

Eagle Eye Application Note - AN003

Real-time Video Monitoring and Insight Using Eagle Eye Cloud VMS Analytics

2024-09-11 Revision 2.0

Target Audience

This Application Note is intended for administrators of Eagle Eye Cloud VMS. Anyone who wants to set up or configure Analytics will benefit from this app note. No prior background knowledge is needed.

Introduction

Eagle Eye Cloud VMS Analytics can be used for both real-time monitoring and to mine insights from historic video. Real-time monitoring detects objects, people and movements as they occur in the environment. Eagle Eye Networks offers five different Analytics: People Counting, Line Crossing, Intrusion Detection, Loitering, and Camera Tampering.

Analytics are available for any camera connected to a Bridge/CMVR (except analog cameras on hybrid Bridges/CMVR). All five analytics can be activated at the same time. It's important to note that the stream used for analytics is MJPEG (secondary stream) and the camera should support a frame rate of 12fps for best results.

Analytics are available to all Editions of the Eagle Eye Cloud VMS (Standard, Professional, Enterprise). Read the application note, [AN043 Eagle Eye Cloud VMS Editions Explained in Detail](#) for more information.

Background

Each analytic serves its own purpose and is described below:

- **Counting:** Used to count objects crossing a line in either direction. For the highest accuracy counting people, use a dedicated camera mounted with a top-down view with an angle less than 10° from the floor in which people remain the same size as they travel through the image. For best results, the camera should be ceiling mounted at a height of 10-12 feet. For the object to be counted, at least 50% of it must cross the line and you can only configure one line per camera.

- **Line Crossing:** When an object crosses a specified line in the selected direction, an alert can be generated. Just like with 'Counting', 50% of the object must cross the line and only one line can be configured per camera.
- **Intrusion Detection:** If an object enters a defined forbidden area, an alert can be generated. There's no limitation to how many areas can be defined in the camera view. The camera's angle should be set such that objects passing through the frame are a consistent size. For best results, the camera should have a view perpendicular to the defined forbidden area.
- **Loitering:** If an object remains in a defined region longer than a specified time (between 1 second and 2 minutes), an alert can be generated. Just like with 'Intrusion Detection', there are no limits on the number of areas that can be defined per camera.
- **Tampering:** Tampering detection is used to generate an alert when someone is trying to block the camera's view or the image is greatly altered.

Functionality

Analytics have to be configured on each camera and the menu can be found within the camera settings window as shown below:

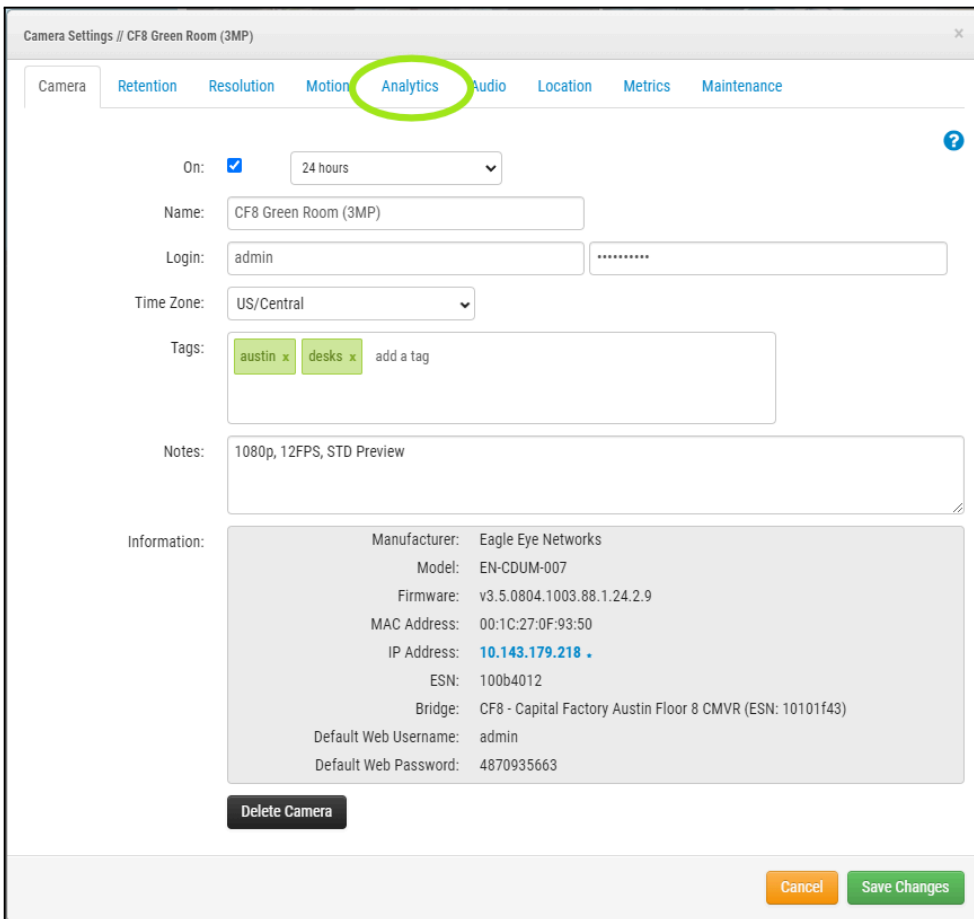


Figure 1: Analytics tab location within the camera settings window

From within this menu, activate any of the five analytics that the Eagle Eye Cloud VMS provides. If required, activate all analytics for each camera.

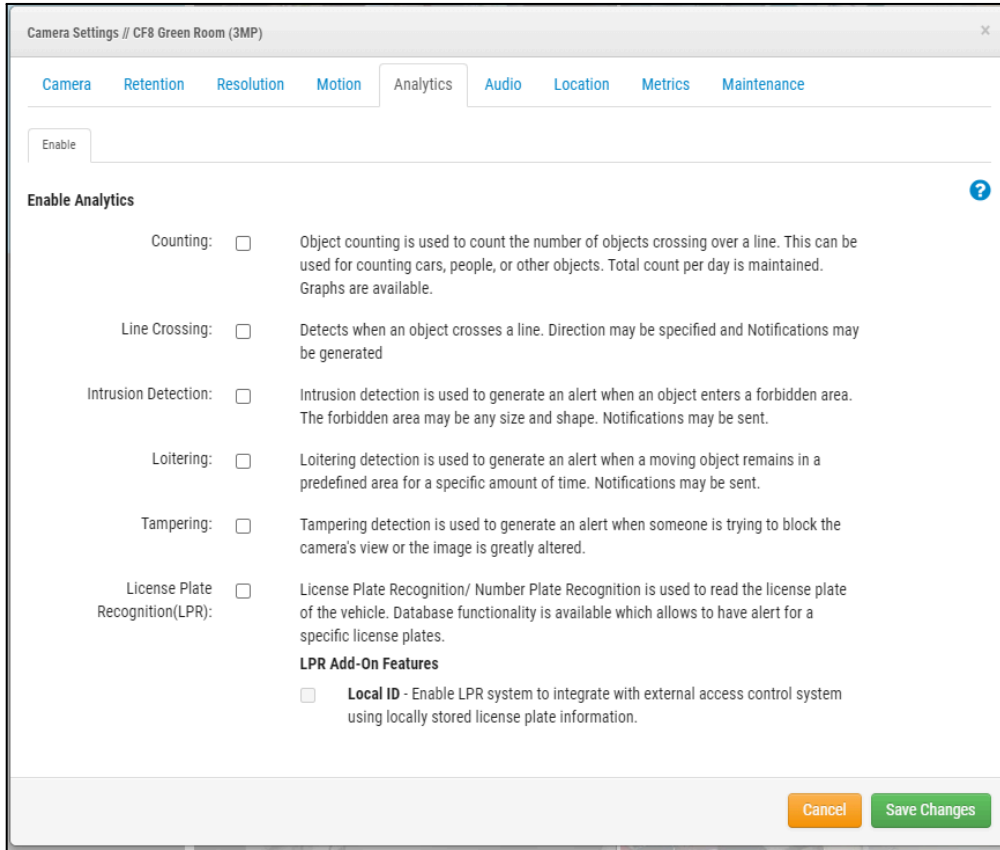


Figure 2: Analytics tab within camera settings

When activating Analytics, it's important to select and check the following:

Resolution menu -> Preview Video -> Quality -> Set to Analytics (normally, this is done automatically).

- Ensure Preview Video Quality is set to Analytics under the Resolution tab.
- By clicking on one analytic, it becomes enabled and a new sub-tab appears for each analytic enabled under the Analytics tab.

