



## CHAPTER 22

# Conference Bridges

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Conference Bridge for Cisco Unified Communications Manager designates a software or hardware application that is designed to allow both ad hoc and meet-me voice conferencing. Additional conference bridge types support other types of conferences, including video conferences. Each conference bridge can host several simultaneous, multiparty conferences.

Conference Bridge includes the following features:

- Creating a conference call
- Adding new participants to an existing conference call
- Ending a conference call
- Dropping conference participants
- Canceling a conference call
- Parking a conference call
- Transferring a conference call

This section covers the following topics:

- [Conference Bridge Configuration Checklist, page 22-1](#)
- [Understanding Conference Devices, page 22-2](#)
- [Using Different Conference Types: Meet Me and Ad Hoc, page 22-9](#)
- [Conferences and the Party Entrance Tone, page 22-18](#)
- [Intelligent Bridge Selection, page 22-18](#)
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## Conference Bridge Configuration Checklist

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Table 22-1 provides a checklist to configure conference bridge. For more information on conference bridges, see the “Where to Find More Information” section on page 22-23.

**Table 22-1 Conference Bridge Configuration Checklist**

| Configuration Steps |  | Related procedures and topics   |
|---------------------|--|---|
| <b>Step 1</b>       | Configure the hardware or software conference bridge(s).   | <a href="#">Conference Bridge Configuration</a> , <i>Cisco Unified Communications Manager Administration Guide</i>              |
| <b>Step 2</b>       | Configure the Meet-Me Number/Pattern.  | <a href="#">Meet-Me Number/Pattern Configuration</a> , <i>Cisco Unified Communications Manager Administration Guide</i>         |
| <b>Step 3</b>       | Add a Conference button for ad hoc or Meet Me Conference button for the meet-me conference to the phone templates, if needed.<br><br>You only need to do this for Cisco Unified IP Phones 12 SP, 12 SP+, and 30 VIP. | <a href="#">Phone Button Template Configuration Settings</a> , <i>Cisco Unified Communications Manager Administration Guide</i> |
| <b>Step 4</b>       | If users will use the Join, ConfList, and RmLstC softkeys, modify either the Standard Feature or Standard User softkey template and assign the modified softkey template to the user device.                         | <a href="#">Modifying Softkey Templates</a> , <i>Cisco Unified Communications Manager Administration Guide</i>                  |
| <b>Step 5</b>       | Configure the ad hoc conference settings.  | <a href="#">Initiating an Ad Hoc Conference</a> , page 22-10.   |
| <b>Step 6</b>       | Notify users that the Conference Bridge feature is available.<br><br>If applicable, notify users of the meet-me conference number range.   | See the phone documentation for instructions on how users access conference bridge features on their Cisco Unified IP Phone.    |

## Understanding Conference Devices

Cisco Unified Communications Manager supports multiple conference devices to distribute the load of mixing audio between the endpoints involved in a conference. A component of Cisco Unified Communications Manager called Media Resource Manager (MRM) locates and assigns resources. The MRM resides on every Cisco Unified Communications Manager server and communicates with MRMs on other Cisco Unified Communications Manager servers.

Cisco Unified Communications Manager supports hardware and software conference devices; both hardware and software conference bridges can be active at the same time.

For conferencing, you must determine the total number of concurrent users (or audio streams) that are required at any given time. (An audio stream is a two-way audio path in a conference that supports one stream for each endpoint/participant.) Then, if you plan to use a software conference device, you create and configure the device to support the calculated number of streams (see the “[Software Conference Devices](#)” section on page 22-4 for information about calculating number of streams). You cannot configure the number of streams for hardware conference bridges. One large conference, or several small conferences, can use these audio streams.

**Caution**

Although a single software conference device can run on the same server as the Cisco Unified CallManager service, Cisco strongly recommends against this configuration. Running a conference device on the same server as the Cisco CallManager service may adversely affect performance on the Cisco Unified Communications Manager.

