

IOS PSTN Ingress Gateway to CVP (Call Queue and Collect) Call Flow

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Introduction

Cisco Customer Voice Portal (CVP) delivers intelligent and interactive voice response (IVR) applications that can be accessed over the phone. There are three types of CVP deployments:

- Standalone Service
- CVP Call Control
- Call Queue and Collect

This document describes the call flow from the perspective of H.323 based IOS® Ingress Gateway in a Call Queue and Collect deployment.

In Call Queue and Collect deployment, the CVP interacts with Intelligent Contact Management (ICM) to make call routing decisions. ICM requests the CVP to provide Voice Response Unit (VRU) treatment to the incoming call for playing menu prompts and collecting digits to determine the skill group to be selected. When the skill group has been identified and an agent from the skill group is available, ICM requests CVP to connect the incoming call to the Agent IP Phone via Cisco CallManager. If the agent is not available, ICM requests CVP to provide call queue treatment (for example play a music-on-hold prompt). CVP provides VRU or call queue treatment by using a VXML Gateway.

Prerequisites

Requirements

There are no specific requirements for this document

Components Used

The information in this document is based on these software and hardware versions:

- IOS PSTN Ingress Gateway: Cisco 2821, IOS 12.4(15)T1
- IOS Gatekeeper: Cisco 2651XM, IOS 12.4(7f)
- IOS VXML Gateway: Cisco AS5400XM, IOS 12.4(15)T1
- Cisco Voice Portal: CVP 4.0
- Cisco CallManager 5.1.2
- ASR / TTS Server: Nuance ASR v8.5 and TTS v4.0.6

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

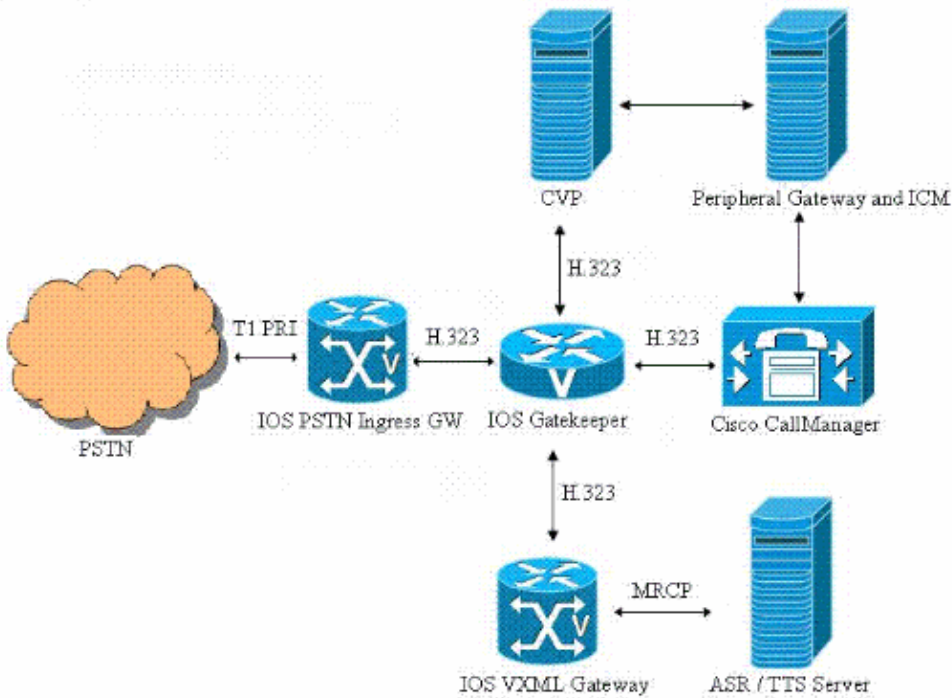
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

Network Diagram

This document uses this network setup:



Configurations

This document uses these configurations:

- Ingress Gateway Configuration
- Gatekeeper Configuration
- VXML Gateway Configuration

Ingress Gateway Configuration

!--- Configure the IOS PSTN Ingress GW to register with the IOS Gatekeeper.

```
interface GigabitEthernet0/1
ip address 14.50.201.11 255.255.255.0

h323-gateway voip interface
h323-gateway voip id IPCC-GW ipaddr 14.50.201.14 1719
h323-gateway voip h323-id PSTN-GW
h323-gateway voip bind srcaddr 14.50.201.11
```

!--- Configure the T1 PRI.

```
controller T1 1/0/0
framing esf
linecode b8zs
pri-group timeslots 1-24
```

!--- Configure the ISDN switch type and incoming-voice under the D-channel interface.

```
interface Serial1/0/0:23
no ip address
encapsulation hdlc
isdn switch-type primary-ni
isdn incoming-voice voice
no cdp enable
```

*!--- Configure a POTS dial-peer that will be used as inbound dial-peer for calls
!--- coming in across the T1 PRI line.*

```
dial-peer voice 2 pots
description PSTN PRI Circuit
incoming called-number .
direct-inward-dial
port 1/0/0:23
```

*!--- Configure an outbound voip dial-peer to route calls to the CVP.
!--- Gateway sends ARQ to Gatekeeper for call routing decision.*

```
dial-peer voice 1 voip
description "To IPCC"
destination-pattern 800.....
session target ras
tech-prefix 2#
```

```
dtmf-relay rtp-nte
codec g711ulaw
no vad
```

Gatekeeper Configuration

```
!--- Configure the local zones and zone prefixes. In this example,
!--- VXML GW registers with Gatekeeper with Tech-Prefix 1#
!--- CVP registers with Gatekeeper with Tech-Prefix 2#
!--- CCM registers with CCM with Tech-Prefix 3#
!--- CVP handles calls with called number in the 800555&. range
!--- CCM handles calls with called numbers in the 75& range (agent dn range)
!--- VXML Gateway handles calls with called numbers starting with 8001112222 (network vru label)

gatekeeper

zone local IPCC-GW cisco.com 14.50.201.14

zone local IPCC-VXML cisco.com

zone local IPCC-CCM cisco.com

zone local IPCC-CVP cisco.com

zone prefix IPCC-CCM 75...

zone prefix IPCC-CVP 800555....

zone prefix IPCC-VXML 8001112222*

gw-type-prefix 1#* default-technology

no shutdown!
```

VXML Gateway Configuration

```
!--- Define Hostname to IP Address mapping for ASR and TTS servers.

ip host asrtts-en-us 14.50.201.16

!--- Define the amount of maximum memory to used for downloaded prompts.
```

```
ivr prompt memory 15000
```

```
!--- Define the RTSP URI of ASR and TTS Server.
```

```
ivr asr-server rtsp://asrtts-en-us/recognizer
```

```
ivr tts-server rtsp://asrtts-en-us/synthesizer
```

```
!--- Configure an application service for CVPErrror.tcl.
```

```
application
```

```
    service cvperror flash:cvperror.tcl
```

```
    paramspace english language en
```

```
    paramspace english index 0
```

```
    paramspace english location flash
```

```
    paramspace english prefix en
```

```
!--- Configure an application service for CVP bootstrap.vxml and bootstrap.tcl.
```

```
    service new-call flash:bootstrap.vxml
```

```
    paramspace english language en
```

```
    paramspace english index 0
```

```
    paramspace english location flash
```

```
    paramspace english prefix en
```

```
    !
```

```
    service bootstrap flash:bootstrap.tcl
```

```
    paramspace english language en
```

```
    paramspace english index 0
```

```
    paramspace english location flash
```

```
    paramspace english prefix en
```

!--- Configure an application service for CVP handoff.tcl.

```
service handoff flash:handoff.tcl  
paramspace english language en  
paramspace english index 0  
paramspace english location flash  
paramspace english prefix en
```

*!--- Specify that the Gateway s RTP stream to the ASR / TTS to go around the
!--- Content Service Switch instead of through the CSS.*

```
mrsp client rtpsetup enable
```

!--- Specify the maximum memory size for the HTTP Client Cache.

```
http client cache memory pool 15000
```

!--- Specify the maximum number of file that can be stored in the HTTP Client Cache.

```
http client cache memory file 500
```

!--- Disable Persistent HTTP Connections.

```
no http client connection persistent
```

!--- Configure the VXML GW to register with the IOS Gatekeeper.

```
interface GigabitEthernet0/0
ip address 14.50.201.15 255.255.255.0

h323-gateway voip interface

h323-gateway voip id IPCC-VXML ipaddr 14.50.201.14 1719

h323-gateway voip h323-id VXML-GW

h323-gateway voip tech-prefix 1#

h323-gateway voip bind srcaddr 14.50.201.15

!--- Configure an inbound voip dial-peer to block calls with called number
!--- starting with 987654.

voice translation-rule 1
rule 1 /987654/ //
!
!
voice translation-profile block
translate called 1

dial-peer voice 987654 voip
description Dial-peer needed for PM Micro-App
translation-profile incoming block
incoming called-number 987654

!--- Configure a VoIP dial-peer that will be used as inbound dial-peer for calls coming
!--- in from CVP. The bootstrap service is applied under this dial-peer.
!--- The 8001112222 in the destination-pattern is the VRU label that is configured in ICM.

dial-peer voice 800 voip
description ICM VRU Label
translation-profile incoming block
service bootstrap
incoming called-number 8001112222T
```

```
dtmf-relay rtp-nte h245-signal h245-alphanumeric
codec g711ulaw
no vad
```

Call Flow Example

This section describes the call flow that results from this configuration example:

1. An ISDN call arrives at the PSTN / VXML Gateway across T1 PRI 1/0/0.
2. IOS Gateway matches POTS dial-peer 2 as the inbound dial-peer for this call.
3. IOS Gateway matches VoIP dial-peer 1 as the outbound dial-peer for this call.
4. IOS Gateway prepends tech-prefix â# to the called number and sends an ARQ to Gatekeeper.
5. Gatekeeper routes the call to CVP.
6. CVP answers the call and RTP media connection is established between IOS Ingress Gateway and CVP.
7. CVP informs ICM about the new call.
8. ICM runs the script associated with the called number of this call.
9. ICM requests CVP to provide VRU treatment to play a Menu prompt (Main_Welcome_Menu.wav) and to collect digits to identify the skill group.