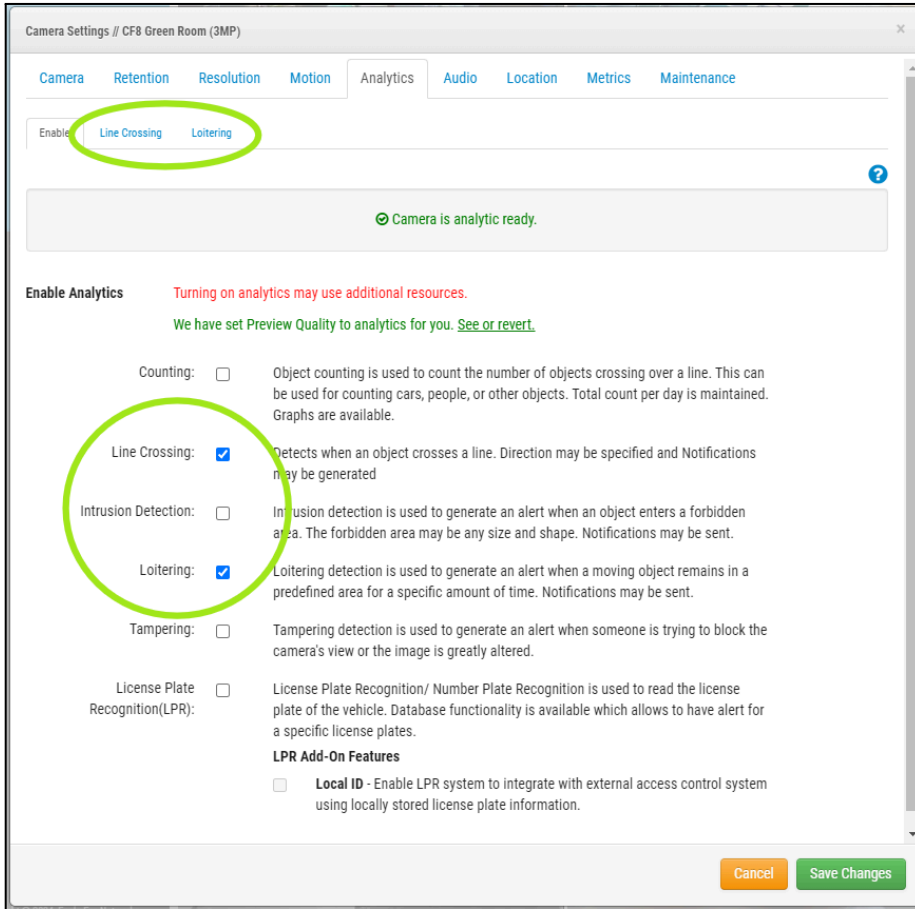


Figure 3: Analytics tab within camera settings

Separate tabs allow the user to configure each Analytic. Each analytic must be enabled prior to selecting “Save Changes”; otherwise the analytic will not be applied. For all analytics except “Tampering,” it’s important to note that the configuration of the “Object Detection Settings” will be applied for the camera view, meaning that the minimum and maximum size for the object detection will be the same for **ALL** analytics being utilized. Select the blue question mark in the top right corner for more information on Object Detection Settings.

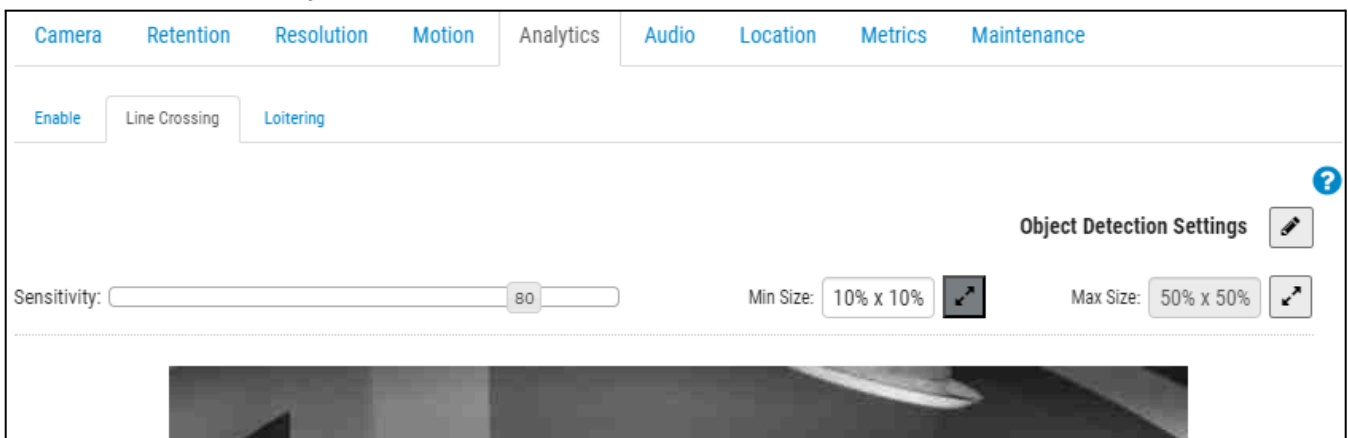


Figure 4: Object detection settings will apply for the camera view

1. Counting

Draw a line on the camera view and choose the direction that the object will enter. Only draw one line per camera. A top-down view with an angle less than 10° from the floor for the camera is also necessary to ensure the best results, as shown in the picture below.