For more information on hardware and software conference devices, see the following sections:

- [Router-Based Conference Capability](#), page 22-3
- [Software Conference Devices](#), page 22-4
- [Video Conference Devices](#), page 22-4
- [Cisco Conference Devices \(WS-SVC-CMM\)](#), page 22-4
- [MTP WS-X6608 DSP Service Card](#), page 22-5
- [Annunciator Support for Conference Bridges](#), page 22-5
- [Conference Bridge Types in Cisco Unified Communications Manager Administration](#), page 22-5

## Router-Based Conference Capability

The Cisco 1700, Cisco 2600, Cisco 2600XM, Cisco 2800, Cisco 3600, Cisco 3700, and Cisco 3800 series voice gateway routers provide conferencing capabilities for Cisco Unified Communications Manager. These routers provide conferencing with two features:

- Cisco Conferencing and Transcoding for Voice Gateway Routers by using the NM-HDV or NM-HDV-FARM network modules. This feature supports up to six parties in a conference. (Choose the Cisco IOS Conference Bridge from the Conference Bridge Configuration window in Cisco Unified Communications Manager Administration to support this feature.)

Cisco Enhanced Conferencing and Transcoding for Voice Gateway Routers by using the Cisco Packet Voice/Fax Digital Signal Processor Modules (PVDM2) on the Cisco 2800 and 3800 series voice gateway routers or using the NM-HD-xx or NM-HDV2 network modules. This feature supports eight parties in a conference. (If you are using a version of Cisco IOS that allows you to specify the Communications Manager version number, ensure this version matches that of your Communications Manager and choose the Cisco IOS Enhanced Conference Bridge from the Conference Bridge Configuration window in Cisco Unified Communications Manager Administration to support this feature. If you are using a Cisco IOS version that does not allow you to specify the Communications Manager version number, choose the Cisco IOS Conference Bridge instead.) For more information about these conferencing routers, see the IOS router documentation provided with your router.

Router-enabled conferencing provides the ability to support voice conferences in hardware. Digital Signal Processors (DSPs) convert multiple Voice over IP Media Streams into TDM streams that are mixed into a single conference call stream. The DSPs support both meet-me and ad hoc conferences by Cisco Unified Communications Manager.

The Cisco routers that support conferencing have the following codecs:

- G.711 a/u-law
- G.729, G.729a, G.729b, G.729ab
- GSM FR, GSM EFR (only supports Cisco Enhanced Conferencing and Transcoding for Voice Gateway Routers feature)

## Software Conference Devices

For software conference devices, you can adjust the number of streams because software conference devices support a variable number of audio streams. You can configure a software conference device and choose the number of full-duplex audio streams that the device supports. To calculate the total number of conferences that a device supports, divide the number of audio streams by three (the minimum number of participants in a conference). The maximum number of audio streams equals 128. For more information on software conference devices, see the [“Conference Bridge Types in Cisco Unified Communications Manager Administration”](#) section on page 22-5.

## Video Conference Devices

The Cisco Video Conference Bridge, a dual multimedia bridge, provides video conferencing. Cisco Unified Communications Manager controls this conference bridge type upon appropriate configuration. The Cisco Video Conference Bridge provides audio and video conferencing functions for Cisco IP video phones, H.323 endpoints, and audio-only Cisco Unified IP Phones. Administrators can partition the resources of the Cisco video conference bridge between the video telephony network and the H.323/SIP network. The Cisco Video Conference Bridge supports the H.261, H.263, and H.264 codecs for video.

To configure this type of conference device, the user chooses the Cisco Video Conference Bridge (IPVC-35xx) conference bridge type in Cisco Unified Communications Manager Administration.

To ensure that only a video conference bridge gets used when a user wants to hold a video conference, add the video conference bridge to a media resource group. Add the media resource group to a media resource group list and assign the media resource group list to the device or device pool that will use the video conference bridge. See [“Conference Bridge Configuration”](#), [“Media Resource Group Configuration”](#), [“Media Resource Group List Configuration”](#), and [“Device Pool Configuration”](#) in the *Cisco Unified Communications Manager Administration Guide* for details. See the *Cisco Unified Videoconferencing MCU 3511 and Cisco Unified Videoconferencing MCU 3540 Module Administrator Guide* for more information about the Cisco video conference bridge.