- a. 1 for TAC
- b. 2 for Sales

ICM also sends the ICM Label (8001112222) of the Network VRU to CVP.

10. CVP sends an ARQ request (with destination = Network VRU label) to Gatekeeper.
11. Gatekeeper provides the IP address of the VXML Gateway in the ACF response.
12. CVP sends a H225 Setup to VXML Gateway which then establishes a VXML session to CVP. Refer to these URL(s) to understand VXML Gateway and CVP, and VXML Gateway and ASR/TTS server interactions:
 - ◆ MRCPv1
 - ◆ MRCPv2
13. CVP disconnects its existing RTP media connection to the Ingress Gateway by sending H245 Empty TCS.
14. CVP establishes a RTP media connection between Ingress Gateway and VXML Gateway.
15. PSTN caller enters digit 1 to select the TAC skill group. The Ingress Gateway sends the DTMF via RTP NTE to VXML Gateway 16) VXML Gateway reports the digits to CVP via VXML which then reports to ICM.
16. VXML Gateway reports the digits to CVP via VXML which then reports to ICM.
17. ICM then finds an available agent from the selected skillgroup and requests CVP to route the call to the Agent by sending the ICM Label (3#75001) of the Agent.
18. CVP disconnects the existing RTP media connection between the Ingress Gateway and VXML Gateway.
19. CVP sends an ARQ request (with destination = Agent label) to Gatekeeper.
20. Gatekeeper provides the IP address of the Cisco CallManager in the ACF response.
21. CVP sends a H225 setup to Cisco CallManager which then establishes a call to the Agent IP Phone.
22. CVP establishes a RTP media connection between the Ingress Gateway and Agent Phone.
23. The PSTN caller hangs up the call after finishing the conversation with the Agent.
24. Ingress Gateway disconnects the call to CVP and informs the Gatekeeper about call termination.
25. CVP then disconnects the call to CCM.

Verify

Use this section to confirm that your configuration works properly at the IOS Gatekeeper.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

- **show gatekeeper endpoints**

```
GATEKEEPER ENDPOINT REGISTRATION
=====
CallSignalAddr  Port  RASSignalAddr  Port  Zone Name          Type  Flags
-----
14.50.201.11    1720  14.50.201.11   53981 IPCC-GW            VOIP-GW
      ENDPOINT-ID: 8527186C00000002  VERSION: 4  AGE: 32 secs  SupportsAnnexE: FALSE
      g_supp_protos: 0x00000050
      H323-ID: PSTN-GW
      Voice Capacity Max.= Avail.= Current.= 0
14.50.201.15    1720  14.50.201.15   62367 IPCC-VXML          VOIP-GW
      ENDPOINT-ID: 84DB194800000003  VERSION: 4  AGE: 27 secs  SupportsAnnexE: FALSE
      g_supp_protos: 0x00000050
      H323-ID: VXML-GW
      Voice Capacity Max.= Avail.= Current.= 0
172.18.110.75   1720  172.18.110.75  1719  IPCC-CVP           VOIP-GW
      ENDPOINT-ID: 84F5E78C00000001  VERSION: 5  AGE: 3 secs   SupportsAnnexE: FALSE
      g_supp_protos: 0x00000040
      H323-ID: CVP
      Voice Capacity Max.= Avail.= Current.= 0
172.18.110.84   43843 172.18.110.84  49600 IPCC-CCM           VOIP-GW
      ENDPOINT-ID: 852A9F2C00000004  VERSION: 5  AGE: 27 secs  SupportsAnnexE: FALSE
      g_supp_protos: 0x00000050
      H323-ID: CCM-GK-Trunk_1
      Voice Capacity Max.= Avail.= Current.= 0

Total number of active registrations = 4
```

- **show gatekeeper gw-type-prefix**

```
GATEWAY TYPE PREFIX TABLE
=====
```

Prefix: 1#* (Default gateway-technology)

Zone IPCC-GW master gateway list:

14.50.201.11:1720 PSTN-GW

Zone IPCC-VXML master gateway list:

14.50.201.15:1720 VXML-GW

Prefix: 2#*

Zone IPCC-CVP master gateway list:

172.18.110.75:1720 CVP

Prefix: 3#*

Zone IPCC-CCM master gateway list:

172.18.110.84:43843 CCM-GK-Trunk_1

Use this section to confirm that your configuration works properly at the **IOS PSTN Ingress Gateway**.

- **show call active voice brief**

Call is connected to VXML Gateway

11E6 : 228 2061411860ms.1 +160 pid:2 Answer 9999 active

dur 00:00:44 tx:1942/326256 rx:2221/354112

Tele 1/0/0:23 (228) [1/0/0.1] tx:44300/44300/0ms g711ulaw noise:-79 acom:7
i/0:-44/-18 dBm

11E6 : 229 2061411870ms.1 +130 pid:1 Originate 2#8005555555 active

dur 00:00:44 tx:2215/1169571516 rx:1942/310720

IP 14.50.201.15:21134 SRTP: off rtt:0ms pl:35210/40ms lost:0/0/0 delay:55/55/65ms
g711ulaw TextRelay: off

media inactive detected:n media contrl rcvd:n/a timestamp:n/a

long duration call detected:n long duration call duration:n/a timestamp:n/a

Telephony call-legs: 1

SIP call-legs: 0

H323 call-legs: 1

Call agent controlled call-legs: 0

```
SCCP call-legs: 0
Multicast call-legs: 0
Media call-legs: 0
Total call-legs: 2
```

Call is connected to Agent IP Phone

```
11E6 : 228 2061411860ms.1 +160 pid:2 Answer 9999 active
dur 00:01:06 tx:2848/478464 rx:3343/533632
Tele 1/0/0:23 (228) [1/0/0.1] tx:66730/66730/0ms g711ulaw noise:-54 acom:7
i/0:-44/-44 dBm

11E6 : 229 2061411870ms.1 +130 pid:1 Originate 2#8005555555 active
dur 00:01:06 tx:3336/1169571516 rx:2848/455680
IP 14.50.202.26:17156 SRTP: off rtt:1ms pl:10290/0ms lost:0/0/0 delay:55/55/65ms
g711ulaw TextRelay: off
media inactive detected:n media contrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a

Telephony call-legs: 1
SIP call-legs: 0
H323 call-legs: 1
Call agent controlled call-legs: 0
SCCP call-legs: 0
Multicast call-legs: 0
Media call-legs: 0
Total call-legs: 2
```

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

Troubleshooting Commands

Configure the IOS Gateway to log the debugs in its logging buffer and disable the logging console .

These are the commands used to configure the Gateway in order to store the debugs in the Gateway's logging buffer:

- **service timestamps debug datetime msec**
- **service sequence**
- **no logging console**
- **logging buffered 5000000 debug**
- **clear log**

These are the **debug** commands used to troubleshoot the configuration:

Note: Refer to Important Information on Debug Commands before you use **debug** commands.

