



Avaya Solution & Interoperability Test Lab

Application Notes of Polycom H.323 Video Endpoints Consisting of VSX Endpoints and HDX Endpoints with Avaya Aura® Communication Manager 6.0.1 and Polycom CMA 4000 – Issue 1.0

Abstract

These Application Notes describe a compliance tested solution comprised of Avaya Aura® Communication Manager, the Polycom CMA 4000, Polycom VSX Endpoints, and Polycom HDX Endpoints. The solution described in these Application Notes pertains only to H.323 interoperability between Avaya Aura® Communication Manager and the aforementioned Polycom gatekeeper and videoconference endpoints.

Testing was conducted at the Avaya Solution and Interoperability Test Lab at the request of the Solutions Marketing Team in support of the Video Collaboration Solution.

1. Introduction

This Application Notes describes a compliance tested solution comprised of Avaya Aura® Communication Manager, Polycom CMA 4000 Gatekeeper, and Polycom Voice and Video End points. Connectivity between Polycom and Avaya devices is via H.323 signaling. This configuration provides basic point-to-point and multipoint Video/Audio calls through Avaya Aura® Communication Manager and Polycom CMA Gatekeeper.

1.1. Support

Technical support on Polycom can be obtained through the following:

Web: <http://www.polycom.com/support/>

2. Network Topology

The configuration in **Figure 1** was used to test Polycom Video Solution interoperability with Avaya Video Solution where some of the Polycom video endpoints were registered to Avaya Aura® Communication Manager and the others were registered to the Polycom CMA. Various types of video and audio calls were tested across the H.323 trunk. The configuration in **Figure 2** was used to test a configuration with Avaya Aura® Communication Manager Neighbored Gatekeeper where only the Avaya video endpoints (Avaya one-X® Communicator were registered to Avaya Aura® Communication Manager and all the Polycom endpoints were registered to the Polycom CMA.

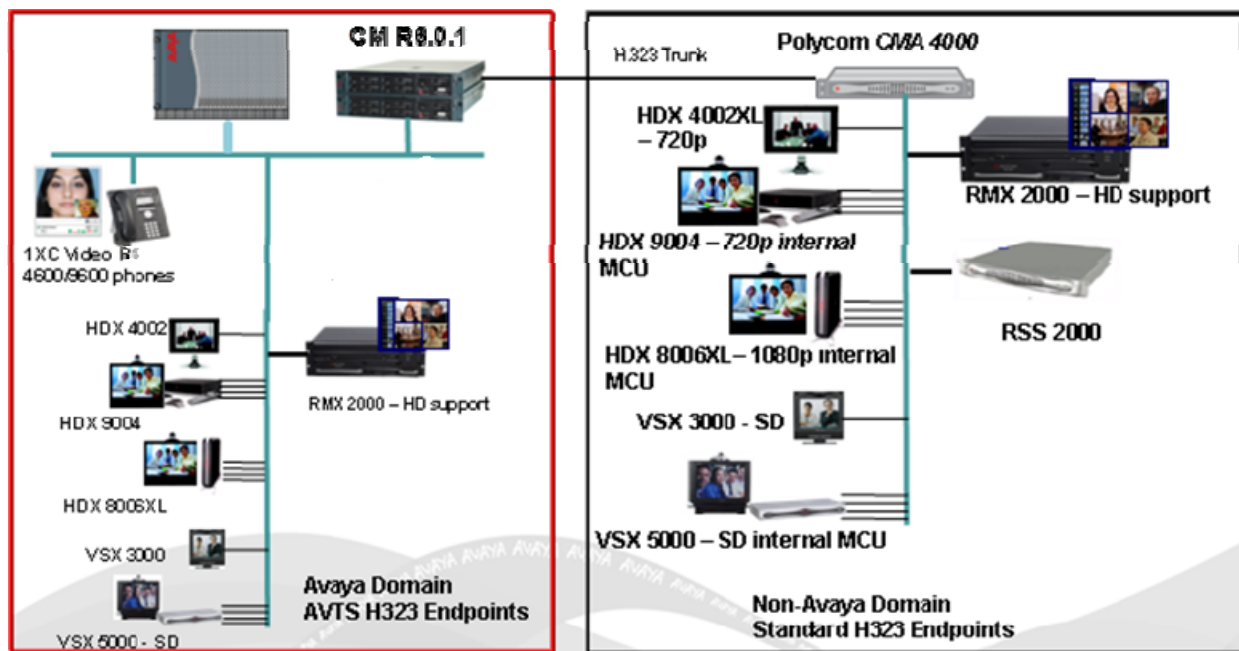


Figure 1: Communication Manager Integration & Communication Manager Neighbored Gatekeeper

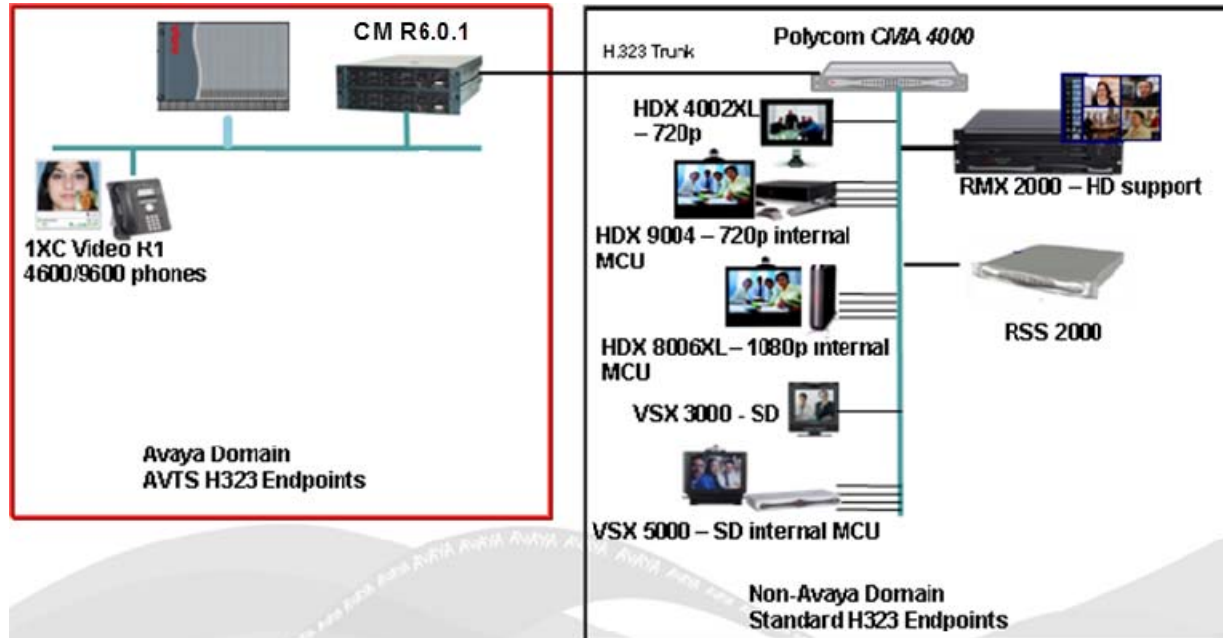


Figure 2 – Communication Manager Neighbored Gatekeeper

3. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment	Software
Avaya Aura® Communication Manager	R016x.00.1.510.1-18777
Avaya Gateway G650 IPSI CONTROL-LAN Medpro (TN2602AP)	FW049 FW038 FW053
Avaya one-X® Communicator	R6.1
Polycom CMA 4000	5.3.0.ER15
Polycom HDX 4002 (h.323)	3.0.0.1-14006
Polycom HDX 8006 (h.323)	3.0.1-10519
Polycom HDX 9004 (h.323)	3.0.1-10519
Polycom VSX 3000 (h.323)	9.0.6.1
Polycom VSX 5000 (h.323)	9.0.6.1

