



asura

Asura Recognition Unit

Vehicle identification plugin for
Milestone XProtect VMS



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ABOUT ASURA TECHNOLOGIES

Asura Technologies is driven by the idea to create easy to integrate, camera-vendor independent visual data collection systems and image/video analytics software based on AI technology for the security, surveillance, parking and traffic management industries.

Asura Technologies made its debut with the Asura Recognition Unit (ARU) Plug and Play LPR in 2017 delivering an easy-to-integrate, flexible solution. ARU earned a quick recognition by earning a Special Mention at 2018 Intertraffic Innovation Awards.

ABOUT ARU

Asura Recognition Unit (ARU) is a data collection software using machine learning enhanced video analytics for complete vehicle identification. Its modular design allows matching the desired identification and authentication requirements as well as the budget constraints of a given task or project. ARU can be used on various fields of parking and traffic management:

- ✓ Surveillance and VMS solutions
- ✓ Traffic and law enforcement
- ✓ Parking and Access control
- ✓ Tolling and ITS

ARU PLUGIN FOR MILESTONE XPROTECT VMS

There are several features of ARU implemented into Milestone XProtect VMS by a plugin. Through the integration your business can easily benefit from the vehicle recognition capabilities of ARU. You can monitor events live or track back security breaches or other specific events.

- ✓ Live view and playback
- ✓ Browse, filter and check the recognition details of specific events (vehicles)



GENERAL FEATURES

Generally, ARU recognizes and identifies vehicles along with some extra features that make it easy to use under any circumstances in security, parking, or traffic enforcement.

VEHICLE IDENTIFICATION



License Plate Recognition

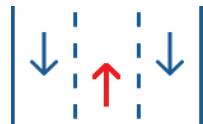


Make and Model Recognition



Color and Classification

TRAFFIC ANALYTICS AND OTHER FEATURES



Wrong way detection

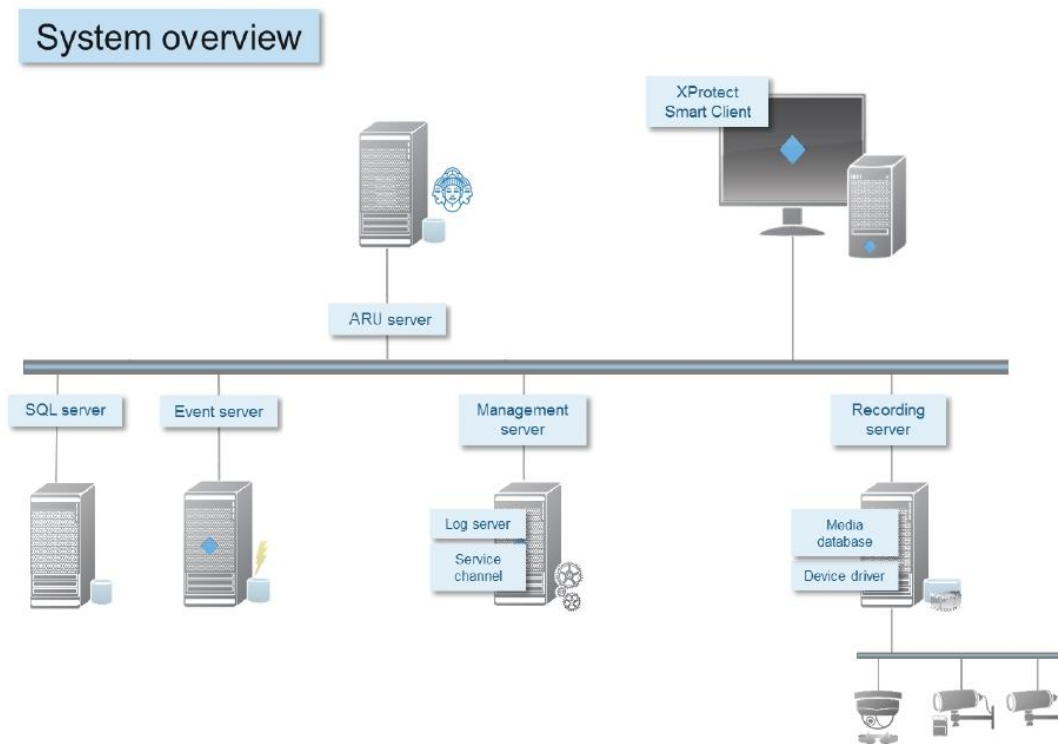


Multi-lane recognition



INTEGRATION WITH MILESTONE

ARU connects to the video stream, processes the images and recognizes events (vehicles, make, model and license plates). Upon a recognition it sends an Alarm into Milestone Server which is displayed in the XProtect Smart Client platform.



