



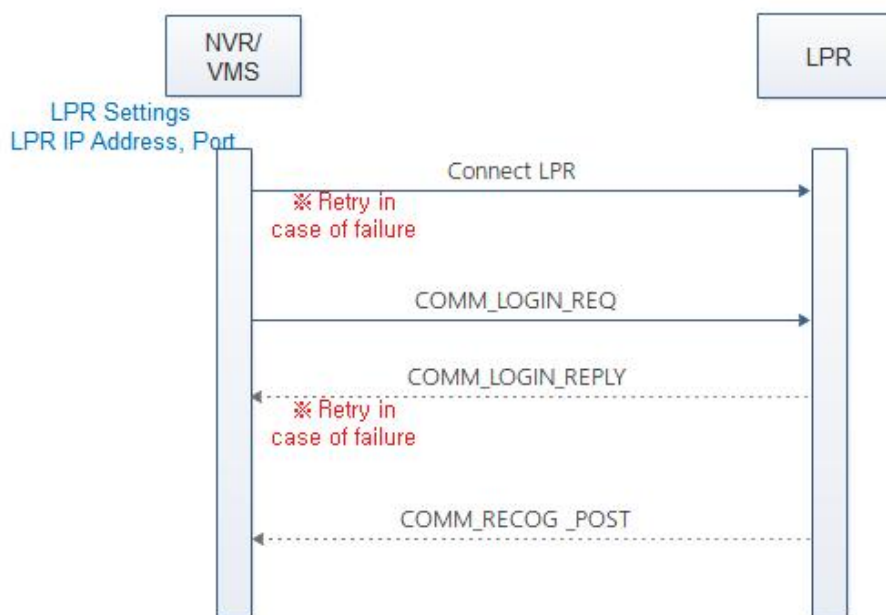
# Milesight-Troubleshooting

Integration between LPR Camera and NVR(VMS)

# Integration between LPR Camera and NVR(VMS)

## 1. TCP Type

### ● System Structure



Enter the LPR IP address and LPR port on the NVR/VMS to register the LPR camera. Then LPR Camera will transmit the data of recognition result to the NVR/VMS when the LPR the license plate is recognized. The data includes the time that was recognized, the license plate, the license plate snapshot, and the full-screen snapshot.

### ● List of messages

|        | Command Name     | Explanation                                   |
|--------|------------------|-----------------------------------------------|
| 0x0001 | COMM_LOGIN_REQ   | Request login to LPR.                         |
| 0x8001 | COMM_LOGIN_REPLY | Response to COMM_LOGIN_REQ.                   |
| 0x8801 | COMM_RECOC_POST  | The metadata and image of recognition result. |

### ● Basic Packet Composition

- |              |                      |
|--------------|----------------------|
| 1. SIG       | CC FF : Packet Start |
| 2. SIG END   | FF DD : Packet End   |
| 3. COMMAND   |                      |
| 4. DATA_SIZE |                      |
| 5. DATA      |                      |

### Basic Packet Composition

| SIG    | COMMAND | DATA_SIZE | DATA     | SIG END |
|--------|---------|-----------|----------|---------|
| 2 byte | 2 byte  | 4 byte    | Variable | 2 byte  |

#### ● COMM\_LOGIN\_REQ

1. Data Type: JSON-charset=utf-8
2. Data Content: ID and Password
3. Example

```
{
  "id": "admin",
  "password": "1234"
}
```

| SIG    | COMMAND | DATA_SIZE | DATA      | SIG END |
|--------|---------|-----------|-----------|---------|
| 2 byte | 2 byte  | 4 byte    | Variable  | 2 byte  |
| CC FF  | 0x0001  | Variable  | JSON DATA | FF DD   |

※ DATA\_SIZE = DATA length + 2 bytes(SIG END)

※ Use Little-Endian

```
> [SEQ/ACK analysis]
v Data (45 bytes)
  Data: ffcc0100250000007b226964223a2261646d696e222c2270...
  [Length: 45]
```

|      |                         |                         |                          |
|------|-------------------------|-------------------------|--------------------------|
| 0000 | 1c c3 16 22 0b 53 70 85 | c2 82 82 48 08 00 45 00 | ...".Sp. ...H..E.        |
| 0010 | 00 55 12 36 40 00 80 06 | 00 00 c0 a8 01 0a c0 a8 | .U.6@... .....           |
| 0020 | 01 df 0a c2 0d 10 0c 87 | 57 5f 63 3f 45 a4 50 18 | ..... W_c?E.P.           |
| 0030 | 40 29 84 81 00 00 ff cc | 01 00 25 00 00 00 7b 22 | @)..... ..%...{"         |
| 0040 | 69 64 22 3a 22 61 64 6d | 69 6e 22 2c 22 70 61 73 | id":"adm in","pas        |
| 0050 | 73 77 6f 72 64 22 3a 22 | 31 32 33 34 35 36 22 7d | sword":" 123456"}<br>... |
| 0060 | 0a dd ff                |                         |                          |

#### ● COMM\_LOGIN\_REPLY

1. Data Type : JSON-charset=utf-8
2. Data Content : result - Required Items

HTTP Status code

a. 200 : OK

b. 401 : No Privileges

c. Etc...

