Video Protocol
for Grandstream DVS/IP Camera

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Owner: Grandstream Networks, Inc.
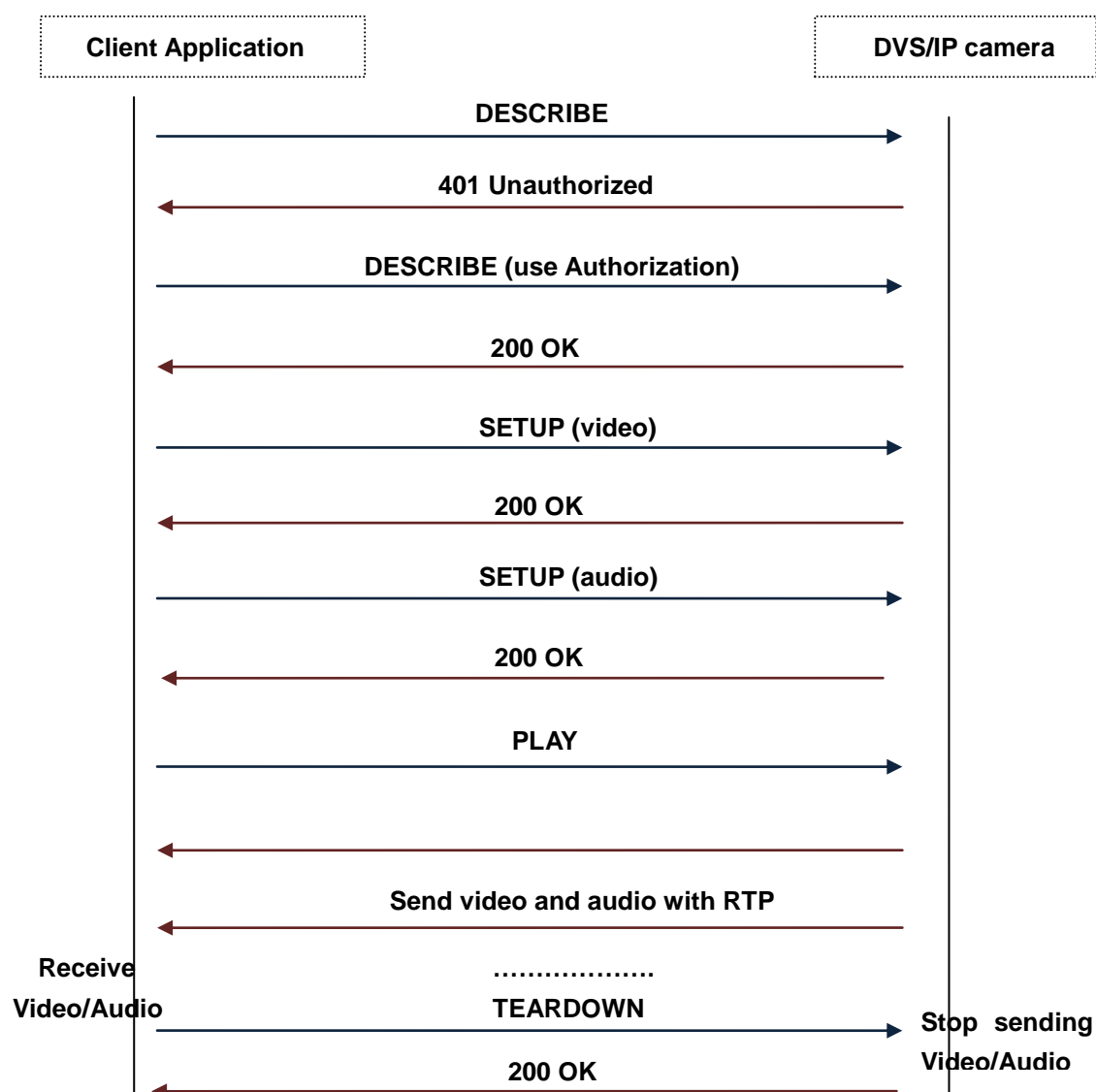Date: 09-10/2009

Table of Connects

Introduction

Grandstream surveillance products support RTSP, RTP and RTSP protocols which were implemented by following RFC2326. H.264 and MJPG are supported as video codec. And the supported audio codec are PCMU, PCMU, G.726-16, G.726-24, G.726-32 and G.726-40.

Grandstream surveillance products use TCP and UDP in FU-A format as transport protocols. The size for each FU-A packet is 1K which is the actual size of audio/video stream excluding RTP header and FU-A header. The user name and password are MD5 encrypted.

