CathexisVision 2024

ANPR Integration Guide

Contents

This guide was designed to deal with ANPR integration specifically. For further information about the CathexisVision software, consult the ***CathexisVision Setup Manual*** or contact
support@cathexisvideo.com

While Cathexis has made every effort to ensure the accuracy of this document, there is no guarantee of accuracy, neither explicit nor implied. Specifications are subject to change without notice.

1. Introduction

This document is a guide to setting up the CathexisVision ANPR system. CathexisVision integrates with three categories of ANPR engines, which require different setups. These are:

- Third-party ANPR algorithms.
- ANPR Cameras.
- Built-in ANPR engines.

Third-party algorithms and **ANPR cameras** only send through **triggers** to CathexisVision, while the **built-in engine** is fully **incorporated** into the CathexisVision software. At present, CathexisVision uses the AR Hungary ANPR engine.

After completing the engine-specific setups, the configuration of the ANPR integration devices, databases and CathexisVision events follows standard procedure and are dealt with in general sections, not specific to any particular application.

This document also details some site optimisation steps which can be run through in order to increase the efficiency of detection.

Note: Some of these steps will not apply to all ANPR engines.

USEFUL LINKS

*To view **tutorial videos** on CathexisVision setup, visit* *https://cathexisvideo.com/resources/videos*

*Find answers to Cathexis **Frequently Asked Questions**: https://cathexis.crisp.help/en/?1557129162258*

A NOTE ON CAMERA CHANNELS

The CathexisVision software packages have **limits on camera channels**. A multi-sensor camera is physically a single device (camera) but it requires a camera channel for each one of the internal cameras. The same applies to an encoder: a 16-channel encoder will account for 16 camera channels on the CathexisVision software, even though it is a single device. Even when a camera or device only uses a single IP license, the camera channel limit will still apply.

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2. General Requirements

2.1 System Requirements

The table below shows the supported operating systems for major CathexisVision releases.

CathexisVision	2016	2017	2018	2019	2020	2021	2022	2023	2024
Netbsd 4	◉	-	-	-	-	-	-	-	-
Fedora 16	◉	◉	◉	-	-	-	-	-	-
Ubuntu 12	◉	◉	◉	◉	◉	-	-	-	-
Ubuntu 16	◉	◉	◉	◉	◉	◉	◉	◉	◉
Ubuntu 20	-	-	-	-	-	◉	◉	◉	◉
Windows XP	◉	-	-	-	-	-	-	-	-
Windows Vista	◉	◉	-	-	-	-	-	-	-
Windows 7	◉	◉	◉	◉	◉	◉	-	-	-
Windows 8	◉	◉	◉	◉	◉	◉	-	-	-
Windows 10 (version 1809)	◉	◉	◉	◉	◉	◉	◉	◉	◉
Windows 11	-	-	-	-	-	◉	◉	◉	◉
Windows Server 2008 R2	◉	◉	◉	◉	◉	◉	-	-	-
Windows Server 2012	◉	◉	◉	◉	◉	◉	◉	-	-
Windows Server 2012 R2	◉	◉	◉	◉	◉	◉	◉	◉	-
Windows Server 2016	◉	◉	◉	◉	◉	◉	◉	◉	◉
Windows Server 2019	-	-	-	◉	◉	◉	◉	◉	◉
Windows Server 2022	-	-	-	-	-	-	◉	◉	◉
Windows 32-bit	◉	◉	◉	◉	◉	◉	-	-	-

◉　　Supported　　　　-　　Not supported

Note:

- There is a **minimum requirement of 8 Gigabytes of RAM** to run the CathexisVision software.
- If the user plans on installing this integration on a Linux unit, contact support@cathexisvideo.com.

See the setup section relevant to the site for specific requirements for the various ANPR engines.

2.2 License Requirements

The minimum CathexisVision LPR integration license requirements for all ANPR applications are as follows:

License No.	License Name	Description
CLPR-2000	Integration Device License	This license is the "base" license to integrate with the LRP system. It is applied to the server to which the LPR is connected. This licence will allow for the connection of a single integration device. All other servers will link back to the integration database on this server. There is no cost for this license.
CLPR-1001	Per Detector License	These licenses apply to the detectors in a LPR system. The CLPR-1001 will license a single detector and may be added on a detector-by-detector basis. A detector is every zone on a camera configured to detect a number plate. A camera can have multiple detector zones configured, where a single camera view is made up of multiple lanes, and each lane needs to be detected separately. A detector license is required for every detection zone required.

Note: Individual devices will require a CLPR-1001 license for each device as well as the applicable IP Camera License (CLIC-1001) for the CathexisVision product suite.

2.3 Image Requirements

There are several **image conditions** and settings to consider when setting up an ANPR system. These image conditions need to be considered before attempting to continue with the rest of the setup.

2.3.1 Image Dimensions

- **Latin characters** require the characters on the license plate to be at least 16 pixels high at the furthest point of capture. This is the minimum character size at the start of the set detection area.
- **Special characters (Arabic, Chinese etc.)** require a character height of at least 20 pixels at the furthest point of capture. This is the minimum character size at the start of the set detection area.
- The **whole license plate** needs to be visible in the image.
- The **language engines** are region specific. Make sure to download the correct engine for the region as different engines are able to detect character heights and text specific to the region.

2.3.2 Image Quality

It is difficult to specify the image quality, since environments vary so greatly. However, in general, images should:

- Be reasonably **sharp**
- Have good **contrast**
- Be under good **lighting conditions**
- Have a **reasonable angle of view**.

2.3.3 Illumination

The most important aspect in ANPR image quality is **illumination.** License plates need to be well illuminated in the day, and night, for the algorithm to work reliably with a non-infrared camera.

Non-infrared, or visible light integrated cameras, have about the same accuracy during the day as IR integrated cameras. However, during the night, non-IR integrated cameras are severely impaired, and will not pick up most plates. This is caused by lack of illumination and high image noise levels (due to increased sensitivity on the sensor).

Therefore, if the cameras are **visible light integrated**, it is necessary to invest in additional visible light illumination if the user wants to recognise license plates, view plate colour, and see the colour of the vehicle in dark areas. The additional illumination needs to be well-positioned LED lighting, that does not create reflections in the camera lens or blind the driver.

2.3.4 Angle of View/Camera Mounting

The CathexisVision ANPR allows for correction based on angle of view, via **Slope** and **Slant** settings, but each installation is different. When it comes to angle of view, there are a few general rules to go by for all ANPR options:

- It is always better to view license plates from the front.
- The camera should not be mounted too high above passing vehicles. In general, 30 degrees should not be surpassed. The maximum camera mounting height is 4 meters.
- The camera must also not be too low as to have the car headlight shining directly into the lens. This will be dependent on the slope of the site. The minimum camera mounting height is 1.5 meters.
- The camera should not be mounted too far to the side of passing vehicles - ideally 15 degrees, or less.
- The capture area should be as level and as straight as possible, with unobstructed views of the vehicle number plates **at all times**. A minimum detection range of 4 meters is ideal.
- Avoid having vehicles turning into the capture area or going over speed reducing humps.
- Avoid moving shadows from vegetation within the capture area where possible.
- Avoid direct or reflected sunlight off the number plate back into the camera.

2.3.5 Framerate

This setting is not the frame rate of the camera. It is the setting for the built-in CathexisVision ANPR engine. This is the number of frames that the ANPR algorithm processes per second. The CathexisVision default is 5. This will suffice for speeds of up to 75kmph. Thus, if the camera frame rate is 20fps, and the ANPR algorithm setting is 5fps, then only every 4th frame from the camera is processed by the algorithm.

2.3.5.1 Set Framerate

This framerate is set according to the frame processing speed of the algorithm, which is available in the LPR Stats. These can be found by following: **Help menu / Local server stats / Others / LPR / LPR**s. For example, if the system can only process a frame at 200ms, then the maximum number of frames that can be processed is 5fps.

2.3.5.2 Frame Processing Time vs Detection Time

For the CathexisVision ANPR Engine, there is a difference between individual frame processing time and the detection time. Detection time is the time spent **waiting** for the captured frames to be processed, which is dependent on the site installation and the ANPR engine. The individual frame processing time can remain at 200ms, but if there is a queue of frames waiting to be processed, this loads the CPU, delaying the result of the detection.
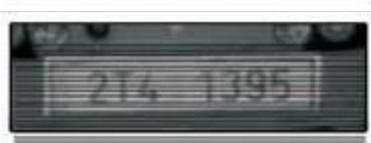
Note:

1. If 3 out of 5 frames are required for a valid detection, then the processing delay (provided there are no queued frames for processing) is a minimum of 3 x 200ms = 600ms.

2. This setting will have the highest impact on the CPU usage of the server, so only adjust it incrementally, and when necessary.

2.3.6 Image Examples

2.3.6.1 Poor Image Examples

	Contrast is too low.
	Overexposed.

	Bad lighting.
	Distortion.
	Low spatial resolution. The resolution of the characters is too low; it needs to be at least 16 pixels, as per the pixel heights given above.
	Unfocused image.
	Interlacing can cause reading issues.

2.3.6.2 Good Image Examples

The images below are good examples. They have:

- Good character resolution.
- Sharp display.
- High contrast.
- Good lighting.
- Good angle of view.

3. ANPR Cameras

CathexisVision supports a number of ANPR cameras, which are cameras with embedded ANPR algorithms. CathexisVision uses the embedded algorithms to perform detections, after which the event information is databased in the CathexisVision integration database. These ANPR cameras are added to the CathexisVision system as IP cameras in the usual manner. The software then detects them as ANPR cameras and pulls through the necessary integration device information.

3.1 Supported Cameras

Please refer to the Cathexis website for the list of ANPR cameras CathexisVision supports.

3.2 ANPR Algorithm Configurations

ANPR detection configuration for ANPR cameras is setup on the camera itself, via the camera's web interface. Consult the camera manufacturer documentation for the latest instructions on configuring ANPR detection on the camera, as well as the camera installation guidelines. The installation documents, and web configuration guides for the specific ANPR camera/s, are available on the CathexisVision website.

Cathexis cannot guarantee the accuracy of these documents. They may not incorporate the latest information, due to firmware updates released by the relevant manufacturers. Please consult the manufacturer documentation directly.

Note: The camera and NVR time need to be synchronised for the event and video to line up correctly. An NTP client-server configuration and setup is highly recommended.