REQUIRED SOFTWARE COMPONENTS

- ✓ Windows 7 or above
- ✓ **Milestone XProtect 2018 R3. Licenses: Express+, Professional (+), Expert, Corporate**
- ✓ **Milestone XProtect Smart Client 2018 R3**
- ✓ **ARU v3.1 or higher**

For hardware requirements for ARU, visit this link: <http://wiki.asuralpr.com/display/TSKB/System+requirements>



BEFORE INSTALLING ARU

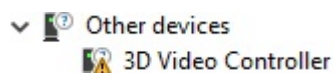
Prior to the installation we strongly recommend checking whether your hardware specification and configuration meet the requirements. In order to do that follow the steps below.

Make sure that you have the required GPU according to specifications and check the driver as well.

Log in to the Device Manager and search for the installed GPU within the Display Adapters-

The required GPU is an NVIDIA Quadro P400 or better. The GPU must comply with NVidia GPU CUDA capability 3.0.

If the driver of the GPU is NOT installed, only the Basic Adapter will show up within the Device Manager and you will see the following text:

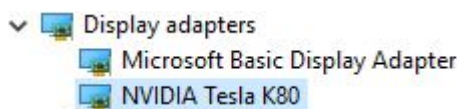


In this case, download and install the driver from the NVIDIA website:

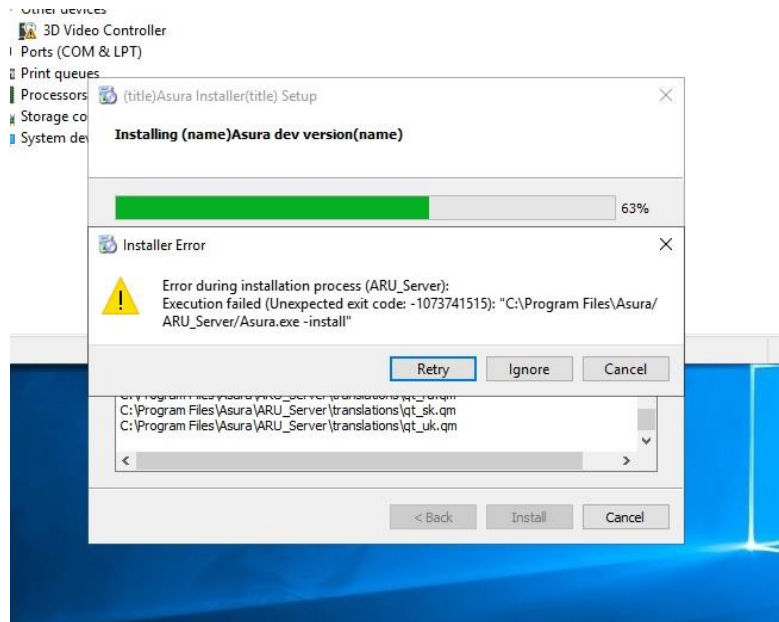
<https://www.nvidia.com/Download/Find.aspx?lang=en-us>

IMPORTANT: the driver must support CUDA toolkit 10.0 or a higher version.

After finishing the installation, the device will show up among the Display Adapters.



In case the device or the driver installation fails these requirements, you will get the following notification while installing ARU:



ARU INSTALL GUIDE AND USER’S GUIDE

You can find the complete user’s guide and install guide of ARU at the Asura Knowledge Base by following the link below:

<http://wiki.asuralpr.com/display/TSKB/ARU+User%27s+Guide>

INSTALLATION OF ARU

Follow the steps below to set up the system:

1. Download the ARU package from the link you have received from Asura Technologies.
2. Run the setup file for installation.
3. When the installation is finished the ARU Server and ARU Manager applications will run as Windows Services automatically.
4. Stop the Milestone XProtect Event Server, close the XProtect Management Client and the XProtect Smart Client.

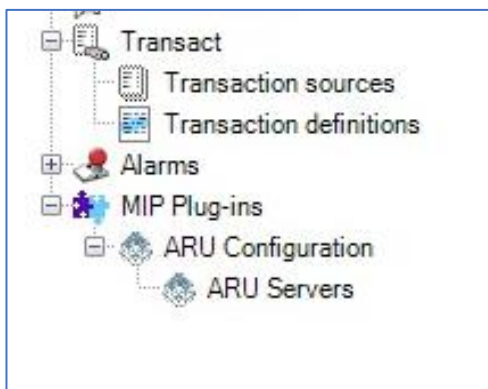


5. Save the AsuraMilestonePluginsSetup.exe file that you receive from Asura to your computer.
6. Run the installer file and press “Next” when the software asks, then press Install.
7. Start the Milestone XProtect Event Server upon successful installation.

