Blackjack Ai™

Servers Powered by DW Spectrum and DW Ai Server

DW Ai Server User Manual

REV: 05/25

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Description

This user guide will describe the features and options of a DW Ai Server for use with DW Spectrum. This software comes pre-installed on DW Blackjack Ai Servers.

Part 1: DW Ai Server Architecture

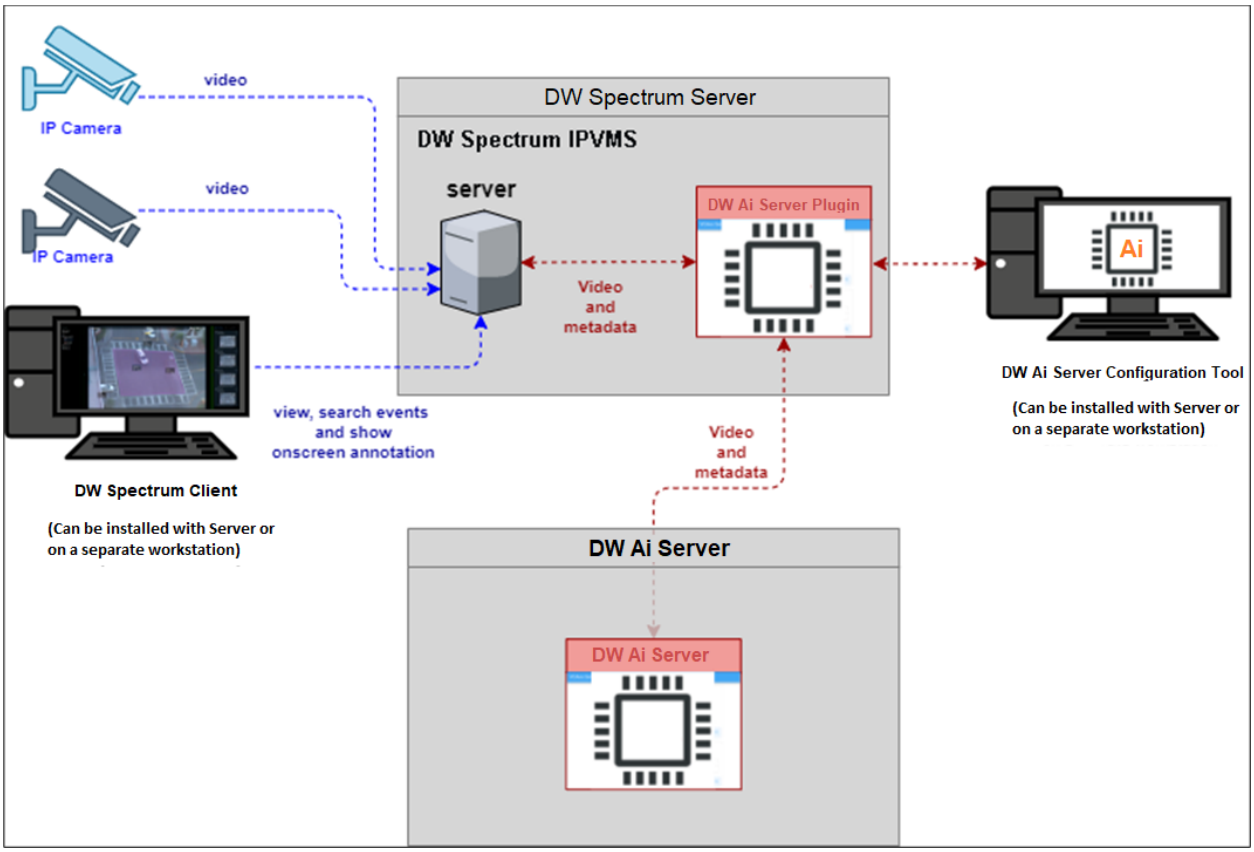
DW Ai Server Plugin

The DW Ai Server plugin consists of two components:

- **DW Ai Server Plugin:** The *DW Ai Server Plugin* is installed alongside DW Spectrum and provides a link to the DW Ai Server.
- **DW Ai Server:** The *DW Ai Server* component receives the encoded video from DW Spectrum, then decodes and processes the video through the analytics engines and rules. It then feeds the metadata back to the DW Ai Server Plugin to be integrated into the video streams of recording servers running DW Spectrum.
    - *DW Ai Server Configuration Tool* - this software component can be used to manage the connections and settings of the DW Ai Server program.

DW Ai Server Configuration Tool

The *DW Ai Server Configuration Tool* is a standalone application that provides a feature-rich experience when configuring a channel's video analytic features. This application provides a user interface through which system administrators can manage and configure the settings and connections of the DW Ai Server for integration with existing DW Spectrum systems.


video
IP Camera
video
IP Camera
DW Spectrum Server
DW Spectrum IPVMS
server
DW Ai Server Plugin
Video
and
metadata
Ai
DW Ai Server Configuration Tool
(Can be installed with Server or
on a separate workstation)
view, search events
and show
onscreen annotation
DW Spectrum Client
(Can be installed with Server or
on a separate workstation)
Video
and
metadata
DW Ai Server
DW Ai Server

Part 2: DW Ai Server Configuration Tool

While some camera settings can be configured through the DW Spectrum Client, the *DW Ai Server Configuration Tool* can provide a complete analytic user experience during the configuration process of the DW Ai Server.

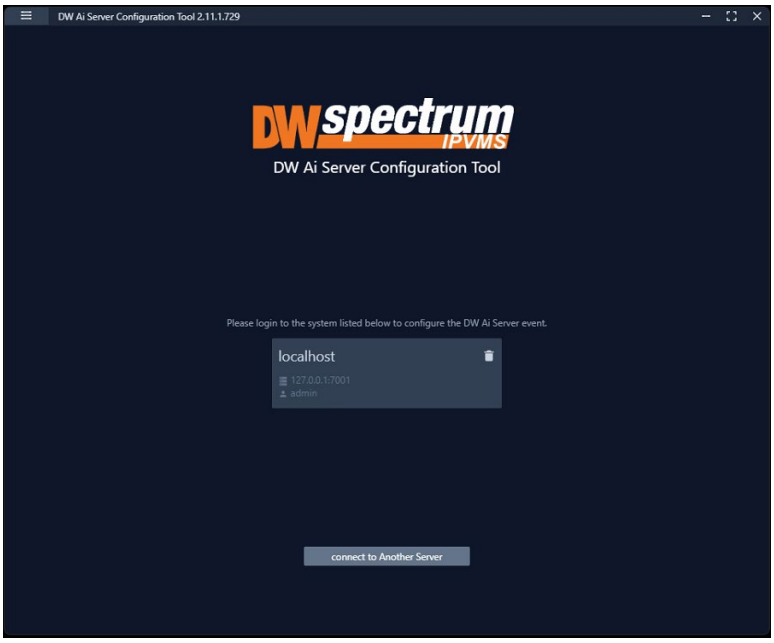
Logging in with the DW Ai Server Configuration Tool

To begin setting up the *DW Ai Server Configuration Tool*:

1) Launch the *DW Ai Server Configuration Tool*. There is an application shortcut on the desktop.