- **debug isdn q931**
- **debug voip ccapi inout**
- **debug ras**
- **debug h225 asn1**
- **debug h245 asn1**
- **debug cch323 h225**
- **debug cch323 h245**
- **debug voip rtp session nte named-event**

Debug Outputs

This section provides debug outputs for this sample call flow:

1. Incoming call from the PSTN to 800-555-5555
2. Ingress Gateway matches inbound Dial-Peer 2
3. Ingress Gateway matches outbound Dial-Peer 1
4. Ingress GW prepends Tech-Prefix "#2" and sends an Admission Request (ARQ) to Gatekeeper
5. Ingress GW sends ISDN Call Proceeding in the POTS leg
6. Ingress GW receives Admission Confirm from GK. The destination ip address is the IP address of the CVP (172.18.110.75)
7. GW sends H225 FastStart Setup message to CVP
8. GW receives H225 Connect message from CVP
9. GW sends Information Request response (IRR) to Gatekeeper
10. GW establishes H245 TCP Connection to CVP and sends Terminal Capability Set (TCS) and Master Slave Determination message to CVP
11. GW receives TCS and MSD message from CVP
12. Ingress GW sends TCS Ack and MSD Ack to CVP
13. Ingress GW receives TCS and MSD ACK from CVP
14. Now, CVP redirects the media connection to the VXML Gateway. Ingress GW receives Empty TCS from CVP
15. Ingress GW closes its logical channel by sending CloseLogicalChannel (CLC) to CVP
16. Ingress GW sends TCS ACK to CVP
17. Ingress GW sends Bandwidth Request to Gatekeeper in order to update the current bandwidth (zero) used for the call
18. CVP closes its logical channel by sending CLC to the Ingress GW
19. Ingress GW receives TCS and MSD from CVP. This TCS provides information about the Terminal Capabilities of the VXML Gateway
20. Ingress GW sends its TCS and MSD to CVP
21. Ingress GW sends MSD Ack and TCS Ack to CVP
22. Ingress GW sends BRQ to Gatekeeper in order to update the current bandwidth used for the call (2*64=128 kbps)
23. Ingress GW sends OLC request to CVP
24. Ingress GW receives OLC from CVP. CVP provides the IP address of the VXML Gateway for the RTCP connection

25. Ingress GW sends OLC Ack response to CVP
26. Ingress GW receives OLC Ack from CVP. CVP provides the IP address of the VXML Gateway for RTP connection. RTP Connection between Ingress GW and VXML GW is established
27. Gateway detects DTMF digit "1" and sends it via RTP NTE (RFC 2833) based DTMF Relay events to the VXML GW
28. Now, CVP redirects the call to the Agent IP Phone that answered the call. Ingress GW receives empty TCS
29. Steps 15 - 18 take place (debug outputs not shown)
30. Ingress GW receives TCS and MSD from CVP. This TCS provides information about the Terminal Capabilities of the IP Phone
31. Steps 20 - 23 take place (debug outputs not shown)
32. Ingress GW receives OLC from CVP. CVP provides the IP address of the CallManager for the RTCP connection
33. GW sends OLC Ack response to CVP
34. GW receives OLC Ack from CVP. CVP provides the IP address of the Agent IP Phone for RTP connection. RTP Connection between Ingress GW and IP Phone is established
35. After finishing the conversation with the Agent, the PSTN caller hangs up the call. Ingress GW receives ISDN Disconnect from the PSTN
36. Ingress GW terminates the H323 call on the IP leg by sending H225 Release Complete message to CVP
37. GW sends DisengageRequest (DRQ) to the Gatekeeper
38. H245 connection between the GW and CVP gets closed after the exchange of CLC and EndSession commands

Note: Some of the lines in the output throughout this section have been moved to the second line due to space constraints.

Incoming call from the PSTN to 800-555-5555

```
*Aug 17 17:21:15.777: ISDN Se1/0/0:23 Q931: RX <- SETUP pd = 8 callref = 0x0088
```

```
Bearer Capability i = 0x8090A2
```

```
Standard = CCITT
```

```
Transfer Capability = Speech
```

```
Transfer Mode = Circuit
```

```
Transfer Rate = 64 kbit/s
```

```
Channel ID i = 0xA98381
```

```
Exclusive, Channel 1
```

```
Progress Ind i = 0x8583 - Origination address is non-ISDN
```

```
Calling Party Number i = 0x0080, '9999'
```

```
Plan:Unknown, Type:Unknown
```

```
Called Party Number i = 0xA1, '8005555555'
```

```
Plan:ISDN, Type:National
```

```
*Aug 17 17:21:15.781: //-1/182F2991800A/CCAPI/cc_api_display_ie_subfields:
```

```
cc_api_call_setup_ind_common:
```

```
cisco-username=
```

----- ccCallInfo IE subfields -----

cisco-ani=9999

cisco-anitype=0

cisco-aniplan=0

cisco-anipi=0

cisco-anisi=0

dest=8005555555

cisco-desttype=2

cisco-destplan=1

cisco-rdie=FFFFFFFF

cisco-rdn=

cisco-rdntype=-1

cisco-rdnplan=-1

cisco-rdnpi=-1

cisco-rdnsi=-1

cisco-redirectreason=-1 fwd_final_type =0

final_redirectNumber =

hunt_group_timeout =0

Ingress Gateway matches inbound Dial-Peer 2

*Aug 17 17:21:15.781: //-1/182F2991800A/CCAPI/cc_api_call_setup_ind_common:

Interface=0x46964DF8, Call Info(

Calling Number=9999,(Calling Name=)(TON=Unknown, NPI=Unknown, Screening=Not Screened, Presentation=Allowed),

Called Number=8005555555(TON=National, NPI=ISDN),

Calling Translated=FALSE, Subscriber Type Str=RegularLine, FinalDestinationFlag=TRUE,

Incoming Dial-peer=2, Progress Indication=ORIGINATING SIDE IS NON ISDN(3),
Calling IE Present=TRUE,

Source Trkgrp Route Label=, Target Trkgrp Route Label=, CLID Transparent=FALSE),
Call Id=-1

Ingress Gateway matches outbound Dial-Peer 1

*Aug 17 17:21:15.793: //228/182F2991800A/CCAPI/ccIFCallSetupRequestPrivate:

Interface=0x46A5D878, Interface Type=1, Destination=, Mode=0x0,

Call Params(Calling Number=9999,(Calling Name=)(TON=Unknown, NPI=Unknown, Screening=Not Screened, Presentation=Allowed),

```
Called Number=8005555555(TON=National, NPI=ISDN), Calling Translated=FALSE,
Subscriber Type Str=RegularLine, FinalDestinationFlag=TRUE, Outgoing Dial-peer=1,
Call Count On=FALSE,
Source Trkgrp Route Label=, Target Trkgrp Route Label=, tg_label_flag=0,
Application Call Id=)
```

Ingress GW prepends Tech-Prefix "#2" and sends an Admission Request (ARQ) to Gatekeeper

```
*Aug 17 17:21:15.797: H225 NONSTD OUTGOING PDU ::=
```

```
value ARQnonStandardInfo ::=
{
  sourceAlias
  {
  }
  sourceExtAlias
  {
  }
  callingOctet3a 128
  interfaceSpecificBillingId "ISDN 1/0/0:23"
  gtd '49414D2C0D0A50524E2C6973646E2A2C2C4E492A...'H
  ingressNetwork scn : NULL
}
```

```
*Aug 17 17:21:15.797: H225 NONSTD OUTGOING ENCODE BUFFER::= 80000010A901800E18495
3444E20312F302F303A323380AC00A949414D2C0D0A50524E2C6973646E2A2C2C4E492A2A2A2C0D0A
5553492C726174652C632C732C632C310D0A5553492C6C6179312C756C61770D0A544D522C30300D0
A43504E2C30342C2C312C3830303535353535350D0A43474E2C30302C2C752C792C312C39393939
0D0A4350432C30390D0A4643492C2C2C2C2C2C792C0D0A4743492C3138326632393931346331643
1316463383030613030313765306162613833380D0A0D0A0100
```

```
*Aug 17 17:21:15.801:
```

```
*Aug 17 17:21:15.801: RAS OUTGOING PDU ::=
```

```
value RasMessage ::= admissionRequest :
{
  requestSeqNum 15287
```

```
callType pointToPoint : NULL
callModel direct : NULL
endpointIdentifier {"84B3CC1C00000004"}
destinationInfo
{
  dialedDigits : "2#8005555555"
}
srcInfo
{
  dialedDigits : "9999",
  h323-ID : {"PSTN-GW"}
}
bandWidth 1280
callReferenceValue 67
nonStandardData
{
  nonStandardIdentifier h221NonStandard :
  {
    t35CountryCode 181
    t35Extension 0
    manufacturerCode 18
  }
  data '80000010A901800E184953444E20312F302F303A...'H
}
conferenceID '182F29914C1D11DC800A0017E0ABA838'H
activeMC FALSE
answerCall FALSE
canMapAlias TRUE
callIdentifier
{
  guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
}
willSupplyUUIEs FALSE
```

```
}
```

Ingress GW sends ISDN Call Proceeding in the POTS leg

```
*Aug 17 17:21:15.805: ISDN Se1/0/0:23 Q931: TX -> CALL_PROC pd = 8 callref = 0x8088
```

```
Channel ID i = 0xA98381
```

```
Exclusive, Channel 1
```

Ingress GW receives Admission Confirm from GK. The destination ip address is the IP address of the CVP (172.18.110.75)

```
*Aug 17 17:21:15.861: RAS INCOMING PDU ::=
```

```
value RasMessage ::= admissionConfirm :
```

```
{
```

```
requestSeqNum 15287
```

```
bandWidth 1280
```

```
callModel direct : NULL
```

```
destCallSignalAddress ipAddress :
```

```
{
```

```
ip 'AC126E4B'H
```

```
port 1720
```

```
}
```

```
irrFrequency 240
```

```
nonStandardData
```

```
{
```

```
nonStandardIdentifier h221NonStandard :
```

```
{
```

```
t35CountryCode 181
```

```
t35Extension 0
```

```
manufacturerCode 18
```

```
}
```

```
data '00020180CCCC400B004100720075006E002D0050...'H
```

```
}
```

```
willRespondToIRR FALSE
```

```
uuiesRequested
```

```
{
```

```
setup FALSE
callProceeding FALSE
connect FALSE
alerting FALSE
information FALSE
releaseComplete FALSE
facility FALSE
progress FALSE
empty FALSE
}
usageSpec
{
  {
    when
    {
      end NULL
      inIrr NULL
    }
    callStartingPoint
    {
      connect NULL
    }
    required
    {
      nonStandardUsageTypes
      {
      }
      startTime NULL
      endTime NULL
      terminationCause NULL
    }
  }
}
```

```
}  
}
```