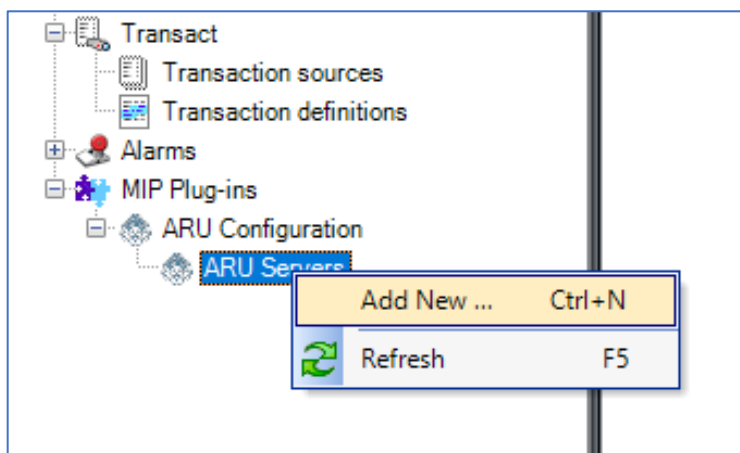
SET UP ARU IN THE MANAGEMENT CLIENT

First you need setup the ARU Manager in the XProtect Management Client.

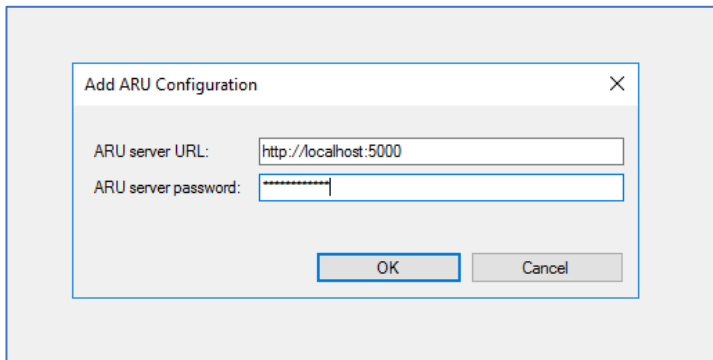
1. Log in to the XProtect Management Client.
2. Expand the MIP Plug-ins directory at the bottom.



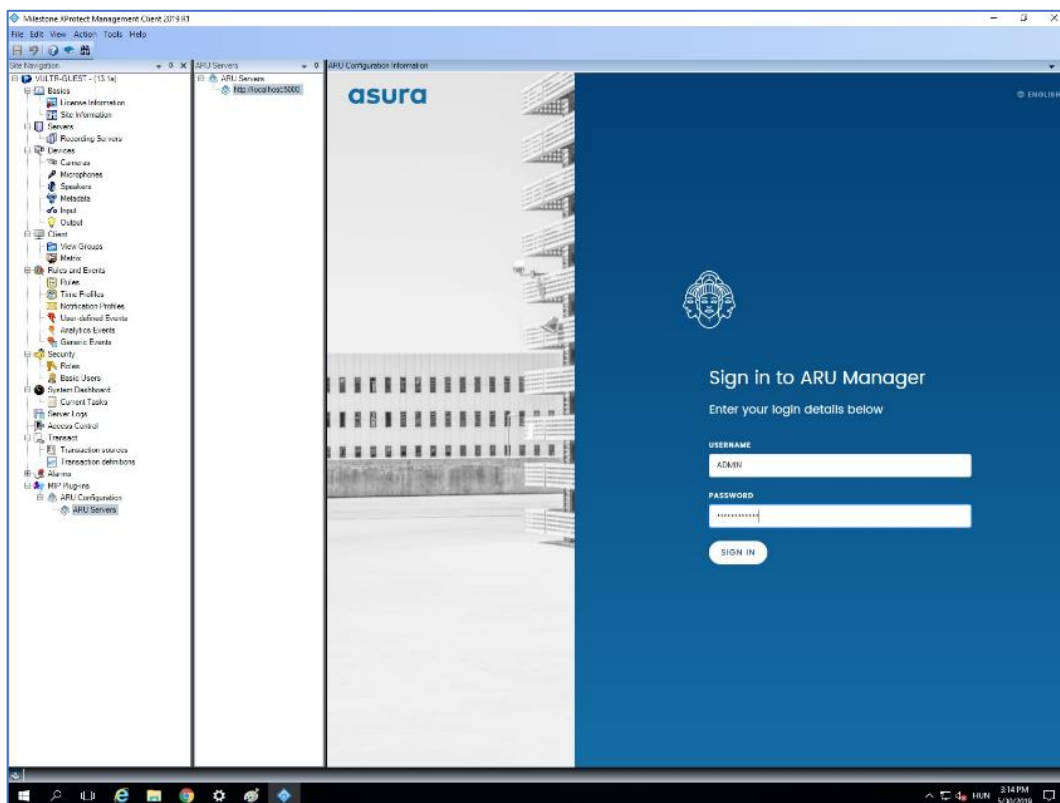
3. Right click on ARU Servers and press Add New.



