

HIKVISION

SOLUTIONS

[ANPR Camera Integration Solution]

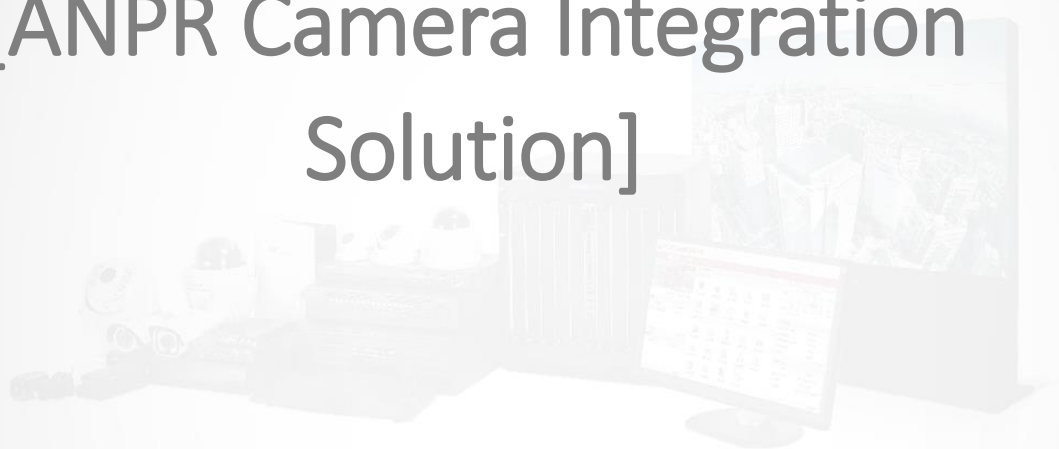


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1 Description

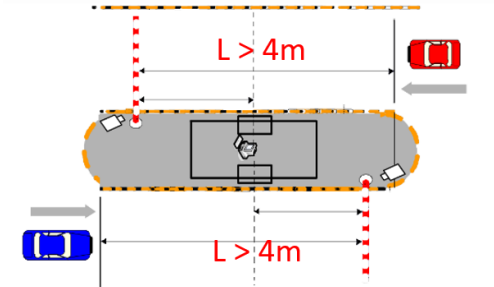
ANPR analytics allows to detect and recognize vehicle's license plate and send ANPR info to third-party software for access management...Here is the detailed integration method for the 7 series ANPR camera.

2 ANPR Configuration

Preparation:

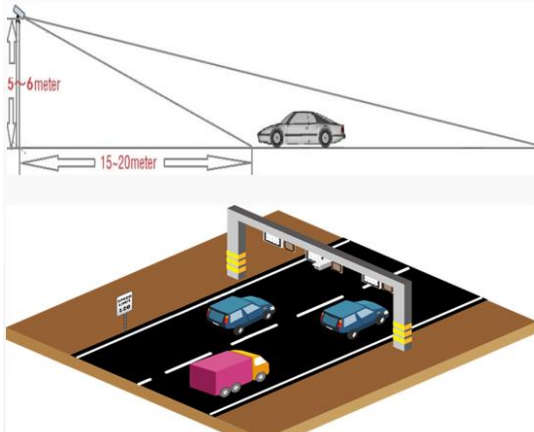
- ◆ Latest version FW of 7 series ANPR camera. [Baseline version is for European countries. Other countries need customized version FW]
- ◆ SDK demo.
- ◆ Measuring tool.
- ◆ Mini SD card if needed.

2.1 Installation Tips _Entrance & Exit.



Mount Height	1.6-2m
Distance to Vehicle	4-6m
Horizontal Angel	Within 30 degree
Character height of the license	25-30 pixel
Lane number	1 lane

2.2 Installation Tips _ City mode



Mount Height	6m
Vertical Angel	Within 30 degree
Horizontal Angel	Within 30 degree
Character height of the license	25-30 pixel
Lane number	2 lane