3.3 Add the Camera in CathexisVision

Adding the ANPR camera to CathexisVision follows the same procedure as adding a general IP camera.

Follow the path: **Setup Tab / Configure Servers / Cameras / New**
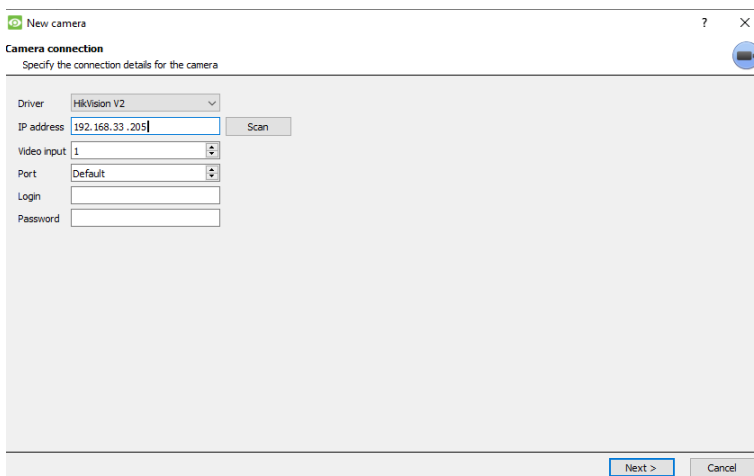
→ Enter the camera details.

→ Click **Next** to follow the addition wizard as usual.

Once added, the system immediately identifies the camera as an ANPR camera and pulls through the relevant device information.

See below, for confirming that the camera is identified correctly.

Once the camera has been added, the ANPR integration device needs to be added in the Integration Devices panel of Configure Servers. See below.

3.3.1 Confirm Camera Identification

To confirm that the camera is identified correctly, consult the server statistics:

Help Menu / Local Server Stats / Network Server / Devices / List / Camera / Section 2 / General
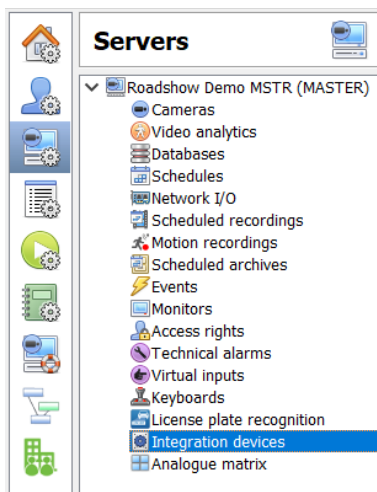
If the camera is an ANPR camera, it will reflect **Yes** in the LPR column.

→ Choose the video stream resolution and setup, for a minimum license plate width in the image of 190 pixels.
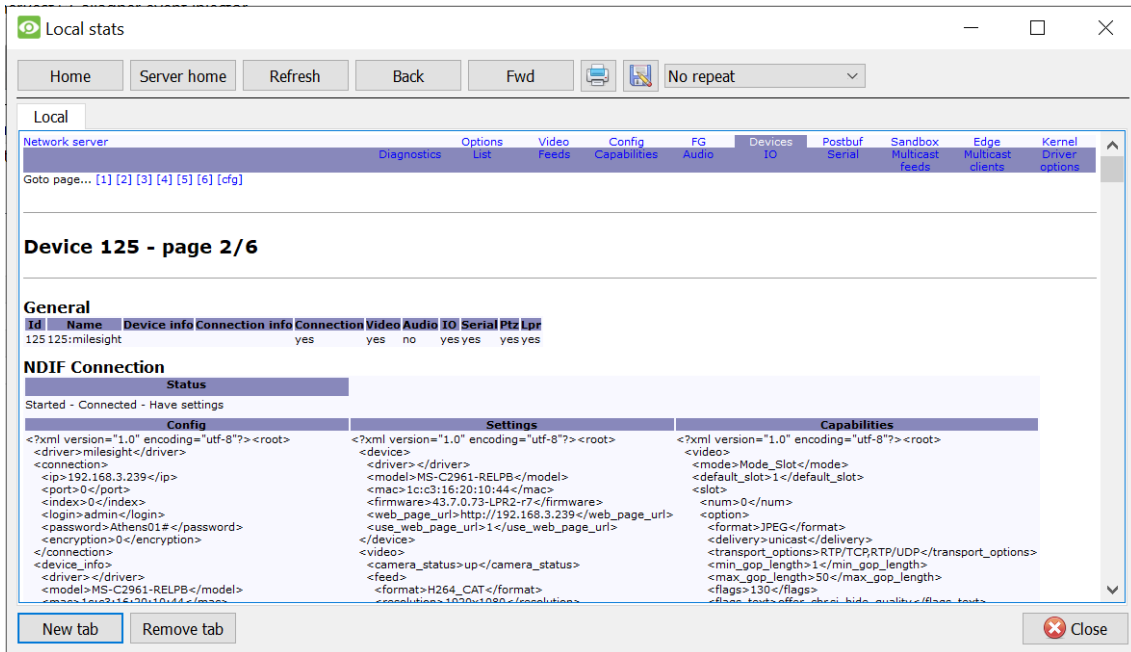
3.4 Add the ANPR Integration Device

Configure the way that **CathexisVision** reads the information being sent from the ANPR camera.

Setup Tab / Configure Servers / Integration Devices

There are two sections in this window: **Devices** and **Configuration.** These will be dealt with individually. Devices is addressed in the section below, whicle Cofiguration is addressed in Section <u>6. Integration Devices Configuration (All)</u>.
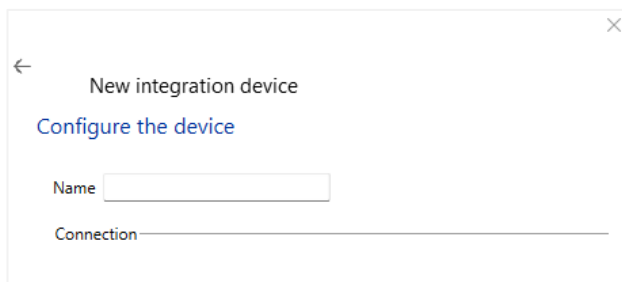
3.4.1 Devices

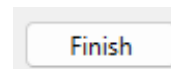The **Devices** section lists the integration devices attached to the integration database.

Server 1 - Integration devices

Devices

Name	Driver		

New device

Edit device

Delete device

3.4.1.1 Add New Devices
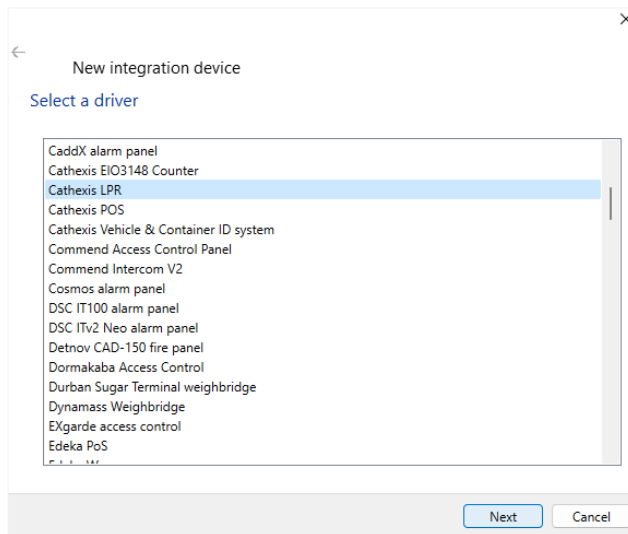
→ Click **New device**.

→ Select **Cathexis LPR** from the list.

→ Click **Next**.

New integration device

Select a driver

CaddX alarm panel
Cathexis EIO3148 Counter
Cathexis LPR
Cathexis POS
Cathexis Vehicle & Container ID system
Commend Access Control Panel
Commend Intercom V2
Cosmos alarm panel
DSC IT100 alarm panel
DSC ITv2 Neo alarm panel
Detnov CAD-150 fire panel
Dormakaba Access Control
Durban Sugar Terminal weighbridge
Dynamass Weighbridge
EXgarde access control
Edeka PoS

Next   Cancel

→ Give the device a descriptive **name**.

Finish   Click **Finish** to save.

New integration device

Configure the device

Name

Connection

The device will now appear in the list.

Select it to bring up the **Configuration** options. See the **Integration Devices Configuration** section.

4. ARH Engine

This section will detail the procedure for setting up the ARH ANPR system to integrate with CathexisVision. After installing the relevant drivers, configuring CathexisVision software to detect license plates is a two-step process. This is dealt with in the next section.

4.1 Critical Notice

4.1.1 Deprecated Engines

Previously, the ANPR feature used both Parking and Free Flow engines supplied by ARH. The Parking Engine is no longer supported by the manufacturer. The Parking feature of the ANPR is now called a Triggered Solution -- as in ground loop, IR beam or less accurate VMD solution, which uses the FreeFlow Engine. **Note:** Any mention of the Parking Engine in this document should be ignored.

For guidance on pre-2018 systems using the Parking feature, see the **Legacy ANPR Document**. For more information, or to request the Legacy ANPR Document, contact support@cathexisvideo.com.

4.1.2 Deprecated Licenses

There is now a single base license for LPR (CLPR-2000), with per-detector licenses (CLPR-1001). These licenses must be applied to the server the LPR integration device is configured on.

The CLFF-2000 (freeflow dongle), CLPK-2000 (parking dongle), and CLDT-1001 (lane license) license have been deprecated. The CLFF-2000 and CLPK-2000 will be considered a CLPR-2000 license, and the CLDT-1001 will be considered a CLPR-1001 license so that existing sites continue to function.

Note: Existing sites will continue working after an upgrade to 2018, as long as the integration device was configured on the same server as the LPR algorithms.

4.2 ARH Software

Install the **ARH ANPR software**, and, if it is required, the **ARH language engines** as well.

4.2.1 Installing ARH Software

→ Navigate to the ANPR software download page of the Cathexis website. Find it at http://downloads.cathexisvideo.com/software/anpr-software/.
→ Download the **FreeFlow** setup files. Alternatively, download the Zip folder, which contains all necessary files.
→ Extract the *.zip* folder and run the *setup.exe* file.
→ Select the "full install" option where possible.
→ Plug the dongle into the USB port on the recording server.
→ Reboot the recording server.

Note: All previous versions of the ARH software (Carmen) must be fully uninstalled if this is a re-install or update.