### 3. Example

```
{
  "result": "200"
}
```

| SIG    | COMMAND | DATA_SIZE | DATA      | SIG END |
|--------|---------|-----------|-----------|---------|
| 2 byte | 2 byte  | 4 byte    | Variable  | 2 byte  |
| CC FF  | 0x8001  | Variable  | JSON DATA | FF DD   |

## ● COMM\_RECOG\_POST

### 1. Recognition Result Message

- ❖ The LPR camera sends the recognition results on its own initiative without requiring a request from the NVR/VMS.
- ❖ Data Type : Binary
- ❖ Data Content

#### a. metadata

- ① Device ID : 16 byte – GUID byte array : 04 f9 12 bb ce 94 65 40 89 af e8 3c d8 8f 70 be
- ② recognition time : 8 byte – Posix Time : 1525867890000
- ③ ~~Car Number : 16 byte – utf 8 string : "부산 02 가 1234" << NULL Exclude Fixed Size~~
- ④ Color of the Car : 1 byte – refer to the color table (stand by)
- ⑤ Color of the licence plate : 1 byte – refer to the color table (stand by)
- ⑥ Speed : 2 byte – unsigned short integer, Km/h Unit
- ⑦ Number of resulting images : 1 byte
- ⑧ Direction : 1 byte – 0: Unknown    1: In    2: Out
- ⑨ Region: 32 byte
- ⑩ ROI ID : 1 byte 1~4    0: unknown
- ⑪ plate's length
- ⑫ license plate
- ⑬ Vehicle Type: 0: unknown 1: car 2: motor bike 3: bus 4: truck 5: minibus
- ⑭ Confidence: 4 byte(float)
- ⑮ Plate Type: 1: black 2: white 3: visitor
- ⑯ Distance: (int) need to enable radar
- ⑰ Azimuth: (float) need to enable radar

- ⑱ Vehicle Count: need to enable radar
- ⑲ Width: resolution width
- ⑳ Height: resolution height
- ㉑ coordinate\_x1: The left coordinates of license plate.
- ㉒ coordinate\_y1: The top coordinates of license plate.
- ㉓ coordinate\_x2: The right coordinates of license plate.
- ㉔ coordinate\_y2: The bottom coordinates of license plate.

b. Image data : variable size

c. Data Chunk

- ① Chunk ID : 4 byte

Meta : 11 ff 00 00

Image : 22 ff 00

- ② Chunk Size : 4 byte

Data size excluding Chunk Header 8 byte.

## 2. Packet Example

| SIG    | COMMAND | DATA_SIZE | DATA     | SIG END |
|--------|---------|-----------|----------|---------|
| 2 byte | 2 byte  | 4 byte    | Variable | 2 byte  |
| CC FF  | 0x8801  | Variable  | ...      | FF DD   |

|                |             |             |
|----------------|-------------|-------------|
| Metadata Chunk | Image Chunk | Image Chunk |
|----------------|-------------|-------------|

| Chunk Header |                                                   | Metadata Chunk    |                         |                                     |                    |                           |                          |                         |                    |
|--------------|---------------------------------------------------|-------------------|-------------------------|-------------------------------------|--------------------|---------------------------|--------------------------|-------------------------|--------------------|
| Chunk ID     | Chunk Size<br>4 byte                              | GUID<br>16 byte   | Time<br>8 byte          | Number (Obs<br>olescent)<br>16 byte | V-color<br>1 byte  | P-color<br>1 byte         | Speed<br>2 byte          | I-count<br>1 byte       | Direction<br>1byte |
| 11 FF 00 00  | 110+Number<br>length<br>(GUID+...+<br>Number<br>) | 04 f9 12 ...      | 0x16344D04550           | 부산01가<br>1234                       | 0x01               | 0x01                      | 100                      | 2                       | 0                  |
|              |                                                   | Region<br>32byte  | ROI ID<br>1byte         | Plate Len<br>1byte                  | Number<br>Variable | Vehicle<br>Type 1<br>byte | Confid<br>ence<br>4 byte | Plate<br>type<br>1 byte | Distance<br>4 byte |
|              |                                                   | WOB/ZK            | 1                       | 6                                   | "AB1234"           | 1                         |                          | 3                       | 30                 |
|              |                                                   | Azimuth<br>4 byte | Vehicle Count<br>4 byte | Width<br>2 byte                     | Height<br>2 byte   | coordi<br>nate_x          | coordi<br>nate_y         | coordi<br>nate_x        | coordina<br>te_y2  |

