can enable CVA for as many channels as the license allows. By default, CVA is disabled for all channels.

In Ganz CORTROL Console, open the target channel settings by double-clicking the channel in the list. Go to the *Video Analytics tab* and put a checkmark in the *Enable* option. Click *OK* to save and close the dialog box or click *Apply* to continue configuring the channel.

To disable the CVA functionality for the selected channel, simply uncheck the *Enable* option and save. The rest of the settings will be preserved.

> ⚠ Important: disabling CVA for the target channel does not reset the settings. Thus, you can pre-configure the video analytics for more channels than your license allows, and then apply for the license later.

Once the CVA engine has been activated and enabled, you can proceed with its configuration: choose the engine, then the object classes to be tracked, create zones, etc. Once you do that, CVA elements (bounding boxes) will be available in the Ganz CORTROL Client (overlaying live video, instant playback, and playback) and CVA rules will also be available in the *Event & Action Configurator* in the Ganz CORTROL Console as event basis.

> 💡 It is only possible to run one of the CVA engines on each channel at a time. It means that it is not possible to run, for example, both PPE Detector and generic object detector on the same channel simultaneously.

You can check what channels use a CVA 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*.

> 💡 CVA metadata overlay is displayed in the Ganz CORTROL Client in live, instant playback, and playback modes. Other modes (e.g., *Sequence* playback) and video export do not support CVA overlay at this point.

The overall logic of the CVA setup is as follows:

- Enable CVA
- Set up general engine parameters
- Add zones and rules
- Configure E&A rules using CVA rule events

Enabling Metadata Overlay

There are two sources of metadata: internal (from Ganz CORTROL CVA) and external (all other metadata, i.e., edge VA, server-side Open VCA). You can control both separately.

Camera-side metadata is enabled by default, so, even if Ganz CORTROL CVA is disabled, you may still see some visual elements in the Ganz CORTROL Client. This will mean that the source of this metadata is the device itself (or older generation Open VCA engine).

> ⚠ Camera-side metadata includes Open VCA metadata (from an older video analytics engine built into the Ganz CORTROL software). If you disable camera-side metadata, you will not see the bounding boxes and other VCA elements in the Ganz CORTROL Client application.

CVA metadata is enabled by default for any channels where CVA is enabled. This means, CVA elements will overlay the video in live and playback. For any Ganz CORTROL Client application, you can enable/disable separate overlay elements via application settings. Further details on this can be found in the Ganz CORTROL Client application user guide.

For CVA, you do not need to enable any of the external metadata sources.
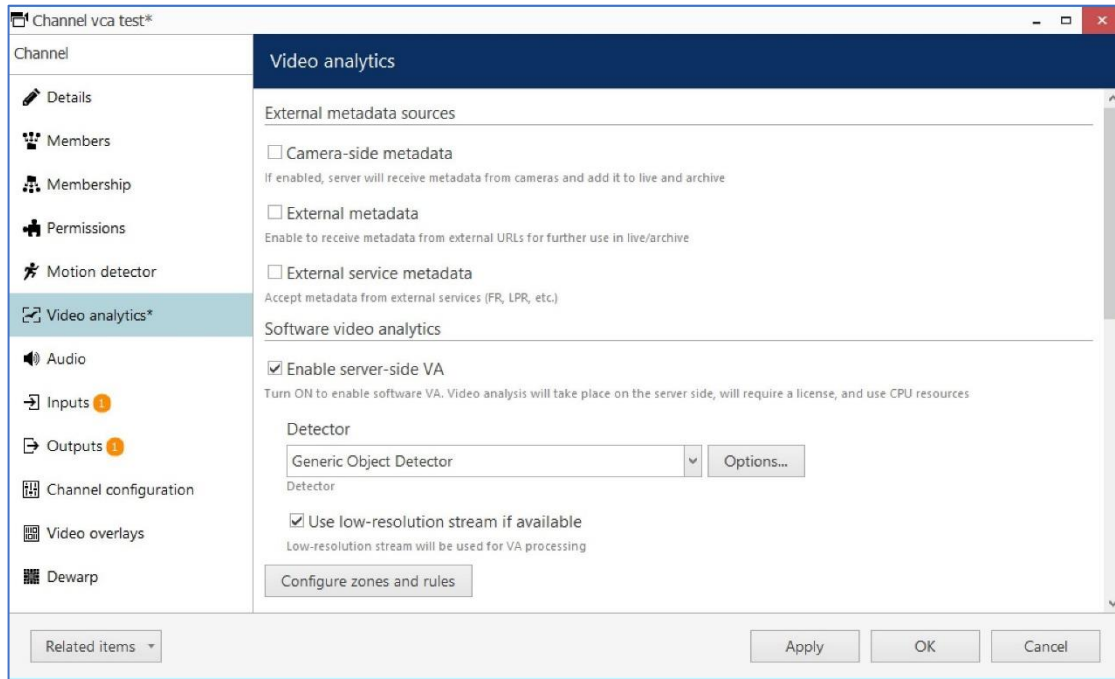
CVA settings in the channel configuration dialog box

General CVA Settings

The rest of the CVA settings are in the same tab. Some of them must be adjusted to proceed (e.g., no object classes are selected by default); other settings already have default values. If you are not sure what values should be used for that video channel, leave the default (pre-configured) value, check how CVA works, then slowly adjust the value until you see which one works best for your scene.

Several supported neural network models do the analytics processing. The numbers next to the engine name designate the **size of the downscaled image** that will be fed to the CVA engine. The bigger the image, the larger 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 scene.

> 💡 The default CORTROL CVA detector model (300x300) is optimized for the CPU. All other engines run better on GPU.

Please adjust the overall engine settings here first before adding zones and rules.

Setting	Description	Default Value
External metadata sources	Enable to accept device-side metadata, external metadata, or data from the integrated external services (not required for CVA configuration)	Enabled
Enable server-side CVA	CVA state for the current channel, ON/OFF	Disabled
Detector	Choose one of the available neural network engines.	Generic
Options	Engine-specific settings	[button]
Use a low-resolution stream if available*	Similarly, to motion detection, use smaller images for detection to save server resources.	Enabled
Configure zones and rules	Click the button to bring up the dialog box for configuring zones, lines, and counters	[button]
Classes	Choose the object classes that you want to be detected in the target video (further class choices will be limited to this list)	None
Detection interval**	Time (delay) in milliseconds between two successive detections (like MD)	500 milliseconds
Object loss timeout	The amount of time in seconds before the lost/disappeared object is not tracked anymore	6 seconds
Scene dynamics***	The relative speed of the objects in the scene, i.e., how fast the object crosses the screen; in more dynamic scenes, objects appear in fewer frames	Normal (average)
Confidence threshold	The minimum level of confidence to decide if the object belongs to a class (detections with lower confidence will be ignored)	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), optimal range: 50-90%	85%
Maximum object size	Larger objects will not be detected. Click the *Select* button to set the size using visual adjustment. (Use this setting to eliminate false detections of non-existing large objects).	50%, 50%

*Only use this option if your camera delivers both high- and low-resolution streams as the same picture. If the secondary stream is a cropped version of the hi-res image, the detection results will be inaccurate.

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

The **detection interval** settings lower the stream FPS so that the frames are fed to the CVA engine less often. The default setting of 500ms means the detection FPS will be equal to 2FPS (no matter what the original stream FPS is). This is enough for slow to moderate scene dynamics.

If you want more frequent detection, decrease the detection interval.

Example: 200ms detection interval corresponds to 5FPS. Keep in mind that when you increase detection FPS for one channel, you "steal" them from other channels, as there is a limit of total detection FPS per GPU/system.

***This setting teaches the CVA engine where to look for the same object in the next frame. The slower option means the object is present in more frames. Faster means the object is present in fewer 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's ability to track objects. If the value is too low for the target scene, different objects may be considered one. Too high (close to one hundred) 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 and GPU

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

⚠ Important recommendations regarding CVA on GPU:

- Not recommended for usage on Windows 10 due to dramatically degraded performance
- Generic 300x300 model is optimized to run on CPU
- Generic models 512x512 and 1024x600 have much better performance on GPU, can barely run on CPU
- Minimum recommended CPU for CVA enabling (any engine):
- i7 Gen.10 or newer minimum one physical CPU core per channel
- If the 512x512 model is used on the CPU, a minimum of two physical CPU cores per channel
- If a 1024x600 engine is used on the CPU, a minimum of four physical CPU cores per channel
- This model is very resource-intensive

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

- **GPU device*:** choose one of the supported graphics cards, or choose *Disable* to leave CVA running on the CPU
- **Advanced** (only change this if you know what you are doing!): per process GPU memory fraction: the 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* if you prefer the entire video memory chunk to be pre-allocated instead of gradual growth

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

*To enable GPU usage for video analytics, you need to install the NVIDIA CUDA toolkit redistributable package, which is NOT a part of the Ganz CORTROL installation. Please download the toolkit from the Ganz Security website (available with the latest Ganz CORTROL version) or request it from a Ganz representative or cortrol@cbcamerica.com.
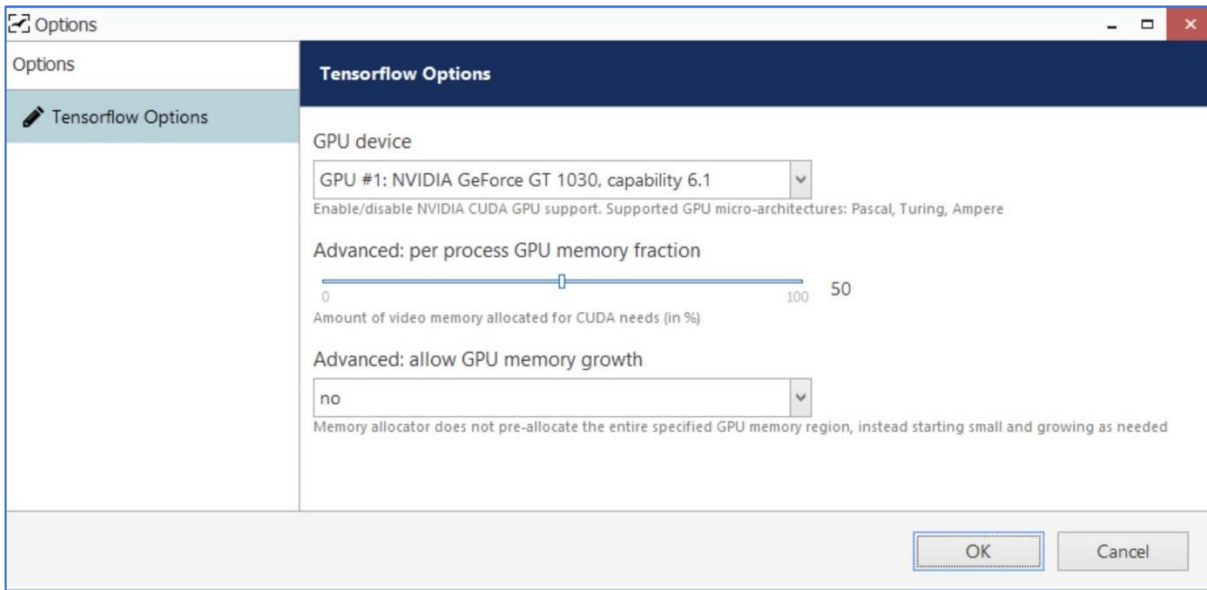
*GPU settings for generic TensorFlow VA engine*

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).

You do not need to run the renderer test utility test: it is only required for GPU decoding on Ganz CORTROL Client workstations.

Zones and Rules

Finally, set up visual detection elements - zones and lines - and add counters and rules for them.

Click the *Configure zones and rules* button to bring up the video overlay dialog box. By default, only CVA 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.
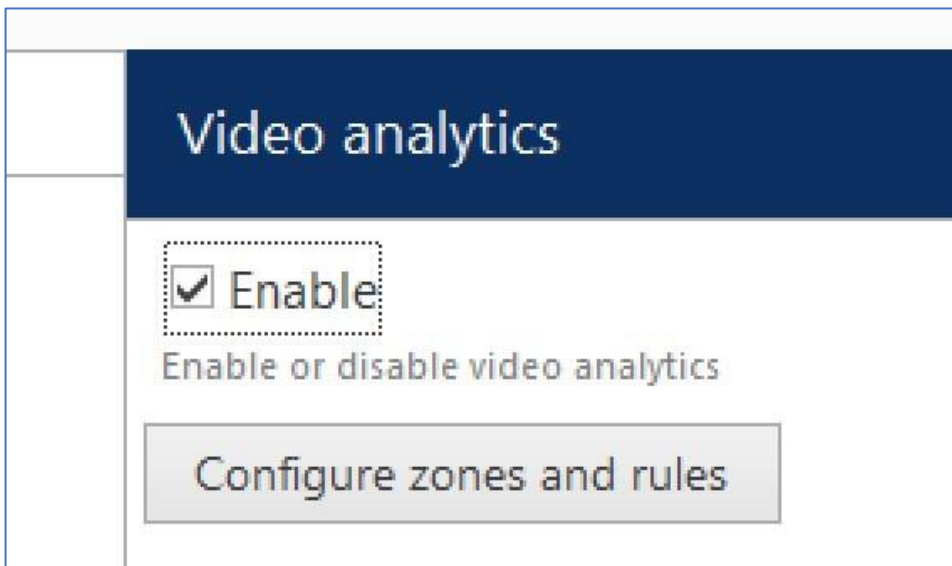
In the top right corner, there are CVA markers: **counter**, counting **line**, and polygonal **zone**. Drag and drop any marker onto the picture to place it, then adjust its size and position.

If you want to see all visual elements of the current channel (channel shortcuts, data sources), click the *Show All* option next to the markers. In this way, you can check that the channel shortcuts and data output fields, if configured, do not overlap with CVA elements.

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
- **Color**: choose the element color using the standard palette
- **Opacity**: color 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: one 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: one second)
- Object **intersection threshold**: percentage of the object area to cross the zone border for it to be 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.
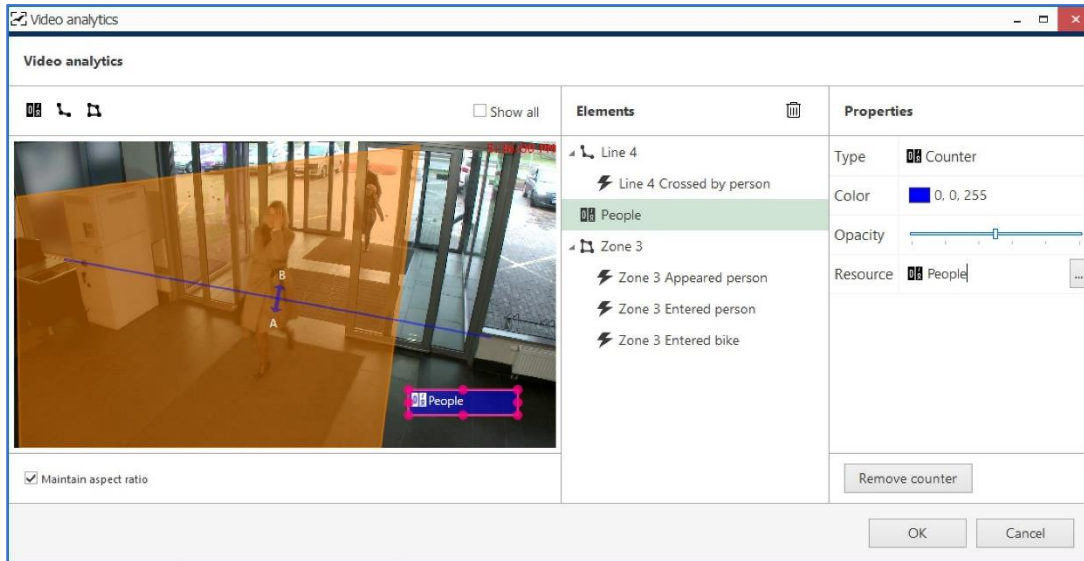
Rules and Counters

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 increase the number of counters.