RTSP Protocol between DVS/IP camera and client application

Communication between the client application and DVS/IP camera

Client Application		DVS/IP camera

DESCRIBE →

← 401 Unauthorized

DESCRIBE (use Authorization) →

← 200 OK

SETUP (video) →

← 200 OK

SETUP (audio) →

← 200 OK

PLAY →

←

Send video and audio with RTP ←

Receive Video/Audio

....

TEARDOWN → Stop sending Video/Audio

← 200 OK

NOTE:

1. The default RTSP port on the server is 554 and the default HTTP port is 80. Web HTTP port can be modified via web configuration page. If the web HTTP port is changed to P other than 80, the RTSP port would be changed to (2000 + P).

2. RTSP URI should follow the format as **rtsp://hostname:rtsp port/channel number**.
   0<= channel number <=7.
   0,1,2,3 represent the primary stream of DVS channel 1,2,3,4.
   4,5,6,7 represent the secondary stream of DVS channel 1,2,3,4.
   0 represents the primary stream of IP camera.
   4 represents the secondary stream of IP camera.

3. Example Messages
   Server: 192.168.86.232, port 554，channel 1, primary stream

   Client application-------------→DVS/IP camera
   DESCRIBE rtsp://192.168.86.232:554/0 RTSP/1.0
   CSeq: 1
   Accept: application/sdp
   User-Agent: Grandstream Client

   DVS/IP camera -------------→ Client application
   RTSP/1.0 401 Unauthorized
   CSeq: 1
   Server: GrandStream Rtsp Server V100R001
   WWW-Authenticate: Digest realm="Surveillance Server", nonce="30507280"

   *NOTE: '*Grandstream Rtsp Server' is the proprietary of the company

   Client application -------------→ DVS/IP camera
   DESCRIBE rtsp://192.168.86.232:554/0 RTSP/1.0
   CSeq: 2
   Accept: application/sdp
   Authorization: Digest username="admin", realm="Surveillance Server", nonce="30507280", uri="rtsp://192.168.86.232:554/0", response="5820de362eb72ee848e98105dfc24814"
   User-Agent: Grandstream Client

   DVS/IP camera -------------→ Client application
   RTSP/1.0 200 OK
   CSeq: 2
   Server: GrandStream Rtsp Server 704*480*30*1024
   Content-Type: application/sdp

Content-length: 219
Content-Base: rtsp://192.168.86.232/0

m=video 0 RTP/AVP 96
a=control:trackID=0
a=rtpmap:96 H264/90000
a=fmtp:96 packetization-mode=1; sprop-parameter-sets=Z0LgHtoCwPRA,aM4wpIA=
m=audio 0 RTP/AVP 0
a=control:trackID=1
a=rtpmap:0 PCMU/8000
a=ptime:20

NOTE: 704*480*30*1024 in the messages tells the height, width, frame rate and bit rate of the video.

Client application -------------→ DVS/IP camera
SETUP rtsp://192.168.86.232:554/0/trackID=0 RTSP/1.0
CSeq: 3
Transport: RTP/AVP/TCP;unicast;interleaved=0-1
Authorization: Digest username="admin", realm="Surveillance Server", nonce="30507280", uri="rtsp://192.168.86.232:554/0", response="3f215bf93e81b5d1e1f7beb83d038dac"
User-Agent: Grandstream Client

DVS/IP camera -------------→ Client application
RTSP/1.0 200 OK
CSeq: 3
Server: GrandStream Rtsp Server V100R001
Session: 09682642;timeout=120
Transport: RTP/AVP/TCP;unicast;interleaved=0-1

Client application -------------→ DVS/IP camera
SETUP rtsp://192.168.86.232:554/0/trackID=1 RTSP/1.0
CSeq: 4
Session: 09682642
Transport: RTP/AVP/TCP;unicast;interleaved=2-3
Authorization: Digest username="admin", realm="Surveillance Server", nonce="30507280", uri="rtsp://192.168.86.232:554/0", response="3f215bf93e81b5d1e1f7beb83d038dac"
User-Agent: Grandstream Client

DVS/IP camera ------------→ Client application
RTSP/1.0 200 OK
CSeq: 4

Server: GrandStream Rtsp Server V100R001

Session: 09682642;timeout=120

Transport: RTP/AVP/TCP;unicast;interleaved=2-3

Client application ------------→ DVS/IP camera

PLAY rtsp://192.168.86.232:554/0 RTSP/1.0

CSeq: 5

Session: 09682642

Authorization: Digest username="admin", realm="Surveillance Server", nonce="30507280", uri="rtsp://192.168.86.232:554/0", response="b8244f6ce442e20f3131919dfa51f4e1"

Rang: npt=0.000-

User-Agent: Grandstream Client

DVS/IP camera ------------→ Client application

RTSP/1.0 200 OK

CSeq: 5

Server: GrandStream Rtsp Server V100R001

Session: 09682642;timeout=120

DVS/IP camera ------------→Client application

RTP….video/audio

RTP….video/audio

……...