GW sends H225 FastStart Setup message to CVP

```
*Aug 17 17:21:15.865: H245 FS OLC OUTGOING PDU ::=
```

```
value OpenLogicalChannel ::=
```

```
{  
  forwardLogicalChannelNumber 1  
  forwardLogicalChannelParameters  
  {  
    dataType audioData : g711Ulaw64k : 20  
    multiplexParameters h2250LogicalChannelParameters :  
    {  
      sessionID 1  
      mediaControlChannel unicastAddress : ipAddress :  
      {  
        network '0E32C90B'H  
        tsapIdentifier 18491  
      }  
      silenceSuppression FALSE  
    }  
  }  
}
```

```
*Aug 17 17:21:15.869: H245 FS OLC OUTGOING ENCODE BUFFER::=  
0000000C6013800B050001000E32C90B483B00
```

```
*Aug 17 17:21:15.869:
```

```
*Aug 17 17:21:15.869: H245 FS OLC OUTGOING PDU ::=
```

```
value OpenLogicalChannel ::=
```

```
{
```

```

forwardLogicalChannelNumber 1

forwardLogicalChannelParameters
{
    dataType nullData : NULL

    multiplexParameters none : NULL
}

reverseLogicalChannelParameters
{
    dataType audioData : g711Ulaw64k : 20

    multiplexParameters h2250LogicalChannelParameters :
    {
        sessionID 1

        mediaChannel unicastAddress : ipAddress :
        {
            network '0E32C90B'H

            tsapIdentifier 18490
        }

        mediaControlChannel unicastAddress : ipAddress :
        {
            network '0E32C90B'H

            tsapIdentifier 18491
        }

        silenceSuppression FALSE
    }
}
}

```

```

*Aug 17 17:21:15.869: H245 FS OLC OUTGOING ENCODE BUFFER::=
400000060401004C60138012150001000E32C90B483A000E32C90B483B00

```

```

*Aug 17 17:21:15.869:

```

```

*Aug 17 17:21:15.869: //229/182F2991800A/H323/generic_send_setup:

```

```

generic_send_setup: is_overlap = 0, info_complete = 0

```

```
*Aug 17 17:21:15.869: //229/182F2991800A/H323/generic_send_setup: sending calling IE
*Aug 17 17:21:15.869: //229/182F2991800A/H323/generic_send_setup: ===== PI = 3
*Aug 17 17:21:15.869: //229/182F2991800A/H323/generic_send_setup: Send infoXCap=128,
infoXRate=16, rateMult=0, xMode=128, info_layer1_prot=163
*Aug 17 17:21:15.869: //229/182F2991800A/H323/generic_send_setup:
src address = 14.50.201.11; dest address = 172.18.110.75
*Aug 17 17:21:15.869: H225 NONSTD OUTGOING PDU ::=
```

```
value H323_UU_NonStdInfo ::=
```

```
{
  version 2
  protoParam qsigNonStdInfo :
  {
    iei 4
    rawMesg '04038090A21803A983811E0285836C0600803939...'H
  }
  progIndParam progIndIEinfo :
  {
    progIndIE '00000003'H
  }
}
```

```
*Aug 17 17:21:15.873: H225 NONSTD OUTGOING ENCODE BUFFER::= E001020001042304038090A21803
A983811E0285836C06008039393939700BA1383030353535353535350A8006000400000003
```

```
*Aug 17 17:21:15.873:
```

```
*Aug 17 17:21:15.873: H225.0 OUTGOING PDU ::=
```

```
value H323_UserInformation ::=
```

```
{
  h323-uu-pdu
  {
    h323-message-body setup :
```

```
{
  protocolIdentifier { 0 0 8 2250 0 4 }
  sourceAddress
  {
    h323-ID : {"PSTN-GW"}
  }
  sourceInfo
  {
    vendor
    {
      vendor
      {
        t35CountryCode 181
        t35Extension 0
        manufacturerCode 18
      }
    }
  }
  gateway
  {
    protocol
    {
      voice :
      {
        supportedPrefixes
        {
          {
            prefix dialedDigits : "1#"
          }
        }
      }
    },
    h323 :
    {
      supportedPrefixes
```

```
        {
        }
    }
}

mc FALSE

undefinedNode FALSE

}

activeMC FALSE

conferenceID '182F29914C1D11DC800A0017E0ABA838'H

conferenceGoal create : NULL

callType pointToPoint : NULL

sourceCallSignalAddress ipAddress :

{
    ip '0E32C90B'H

    port 22143
}

callIdentifier

{
    guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
}

fastStart

{
    '0000000C6013800B050001000E32C90B483B00'H,
    '400000060401004C60138012150001000E32C90B...'H
}

mediaWaitForConnect FALSE

canOverlapSend FALSE

multipleCalls TRUE

maintainConnection TRUE

symmetricOperationRequired NULL

}

h245Tunneling TRUE
```

```

nonStandardControl
{
    {
        nonStandardIdentifier h221NonStandard :
        {
            t35CountryCode 181
            t35Extension 0
            manufacturerCode 18
        }
        data 'E001020001042304038090A21803A983811E0285...'H
    }
}
}

```

GW receives H225 Connect message from CVP

*Aug 17 17:21:15.913: H225.0 INCOMING PDU ::=

```

value H323_UserInformation ::=
{
    h323-uu-pdu
    {
        h323-message-body connect :
        {
            protocolIdentifier { 0 0 8 2250 0 5 }
            h245Address ipAddress :
            {
                ip 'AC126E4B'H
                port 19698
            }
            destinationInfo
            {
                gateway
            }
        }
    }
}

```

```
{
  protocol
  {
    voice :
    {
      supportedPrefixes
      {
        {
          prefix dialedDigits : "2#"
        }
      }
    }
  }
  mc FALSE
  undefinedNode FALSE
}
conferenceID '182F29914C1D11DC800A0017E0ABA838'H
callIdentifier
{
  guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
}
fastStart
{
  '400080060401004C6013801215000100AC126E4B...'H,
  '0000000C6013801215000100AC126E4B406000AC...'H
}
multipleCalls FALSE
maintainConnection TRUE
presentationIndicator presentationAllowed : NULL
screeningIndicator 2
featureSet
```

```
    {
        replacementFeatureSet FALSE

        neededFeatures
        {
        }

        desiredFeatures
        {
        }

        supportedFeatures
        {
        }
    }

    h245Tunneling FALSE
}
}
```

*Aug 17 17:21:15.917: //-1/xxxxxxxxxxxxx/H323/cch323_h225_receiver:
Received msg of type SETUPCFM_CHOSEN

*Aug 17 17:21:15.917: //229/182F2991800A/H323/setup_cfm_ind: ===== PI = 0

*Aug 17 17:21:15.917: //229/182F2991800A/H323/setup_cfm_ind:
Set new event H225_EV_FS_SETUP_CFM_IND

*Aug 17 17:21:15.917: //229/182F2991800A/H323/setup_cfm_ind:
Rcvd CONNECT Display Info IE = rtpmscvp

*Aug 17 17:21:15.917: //229/182F2991800A/H323/cch323_h225_receiver:
SETUPCFM_CHOSEN: src address = 14.50.201.11; dest address = 172.18.110.75

*Aug 17 17:21:15.917: //229/182F2991800A/H323/run_h225_sm:
Received event H225_EV_FS_SETUP_CFM_IND while at state H225_REQ_FS_SETUP

*Aug 17 17:21:15.917: //229/182F2991800A/H323/cch323_h225_set_new_state:
Changing from H225_REQ_FS_SETUP state to H225_FS_ACTIVE state

*Aug 17 17:21:15.917: H245 FS OLC INCOMING ENCODE BUFFER::=
400080060401004C6013801215000100AC126E4B406000AC126E4B406100

*Aug 17 17:21:15.917:

*Aug 17 17:21:15.917: H245 FS OLC INCOMING PDU ::=

```

value OpenLogicalChannel ::=
{
  forwardLogicalChannelNumber 129
  forwardLogicalChannelParameters
  {
    dataType nullData : NULL
    multiplexParameters none : NULL
  }
  reverseLogicalChannelParameters
  {
    dataType audioData : g711Ulaw64k : 20
    multiplexParameters h2250LogicalChannelParameters :
    {
      sessionID 1
      mediaChannel unicastAddress : ipAddress :
      {
        network 'AC126E4B'H
        tsapIdentifier 16480
      }
      mediaControlChannel unicastAddress : ipAddress :
      {
        network 'AC126E4B'H
        tsapIdentifier 16481
      }
      silenceSuppression FALSE
    }
  }
}

```

```

*Aug 17 17:21:15.921: H245 FS OLC INCOMING ENCODE BUFFER::=
0000000C6013801215000100AC126E4B406000AC126E4B406100

```

*Aug 17 17:21:15.921:

*Aug 17 17:21:15.921: H245 FS OLC INCOMING PDU ::=

```
value OpenLogicalChannel ::=
{
  forwardLogicalChannelNumber 1
  forwardLogicalChannelParameters
  {
    dataType audioData : g711Ulaw64k : 20
    multiplexParameters h2250LogicalChannelParameters :
    {
      sessionID 1
      mediaChannel unicastAddress : ipAddress :
      {
        network 'AC126E4B'H
        tsapIdentifier 16480
      }
      mediaControlChannel unicastAddress : ipAddress :
      {
        network 'AC126E4B'H
        tsapIdentifier 16481
      }
      silenceSuppression FALSE
    }
  }
}
```

GW sends Information Request response (IRR) to Gatekeeper

*Aug 17 17:21:15.925: H225 NONSTD OUTGOING PDU ::=

```
value IRRperCallnonStandardInfo ::=
{
  startTime 1187371275
}
```

*Aug 17 17:21:15.925: H225 NONSTD OUTGOING ENCODE BUFFER ::= 7046C5D90B

*Aug 17 17:21:15.925:

*Aug 17 17:21:15.925: RAS OUTGOING PDU ::=

value RasMessage ::= infoRequestResponse :

```
{
  requestSeqNum 15288
  endpointType
  {
    vendor
    {
      vendor
      {
        t35CountryCode 181
        t35Extension 0
        manufacturerCode 18
      }
    }
    gateway
    {
      protocol
      {
        voice :
        {
          supportedPrefixes
          {
            {
              prefix dialedDigits : "1#"
            }
          }
        }
      }
    }
  }
}
```

```
    }
  },          h323 :
  {
    supportedPrefixes
    {
    }
  }
}
mc FALSE
undefinedNode FALSE
}
endpointIdentifier {"84B3CC1C00000004"}
rasAddress ipAddress :
{
  ip '0E32C90B'H
  port 50363
}
callSignalAddress
{
  ipAddress :
  {
    ip '0E32C90B'H
    port 1720
  }
}
endpointAlias
{
  h323-ID : {"PSTN-GW"}
}
perCallInfo
{
```

```
{
  nonStandardData
  {
    nonStandardIdentifier h221NonStandard :
    {
      t35CountryCode 181
      t35Extension 0
      manufacturerCode 18
    }
    data '7046C5D90B'H
  }
  callReferenceValue 67
  conferenceID '182F29914C1D11DC800A0017E0ABA838'H
  originator TRUE
  h245
  {
  }
  callSignaling
  {
  }
  callType pointToPoint : NULL
  bandwidth 1280
  callModel direct : NULL
  callIdentifier
  {
    guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
  }
  substituteConfIDs
  {
  }
  usageInformation
  {
    nonStandardUsageFields
```

```
    {
    }
    connectTime 1187371275
  }
}
}
needResponse FALSE
unsolicited TRUE
}
```

GW establishes H245 TCP Connection to CVP and sends Terminal Capability Set (TCS) and Master Slave Determination message to CVP

*Aug 17 17:21:15.953: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{
  sequenceNumber 1
  protocolIdentifier { 0 0 8 245 0 7 }
  multiplexCapability h2250Capability :
  {
    maximumAudioDelayJitter 20
    receiveMultipointCapability
    {
      multicastCapability FALSE
      multiUniCastConference FALSE
      mediaDistributionCapability
      {
        {
          centralizedControl FALSE
          distributedControl FALSE
          centralizedAudio FALSE
          distributedAudio FALSE
          centralizedVideo FALSE
        }
      }
    }
  }
}
```

```
        distributedVideo FALSE
    }
}
transmitMultipointCapability
{
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
        {
            centralizedControl FALSE
            distributedControl FALSE
            centralizedAudio FALSE
            distributedAudio FALSE
            centralizedVideo FALSE
            distributedVideo FALSE
        }
    }
}
receiveAndTransmitMultipointCapability
{
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
        {
            centralizedControl FALSE
            distributedControl FALSE
            centralizedAudio FALSE
            distributedAudio FALSE
```

```

        centralizedVideo FALSE
        distributedVideo FALSE
    }
}
}
mcCapability
{
    centralizedConferenceMC FALSE
    decentralizedConferenceMC FALSE
}
rtcpVideoControlCapability FALSE
mediaPacketizationCapability
{
    h261aVideoPacketization FALSE
}
logicalChannelSwitchingCapability FALSE
t120DynamicPortCapability FALSE
}
capabilityTable
{
    {
        capabilityTableEntryNumber 34
        capability receiveRTPAudioTelephonyEventCapability :
        {
            dynamicRTPPayloadType 101
            audioTelephoneEvent "0-16"
        }
    },
    {
        capabilityTableEntryNumber 25
        capability receiveAndTransmitDataApplicationCapability :
        {

```

```

application nonStandard :
{
  nonStandardIdentifier h221NonStandard :
  {
    t35CountryCode 181
    t35Extension 0
    manufacturerCode 18
  }
  data '52747044746D6652656C6179'H
}
maxBitRate 0
},
{
  capabilityTableEntryNumber 31
  capability receiveUserInputCapability : hookflash : NULL
},
{
  capabilityTableEntryNumber 30
  capability receiveUserInputCapability : dtmf : NULL
},
{
  capabilityTableEntryNumber 27
  capability receiveUserInputCapability : basicString : NULL
},
{
  capabilityTableEntryNumber 3
  capability receiveAudioCapability : g711Ulaw64k : 20
}
}
capabilityDescriptors
{

```

```

    {
        capabilityDescriptorNumber 1
        simultaneousCapabilities
        {
            {
                3
            },
            {
                34,
                30,
                27,
                25
            },
            {
                31
            }
        }
    }
}

```

```

*Aug 17 17:21:15.961: H245 MSC OUTGOING ENCODE BUFFER ::=
027001060008817500078013800014000100000100000100000CC0010
00100058000218A061404302D31368000184810B50000120C52747044
746D6652656C6179000080001E83015080001D83014080001A8301108
0000220C01300800102000002030021001D001A001800001E

```

```

*Aug 17 17:21:15.961:

```

```

*Aug 17 17:21:15.961: //229/182F2991800A/H323/h245_cap_out_set_new_state:
changing from IDLE state to AWAITING_RESPONSE state

```

```

*Aug 17 17:21:15.961: //229/182F2991800A/H323/cch323_run_h245_ms_sm:
Received event H245_EVENT_MSD while at state H245_MS_NONE

```

```

*Aug 17 17:21:15.961: H245 MSC OUTGOING PDU ::=

```

```
value MultimediaSystemControlMessage ::= request : masterSlaveDetermination :
{
    terminalType 60
    statusDeterminationNumber 9348
}
```

GW receives TCS and MSD message from CVP

```
*Aug 17 17:21:15.965: H245 MSC INCOMING PDU ::=
```

```
value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{
    sequenceNumber 1
    protocolIdentifier { 0 0 8 245 0 11 }
    capabilityTable
    {
        {
            capabilityTableEntryNumber 1
            capability receiveAndTransmitAudioCapability : g711Ulaw64k : 20
        },
        {
            capabilityTableEntryNumber 2
            capability receiveAndTransmitUserInputCapability : basicString : NULL
        },
        {
            capabilityTableEntryNumber 3
            capability receiveAndTransmitUserInputCapability : dtmf : NULL
        },
        {
            capabilityTableEntryNumber 4
            capability receiveAndTransmitUserInputCapability : hookflash : NULL
        },
        {
```

```
capabilityTableEntryNumber 5

capability receiveAndTransmitUserInputCapability : iA5String : NULL

},

{

    capabilityTableEntryNumber 729

    capability receiveAndTransmitAudioCapability : g729 : 2

}

}

capabilityDescriptors

{

    {

        capabilityDescriptorNumber 1

        simultaneousCapabilities

        {

            {

                1,

                2,

                3,

                4,

                5,

                729

            },

            {

                1,

                729

            },

            {

                1

            }

        }

    }

}
```

```
    }
  }
}
}
```

*Aug 17 17:21:15.969: H245 MSC INCOMING PDU ::=

```
value MultimediaSystemControlMessage ::= request : masterSlaveDetermination :
{
  terminalType 50
  statusDeterminationNumber 767617
}
```

Ingress GW sends TCS Ack and MSD Ack to CVP

*Aug 17 17:21:15.969: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= response : terminalCapabilitySetAck :
{
  sequenceNumber 1
}
```

*Aug 17 17:21:15.969: //229/182F2991800A/H323/MSDetermination:
Am MASTER, ccb->h245.h245_mdStatus = 0x1

*Aug 17 17:21:15.969: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= response : masterSlaveDeterminationAck :
{
  decision slave : NULL
}
```

Ingress GW receives TCS and MSD ACK from CVP

*Aug 17 17:21:15.973: H245 MSC INCOMING PDU ::=

```
value MultimediaSystemControlMessage ::= response : terminalCapabilitySetAck :
{
```