2.3 Mixed traffic type

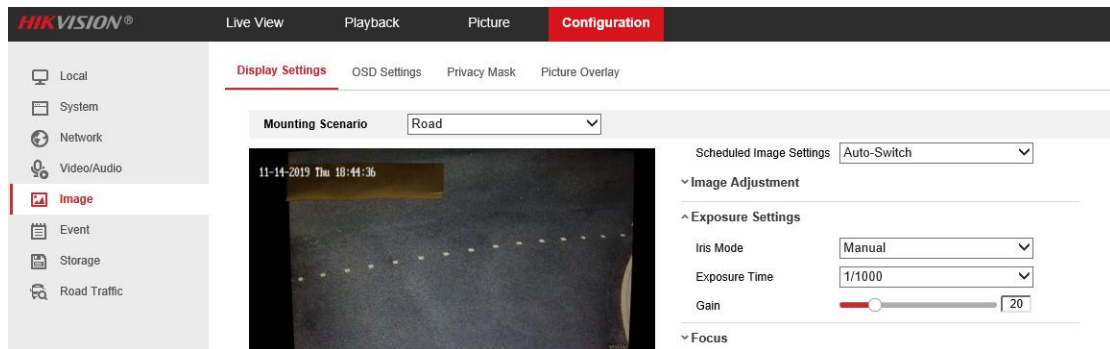
- a. Mixed traffic type support capture both vehicle and non-motorized vehicle. Note that many countries still not support motorbike plate recognize, need customization if required.
- b. The installation requirements are same with city mode. But mixed traffic mode only support one lane.

2.4 Road traffic settings.

The screenshot displays the Hikvision web interface for configuring road traffic detection. The interface includes a sidebar with navigation options and a main configuration area. The 'Road Traffic' section is selected, showing the 'Detection Configuration' page. The 'Type' is set to 'Vehicle Detection' and 'Enable' is checked. The 'Area Settings' tab is active, showing a video feed of a car on a road with a green detection box and yellow lane lines. Below the video feed are fields for 'Total Number of Lanes' (1), 'Country/Region' (North America), and 'Select Mode' (Entrance/Exit). A 'Save' button is at the bottom.

- a. Select mode as Entrance & Exit, city street, or alarm input.
- b. Draw the border or lane.
- c. Draw the detection line to a proper position.
- d. Import blacklist & whitelist if needed. And set arming schedule for different list. Other list is all the plate number not in black or white list.

2.5 Video & Image setting



- Set Focus mode as semi-auto. Adjust zoom ratio to proper position and adjust focus to make image clear.
- Set better image quality and use recommended bitrate.
- Set display settings to road mode. In this mode, exposure time is 1/1000, Gain is 20 as default. Adjust the settings according to the capture picture. Reduce the exposure time will reduce overexposure caused by vehicle light. Increase the gain will make the license plate brighter.

^ Image Enhancement

Digital Noise Reduction	<input type="text" value="Expert"/>
Space DNR Level	<input type="range" value="50"/>
Time DNR Level	<input type="range" value="50"/>
Defog Mode	<input type="text" value="OFF"/>
EIS	<input type="text" value="OFF"/>
Gray Scale	<input type="text" value="[0-255]"/>


- 3D DNR. If the capture image has many noise, enable DNR and set as expert mode, adjust space DNR level to reduce the noise.

2.6 Check capture effects

Detection Configuration
Picture
Camera
Blacklist & Whitelist
Real-time LPR Result




- Local
- System
- Network
- Video/Audio
- Image
- Event
- Storage
- Road Traffic

Enable Real-time LPR Result
 Country/Region



11-14-2019 Thu 18:18:43

Camera 01

No.	Capture Time	Plate No.	Captured Picture	Lane No.	Direction	Matching Result	Country/Region
32	11-14-2019 18:18:36	AD09MZD		1	Arrival	Other List	United States(USA)
31	11-14-2019 18:18:31	R12SPK		1	Arrival	Other List	United States(USA)
30	11-14-2019 18:18:29	VX61HWC		1	Arrival	Other List	United States(USA)

From web components – road traffic – real time LPR result. Note that Mixed traffic mode doesn't support this function.