4.2.2 Installing Language Engines

The language engine will allow the **CathexisVision** interface to recognise different language characters on the license plates. The default language is set to English (latin_general), but additional engines can be installed.

If the unit is required to recognise license plate characters other than English, do the following:

→ Navigate to the ANPR software download page of the Cathexis website. Find it at
    http://downloads.cathexisvideo.com/software/anpr-software/.
→ Download the desired language engine.
→ Navigate: **Start Menu / All Programs / CARMEN GX / Engine Manager**.
→ Run the Engine manager.
→ Once the **Engine Manger** is running, click "Browse" (next to Engine(s) packages), navigate to the **Carmen** engine file, and click **Open**. The engine will now appear under "**Found engines**".
→ Click on **Install engines** and the new engine will now appear in the **Installed Engines.**
→ Restart the Recording Server.

To check if the language engine installation was successful, open **CathexisVision software / Setup tab / Configure Servers / License Plate Recognition**.

At the bottom of the screen, select the language engine of choice. If this option is not presented, either run the process again or contact support@cathexisvideo.com.

4.3 License Plate Recognition Panel Setups

Configuration of the camera and how it reads license plates is done in the License plate recognition panel shown below. This involves defining the areas of detection, and configuring the FreeFlow and Triggered Drivers. Navigate to: **Setup Tab / Configure Servers / License Plate Recognition.**
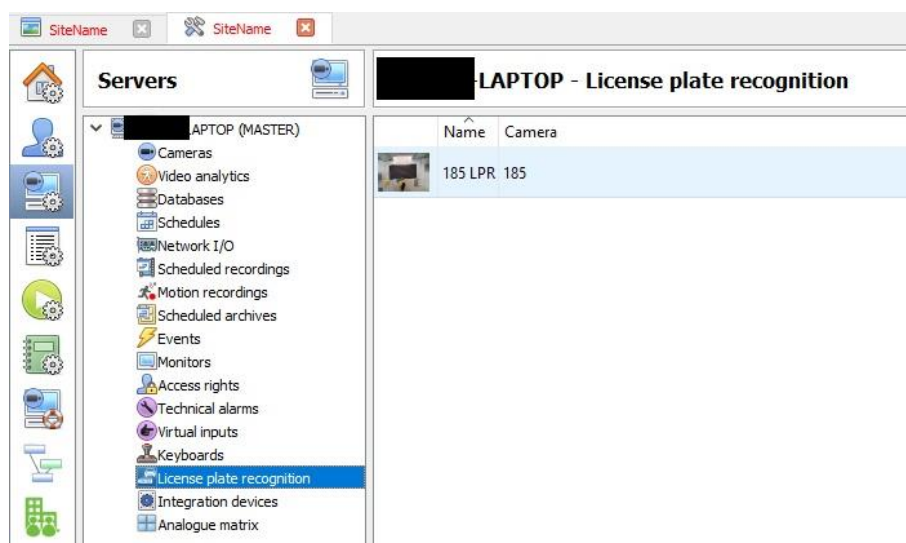
All ANPR cameras will appear here once set up.

→ Select **New** to add an ANPR camera.

→ Select **Edit** to edit an existing ANPR camera.

These popups are identical.

In the add/edit popup two ANPR applications are available to choose: **FreeFlow** and **Triggered.** These will be discussed in the next two sections.

Note:

1. License plate character heights of between 15-20 pixels will generally be recognised, but character heights of greater than 20 pixels (but less than 100 pixels) are preferred. *Images with a pixel height greater than 100 may be too large to detect.*

2. When using the Triggered application, select the "Use the FreeFlow algorithm" check box in the **Advanced** setting section. See below.

4.3.1 FreeFlow

FreeFlow is typically used to identify the license plates of *moving vehicles*. This would be used on road-view cameras. FreeFlow can be used for a triggered/parking type application, where the lane count is very high and multiple detectors are required.

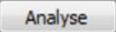|	
Name — ANPR Cam LPR Type — Freeflow (no engine) ☑ Only check during motion Motion sensitivity — Medium Video — H264 1920x1088 Framerate — 5.00 Character height Minimum 19 Average 56 Maximum 139 🟥 Slope 🟨 Slant Meta-information Advanced Analyse	→ **Name** the algorithm. → Select the **type** of ANPR application. Here, choose between **FreeFlow** and **Triggered. Note**: If the Triggered application of the ANPR is selected, then in the advanced setting, the FreeFlow engine must be selected. → Selecting ☑ Only check during motion will not capture the license plates of stationary vehicles. → Select the desired **Motion Sensitivity.** Check the **%** statistics for "frames with licenses". The higher the %, the quicker the detection. → Select the desired resolution of **Video** feed for the algorithm to analyse. → Select the desired **Framerate** (5 fps is recommended for speeds of up to 75kmph). → Set the desired **Character Height**, **Slope**, and **Slant**. This is explained below.

To test the algorithm, click [Analyse] if there is a vehicle with a visible number plate in the image. The algorithm's confidence level will be shown as % in brackets.

4.3.1.1 Advanced
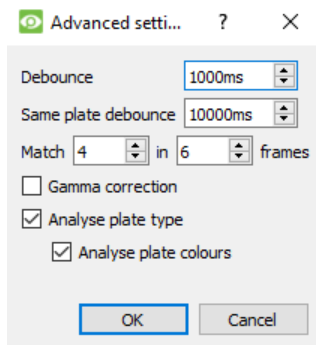
Debounce: If a license plate is detected less than the defined number of milliseconds (ms) after the previous detection is discarded.

Same plate debounce: If the same license plate is detected in consecutive detections, then it is discarded if it is less than the defined number of ms since the first detection. This is useful to prevent consecutive triggering of the same event.

Match x in y frames: For a license plate detection to occur, the system needs to find the same license plate in x of y frames. In this example, the license plate needs to be identified correctly at least four times in six frames. This provides a level of confidence in the detected license plate. If plates are persistently misread, this is a good setting to change.

**Gamma correction:** Correct images with contrast issues.

Analyse Plate Type and Colours: This is important for regions where license plate types and colours are used as identifiers. For example, a government license plate.

4.3.2 Triggered

Triggered mode is used in a *parking environment* to identify license plates on stationary vehicles. This would be used in parking lots, or similar.
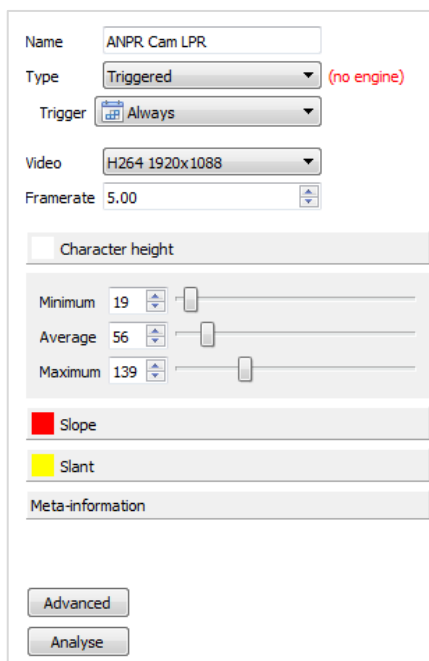
→ **Name** the device.

→ Select the **type** of ANPR application. Here, choose between **FreeFlow** and **Triggered.**

Note: If the Triggered application of the ANPR is selected, then in the advanced setting, the FreeFlow engine must be selected.

→ Select the **Trigger**. This could be on I/O input trigger from a loop in the road or an IR beam across the road.

→ Select the type of **Video** feed.

→ Select the **Framerate**.

→ Select the desired **Framerate.** Select the desired **Framerate.** (5 fps is recommended for speeds of up to 75kmph).

→ Set the desired **Character Height**, **Slope** and **Slant**. Explained below.

To test the algorithm, click [Analyse] if there is a vehicle with a visible number plate in the image. The algorithm's confidence level will be shown as % in brackets.

Recommendation: It is best that a triggering input — such as a ground loop or IR beam across the road— is used. If a motion trigger is used, the percentage of frames without license plates which are presented for processing, places an extra load on the CPU and delays the processing of valid frames.

4.3.2.1 Advanced
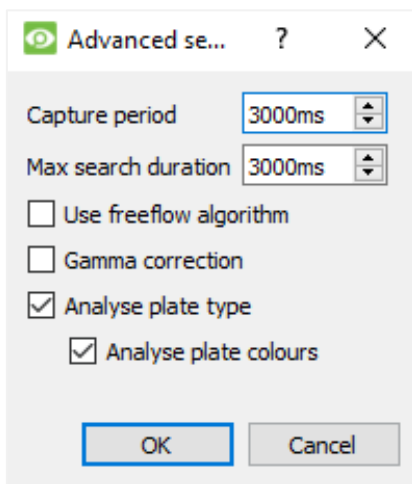
Capture period: Define how much video to process for a trigger.

Max search duration: The maximum time the system will search the given video to find a license plate.

Use FreeFlow algorithm: This setting makes it possible to use a **FreeFlow** algorithm in the Triggered or parking environment.

Gamma correction: Correct images with contrast issues.

Analyse Plate Type and Colours: This is important for regions where license plate types and colours are used as identifiers. For example, a government license plate.

4.3.3 Area of Analysis

Left-clicking on **Character Height**, **Slope**, and **Slant** will expand the options for each settings group. Do so for each setting.

4.3.3.1 Character Height

License plate characters need to be a specific height (minimum 16 pixels) so that the software can read them.
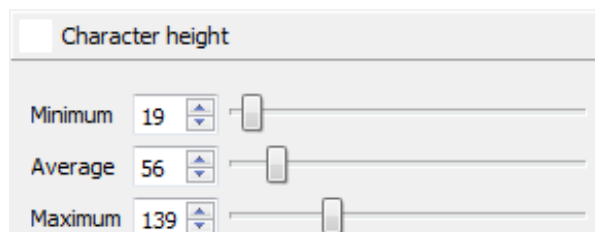
Set the **Minimum** character height to the size of the smallest license plate characters to be captured on the camera, when the vehicle enters the detection zone.

Set the **Average** height to the average size of the license plate characters captured by the camera, which is the middle of the detection zone.

Set the **Maximum** height to the size of the largest license plate characters captured by the camera, exit of detection zone.

Tip: Line up the boxes, with the license plate characters, for a visual representation of the **Minimum, Average**, and **Maximum** character height values. The sizes of the boxes will change as the values are increased/decreased. For best results, a character height of greater than 20 pixels is preferred, though between 15 – 20 pixels is also acceptable.