Note: For best results, place the line in the center of the field of view and allow as much space as possible to either side. A proper configuration should allow the analytic to identify an object fully in view and track its motion clearly over the line. Avoid placing analytic regions or lines near the edge of view.

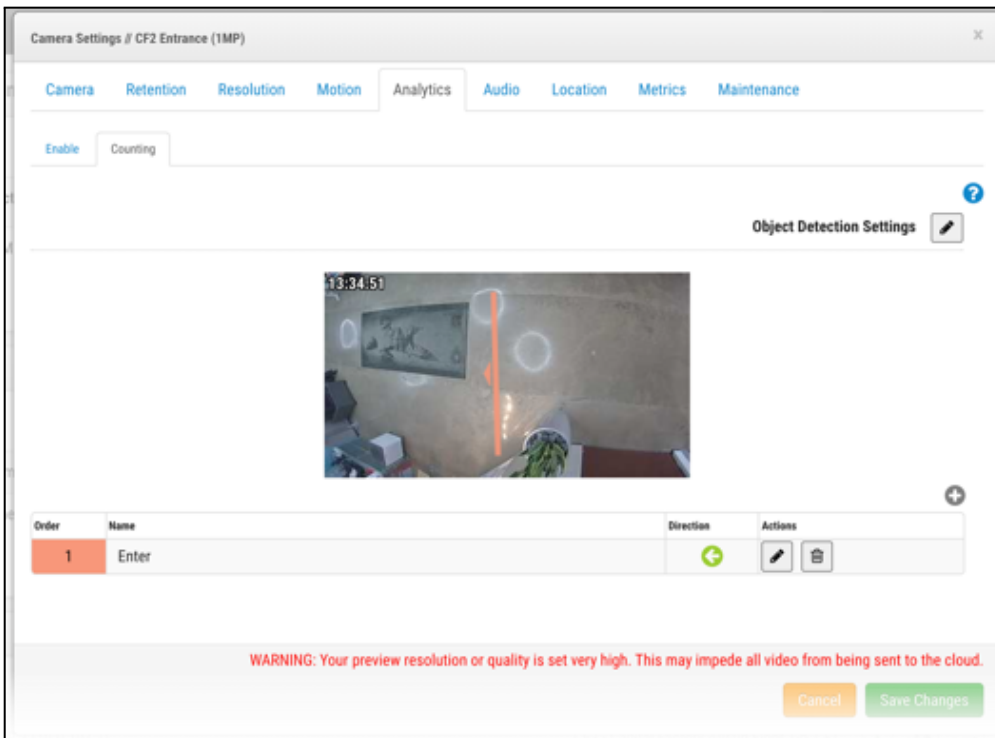


Figure 5: Example of line placed in the center of the field with plenty of space on either side

The system will automatically count +1 for the chosen direction, -1 for the opposite direction and will count and track in real time as can be seen in the image below:

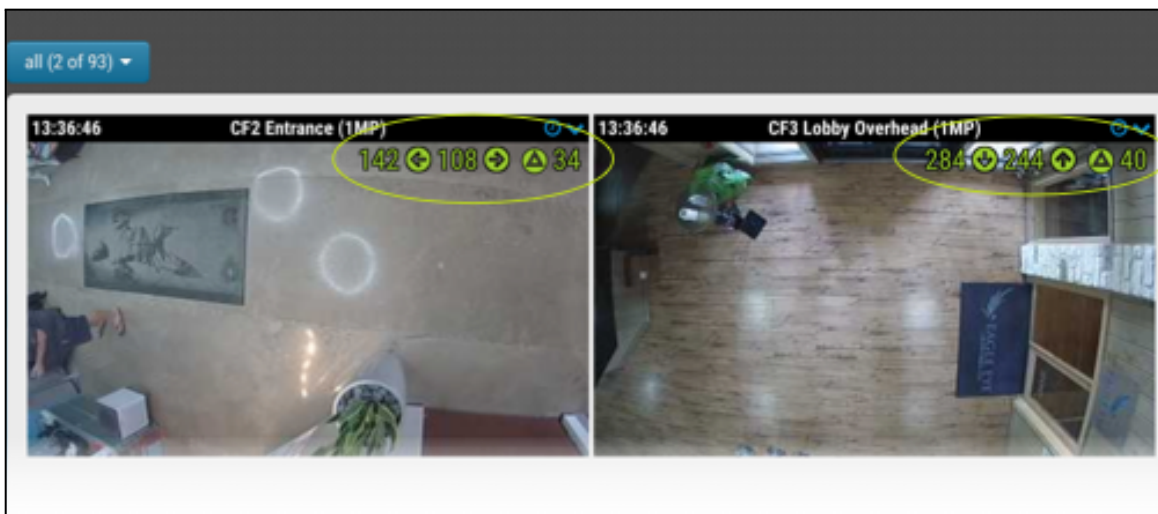


Figure 6: Real-time tracking/counting of objects crossing a line in both directions including a total

Full statistics are available from analytic graphing which can be found on the Dashboard next to the camera icons and as seen below:

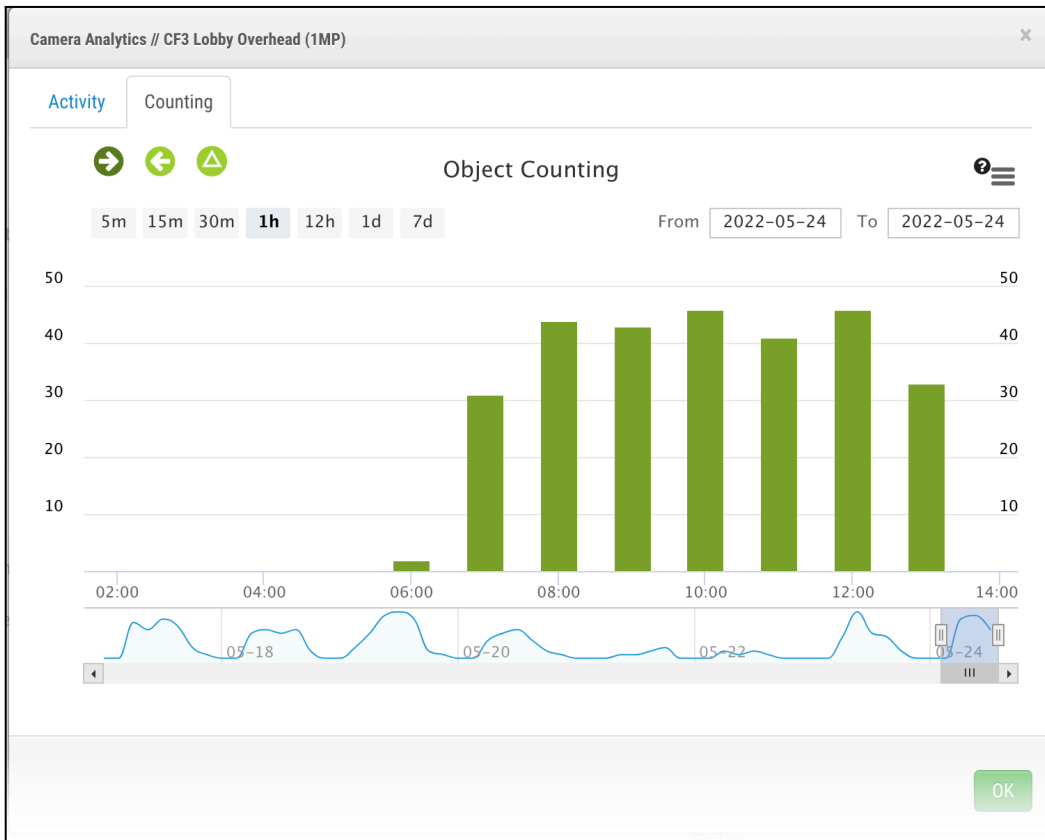


Figure 7: Analytic statistics and graphs can be found on the Dashboard next to the camera icon

The data can be exported in several formats (XLS, CSV, PDF, JPEG, etc.), are available via the Eagle Eye Networks API, and can be extracted to be analyzed at a later date or injected into 3rd party systems to be combined with additional data for better management of business KPIs, for example.

2. Line Crossing

Configuration is similar to the “Counting” analytic. Draw a line in the view to detect objects crossing it. Remember, only one line per camera and 50% of the object must cross it to be detected. The camera should be at no more than a 45-degree angle from the floor.

Advice: It’s best to draw the line in the middle of the view so the system can detect the object easier. Avoid putting the line near the edge of the camera view. Fisheye cameras should be avoided.