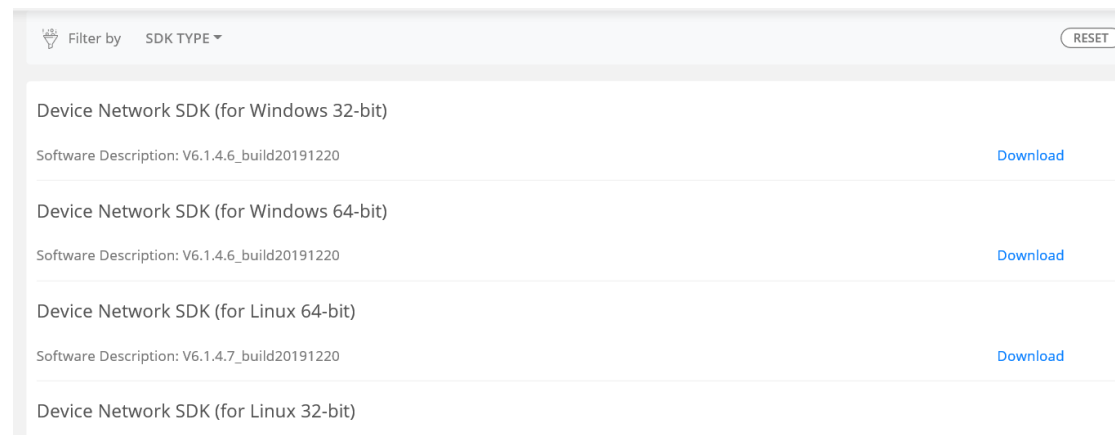
3 Integration Method

3.1 SDK

The device network SDK is developed based on private network communication protocol, and it is designed for the remote connection and configuration of embedded DVR, Encoder, IPC and the other IP devices.

Please access to the latest Device Network SDK via link below:

<https://www.hikvision.com/en/support/download/sdk/>



3.2 ISAPI

ISAPI is a kind of Hikvision protocol, based on HTTP. It is available to all kinds of platforms, such as console application, web application and so on.

For the complete ISAPI materials, it need to sign the **Material License Agreement** first.



Hikvision Materials
License Agreement--
NL.docx

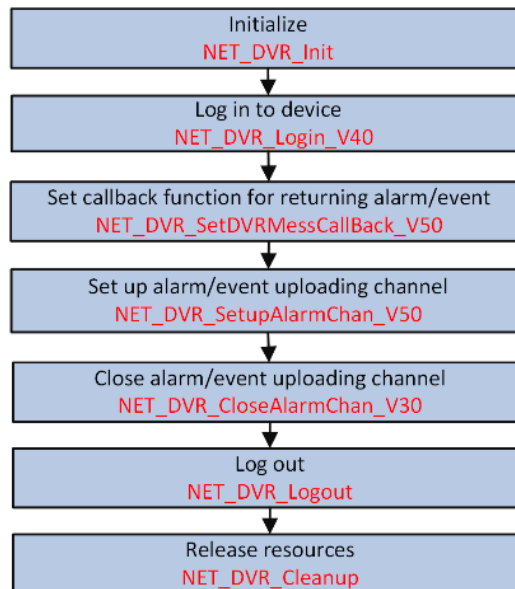
4 ANPR detection

4.1 Receive Event in Arming Mode

When the vehicle plate is detected, the secondarily developed third-party platform can automatically connect and send event uploading command to the device, and then the device uploads the ANPR event information to the platform for receiving.

4.1.1 SDK Integration

Programming flow



Main Step and the Returned Data

Call `NET_DVR_SetDVRMessageCallBack_V50` to set alarm callback function for receiving and handling alarm information.

Command: COMM_ITS_PLATE_RESULT:

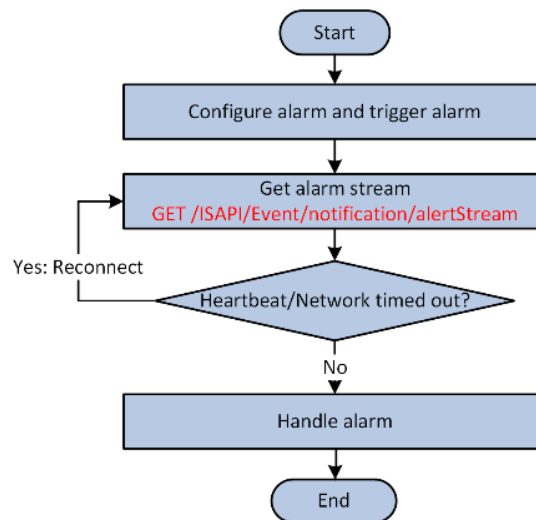
Main Structure : NET_ITS_PLATE_RESULT

Main field

Main field	Remark
<i>byDriveChan</i>	The lane that triggered snapshot
<i>byPlateType</i>	License plate type
<i>byEntireBelieve</i>	Accuracy of the license plate (percentage): 0~10
<i>byRegion</i>	Region index
<i>byCountry</i>	Country index
<i>sLicense</i>	License number

4.1.2 ISAPI Integration

Programming flow



Main Step and the Returned Data

URL: GET /ISAPI/Event/notification/alertStream

Note: If Heartbeat/Network timed out, platform should call this URL to reconnect.