4. Configure Avaya Aura® Communication Manager

This section provides the procedures for configuring Avaya Aura® Communication Manager for video endpoints. The configuration pages in this section are accessed using Avaya Aura® Communication Manager System Access Terminal (SAT). Log in with the proper login credentials. It is assumed that all of the other Communication Manager administration is complete, including but not limited to license, Dial Plan, Routing Patterns, AAR Analysis, and Uniform Dial Plan.

The procedures include the following areas:

- Administer Codec Set
- Administer Network Region
- Configure Polycom VSX/HDX Series Video Conferencing Systems on Communication Manager

4.1. Administer Codec Set

Use the **change ip-codec-set x** command (where x is the chosen IP codec set) to:

- Define the codecs (page 1 of form). The following codecs are recommended:
 - o SIREN14-32K (1 fpp, 20 ms)
SIREN14-32K is a wideband codec. Since most Polycom systems are not configured for stereo, it is not recommended to use a stereo SIREN codec as a default.
 - o G722-64K (1 fpp, 20 ms)

G722-64K is a wideband codec. This codec allows wideband audio with video endpoints that do not support SIREN codecs.

- o G.711 (no silence suppression, 2 fpp, 20 ms) is a high bit rate (64 Kbps) ITU standard codec. Both G.711MU and G.711A are supported.
- o G.729A (no silence suppression, 2 fpp, 20 ms)
Polycom systems do not support all variants of G.729 codecs. If you want to use G.729, you must specify G.729A. If you specify G.729, audio problems arise. All variants of G.729 codecs are narrowband codecs.

NOTE:

Wideband codecs should appear before narrowband codecs in the codec set.

- **Media Encryption** is currently not supported with video so this value needs to be set to **none**.
- Set **Allow Direct-IP Multimedia** to y (page 2 of form).
- Set **Maximum Call Rate for Direct-IP Multimedia**. This setting is the combined audio and video transmit rate or receive rate for non-priority (normal) video calls. You can use this setting to limit the amount of bandwidth used for normal video calls. For example, if you select 384 Kbits, a maximum of 384 Kbits will be used to transmit *and* to receive audio/video.
- **Maximum Call Rate for Priority Direct-IP Multimedia**. This setting is the combined audio and video transmit rate or receive rate for priority video calls. You can use this setting to limit the amount of bandwidth used for priority video calls. For example, if you select 384 Kbits, a maximum of 384 Kbits will be used to transmit *and* to receive audio/video.

Repeat the above steps for each IP codec set that will be used for video.

change ip-codec-set 1				Page 1 of 2
IP Codec Set				
Codec Set: 1				
Audio Codec	Silence Suppression	Frames Per Pkt	Packet Size(ms)	
1: SIREN14-32K		1	20	
2: G.722-64K		2	20	
3: G.711MU	n	2	20	
4: G.729A	n	2	20	
5:				
6:				
7:				
Media Encryption				
1: none				
2:				
3:				

It is important to set the correct Maximum Call Rate. Below is an example of how to configure the rates. Contact your Network Administrator for the Maximum Call Rate allowed.

```
change ip-codec-set 1                                     Page 2 of 2

                                IP Codec Set

                                Allow Direct-IP Multimedia? y
                                Maximum Call Rate for Direct-IP Multimedia: 4096:Kbits
                                Maximum Call Rate for Priority Direct-IP Multimedia: 4096:Kbits

                                Mode                                Redundancy
                                relay                                0
FAX                               off                                0
Modem                             US                                3
TDD/TTY                           n                                0
Clear-channel
```

4.2. Administer Network Region

Use the **change ip-network-region x** command (where x is the chosen IP network region) to set the following parameters:

- **Intra-region IP-IP Direct Audio** to **yes**.
- **Inter-region IP-IP Direct Audio** to **yes**.
NOTE: Shuffling is recommended. However, you can set shuffling to **no**, and video calls will work properly.
- **Security Profiles 1** to **any-auth** (page 3 of form).
- **Codec set** (page 1 and page 4 of form) to one of the codec sets defined in Section 4.1.
- **Video Norm** (page 4 of form) to the amount of bandwidth that you want to allocate for the normal video pool to each IP network region. If this field is left blank as it is in the example screen capture on page 4 there is no bandwidth limitation.
- **Video Prio** (page 4 of form) to the amount of bandwidth that you want to allocate for the priority video pool to each IP network region. If this field is left blank as it is in the example screen capture on page 4 there is no bandwidth limitation.
- **Video Shr** (page 4 of form). Specify whether the normal video pool can be shared with the audio pool for each link between IP network regions. If this field is left blank as it is in the example screen capture on page 4 there is no bandwidth limitation.

Repeat the above steps for each IP network region that will be used for video in this system.

```

change ip-network-region 2                                     Page 1 of 20
                                IP NETWORK REGION
    Region: 2
    Location: 1          Authoritative Domain: dr.avaya.com
    Name: video_endpoints
MEDIA PARAMETERS                                Intra-region IP-IP Direct Audio: yes
    Codec Set: 1                                Inter-region IP-IP Direct Audio: yes
    UDP Port Min: 2048                                IP Audio Hairpinning? y
    UDP Port Max: 65535
DIFFSERV/TOS PARAMETERS                                RTCP Reporting Enabled? y
    Call Control PHB Value: 46                        RTCP MONITOR SERVER PARAMETERS
    Audio PHB Value: 46                                Use Default Server Parameters? y
    Video PHB Value: 36
802.1P/Q PARAMETERS                                AUDIO RESOURCE RESERVATION PARAMETERS
    Call Control 802.1p Priority: 7                                RSVP Enabled? n
    Audio 802.1p Priority: 0
    Video 802.1p Priority: 5
H.323 IP ENDPOINTS
    H.323 Link Bounce Recovery? y
    Idle Traffic Interval (sec): 20
    Keep-Alive Interval (sec): 5
    Keep-Alive Count: 5
  
```

It is important to administer the H.323 SECURITY PROFILES appropriately. Below is an example of how to configure the profiles.

```

change ip-network-region 2                                     Page 3 of 20
                                IP NETWORK REGION

INTER-GATEWAY ALTERNATE ROUTING / DIAL PLAN TRANSPARENCY
    Incoming LDN Extension:
    Conversion To Full Public Number - Delete:      Insert:
    Maximum Number of Trunks to Use for IGAR:
    Dial Plan Transparency in Survivable Mode? n

BACKUP SERVERS(IN PRIORITY ORDER)    H.323 SECURITY PROFILES
1                                     1 any-auth
2                                     2
3                                     3
4                                     4
5
6                                     Allow SIP URI Conversion? y
  