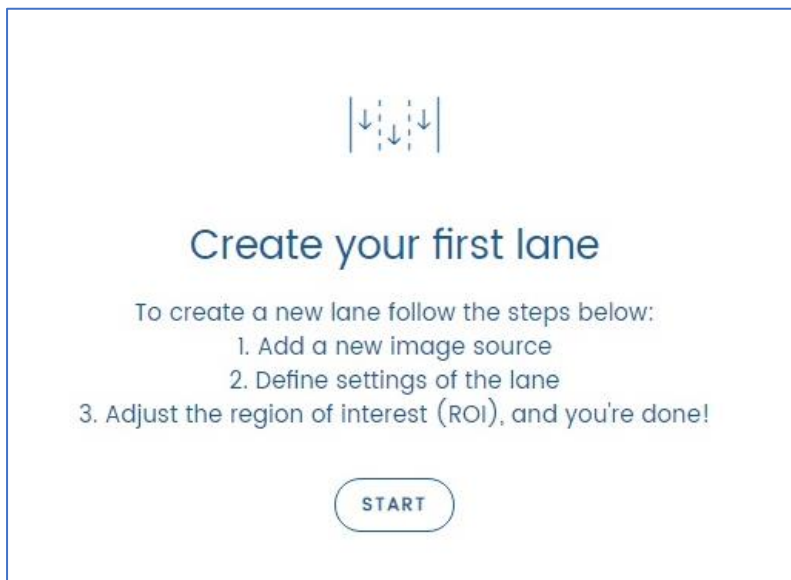
4. Type the ARU server URL: <http://localhost:5000> and the password you receive from Asura in the pop-up window. (For the demo version of ARU the default password is “password1234” , no need to type Login here.)



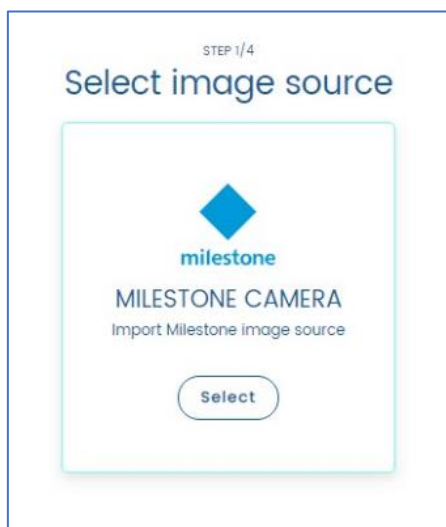
5. The ARU Manager appears in the right window. Enter the login and the password to access the ARU Manager. The default username is ADMIN.



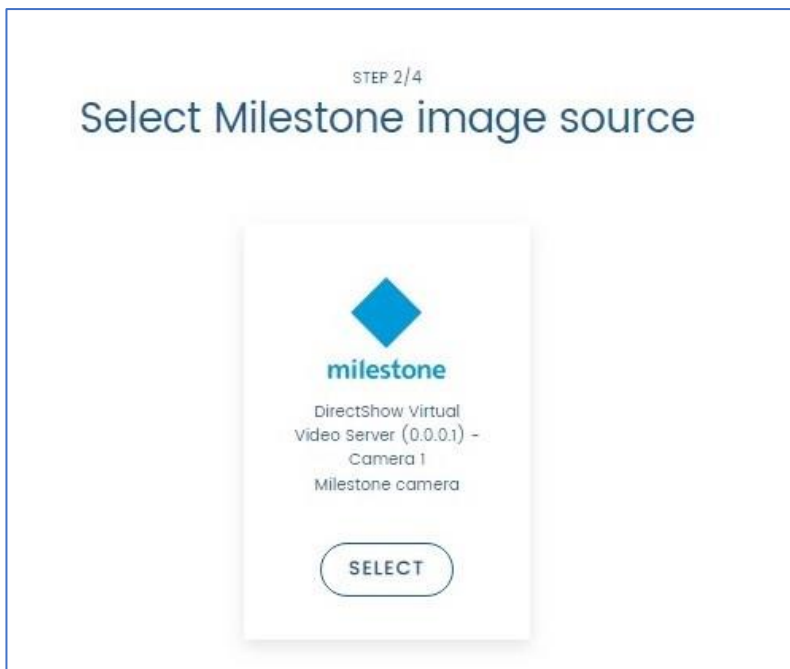
6. Click START to set your cameras.