## Cisco Conference Devices (WS-SVC-CMM)

Applications can control a Cisco Unified Communications Manager Conference Bridge (WS-SVC-CMM). For more information on Cisco Conference Devices (WS-SVC-CMM), see the [“Conference Bridge Types in Cisco Unified Communications Manager Administration”](#) section on page 22-5.

To configure this type of conference device, the user chooses the Cisco Conference Bridge (WS-SVC-CMM) conference bridge type in Cisco Unified Communications Manager Administration.

## MTP WS-X6608 DSP Service Card

Because hardware conference devices are fixed at 32 full-duplex streams per WS-X6608 port, hardware conference devices support 32 divided by three (32/3), or 10, conferences. Users cannot change this value.



**Caution**

Full-duplex streams per WS-X6608 port cannot exceed the maximum limit of 32.

## Annunciator Support for Conference Bridges

Cisco Unified Communications Manager provides annunciator resource support to a conference bridge under the following circumstances:

- If the media resource group list that contains the annunciator is assigned to the device pool where the conference bridge exists.
- If the annunciator is configured as the default media resource.

Cisco Unified Communications Manager does not provide annunciator resource support for a conference bridge if the media resource group list is assigned directly to the device that controls the conference.


## Conference Bridge Types in Cisco Unified Communications Manager Administration

The following conference bridge types in [Table 22-2](#) exist in Cisco Unified Communications Manager Administration.

**Table 22-2** Conference Bridge Types

| Conference Bridge Type   | Description  |
|--|--|
| Cisco Conference Bridge Hardware<br><br>(WS-6608-T1 or WS-6608-E1) | <p>This type supports the Cisco Catalyst 4000 and 6000 Voice Gateway Modules and the following number of conference sessions.</p> <p><b>Cisco Catalyst 6000</b></p> <ul style="list-style-type: none"> <li>• G.711 or G.729a conference—32 participants per port; six participants maximum per conference; 256 total participants per module; 10 bridges with three participants</li> <li>• GSM—24 participants per port; six participants maximum per conference; 192 total participants per module</li> </ul> <p><b>Cisco Catalyst 4000</b></p> <ul style="list-style-type: none"> <li>• G.711 conference only—24 conference participants; maximum of four conferences with six participants each</li> </ul> |

**Table 22-2 Conference Bridge Types (continued)**

| Conference Bridge Type  | Description   |
|---|---|
| Cisco Conference Bridge Software  | <p>Software conference devices support G.711 codecs by default.</p> <p>The maximum number of audio streams for this type equals 128. With 128 streams, a software conference media resource can handle 128 users in a single conference, or the software conference media resource can handle up to 42 conferencing resources with three users per conference.</p> <hr/> <p> <b>Caution</b> If the Cisco IP Voice Media Streaming Application service runs on the same server as the Cisco CallManager service, a software conference should not exceed the maximum limit of 48 participants.</p>  |
| Cisco IOS Conferencing and Transcoding for Voice Gateway Routers          | <ul style="list-style-type: none"> <li>• Uses the NM-HDV or NM-HDV-FARM network modules.</li> <li>• G.711 a/mu-law, G.729, G.729a, G.729b, and G.729ab participants joined in a single conference</li> <li>• Up to six parties joined in a single conference call</li> </ul> <p>Cisco Unified Communications Manager assigns conference resources to calls on a dynamic basis. In a Cisco Unified Communications Manager network that includes both Cisco IOS Conferencing and Cisco IOS Enhanced Conferencing, set the Cisco CallManager service parameters, Maximum Ad hoc Conference and the Maximum MeetMe Conference Unicast, to six conference participants.</p> <p>For more information about Cisco IOS Conferencing and Transcoding for Voice Gateway Routers, see the IOS documentation that you received with this product.</p>   |
| Cisco IOS Enhanced Conferencing and Transcoding for Voice Gateway Routers | <ul style="list-style-type: none"> <li>• Uses the onboard Cisco Packet Voice/Fax Digital Signal Processor Modules (PVDm2) on the Cisco 2800 and 3800 series voice gateway routers or uses the NM-HD or NM-HDV2 network modules.</li> <li>• G.711 a-law/mu-law, G.729, G.729a, G.729b, G.729ab, GSM FR, and GSM EFR participants joined in a single conference</li> <li>• Up to eight parties joined in a single call.</li> </ul> <p><b>Tip</b> In Cisco Unified Communications Manager Administration, ensure that you enter the same conference bridge name that exists in the gateway Command Line Interface.</p> <p>Cisco Unified Communications Manager assigns conference resources to calls on a dynamic basis. In a Cisco Unified Communications Manager network that includes both Cisco IOS Conferencing and Cisco IOS Enhanced Conferencing, set the Cisco CallManager service parameters, Maximum Ad hoc Conference and the Maximum MeetMe Conference Unicast, to six conference participants.</p> <p>For more information about Cisco IOS Enhanced Conferencing and Transcoding for Voice Gateway Routers, see the IOS documentation that you received with this product.</p> |