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

- To **track the number of people in any zone**: create a *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' CVA, 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

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 the 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 CVA configuration; to set up **reactions**, go to the Events & Actions section of Ganz CORTROL Console. The CVA rules are converted to E&A events automatically for E&A, so you just need to set up required actions - e.g., increment counters. In the example below, the VA events have been created **automatically** for the given channel, but the rules (middle column) have been created by the user.
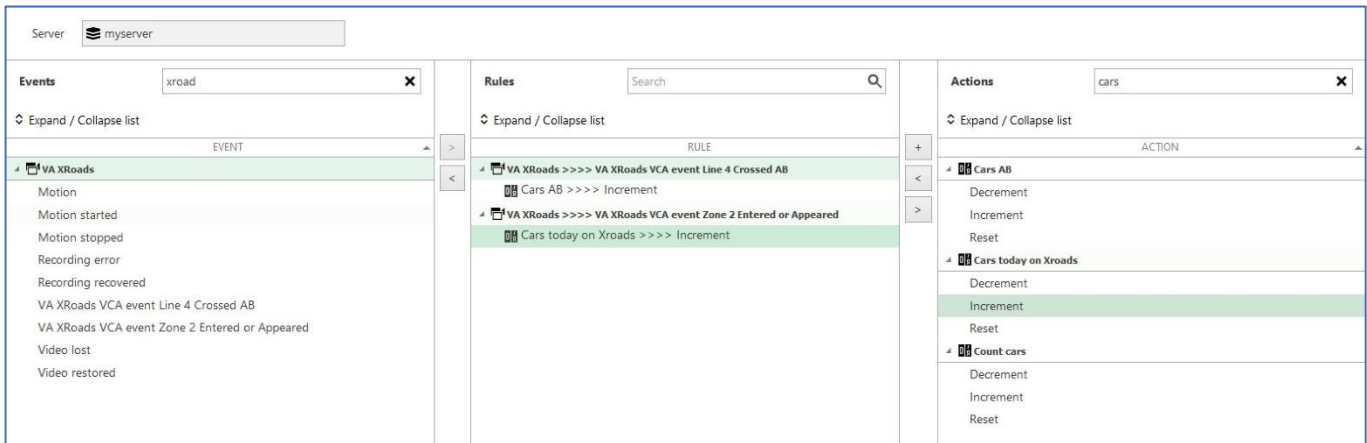
E&A Configurator events created based on CVA rules

Please see the consequent sections of this document on how to create E&A items.

Counters

Counters are entities that contain a certain integer value, which can be altered based on some occurred event - in this case, the CVA rule event. CVA has two types of counters available:

- **Software counters** (system-wide counters) for counting the number of any event occurrences
- **CVA counters**, or zone counters (created specifically for CVA and intended to reflect the current number of CVA objects in a zone)

You can create new counters from the CVA configuration when binding visual elements to actual counters. Alternatively, you can add new counter entities in the Events & Actions section of the Ganz CORTROL Console, under the *Counters* subsection. Each new counter will have a starting value of 0 (zero).

In the E&A Configurator, each counter will appear in the right-hand column with three **built-in actions**:

- **Increment**: increase counter value by one
- **Decrement**: decrease the counter value by one
- **Reset**: set the counter's value to zero

Counters in CVA Configuration

The overall logic using counters is as follows (the order of steps is not particularly important):
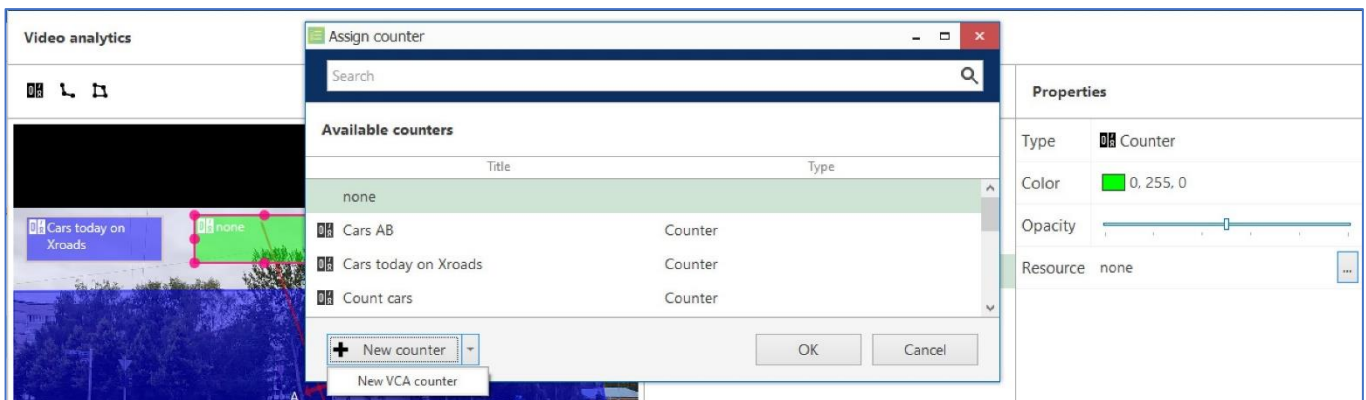
- **Create** a counter (either from the CVA config or the E&A section)
- Bind the counter to its **visual** representation in the CVA overlay
- If desired Bind CVA **rules** to it in the E&A section

You can create a new counter of any type, right from the CVA configuration dialog box. So, start by **dragging and dropping the visual element** from the panel above the video and position the box where you want the counter to be displayed. By default, it will have no linked counters, i.e., the box is just a visual container. You need to link it to an existing counter or create a new one. In this example, two boxes are bound to counters, and the green one is empty.
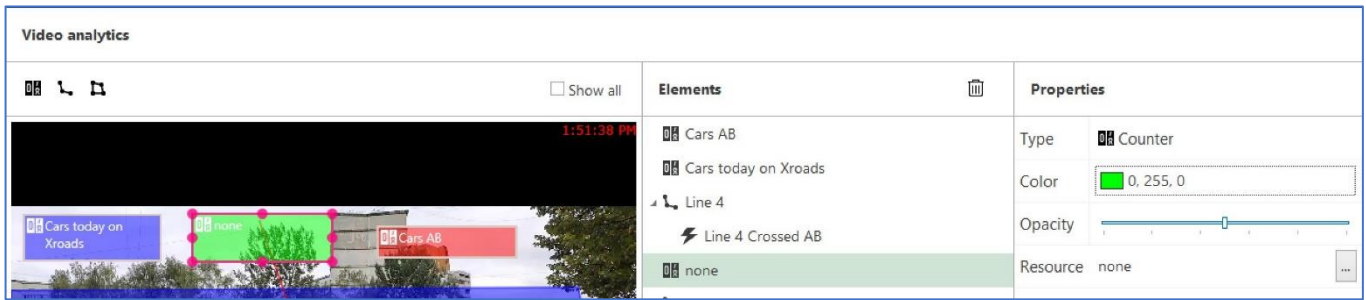
Drag the very first overlay control to visualize counters

Click the … three-dot button next to the *Resource* on the right, and either choose an existing counter or create a new one using the buttons below.

Create a new counter from the CVA configuration window

You have two buttons here:

- Clicking *+New counter* will create a new software counter
- Available outside CVA click the arrow next to that button to create a *+New VCA counter*
 - Which will count the current number of specified objects in the zone

To add new VCA counters for the specified zone, you can also click a zone, then click the *+New zone counter* below. Finally, to **bind CVA rules to counters**, go to the E&A section of Ganz CORTROL Console as described in the next section of this document. E&A (Events and Actions) is a tool for centralized event & action management.

💡 In CVA configuration, you create desired CVA rules that further trigger E&A events. CVA rules do not do anything themselves other than just provide the event source.

Again, here is the **difference** between "zone" counters and "regular" software counters:

Software counters can be used to count anything (any event occurrences). Use software counters to estimate the number of passing cars, incoming customers, the number of customers in the shopping mall, etc. You can increment and/or decrement software counters based on CVA events from many different channels, even if they use different video analytics types.

Zone counters are solely intended for reflecting the current number of objects in the zone. Object class is considered. You can use this for **queue** length or **traffic** estimation.
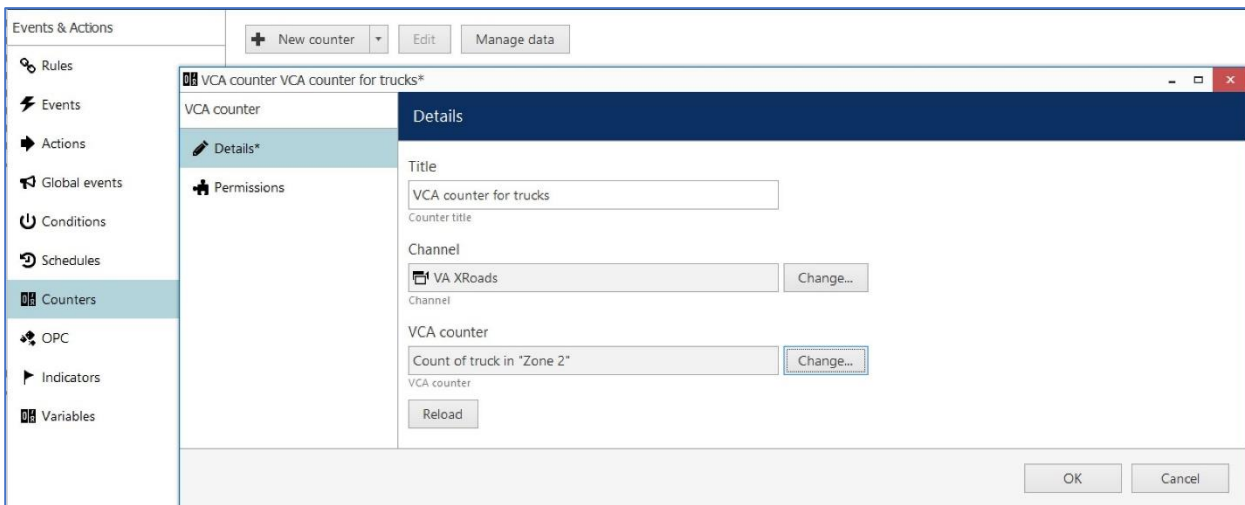
Create a new VCA (zone) counter from the E&A section of the Ganz CORTROL Console for reflecting the zone state

Such counters can be also added from the CVA configuration dialog box using the *+New zone counter* button. The counters added from E&A will appear under corresponding zones in the CVA configuration.
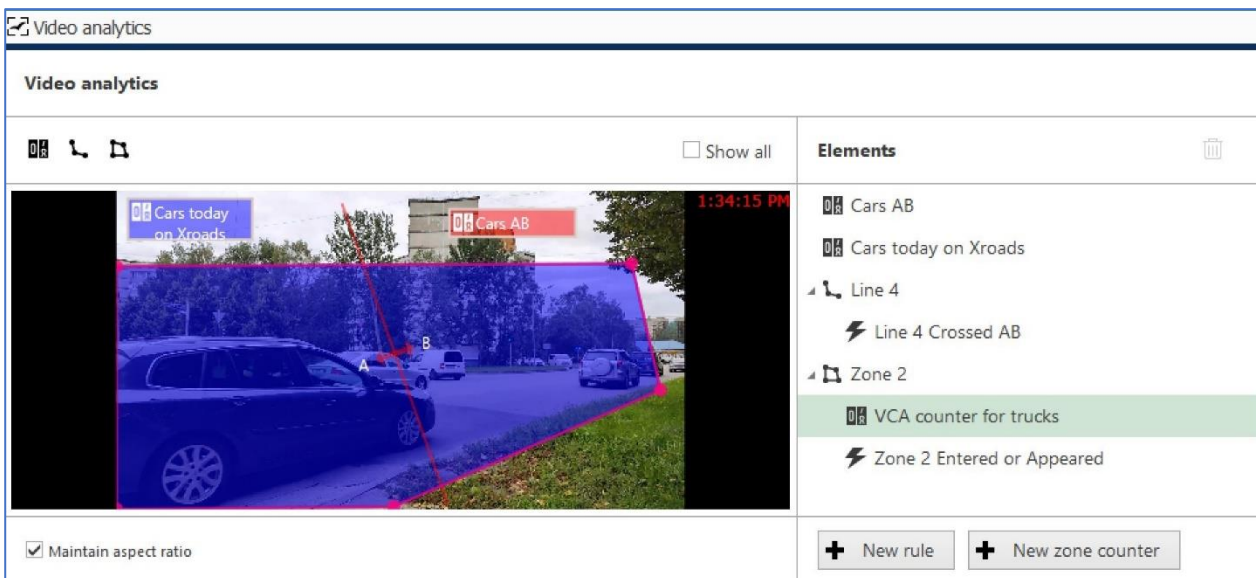
Zone counter and a button for adding a new zone counter in CVA settings

See the sections below on how to add rules using the created counters and CVA events.
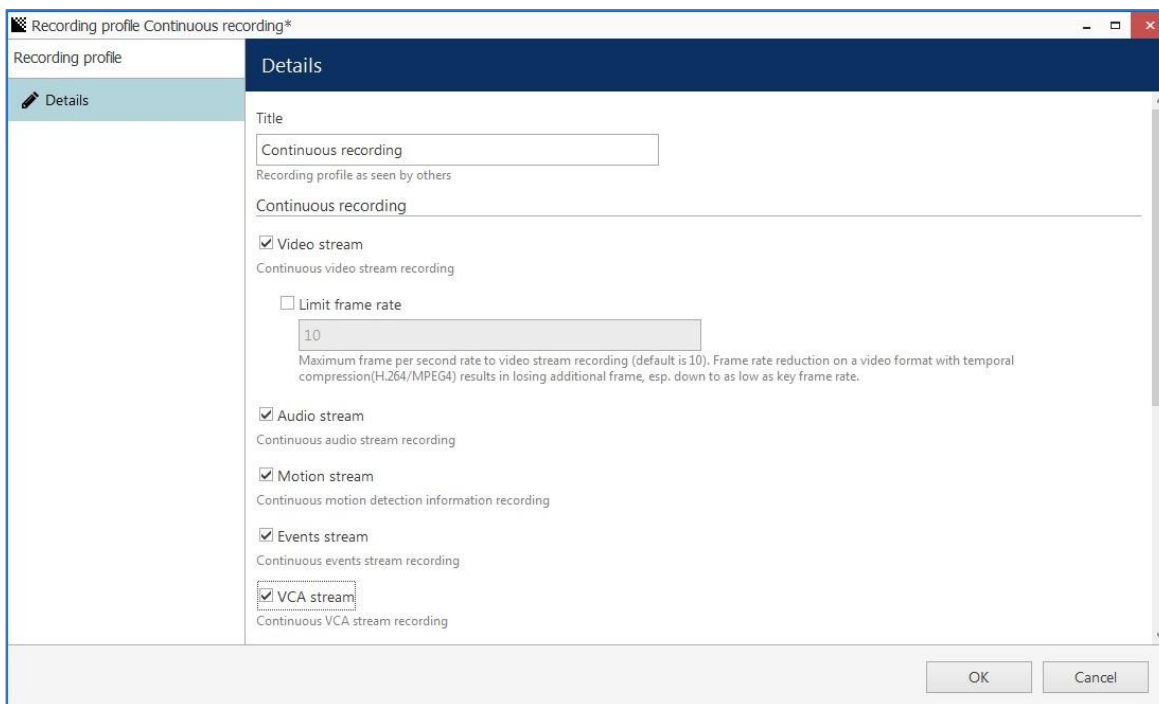
6. Video Analytics Events

Once you have enabled and configured CVA for the desired channel(s), you can add rules in the E&A Configurator and build different flexible rules to cover your automated scenarios.