```

```

change ip-network-region 2                                     Page 4 of 20

Source Region: 2      Inter Network Region Connection Management      I      M
                                                                G      A      e
dst codec direct  WAN-BW-limits  Video      Intervening      Dyn  A  G  a
rgn  set  WAN  Units  Total Norm  Prio Shr  Regions      CAC  R  L  s
1    1    y    NoLimit
2    1
3    1    y    NoLimit
                                                                n
                                                                all
                                                                n
  
```

4.3. Configure Polycom VSX/HDX Series Video Conferencing Systems on Communication Manager

Use this procedure to configure Polycom VSX/HDX video conferencing systems. When setting up these systems, you will need to know the following information:

- Maximum number of VSX/HDX systems on your network
- PIN for each VSX/HDX system. The PIN can consist of a maximum of eight numeric characters and is defined by the System Administrator. The PIN must be the same number as is defined on the station form **Security Code**.
- The key code that combines the Avaya option with any other Polycom options.
- Whether the VSX/HDX system has the multipoint option. If so, you must combine the Polycom Software License for this capability with the "Avaya Option" Polycom Software License to create a single Key Code to input into the unit.
- IP address of the voice system.
- IP codec sets you want to use.
- IP network regions you want to use.

Perform the following steps to configure Polycom systems on Communication Manager:

1. Use the **display system-parameters customer-options** command to verify the **Maximum Video Capable Stations** (page 2 of form). This number is provided by the RFA license file. The **Maximum Video Capable Stations** was determined using the following criteria.
 - Each single-point VSX/HDX system is considered to be one station.
 - Each VSX Multipoint system can be **three** to **six** stations depending if the Multipoint Option was purchased from Polycom.
 - Each HDX system can be **three** stations with the Multipoint plus 4 (MPplus 4 Port) Polycom licensed Options and **seven** stations with the MultiPoint plus 8 (MPplus 8 Port) Polycom licensed Options for the HDX9004 (see example screen capture below). The HDX9002 only has Multipoint plus 4 (MPplus 4 Port) as an option.

The screenshot shows a web-based configuration interface for a Polycom system. At the top, a dark header bar contains the text "Enter a software registration key." Below this, on the left, is a vertical navigation menu with the following items: "General Settings" (expanded), "System Settings", "Home Screen Settings", "Security", "Location", "Date and Time", "Serial Ports", and "Options". The main content area is titled "Options" and features a large red heading "Polycom licensed Options". It displays a table of options with three columns: "Option", "Key", and "Enabled". The "Key" column contains the value "K2BF-F75C-". The "Enabled" column shows status icons: a red circle with a slash for "MPplus 4 Port" and green checkmarks for "MPplus 8 Port" and "Avaya". A red rectangular box highlights the "MPplus 4 Port" and "MPplus 8 Port" rows. An "Update" button is located in the top right corner of the main content area.

Option	Key	Enabled
MPplus 4 Port	K2BF-F75C-	
MPplus 8 Port		
Avaya		

2. Use the **change cos-group** command to set **Priority Ip Video** (page 2 of form) for the appropriate COS levels.
3. Use the **add station** command to add a station for the Polycom system. Set the following parameters:
 - **Type** to **H.323**.
 - **Security Code** to the “pin” you will administer for the VSX or HDX system.
 - **IP Video** to **y**.
 - If you want this station to be able to make priority video calls, make sure you select a COS level that has **Priority Ip Video** enabled.

NOTE: You can create an alias for VSX/HDX stations.

The following screen illustrates the **system-parameters customer-options** highlighting the **Maximum Video Capable Stations**.

display system-parameters customer-options		Page 2 of 11
OPTIONAL FEATURES		
IP PORT CAPACITIES	USED	
Maximum Administered H.323 Trunks:	12000	328
Maximum Concurrently Registered IP Stations:	18000	6
Maximum Administered Remote Office Trunks:	12000	0
Maximum Concurrently Registered Remote Office Stations:	18000	0
Maximum Concurrently Registered IP eCons:	414	0
Max Concur Registered Unauthenticated H.323 Stations:	100	0
Maximum Video Capable Stations:	18000	24
Maximum Video Capable IP Softphones:	18000	110
Maximum Administered SIP Trunks:	24000	14278
Maximum Administered Ad-hoc Video Conferencing Ports:	24000	130
Maximum Number of DS1 Boards with Echo Cancellation:	522	0
Maximum TN2501 VAL Boards:	128	1
Maximum Media Gateway VAL Sources:	250	0
Maximum TN2602 Boards with 80 VoIP Channels:	128	0
Maximum TN2602 Boards with 320 VoIP Channels:	128	9
Maximum Number of Expanded Meet-me Conference Ports:	300	0
(NOTE: You must logoff & login to effect the permission changes.)		

The following screen illustrates the **cos-group** highlighting **Priority Ip Video**.

change cos-group 1											Page						2 of		2	
CLASS OF SERVICE																				
</																				

The following screens illustrate an example **station** highlighting relevant parameters.

add station 50084		Page 1 of 4
STATION		
Extension: 50084	Lock Messages? n	BCC: 0
Type: H.323	Security Code: 123456	TN: 1
Port: IP	Coverage Path 1:	COR: 1
Name: HDX8000	Coverage Path 2:	COS: 2
	Hunt-to Station:	Tests? y
STATION OPTIONS		
Loss Group: 19	Time of Day Lock Table:	
	Message Waiting Indicator: none	
	Authentication Required? y	
Survivable COR: internal		
Survivable Trunk Dest? y		
DTMF over IP: in-band		
IP Video? y		

add station 50084		Page 2 of 4
STATION		
FEATURE OPTIONS		
LWC Reception: spe	Coverage Msg Retrieval? y	
LWC Activation? y	Data Restriction? n	
LWC Log External Calls? n	Call Waiting Indication: y	
CDR Privacy? n	Att. Call Waiting Indication: y	
Redirect Notification? y		
Per Button Ring Control? n		
Bridged Call Alerting? n		
Switchhook Flash? y		
H.320 Conversion? n	Per Station CPN - Send Calling Number?	
MWI Served User Type:	Coverage After Forwarding? s	
AUDIX Name:	Multimedia Early Answer? n	
	Direct IP-IP Audio Connections? y	
Emergency Location Ext: 50084	IP Audio Hairpinning? y	

If the VSX/HDX system has the multipoint option, perform the following steps:

1. Use the **add station** command to add a second station for the Polycom system.
2. Set **Type** to **H.323**.
3. Set **Security Code** to the “pin” you will administer for the VSX/HDX. Make sure the security code is the same as the previous station. All the stations configured for a single VSX or HDX system must have the same security code.
4. Set **IP Video** to **y**.
5. On page 2 of the form, set **Direct IP-IP Audio Connections** to **y**.