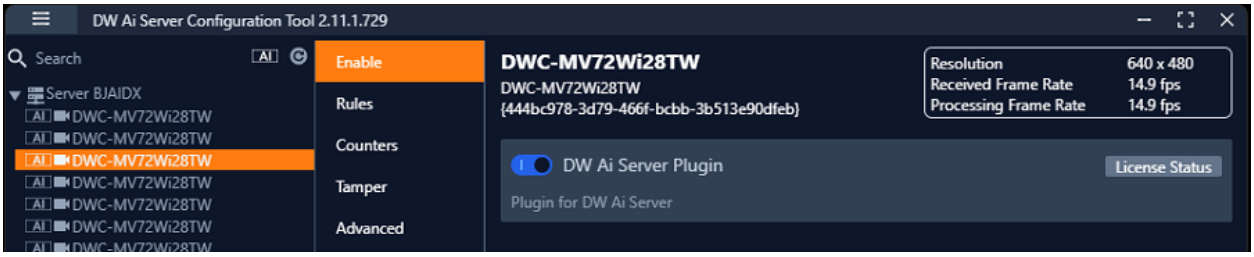
   Select the DW Ai Server you want to connect with and log in with the local 'admin' user profile.

**NOTE: If connecting the *DW Ai Server Configuration Tool* to the DW Spectrum Server is hindered by the message "Unauthorized. Please check the access credentials and try again," after changing the user password, enable the *Digest Authentication* setting of the user profile in the DW Spectrum Client.



2) Once logged in and connected to the DW Ai Server through the *DW Ai Server Configuration Tool*, a list will show all added cameras in the left-side panel.

   Enable the DW Ai Server Plugin toggle to view camera analytic rules and configuration.



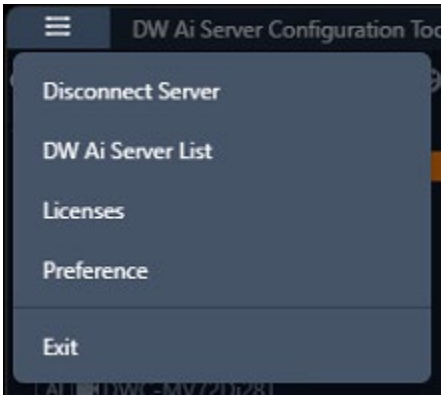
Once enabled, you will find the following features in the left-side panel:

- **Search:** This search box can filter the camera list based on the entered device name.
- **DW Ai (toggle):** The DW Ai button toggles the camera list between showing all cameras on the DW Spectrum System or just those with the plugin enabled. This toggle appears beside the search bar at the top of the camera list. While enabled, the toggle will appear in orange.
- **Refresh:** When clicked, this button refreshes the list of cameras from DW Spectrum.

- **Device List:** A list of DW MEGApix Ai and standard IP devices are listed in the Resource Tree organized by server. Only Ai devices will be listed while the DW Ai toggle is active.

Select the **Main Menu** to display the menu options:

- **Disconnect Server:** Disconnects the current session with your DW Spectrum Server.
- **DW Ai Server List:** Displays a list of the DW Ai Server(s) your DW Spectrum system configures to use.
- **Licenses:** Displays a list of the licenses available from the DW Ai Servers.
- **Preference:** Displays a list of the DW Ai Server Configuration Tool's advanced options.



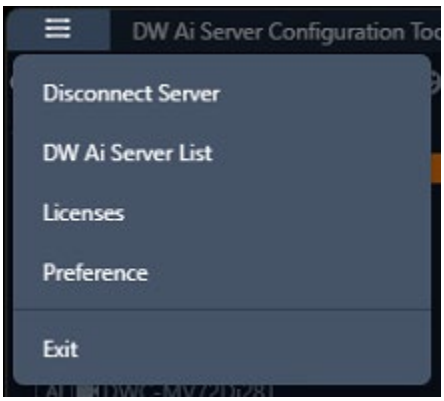
Part 3: DW Ai Server List

If multiple DW Ai Servers will be used, an additional DW Ai Server will need to be added.

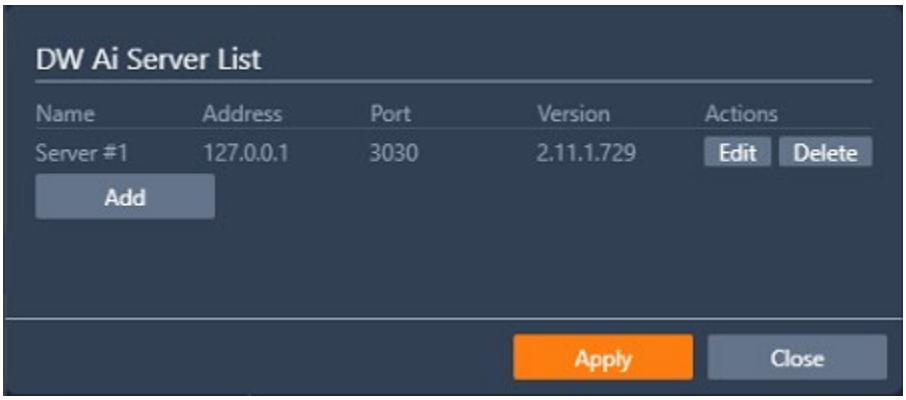
NOTE: You can define up to four (4) DW Ai Servers at a time.

To add DW Ai Server:

1) Open the *DW Ai Server Configuration Tool* and log in as the admin.
2) Click on the menu icon in the top left, then select **DW Ai Server List**.