**Table 22-2** Conference Bridge Types (continued)

| Conference Bridge Type                        | Description   |
|---|---|
| Cisco Video Conference Bridge (IPVC-35xx)     | This conference bridge type specifies a dual multimedia bridge that provides video conferencing. The Cisco Video Conference Bridge provides audio and video conferencing functions for Cisco IP video phones, H.323 endpoints, and audio-only Cisco Unified IP Phones.  |
| Cisco Conference Bridge (WS-SVC-CMM)          | <p>This conference bridge type supports the Cisco Catalyst 6500 series and Cisco 7600 series Communication Media Module (CMM).</p> <p>This conference bridge type supports up to eight parties per conference and up to 64 conferences per port adapter. This conference bridge type supports the following codecs: G.711 mu-law, G.711 a-law, G.729 annex A and annex B, and G.723.1. This conference bridge type supports ad hoc conferencing.</p>  |
| Cisco IOS Homogeneous Video Conference Bridge | <p>Cisco Integrated Services Routers Generation 2 (ISR G2) can act as IOS-based conference bridges that support ad hoc and meet-me video conferencing. DSP modules must be installed on the router to enable the router as a conference bridge.</p> <p>Cisco IOS Homogeneous Video Conference Bridge specifies the IOS-based conference bridge type that supports homogeneous video conferencing. A homogeneous video conference is a video conference in which all participants connect using the same video format attributes. All the video phones support the same video format and the conference bridge sends the same data stream format to all the video participants.</p> <p>If the conference bridge is not configured to support the video format of a phone, the caller on that phone connects to the conference as an audio only participant.</p> <p>For more detailed information about video conferencing with ISR G2 routers, refer to the document <i>Configuring Video Conferences and Video Transcoding</i>.</p> |

Table 22-2 Conference Bridge Types (continued)

| Conference Bridge Type                          | Description  |
|---|--|
| Cisco IOS Heterogeneous Video Conference Bridge | <p>Cisco Integrated Services Routers Generation 2 (ISR G2) can act as IOS-based conference bridges that support ad hoc and meet-me video conferencing. DSP modules must be installed on the router to enable the router as a conference bridge.</p> <p>Cisco IOS Heterogeneous Video Conference Bridge specifies the IOS-based conference bridge type that supports heterogeneous video conferences. In a heterogeneous video conference, all the conference participants connect to the conference bridge with phones that use different video format attributes. In heterogeneous conferences, transcoding and transsizing features are required from the DSP to convert the signal between the various formats.</p> <p>For heterogeneous video conferences, callers connect to the conference as audio participants under either of the following conditions:</p> <ul style="list-style-type: none"> <li>• Insufficient DSP resources.</li> <li>• The conference bridge is not configured to support the video capabilities of the phone.</li> </ul> <p>For more detailed information about video conferencing with ISR G2 routers, refer to the document <i>Configuring Video Conferences and Video Transcoding</i>.</p> |
| Cisco Guaranteed Audio Video Conference Bridge  | <p>Cisco Integrated Services Routers Generation 2 (ISR G2) can act as IOS-based conference bridges that support ad hoc and meet-me voice and video conferencing. DSP modules must be installed on the router to enable the router as a conference bridge.</p> <p>Cisco IOS Guaranteed Audio Video Conference Bridge specifies the IOS-based video conference bridge type where DSP resources are reserved for the audio portion of the conference, and video service is not guaranteed. Callers on video phones may have video service if DSP resources are available at the start of the conference. Otherwise, the callers connect to the conference as audio participants.</p> <p>For more detailed information about video conferencing with ISR G2 routers, refer to the document <i>Configuring Video Conferences and Video Transcoding</i>.</p>   |