7. Press Select to download the cameras from Milestone.



8. Select a camera from the list.



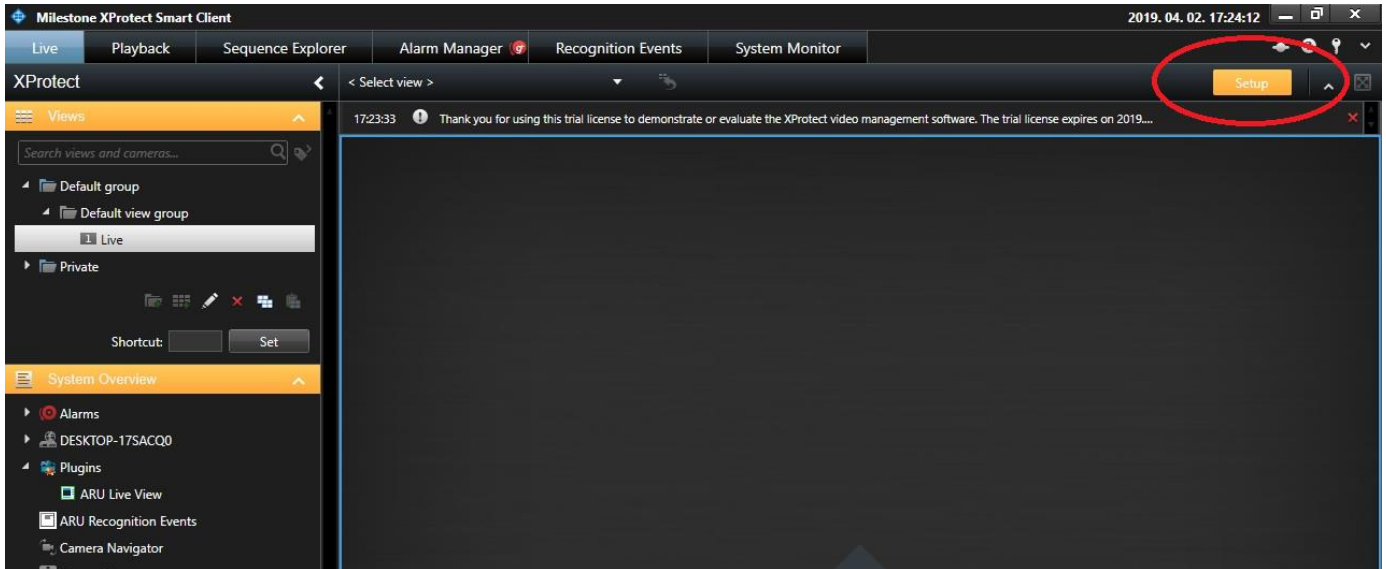
9. For further settings please refer to the ARU Users Guide by following the link below:
<http://wiki.asuralpr.com/display/TSKB/ARU+User%27s+Guide>



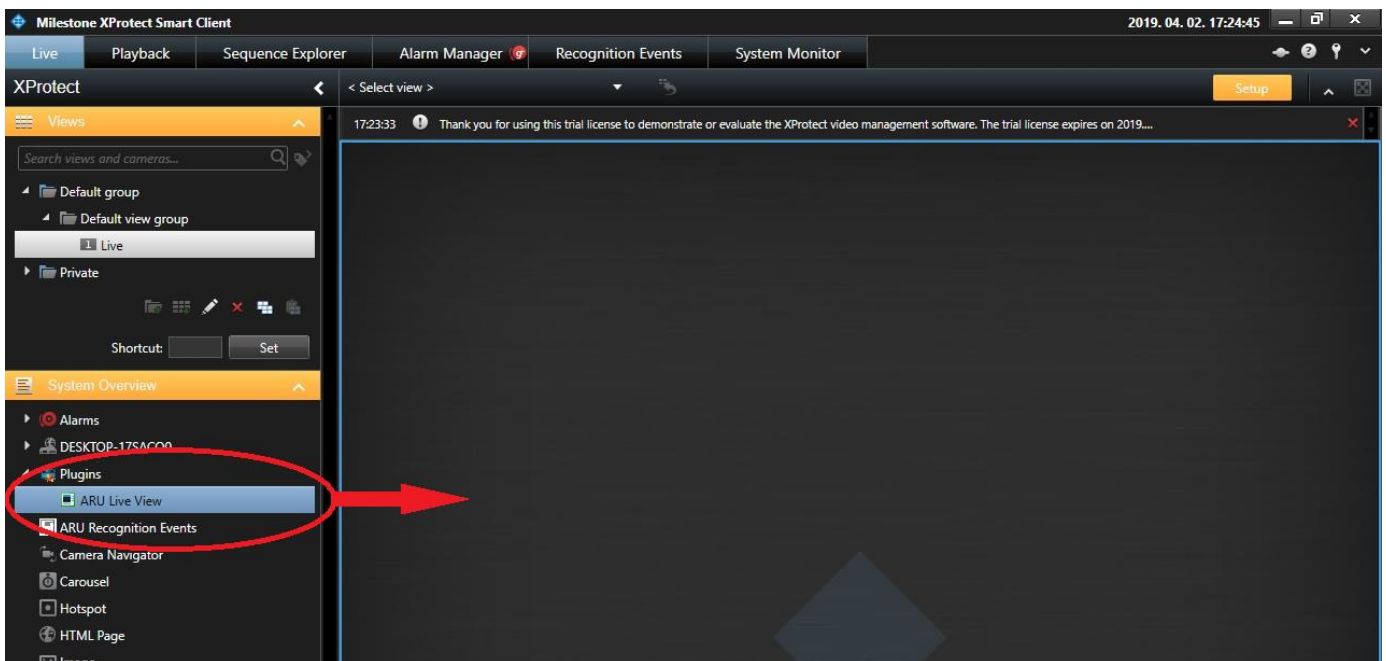
SETUP ARU IN THE SMART CLIENT

Follow the steps below to enable live monitoring within the Milestone XProtect Smart Client