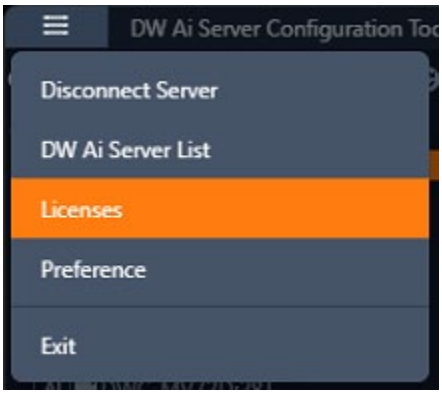
3) Click **Add**.
4) Enter the IP address of the DW Ai Server.
5) Leave the port set to **3030.**
6) Click **OK** to return to the previous menu.
7) Click **Apply** to save your changes.
8) Click **Close** to close and return to the previous menu.



Part 4: DW Ai Server Licenses

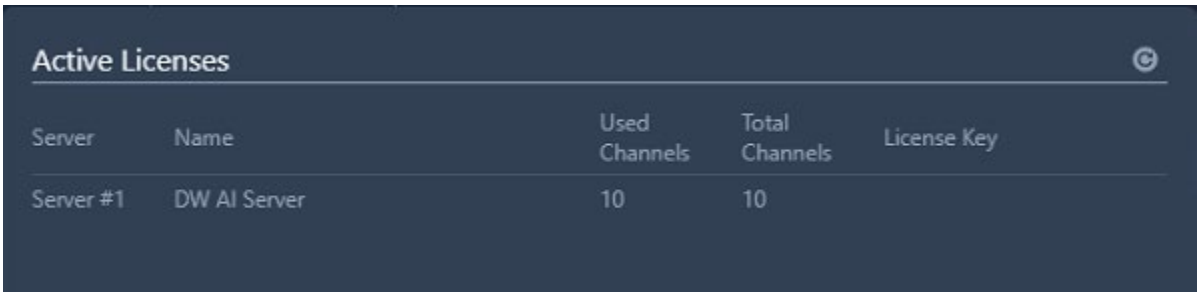
A license is required to use the analytic features of a DW Ai Server. Licenses can be managed through the DW Ai Server Configuration Tool program.

Select "Licenses" from the Main Menu in the DW Ai Server Configuration Tool to view the licenses.



Active Licenses

The *Active Licenses* list shows all licenses of the DW Ai Server and how the licenses are currently allocated.

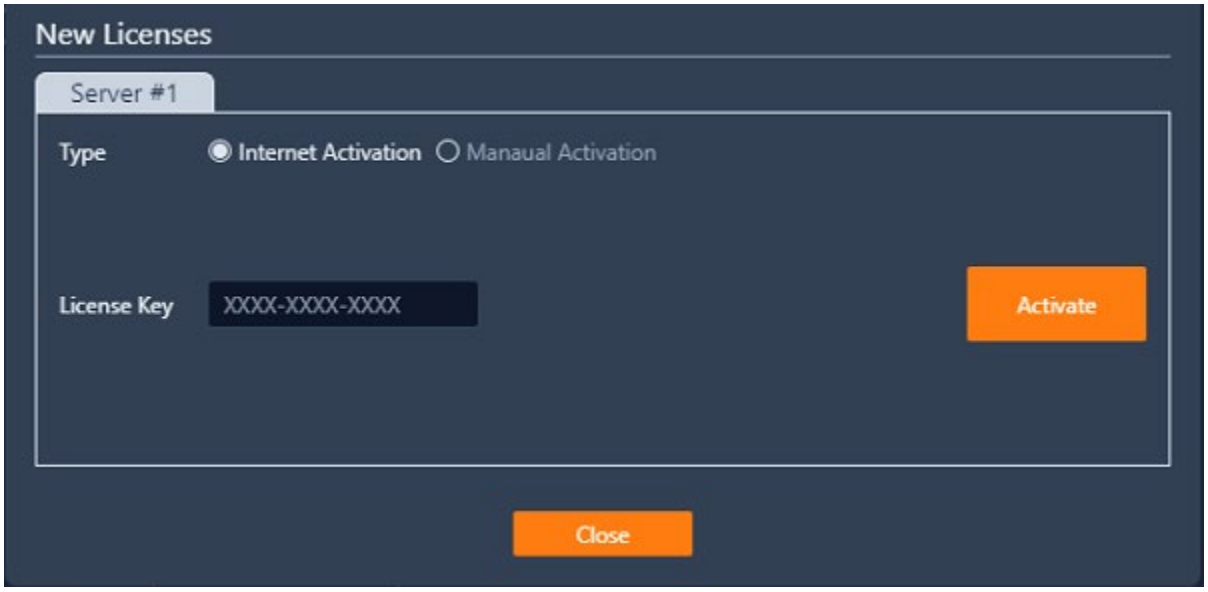


New Licenses

In the *New Licenses* area of the menu, server tabs (Server #) are created for each DW Ai Server. Select a server tab to view the license activation interface.

- **Type** Specifies the activation method that will be used for your license activation request.
  - **Internet Activation:** Select to enter the license activation key to add additional DW Ai licenses.

        - **License Key:** Enter the alphanumeric DW Ai license key, then click "Activate" to add a license. An Internet connection is needed for the DW Ai Server to use this feature.
    - **Manual Activation:** Select to copy the server's HW GUID and manually add a DW Ai license. This option is intended for use if the DW Ai Server cannot access the Internet.
        - **HWGUID:** This is the system's unique code. Copy the HWGUID and submit a request for a manual activation code to licenses@digital-watchdog.com. The email should include the server's HWGUID and the license key you are trying to activate.
        - **Copy to clipboard:** Copies the HWGUID to the clipboard.
        - **License Key:** Type or paste the activation code into the space provided, then click "Activate."
- **Activate:** Click this button to validate the entered *Code*. The license will then be applied to the selected DW Ai Server.
- **Close:** Click this button to close the *Licenses* page and return to the previous screen.