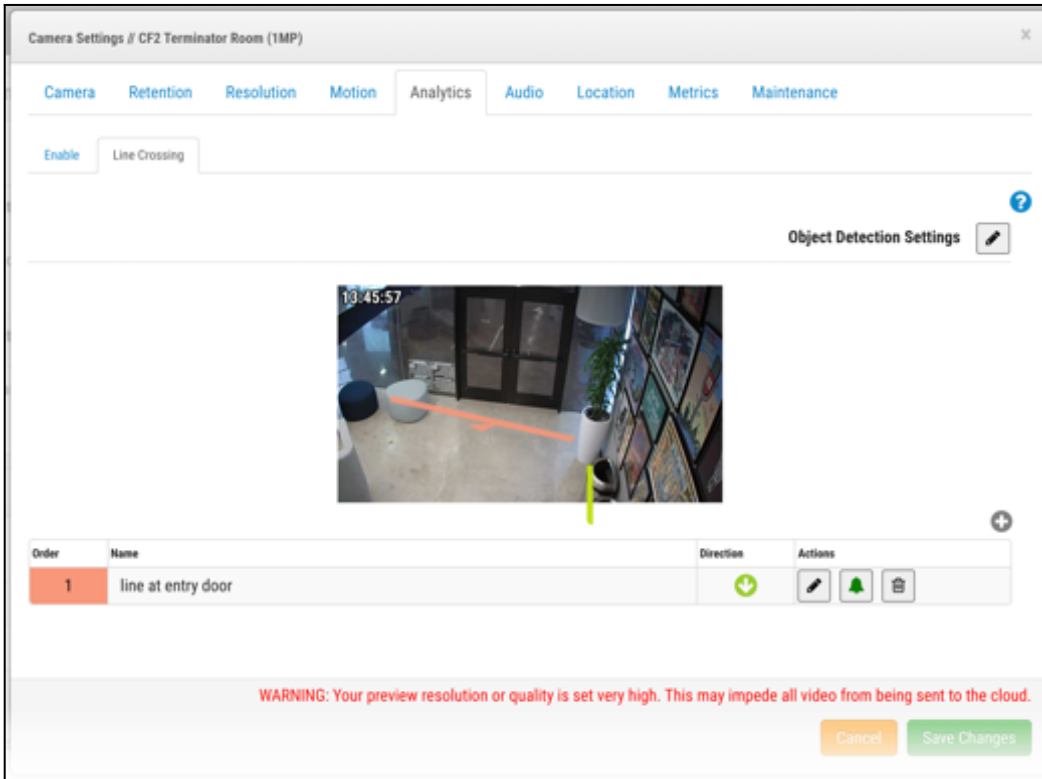


Figure 8: Example setup of the Line Crossing Analytic with the line in the center of the camera view

3. Intrusion Detection

Configuration is done by creating areas in the camera view. There's no limit to how many areas can be created but careful consideration should be used when implementing. The camera's angle should be set such that objects passing through the frame are a consistent size. For best results, the defined forbidden area should be perpendicular to the camera's angle (e.g., a camera with a bird's eye view should have the forbidden area defined on the ground).

Advice: Try to avoid creating areas at the edge of the camera view and if possible, try extending the area so the object can be caught before going out of the area and view. The Object Detection settings should be configured for the smallest and largest object intruding into the defined forbidden area.