6. If you want this station to be able to make priority video calls, make sure you select a COS level that has **Priority Ip Video** enabled.
7. Repeat Steps 1 through 7 to create the third consecutive station. For VSX systems, you can have up to six stations.
8. Use the **change station xx** command (where **xx** is the first station you added for the Polycom system) to set **Hunt-to Station** to the second station you added for the Polycom system.
9. Use the **change station xx** command (where **xx** is the second station you added for the Polycom system) to set **Hunt-to Station** to the third station you added for the Polycom system.
10. Use the **change station xx** command (where **xx** is the third station you added for the Polycom system) to set **Hunt-to Station** to the first station you added for the Polycom system. All stations must be in a circular hunt. If you added more than three stations for the Polycom system, use the **change station xx** command to set **Hunt-to Station** for each station.

The following screens illustrate an example series of **stations** for a Polycom system, highlighting relevant parameters.

add station 50084		Page 1 of 4
STATION		
Extension: 50084	Lock Messages? n	BCC: 0
Type: H.323	Security Code: 123456	TN: 1
Port: IP	Coverage Path 1:	COR: 1
Name: HDX8000	Coverage Path 2:	COS: 2
	Hunt-to Station: 50082	Tests? y
STATION OPTIONS		
Loss Group: 19	Time of Day Lock Table:	
	Message Waiting Indicator: none	
	Authentication Required? y	
Survivable COR: internal		
Survivable Trunk Dest? y		
DTMF over IP: in-band		
IP Video? y		

The following screen illustrates the second **station** in the series.

add station 50082		Page 1 of 4
STATION		
Extension: 50082	Lock Messages? n	BCC: 0
Type: H.323	Security Code: 123456	TN: 1
Port: IP	Coverage Path 1:	COR: 1
Name: HDX8000	Coverage Path 2:	COS: 2
	Hunt-to Station: 50083	Tests? y
STATION OPTIONS		
Loss Group: 19	Time of Day Lock Table:	
	Message Waiting Indicator: none	
	Authentication Required? y	
Survivable COR: internal		
Survivable Trunk Dest? y		
DTMF over IP: in-band		
IP Video? y		

The following screen illustrates the third and last **station** in the example series of stations.

add station 50083		Page 1 of 4
STATION		
Extension: 50083	Lock Messages? n	BCC: 0
Type: H.323	Security Code: 123456	TN: 1
Port: IP	Coverage Path 1:	COR: 1
Name: HDX8000	Coverage Path 2:	COS: 2
	Hunt-to Station: 50084	Tests? y
STATION OPTIONS		
Loss Group: 19	Time of Day Lock Table:	
	Message Waiting Indicator: none	
	Authentication Required? y	
Survivable COR: internal		
Survivable Trunk Dest? y		
DTMF over IP: in-band		
IP Video? y		

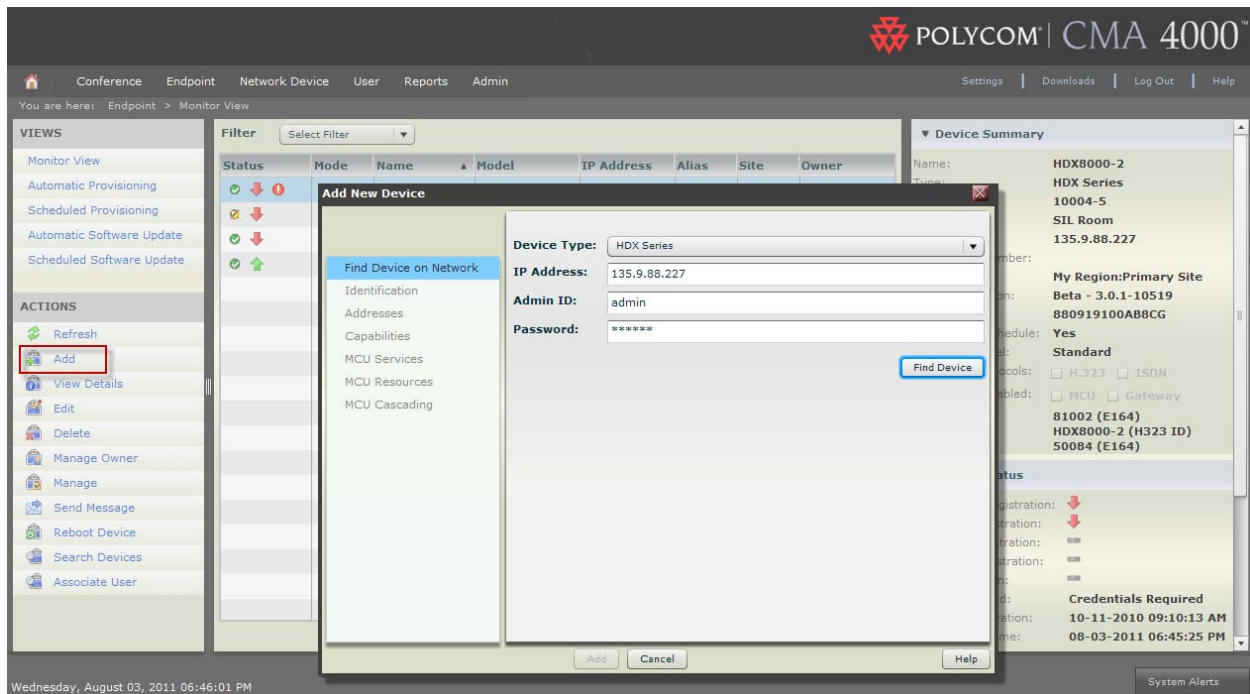
5. Configure Endpoints with Polycom CMA 4000 Gatekeeper

This section discusses the configuration of video endpoints with Polycom CMA Gatekeeper. Is it assumed that the basic configuration of the CMA including Neighboring Gatekeepers, Dial Rules, Sites, and Site-links are already in place.

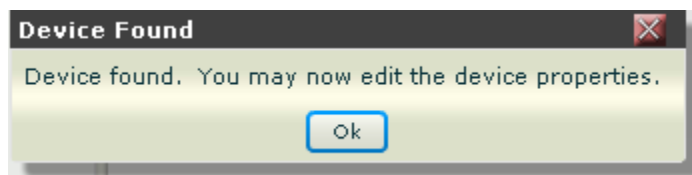
5.1. Endpoints

These are Polycom video endpoints registered to the Polycom CMA. As such they will be recognized only by the Polycom CMA and not by the Communication Manager as valid endpoints.

Click **Endpoint** tab and then **Monitor View**. Select **Add** to add a new endpoint to the table. Enter a **Device Type** from the drop down menu, **IP Address** of the device, the **Admin ID**, and the **Password**. Click **Find Device**.



If the device was successfully found, you will see the following message displayed:



Select the **Identification** option from the Add New Device list. This is the data that was sent by the Polycom Endpoint that was found. Fill in a **Description** if necessary (see below).