RTCP Protocol (for heartbeat connection and reporting alarm)

This protocol is used for heartbeat connection and reporting alarm events. A RTCP connection would be established after RTSP is connected. Once the RTCP connection is established, the client application will receive all the alarms from both connected alarm equipment and motion detector. The maximum allowed heartbeat connection delay is 10 seconds. If the DVS/IP camera cannot receive heartbeat response within 10 seconds, it will disconnect the RTSP/RTCP connection with client application. This rule also works for reporting alarm connections.

Communication between the client application and DVS/IP camera
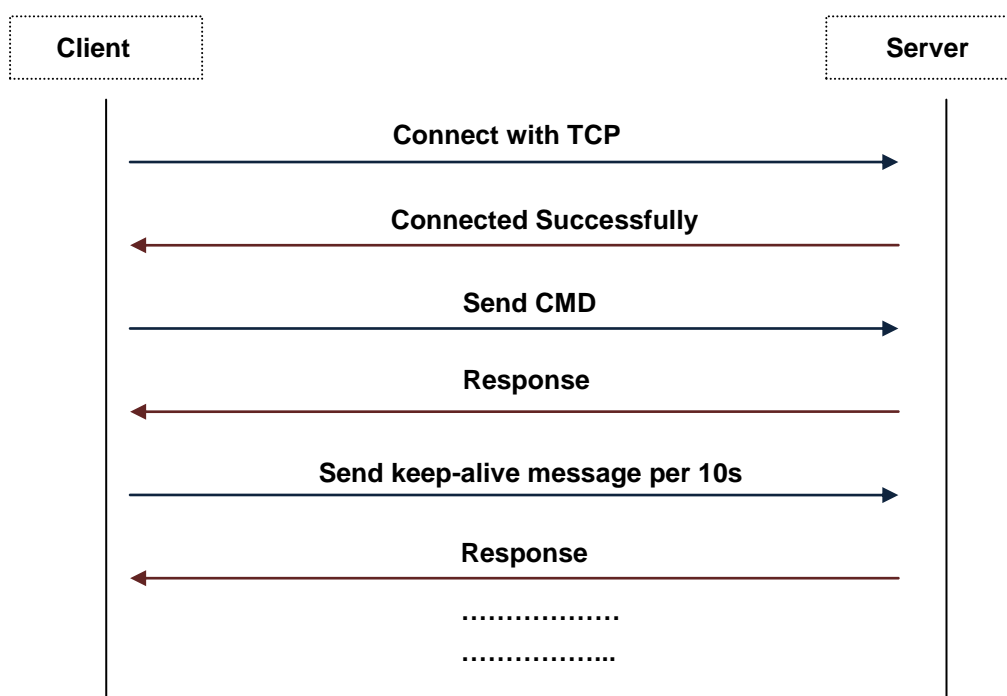
NOTE:

Heartbeat connection

1. ***Client application sends a heartbeat connection request to DVS/IP camera***

    CMD: ALIVE MCTP/1.0 CS\n

    @A@B\n

    END\n

    NOTE: A – RTSP Session ID.   The length of RTSP conversion ID has to be 8 digits.

    If A equals FFFFFFFF, the message will be used to report alarms

    B – Video Channel ID.

    0<=B<=7.

    0, 1, 2, 3 represent channel 1-4 primary stream.

    4,5,6,7 represent channel 1-4 secondary stream.

    RTSP heartbeat connection can only be established after RTSP connection.

2. ***DVS/IP camera sends response the heartbeat connection request***

    CMD: ALIVE MCTP/1.0 SC\n

    @A@B@C\n

    END\n

    NOTE: A – RTSP Sesstion ID.   The length of RTSP conversion ID has to be 8

    B – Video Channel ID.

    0<=B<=7.

0, 1, 2, 3 represent channel 1-4 primary stream.

4,5,6,7 represent channel 1-4 secondary stream.

If B is set to -1, the message will be used to report alarms from all channels, which is supported in the latest firmware.

C – Execution Result. 1 – Success; 0 – failure

Keep-alive Messages

The format of message sent from the client application to DVS/IP camera

CMD:ALIVE MCTP/1.0 CS\n

END\n

The format of message sent from DVS/IP camera to the client application

CMD:ALIVE MCTP/1.0 SC\n

END\n

Sample Messages

Server: 192.168.86.232, port 554，channel 1, primary stream

Client-------------→Server

CMD:ALIVE MCTP/1.0 CS

@09682642@0

END

Server-------------→Client

CMD:ALIVE MCTP/1.0 SC

@09682642@0@1

END

Client-------------→Server

CMD:ALIVE MCTP/1.0 CS

END

Server-------------→Client

CMD:ALIVE MCTP/1.0 SC

END