All CVA **object detections** can be used as **event sources** in Ganz CORTROL and are available in the configurable event list in Ganz CORTROL Console for each channel that has CVA enabled. Thus, CVA events can be used for triggering one or multiple standard actions, such as: starting or stopping recording, sending an email, popping up a camera in Ganz CORTROL Client, running a third-party application, and others. Also, CVA metadata can be recorded alongside the video stream.

> ⚠ For the CVA rules you add in the channel configuration, events are added **automatically** meaning you do not have to add them in the E&A section. If you want to add extra rules, follow the steps below.

Enable Recording
CVA metadata recording is enabled by default for the built-in recording profile *Continuous Recording*. If you are creating a new recording profile in Ganz CORTROL Console and you wish to save the CVA metadata with the video archive, make sure to mark the *VCA stream* option in the recording profile properties. If enabled, CVA metadata will be displayed in the playback and instant playback modes in Ganz CORTROL Client.

*Built-in recording profile with VCA stream enabled*

Add Events

To set up system reactions based on the video analytics events, either use the automatically created CVA events, or create new ones. For this, go to Ganz CORTROL Console, choose the *Events & Actions* section in the bottom left corner, and then select the *Events* component from the menu on the left. Click the *+ New event* button on the upper panel and select the *VCA event* item from the drop-down list.

At this point, the available events include:

- New **object detections:** each new detection of an object of the selected type will trigger an event.
- **Zone** and **line** rules (those created for the target item in CVA settings) - these are added **automatically**

Again, you do not need to create zone and line rules here explicitly, these appear listed under the relevant channel in the configurator automatically after you create them in CVA settings.
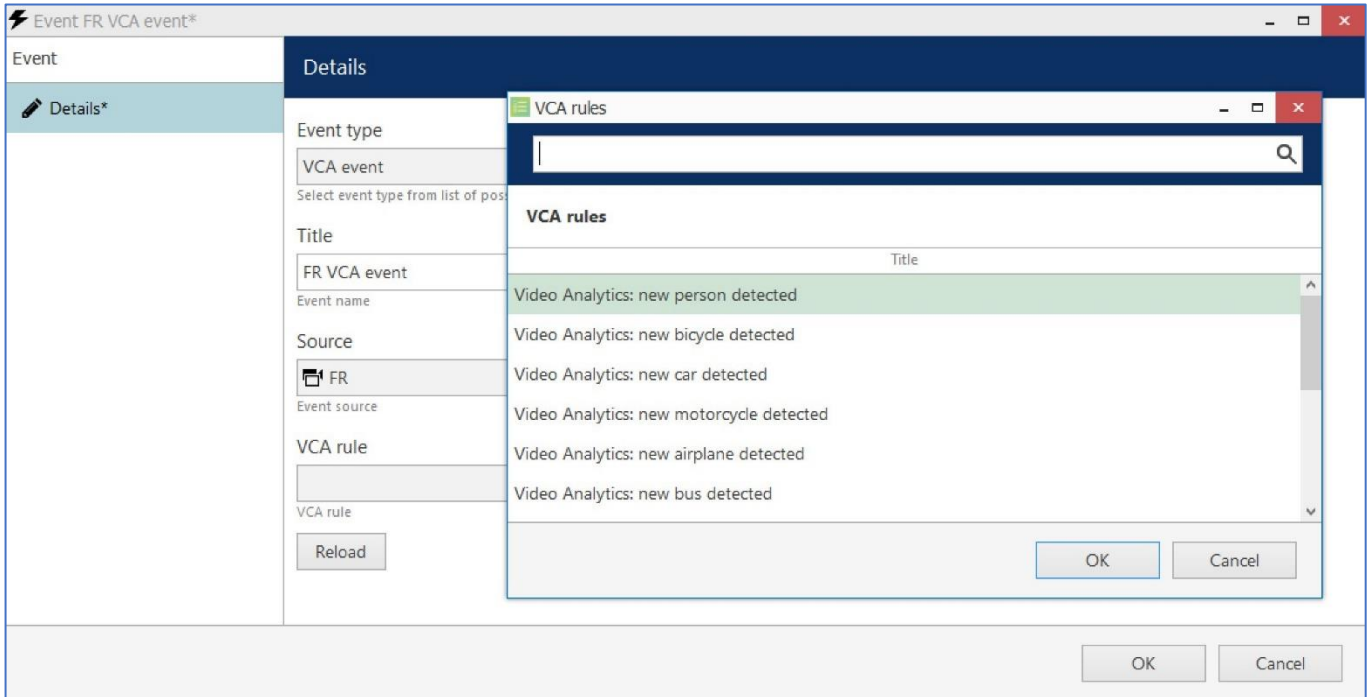
Video analytics event from CVA

The settings available here will be as follows:

- **Event type**: VCA **event title** will be composed automatically, and you can change it to anything you want.
- Event **source**: the channel that has CVA enabled
- **VCA rule**: one of the CVA rules

> 💡 If the target channel has device-side VCA enabled and configured, the VCA rule list will include both CORTROL CVA (software side) and the device's own VCA (hardware side).

When ready with the event settings, click OK to save: your newly created event will appear in the list and will be ready to be used in the E&A scenarios.

Create Rules
Switch to the Rules section, choose the target server from the upper panel, and click the Configurator button to open the Event & Action Configurator dialog box.

> 💡 Events and actions are associated with servers. The Target server is the server where the VCA-enabled channel resides; other servers will not see any events or actions related to this channel.
>
> To pass the events from server to server in Ganz CORTROL Global, use global events: you will find more information on these under the corresponding section of your Ganz CORTROL Global management manual.

You can add new events and actions and edit existing ones from the Configurator window as well, without going to these sections separately.

When you have all the necessary events and actions, you can combine them to create rules - automated scenarios that will be executed if the Ganz CORTROL server is running. The example in the picture here shows how a new person detection triggers a camera popup on-screen on weekends only, increments the people counter, and creates a bookmark for the target channel.
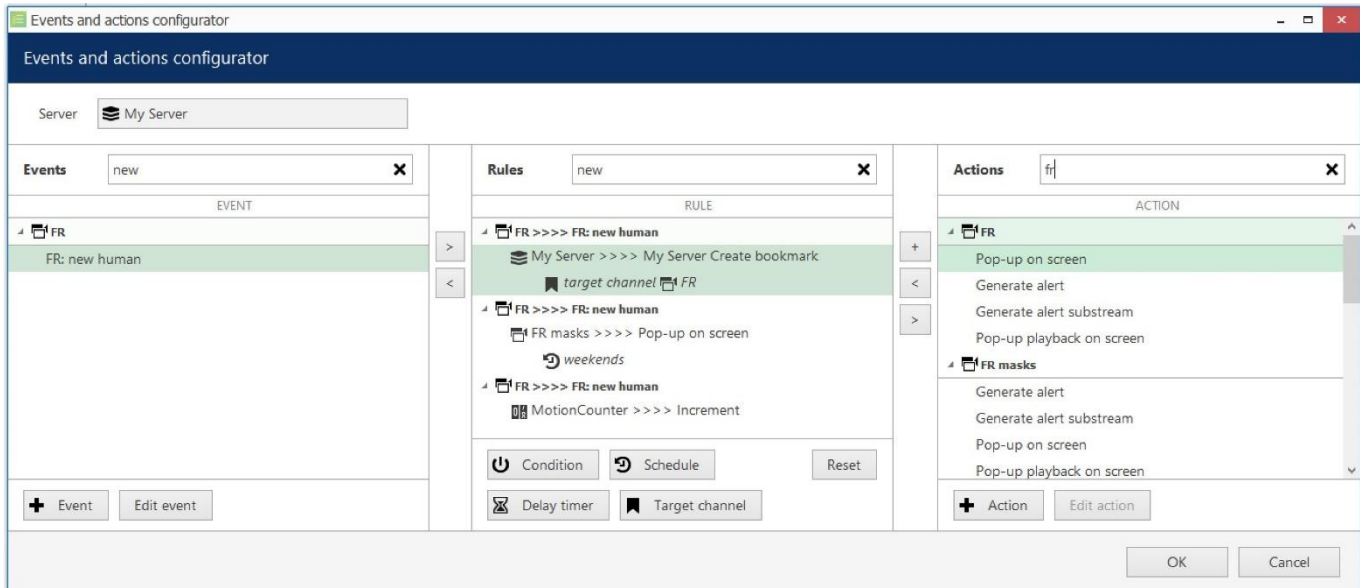
FR event triggering three different actions

Start with adding events: select one or more events from the column on the left (use CTRL+click to select multiple items) and move them to the central column (rule map): Single items can be moved with a mouse double-click, single/multiple items - by clicking the > arrow button between the columns.

Similarly, attach actions to the target events by selecting the desired actions in the column on the right and using the < arrow or + plus button between the central and the right columns. The + plus button should be used when you wish to attach more than one action to the same source event. To replace an action, use the > arrow to remove the selected action from the Rules column and select a new action instead.

To delete the rules one by one, remove the source events from the Rules column using the < arrow between the central and the left columns; to clear the Rules section, use CTRL+A to select all items and then use the < arrow to remove all source events.

Each CVA-based rule, just as any other rule, can have extra items controlling the rule behavior.

These are conditions, schedules, delay timers, and snapshot sources (the latter is only applicable to the Send Email action). You will find more details on these items in the corresponding section of the Ganz CORTROL management manual.

Once you have created the desired rules, click OK to save and exit the E&A Configurator.

Rule List
All the created rules will appear under the corresponding section in Ganz CORTROL Console. Using the upper panel, you can disable any rule and enable it back; also, any enabled rule can be evaluated so that you do not have to wait until the event is triggered to check if the rule is operational.

Rule Example: Video Popup Upon CVA Event

Let us consider an example: how-to pop-up video channels if built-in video analytics (CVA) 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, place Channel A on all the operators' screens.

Preliminary setup:

- Channel A: enable CVA, add a crossing line, and add a line event of the Crossed type with the Person class enabled

The rule for Channel A:

- CVA 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 the viewport index as the channel destination.

Counters

Counters are entities that contain a certain integer value, which can be altered based on some occurred event - in this case, the CVA rule event. CVA has two types of counters available:

- Software counters (system-wide counters)
- CVA counters, or zone counters (created specifically for CVA and intended to reflect the current number of CVA objects in a zone)

In the Events & Actions section of Ganz CORTROL Console, you can create new counters under the Counters subsection. Each new counter will have a starting value of 0 (zero).

Then, in the E&A Configurator, the counter will appear in the right-hand column with three built-in actions:

- Increment: increase counter value by one
- Decrement: decrease the counter value by one
- Reset: set the counter's value to zero

