

Infodraw MRS Interfaces for Non-MRS Applications

Abstract

MRS stands for Media Relay System, a system where media, such as audio and video, is passed from capture devices to monitors. The MRS servers and clients use TCP port 12654 and UDP port 12655 to exchange commands and media data in a non-standard protocol. However, in order to provide connectivity with non-MRS applications, the MRS server supports other interfaces in different protocols as explained below.

Media Types

MRS supports only two standard media types, one for video and one for audio.

Video – H264.

Audio – AAC.

Identifying Channels

Media channels are typically identified with two numbers: the first number is the device identifier. The second number is the index of the video or audio channel. The device identifier is given to the device by the manufacturer and can be modified as a device configuration parameter. Every device has zero or more video channels and zero or more audio channels. Typically, an MRS-400 device has four (4) video channels and one (1) audio channel. An MRS-100 device has one (1) video channel and one (1) audio channel. The channel index starts from zero or one, see protocol support details.

Connected Devices List (XML/HTTP)

The server can send a list of connected capture devices upon the following request:

`http://server_ip:12654/queries/getdevicessummary`

The server reply is in an XML format according to this example:

```
= <mrs:Message xmlns:mrs="http://www.infodraw.com">
= <mrs:DevicesSummary>
= <mrs:CaptureDevices>
=   <mrs:CaptureDevice mrs:DeviceID="522">
=     <mrs:Name>MRS Device 522</mrs:Name>
=     <mrs:VideoChannels>
=       <mrs:VideoChannel>
=         <mrs:Index>0</mrs:Index>
=         <mrs:Name />
=       </mrs:VideoChannel>
=     </mrs:VideoChannels>
```

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```
=      <mrs:AudioChannels>
=          <mrs:AudioChannel>
=              <mrs:Index>0</mrs:Index>
=              <mrs:Name />
=          </mrs:AudioChannel>
=      </mrs:AudioChannels>
=  </mrs:CaptureDevice>
=  <mrs:CaptureDevice mrs:DeviceID="1256">
=      <mrs:Name>MRS Device 1256</mrs:Name>
=      <mrs:VideoChannels>
=          <mrs:VideoChannel>
=              <mrs:Index>0</mrs:Index>
=              <mrs:Name>CH-01</mrs:Name>
=          </mrs:VideoChannel>
=          <mrs:VideoChannel>
=              <mrs:Index>1</mrs:Index>
=              <mrs:Name>CH-02</mrs:Name>
=          </mrs:VideoChannel>
=      </mrs:VideoChannels>
=      <mrs:AudioChannels>
=          <mrs:AudioChannel>
=              <mrs:Index>0</mrs:Index>
=              <mrs:Name>Aud-In-01</mrs:Name>
=          </mrs:AudioChannel>
=      </mrs:AudioChannels>
=  </mrs:CaptureDevice>
</mrs:CaptureDevices>
</mrs:DevicesSummary>
</mrs:Message>
```

Details are given about every connected device, its identifier, name, its video and audio channels. Every video channel and audio channel has an index (0-based here) and a name.

RTSP/SDP/RTP Media Streaming

MRS Server supports standard Internet media streaming protocols in the following manner: The server receives an RTSP DESCRIBE request for an SDP file. The request contains a device identifier and may contain a video channel index (1-based), an audio channel index (1-based) or both. The server returns an SDP file. The client then sends SETUP and PLAY commands over the RTSP channel. The server then transmits media packets in RTP format over UDP ports as stated in the SDP file.

The RTSP DESCRIBE request takes the following form:

```
rtsp://server_ip:12654/stream/device_m_camera_n_mic_p.sdp
m = device identifier, positive decimal integer.
```

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n = video channel index, 1-based positive decimal integer: 1,2,3,4.

p = audio channel index, 1-based positive decimal integer: 1,2,3,4.

Note: it is also possible to request one video channel only or one audio channel only. For example:

`rtsp://212.143.39.227:12654/stream/device_1256_camera_1.sdp`
That requests the first video channel of device 1256 from MRS server found at address 212.143.39.227.

The following RFC documents supply information about these standards:

| Subject | RFC |
|----------------------------|------|
| SDP Format | 2327 |
| RTP Format | 3550 |
| H264 video over RTP | 3984 |
| AAC audio over SDP and RTP | 3640 |

Adobe Flash Video Streaming

MRS Server supports the Adobe Flash Video File Format in the following manner: The server receives an HTTP GET request to download an FLV file. The request contains a device identifier and may contain a video channel index (1-based), an audio channel index (1-based) or both. The server starts streaming the file over HTTP as a response to the request, until it loses connectivity with either the device or the client.

The request takes the following form:

`http://server_ip:12654/stream/device_m_camera_n_mic_p.flv`

m = device identifier, positive decimal integer.

n = video channel index, 1-based positive decimal integer: 1,2,3,4.

p = audio channel index, 1-based positive decimal integer: 1,2,3,4.

A different request that gives an example for using the flash file in an HTML takes the following form:

`http://server_ip:12654/stream/device_m_camera_n_mic_p.html`

Note: it is also possible to request one video channel only. For example:

`http://212.143.39.227:12654/stream/device_1256_camera_1.flv`

That requests the first video channel of device 1256 from MRS server found at address 212.143.39.227.

Sending Text Messages

MRS Server supports sending SMS messages using from the modem found inside capture devices. The server receives an HTTP POST request to send an SMS text message. The request contains a device identifier, a phone number, and the message text body.

The request takes the following form:

`http://server_ip:12654/command/sms`

POST buffer parameters

| Parameter Name | Description | Example |
|----------------|--|--------------|
| device_id | Decimal integer device identifier | 4578 |
| phone_number | Phone number text, may include '-' (ignored), '+' for international prefix | 052-8741235 |
| Message | Message text | Hello world! |

The following is an HTML example of a form that submits an SMS using the HTTP POST command:

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
<title>MRS SMS Post</title>
</head>
<body>
<FORM ACTION="http://212.143.39.227:12654/command/sms" METHOD=POST>
<P>Please fill in the SMS command parameters:</p><br>
<table>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
<tr><td>Device ID</td><td><input type="text" name="device_id"></td></tr>
<tr><td>Phone Number</td><td><input type="text" name="phone_number"></td></tr>
<tr><td>Message</td><td><input type="text" name="message"></td></tr>
</table>
<br/>
<input type="submit" value="Send">
</FORM>
</body>
</html>
```

