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Video Communications

Polycom HDX 9000 series Multipoint Features

Polycom HDX 9000 series' internal MCU can host a conference which includes a combination of video and voice calls, subject to the port capacity described below. These calls can use any combination of protocols supported by the system: H.320, H.323, SIP, ISDN voice or analog voice (POTS), though SIP and H.323 are not allowed in the same conference.

Polycom HDX 9000 series supports the following features in an internal multipoint call:

- H.264/H.263/H.261 up to CIF/SIF 30 fps people video
- H.264 Content video at the same resolutions and frame rates as in a point-to-point call
- AES encryption
- Any audio codec

Display Modes

The Polycom HDX 9000 series displays the images in the same manner as a point to point call, with the far end being one of the following. The host Polycom HDX 9000 series does not support the display of each of the far end images on different displays. For the HDX 9001 and Polycom HDX 9000 series 9002 there are only 3 outputs, one HD capable for main display, one HD capable for 2nd display and one SD only for VCR/DVD recording. The HDX 9004 has an additional HD capable output for content only.

Full Screen

In Full Screen mode, every participant (except the dominant talker) sees the dominant talker's video full-screen. The dominant talker sees the previous dominant talker's video full-screen. This mode is also commonly known as voice-switched or voice-activated switching mode.

Discussion

The Discussion layouts consist of the local video and at most 3 video sites. If there are more than 3 external video connections, the last 3

active speaking locations are seen. Thus when someone speaks at an endpoint which does not currently appear in the layout, the new speaker's video replaces the video from the "oldest" speaker (that is, the endpoint which has been silent the longest). This mode is also commonly known as continuous presence mode.

Presentation

The Presentation mode allows the active speaker to see the Discussion mode layout while the others in the conference see the active speaker full screen. This mode is thus useful when there is a single site doing an extended presentation- the presenter can see the other sites, while the other sites see only the presenter.

Auto

Polycom HDX 9000 series also supports an Auto mode, where the layout automatically switches between Full Screen and Discussion modes depending on the interaction between the sites. Specifically, if multiple sites are talking at the same time, Discussion mode is used. If one site is talking uninterrupted for at least 15 seconds, the speaker appears full screen.

Transcoding

The Polycom HDX 9000 series supports transcoding of line speed (up to those defined in the chart below, which is from the HDX Administrator's Guide), video algorithm, video resolution, and audio algorithm.

For line speed and video algorithm / resolution the HD accelerator card is required, which means that is supported only on the HDX 9002 and HDX 9004. Transcoding must also be active and is configured in the UI under Network, Call Preferences.

The Polycom HDX 9002 and HDX 9004 supports both transcoding and down-speeding. They are both appropriate depending on whether transcoding is enabled or not.

- If transcoding is enabled, the calls will not use down-speeding unless the maximum speed is exceeded.

- If it is disabled, they will use down-speeding, similar to the behavior in VSX.

Line Transcoding

A Polycom HDX 9000 series system with an HD accelerator option card installed, the HDX 9002 and HDX 9004, will support call speed transcoding. A Polycom HDX 9000 series system without the HD accelerator option card, HDX 9001, will not support transcoding.

When transcoding is configured, each far-end system can connect at a different rate as defined in the following table. Polycom HDX 9000 series will down-speed any calls greater than this maximum. When transcoding is configured, the system supports all switching modes (Full Screen, Discussion and Presentation).

Video Transcoding

A Polycom HDX 9000 series system with an HD accelerator option card installed, the HDX 9002 and HDX 9004, will support video transcoding as a configurable option. A Polycom HDX 9000 series system without the HD accelerator option card, HDX 9001, will not support video transcoding.

When video transcoding is enabled, the internal MCU will negotiate the best video algorithm and resolution shared between it and each endpoint independently, transcoding between them as necessary. When transcoding is configured, the system supports all switching modes (Full Screen, Discussion and Presentation). Thus line rate, video algorithm and resolution are all transcoded in this mode.

If the video transcoding feature is not configured, or not supported as on the HDX 9001, and a new site calls in at a rate higher than the existing conference rate, Polycom HDX 9000 series will down-speed the new caller to the conference rate. When transcoding is not configured, or not supported, video resolution and algorithm will be at the highest common parameters. If the conference has to step down to meet a new site's parameters, after leaving the conference the conference will not re-sync at the previous parameters.

Audio Transcoding and Mixing

Audio transcoding is done on all the Polycom HDX 9000 series systems, with or without the HD accelerator option card.

The system will use a computationally efficient 8-to-3 decoder based to mix the audio. As a result, each site will hear a mix of the 3 most active sites (excluding itself). Switching sites into and out of the mix occurs quickly, to prevent lost conversation.

Port Capacity

Polycom HDX 9000 series provides itself plus either 3 or 7 external video call ports, 1 internal voice call port (POTS or ISDN Voice) or a voice call on an attached Polycom SoundStation interface. The maximum port capacity can be stated as:

- Itself , plus
- 1 voice call using a directly connected network (POTS, VoIP, or ISDN Voice), plus
- Either 3 or 7 external voice or video calls, depending on system and option installed.

	With BRI Lines		With T1 PRI Lines	With E1 PRI Lines	H.323/SIP
Number of sites in a call, including host site	Number of ISDN BRI lines	Max Speed for Each Site (kbps)	Max Speed for Each Site (kbps)	Max Speed for Each Site (kbps)	Max Speed for Each Site (kbps) ¹
2	2	256	1472	1920	4096 / 4096
2	3	384	1472	1920	4096 / 4096
2	4	512	1472	1920	4096 / 4096
3	2	128	704	960	1920 / 3072
3	3	192	704	960	1920 / 3072
3	4	256	704	960	1920 / 3072
4	2	64	448	640	1344 / 1920
4	3	128	448	640	1344 / 1920
4	4	128	448	640	1344 / 1920
5	2	N/A	320	448	768 / 768
5	3	64	320	448	768 / 768
5	4	128	320	448	768 / 768
6	2	N/A	256	384	768 / 768
6	3	64	256	384	768 / 768
6	4	64	256	384	768 / 768
7	2	N/A	192	320	384 / 384
7	3	64	192	320	384 / 384
7	4	64	192	320	384 / 384
8	2	N/A	192	256	384 / 384
8	3	N/A	192	256	384 / 384
8	4	64	192	256	384 / 384

Notes on table:

1. With 4mps / with 6mps option

Maximum speeds can future be limited by the communications equipment.

Cascading:

- You can not place cascaded multipoint call through PathNavigator
- These features are not supported in cascaded calls: Polycom StereoSurround, AES encryption, Continuous Presence, Chair control, People+Content, nor H.239
- H.264 is only supported when all of the multipoint-capable systems are Polycom HDX 9000 series systems and each Polycom HDX 9000 series system calls no more than three other systems.
- More than three sites, plus itself, on each system for a maximum of 10 sites.

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