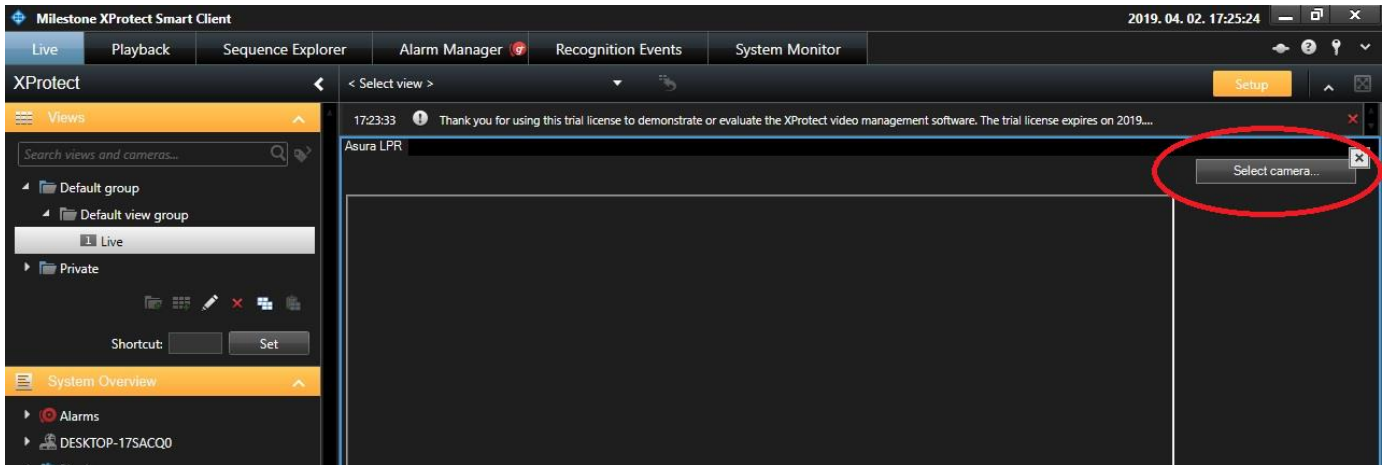
1. Click Setup



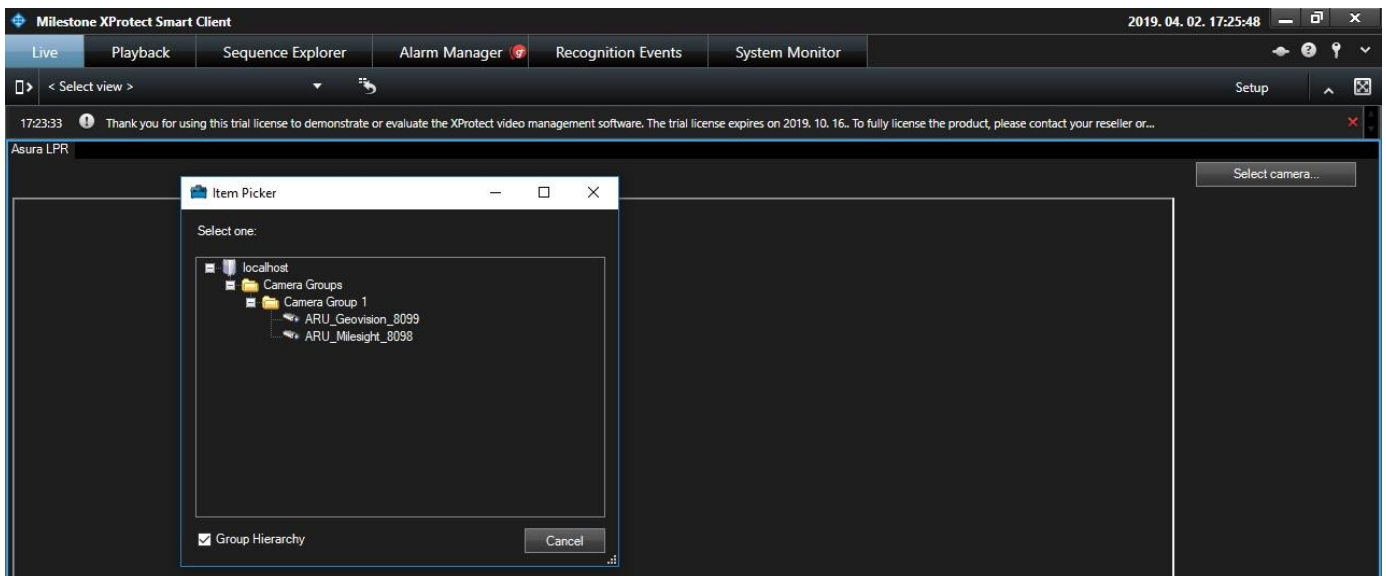
2. Expand the menu item "Plugins" and drag and drop *ARULiveView* to the empty view on the right.