Add New Device

IP Address and Password

Identification

Addresses

Capabilities

MCU Services

MCU Resources

MCU Cascading

Device Type: HDX Series

IP Address: 135.9.88.227

System Name: HDX8000-2

Description:

GAB Display Name: SIL Room - HDX 8000 HD

Site: My Region:Primary Site

Serial Number: 880919100AB8CG

Software Version: Beta - 3.0.1-10519

HTTP URL: http://135.9.88.227/

HTTP Port: 80

Add Cancel Help

Select the **Addresses** option from the Add New Device list. The values displayed below are all values that were automatically setup when the Device (Polycom Endpoint) was found with the exception of the E164 Type and Value. It is necessary to enter an Alias Value for the Alias Type of E164, which is the extension that the endpoint will be assigned. In the example below the extension (E164) of this endpoint is 50084. Add additional details to this form as necessary.

Add New Device

Device Type: HDX Series

IP Address: 135.9.88.227

DNS Name: HDX8000-2

Aliases:

Alias Type: E164

Alias Value: **Add**

Type	Value	
E164	81002	Delete
H323 ID	HDX8000-2	Delete
E164	50084	Delete

ISDN Video Number:

Country Code: **Select**

City/Area Code:

Local Phone Number:

Add **Cancel** **Help**

Select the **Capabilities** option from the Add New Device list. The values displayed below are all default values that were automatically setup when the Device (Polycom Endpoint) was found. Select the additional items to this form as necessary. Click **Add**. Repeat this **Section 5.1** to add additional Polycom Endpoints.

Add New Device

Device Type: HDX Series

IP Address: 135.9.88.227

Supported Protocols: ☒ IP(H.323)
Required MCU Service: Any Available Service ▼

☐ ISDN(H.320)
Required MCU Service: Any Available Service ▼

Capabilities Enabled: ☐ MCU
☐ Gateway

Monitoring Level: ☒ Standard
☐ VIP

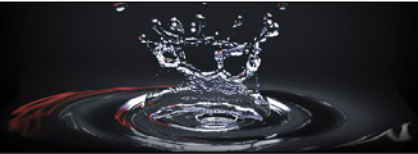
☒ Available to Schedule

Buttons: Add, Cancel, Help

5.2. Configure Polycom VSX/HDX Systems registered to Communication Manager Gatekeeper

1. Install the Polycom system and connect it to your network.
2. Upgrade the Polycom system software (if necessary).
3. Using a web browser, access the Polycom home page for the unit, and select **Admin Settings>Network>IP Network**.
4. Select the **Enable IP H.323** check box.
5. Select the **Display H.323 Extension** check box.
6. Enter a descriptive name in the **H.323 Name** box.
7. In the **H.323 Extension (E.164)** box, enter the first station extension number you specified for this system on the Communication Manager system.
8. From the **Use Gatekeeper** box, select **Specify with PIN**.
9. In the **Gatekeeper IP Address** box, enter the IP address of the CLAN or Processor Ethernet (procr) followed by: 1719 (to specify the correct port to use).
10. In the **Authentication PIN** box, enter the security code you entered when administering the station on Communication Manager.
11. In the **Number** box in the Gateway area, enter the H.323 extension you specified.
12. For the **Gateway Number Type** option select **Number + Extension** from the drop down menu.
13. In the **Type of Service** box in the **Quality of Service** area, select the appropriate setting. Both **IP Precedence** and **DiffServ** are supported. Contact your Network Administrator for this information.
14. In the **Type of Service Value** boxes (**Video**, **Audio**, and **Control**), enter the QoS values for the IP Network Region settings in which the VSX/HDX station belongs.
15. Select the **Enabled PVEC** check box. PVEC (Polycom Video Error Concealment) is an algorithm for IP video Quality of Service (QoS). PVEC significantly improves video quality over congested IP networks that suffer from packet loss by compensating for the losses using packet information from before and after the actual occurrence. PVEC allows video frame rates to remain high during IP network hits and eliminates the poor images usually associated with heavy IP packet loss. This is done completely transparent to the user.
16. Select the **Dynamic Bandwidth** check box.
17. From the **Maximum Transmit Bandwidth** box, select the setting that matches the Maximum Call Rate for Direct-IP Multimedia setting you specified for the Communication Manager system. See Section 4.1.
18. From the **Maximum Receive Bandwidth** box, select the setting that matches the Maximum Call Rate for Direct-IP Multimedia setting you specified for the Communication Manager system. See Section 4.1.
19. Complete the **Firewall** section as necessary.
20. When finished, click the **Update** button at the top (see **Figure 3**).

Repeat above Steps for each Polycom system.

Place a Call

Admin Settings

Diagnostics

Utilities

Home

Configure the system so that users can place and receive calls using IP on your LAN or WAN.

General Settings

Network

IP Network

Telephony

Call Preference

Network Dialing

Call Speeds

Monitors

Cameras

Audio Settings

Polycom Touch Control

LAN Properties

Global Services

Tools

IP Network

Update

Logout

H.323 Settings

Enable IP H.323:

Display H.323 Extension:

H.323 Name:

H.323 Extension (E.164):

Use Gatekeeper:

Current Gatekeeper IP Address:

Primary Gatekeeper IP Address:

Change PIN:

Authentication PIN:

Confirm PIN:

Gateway

Country Code:

Area Code:

Number:

Gateway Number Type

Dial Prefix:

SIP Settings

Enable SIP:

Directory:

Microsoft Lync Server 2010:

Quality of Service

Type of Service:

Type of Service Value:

Video:

Audio:

Control:

Maximum Transmission Unit Size:

Enable PVEC:

Enable RSVP:

Dynamic Bandwidth:

Maximum Transmit Bandwidth:

Maximum Receive Bandwidth:

Firewall

Fixed Ports:

TCP Ports:

UDP Ports:

Figure 3. Example of a Polycom HDX8000 registered to Communication Manager

5.3. Configure VSX/HDX Polycom Systems registered to Polycom CMA Gatekeeper

1. Install the Polycom system and connect it to your network.
2. Upgrade the Polycom system software (if necessary).
3. Using a web browser, access the Polycom home page for the unit, and select **Admin Settings>Network>IP Network**.
4. Select the **Enable IP H.323** check box.
5. Select the **Display H.323 Extension** check box.
6. Enter a descriptive name in the **H.323 Name** box.
7. In the **H.323 Extension (E.164)** box, enter the first station number you specified for this system on the Polycom CMA Gatekeeper.
8. From the **Use Gatekeeper** box, select **Specify**.
9. In the **Gatekeeper IP Address** box, enter the IP address of the Polycom CMA Gatekeeper followed by: 1719 (to specify the correct port to use).
10. In the **Number** box in the Gateway area, enter the H.323 extension you specified.
11. For the **Gateway Number Type** option select **Number + Extension** from the drop down menu.
12. In the **Type of Service** box in the **Quality of Service** area, select the appropriate setting. Both **IP Precedence** and **DiffServ** are supported. Contact your Network Administrator for this information.
13. In the **Type of Service Value** boxes (**Video**, **Audio**, and **Control**), enter the QoS values necessary. Contact your Network Administrator for this information.
14. Select the **Enabled PVEC** check box. PVEC (Polycom Video Error Concealment) is an algorithm for IP video Quality of Service (QoS). PVEC significantly improves video quality over congested IP networks that suffer from packet loss by compensating for the losses using packet information from before and after the actual occurrence. PVEC allows video frame rates to remain high during IP network hits and eliminates the poor images usually associated with heavy IP packet loss. This is done completely transparent to the user.
15. Select the **Dynamic Bandwidth** check box.
16. From the **Maximum Transmit Bandwidth** box, select the appropriate setting. Contact your Network Administrator for this information.
17. From the **Maximum Receive Bandwidth** box, select the appropriate setting. Contact your Network Administrator for this information.
18. Complete the **Firewall** section as necessary.
19. When finished, click the **Update** button at the top (see **Figure 4**).