```

sequenceNumber 1
}

*Aug 17 17:21:15.973: h245_decode_one_pdu: H245ASNDecodePdu rc = 0, bytesLeftToDecode = 0
*Aug 17 17:21:15.973: h245_decode_one_pdu: Read Pkt body: more_pdus:0 rc:0 asn_rc:0
*Aug 17 17:21:15.973: //229/182F2991800A/H323/cch323_run_h245_cap_out_sm:
Received H245_EVENT_CAP_CFM while at state AWAITING_RESPONSE
*Aug 17 17:21:15.973: //229/182F2991800A/H323/h245_cap_out_set_new_state:
changing from AWAITING_RESPONSE state to IDLE state
*Aug 17 17:21:15.973: //229/182F2991800A/H323/run_h245_iwf_sm:
received IWF_EV_CAP_CFM while at state IWF_AWAIT_CAP_MSD_RESP
*Aug 17 17:21:15.977: //229/182F2991800A/H323/h245_iwf_set_new_state:
changing from IWF_AWAIT_CAP_MSD_RESP state to IWF_AWAIT_MSD_RESP state
*Aug 17 17:21:15.977: h323chan_chn_process_read_socket
*Aug 17 17:21:15.977: h323chan_chn_process_read_socket: fd=4 of type CONNECTED has data
*Aug 17 17:21:15.977: h323chan_chn_process_read_socket: h323chan accepted/connected fd=4

*Aug 17 17:21:15.977: h245_decode_one_pdu: more_pdus = 0, bytesLeftToDecode = 2
*Aug 17 17:21:15.977: H245 MSC INCOMING ENCODE BUFFER ::= 2080
*Aug 17 17:21:15.977:
*Aug 17 17:21:15.977: H245 MSC INCOMING PDU ::=

value MultimediaSystemControlMessage ::= response : masterSlaveDeterminationAck :
{
    decision master : NULL
}

```

Now, CVP redirects the media connection to the VXML Gateway. Ingress GW receives Empty TCS from CVP

```

*Aug 17 17:21:15.985: H245 MSC INCOMING PDU ::=

value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{
    sequenceNumber 2
}

```

```
protocolIdentifier { 0 0 8 245 0 11 }  
}
```

Ingress GW closes its logical channel by sending CloseLogicalChannel (CLC) to CVP

*Aug 17 17:21:15.985: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= request : closeLogicalChannel :  
  
  {  
  
    forwardLogicalChannelNumber 1  
  
    source user : NULL  
  
  }
```

Ingress GW sends TCS ACK to CVP

*Aug 17 17:21:15.985: H245 MSC OUTGOING ENCODE BUFFER ::= 0400000000

*Aug 17 17:21:15.985:

*Aug 17 17:21:15.985: //229/182F2991800A/H323/h245_olc_out_set_new_state:
Changing from H245_OLC_OUT_STATE_ESTABLISHED state to H245_OLC_OUT_STATE_IDLE state

*Aug 17 17:21:15.985: //229/182F2991800A/H323/h245_iwf_set_new_state:
changing from IWF_OLC_DONE state to IWF_OLC_IN_DONE state

*Aug 17 17:21:15.985: //229/182F2991800A/H323/cch323_run_h245_cap_in_sm:
Received H245_EVENT_CAP_RESP while at state AWAITING_RESPONSE

*Aug 17 17:21:15.985: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= response : terminalCapabilitySetAck :  
  
  {  
  
    sequenceNumber 2  
  
  }
```

Ingress GW sends Bandwidth Request to Gatekeeper in order to update the current bandwidth (zero) used for the call

*Aug 17 17:21:15.985: H245 MSC OUTGOING ENCODE BUFFER ::= 218002

*Aug 17 17:21:15.985:

*Aug 17 17:21:15.985: //229/182F2991800A/H323/h245_cap_in_set_new_state:
changing from AWAITING_RESPONSE state to IDLE state

*Aug 17 17:21:15.989: RAS OUTGOING PDU ::=

```
value RasMessage ::= bandwidthRequest :  
  
  {
```

```
requestSeqNum 15289
endpointIdentifier {"84B3CC1C00000004"}
conferenceID '182F29914C1D11DC800A0017E0ABA838'H
callReferenceValue 67
bandWidth 0
callIdentifier
{
    guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
}
answeredCall FALSE
}
```

CVP closes its logical channel by sending CLC to the Ingress GW

```
*Aug 17 17:21:15.989: H245 MSC INCOMING PDU ::=
```

```
value MultimediaSystemControlMessage ::= request : closeLogicalChannel :
{
    forwardLogicalChannelNumber 129
    source user : NULL
    reason unknown : NULL
}
```

```
*Aug 17 17:21:15.989: h245_decode_one_pdu: H245ASNDecodePdu rc = 0, bytesLeftToDecode = 0
```

```
*Aug 17 17:21:15.989: h245_decode_one_pdu: Read Pkt body: more_pdus:0 rc:0 asn_rc:0
```

```
*Aug 17 17:21:15.989: H245 MSC OUTGOING PDU ::=
```

```
value MultimediaSystemControlMessage ::= response : closeLogicalChannelAck :
{
    forwardLogicalChannelNumber 129
}
```

Ingress GW receives TCS and MSD from CVP. This TCS provides information about the Terminal Capabilities of the VXML Gateway

*Aug 17 17:21:16.129: H245 MSC INCOMING PDU ::=

```
value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{
  sequenceNumber 3
  protocolIdentifier { 0 0 8 245 0 11 }
  multiplexCapability h2250Capability :
  {
    maximumAudioDelayJitter 20
    receiveMultipointCapability
    {
      multicastCapability FALSE
      multiUniCastConference FALSE
      mediaDistributionCapability
      {
        {
          centralizedControl FALSE
          distributedControl FALSE
          centralizedAudio FALSE
          distributedAudio FALSE
          centralizedVideo FALSE
          distributedVideo FALSE
        }
      }
    }
  }
  transmitMultipointCapability
  {
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
```

```
    {
        centralizedControl FALSE
        distributedControl FALSE
        centralizedAudio FALSE
        distributedAudio FALSE
        centralizedVideo FALSE
        distributedVideo FALSE
    }
}
receiveAndTransmitMultipointCapability
{
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
        {
            centralizedControl FALSE
            distributedControl FALSE
            centralizedAudio FALSE
            distributedAudio FALSE
            centralizedVideo FALSE
            distributedVideo FALSE
        }
    }
}
mcCapability
{
    centralizedConferenceMC FALSE
    decentralizedConferenceMC FALSE
}
```

```
rtcpVideoControlCapability FALSE

mediaPacketizationCapability
{
    h261aVideoPacketization FALSE
}

logicalChannelSwitchingCapability FALSE

t120DynamicPortCapability FALSE
}

capabilityTable
{

    {
        capabilityTableEntryNumber 34
        capability receiveRTPAudioTelephonyEventCapability :
        {
            dynamicRTPPayloadType 101
            audioTelephoneEvent "0-16"
        }
    },
    {
        capabilityTableEntryNumber 31
        capability receiveUserInputCapability : hookflash : NULL
    },
    {
        capabilityTableEntryNumber 30
        capability receiveUserInputCapability : dtmf : NULL
    },
    {
        capabilityTableEntryNumber 27
        capability receiveUserInputCapability : basicString : NULL
    },
    {
        capabilityTableEntryNumber 3
```

```

        capability receiveAudioCapability : g711Ulaw64k : 20
    }
}
capabilityDescriptors
{
    {
        capabilityDescriptorNumber 1
        simultaneousCapabilities
        {
            {
                3
            },
            {
                34,
                30,
                27
            },
            {
                31
            }
        }
    }
}

```

Ingress GW sends its TCS and MSD to CVP

*Aug 17 17:21:16.141: H245 MSC OUTGOING PDU ::=

```

value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{

```

```
sequenceNumber 2
protocolIdentifier { 0 0 8 245 0 7 }
multiplexCapability h2250Capability :
{
  maximumAudioDelayJitter 20
  receiveMultipointCapability
  {
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
      {
        centralizedControl FALSE
        distributedControl FALSE
        centralizedAudio FALSE
        distributedAudio FALSE
        centralizedVideo FALSE
        distributedVideo FALSE
      }
    }
  }
  transmitMultipointCapability
  {
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
      {
        centralizedControl FALSE
        distributedControl FALSE
        centralizedAudio FALSE
```

```
        distributedAudio FALSE
        centralizedVideo FALSE
        distributedVideo FALSE
    }
}
}
receiveAndTransmitMultipointCapability
{
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
        {
            centralizedControl FALSE
            distributedControl FALSE
            centralizedAudio FALSE
            distributedAudio FALSE
            centralizedVideo FALSE
            distributedVideo FALSE
        }
    }
}
mcCapability
{
    centralizedConferenceMC FALSE
    decentralizedConferenceMC FALSE
}
rtcpVideoControlCapability FALSE
mediaPacketizationCapability
{
    h261aVideoPacketization FALSE
}
```

```

logicalChannelSwitchingCapability FALSE

t120DynamicPortCapability FALSE
}
capabilityTable
{

    {
        capabilityTableEntryNumber 34
        capability receiveRTPAudioTelephonyEventCapability :
        {
            dynamicRTPPayloadType 101
            audioTelephoneEvent "0-16"
        }
    },
    {
        capabilityTableEntryNumber 25
        capability receiveAndTransmitDataApplicationCapability :
        {
            application nonStandard :
            {
                nonStandardIdentifier h221NonStandard :
                {
                    t35CountryCode 181
                    t35Extension 0
                    manufacturerCode 18
                }
                data '52747044746D6652656C6179'H
            }
            maxBitRate 0
        }
    },
    {
        capabilityTableEntryNumber 31

```