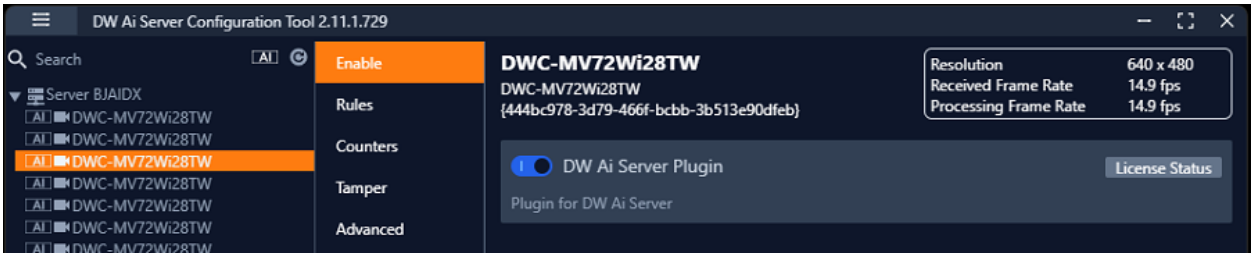
Part 5: Enable Tab – DW Ai Server Plugin

Select a camera from the left-side panel to set up analytics on the DW Ai Server. The *Enable* tab shows the status of the plugin for the selected camera. You can check the license status and select the preferred deep-learning feature from here.

- **DW Ai Server Plugin:** Toggle to enable/disable the plugin for the selected camera.
- **Tracker Engine:** Defines the tracking engine that will be used for analytics. The tracker engine must 'learn the scene' to determine the background from moving foreground objects. While initially learning the scene, a message will be displayed in the live view, and no objects will be tracked during this time.
    - **DL Object Tracker:** When selected, the analytic engine will use the GPU to detect, categorize and track objects moving through the camera's detection areas.
        - Object Tracker can classify objects using either deep learning models or properties extracted from an object in a calibrated scene. If the *Deep Learning Filter* is not used, camera calibration is required to detect the object class.
    - **DL People Tracker:** The tracker uses the GPU to detect and track people moving through the camera's detection areas.
- **Apply:** Apply changes to the selected camera.

The calibration and classification features are not displayed using the Deep Learning filter, DL Object Tracker, or DL People Tracker. When first selected, the DL trackers will run a model generation process. This optimizes the DL models to run on the available GPU hardware.

Regardless of which tracker is selected, the DL People Tracker, DL Object Tracker, and DL Filter models will all be optimized together. This process can take up to 10 minutes per model and may increase with different GPU configurations. The process will not need to run again unless the GPU hardware changes. While optimization is performed, a message will be displayed in the live view, and no objects will be tracked during this time.



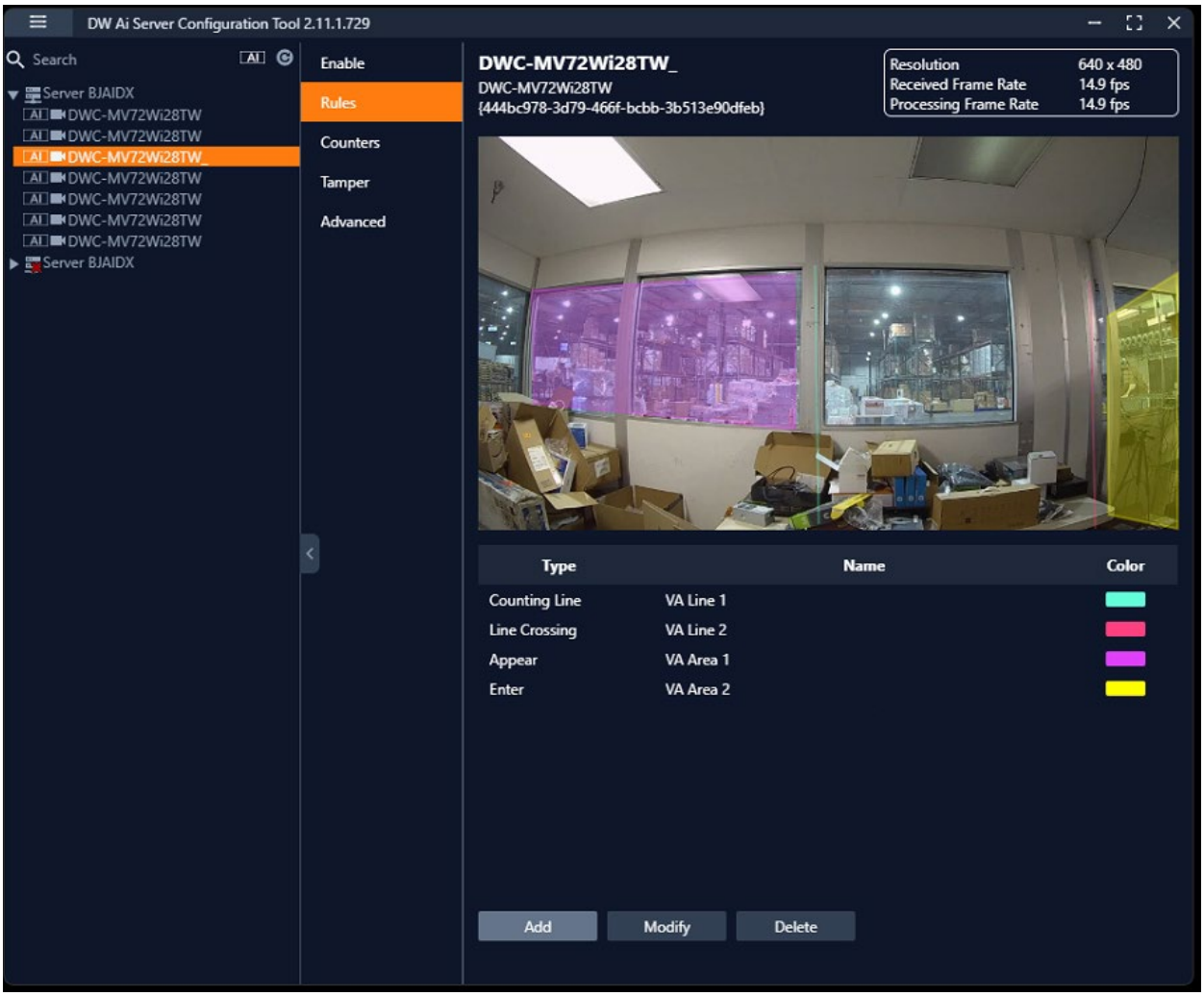
Part 6: Rules Tab – Analytic Rules

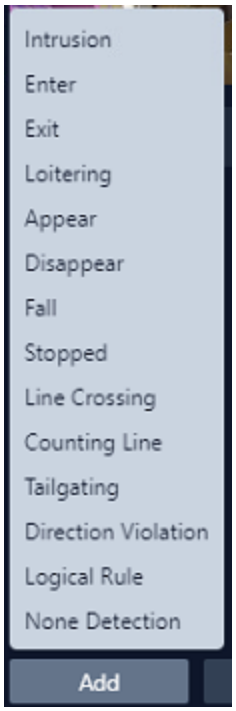
Selecting a camera in the *DW Ai Server Configuration Tool* and select the *Rules* menu tab. All the analytic rules configured for the selected camera will be displayed.