|  |  |     |    |      |     |             |             |             |        |
|--|--|-----|----|------|-----|-------------|-------------|-------------|--------|
|  |  |     |    |      |     | 1<br>2 byte | 1<br>2 byte | 2<br>2 byte | 2 byte |
|  |  | 3.5 | 50 | 1280 | 720 |             |             |             |        |

| Chunk Header    |                   | Image Chunk     |
|-----------------|-------------------|-----------------|
| Chunk ID 4 byte | Chunk Size 4 byte | JPEG image data |
| 22 FF 00 00     | Variable          | FF D8 FF E0 ... |

| Chunk Header    |                   | Image Chunk     |
|-----------------|-------------------|-----------------|
| Chunk ID 4 byte | Chunk Size 4 byte | JPEG image data |
| 22 FF 00 00     | Variable          | FF D8 FF E0 ... |

## ● Color Table

```
enum LprColor{
    LPR_COLOR_UNKNOWN = 0,
    LPR_COLOR_BLACK,
    LPR_COLOR_BLUE,
    LPR_COLOR_CYAN,
    LPR_COLOR_GRAY,
    LPR_COLOR_GREEN,
    LPR_COLOR_RED,
    LPR_COLOR_WHITE,
    LPR_COLOR_YELLOW,
    LPR_COLOR_VIOLET,
    LPR_COLOR_ORANGE
};
```

| Revision | Date       | Description                                                     |
|----------|------------|-----------------------------------------------------------------|
| 1.0      | 2018/10/18 |                                                                 |
| 1.1      | 2019/5/13  | Metadata Chunk Add Direction                                    |
| 1.2      | 2019/9/17  | Metadata Chunk Add Region,ROI-ID                                |
| 1.3      | 2020/7/29  | Remove "Number". Add new fields "Plate Len" and "Number".       |
| 1.4      | 2021/7/5   | Add "Vehicle Type" and modify "Color Table"                     |
| 1.5      | 2021/8/13  | Add "Confidence, Plate Type, Distance, Azimuth, Vehicle Count"  |
| 1.6      | 2022/4/12  | Add Width and Height of Resolution, Coordinate of license plate |

## HTTP Type

### ● Integrate Method

For the HTTP Type, currently our LPR camera supports HTTP Post and Get request method.

VMS or NVR needs to develop matched API to receive the LPR information from the camera.

The matched API URL may be like below:

URL of Post Method: <http://IP:Port/xxxx>

URL of Get Method: <http://IP:Port/xxxx?>

After VMS or NVR has completed the API, our LPR camera could use the API URL to send LPR information to the VMS or NVR when the car plate is recognized.

### ● LPR Information transfer

#### ✓ Post Method

Take an example, the API URL from a VMS is like "<http://192.168.2.24:1234/post>"

Fill in the specified URL in camera's web UI (if the VMS requires the authentication, please also fill in) :

| LPR Message Post Settings |                                                            |
|---------------------------|------------------------------------------------------------|
| Enable LPR Message Post:  | <input checked="" type="checkbox"/>                        |
| Post Type:                | HTTP ▾                                                     |
| HTTP Method:              | Post ▾                                                     |
| Snapshot Type:            | All ▾                                                      |
| HTTP Notification URL:    | <input type="text" value="http://192.168.2.24:1234/post"/> |
| User Name:                | <input type="text" value="admin"/>                         |
| Password:                 | <input type="password" value="••••••••"/>                  |

Camera will post the LPR information data in json format to the VMS or NVR in real time when it is recognized.

The content will be sent is as follows:

```
POST /post HTTP/1.1
User-Agent: httpclient
Host: 192.168.2.24:1234
Content-Type: application/json
Content-Length: 46107
```

[illegible][illegible]

| Key                             | Sample of Value        | Description                                                                                          |
|---------------------------------|------------------------|------------------------------------------------------------------------------------------------------|
| device                          | Network Camera         | The Device Name which can be configured on the System Info of camera. The default is Network Camera. |
| time                            | 2020-11-03<br>20:29:48 | The time when license plate is recognized.                                                           |
| plate                           | AMW212                 | The recognized license plate number.                                                                 |
| type                            | Visitor                | The plate list type of recognized license plate, Black or White or Visitor.                          |
| speed                           | -                      | The running speed of detected vehicle.                                                               |
| direction                       | Away                   | The driving direction of detected vehicle, Approach or Away.                                         |
| detection_region                | 1                      | The ID of detection region where the vehicle is being tested, 1 or 2 or 3 or 4.                      |
| region                          | BEL                    | The registration country/region of the recognized license plate.                                     |
| resolution_width                | 1280                   | The width of LPR processing resolution.                                                              |
| resolution_height               | 720                    | The height of LPR processing resolution.                                                             |
| coordinate_x1,<br>coordinate_y1 | 473, 93                | The top left coordinates of license plate.                                                           |
| coordinate_x2,<br>coordinate_y2 | 676, 135               | The bottom right coordinates of license plate.                                                       |
| confidence                      | 0.70                   | The confidence value of recognized license plate.                                                    |
| plate_color                     | White                  | The color of recognized license plate.                                                               |
| vehicle_type                    | Bus                    | The type of recognized vehicle.                                                                      |
| vehicle_color                   | White                  | The color of recognized vehicle.                                                                     |