**Table 22-2** Conference Bridge Types (continued)

| Conference Bridge Type | Description   |
|------------------------|---|
| Cisco TelePresence MCU | <p>Cisco TelePresence MCU is a set of hardware conference bridges for Cisco Unified Communications Manager.</p> <p>The Cisco TelePresence MCU is a high-definition (HD) multipoint video conferencing bridge. It delivers up to 1080p at 30 frames per second, full continuous presence for all conferences, full transcoding, and is ideal for mixed HD endpoint environments.</p> <p>The Cisco TelePresence MCU supports SIP as the signaling call control protocol. It has a built in Web Server that allows for complete configuration, control, and monitoring of the system and conferences. The Cisco TelePresence MCU provides XML management API over HTTP.</p> <p>Cisco TelePresence MCU allows both ad hoc and meet-me voice and video conferencing. Each conference bridge can host several simultaneous, multiparty conferences.</p> <p>Cisco TelePresence MCU must be configured in Port Reservation mode. For more information, consult the <i>Cisco TelePresence MCU Configuration Guide</i>.</p> <p><b>Note</b> Cisco TelePresence MCU does not support a common out-of-band DTMF method. Under the default setting, Cisco Unified Communications Manager will not require an MTP. However, if the <b>Media Termination Point Required</b> check box is checked, Cisco Unified Communications Manager will allocate an MTP and the SIP trunk will negotiate DTMF according to RFC 2833.</p> <p><b>Note</b> BFCP is not supported when used between Cisco Unified Communications Manager and Cisco TelePresence MCU.</p> <p><b>Note</b> TLS is not supported with Cisco TelePresence MCU.</p> |

## Using Different Conference Types: Meet Me and Ad Hoc

Cisco Unified Communications Manager supports both meet-me conferences and ad hoc conferences. Meet-me conferences allow users to dial in to a conference. Ad hoc conferences allow the conference controller (or in some cases, another participant) to add specific participants to the conference.

Meet-me conferences require that a range of directory numbers be allocated for exclusive use of the conference. When a meet-me conference is set up, the conference controller chooses a directory number and advertises it to members of the group. The users call the directory number to join the conference. Anyone who calls the directory number while the conference is active joins the conference. (This situation applies only when the maximum number of participants that is specified for that conference type has not been exceeded and when sufficient streams are available on the conference device.)

Ad hoc conferences comprise two types: basic and advanced. In basic ad hoc conferencing, the originator of the conference acts as the controller of the conference and is the only participant who can add or remove other participants. In advanced ad hoc conferencing, any participant can add or remove other

participants; that capability does not get limited to the originator of the conference. Advanced ad hoc conferencing also allows you to link multiple ad hoc conferences together. Set the Advanced Ad Hoc Conference Enabled clusterwide service parameter to True to gain access to advanced ad hoc conferencing.

For more information on ad hoc and meet me conferences, see the following sections:

- [Initiating an Ad Hoc Conference, page 22-10](#)
- [Initiating a Meet-Me Conference, page 22-17](#)

## Initiating an Ad Hoc Conference

Initiate ad hoc conferences in the following ways:

- Press the Conference (Confrn) softkey, dial another participant, and press the Confrn softkey again to add the new participant.
- Join established calls by using the Select and Join softkeys.

If sufficient streams are available on the conference device, the conference controller (or other participant in the case of advanced ad hoc conferencing) can add up to the maximum number of participants that is specified for ad hoc conferences to the conference. Configure the maximum number of participants for an ad hoc conference with the Maximum Ad Hoc Conference service parameter in the Service Parameter Configuration window. Cisco Unified Communications Manager supports multiple, concurrent ad hoc conferences on each line appearance of a device.

### Using Conference Softkey for an Ad Hoc Conference

When a user initiates a conference call, Cisco Unified Communications Manager places the current call on hold, flashes the conference lamp (if applicable), and provides dial tone to the user. At the dial tone, the conference controller dials the next conference participant and presses the Conference softkey to complete the conference. Cisco Unified Communications Manager then connects the conference controller, the first participant, and the new conference participant to a conference bridge. Each participating Cisco Unified IP Phone display reflects the connection to the conference.