This menu allows analytic rules to be created/modified or deleted as required. A camera snapshot will be displayed on the screen to allow rule areas to be defined and visually drawn.

You can create, edit, or remove rules with:

- **Add:** Click to add a new analytic rule.
- **Modify:** Select an existing rule from the list, then click to modify it.
- **Delete:** Click to delete the selected rule.





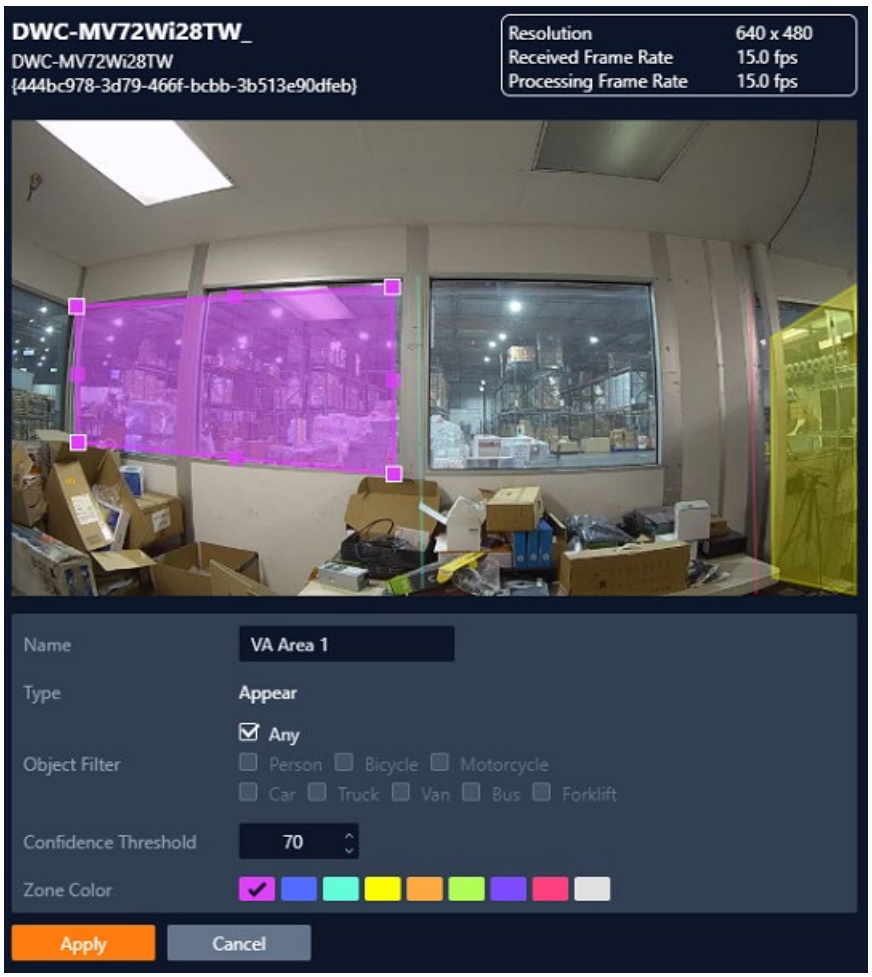
Analytic Area Rules

When creating Analytic Area Rules, the DW Ai Server will overlay a survey zone over the camera video, and the DW Ai Server will monitor and track people and objects while triggering alerts depending on analytic rules.

Area rule types include:

- **Intrusion:** The *Intrusion* rule triggers an event when an object is first detected and has crossed into a specified zone
    - NOTE: The *Intrusion* rule will trigger in the same circumstances as the *Enter* and *Appear* rules. The choice of which rule is most appropriate will depend upon the scenario.
- **Enter:** The *Enter* rule triggers an event when a tracked object crosses the border from outside of a zone to inside the zone.
- **Exit:** The *Exit* rule triggers an event when an object crosses the zone border, moving from inside the zone to outside
- **Loitering:** The *Loitering* rule triggers an event when an object remains in a zone for a pre-defined period.
- **Appear:** The *Appear* rule triggers an event when an object suddenly starts to be tracked from within a zone.
- **Disappear:** The *Disappear* rule triggers an event when an object suddenly stops being tracked (disappears) from within a zone.

- **Stopped:** The *Stopped* rule triggers an event when an object has remained stationary in a particular zone for a pre-defined period.
    - NOTE: The *Stopped* rule does not detect abandoned objects. It only detects moving objects and then becomes stationary within the zone.