Main field in the returned data

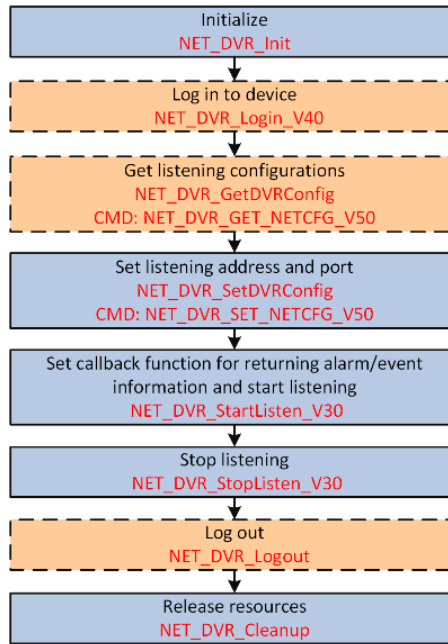
Main field	Remark
dateTime	The event time
eventType	ANPR
eventDescription	ANPR
country	Country info.
licensePlate	Licence plate. Eg. AD537MX
direction	Eg. reverse

4.2 Receive Event in Listening Mode

When ANPR event occurred, the device uploads the event information automatically, so you can configure the listening address and port for listening and receiving the ANPR events in the secondarily developed third-party platform.

4.2.1 SDK Integration

Programming Flow



Main Step and the Returned Data

Step1: Call **NET_DVR_SetDVRConfig** with **NET_DVR_SET_NETCFG_V50** for setting the listening address and port.

Step2: Call **NET_DVR_StartListen V30** to set callback function for returning alarm/event information and start the listening.

Command:

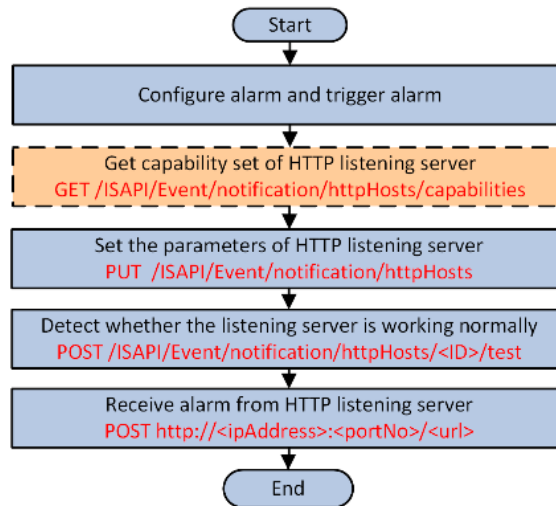
Main Structure : COMM_ISAPI_ALARM

Main field: [NET_DVR_ALARM_ISAPI_INFO](#)

Main field	Remark
<i>pAlarmData</i>	ISAPI alarm message in XML or JSON format (not contain binary data).
<i>byPicturesNumber</i>	Number of pictures
<i>pPicPackData</i>	Alarm picture data structure: NET_DVR_ALARM_ISAPI_PICDATA.

4.2.2 ISAPI Integration

Programming Flow



Main Steps and the Returned Data

Step1: Call [/ISAPI/Event/notification/httpHosts](#) by PUT method to set the parameters (including listening address and listening port) of HTTP listening server.

Step2: Call [http://ipAddress:portNo/url](#) by POST method to receive the alarm/event information from the listening server.

Main field in the returned data

Main field	Remark
dateTime	The event time
eventType	ANPR
eventDescription	ANPR
country	Country info.
licensePlate	Licence plate. Eg. AD537MX
direction	Eg. reverse

4.3 Example for the ANPR event

```

<EventNotificationAlert version="2.0" xmlns="http://www.std-cgi.com/ver20/XMLSchema">
  <ipAddress>10.7.65.13</ipAddress>
  <portNo>80</portNo>
  <protocol>HTTP</protocol>
  <macAddress>00:04:7e:05:72:e7</macAddress>
  <channelID>1</channelID>
  <dateTime>2019-12-05T17:45:46+01:00</dateTime>
  <activePostCount>1</activePostCount>
  <eventType>ANPR</eventType>
  <eventState>active</eventState>
  <eventDescription>ANPR</eventDescription>
  <channelName></channelName>
  <ANPR>
  