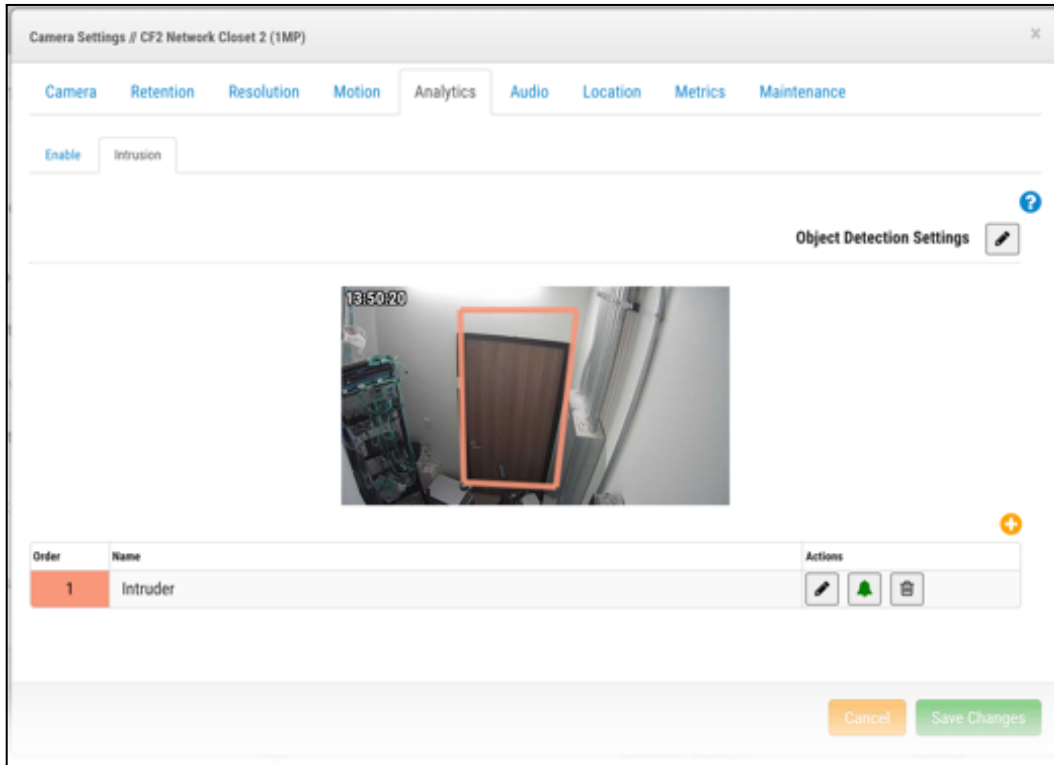


Figure 9: Example setup of the Intrusion Detection Analytic that avoids creating areas at the edge of the camera view

In this configuration, any person that enters the room will trigger an alert. As can be seen from the example above, options for where to place the area within the camera view may be limited.

4. Loitering

Configuration is similar to “Intrusion Detection” where areas are drawn within the camera view. However, in this case, the alert will be triggered only when an object stays in an area longer than the time specified. As seen in the example below, there is a parameter called “Dwell time” and any dwell time can be chosen (from one second up to two minutes). For best results, the area defined should be perpendicular to the camera’s angle. Standard fixed-lens cameras should be used. Fisheye, PTZ, and motorized lens cameras should be avoided to prevent unexpected issues.

Advice: Try to create an area that covers a bit more than what is required to get the best results, especially with people as there tends to be a lot of movement.

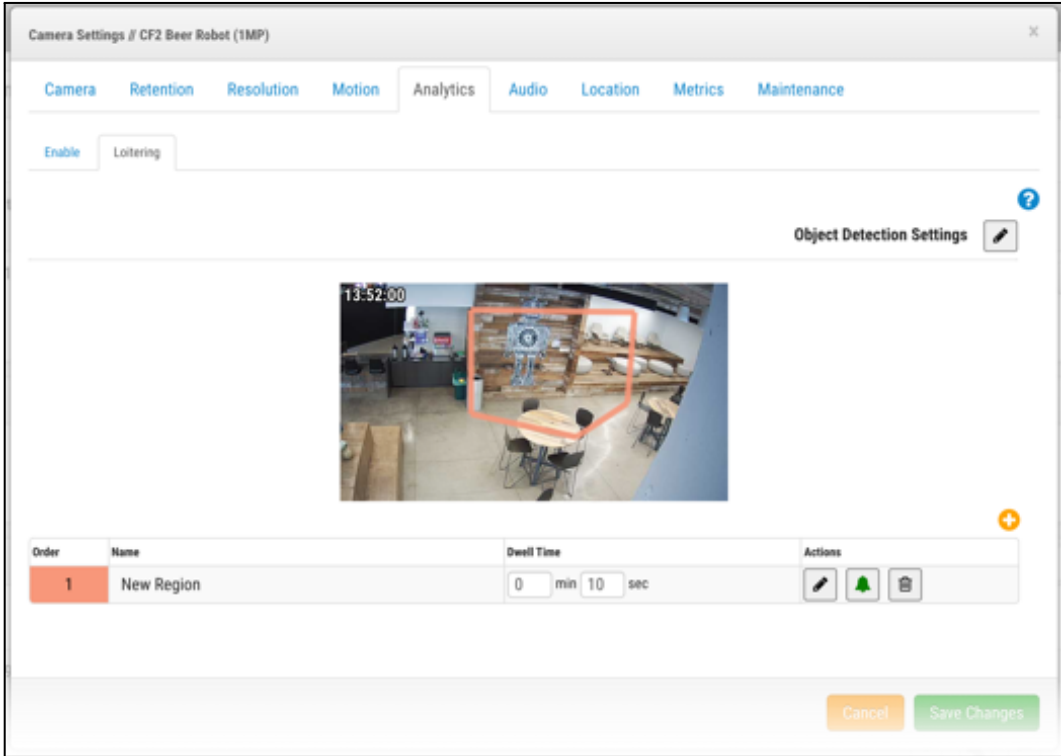


Figure 10: Example setup of the Loitering Analytic with a larger area than is required

5. Camera Tampering

For camera tampering analytics, sensitivity is the only parameter to change depending on how you want alerts to be sent when there are changes to the initial view.