```
        capability receiveUserInputCapability : hookflash : NULL
    },
    {
        capabilityTableEntryNumber 30
        capability receiveUserInputCapability : dtmf : NULL
    },
    {
        capabilityTableEntryNumber 27
        capability receiveUserInputCapability : basicString : NULL
    },
    {
        capabilityTableEntryNumber 3
        capability receiveAudioCapability : g711Ulaw64k : 20
    }
}
capabilityDescriptors
{
    {
        capabilityDescriptorNumber 1
        simultaneousCapabilities
        {
            {
                3
            },
            {
                34,
                30,
                27,
                25
            },
        }
    }
}
```

```
    {
      31
    }
  }
}
}
```

```
*Aug 17 17:21:16.149: H245 MSC OUTGOING ENCODE BUFFER ::=
0270020600088175000780138000140001000001000001000000CC0010
00100058000218A061404302D31368000184810B50000120C52747044
746D6652656C6179000080001E83015080001D83014080001A8301108
0000220C01300800102000002030021001D001A001800001E
```

```
*Aug 17 17:21:16.149:
```

```
*Aug 17 17:21:16.149: //229/182F2991800A/H323/h245_cap_out_set_new_state:
changing from IDLE state to AWAITING_RESPONSE state
```

```
*Aug 17 17:21:16.149: //229/182F2991800A/H323/cch323_run_h245_ms_sm:
Received event H245_EVENT_MSD while at state H245_MS_NONE
```

```
*Aug 17 17:21:16.149: H245 MSC OUTGOING PDU ::=
```

```
value MultimediaSystemControlMessage ::= request : masterSlaveDetermination :
{
  terminalType 60
  statusDeterminationNumber 3855
}
```

Ingress GW sends MSD Ack and TCS Ack to CVP

```
*Aug 17 17:21:16.153: H245 MSC OUTGOING PDU ::=
```

```
value MultimediaSystemControlMessage ::= response : masterSlaveDeterminationAck :
{
  decision slave : NULL
}
```

```

*Aug 17 17:21:16.153: H245 MSC OUTGOING ENCODE BUFFER ::= 20A0

*Aug 17 17:21:16.153:

*Aug 17 17:21:16.153: //229/182F2991800A/H323/cch323_run_h245_ms_sm:
MS_Determine_indication to Appl: Sent MSD ACK!

*Aug 17 17:21:16.153: //229/182F2991800A/H323/h245_ms_set_new_state:
Changing from H245_MS_OUTGOING_WAIT state to H245_MS_INCOMING_WAIT state

*Aug 17 17:21:16.153: //229/182F2991800A/H323/run_h245_iwf_sm:
received IWF_EV_MSD_ACK_SENT while at state IWF_AWAIT_MSD_RESP

*Aug 17 17:21:16.153: //229/182F2991800A/H323/h245_iwf_common_msacksent:
Negotiated codecs and dtmf are initialised in ccb

*Aug 17 17:21:16.153: h323chan_chn_process_read_socket

*Aug 17 17:21:16.153: h323chan_chn_process_read_socket: fd=4 of type CONNECTED has data

*Aug 17 17:21:16.153: h323chan_chn_process_read_socket: h323chan accepted/connected fd=4

*Aug 17 17:21:16.153: h245_decode_one_pdu: more_pdus = 0, bytesLeftToDecode = 3

*Aug 17 17:21:16.153: H245 MSC INCOMING ENCODE BUFFER ::= 218002

*Aug 17 17:21:16.153:

*Aug 17 17:21:16.153: H245 MSC INCOMING PDU ::=

value MultimediaSystemControlMessage ::= response : terminalCapabilitySetAck :
{
    sequenceNumber 2
}

```

Ingress GW sends BRQ to Gatekeeper in order to update the current bandwidth used for the call (2*64=128 kbps)

```

*Aug 17 17:21:16.157: RAS OUTGOING PDU ::=

value RasMessage ::= bandwidthRequest :
{
    requestSeqNum 15290
    endpointIdentifier {"84B3CC1C00000004"}
    conferenceID '182F29914C1D11DC800A0017E0ABA838'H
    callReferenceValue 67
    bandwidth 1280
}

```

```
callIdentifier
{
    guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
}
answeredCall FALSE
}
```

*Aug 17 17:21:16.173: RAS INCOMING PDU ::=

```
value RasMessage ::= bandwidthConfirm :
{
    requestSeqNum 15290
    bandWidth 1280
}
```

Ingress GW sends OLC request to CVP

*Aug 17 17:21:16.173: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= request : openLogicalChannel :
{
    forwardLogicalChannelNumber 2
    forwardLogicalChannelParameters
    {
        dataType audioData : g711Ulaw64k : 20
        multiplexParameters h2250LogicalChannelParameters :
        {
            sessionID 1
            mediaControlChannel unicastAddress : ipAddress :
            {
                network '0E32C90B'H
                tsapIdentifier 18491
            }
            silenceSuppression FALSE
        }
    }
}
```

```
}  
}
```

Ingress GW receives OLC from CVP. CVP provides the IP address of the VXML Gateway for the RTCP connection

```
*Aug 17 17:21:16.177: H245 MSC INCOMING PDU ::=
```

```
value MultimediaSystemControlMessage ::= request : openLogicalChannel :  
  
  {  
  
    forwardLogicalChannelNumber 258  
  
    forwardLogicalChannelParameters  
  
    {  
  
      dataType audioData : g711Ulaw64k : 20  
  
      multiplexParameters h2250LogicalChannelParameters :  
  
      {  
  
        sessionID 1  
  
        mediaControlChannel unicastAddress : ipAddress :  
  
        {  
  
          network '0E32C90F'H  
  
          tsapIdentifier 21135  
  
        }  
  
      }  
  
    }  
  
  }  
  
}
```

GW sends OLC Ack response to CVP

```
*Aug 17 17:21:16.181: H245 MSC OUTGOING PDU ::=
```

```
value MultimediaSystemControlMessage ::= response : openLogicalChannelAck :  
  
  {  
  
    forwardLogicalChannelNumber 258  
  
    forwardMultiplexAckParameters h2250LogicalChannelAckParameters :  
  
    {  
  
      mediaChannel unicastAddress : ipAddress :  
  
      {  
  

```

```

        network '0E32C90B'H
        tsapIdentifier 18490
    }
    mediaControlChannel unicastAddress : ipAddress :
    {
        network '0E32C90B'H
        tsapIdentifier 18491
    }
    flowControlToZero FALSE
}
}

```

GW receives OLC Ack from CVP. CVP provides the IP address of the VXML Gateway for RTP connection. RTP Connection between Ingress GW and VXML GW is established

*Aug 17 17:21:16.185: H245 MSC INCOMING PDU ::=

```

value MultimediaSystemControlMessage ::= response : openLogicalChannelAck :
{
    forwardLogicalChannelNumber 2
    forwardMultiplexAckParameters h2250LogicalChannelAckParameters :
    {
        sessionID 1
        mediaChannel unicastAddress : ipAddress :
        {
            network '0E32C90F'H
            tsapIdentifier 21134
        }
        mediaControlChannel unicastAddress : ipAddress :
        {
            network '0E32C90F'H
            tsapIdentifier 21135
        }
    }
}
}

```

Gateway detects DTMF digit "1" and sends it via RTP NTE (RFC 2833) based DTMF Relay events to the VXML GW

```
s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2543 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:03 00 00 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2544 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:03 00 00 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2545 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:03 00 00 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2546 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:03 01 90 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2547 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:03 03 20 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2548 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:83 03 38 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x2549 timestamp 0x16EE0
Pt:101 Evt:1 Pkt:83 03 38 <Snd>>>

s=DSP d=VoIP payload 0x65 ssrc 0x1D5E sequence 0x254A timestamp 0x16EE0
Pt:101 Evt:1 Pkt:83 03 38 <Snd>>>
```

Now, CVP redirects the call to the Agent IP Phone that answered the call. GW receives empty TCS

```
*Aug 17 17:22:05.349: H245 MSC INCOMING PDU ::=
```

```
value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{
    sequenceNumber 4
    protocolIdentifier { 0 0 8 245 0 11 }
}
```