The conference controller (or other participant in the case of advanced ad hoc conferencing) can drop the last conference participant from the conference by pressing the RmLstC softkey on the Cisco Unified IP Phone 7960 or 7940. The conference controller (or other participant in the case of advanced ad hoc conferencing) can also remove any conference participant by pressing the ConfList softkey to display the list of participants, highlighting a participant, and pressing the Remove softkey (only visible after you press the ConfList softkey).

A conference participant can view the list of conference participants by pressing the Conference List (ConfList) softkey and can drop the last conference participant from the conference by pressing the Remove Last Conference Party (RmLstC) softkey on the Cisco Unified IP Phone. If a conference participant transfers the conference to another party, the transferred party becomes the last conference participant in the conference. If a conference participant parks the conference, the participant becomes the last party in the conference when the participant picks up the conference. When only two participants remain in the conference, Cisco Unified Communications Manager terminates the conference, and the two remaining participants reconnect directly as a point-to-point call.

Participants can leave a conference by simply hanging up. In basic ad hoc conferencing, a conference continues even if the conference controller hangs up, although the remaining conference participants cannot add new participants to the conference. In advanced ad hoc conferencing, a conference continues even if the originator hangs up, and any remaining participant can add new participants.

### Conference by Using Join Softkey

The user initiates an ad hoc conference by using the Select and Join softkeys. During an established call, the user chooses conference participants by pressing the Select softkey and then presses the Join softkey, making it an ad hoc conference. Up to 15 established calls can be added to the ad hoc conference, for a total of 16 participants. Cisco Unified Communications Manager treats the ad hoc conference the same way as one that is established by using the Conference softkey method.

**Note**

The Join Across Lines feature allows the user to join conference participants across different lines—either on different directory numbers, or on the same directory number but on different partitions. The Maximum Ad Hoc Conference Service Parameter controls the maximum number of established calls that can be added to the conference.

### Conference by Using cBarge

You can initiate a conference by pressing the cBarge softkey, or if the Single Button cBarge feature is enabled, by pressing the shared-line button of the active call. When cBarge is initiated, a barge call gets set up by using the shared conference bridge, if available. The original call gets split and then joined at the conference bridge. The call information for all parties gets changed to Conference.

The barged call becomes a conference call with the barge target device as the conference controller. It can add more parties to the conference or can drop any party.

When any party releases from the call, leaving only two parties in the conference, the remaining two parties experience a brief interruption and then get reconnected as a point-to-point call, which releases the shared conference resource.

For more information about shared conferences by using cBarge or the Single Button cBarge feature, see “[Barge and Privacy](#)” section in the *Cisco Unified Communications Manager Features and Services Guide*.

## Ad Hoc Conference Linking

Advanced ad hoc conferencing allows you to link multiple ad hoc conferences together by adding an ad hoc conference to another ad hoc conference as if it were an individual participant. If you attempt to link multiple conferences together when the Advanced Ad Hoc Conference Enabled service parameter is set to False, the IP phone displays a message. You can also use the methods that are available for adding individual participants to an ad hoc conference to add another conference to an ad hoc conference.

You can invoke ad hoc conference linking for phones that are running SIP only by using the Conference and Transfer functions. The system does not support Direct Transfer and Join. Supported phones that are running SIP comprise Cisco Unified IP Phones 7911, 7941, 7961, 7970, and 7971.