Advice: Leave the parameter as is to perform initial testing and adjust as necessary depending on the alert level you require.

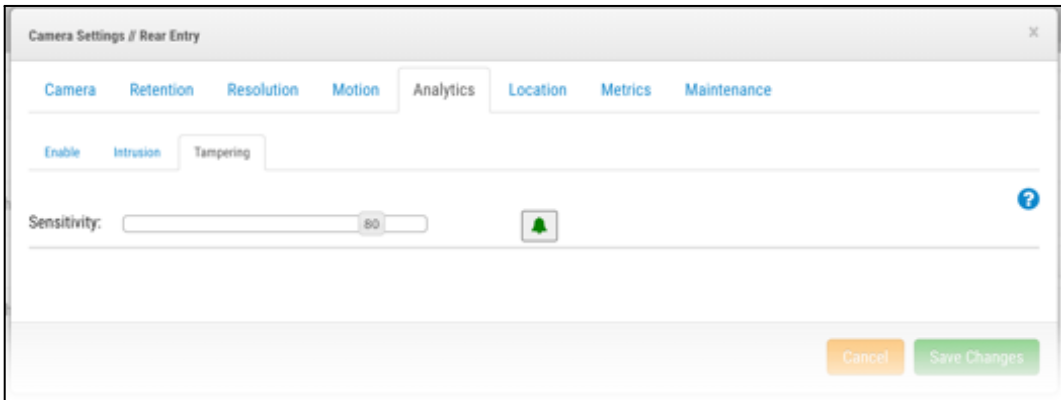


Figure 11: Example view of the sensitivity setting. Leave as is for initial testing and adjust as necessary

Usage

There are a variety of uses for Eagle Eye Networks Cloud VMS analytics. Knowing that existing IP cameras already installed at a customer site can be used, there is no need for a large up-front capital expenditure on cameras to optimize operations through the use of business analytics.

• Object Counting

- Counting people is a useful tool and provides great data for every customer looking to better track quantities of people at a location. Retail customers utilize People Counting to link entrances with sales using the Eagle Eye Cloud VMS API by injecting data into 3rd party solutions to better track KPIs.
- Covid-19 has forced businesses to control their occupancy levels. Having such data easily available can be crucial to compliance and regulatory operations.
- Transit Flow helps determine how people move around in a location. Analytics can be used to determine where to focus resources. For example, where security personnel or housekeeping should focus or even where housekeeping should focus.
- Receive notifications when the workforce arrives on-site and for departures as well.
- Customer flows are also important to understand in the Transportation sector.

• Line Crossing

- Line Crossing can be used to track vehicles as they enter and exit designated areas, or for situational awareness when monitoring crowds or temporarily restricted areas.
- Line Crossing tracks an object's movement over a specified line and results in an alert and event recording so that notifications always occur when a person or object crosses a line.
- More focused on security, Line Crossing analytics will help to detect in real-time when an object is crossing a restricted threshold and can provide alerts to this activity if desired.

• Intrusion Detection

Using Areas, Intrusion Detection allows for the monitoring of certain locations within a camera's view and for various purposes such as the following:

- Protecting an asset in a specific location
- Parking spaces
- Restricted area bypassing a door (this is an example of why an area can be more useful than a line)
- Detection of people near a fence or going over a fence
- Set up different levels of alerts with different areas. For example:
 - Configure an area at 15m - Warning event
 - Configure an area at 7m - Alert event

• Loitering

Just like with Intrusion Detection, we can use several areas in camera views to monitor different places. Loitering can be used to:

- Help detect suspicious behavior near an office. For example, people hanging out or standing in certain areas

- Identify cars that have been parked longer than expected in a particular space or location
- Identify people lingering in a certain area when they shouldn't be
- Help detect long wait lines/queues as they grow so that actions can be taken to improve the situation (cashier, banks, lobby, etc.)

- **Camera Tampering**

Camera Tampering allows for the monitoring of a camera view to help determine if it is blocked or if the view changes. This is important on specific, high-profile cameras when monitoring important assets or areas and for ensuring that the cameras have the correct view as installed.

For integrating Bosch camera analytics, read application note [AN075](#).