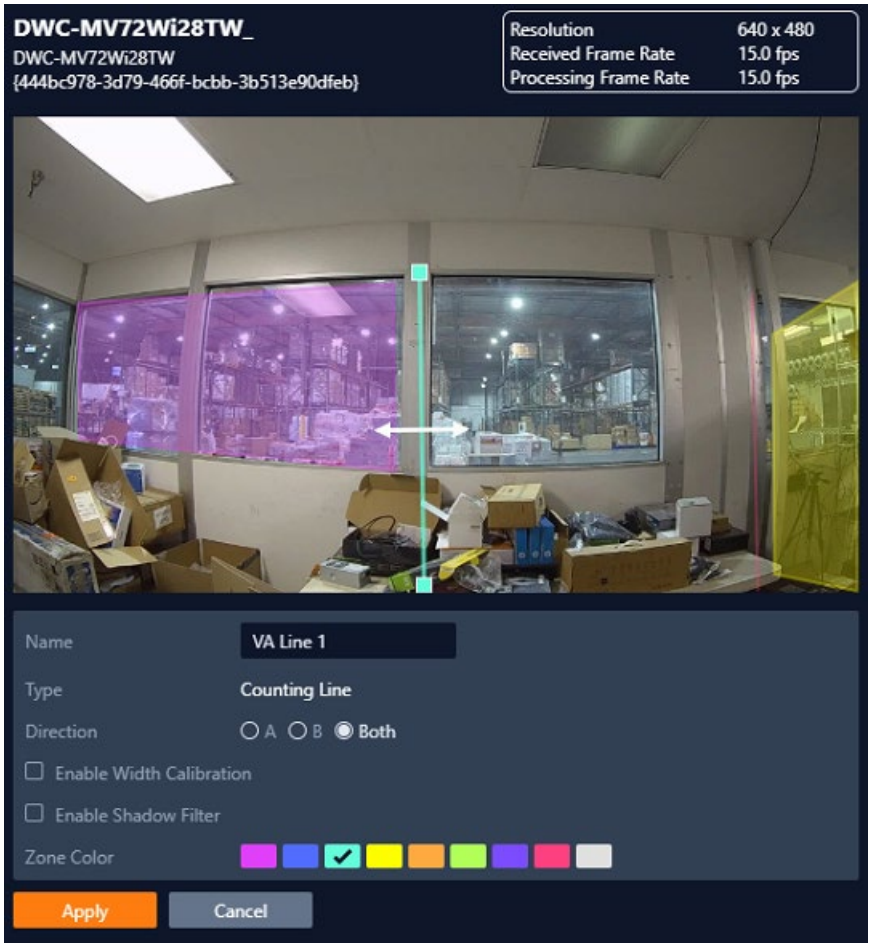


Analytic Line Rules

Analytic line rules mark an Ai engine survey line to monitor tracking people and objects. Line rule types include:

- **Line Crossing:** The *Line Crossing* rule triggers an event when an object is first detected crossing the line.
    - NOTE: *The line-crossing* rule will trigger in the same circumstances as the *Direction Violation* rule. The choice of the most appropriate rule will vary depending on the scenario.

- **Counting Line:** The *Counting Line* triggers an event when movement is detected crossing a detection line in a particular direction, regardless of the angle of the crossing. Additional specifications that can be defined include the required direction of travel and the minimum width of passing objects to trigger the rule.
    - NOTE: *Counting Line* differs from the *Direction* rule because it does not use the *Object Tracker*. Instead, it detects motion that moves past the line. The *Object Filter* feature is not available when using the counting line rule.
- **Tailgating:** The *Tailgating* rule triggers an event when objects cross over a line within quick succession of each other within the defined time.
- **Direction Violation:** The *Direction Violation* rule triggers an event when an object crosses the detection line in a specified direction, angle, etc.
    - NOTE: You can also adjust the rule settings using the preview overlay. Click and hold inside the dotted circles and drag the line to the desired angle.



Analytic Filtering Rules

Analytic filtering rules can be applied to reduce false positives and unwanted analytic triggering.

- Logical Rule: A *Logical Rule* extends the standard analytic rules to combine various inputs using logical expressions. This allows rules to be combined to form a complex filter of events to help reduce false alerts.
    - NOTE: Not all standard rules are available for *Logical* rules.
- None Detection: The *None Detection* rule will create an exclusion zone that can be used to map areas of the scene from being analyzed. This can reduce false triggers caused by moving foliage or busy backgrounds by telling the engine to ignore certain areas.

Adding an Analytic Rule

To create a new rule:

1) Select a camera from the device list, then select the **Rules** tab.
2) Click the **Add** button and select the rule type to be added (see the Types of Rules Available section).
    - When configuring an **AREA rule**, the engine will overlay a zone on a snapshot image of the camera's view.
    - When configuring a **LINE rule**, the engine will overlay a line on a snapshot image of the camera's view.
    - Click-and-drag the major and minor nodes to reshape the detection zone or to reorient the detection line as needed. Clicking on a minor node will split the segment and create a more complex shape.
    - To remove a segment, right-click on a major node and select "*Delete*."
3) Configure the analytic rule accordingly.
   The configuration options for rules include (availability varies by rule type):
    - **Name:** Define a name for the rule.
        - **Confidence Threshold:** Define, in seconds, the period an object needs to be present within a zone to trigger an event.
    - **Object Filter:** Defines if the objects will be filtered before triggering an event.
        - NOTE: The *Object Filter* option is only available when the standard *Object Tracker* and *Deep Learning Object Tracker* are selected in the *Enable* menu.
    - **Zone Color:** Select a color for the zone.
        - **Apply:** Apply to save the rule and return to the previous menu.
    - **Cancel:** Cancel changes and return to the previous menu.
        - **Direction:** Define the direction in which objects will be monitored for movement to trigger detection line events.
        - **A:** Only direction **A** will be monitored across the counting line.
        - **B:** Only direction **B** will be monitored across the counting line.
        - **Both:** Both directions across the counting line will be monitored.
    - **Enable Width Calibration:** Turn the object width calibration feature on or off.

    - **Width Calibration:** Define the width calibration value, which adjusts the target objects' minimum and maximum width to trigger an event when crossing the detection line.
- **Enable Shadow Filter:** Turn the shadow filter on or off; this attempts to compensate for shadows cast by objects.
    - **Counter:** Toggle to enable or disable a tally counter for this line.
    - **Reset:** Click to reset the counter.
- **Angle:** Define the direction in which objects must move to trigger a *Direction Violation* event.
    - **Acceptance:** Define the allowed variance on each side of the angle that will still trigger a *Direction Violation* event
- **Select Rule:** Define the first and second rules used in the *Logical* rule.
    - **Then within:** Define the period between which the standard rules must occur to trigger the *Logical* rule.
- **Add a clause:** Add an additional rule to the logical rule; this displays a new "*Then within*" field for the rule.

4) Click **Apply** to save the rule and return to the previous menu.

NOTE: The *Object Filter* option is only available when the standard object tracker and Deep Learning Object tracker are selected. Filter option availability will change depending on which tracker is being used.

How to Modify a Rule

1) In the *Rules* tab, highlight the rule to be modified.
2) Select **Modify** to open the settings for the rule.
3) Modify the rule accordingly.
4) Click **Apply** to save the rule and return to the previous menu.

How to Delete a Rule

1) In the *Rules* tab, highlight the rule to be deleted
2) Click **Delete** to delete the rule from the list.

How to Search for Analytic Events

The purpose of the *DW Ai Server Configuration Tool* is to connect and send metadata from the analytic engine to the DW Spectrum Server.