Device Location

MRS Server keeps track of capture device locations. It is possible to read the current device locations from the server using the following HTTP GET request:

`http://server_ip:12654/queries/getdevicelocations`

The output of this query is an XML file having the following structure:

- mrs:Message – top element
- mrs:LocationsSummary – internal element in mrs:Message
- mrs:DeviceLocations – internal element in mrs:LocationsSummary
- mrs:DeviceLocation – internal elements in mrs:DeviceLocations with attributes:

| Attribute Name | Description | Example |
|----------------|-----------------------------------|---------|
| mrs:DeviceID | Decimal integer device identifier | 2015 |

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| | | |
|---------------|---|------------------|
| mrs:Height | Real decimal number specifying height in meters | 3.5 |
| mrs:Latitude | Real decimal number specifying latitude on earth | 32.0846 |
| mrs:Longitude | Real decimal number specifying longitude on earth | 34.8021 |
| mrs:Name | Name of the device | PMRS Device 2015 |

It is also possible to see the on-line devices on Google Map using the following HTTP GET request:
`http://server_ip:12654/map`

The output of this query is an HTML file displaying Google Map with all on-line devices on it.

If required to track a single device, it is possible to view a map for a single device with the following HTTP GET request:

`http://server_ip:12654/map?device_id=m`
m = decimal integer device identifier.

The output of this query is an HTML file displaying Google Map with only one specified device on it.

PTZ Commands

MRS Server can relay basic PTZ commands to connected device. The server receives an HTTP POST request to send an PTZ command. The request contains a device identifier, PTZ engine index, operation name and additional operation-based parameters.

The request takes the following form:

`http://server_ip:12654/commands/ptz`

General POST parameters

| Parameter Name | Description | Example |
|----------------|-----------------------------------|---------|
| device_id | Decimal integer device identifier | 4578 |
| index | 0-based PTZ engine index. | 0 |
| operation | Command type | move |

Additional parameters for operation “move”

| Parameter Name | Description | Example |
|----------------|-----------------------|---------|
| angle | Decimal integer 0-359 | 10 |

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| Parameter Name | Description | Example |
|----------------|--------------------------|---------|
| speed | Decimal integer 0-100 | 50 |
| time | Duration in milliseconds | 1000 |

Additional parameters for operation “zoom”

| Parameter Name | Description | Example |
|----------------|--------------------------|---------|
| direction | in or out | in |
| time | Duration in milliseconds | 800 |

The following is an HTML example of a form that submits a PTZ command using HTTP POST:

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
<title>MRS PTZ Command</title>
</head>
<body>
<FORM ACTION="http://mrs2.infodraweurope.com:12654/commands/ptz" METHOD=POST>
<P>Please fill in the ptz command parameters:</p><br>
<table>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
<tr><td>Device ID</td><td><input type="number" name="device_id"
value="4067"/></td></tr>
<tr><td>Engine Index</td><td><input type="number" name="index"
value="0"/></td></tr>
<tr><td>Operation</td><td><select name="operation">
<option>move</option><option>zoom</option></select></td></tr>
<tr><td>Time (ms)</td><td><input type="number" name="time" value="1000"/></td></tr>
<tr><td>Angle (move)</td><td><input type="number" name="angle"
value="0"/></td></tr>
<tr><td>Speed (move)</td><td><input type="number" name="speed"
value="30"/></td></tr>
<tr><td>Direction (zoom)</td><td><select name="direction">
<option>in</option><option>out</option></select></td></tr>
</table>
<br/>
<input type="submit" value="Send">
</FORM>
</body>
</html>
```

Manual Recording Control

MRS Server accepts HTTP POST commands to start and stop a manual recording on the server or on the device. The request is supported from version 6.0.0.3 and takes the following form:

`http://server_ip:12654/command/record`

Post buffer parameters

| Parameter Name | Description | Example |
|----------------|--|------------|
| device_id | Decimal integer device identifier | 1362498768 |
| video_ch | 0-based video channel index, -1 if not relevant | 0 |
| audio_ch | 0-based audio channel index, -1 if not relevant | -1 |
| target | server or device, for controlling where the media files are kept | server |
| action | start or stop | start |

The following is an HTML example form that submits a record command using HTTP POST:

```
<html>
<head><title>record</title></head>
<body>
<form action='http://localhost:12654/command/record' method='post'>
Device ID: <input type='number' name='device_id' /><br/>
Video Channel Index: <select name='video_ch'><option>-
1</option><option>0</option></select><br/>
Audio Channel Index: <select name='audio_ch'><option>-
1</option><option>0</option></select><br/>
Target: <select
name='target'><option>server</option><option>device</option></select><br/>
Action: <select
name='action'><option>start</option><option>stop</option></select><br/>
<input type='submit' value='Go' />
</form>
</body>
</html>
```