4.3.3.2 Slope

Slope defines the slope of the surface the vehicles are on.
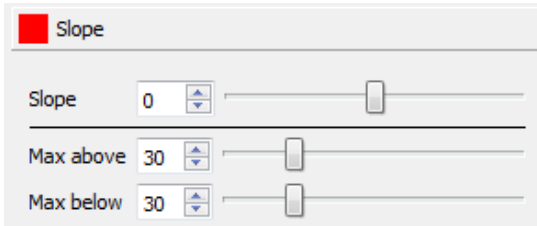
Slope: The horizontal angle of the license plate.

Max Above/Below: Define the angle of the slope.

Tip: Match the horizontal line under the characters to the bottom of the license plate, and then adjust the slope as needed using **Slope, Max above**, and **Max below**.

4.3.3.3 Slant

Slant defines the slant of the license plate. This is the angle of view that the license plates appear on the camera.
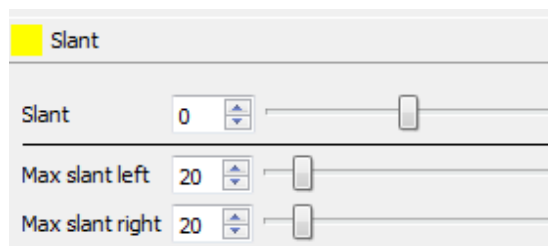
Slant: The vertical angle of the license plate.

Max slant left/Max slant right: Define the angle of the slant.

Tip: Match the vertical line with the side of the license plate slant, as needed, using **Slant, Max slant left**, and **Max slant right.**

4.3.3.4 Editing the Areas of Analysis

→ Select the overlay zone to bring up the control points.

→ Click-and-drag to change the shape of the zone.

→ Hold CTRL and click on a line to add a new control point.

→ Double-click on a control point to remove it.

→ Keep it as small as possible, as this will reduce the search detection time for images, where no plate is detected.

→ Check LPR detection on the entry and exit of the zone, once it is configured.

4.4 ARH Carmen FreeFlow Licensing

4.4.1 Licencing Expired Notification
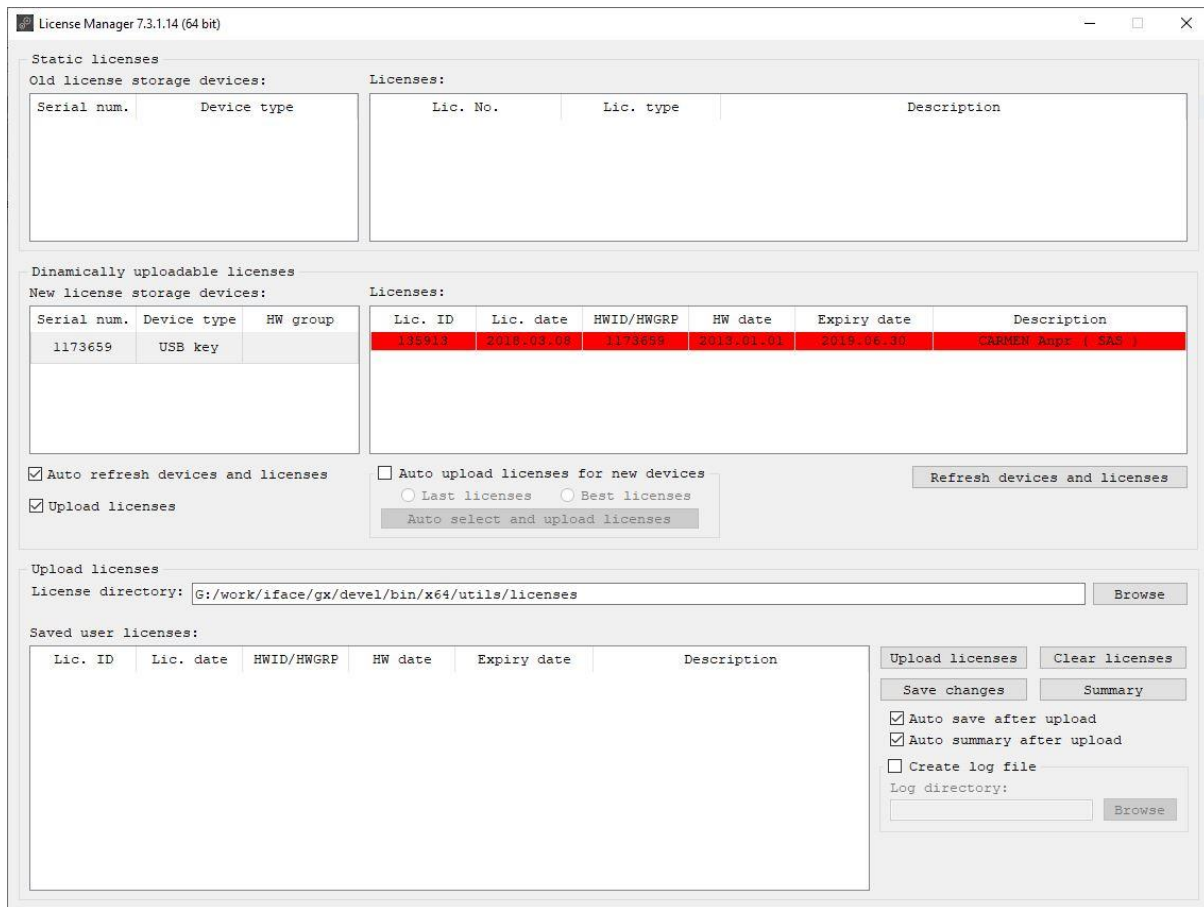
A license expiry, as displayed in the Licence Manager Utility above, only means that the **license update period** is expiring, i.e. there is no access to the latest engine and, possibly, new license plate types. During this time, the engine continues to operate, provided the engine is the same version that was available at the time of the license purchase. When purchasing a license, a one-year free update is included in the price from ARH.

Note: the licence validity, and functioning of the engine, can be tested using the **Demo for Images utility** within the CARMEN GX software package, which is automatically installed within the Windows Start menu. The Licence and Engine management utilities are also available on this menu.

If access is required to the latest developments, even after the expiry of the update period, there are two scenarios:

1. In case the license update period has already expired, a reactivation will need to be purchased. This means receiving the latest engine on a once-off basis.

   After this, there is an option of also buying an update, which provides access to the latest engines (released every quarter), for one year.

2. The second scenario is that, if an extension of the expiry period is required before the current expiry date, for a given license, a one-year update fee can be purchased for the above prices, thus extending the update period.

Note: Contact support@cathexisvideo.com for updated pricing. There is a video available from ARH on the Carmen engine licensing policy.

ARH USB key Update process

Note: the ARH engine and Carmen software are specific to the USB hardware license key, and as such, any updates to the licence will require the serial number of the USB license. This serial number is usually on a label on the key. Alternatively, the Licence Manager Utility will detect the serial number.

For the full process of upgrading an existing license, follow the link:
https://adaptiverecognition.com/app/uploads/DOC/Software/Carmen/license_manager_user_manual.pdf

ARH Hardware Key Locking error

Query:
We are getting a "Hardware Key locking error" on a site in the UAE, using the latest Arabic Engine 7.3.9.69. See attached image for info. We have uninstalled the ARH software, and reinstalled, to try fix the problem but without success.

ARH Answer:

The issue mentioned can arise when Windows refuses to uninstall the drivers properly. In this scenario, when Carmen software is updated, two or more drivers might get stuck in the driverstore of Windows, which might cause the issue to occur. This can be fixed in the following ways:

→ Remove Carmen completely (32 and 64-bit versions) via Control Panel \ Programs and features, then install the latest (7.3.1-08) package. In some cases, this works.

→ Request a utility for manual driver installations (DPINST) from support@cathexisvideo.com.

  - If, after a complete Carmen uninstall, there is still any driver starting with 'gxsd_' in \Windows\system32\drvstore, then please copy dpinst executable in this folder, run 'cmd' as Administrator and manually remove the driver with dpinst.

  - If after the uninstall of Carmen in Windows\system32\DriverStore\FileRepository\ folder there is still one or more drivers starting with 'fxmc', please also remove all using DPINST (DPInst.exe /u gxsdxxxxxxxx\gxsd.inf).

After all the drivers have been completely removed, the latest release (7.3.1-08) can be reinstalled.

5. Integration Devices Configuration (All)

This section deals with the **configuration** of the ANPR integration devices, all of which follow the same procedures.

Setup Tab / Configure Servers / Integration Devices

There are two sections Integration Devices panel: **Devices** and **Configuration.** Devices has been addressed in Section 4.6.1 Devices. The **Configuration** section enables editing/reviewing the device. Select the newly added device in the above section to bring up configuration options, which are divided into a number of tabs:

- Object configuration.
- Object properties.
- Device events.
- Groups.
- General.

5.1 Object Configuration Tab

The **Object Configuration** tab allows viewing all the individual objects that comprise the integration.

5.1.1 Object Configuration Buttons

Button	Description
New	Add a new object.
Edit	Edit an existing object.
Delete	Delete an existing object from the CathexisVision configuration.

5.1.2 Object Configuration Right-Click

Through the right-click menu, accomplish similar goals to those achieved by the configuration buttons. Right-clicking on an object will bring up the following options.

New...
Disable
Delete
Properties

New will open up the dialogue to add a new object.

Disable/Enable allows manually enabling/disabling individual nodes.

Delete will permanently remove this object from the list.

Properties opens up the object properties. Edit the object from here (it is possible to assign cameras to this object, as well as define its user access levels).

5.1.3 Properties Window

Selecting **Properties** from the right-click menu will bring up the editing window, where the same goals can be accomplished as if **Edit** had been selected. This window is also displayed in tabs.

5.1.3.1 Properties Window: Cameras Tab

Adding a camera to an object will mean that, whenever there is an event on that object, the recording from that camera will be related to the time and date of the object event, in the Integration database.
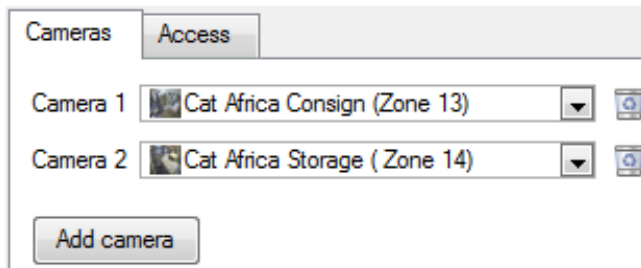
To add a camera, click Add camera , and select the relevant camera from the drop-down menu.