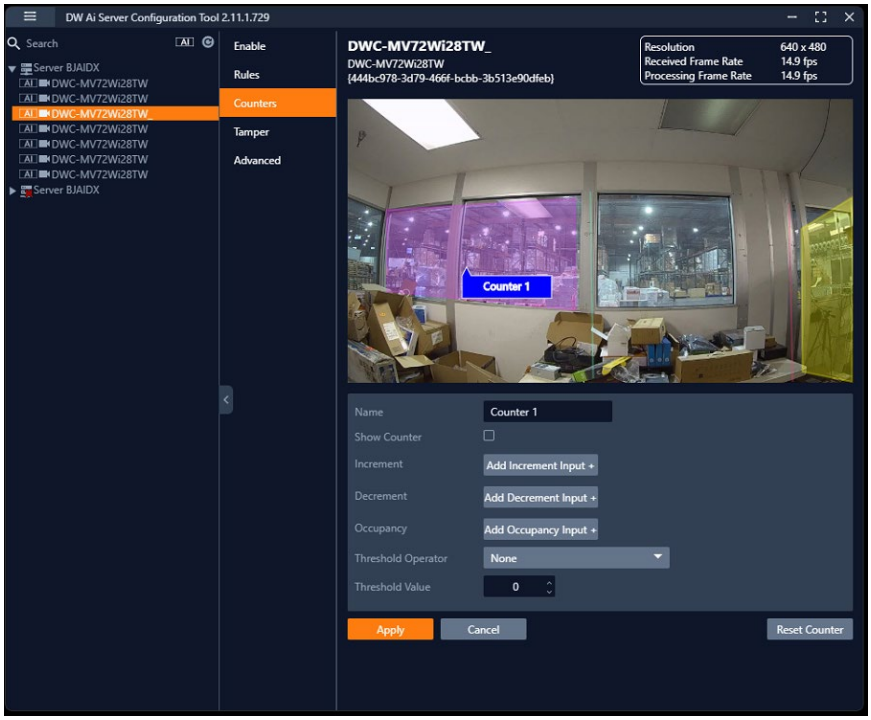
All event and object detection searches should be performed through DW Spectrum using the *DW Spectrum Client* for desktop computers. For more information on event searches, please refer to the *DW Spectrum User Manual*.

Part 7: Counters Tab

A counter can be added to count the number of times a rule is triggered. For example, tracking the number of people that crossed a *Counting Line*.

You can create, edit, or remove counters with the available features:

- **Add:** Click to add a new counter.
- **Modify:** Click to modify the highlighted rule.
- **Delete:** Click to delete the highlighted rule.



How to Add a Counter

To add a Counter:

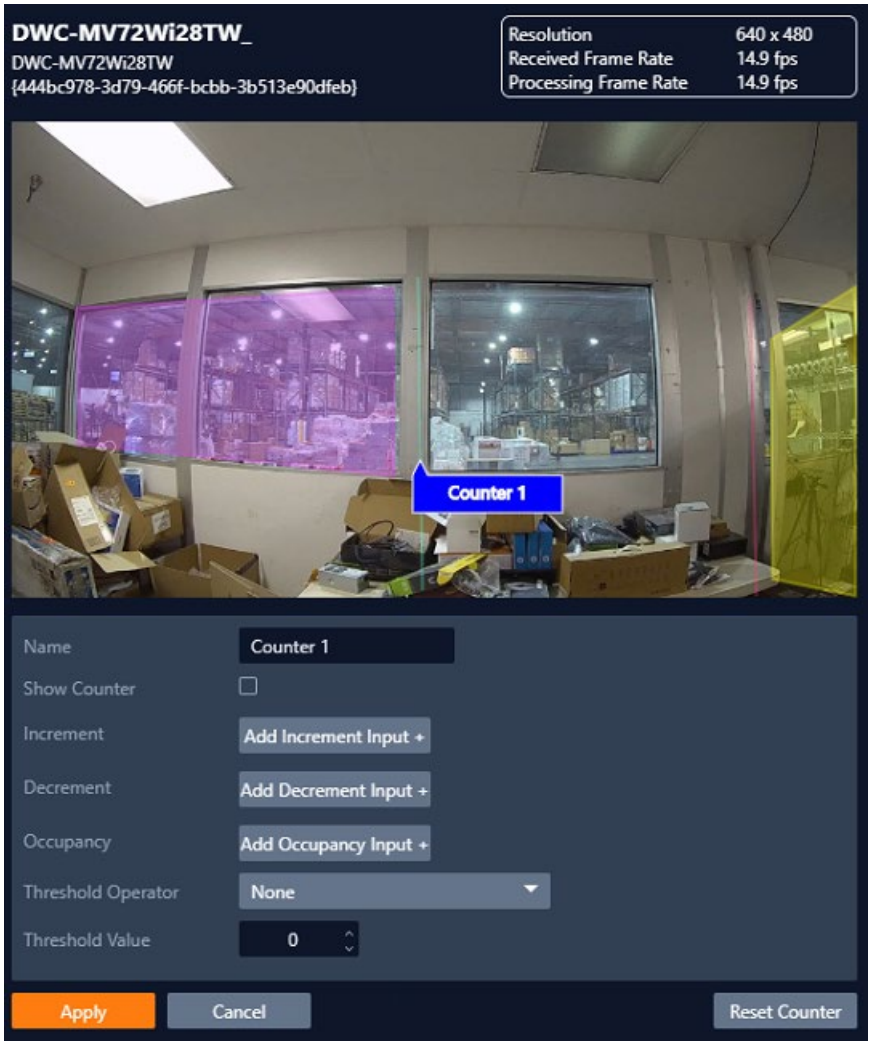
1) Select the camera, then click on the **Counters** tab.
2) In the *Counters* menu, click the **Add** button.
3) Configure the counter as needed.

   The configuration options include:

   - **Name:** Specify the name of the Counter.
   - **Show Counter:** Enable to display the counter in the analytic video stream.

- **Increment:** Select which rule, when triggered, will add to the Counter.
- **Decrement:** Select which rule, when triggered, will subtract from the Counter.
- **Occupancy:** Select a rule to set the Counter to the current number of the rule's active triggers.
- **Threshold Operator:** Select the scenario in which the Counter will generate an event only when the parameter has been met.
    - Greater than or equal to
    - Less than or equal to
    - Great than
    - Less than
    - Equal to
    - Not Equal to
    - None
- **Threshold Value:** set the value to which the *Threshold Operator* will increase or decrease the Counter value.
- **Reset Counter:** click to reset the counter value to 0.

4) Click the **Apply** button to save the Counter settings.