```

<country>Italy</country>
<licensePlate> Y723VEN</licensePlate>
<line>1</line>
<direction>reverse</direction>
<confidenceLevel>100</confidenceLevel>
<plateType>unknown</plateType>
<plateColor>other</plateColor>
<licenseBright>142</licenseBright>
<plateCharBelieve>100,100,100,100,100,100,100,100</plateCharBelieve>
<speedLimit>0</speedLimit>
<vehicleType>vehicle</vehicleType>
<detectType>0</detectType>
<dwllegalTime>0</dwllegalTime>
<vehicleInfo>
<index>26</index>
<vehicleType>3</vehicleType>
<colorDepth>0</colorDepth>
<color>unknown</color>
<speed>0</speed>
<length>0</length>
<vehicleLogoRecog>0</vehicleLogoRecog>
<vehileSubLogoRecog>0</vehileSubLogoRecog>
<vehileModel>0</vehileModel>
</vehicleInfo>
<pictureInfoList>
<pictureInfo>
<fileName>licensePlatePicture.jpg</fileName>
<type>licensePlatePicture</type>
<dataType>0</dataType>
<absTime>20191205174546024</absTime>
</pictureInfo>
<pictureInfo>
<fileName>detectionPicture.jpg</fileName>
<type>detectionPicture</type>
<dataType>0</dataType>
<absTime>20191205174546024</absTime>
<plateRect>
<X>838</X>
<Y>470</Y>
<width>66</width>
<height>260</height>
</plateRect>
</pictureInfo>
</pictureInfoList>

```
<originalLicensePlate>AD537MX</originalLicensePlate>
</ANPR>
<UUID>db35c000-cc44-11b2-80de-00047e0572e7</UUID>
<picNum>2</picNum>
<deviceId>Camera 01</deviceId>
<monitoringSiteID></monitoringSiteID>
</EventNotificationAlert>
```

--boundary

Content-Disposition: form-data; name="licensePlatePicture.jpg"; filename="licensePlatePicture.jpg"

Content-Type: image/jpeg

Content-Length: 10563

detectionPicture



licensePlatePicture

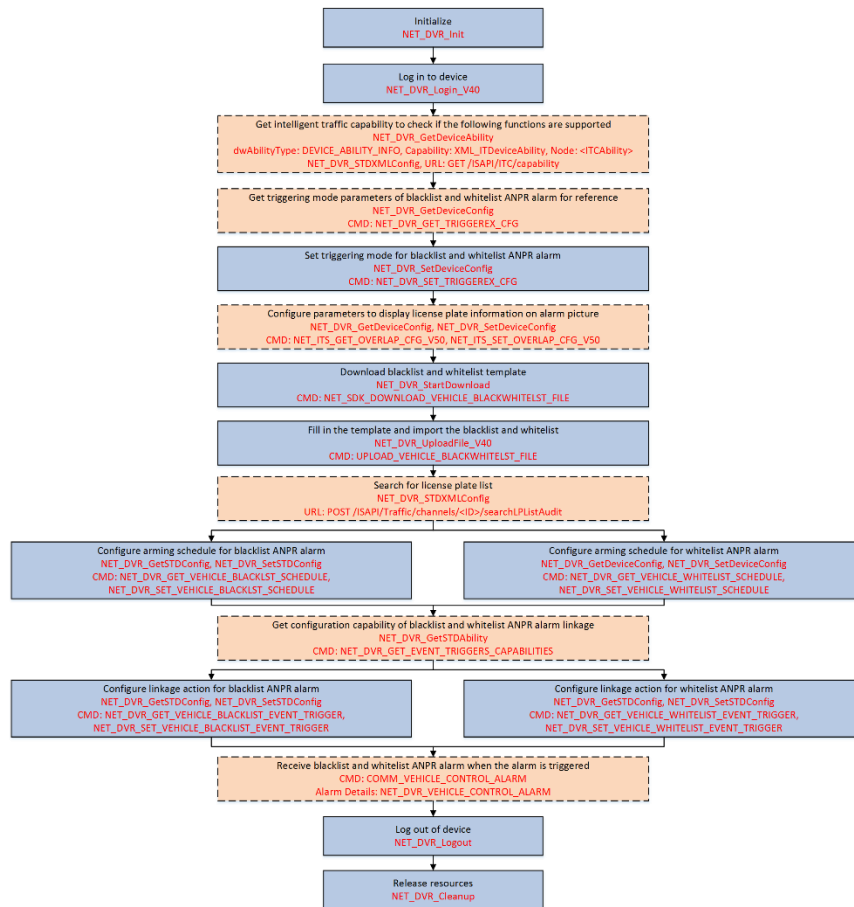


5 Configure Blacklist and Whitelist

After capturing the vehicle picture, you can control the entry of vehicles according to the ANPR results after configuring the alarm of license plate in blacklist or whitelist. The vehicles in blacklist are not allowed to enter, while the vehicles in the whitelist are allowed to enter