To delete a camera, click .

Note:

1. Add up to 4 cameras per ANPR Detector.
2. If *continuous recording* is not set up on associated cameras, there is the risk of zones (object) triggering while the cameras are not recording. To only record cameras when an object triggers, set up **Events** that trigger a recording when one of these objects is activated.

5.1.3.2 Properties Window: Access Tab
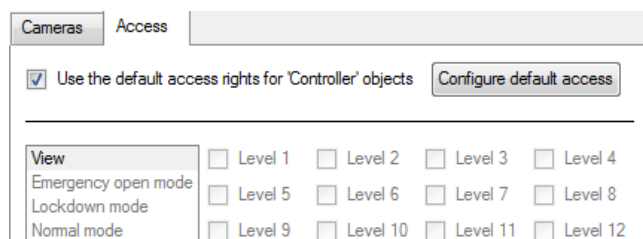
Access allows protecting sensitive objects, by only allowing certain user levels access to them.

There will be a list of objects, for which access levels can be set.

Note: If *Use default access rights* are checked, make sure the default rights have been correctly defined. Click on **Configure default access** to do this.

5.2 Object Properties Tab

The **Object Properties** tab allows viewing the objects, sorted by type. In the case of the ANPR device, there is the option of viewing by the ANPR Camera.

Use the drop-down menu to view by the different object types:

5.3 Device Events Tab

This will list real time events happening on this device. It is an excellent way for installers to see that the integration is functioning, and to monitor the live events happening on site.

5.4 Object Groups Tab

Groups of the same type of object can be created. This is useful when setting up **Events:** Instead of setting up **Events** for each individual detector, group them together according to object type.

5.4.1 Create/Edit a Group

Edit Group

Create Group

Group [dropdown]

Delete Group

If a group type is already
created, select it here.

5.4.1.1 Create a Group

Create a ne...

Create a new object group
Configure the new object group

Group name [   ]

Object type [LPR detector ▾]

OK   Cancel
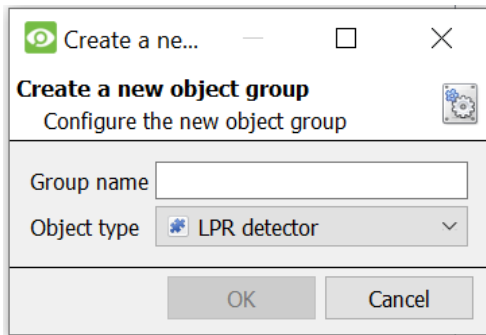
Give the group a descriptive **Group name.**

Click on the drop-down menu to select the **Object type**
to include in this group.

Select **OK** when finished.

Once the group is created, a list of **Available Objects** will appear.

Move objects from **Available Objects** to **Objects in 'Group_Name'** using the ⇨/⇦ buttons.

5.4.1.2 Edit a Group

Create a ne...

Create a new object group
Configure the new object group

Group name [Allowed Vehicles]

Object type [LPR detector ▾]

OK   Cancel
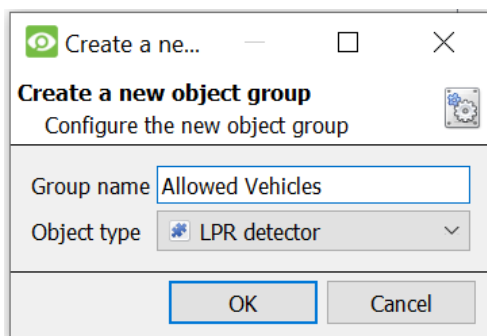
Note: Once a group is created, the Object type cannot
be edited. In order to change the Object type of a group
that has been created, delete and create another group
with the correct Object type.

5.5 General Tab
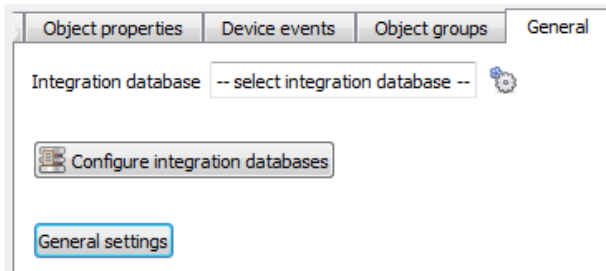
5.5.1 Database Settings

Select a pre-created database, or configure a new database.

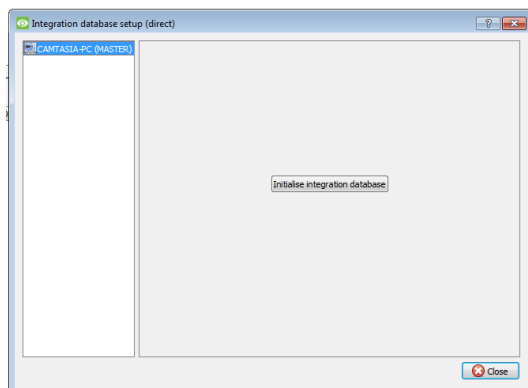#### 5.5.1.1 Select an Integration Database
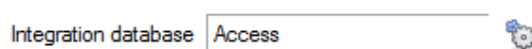
Click to select the relevant database. Only databases relating to the device being added should appear.
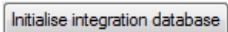
5.5.1.2 Configure Integration Database
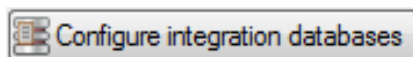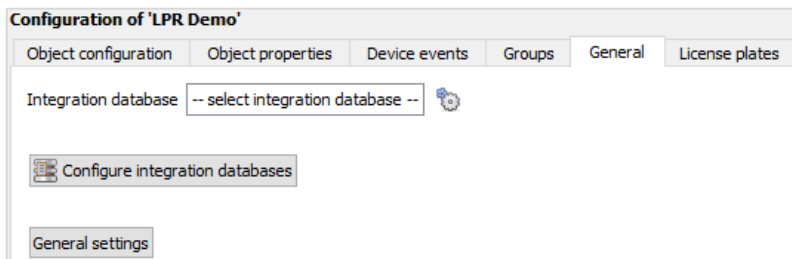
If there is no database, clicking on this button will navigate to the integration database setup.
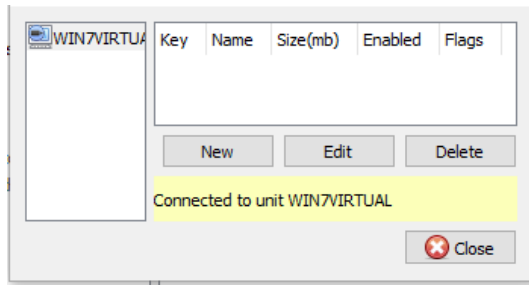
5.5.1.3 Initialise the Integration Database

The first time an integration database is added, initialise this feature on the unit. This will add a broad database, within which all of the integrated device's databases will be added.

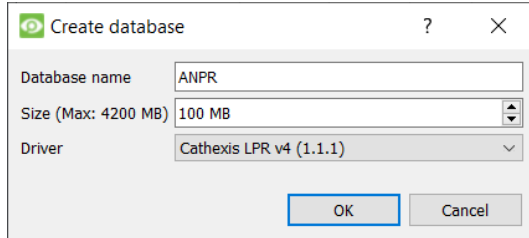Select the unit to add the database to, from the list on the left. Click .

Choose which partition the database will be formed on, and select how much space it will take up.
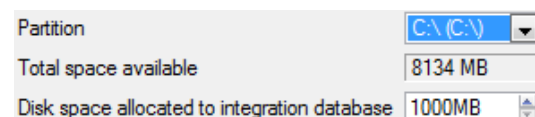
Once the integration database has been initialised, create a database for the ANPR.

→ Click **New**.

→ Give the integration database a descriptive name.

→ Set the size of the database by clicking **New** at the bottom of the New Database Screen.
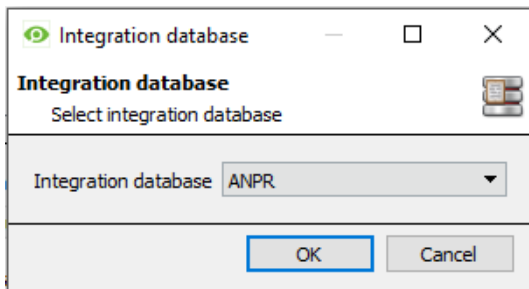
→ Select the most recent version of the Cathexis LPR drivers for a new installation. The older versions are for legacy installations.
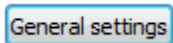
→ Click **OK**.

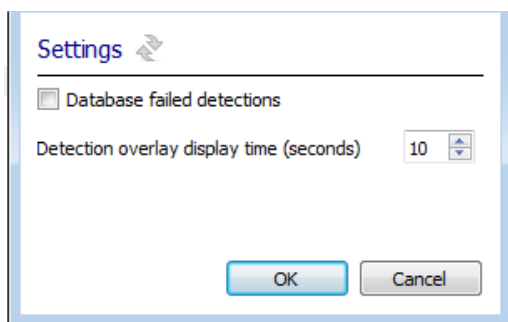In the main window, click the gear icon.

Select the newly created database from the drop-down menu.

5.5.2 General Settings

Click **General Settings** to configure general settings for the ANPR.