|             |                                                                                                                                                                                                                                                                                    |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| plate_image | <p>The snapshot of license Plate, depends on whether it is configured to send together.</p> <p>As shown below, it will be sent together if select License Plate or All.</p> <p>HTTP Method: </p> |
| full_image  | <p>The full snapshot, depends on whether it is configured to send together.</p> <p>As shown below, it will be sent together if select Full Snapshot or All.</p> <p>HTTP Method: </p>             |

## ✓ Get Method

Take an example, the API URL from a VMS is like "<http://192.168.7.121:8080/api/lpr?>"

Fill in the specified URL in camera's web UI (if the VMS requires the authentication, please also fill in) :

| LPR Message Post Settings |                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------|
| Enable LPR Message Post:  | <input checked="" type="checkbox"/>                                                 |
| Post Type:                | HTTP                                                                                |
| HTTP Method:              | Get                                                                                 |
| HTTP Notification URL:    | <a href="http://192.168.7.121:8080/api/lpr?">http://192.168.7.121:8080/api/lpr?</a> |
| User Name:                | admin                                                                               |
| Password:                 | ••••••••                                                                            |

For sending the license plate information, the LPR camera will automatically add the license plate parameters to the URL.

For example, the car plate is "MS12345" . Once it's detected, the LPR camera will send below URL to VMS:

<http://192.168.7.121:8080/api/lpr?Caption = LPR&description = MS12345>

If the license plate information is to be displayed in VMS, the VMS side needs to extract it from the URL.

## 2. RTSP Type

### ● Prerequisites

This part is implemented in onvif metadata. There are three streams in rtsp: video stream, audio stream, and alarm stream. Metadata alarm is performed through the onvif alarm stream in the rtsp. So if the VMS or NVR supports and can receive the onvif alarm stream in the rtsp, it can work with rtsp.

### ● Integrate Method

We have defined the format of the XML. Knowing the XML format, VMS or NVR can be developed to be integrated, and LPR information can be displayed in VMS or NVR.

ex.) The contents of the xml include the date, time, license plate, and license plate snapshot paths as shown below.

```
<tt:MetaDataStream>
  <tt:Event>
    <wsnt:NotificationMessage>
      <wsnt:Topic
Dialect="http://www.onvif.org/ver10/tev/topicExpression/ConcreteSet">tns1:RuleEngine/LicensePlateDetector/LicensePlate</wsnt:Topic>
      <wsnt:Message>
        <tt:Message UtcTime="2018-05-15T06:19:34Z" PropertyOperation="Changed">
          <tt:Source>
            <tt:SimpleItem Name="VideoSourceConfigurationToken" Value="VideoSourceToken"/>
            <tt:SimpleItem Name="VideoAnalyticsConfigurationToken"
Value="VideoAnalyticsToken"/>
            <tt:SimpleItem Name="Rule" Value="MyLicensePlateDetectorRule"/>
          </tt:Source>
          <tt:Key>
            <tt:SimpleItem Name="LicensePlateResult" Value="43 거 6510"/>
          </tt:Key>
          <tt>Data>
```

```
<tt:SimpleItem Name="LicensePlatePicturePath" Value="/LPR/2018051506193401.jpg"/>
<tt:SimpleItem Name="LicenseCarSpeed" Value="25km/h"/>
<tt:SimpleItem Name="LicenseCarDirection" Value="1"/>
</tt:Data>
</tt:Message>
</wsnt:Message>
</wsnt:NotificationMessage>
</tt:Event>
</tt:MetaDataStream>
```

Description: You can receive the recognized license plate image through the snapshot path and the command named get ( ex. <http://IP:PORT/LPR/2018051506193401.jpg>). Only 10 latest images are available for download. (If you can't see image in the NVR or VMS, type url ( ex.<http://IP:PORT/LPR/2018051506193401.jpg>) in the web browser address box to see if the image is visible.)

## ● LPR information transfer

When the integration is complete, the LPR camera sends an xml containing LPR information to the VMS or NVR in real time when it is recognized.

—————END—————