3. Click on Select Camera button in the top right corner.



4. The available Milestone servers and cameras are listed, expand to pick the camera you want to use.



- 5. Click on the camera name of your choice.
- 6. The camera Live Streaming will start. Once the camera is activated the LPR results will be displayed on the right side of the window.

You can monitor the video stream of the camera and the latest results on the **Live** tab and browse all historical events on the **Asura events** tab.



FEATURES

LIVE VIEW

As a general feature of XProtect VMS, you can monitor the video stream in live view mode. The information is streamed real time after being processed on the recognition server. You can also see the detailed results and access the playback feature within the live view mod.

The screenshot displays the Milestone XProtect Smart Client interface. The main window shows a live video feed of a street scene with several cars. On the right side, there is a list of detected vehicles with their license plates, timestamps, locations, and models.

License Plate	Timestamp	Location	Model
HPJ815	2019.03.29 14:12:43.297	Hungary	Opel Meriva green
IPR367	2019.03.29 13:51:19.940	Hungary	Fiat Ducato gray, white
LKX708	2019.03.29 13:51:17.290	Hungary	gray, blue
HH648	2019.03.29 13:51:14.067	Hungary	gray
NHH768	2019.03.29 13:51:13.517	Hungary	Opel Corsa red
NNW201	2019.03.29 13:43:46.853	Hungary	Opel Vivaro yellow
KMV851	2019.03.29 13:43:38.647	Hungary	gray, green
KE5324	2019.03.29 13:43:33.137	Hungary	Toyota RAV 4



PLAYBACK

By clicking on any of the results displayed in the right side of the window, you can get access to more detailed information and the playback option.

1. Playback view
2. The latest recognized image
3. Cropped image of the plate
4. Recognized text, date and time of event, Make and Model, color, and country of origin

The screenshot shows the Milestone XProtect Smart Client interface. The main window displays a video playback of a street scene with several cars. Four numbered callouts (1-4) point to specific features: 1. The video playback controls, 2. A red car in the video, 3. A cropped image of a license plate (NHH-768), and 4. A metadata panel for the red car. The metadata panel lists the following information:

- Timestamp: 2019.03.29 13:51:13
- Plate number: NHH768
- Image source: ARU_Geovision_8099
- Country: Hungary
- Make and model: Opel Corsa
- Vehicle color: red

On the right side of the interface, there is a list of detected vehicles with their respective details:

- HPU815**: 2019.03.29 14:12:43.297, Hungary, Opel Meriva, green
- IPR367**: 2019.03.29 13:51:19.940, Hungary, Fiat Ducato, gray, white
- LKX708**: 2019.03.29 13:51:17.290, Hungary, gray, blue
- HHE648**: 2019.03.29 13:51:14.067, Hungary, gray
- NHH768**: 2019.03.29 13:51:13.517, Hungary, Opel Corsa, red
- NNW201**: 2019.03.29 13:43:46.853, Hungary, Opel Vivaro, yellow
- KMV851**: 2019.03.29 13:43:38.647, Hungary, gray, green
- KE5324**: 2019.03.29 13:43:33.137, Hungary, Toyota RAV 4, gray



RECOGNITION EVENTS

Browsing all the recorded data within the retention period is available for users at any time, along with additional features like filtering or validating any result by checking its image when detected.