5.1 SDK Intergation

Programing Flow



Main Steps

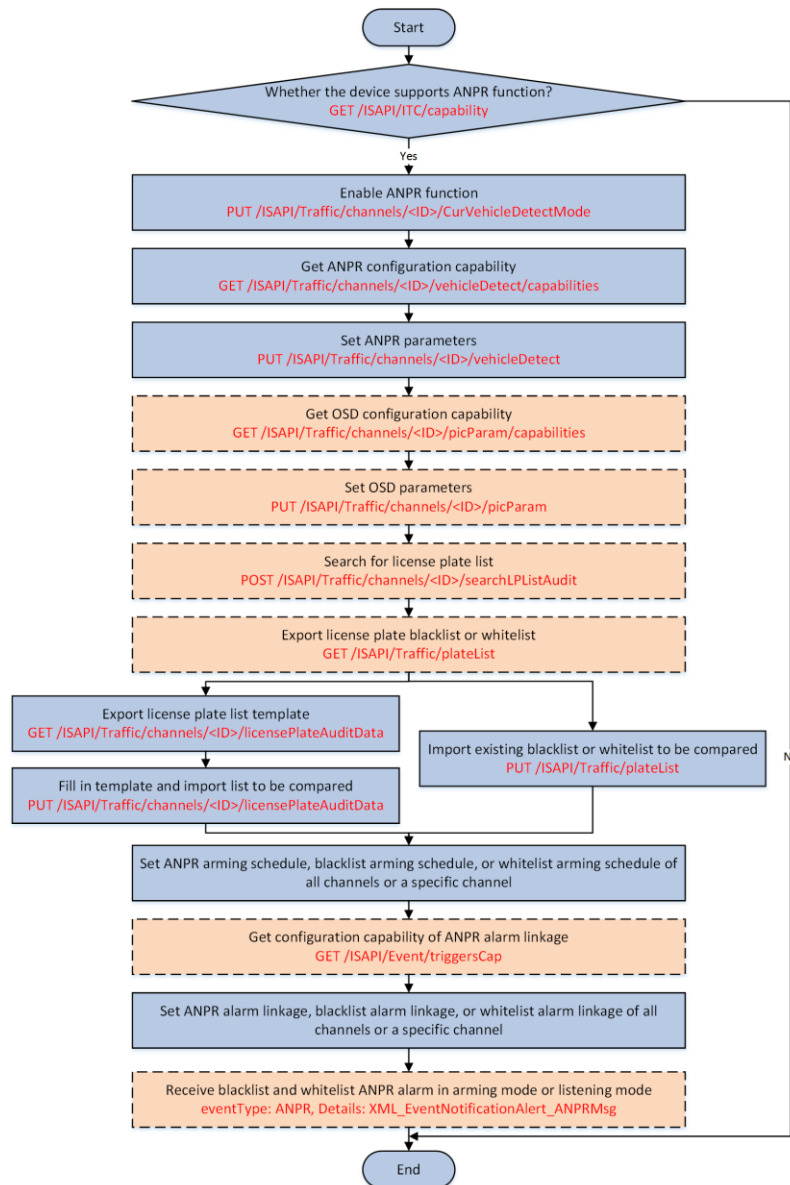
Step1: Call [NET DVR StartDownload](#) with

"NET_SDK_DOWNLOAD_VEHICLE_BLACKWHITELST_FILE" (command No.: 7) to download the blacklist and whitelist template.

Step2: Call [NET DVR UploadFile V40](#) with "UPLOAD_VEHICLE_BLACKWHITELST_FILE" (command No.: 13) to import the blacklist and whitelist information filled in the template.

5.2 ISAPI Integration

Programing Flow



Main Steps:

Step1: Call [/ISAPI/Traffic/channels/<ID>/licensePlateAuditData](#) by GET method to export the template of license plate list.

Step2: Call [/ISAPI/Traffic/channels/<ID>/licensePlateAuditData](#) by PUT method to fill in the template and import the blacklist or whitelist.

Note: It support to export and import the file via Excel and XML format. If you want to update the blacklist and whitelist via XML, please use the command below:

GET/PUT [/ISAPI/Traffic/channels/<ID>/licensePlateAuditData?fileType=xml](#)