Software counters will allow you to build automatic and manual reports. For more details on the counters, please refer to the E&A section of the main Ganz CORTROL administration guide.
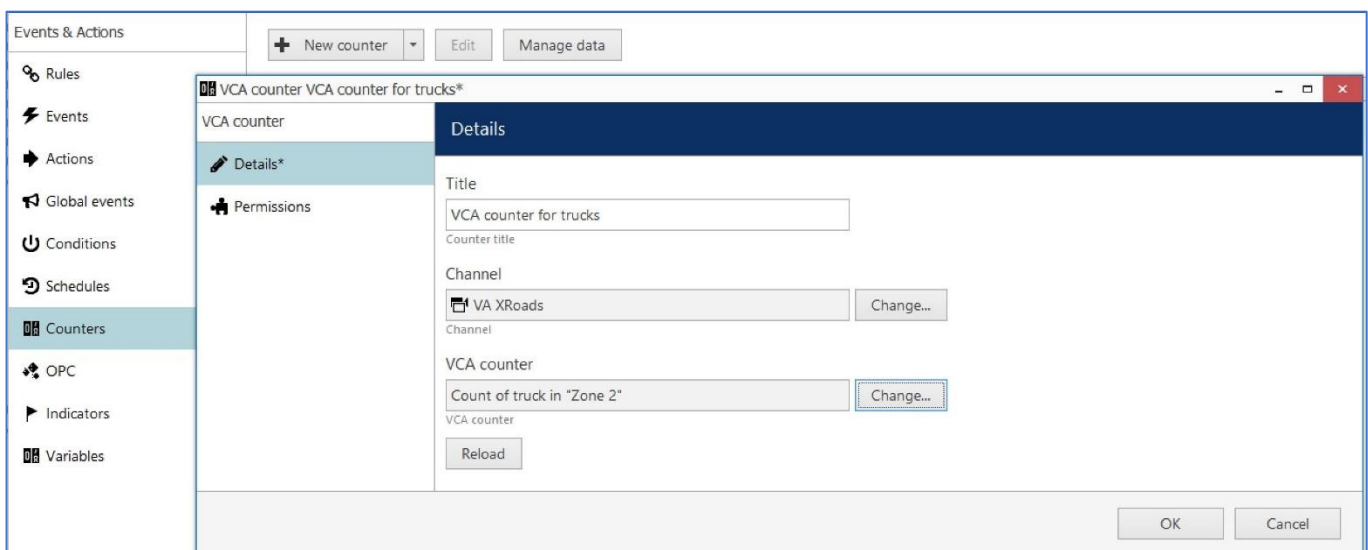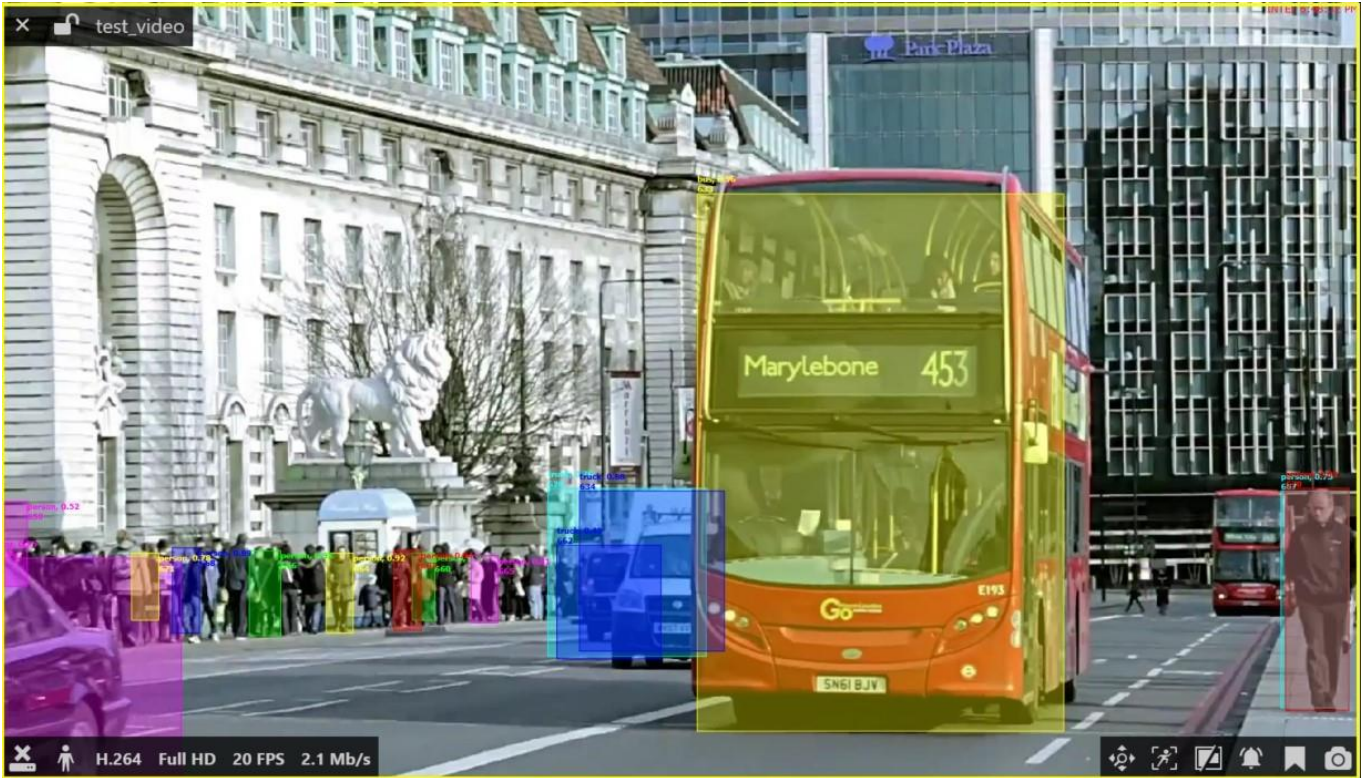

Create a new VCA (zone) counter from the E&A section of the Console for reflecting the zone state

7. Live and Playback

Metadata Overlay
CVA metadata elements are displayed in the Ganz CORTROL Client Application for user reference: CVA bounding boxes overlay the video feeds, allowing the user to see the tracked objects.


CVA overlay in live view

The following items are displayed in the live, instant playback, and regular playback modes:

- Tracked objects - moving bounding boxes
- Object classification and detection details

💡 CVA metadata overlay is displayed in Ganz CORTROL Client in live, instant playback, and playback modes. Other modes (e.g., *Sequence* playback) and video export do not support CVA overlay at this point.

Item presentation can be selectively turned ON or OFF via Ganz CORTROL Client application settings via main menu *Edit -> Settings -> Viewport Overlays* tab -> *VCA* section. Some of the items here are not relevant for CVA (e.g., zones), as these settings cover both CVA and Open VCA metadata.
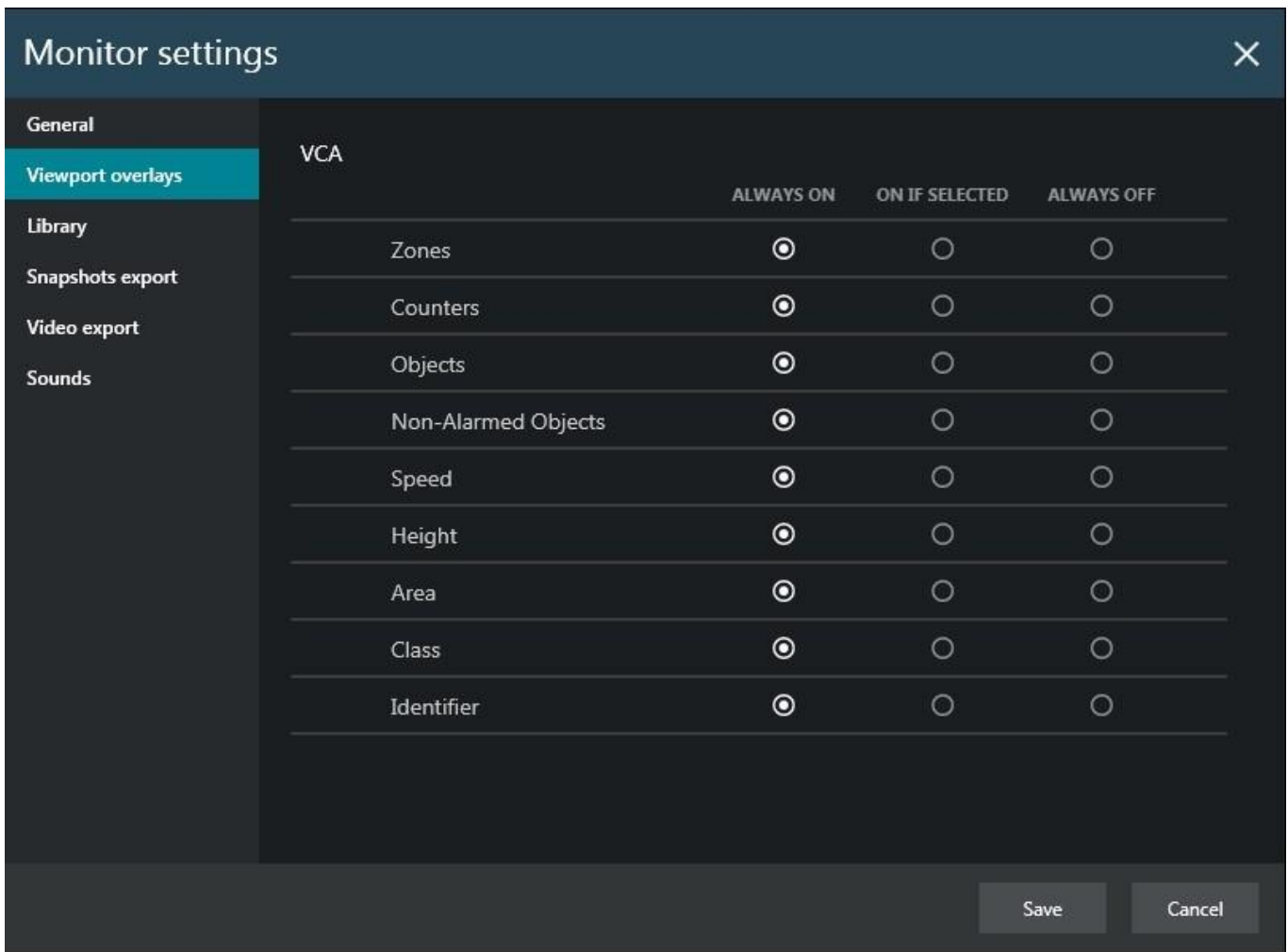
Overlay settings for CVA elements

Each element can be set to be displayed always or only when the viewport is selected or turned OFF at all. Note that display settings are applied to live, instant playback, and playback modes at once.

Playback
In playback, there is a special investigation mode that involves CVA objects. To use it, switch to the *Playback* tab, then click the *VCA* button in the upper right corner.
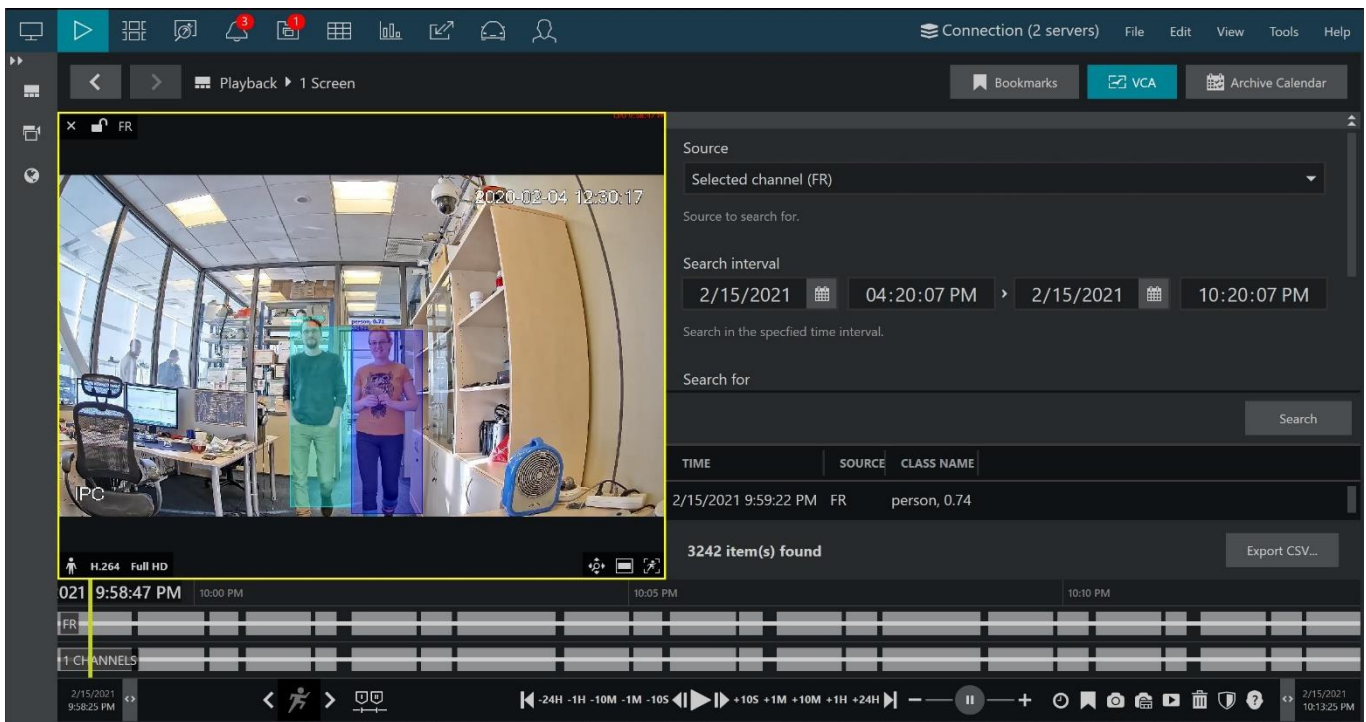
CVA search in the Playback mode

The appeared panel will allow you to specify the search criteria, which are:

- Source: a channel currently present in the layout that has CVA enabled
- Search interval: time range to look for the events in
- Search for CVA item to search for
  - Object: all entries containing object appearance according to the VCA object classification

- Class name: CVA class name (full or partial) according to the CVA internal object classification

💡 At this point, only a CVA object search is possible. Other search options are for Open VCA. More functionality is coming in the next software releases.

When ready, press *Search* to get the results based on your refinements. Click any result in the list to jump to it in playback, then press the play button below the timeline to start viewing the footage.

Found data can be saved into a CSV file (comma-separated values) that can be later parsed or opened with MS Excel-like applications. To do this, simply click the *Export CSV...* button below the search result list and specify your desired file name and path.

8. Automatic Reports

Data received from software **counters** based on CVA events can be used to **build and send automatic reports** from Ganz CORTROL servers.

Reports can have different periods and are configured using Ganz CORTROL Console. 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.

The report creation process is like 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.

General
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 intervals 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.

> ⚠️ If the report interval is the previous day with specific hours, the report will be sent immediately after the selected time is over. For weeks/months, the report will be emailed after the selected report interval has ended.
>
> Example 1: the report interval is the previous day with a time filter set to 8 AM to 6 PM. The report will be emailed the same day at 6:01 PM.
>
> Example 2: the report interval is a previous week with only working days selected (weekends deselected). The report will be emailed at 12:01 AM next Monday, i.e., when the week is over.

Prerequisites
Reporting in Ganz CORTROL Console is primarily aimed at automatic report sending via email. To achieve this, you need to configure a mail server in Ganz CORTROL Console for the emails to be sent through, according to the steps explained in the corresponding section of the main Ganz CORTROL administration guide. You can do this before 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 report to be created successfully, there must be some counter data present in the database, so make sure to collect some data from the counters before scheduling the reports.