How to Modify a Counter

1) In the *Counters* tab, highlight the Counter to be modified.
2) Select **Modify** to open the settings for the rule.
3) Modify the rule accordingly.
4) Select **Apply** to save and return to the previous menu.

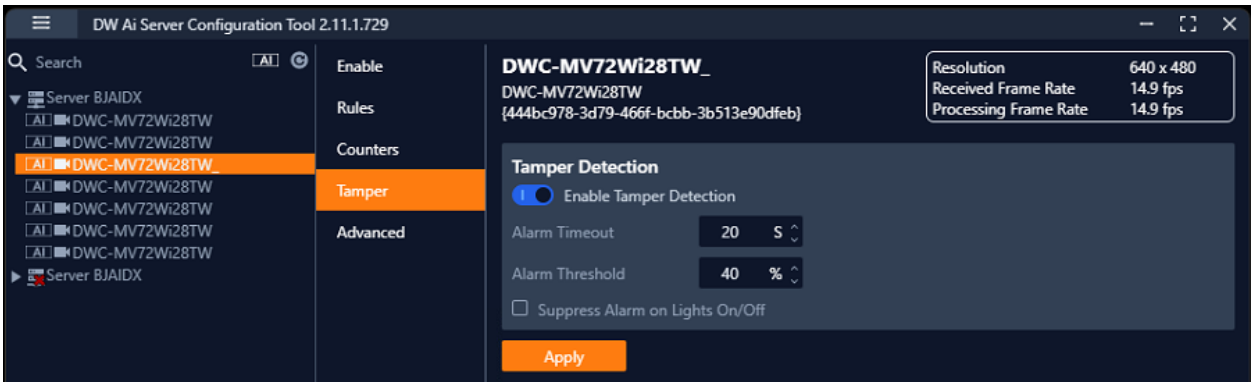
How to Delete a Counter

1) In the *Counters* tab, highlight the Counter to be deleted.
2) Select **Delete** to delete the Counter from the list.

Part 8: Tamper Tab – Tamper Detection

The *Tamper Detection* feature detects when camera tampering events obscure the camera view, such as bagging (physically blocking the camera lens), defocusing, or moving the camera. This is achieved by the analytics automatically detecting large persistent changes in the image.

Select the *Tamper* menu tab to configure the *Tamer Detection* settings.



Configuration options include:

- **Enable Tamper Detection:** Toggle to enable/disable the *Tamper Detection* feature for the selected camera.
- **Alarm Timeout:** Defines the length of time, in seconds, that the image must be persistently changed before the alarm is triggered.
- **Alarm Threshold:** Defines the percentage area of the image that must be changed for the tampering to be triggered.
- **Suppress Alarm on light:** Toggle to enable/disable the feature. This feature mitigates scenarios where sudden changes in lighting, such as switching on/off indoor lighting, can cause false tamper events.
- **Apply:** Click to save the current settings.

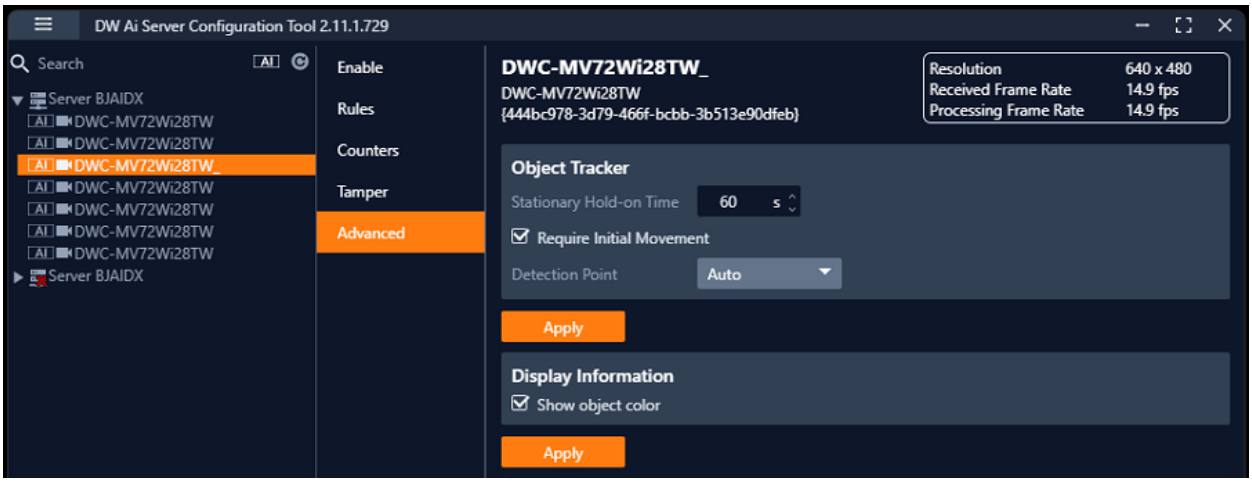
NOTE: The option will reduce sensitivity to genuine alarms and should be used cautiously. Remember to **Apply** changes for them to take effect.

Part 9: Advanced

The *Advanced* camera menu contains settings relating to how the analytics engine tracks objects, such as the time threshold for the *Stationary Rule*.

In most installations, the default configuration is sufficient.

Select the *Advanced* menu tab to configure the advanced analytic settings.



Object Tracker

The *Object Tracker* section includes the settings used by the Ai engine when tracking objects for analytic rules.

Object Tracker settings include:

- **Stationary Hold-on Time:** Defines how long an object will continue to be tracked and classified once it has stopped moving and has become stationary.
- **Detection Point:** Defines the tracking point that will be used to evaluate object detection and pathing for analytic rules.
    - **Auto:** In *Auto* mode, the detection point is automatically set based on how the calibration is configured.
    - **Mid bottom:** In *Mid bottom* mode, the detection point for each object is centered along the bottom line of the bounding box.
    - **Centroid:** In *Centroid* mode, the detection point for each object is located in the middle of the bounding box.
- **Require Initial Movement:** Toggle to track all objects or moving objects. It will prevent objects that have not moved from being tracked.

- **Apply:** Click to apply changes to the selected camera.

NOTE: Changing the *Detection Point* setting may affect the point at which objects will trigger an event, depending on the pathing of the tracked objects.

Display Information

The *Display Information* section includes the settings that determine how object tracking annotations will appear for users.

Display Information settings include:

- **Show Object Color:** Toggle to display the color of tracked objects.
- **Apply:** Click to apply changes to the selected camera.