To enter failed detections into the database, check ☑ Database failed detections .
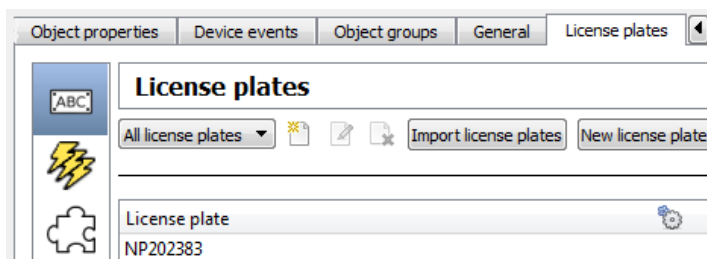
Set the **time (in seconds)** that license plate detections will be **displayed as an overlay**.
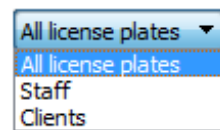
5.6 License Plates Tab

In the License Plates tab, license plates and license plate groups can be created, and traffic rules and plugins can be configured.
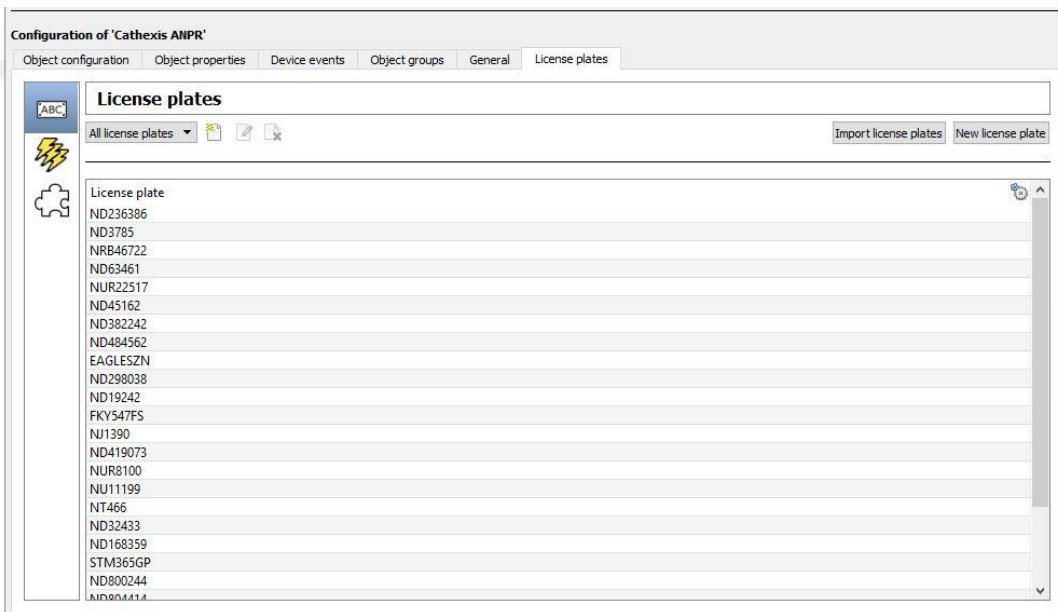
5.6.1 License Plates Section

Click the drop-down menu to change how license plates are displayed:

Display all license plates, or certain groups of license plates (if created).

5.6.1.1 License Plate Groups

Create new license plate group.

Edit name of existing license plate group.

Delete license plate group.

Tip: Groups are useful when setting up traffic rules. See below.

Once a group is selected, license plates may be added to it:
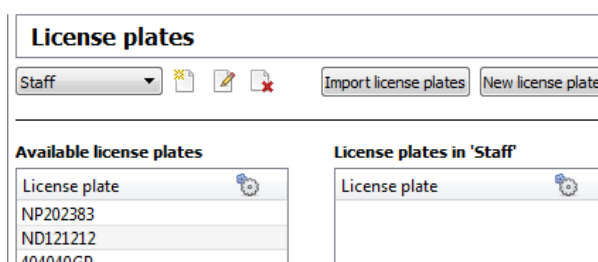
Add/remove license plates to and from the group using the arrows.

5.6.1.2 Create/Import License Plate

Import license plates Click to import an existing license plate list in CSV format.

New license plate Click to create a new license plate. See below.

New License Plate

Fill in the meta-information associated with the license plate.

Add a reference image if necessary. This may be, for example, a picture of the driver or of the car.

5.6.2 Traffic Rules Section

Traffic rules can be configured to generate messages when defined traffic patterns are detected. For example, a rule can be configured to generate a message if a license plate is seen multiple times at a given location in a certain period.

Currently, there are four rules:

Visit location	Triggers if a license plate is seen at the same location multiple times.
Visit area	Triggers if a license plate is seen at multiple locations in a given time period.
Average speed	Generates an event based on the average speed of a vehicle between two points.
Loitering traffic	Triggers if a license plate has been in an area for too long.

5.6.2.1 New Rule

→ Click **New** to add a new traffic rule.

→ Give the traffic rule a descriptive name.

→ Select the kind of rule to apply. See above for rule descriptions.

The settings options will change depending on which rule is selected. See below for appropriate rule.

Visit Location Rule

Rule Tab

Set the **number of visits** that will trigger the rule.
Set the **period of days or hours** in which these visits must occur to trigger the rule.

Locations Tab

Select the locations to be checked.
These locations are the sites at which the ANPR detectors are installed.

License Plates tab

If license plate groups have been created, they can be included in, or excluded from, the rule.

See the License Plates section for details on creating license plate groups.

Visit Area Rule

Rule Tab

Set the **minimum locations** that a license plate must visit in order to trigger the rule.
Set the **period of days or hours** in which these visits must occur to trigger the rule.

Locations Tab

Select the locations to be checked.
These locations are the sites at which the ANPR detectors are installed.

License Plates Tab

If license plate groups have been created, they can be included in or excluded from the rule.

See the License Plates section for details on creating license plate groups.

Average Speed Rule

Rule Tab

Set the locations between which the average speed will be detected.

These locations are the sites at which the ANPR detectors are installed.

Note: To edit the speed settings (from mph or kph), it is necessary to edit the regional system settings. See note below.*

Direction

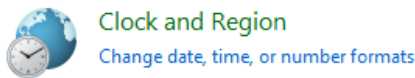Select a direction between locations, or both.

Distance

Select the distance of detection.

*Follow the instructions below to edit speed settings.

→ Visit the Control Panel.

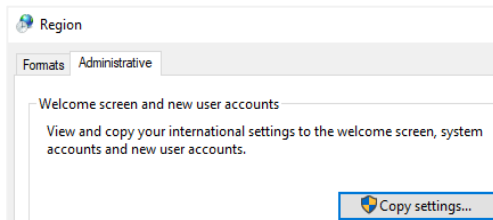→ Click on **Change date, time, or number formats** to change the region.

→ To display the reading in **mph**, change the regional system settings to **English (United States)**.
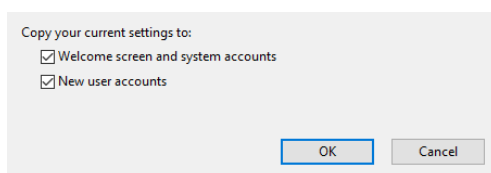
To display the reading in **kph**, change the regional system settings to **English (United Kingdom)**.
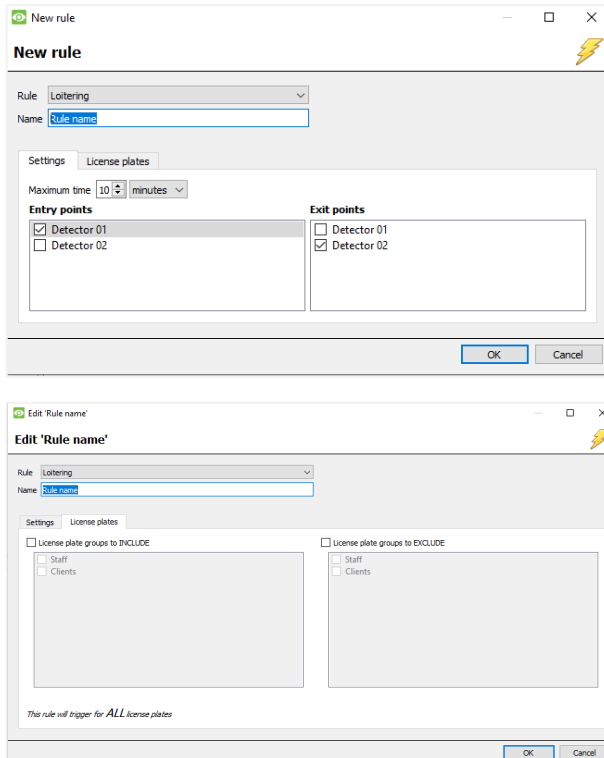

→ Move to the *Administrative* tab and click **Copy Settings**.

→ Check **Welcome screen and system accounts** and check **New user accounts**. Click **OK** to save.

Loitering Traffic Rule

Rule Tab

Select the **entry/exit cameras**. It is possible to select multiple entry/exit cameras.

Adjust the maximum time a license plate is allowed within an area, and at which point an alert will be sent according the system's configuration. The maximum time can be set from 1 minute to 24 hours.
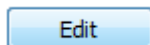

License Plates Tab

If license plate groups have been created, they can be included in or excluded from the rule.

See the License Plates section for details. on creating license plate groups.

5.6.3 Plugins Section
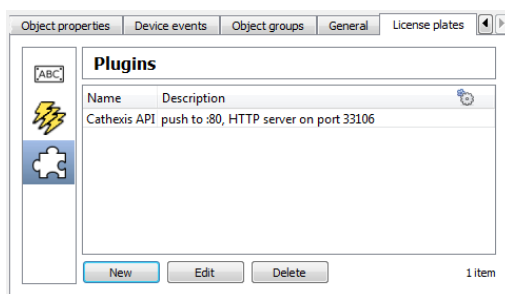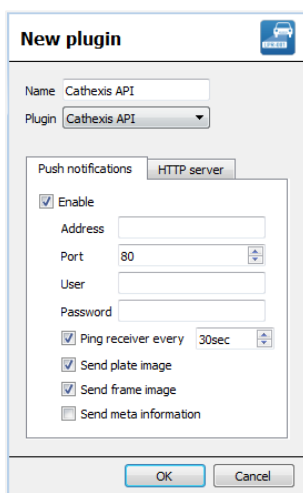

 Click **New** to configure new plugin.

 Click **Edit** to edit plugin.

 Click **Delete** to delete plugin.

5.6.3.1 New Plugin

Enter a name for the plugin.

Choose the plugin type from the drop-down menu.

Push Notifications Tab

Check **Enable** to enable push notifications.
Enter the **IP address**.
Enter the **Port number**.
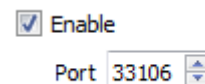Enter the **Username** and **Password**.
Set a **ping** frequency.
Click to send plate image.
Click to send frame image.
Click to send meta-information (if available).

HTTP Server Tab

Check to enable, and set port number:

6. Database

The database tab allows navigating to the databased entries for each individual database. In the database tab, each database is presented as a table. It has built in filters, and the ability to navigate by timestamp. If a database entry has an associated recording it is possible to launch this recording, from within the database tab.

Most integrations will have a different database presentation, and unique filters, due to the different parameters sent to **CathexisVision** by the integrated device.