Report Configuration
To start the report setup, go to the *Configuration* section of Ganz CORTROL Console and choose *Reports* from the menu on the left. Press the *+ New counters report* button on the top panel to bring up the report configuration dialog box.
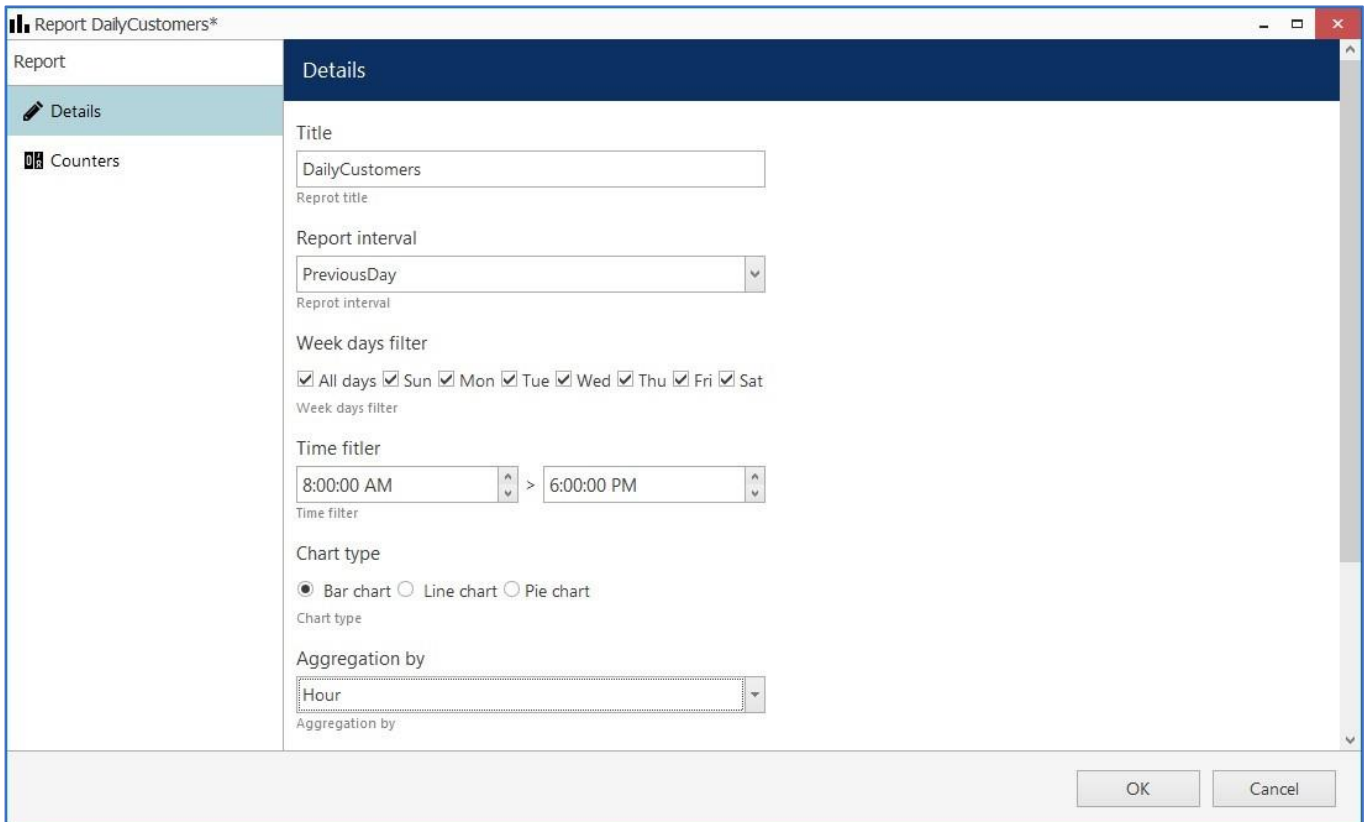
Edit report dialog box

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	The time interval to be represented in the report; can be the previous day, week, or month	Previous day
Weekdays filter	Days of the week to be included in the report (e.g., ignore weekends)	All days
Time filter	Target audit interval to be analyzed for each of the selected days	12AM > 12AM (Whole day)
Chart type	Diagram type: bar, line, or pie	Line chart
Aggregation by	The 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 a 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

24 | P a g e

Sum counters	Choose whether you want each counter to be represented separately or all counters to be added up (for bar and line type diagrams only)	Disabled
Show labels	Display value labels on the chart	Disabled
File type	Choose whether you want the report to be in PDF or 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. All the counters available in the system are listed here in case their data is present in the database.
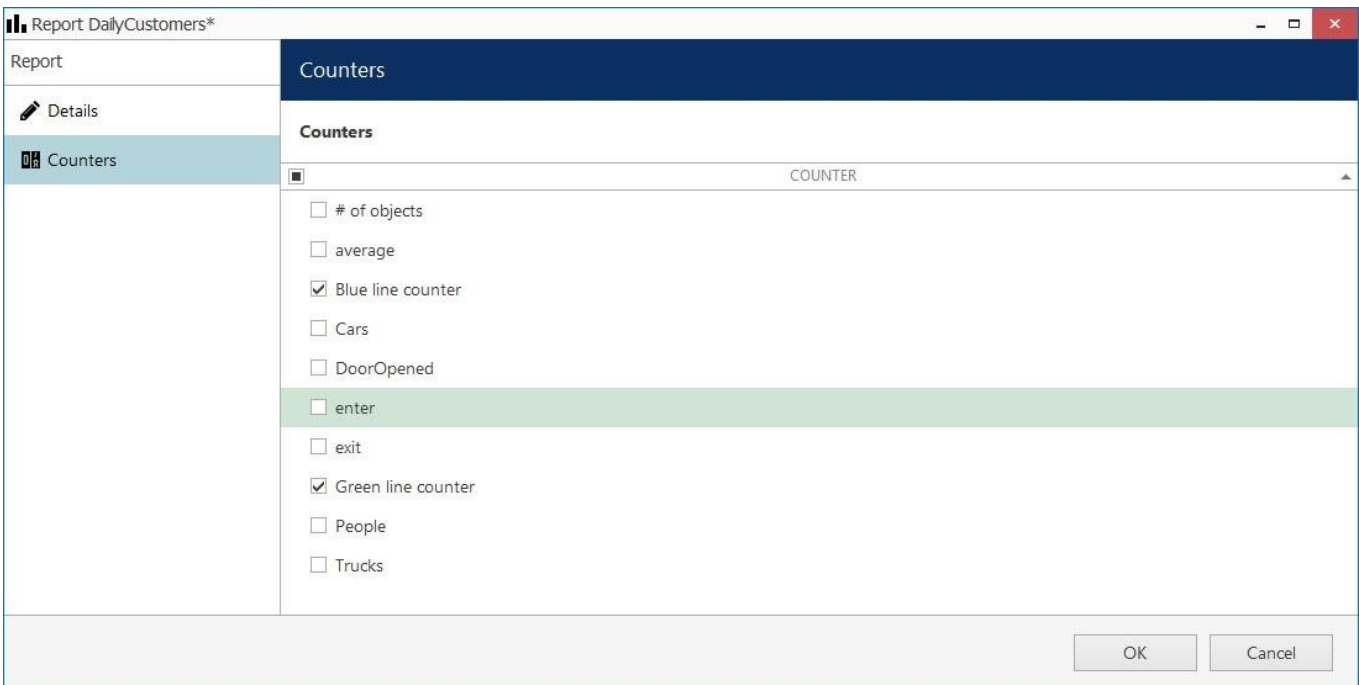

The list of counters available for the report

When ready, hit the *OK* button at 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 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 is specified.

💡 When you have created a **new report** and wish to evaluate it, please wait about 10-30 seconds before pressing the *Test* button: this time is required to retrieve the counter information from the database.
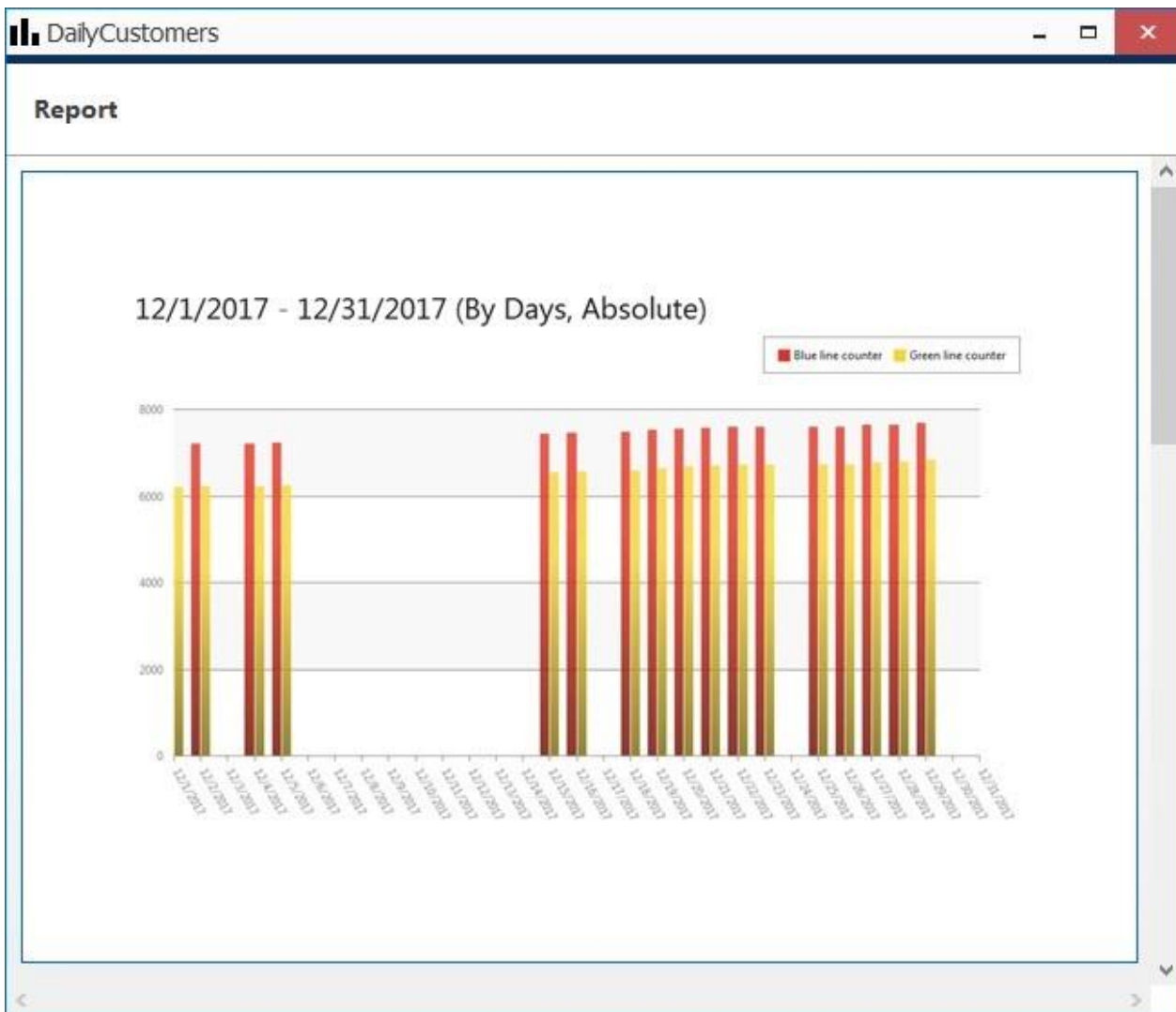
Report preview

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 values 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.
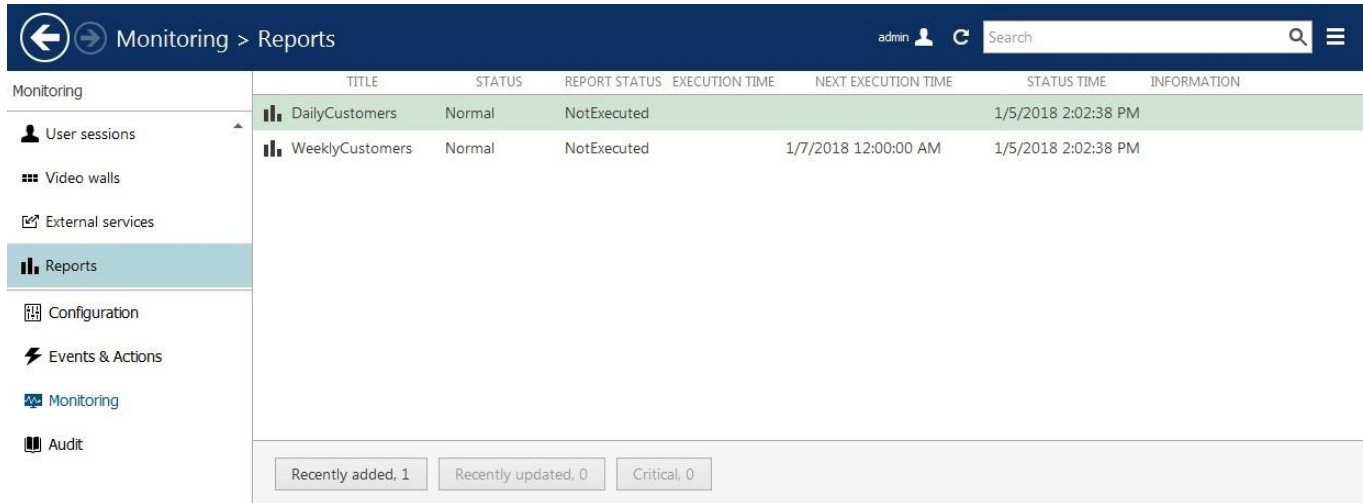
Each chart also contains a **legend** that provides information about the colors used in the diagram:

- If you have selected to analyze every counter separately, each counter will be represented with its color 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 counter

- 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 the Ganz CORTROL Console, by choosing *Reports* from the menu on the left.
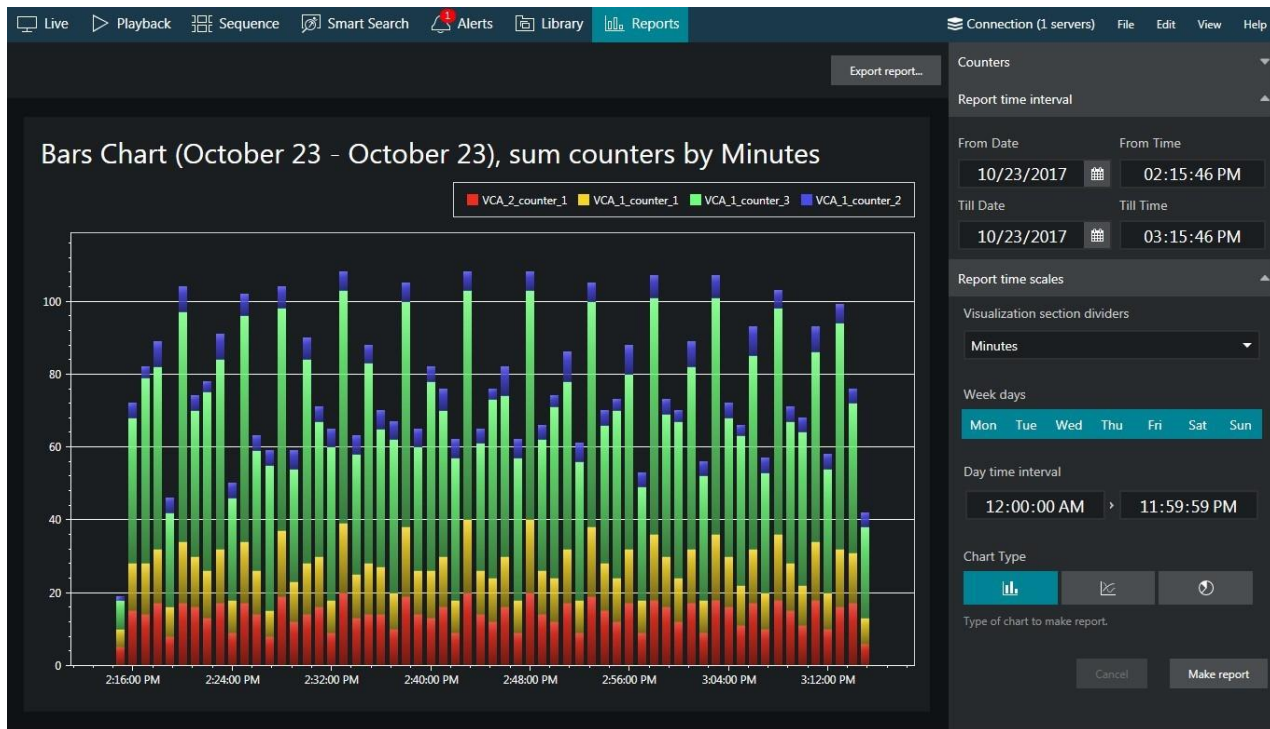

Report status

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.