Timestamp	Platenumber	Source name	Country	State	Make and model	Vehicle color	Vehicle lists
2019.03.29 14:12:43	HPU815	ARU_Geovision_8099	Hungary		Opel Meriva	green	
2019.03.29 13:51:19	IPR367	ARU_Geovision_8099	Hungary		Fiat Ducato	gray, white	
2019.03.29 13:51:17	LXX708	ARU_Geovision_8099	Hungary			gray, blue	
2019.03.29 13:51:14	HHE648	ARU_Geovision_8099	Hungary			gray	
2019.03.29 13:51:13	NHH768	ARU_Geovision_8099	Hungary		Opel Corsa	red	
2019.03.29 13:43:46	NNW201	ARU_Geovision_8099	Hungary		Opel Vivaro	yellow	
2019.03.29 13:43:38	KMV851	ARU_Geovision_8099	Hungary			gray, green	
2019.03.29 13:43:33	KES324	ARU_Geovision_8099	Hungary		Toyota RAV 4	gray	
2019.03.29 13:43:07	IYZ660	ARU_Geovision_8099	Hungary			blue	
2019.03.29 13:43:01		ARU_Geovision_8099			Skoda Octavia	gray, white	
2019.03.29 13:43:01	KCX767	ARU_Geovision_8099	Hungary		Kia Sorento	gray	
2019.03.29 13:42:57	NSZ402	ARU_Geovision_8099	Hungary		Skoda Superb	gray	
2019.03.29 13:42:54	MAY229	ARU_Geovision_8099	Hungary		BMW 116	gray	
2019.03.29 13:42:48	HVE051	ARU_Geovision_8099	Hungary		Fiat Bravo	purple	
2019.03.29 13:42:37	RAG975	ARU_Geovision_8099	Hungary		Volkswagen up!	white	
2019.03.29 13:42:34	NCC167	ARU_Geovision_8099	Hungary		Ford Transit Connect	gray	
2019.03.29 13:42:17	JRK572	ARU_Geovision_8099	Hungary		Suzuki Swift	white	
2019.03.29 13:42:15	PVB769	ARU_Geovision_8099	Hungary		Opel Combo	gray, blue	
2019.03.29 13:42:10	LAS375	ARU_Geovision_8099	Hungary		Audi A6	black	
2019.03.29 13:41:25	MVY991	ARU_Geovision_8099	Hungary		BMW X4	white	
2019.03.29 13:41:15	LSX213	ARU_Geovision_8099	Hungary		Opel Astra	blue	
2019.03.29 13:40:45	PIU301	ARU_Geovision_8099	Hungary		Dacia Lodgy	white	
2019.03.29 13:40:43	LRU571	ARU_Geovision_8099	Hungary		Volvo C30	yellow	
2019.03.29 13:40:30	EDG946	ARU_Geovision_8099	Hungary		Volkswagen Touran	yellow	
2019.03.29 13:39:58	NBD967	ARU_Geovision_8099	Hungary		Toyota Prius	white, gray	
2019.03.29 13:39:38	NCB789	ARU_Geovision_8099	Hungary		Mercedes-Benz Sprinter	gray	
2019.03.29 13:39:18	PGD240	ARU_Geovision_8099	Hungary		Ford Transit Connect	blue, white	
2019.03.29 13:39:15	LZM115	ARU_Geovision_8099	Hungary		Nissan NV200	white, gray	
2019.03.29 13:39:09	LLB866	ARU_Geovision_8099	Hungary		Ford Fiesta	red	
2019.03.29 13:38:57	PZZ491	ARU_Geovision_8099	Hungary		Suzuki Vitara	gray	
2019.03.29 13:38:36	KOT274	ARU_Geovision_8099	Hungary		Ford Focus	blue	

In order to facilitate going through all the data, the user can use the below filtering criteria:

1. **Start date:** first day of the results to be fetched
2. **End date:** last day of the results to be fetched
3. **Plate number:** to filter the results based on the recognized plate number
4. **Image source:** to filter the results based on camera name.
5. **Country/State:** to filter out results belonging to the selected country.
6. **Make/Model:** to filter out results to the Make and Model.
7. **Vehicle color:** to filter out results where plate color matches the selected color.
8. **Vehicle lists:** to filter out results belonging to a certain vehicle list.



EVENT DETAILS

Double clicking on any of the displayed results, opens a pop-up window allowing the user to view detailed information. You can also see the details when clicking on the alarms on the Live view screen.

Timestamp	Plate number	Image source	Country	Make and model	Vehicle color
2019.03.29 13:41:25	MVV991	ARU_Geovision_8099	Hungary	BMW X4	white
2019.03.29 13:37:45	KNX679	ARU_Geovision_8099	Hungary	Volkswagen Caddy	red
2019.03.29 13:37:40	RCA244	ARU_Geovision_8099	Hungary	Volkswagen Caddy	green, gray
2019.03.29 13:37:35	KAE936	ARU_Geovision_8099	Hungary	Porsche 911	yellow, white
2019.03.29 13:37:08		ARU_Geovision_8099		Ford Fiesta	blue
2019.03.29 13:36:52	NOS511	ARU_Geovision_8099	Hungary	Subaru Levorg	blue
2019.03.29 13:36:35	LDE883	ARU_Geovision_8099	Hungary	Mazda 5	white
2019.03.29 13:36:15	JUS071	ARU_Geovision_8099	Hungary	Volkswagen Polo	green
2019.03.29 13:36:09	IRT055	ARU_Geovision_8099	Hungary	Smart forTwo	blue
2019.03.29 13:36:02	MUK741	ARU_Geovision_8099	Hungary	Volkswagen Polo	gray



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