6.1 Navigate to the Database Tab
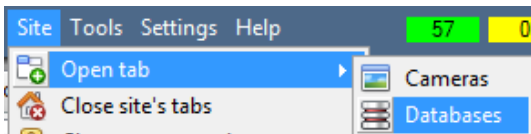
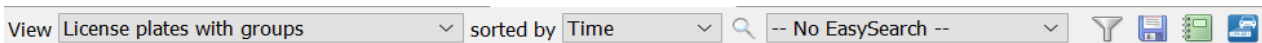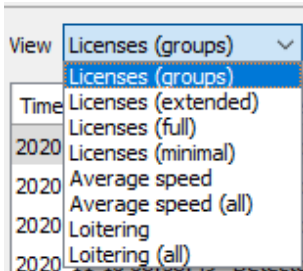Follow the path: **Site / Open tab / Databases**
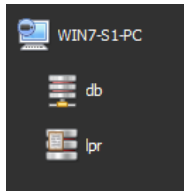
Select the relevant integration database from the databases tab.
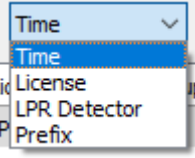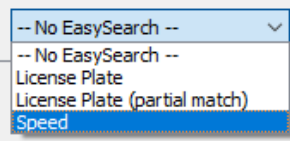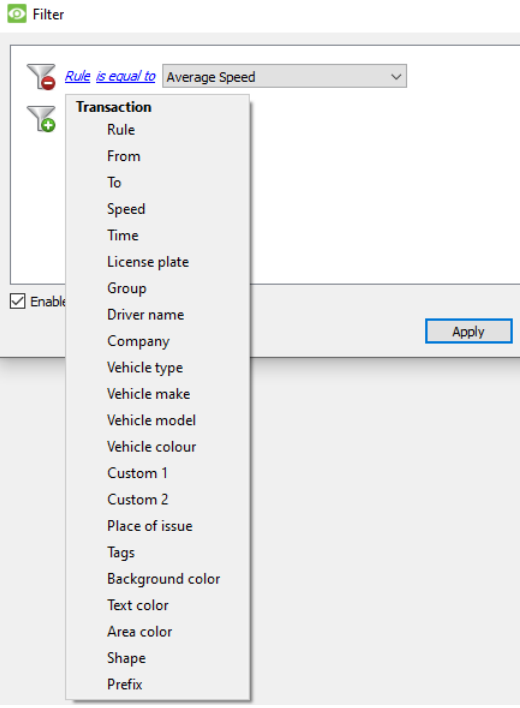
Choose the ANPR database.

6.2 Database Interface

| 1 | | 2 | 3 | 4 5 6 7 |

1	**View**	The user may change the way that the database is presented. Some integration databases have multiple view options.
		Note: Supported Dahua cameras and cameras integrated with the FF Group plugin allow for the detection of a vehicle's type, make, model and colour. When this detection has been configured, selecting the **Licenses (full)** view will display this detection data.
		For more information, consult the *CathexisVision FF Group LPR Integration App-note*, available on the Cathexis website (https://cathexisvideo.com).
2	**Sorted By**	Events can only be sorted by certain parameters.

		Time ⌄ **Time** License LPR Detector Prefix	
3	**Easy Search**	-- No EasySearch -- ⌄ -- No EasySearch -- License Plate License Plate (partial match) **Speed**	The EasySearch option lets the user quickly search the database.
4	**Filter**	Filter offers a more advanced manner of sorting information in the Integration Database table. Once the filters dialogue is open, the following filter options are available: 1. To **enable** filters check this box: ☑ Enable filters 2. To **add** a new filter click on 🔽➕. 3. To **delete** an added filter click on 🔽➖. It is possible to filter the same perameters more than once. To change a filter, click on the blue hyperlinked text. (For example, click on *Timestamp* to change the filter from Timestamp to any of the other available options.) The filter options in this integration are: 👁 Filter *Rule* *is equal to* Average Speed ⌄ **Transaction** Rule From To Speed Time License plate Group Driver name Company Vehicle type Vehicle make Vehicle model Vehicle colour Custom 1 Custom 2 Place of issue Tags Background color Text color Area color Shape Prefix ☑ Enable ... Apply **Note**: 1. Multiple filters may be run simultaneously. 2. The filter icon 🔽 will change to 🔽 when filters are active.	
5	**Export**	Generate metadatabase reports in PDF or CSV format. See below.	
6	**Scheduled Reports**	Click this to create and manage scheduled metadatabase reports. See below.	
7	**Go to Time**	This navigates to a specific point in time, down to the second. To navigate to a timestamp set the time using the time and date boxes, and then click on the ➡ icon.	

6.2.1 Scheduled Metadatabase Reports

→ Click this icon to open the scheduled report window.
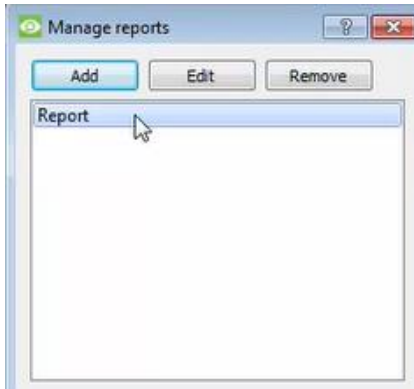
All created reports will be listed here.

First, click **Add** to create a report. Then edit to define the reporting schedule. See below for more detail.

To create, edit, or delete a report, select the entry and click on the corresponding button.

6.2.1.1 New Scheduled Report

→ Click Add and give the report a description. Click OK when done.
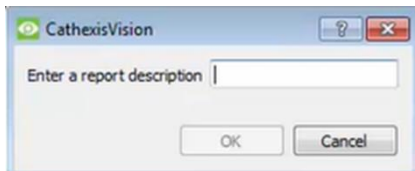
→ Once the new report is listed with the other reports, select it for editing to define the reporting schedule.

→ Either right-click the entry and select **Schedule**, or select the entry and click the **schedule button** at the bottom of the screen:
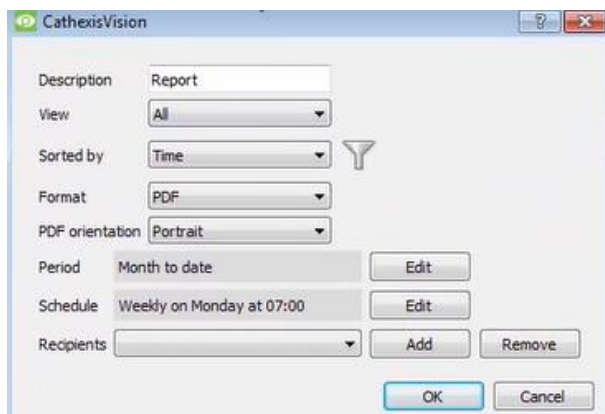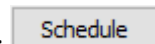
→ Edit the **description** if needed.

→ Edit **Viewing** options.

→ Select the **Sorted by** option.

→ Select the **Format**.

→ Select the **Orientation** of the Format.

→ Select the **period** to be reported on.

→ Define the **Schedule** for the report.

→ Add/remove recipients to whom reports will be sent.

Add recipient: Click Add and enter the email address of the recipient. Multiple recipients may be added. All will receive emails.

Remove recipient: Select the recipient from the dropdown menu and click Remove.

6.2.1.2 Generate Metadatabase Reports

Click this icon to open the Export window.

Select the **Period** to export, and enter the required details.

Click **Next**.

Select the **Format** to export the report in; either CSV or PDF.

See below for the two options.

Export CSV

Select CSV **Format**.

Edit the **Filename** by either entering it straight into text field (replacing **report.csv)**, or click the folder icon to choose a new save folder and filename.

Export PDF

Select PDF **Format**.

Give the PDF a **Heading**.

Select either Landscape or Portrait **Orientation** of the PDF.

Edit the **Filename** by either entering it straight into text field (replacing **report.csv)**, or click the folder icon to choose a new save folder and filename.

6.2.1.3 Viewing an Entry's Associated Recording
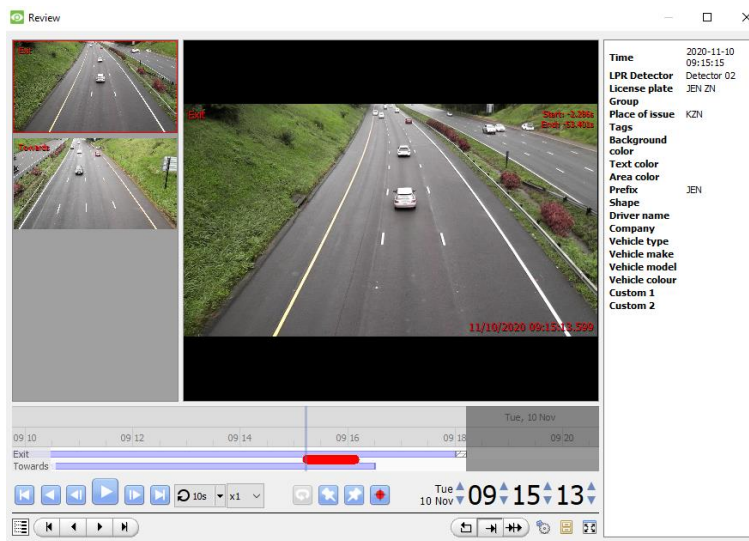
If cameras are attached to device objects in the Integration setup, and these cameras are set up to record continuously, each Integration database entry will have a corresponding recording.

To view a databased event's recording click on the event, and the video feed will appear in the replay area in the database.

7. Events

A **CathexisVision** event has a trigger, which causes an action. Set integrated devices to act as triggers, or as actions. This section is a guide to the creation of an **Event** and a **Trigger**.

For a comprehensive guide to Events, please consult the *CathexisVision Setup Manual*.

7.1 Creating Events

Setup Tab / Configure Servers / ⚡ Events **/** ▭ New

Give the event a descriptive name.

Give the event a **Description** for reference when **Databased** or when **Sent as an Alarm**.

❓ Click on the question mark icon to see a list of available descriptions.

Create/**Edit** recording schedules.

Set **Priority** level of event.

7.1.1 While/When and Any/All

When triggering on a door, there is the option to trigger **while/when** a trigger is active. It is also possible to select multiple triggers, and define whether **all/any** of the triggers need to be active to set-off an event.