9. Manual Reports

Ganz CORTROL Client Application provides an opportunity to make **reports** based on the CVA counters, which data has been recorded with the video stream(s). Reports can be built manually, for any period, provided that some data from the counters is available. Automatic reports can be configured comparably; see the next chapter for details.

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 intervals 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. Any report can be also exported as **PDF**.

Bar diagram report example

Create Reports

In your Ganz CORTROL Client Application, switch to the *Reports* tab and stay in the *Charts* section. Note that this functionality will be available when at least one of the connected servers has CVA operating and software counters configured for at least one of its channels, and the used user account has sufficient privileges to access the recorded counter metadata. Otherwise, there will be no counters in the list.

You do not need to select CVA channels manually: all the available counters are listed automatically in the right-hand panel, under *Counters*.

Specify the **reporting criteria** in the right-hand panel, which is divided into three sections:

- **Counters**:
    - o Select desired one or more **software counters** to be included in the report (none are selected by default)
    - o All the counters present in the system are listed, including camera-side VCA and server-side Open VCA

- R**eport time interval**:
    - o Choose the **start and end** date and time for the target report

- **Report filters**:
    - **Weekdays**: select **days of the week** that you want to be included in the report (e.g., ignore weekends) (all days are selected by default, marked blue)
    - **Day time interval**: choose the target **audit interval** to be analyzed for each of the selected days
- R**eport visualization** settings:
    - Select the **diagram type** by toggling the icons: from left to right, these are bar, line, and pie type; the currently selected mode is marked blue
    - **Aggregation**: specify the **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 a pie diagram)
    - The **counter value** setting lets you choose, what value is 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
- Choose whether you want each counter to be represented **separately** or all counters to be **added up**

💡 **Report interval** defines the whole period to be reflected in the report. **Report filters** specify which exact time should be analyzed for each of the selected days of the time window specified as the report time interval.

For example, if you wish to examine customer flow during working hours for the past two months, you need to set:

- Two months period in the *Report interval* section only
- Mark working days in the *Report filters* section
- Unmark the weekend as all the days are preselected by default
- Set the time interval under the *Time filter* in the *Report filters* section to your target working hours

💡 Choose the **diagram type** by toggling the icons at the bottom of the right-hand panel in the *Report visualization* section: from left to right, these are bar, line, and pie type. The currently selected mode is marked blue.

When ready, hit the *Make Report* button at the bottom of the right-hand panel to display the report diagram based on your selected criteria. Note that the chart will be built step-by-step, and you will see how the newer data appears on it: if the requested report interval is large, the total time required for the chart construction may increase to several minutes. You will see the *Loading…* status in the right-hand panel indicating that reporting is in progress. You can modify the report criteria and restart the reporting process without having to wait until the current diagram is finished.

Interpret Reports

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 values 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.
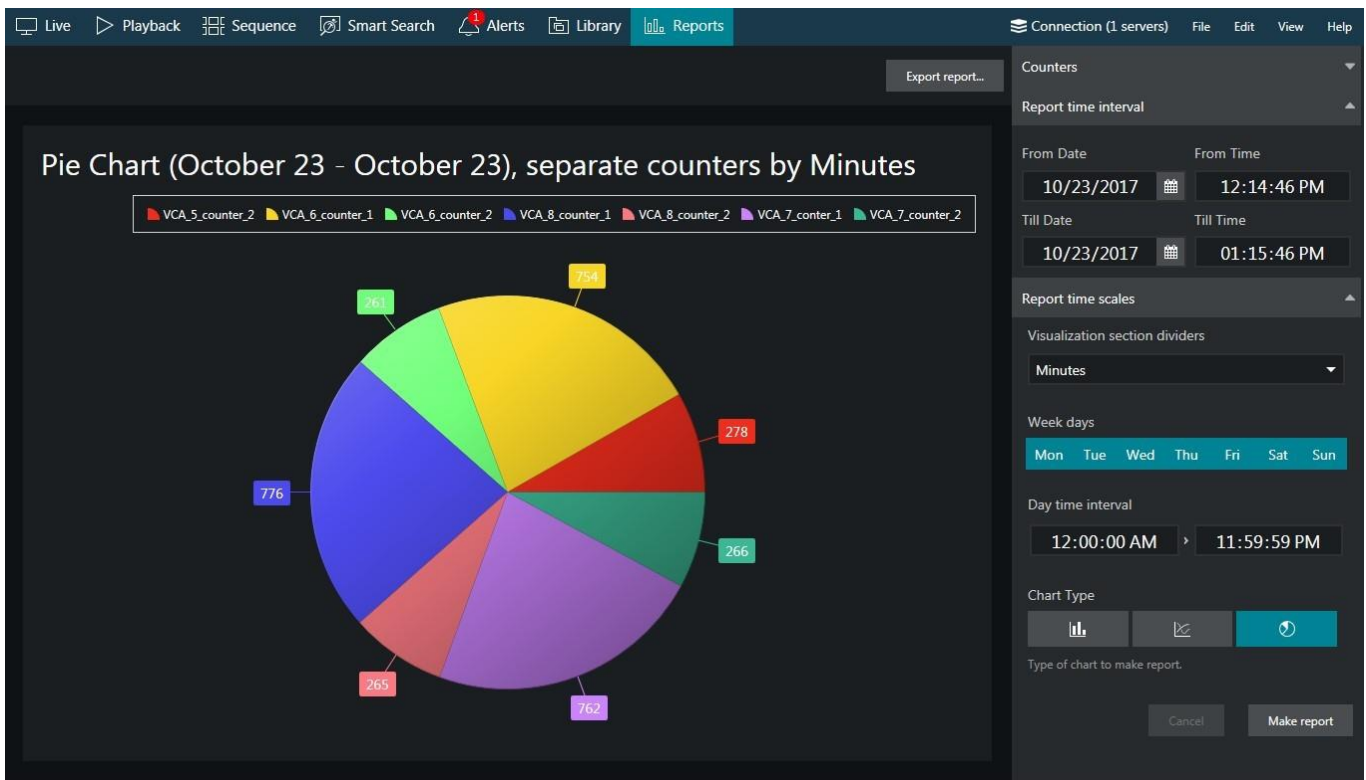
Pie diagram report example

Each chart also contains a **legend** that provides information about the colors used in the diagram:

- If you have selected to analyze every counter separately, each counter will be represented with its color 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 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

Any report can be also **saved in PDF or CSV format**. To do so, click the *Export report* button above the diagram and specify the file name, type, and path for the report to be exported to in the dialog box that appears; then, click the *Export report* button in the dialog box to create the file.

10. PPE Detector

Introduction

Personal Protective Equipment (PPE) Detector is a part of the Ganz CORTROL video analytics (CVA) suite and is a real-time video analytics engine that utilizes **neural networks** to detect cases when **personal protective equipment** is not used. Personal protective equipment (PPE) is protective **helmets** (hard hats) and **vests** designed to protect the wearer's body. The PPE Detector engine is seamlessly built into the Ganz CORTROL software and a part of the unified Ganz CORTROL licensing system.

Ganz CORTROL CVA with PPE Detector can:

- Detect and classify objects of related types in the live video stream
- Trigger events based on these objects' [dis]appearance and convert them into automated action rules
- Count objects over time or momentarily using lines and zones
- Generate alarms and reports using E&A and other Ganz CORTROL functionality

Supported object classes for detection:

- Person with PPE
- Person without PPE (no vest and no helmet)
- Person with partial PPE (vest or helmet missing)
- PPE itself (yellow-green/orange vest, any color head cover)

This user guide will explain how to enable and set up PPE Detector for pre-configured video channels on Ganz CORTROL servers.

PPE Detector is a part of Ganz CORTROL CVA, which is an integral part of Ganz CORTROL core, therefore:

- No additional installation is needed but an additional per-channel license is required
- Regular CVA channel license does not work so ask Ganz CORTROL sales explicitly for PPE Detector channels
- CVA cannot operate on its own without Ganz CORTROL channels
- Triggered rules can be used in the Event & Action scenarios to create complex and flexible automated behavior patterns
- CCVA metadata overlay is displayed in Ganz CORTROL Client for the user to see the tracked objects both in live view and playback
- CVA metadata can be used for forensic search and reports in Ganz CORTROL Client

As PPE Detector is one of the Ganz CORTROL CVA engines, it is impossible to combine PPE detection CVA with other CVA engines (e.g., generic object detection). Like any server-side CVA, PPE Detector can be freely combined with any kind of camera-side (edge) analytics.

PPE Detector Usage

A typical application for the PPE Detector is **personnel monitoring** to ensure compliance with safety rules in areas like **construction, manufacturing, or mining**, where the safety rules prescribe the personnel to always use personal protection equipment.

The analytics can effectively detect, alarm, and report cases when persons without PPE are entering workshops, construction/manufacturing sites, or other hazardous areas under surveillance. For example, Ganz CORTROL can trigger alarms in places of elevated risk (cranes or other operating machinery) and poor visibility (smoke, steam, etc.) or make audio announcements whenever a person without PPE is detected.

As a result, work discipline and safety are significantly increased. PPE Detector helps comply with the work legislation and provides an evidence base in case of any incidents (e.g., to prove that an injury was caused by the disciplinary violation and not by unsafe working conditions). Also, you can use it for access control by automatically granting access to restricted areas only in case PPE is present.

Getting Started

PPE Detector can be enabled and configured on any Ganz CORTROL server that either has a Ganz CORTROL S license or is a part of the Ganz CORTROL Global system. The server license must include the required number of purchased PPE Detector channels; kindly contact cortrol@cbcamerica.com for a license upgrade.

- Ensure that you have installed your Ganz CORTROL server, version 1.21.x or newer, 64-bit version
- Activate your Ganz CORTROL server with a license key that allows PPE Detector usage
- By default, no channels are included, additional channels can be purchased by contacting us at Product_quote_request
- Add video sources to be analyzed (please check with the main Ganz CORTROL manual for details)
- Enable and configure PPE Detector via VA configuration in Ganz CORTROL Console for the desired channels
- Configure E&A rules, if necessary
- Enjoy.

💡 PPE Detector is enabled and configured via Ganz CORTROL Console using the main CVA interface. After you set it up, it is possible to add Event & Action scenarios based on the CVA detections in Ganz CORTROL Console and see the CVA metadata overlaying the video in Ganz CORTROL Client.

Factors That Affect Detection

The engine is optimized to work with color images in a well-lit environment. Night/IR/darker images lead to lower quality of detection.

Things to improve:

- Increase camera/image quality
- Avoid glares and backlight
- Low-contrast images or scenes
- Camera position
- Angle
- Get rid of obstructions between cameras and people

The engine works well with close-up and full-height views, both front and back (remember to adjust object size) such positioning can be used for access control at the entrance/exit/checkpoint. Up to 45-degree downright views can be used as well for detecting people standing, walking, or sitting in the area.

The camera should be fixed; it is possible to use PTZ cameras that stay in the same position (preset) for some time. Constantly moving PTZ cameras/bodycams have lower accuracy.

When configuring detection, always start from default values, and then slowly change the settings one by one if you are not happy with the results. If changing a certain setting in a certain direction produces worse results, change it back to default and try the opposite direction (decrease vs increase). Do not change the advanced engine values (e.g., workers) if the detection is working OK.

All frames are down-sampled to 640x480 or similar resolution, preserving the aspect ratio, so using ultra-high-resolution streams is not recommended as there will be more distortion. Smaller frames are not upscaled.

System Requirements

- **Hardware**: Intel processor Coffee Lake or newer, four physical cores per channel
- **Operating system**: Microsoft Windows 10 or newer Processing on GPU is not supported.

Configuration

PPE Detector is enabled and configured via Ganz CORTROL Console for each channel, in the *Video analytics* tab.

1. Make sure your license supports PPE Detector by running the [license manager](#) (a regular CVA channel license is not suitable for PPE Detector)
2. Turn ON the *Enable server-side CVA* option
3. Choose *Personal Protective Equipment Detector* from the list of detectors and adjust its settings
4. Choose desired classes from the corresponding section
5. Configure specific zones and rules, if desired
6. Adjust other settings, if required

Main Settings

Most of the settings are the same as for generic CVA engines. You can pre-configure everything without turning ON the video analytics, and then enable CVA later.

These settings describe the scene to the CVA engine, and "teach" it about the scene specifics, so take a moment and think about these. Does the scene have perspective? What is the maximum expected size of the object? Settings and recommendations:

- *Object loss timeout*: after a measure of time before the object is forgotten by CVA once it disappears from the scene.
  - Increase this value if the object is likely to dwell (re-enter the scene).

- *Scene dynamics*: defines how fast the changes occur in the scene.
  - For large scenes (far away or zoomed out) the dynamics are lower.
  - Highly dynamic scenes are close-ups where objects swiftly cross the frame from one side to another.

- *Confidence threshold*: how certain the engine is about the object class.
  - Tweak this setting if you do not get any or enough detections, always start with a default value.
  - Too high confidence levels lead to no detections, and too low - to false positives.

- *Object similarity*: higher levels correspond to lower variability of the same object's appearance across frames
  - Lower levels mean the same object changes a lot while crossing the scene.
  - Set lower similarity for scenes with perspective and other scenes where objects tend to change their shape/appearance as they move (e.g., they cross the frame border, turn, persons change not just the position but also the pose, etc.)

A general recommendation is to leave the defaults and then start changing the settings one by one to improve detection. If you see that detection is not improving, stop changing the setting or even reset it to default.

Defaults: 500ms/6s/normal/70/85/50-50.