Repeat above Steps for each Polycom system.




Place a Call
Admin Settings
Diagnostics
Utilities
Home

Configure the system so that users can place and receive calls using IP on your LAN or WAN.

General Settings
System Settings
Home Screen Settings
Sites
Security
Password Settings
Location
Date and Time
Serial Port
Password Settings
Location
Date and Time
Serial Port
Password Settings
Location
Date and Time
Serial Port
Password Settings
Location
Date and Time
Serial Port
Options
Software Update
Network
IP Network
Telephony
Call Preference
Network Dialing
Call Speeds
Monitors
Cameras
Audio Settings
LAN Properties
Global Services
Tools

Update

IP Network

H.323 Settings

Enable IP H.323:	☒
Display H.323 Extension:	☒
H.323 Name:	HDX8000
H.323 Extension (E.164):	81002
Use Gatekeeper:	Specify
Gatekeeper IP Address:	135.9.88.45:1719
Use PathNavigator for Multipoint Calls:	Always

Gateway

Country Code:	1
Area Code:	
Number:	81002
Gateway Number Type:	Number + Extension

SIP Settings

Enable SIP:	☐
-------------	--------------------------

Quality of Service

Type of Service:	DiffServ
Type of Service Value:	
Video:	36
Audio:	46
Control:	0
Maximum Transmission Unit Size:	Default 1260 bytes
Enable PVEC:	☒
Enable RSVP:	☒
Dynamic Bandwidth:	☒
Maximum Transmit Bandwidth:	1920 Kbps
Maximum Receive Bandwidth:	1920 Kbps

Firewall

Fixed Ports:	☐
TCP Ports:	3230 to 3243
UDP Ports:	3230 to 3285
Enable H.460 Firewall Traversal:	☐
NAT Configuration:	Off

Figure 4. Example of a Polycom HDX8000 registered to Polycom CMA Gatekeeper

6. Verification

This section provides the tests that can be performed to verify proper configuration of Communication Manager and Polycom Gatekeeper.

6.1. Interoperability Testing

The interoperability testing included basic feature testing.

Feature tests focused on:

- Point to point calls
- Multipoint audio and video calls
- Media shuffling
- Basic Telephony
 - Hold
 - Unhold
 - Mute Audio and Video
 - Unmute Audio and Video
 - Transfer
 - Video start/stop
- Polycom H.323 Interoperability testing with Communication Manager Neighbored Gatekeeper
- Polycom H.323 Interoperability testing with Communication Manager Integration and Communication Manager Neighbored Gatekeeper
- Reset Communication Manager
- Communication Manager Server Interchanges
- Communication Manager C-LAN / PE Failures

Use the **Status Station** command to verify the status of the station. The following screen captures display the status of station 50090. The Service State is in-service/off-hook meaning that this user is active on a call. The following four screen captures are an example of the status of a Polycom video endpoint active on a call.

status station 50090	Page 1 of 8
GENERAL STATUS	
Administered Type: H.323	Service State: in-service/off-hook
Connected Type: N/A	TCP Signal Status: connected
Extension: 50090	
Port: S01762	Parameter Download: not-applicable
Call Parked? no	SAC Activated? no
Ring Cut Off Act? no	
Active Coverage Option: 1	one-X Server Status: N/A
EC500 Status: N/A	Off-PBX Service State: N/A
Message Waiting:	
Connected Ports: T01844	
Limit Incoming Calls? no	
User Cntrl Restr: none	HOSPITALITY STATUS
Group Cntrl Restr: none	Awaken at:
	User DND: not activated
	Group DND: not activated
	Room Status: non-guest room

In the following screen, the **Switch-End** IP address is the IP address of the CLAN or Processor Ethernet that this endpoint is registered to. The **Set End** is the IP address of this endpoint.

status station 50090	Page 4 of 8
CALL CONTROL SIGNALING	
Port: S01762	Switch-End IP Signaling Loc: 01B1217 H.245 Port: 01B1217
IP Address	Port Node Name Rgn
Switch-End: 135.9.88.5	1720 sqe8730clan3B 1
Set End: 135.9.88.233	1720 1
H.245 Near: 135.9.88.5	13118
H.245 Set: 135.9.88.233	H.245 Set:33369

In the following screen, the **Other-End** IP address is the IP address of the endpoint that this endpoint is talking to. The **Set-End** is the IP address of this endpoint. In this example below the **Audio Connection Type** is **ip-direct**, meaning that the call has shuffled and therefore not using any Media Processor resources on Communication Manager.

status station 50090	Page 5 of 8
AUDIO CHANNEL Port: S01762	
SIREN14-32K	Switch-End Audio Location:
IP Address	Port Node Name Rgn
Other-End: 135.9.88.227	49174 1
Set-End: 135.9.88.233	49170 2
Audio Connection Type: ip-direct	

In this example below the call is using the codec **srn14-32** which was defined earlier on the **ip-codec set** form on Communication Manager.

status station 50090	Page 7 of 8
SRC PORT TO DEST PORT TALKPATH	
src port: S01762	
S01762:TX:135.9.88.233:49170/srn14-32/20ms	
T01844:RX:135.9.88.227:49174/srn14-32/20ms	
Dst port: T01844	

6.2. Verify Polycom Endpoint Registered to CMA

Log in to the Polycom CMA web interface to verify registered endpoints. Under the **Endpoint** tab select **Monitor View**. This will bring up a list of registered endpoints and other relevant information including the Device Summary, Device Status, and Call Info.

The screenshot displays the Polycom CMA 4000 web interface. The top navigation bar includes tabs for Conference, Endpoint, Network Device, User, Reports, and Admin. The 'Endpoint' tab is active, and a dropdown menu shows 'Monitor View' selected. Below the navigation bar, there is a table of registered endpoints. The table has columns for Model, IP Address, Alias, Site, and Owner. Two endpoints are listed: one with model HDX 8000 H and IP 135.9.88.2, and another with model VSX 3000A and IP 135.9.88.2. To the right of the table, a 'Device Summary' panel shows details for the selected endpoint, including Name (HDX8000-2), Type (HDX Series), Id (10004-5), Owner (SIL Room), and IP Address (135.9.88.227).