7.2 Creating Triggers

A trigger is the user defined input that tells the event to start. The trigger causes the subsequent action, which the user will also define.

Setup Tab / Configure Servers / ⚡ Events **/** ▭ New **/ Triggers tab.**

7.2.1 Set Device as the Trigger

If creating a new event, the trigger type will default to: Use *standard triggers* . To define which device should trigger the event, click on the hyperlink after "use". To set it as the **ANPR device**, click on the hyperlink, and select the relevant device name from the drop-down menu.

Once the ANPR device to **trigger the event** is chosen, the window will present different **Trigger Type** options**:**
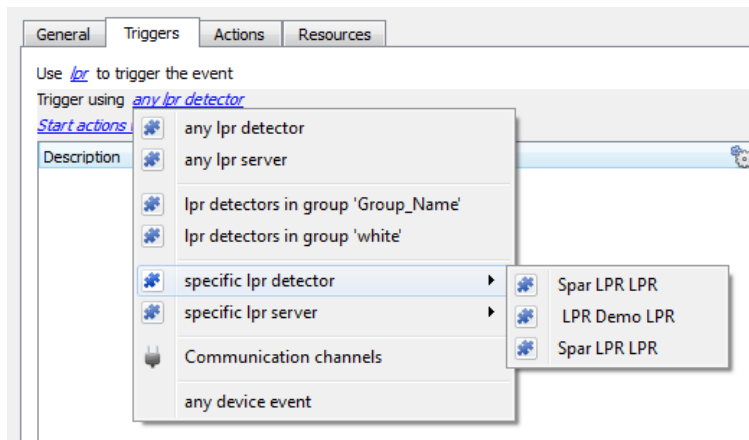
Any object (ANPR detector/server) will trigger an event if any of the chosen objects send information.

Trigger an event using **groups** that have been created.

Specific ANPR detectors/servers will trigger an event only if the specific device sends information.

Any device event will trigger on any event that occurs on the device. Within the "any device event" setup, set "device event rules", which will constrain which device events will trigger the event.

7.2.1.1 Databasing Group Triggers

For this event to be databased under the name of a specific object, and not the name of the triggering group, modify the **Description** field in the **General tab** of the **Event** setup.

7.3 Adding Triggers to an Event

After selecting a trigger type, add a trigger to the event. Click [New] on in the **Triggers** tab. This will bring up the dialogue box, where rules for triggering an event can be set.

7.3.1 Any Device Event: Adding Trigger Constraints

If **Any Device Event** is selected to trigger an event from the drop-down menu in the previous section, then the following window will be presented:

Click to select *any* / *all* from the drop-down menu.

Note: Multiple constraints may be set. These constraints need to be fulfilled to set off a trigger.

Click to **Add/Edit/Delete** a constraint**.**

Clicking **Add/Edit** will bring up the window below.

7.3.2 Add/Edit Constraints

To change the constraint, click on the first hyperlink; this will bring up the full list of available rules.

To modify the way this rule will be treated click on the second hyperlink; this will display the rules options.

Note: When all available options are known to **CathexisVision**, a drop-down menu will appear. When these variables are not pre-defined, fill them in. The information pulled through to the events is information sent to CathexisVision from the ANPR device. See either the ANPR settings, or the **Integration devices** / **Device Events**, for the strings needed here.

7.3.3 Any Device Event: Adding Triggers

If **Any object (ANPR Detector/Server)** is chosen to trigger events, the triggers will have a slightly different setup window. In these instances, it is not necessary to set constraints, since they are being added one at a time. This option is better if there are a few select triggers in use.
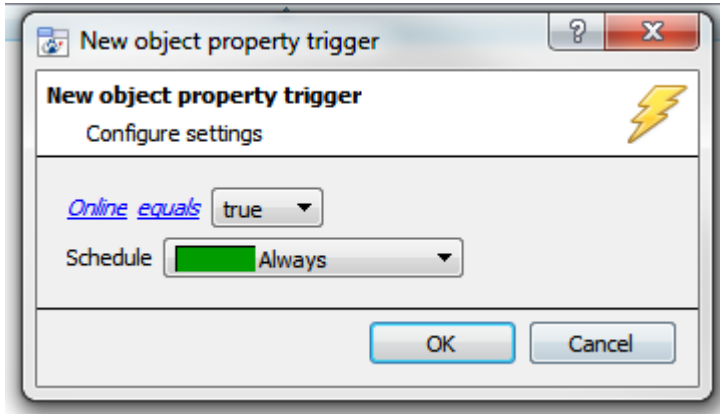
Since only one type of object is used to trigger the event in this instance, the dialogue will appear as the **New Device Event Rule** window did previously.

Note: this is true for groups too, since a group may only be made up of one object type.

7.4 Actions

Once the triggers that are going to initiate the event are defined, define some Actions.

Many integrations have the **Action option** to control the integrated device; because of the nature of this integration this option is not available with the ANPR device. However, choose any of the **CathexisVision Action options**, which are detailed extensively in the *CathexisVision Setup Manual*.

8. Site Optimisation (All)

Site optimisation is critical to the efficiency of the CathexisVision ANPR detection. Each site presents a unique set of parameters that will need to be specifically configured for the environment in which the ANPR is required. To assist with the site ANPR setup, CathexisVision provides the ANPR engine operation statistics, which indicate the performance of the engine. Running through these statistics as an optimisation 'checklist' will increase the efficiency of the ANPR detection.

8.1 Check for System Issues

To ensure that there are no system issues hindering the detection, consult the status bar at the bottom right-hand corner of the GUI. There, there are warnings concerning unlicensed engines, possible detector delays, and similar issues.

 Click the ANPR icon to display ANPR-specific information about the site.

8.1.1 LPR Cannot Process Video Fast Enough

This warning is shown if the average processing time far exceeds the norm for the various plate types (e.g., Latin 100ms, and Arabic 200ms). There are ways to reduce the average processing time. See below.
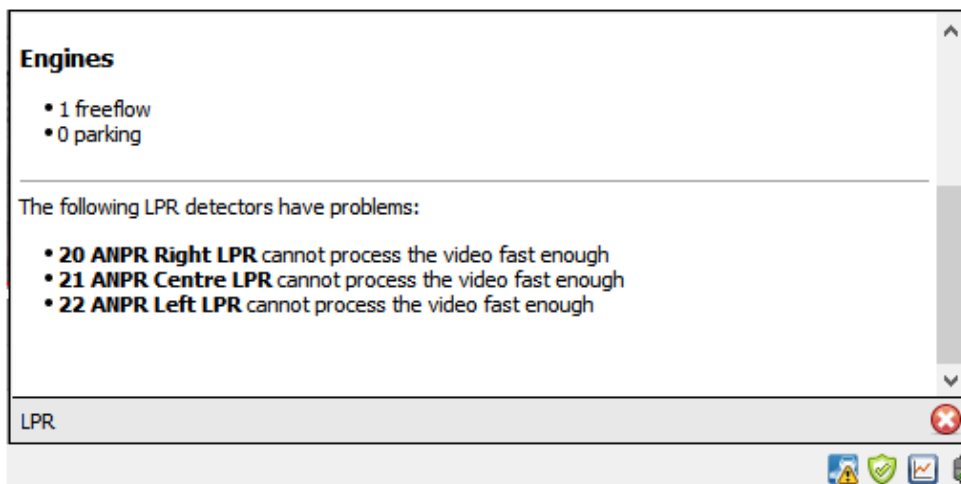
8.1.1.1 Improve Average Processing Time

- Reduce the sensitivity of the motion trigger to increase the percentage of 'frames with licenses.' Consult the ANPR stats for this information.

- Position the camera to avoid unwanted motion triggers, such as people walking past or a busy road adjacent to the detection area.

- Reduce the frame rate of the detector – the default is 5fps.

- Reduce the resolution and framerate of the ANPR video feed.

8.2 Statistics

These statistics can be accessed via: **Help Menu / Local Server Stats / Others / LPR**

- Decode queue: If not clearing to 0, check the presented frame rate, CPU load, and detector sensitivity.

- Pop f/s: Should be almost the same as the detector settings.

- Timings: Min/average/max   time to process a frame.

- Frames with Licenses: The higher the percentage the better.

- Ensure that the long-term incoming frame rate is lower than the ability of the server/engine to consume frames. A good example is to check the average processing time per frame against the framerate. If the average processing time is higher than the inter-frame time, there will be a processing bottleneck. If the engine can only process at 5fps (200mS/frame) then presenting it at 8fps is not efficient.

8.3 Cameras

- The recommended camera resolution is HD: 1MP to 2 MP.

- If the number plate image is not sharp enough, increase the shutter speed. The standard is 1/500. If the shutter speed is too fast, there will not be sufficient light on the image. Make small incremental changes and test.

- Check the positioning of the camera such that the license plate orientation to the camera is as constant as possible - no turns or bumps.

- Check that the time the license plate is in the detection zone for is long enough to capture sufficient frames for processing.

8.4 Servers

- Check that the most current CathexisVision software is loaded.

- Check that the most current ARH Carmen software and engine is loaded.

- Each FreeFlow engine requires a single CPU core, check the CPU individual core loads.

- An i7 CPU is recommended for an ANPR application with high traffic flow at any time.

8.5 Detectors

- Check the system trigger is correct.

  - For a Triggered (parking) application, the ground loop or IR beam functionality must be checked.

  - For a FreeFlow application using the motion trigger, adjust the sensitivity: check the "frames with licenses" in the Stats for as high a percentage as possible. The higher the sensitivity, the lower the percentage of frames containing license plates will be.

- Check that the detection frame rate is within the capabilities of the engine to process them timeously. Refer to the stats for this information.

- Adjust the valid detection parameters as required – e.g. 2 out of 3 frames, 2 out of 4 etc.

  Note: The minimum time for a full detection is determined by these settings. With a 150mS frame processing time, the minimum detection value is 2x150mS = 300mS.

- When selecting the valid detection parameters (2 out of 3 frames, 2 out of 4 frames etc.), the required accuracy or the speed of the detection must be taken into consideration.

  - For a high security application, 4 out of 5 frames would probably be required but the detection times would be increased.

  - For a shopping centre, 2 out of 4 frames will provide a quicker detection time but less accuracy.

9. Conclusion

This app-note was designed to deal specifically with this integration. For further information about the CathexisVision software, consult the *CathexisVision Setup Manual* (https://cathexisvideo.com/).

For support, email support@cathexisvideo.com.