Pay attention to the *Detection interval*: this setting defines how frequently the frames are analyzed, and it dramatically affects CPU usage. 200ms means the recognition FPS is equal to 5FPS. Higher frequency = higher accuracy. If you want to run recognition on more channels (sacrificing accuracy), set it to 500ms (2FPS), which is also the default setting.
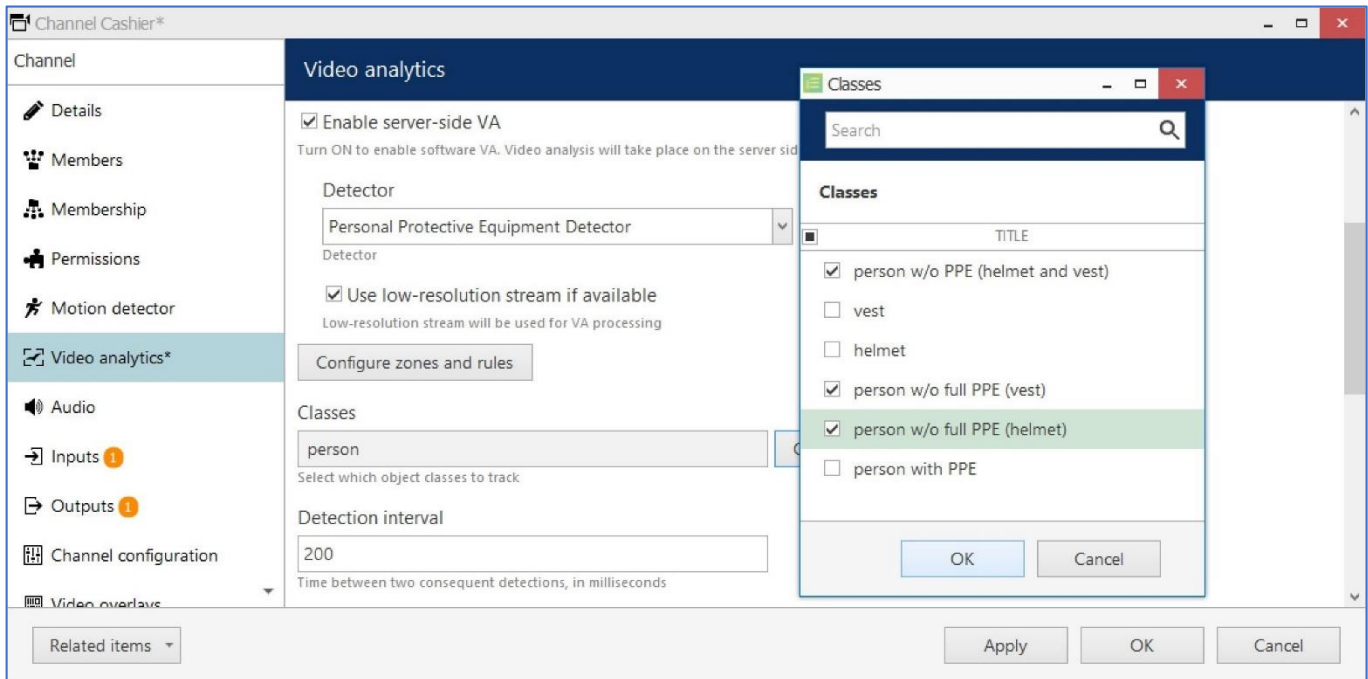
Enable PPE Detector in the CVA settings

Engine-Specific Settings (Advanced)
Some advanced engine-specific options are available. You can use those to finetune the engine (mostly when the adjustments are advised by Ganz support). Changing these settings may lead to lower detection quality, so if you feel the accuracy is worse after changing them, change the settings back to **defaults**. These settings are per-channel, meaning that they can be changed **independently for every video channel**. Again, changing advanced settings is NOT obligatory, do not change them unless you know what you are doing.
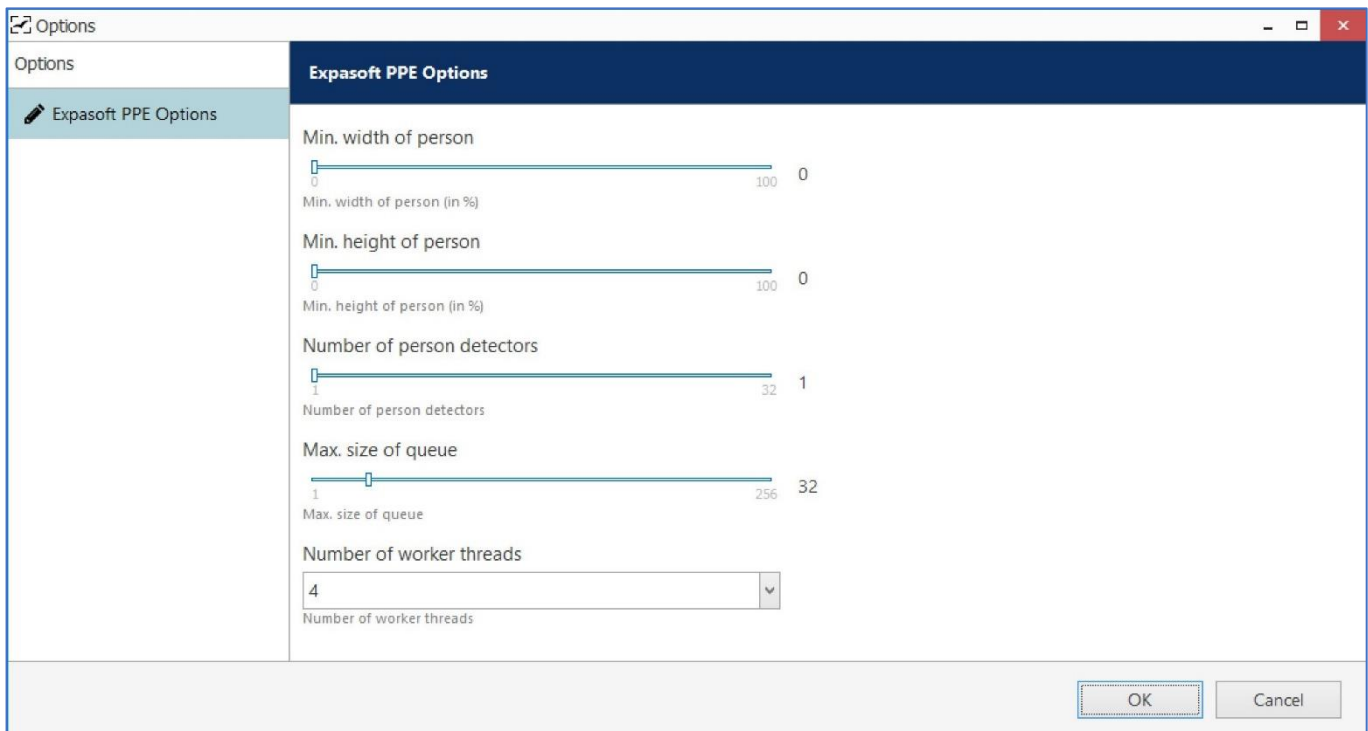
Default PPE Detector engine settings

Available settings:

- **Min width/height of a person**: the minimum and maximum expected size of persons, % of image width/height - increase these settings to filter out tiny objects in a distance
- **Person detectors + worker threads**:
    o For **faster** results, set worker threads to one and increase the number of person detectors (but do not exceed the number of your CPU threads)
    o To manage more **frames**, set person detectors to one and increase the number of workers

- **Queue size** optimal value is equal to the number of workers, otherwise, the frames will be analyzed slightly longer, but you might want to increase the queue size to ensure that more frames are analyzed

Zones, Rules, and Events

Without zone rules, the metadata will appear on top of the video, but no events will be triggered. To trigger events, create at least one **zone** and then create the desired **rules** for that zone. For each rule, you can choose some or all the object classes, which are enabled for detection (but you cannot choose the classes that are not enabled in the detector settings on the level above).
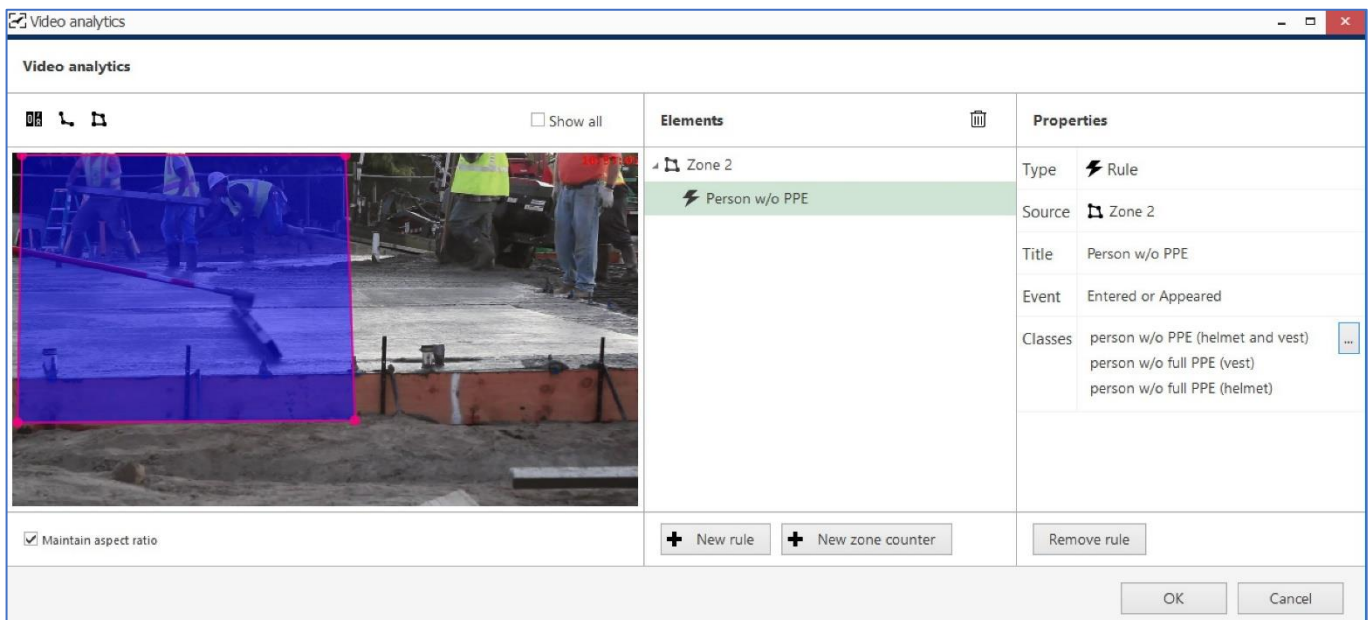

Zone configuration and zone rules in VA configuration

The created **rules will appear as events** in the Event & Action Configurator so you can use them straight away for building automated scenarios, for example, to trigger alarms, create bookmarks, or send out emails with attached snapshots.
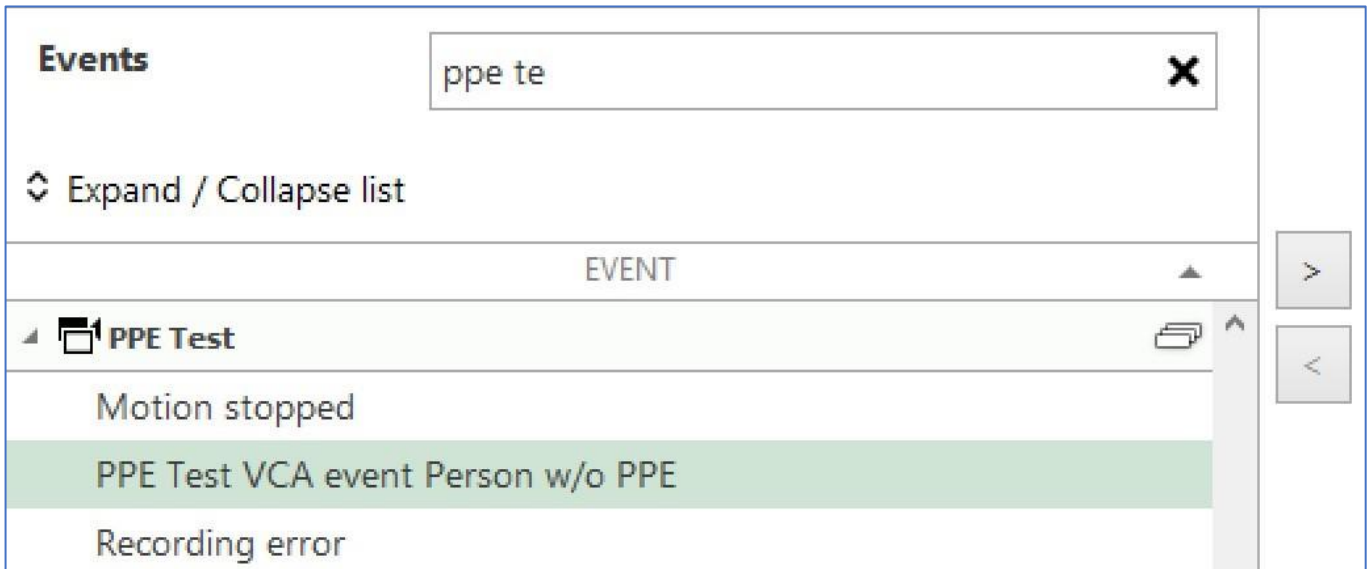
The zone event rule automatically appears in E&A under the related channel

You can modify these events later via E&A Configurator because these are not built-in events but rather automatically created events of the *VCA event* type.
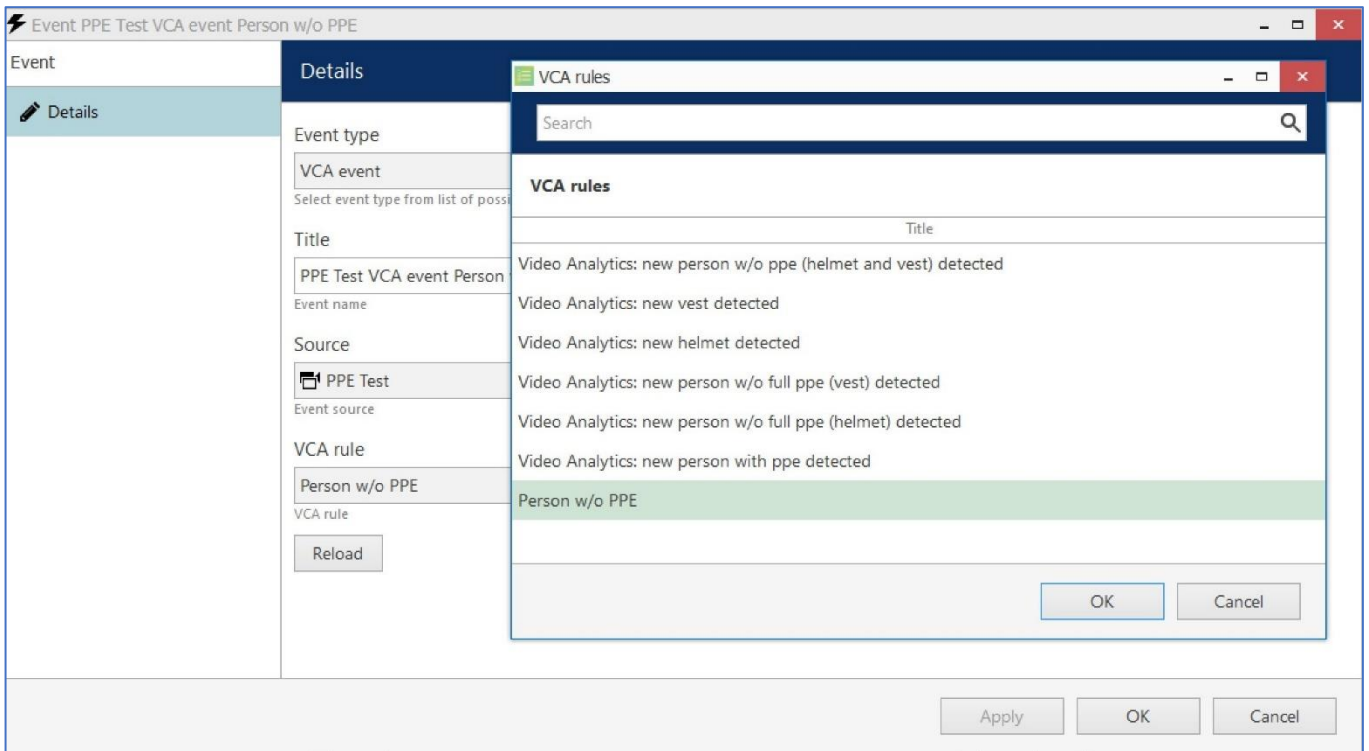

CVA event settings

Feel free to create any E&A rules based on PPE Detector events.
Once PPE Detector (actually, any CVA) is enabled, even without any zones/rules, the colorful **bounding boxes** will appear on top of the video in the Ganz CORTROL Client Application, designating detected objects. These appear in both **live** view and video **archive playback**, and you can turn them OFF/ON in the application settings.