Model	IP Addr...	Alias	Site	Owner
HDX 8000 H	135.9.88.2	81002	My Re	SIL Room
VSX 3000A	135.122.47	46599	My Re	
VSX3000-2	135.9.88.2	81001	My Re	SIL Room

Device Summary

Name: HDX8000-2
Type: HDX Series
Id: 10004-5
Owner: SIL Room
IP Address: 135.9.88.227

Below is an example of a Polycom HDX8000 device (81002) registered to the CMA and active on a call. Under the Status column there are various symbols that represent different things including active on a call (connected plug symbol) and registered (check mark). On the right hand side of the CMA screen capture below is the Device Summary which gives information pertaining to the device registered to the CMA, the Device Status which in this case shows the endpoint is registered by displaying a green up arrow, and the Call Info in this case displays the Far Site Name and Number which is the CLAN IP address located at the Neighboring Communication Manager Gatekeeper.

The screenshot shows the Polycom CMA 4000 interface. On the left is a sidebar with 'VIEWS' (Monitor View, Automatic Provisioning, Scheduled Provisioning, Automatic Software Update, Scheduled Software Update) and 'ACTIONS' (Refresh, Add, View Details, Manage, Send Message, Clear Help, Reboot Device, Edit, Manage User, Delete). The main area displays a table of devices with columns: Status, Node, Name, Type, IP Address, Alias, Site, and Owner. The first row is highlighted in blue and has a red box around it. A red arrow points from the text 'Extension 81002 is registered with this CMA and is currently active on a call.' to the 'Status' column of the first row. Another red arrow points from the text 'Endpoint is registered. Gatekeeper Registration has a green arrow pointing upward.' to the 'Gatekeeper Registration' status in the 'Device Status' section on the right.

Status	Node	Name	Type	IP Address	Alias	Site	Owner
		HDX8000-2	HDX Series	135.9.88.227	81002	My Region	SIL Room
		MLVSK 3K	V and VSK Series	135.122.26.229	46599	My Region	
		VSK3000-2	V and VSK Series	135.9.88.225	81001	My Region	SIL Room
		VSK5000-1	V and VSK Series	135.9.88.232	81003	My Region	SIL Room

Device Summary

Name: HDX8000-2
 Type: HDX Series
 Id: 10005-6
 Owner: SIL Room
 IP Address: 135.9.88.232
 ISDN Video Number:
 Site: My Region/Primary Site
 Software Version: Release 9.9.5.2 - 29Sep2009 08:03
 Serial Number: 82060706014807
 Available to Schedule: Yes
 Monitoring Level: Standard
 Supported Protocols: ☒ H.323 ☐ ISDN
 Capabilities Enabled: ☐ PC31 ☐ Gateway
 Alias (type): 81002 (E164)
 VSK5000-1 (H323 ID)

Device Status

Gatekeeper Registration:
 Directory Registration:
 Presence Registration:
 Exchange Registration:
 SIP Registration:
 Device Managed: OK
 Last OK Registration: 08-04-2011 10:51:52 AM
 Device Local Time: 08-04-2011 11:54:25 AM
 ISDN Line Status:
 ISDN Assignment Type: From Network
 Device ISDN Type:

Call Info

Call Type:
 Video Protocol: Txc Rxc
 Video Format: Txc Rxc
 Audio Protocol: Txc Rxc
 Far Site Name:
 Far Site Number:
 Pause Code:

Here is an example of an endpoint that is administered on the CMA but not registered.

The screenshot shows the Polycom CMA 4000 interface. The top navigation bar includes links for Conference, Endpoint, Network Device, User, Reports, Admin, Settings, Downloads, Log Out, and Help. The breadcrumb trail indicates the user is in the Endpoint > Monitor View section.

On the left, there are two panels: 'VIEWS' with links like Monitor View, Automatic Provisioning, Scheduled Provisioning, Automatic Softupdate, and Scheduled Softupdate; and 'ACTIONS' with icons for Refresh, Add, View Details, Manage, Send Message, Clear Help, Reboot Device, Edit, and Delete.

The main area contains a table with columns: Status, Mode, Name, Type, IP Address, Alias, Site, and Owner. The table lists three endpoints:

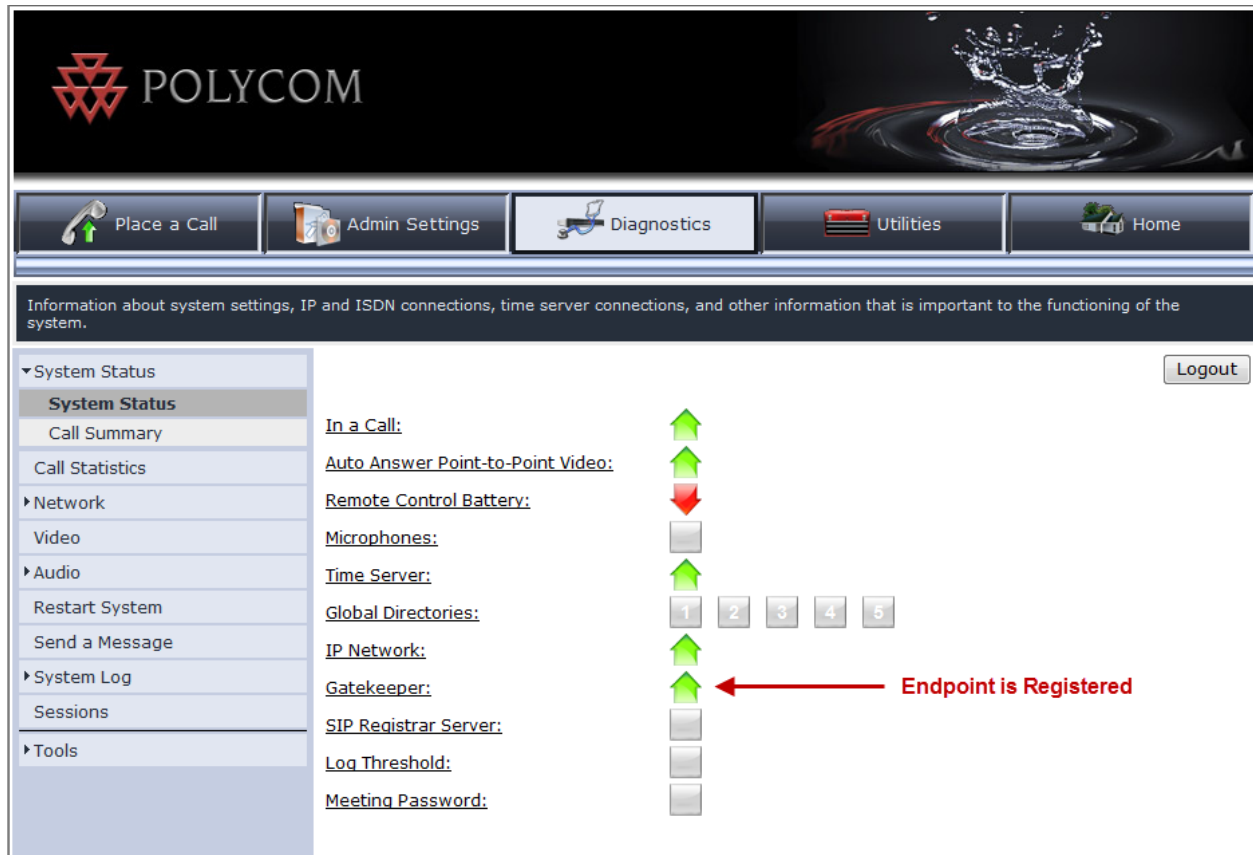
Status	Mode	Name	Type	IP Address	Alias	Site	Owner
		HDX8000-2	HDX Series	135.9.88.227	81002	My Region	SIL Room
		MLV SX 3K	V and VSX Series	135.122.26.229	46599	My Region	SIL Room
		VSX3000-2	V and VSX Series	135.9.88.225	81001	My Region	SIL Room
		VSX5000-1	V and VSX Series	135.9.88.232	81003	My Region	SIL Room

A red text box with the text "Endpoint is not registered. Gatekeeper Registration has a red arrow pointing downward." has a red arrow pointing to the status icon of the MLV SX 3K endpoint.