Ingress GW receives TCS and MSD from CVP. This TCS provides information about the Terminal Capabilities of the IP Phone

```
*Aug 17 17:22:09.569: H245 MSC INCOMING PDU ::=
```

```
value MultimediaSystemControlMessage ::= request : terminalCapabilitySet :
{
    sequenceNumber 5
```

```
protocolIdentifier { 0 0 8 245 0 11 }
multiplexCapability h2250Capability :
{
  maximumAudioDelayJitter 60
  receiveMultipointCapability
  {
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
      {
        centralizedControl FALSE
        distributedControl FALSE
        centralizedAudio FALSE
        distributedAudio FALSE
        centralizedVideo FALSE
        distributedVideo FALSE
      }
    }
  }
  transmitMultipointCapability
  {
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
      {
        centralizedControl FALSE
        distributedControl FALSE
        centralizedAudio FALSE
        distributedAudio FALSE
```

```
        centralizedVideo FALSE
        distributedVideo FALSE
    }
}
}
receiveAndTransmitMultipointCapability
{
    multicastCapability FALSE
    multiUniCastConference FALSE
    mediaDistributionCapability
    {
        {
            centralizedControl FALSE
            distributedControl FALSE
            centralizedAudio FALSE
            distributedAudio FALSE
            centralizedVideo FALSE
            distributedVideo FALSE
        }
    }
}
mcCapability
{
    centralizedConferenceMC FALSE
    decentralizedConferenceMC FALSE
}
rtcpVideoControlCapability FALSE
mediaPacketizationCapability
{
    h261aVideoPacketization FALSE
}
logicalChannelSwitchingCapability FALSE
```

```
t120DynamicPortCapability FALSE
}
capabilityTable
{
    {
        capabilityTableEntryNumber 1
        capability receiveAudioCapability : g711Ulaw64k : 40
    },
    {
        capabilityTableEntryNumber 2
        capability receiveAndTransmitUserInputCapability : dtmf : NULL
    },
    {
        capabilityTableEntryNumber 3
        capability receiveAndTransmitUserInputCapability : basicString : NULL
    },
    {
        capabilityTableEntryNumber 44
        capability receiveAndTransmitUserInputCapability : hookflash : NULL
    }
}
capabilityDescriptors
{
    {
        capabilityDescriptorNumber 0
        simultaneousCapabilities
        {
            {
                1
            },
        }
    }
}
```

```
    {
      2,
      3
    },

    {
      44
    }
  }
}
}
```

*Aug 17 17:22:09.589: H245 MSC INCOMING PDU ::=

```
value MultimediaSystemControlMessage ::= request : masterSlaveDetermination :
{
  terminalType 50
  statusDeterminationNumber 767617
}
```

Ingress GW receives OLC from CVP. CVP provides the IP address of the CallManager for the RTCP connection

*Aug 17 17:22:09.597: H245 MSC INCOMING PDU ::=

```
value MultimediaSystemControlMessage ::= request : openLogicalChannel :
{
  forwardLogicalChannelNumber 259
  forwardLogicalChannelParameters
  {
    dataType audioData : g711Ulaw64k : 20
    multiplexParameters h2250LogicalChannelParameters :
    {
```

```
    sessionID 1

    mediaControlChannel unicastAddress : ipAddress :
    {
        network 'AC126E54'H
        tsapIdentifier 4001
    }
}
}
```

GW sends OLC Ack response to CVP

*Aug 17 17:22:09.613: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= response : openLogicalChannelAck :
{
    forwardLogicalChannelNumber 259
    forwardMultiplexAckParameters h2250LogicalChannelAckParameters :
    {
        mediaChannel unicastAddress : ipAddress :
        {
            network '0E32C90B'H
            tsapIdentifier 18490
        }
        mediaControlChannel unicastAddress : ipAddress :
        {
            network '0E32C90B'H
            tsapIdentifier 18491
        }
        flowControlToZero FALSE
    }
}
```

GW receives OLC Ack from CVP. CVP provides the IP address of the Agent IP Phone for RTP connection. RTP Connection between Ingress GW and IP Phone is established

*Aug 17 17:22:09.609: H245 MSC OUTGOING PDU ::=

```
value MultimediaSystemControlMessage ::= request : openLogicalChannel :
{
  forwardLogicalChannelNumber 3
  forwardLogicalChannelParameters
  {
    dataType audioData : g711Ulaw64k : 20
    multiplexParameters h2250LogicalChannelParameters :
    {
      sessionID 1
      mediaControlChannel unicastAddress : ipAddress :
      {
        network '0E32C90B'H
        tsapIdentifier 18491
      }
      silenceSuppression FALSE
    }
  }
}
```

*Aug 17 17:22:09.633: H245 MSC INCOMING PDU ::=

```
value MultimediaSystemControlMessage ::= response : openLogicalChannelAck :
{
  forwardLogicalChannelNumber 3
  forwardMultiplexAckParameters h2250LogicalChannelAckParameters :
  {
    sessionID 1
    mediaChannel unicastAddress : ipAddress :
    {
      network '0E32CA1A'H
    }
  }
}
```

```

        tsapIdentifier 17156
    }
    mediaControlChannel unicastAddress : ipAddress :
    {
        network '0E32CA1A'H
        tsapIdentifier 17157
    }
}
}

```

After finishing the conversation with the Agent, the PSTN caller hangs up the call. Ingress GW receives ISDN Disconnect from the PSTN

```

*Aug 17 17:22:56.329: ISDN Se1/0/0:23 Q931: RX <- DISCONNECT pd = 8  callref = 0x0088
    Cause i = 0x8290 - Normal call clearing
*Aug 17 17:22:56.329: %ISDN-6-DISCONNECT: Interface Serial1/0/0:0  disconnected from 9999
call lasted 100 seconds
*Aug 17 17:22:56.333: ISDN Se1/0/0:23 Q931: TX -> RELEASE pd = 8  callref = 0x8088
*Aug 17 17:22:56.333: //228/182F2991800A/CCAPI/cc_api_call_disconnected:
    Cause Value=16, Interface=0x46964DF8, Call Id=228
*Aug 17 17:22:56.333: //228/182F2991800A/CCAPI/cc_api_call_disconnected:
    Call Entry(Responded=TRUE, Cause Value=16, Retry Count=0)

```

Ingress GW terminates the H323 call on the IP leg by sending H225 Release Complete message to CVP

```

*Aug 17 17:22:56.337: H225.0 OUTGOING PDU ::=

value H323_UserInformation ::=
{
    h323-uu-pdu
    {
        h323-message-body releaseComplete :
        {
            protocolIdentifier { 0 0 8 2250 0 4 }
            callIdentifier
            {
                guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
            }
        }
    }
}

```

```
    }
  }
  h245Tunneling FALSE
  nonStandardControl
  {
    {
      nonStandardIdentifier h221NonStandard :
      {
        t35CountryCode 181
        t35Extension 0
        manufacturerCode 18
      }
      data '6001020001082C080282901C269E810003677464...'H
    }
  }
  tunnelledSignallingMessage
  {
    tunnelledProtocolID
    {
      id tunnelledProtocolAlternateID :
      {
        protocolType "gtd"
      }
    }
    messageContent
    {
      '52454C2C0D0A50524E2C6973646E2A2C2C4E492A...'H
    }
    tunnellingRequired NULL
  }
}
}
```

GW sends DisengageRequest (DRQ) to the Gatekeeper

*Aug 17 17:22:56.341: RAS OUTGOING PDU ::=

```
value RasMessage ::= disengageRequest :
{
  requestSeqNum 15295
  endpointIdentifier {"84B3CC1C00000004"}
  conferenceID '182F29914C1D11DC800A0017E0ABA838'H
  callReferenceValue 67
  disengageReason normalDrop : NULL
  nonStandardData
  {
    nonStandardIdentifier h221NonStandard :
    {
      t35CountryCode 181
      t35Extension 0
      manufacturerCode 18
    }
    data '40001A52454C2C0D0A50524E2C6973646E2A2C2C...'H
  }
  callIdentifier
  {
    guid '182FC5B94C1D11DC8298DF9092AE2C6A'H
  }
  answeredCall FALSE
  usageInformation
  {
    nonStandardUsageFields
    {
      {
        nonStandardIdentifier h221NonStandard :
        {
```

```

        t35CountryCode 181
        t35Extension 0
        manufacturerCode 18
    }
    data '4800'H
}
}
connectTime 1187371275
endTime 1187371375
}
terminationCause releaseCompleteCauseIE : '08028090'H
}

```

H245 connection between the GW and CVP gets closed after the exchange of CLC and EndSession commands

*Aug 17 17:22:56.357: H245 MSC INCOMING PDU ::=

```

value MultimediaSystemControlMessage ::= request : closeLogicalChannel :
{
    forwardLogicalChannelNumber 259
    source user : NULL
    reason unknown : NULL
}

```

*Aug 17 17:22:56.357: h245_decode_one_pdu: H245ASNDecodePdu rc = 0, bytesLeftToDecode = 0

*Aug 17 17:22:56.357: h245_decode_one_pdu: Read Pkt body: more_pdus:0 rc:0 asn_rc:0

*Aug 17 17:22:56.357: H245 MSC OUTGOING PDU ::=

```

value MultimediaSystemControlMessage ::= response : closeLogicalChannelAck :
{
    forwardLogicalChannelNumber 259
}

```

*Aug 17 17:22:56.357: H245 MSC INCOMING PDU ::=

value MultimediaSystemControlMessage ::= command : endSessionCommand : disconnect : NULL

*Aug 17 17:22:56.357: h245_decode_one_pdu: H245ASNDecodePdu rc = 0, bytesLeftToDecode = 0

*Aug 17 17:22:56.357: h245_decode_one_pdu: Read Pkt body: more_pdus:0 rc:0 asn_rc:0

*Aug 17 17:22:56.357: H245 MSC OUTGOING PDU ::=

value MultimediaSystemControlMessage ::= command : endSessionCommand : disconnect : NULL

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