An example of PPE detection vs a person without PPE

In the *Playback* mode, you can also enable the VCA panel and search for specific events/objects/classes during specific periods.
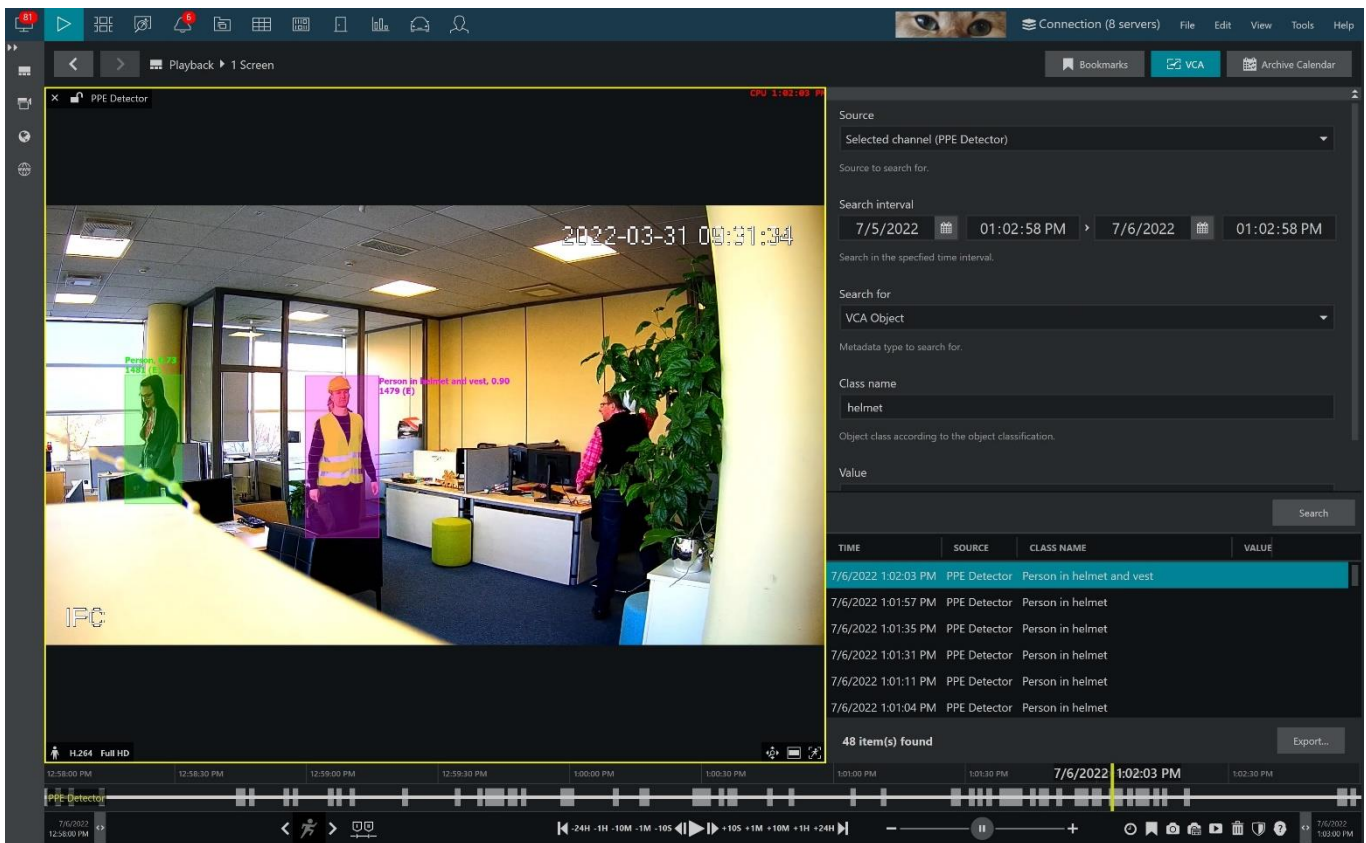
A CVA search example displaying a detected person with a helmet

Example

Let us consider the following example scenario: the system should **trigger an alarm when a person without full PPE is detected**.

The plan is:

1. Enable PPE Detector and enable required object classes
2. Create a zone
3. Create a zoning rule
4. In E&A, use the zone event to trigger the alarm

First, in the detector settings, enable the relevant object classes. There are two: a person w/o full PPE (vest) and a person w/o full PPE (helmet).

Next, draw a zone and create a new rule for it by clicking the *+ New rule* button. On the right side of the window, choose both object classes and set the event type to *Entered/Appeared*. Make sure to name your event something meaningful so that it is easier to locate it in E&A afterward. Click *OK/Apply* to save.
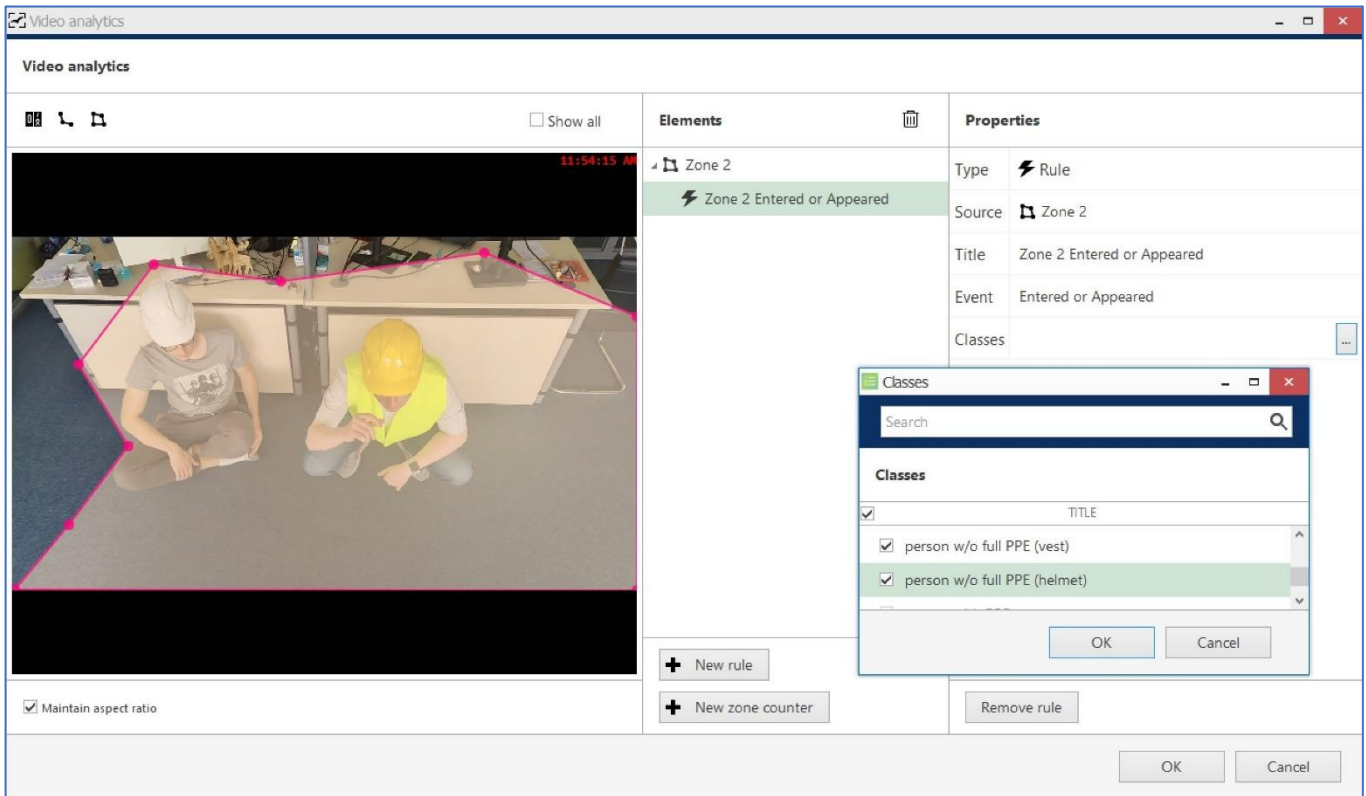
Create a zone and attach an object appearance rule to it

This rule will be automatically copied to Event & Action Configurator, so when you now go to the E&A, you will have the event listed under the corresponding channel events. The event will use the rule name (the one you used in the CVA configuration) and you can change the event name anytime; note that changing the rule name later will NOT affect the event name anymore as the rule name is used the moment when the rule is copied to E&A (and is not updated anymore). The event type is *VCA event,* and it is editable.
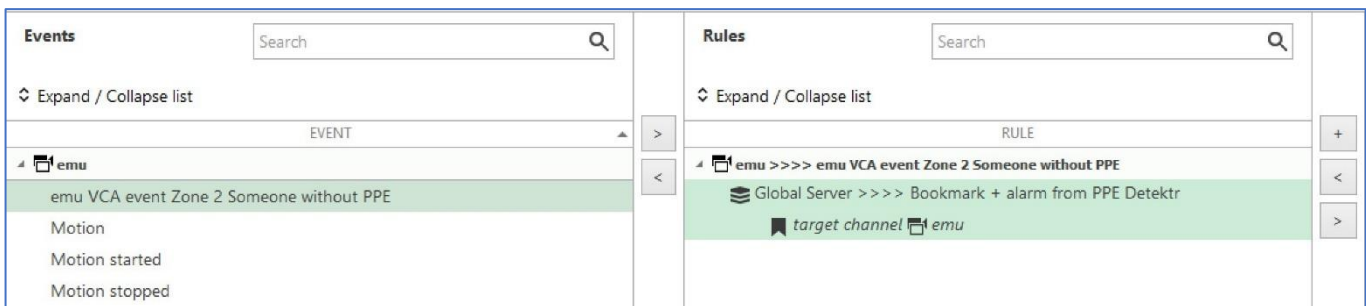

An automatically created CVA rule event used in an E&A rule

In the E&A Configurator, choose the event from the list on the left and move it to the central column either by double-clicking or by clicking the > button. Use any of the alarm actions you like. In this example, a *Bookmark* action is used with the following parameters:

- *Bookmark title*: Someone is violating PPE rules
- *Bookmark body (description)*: Camera {EVENT_SOURCE_TITLE} has detected someone without vest or helmet
- Severity: High
- *Create alarm* option enabled (this will ensure that the bookmark will pop up in the alarms panel in Ganz CORTROL Client)

And here is the result: each time CVA detects a person who is missing a vest or a helmet, a bookmark will be added to the archive and an alarm will pop up in the alarm panel. (Please see the Ganz CORTROL Client user guide on how to enable the alarm panel).
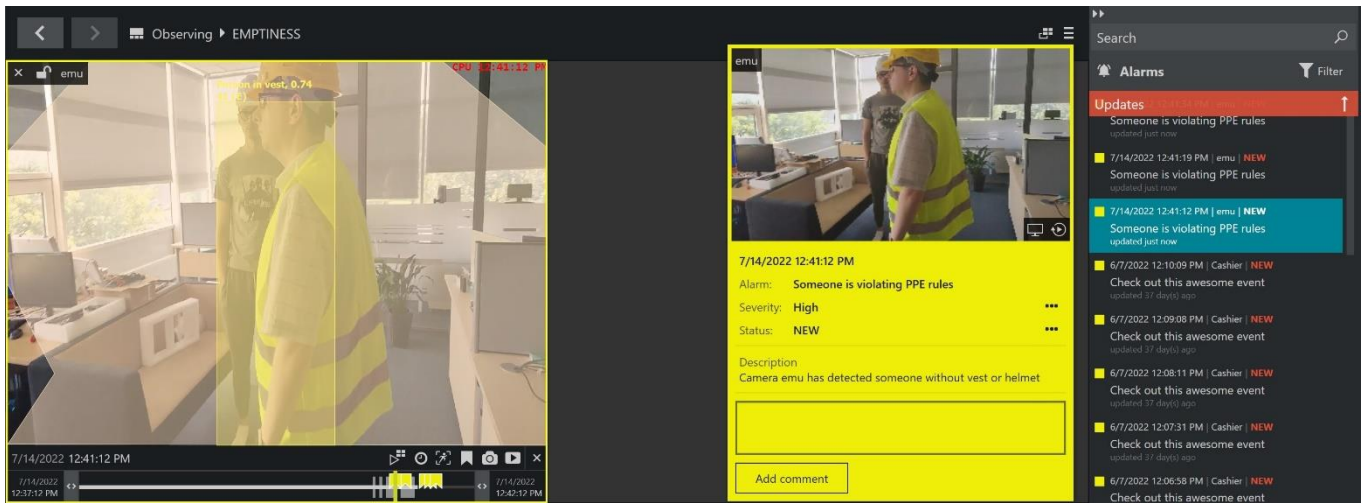
Bookmarks in alarm panel based on PPE Detector events

Troubleshooting

Q. I get the *Video analytic channel count exceeded* error when I enable PPE Detector and save the settings.

A. Make sure your Ganz CORTROL license has sufficient PPE Detector channels. You can run the license manager locally on the server. If other channels are using the license, disable CVA on those channels or disable the channels via Ganz CORTROL Console.

Q. How to check on which/how many channels CVA/PPE Detector is running?

A. In Ganz CORTROL Console under *Configuration > Channels* enable the *Video Analytics* column, then scroll horizontally to that column.

Video analytics setting status in the Channels section

Q. I have enabled CVA/PPE Detector, but no bounding boxes are appearing in the image in Ganz CORTROL Client.

A. Check application settings to see if you have accidentally/previously disabled visualization (main menu *Edit > Settings > Viewport overlays*). If zones and counters appear but there are no bounding boxes, it means no objects are detected: verify your analytics settings. The detection interval or detection confidence is too low, or the selected classes are not present in the scene.