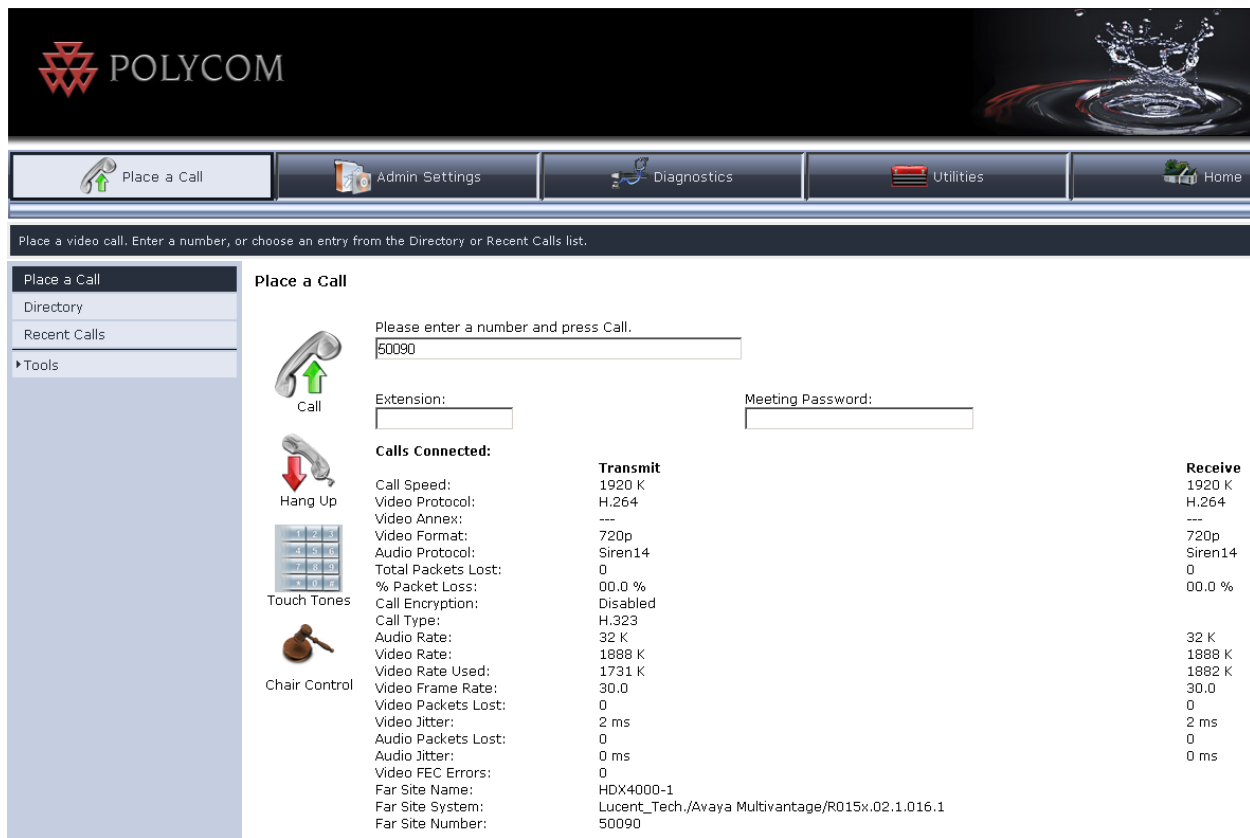
On the right, there is a 'Device Summary' panel for the selected endpoint (MLV SX 3K). It shows details like Name, Type, Owner, IP Address, ISDN Video Number, Site, Software Version, Serial Number, Available to Schedule, Monitoring Level, Supported Protocols, Capabilities Enabled, Alias (type), and Device Status. The Device Status section shows Gatekeeper Registration, GDS Registration, Presence Registration, Device Managed, GK Registration Timeout, Last GK Registration, Device Local Time, ISDN Line Status, ISDN Assignment Type, and Device ISDN Type.

6.3. Verify Status of Polycom Endpoint

Log in to the Polycom endpoint's web interface and select the **Diagnostics** tab and then from the left column select **System Status**. This is an example of the Polycom video endpoint's web interface showing that it is registered with the Gatekeeper. Notice the green upward arrow next to Gatekeeper. If the endpoint was not registered a red arrow pointing downward would be displayed instead of the green upward arrow.



To see the status of an active Polycom endpoint from its web interface select the **Place a Call** tab. Under **Please enter a number and press Call** you will notice that the number **50090** was dialed in this example. All of the information that pertains to this call is displayed under **Calls Connected**.



Place a video call. Enter a number, or choose an entry from the Directory or Recent Calls list.

Place a Call

Please enter a number and press Call.
50090

Extension: Meeting Password:

Calls Connected:

	Transmit	Receive
Call Speed:	1920 K	1920 K
Video Protocol:	H.264	H.264
Video Annex:	---	---
Video Format:	720p	720p
Audio Protocol:	Siren14	Siren14
Total Packets Lost:	0	0
% Packet Loss:	00.0 %	00.0 %
Call Encryption:	Disabled	
Call Type:	H.323	
Audio Rate:	32 K	32 K
Video Rate:	1888 K	1888 K
Video Rate Used:	1731 K	1882 K
Video Frame Rate:	30.0	30.0
Video Packets Lost:	0	0
Video Jitter:	2 ms	2 ms
Audio Packets Lost:	0	0
Audio Jitter:	0 ms	0 ms
Video FEC Errors:	0	
Far Site Name:	HDX4000-1	
Far Site System:	Lucent_Tech./Avaya Multivantage/R015x.02.1.016.1	
Far Site Number:	50090	

7. Conclusion

The H.323 Video interoperability among Avaya Aura® Communication Manager Gatekeeper, Polycom CMA 4000 Gatekeeper, VSX 3000, VSX5000, HDX 4002, HDX 8006, and HDX 9004 Endpoints has been tested and passed.

8. Additional References

Avaya references are available at <http://support.avaya.com>

Polycom references are available at <http://www.polycom.com/support/>

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