**Note**

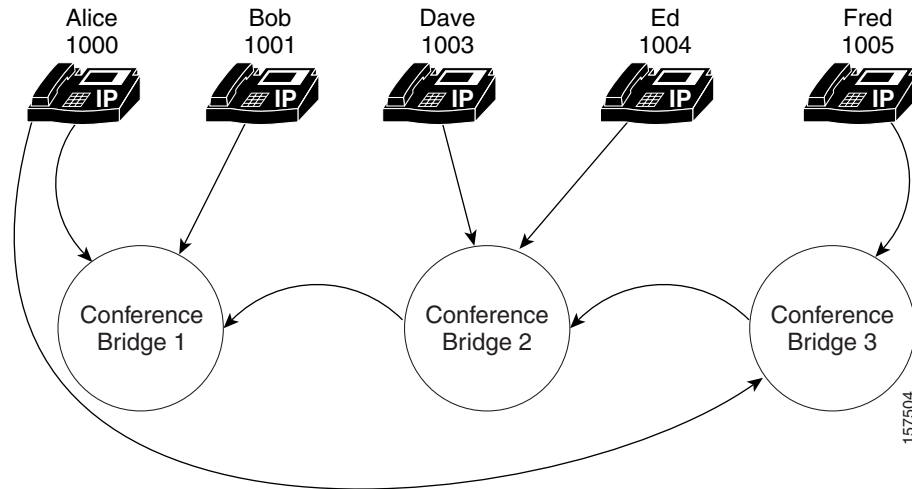
The participants in linked conferences can all hear and talk with one another, but the conferences do not get merged into a single conference. The Conference List (ConfList) softkey displays an added conference as Conference and does not display the individual participants in the added conference. Each participant can see only the individual participants in their own conference bridge.

Two types of conference linking exist: linear and nonlinear.

### Linear Ad Hoc Conference Linking

In linear ad hoc conference linking, no more than two ad hoc conferences can link directly to any participating conference. See [Figure 22-1](#) for an example of linear ad hoc conference linking.

**Figure 22-1** Linear Ad Hoc Conference Linking Example



With linear conference linking, no limitation exists to the number of ad hoc conferences that can be added, as long as no more than two conferences link directly to any one conference.

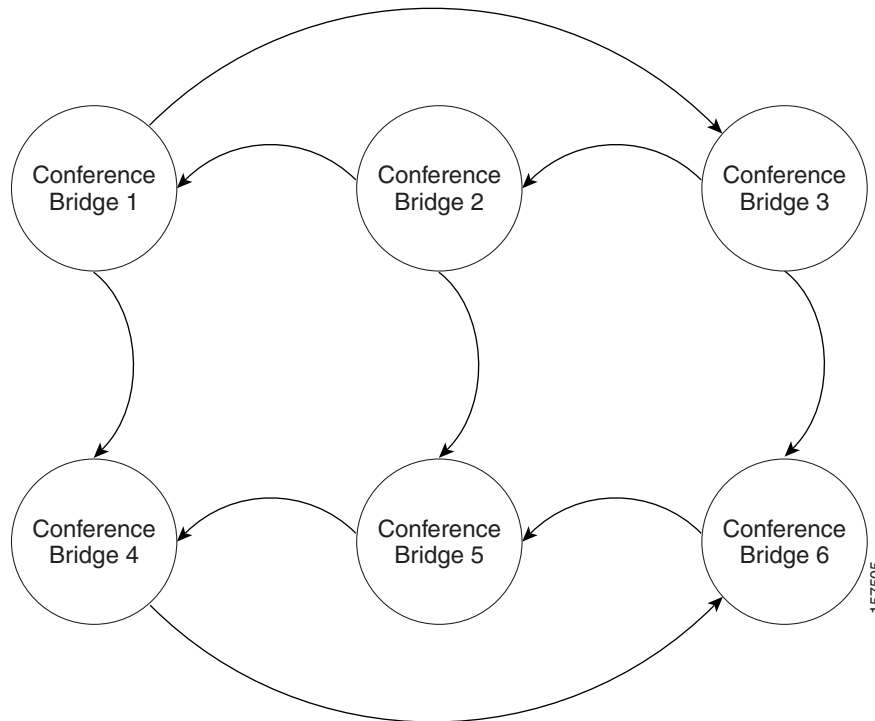


**Caution**

In [Figure 22-1](#), if Conference Bridge 1 links directly to Conference Bridge 3, a looped conference results. Looped conferences do not add any functionality, and Cisco recommends avoiding them because participants in all the conferences can hear echoes.

**Nonlinear Ad Hoc Conference Linking**

When three or more ad hoc conferences link directly to another conference, nonlinear linking results. The system does not permit this type of linking by default because potentially negative impact on conference resources exists. See [Figure 22-2](#) for an example of nonlinear ad hoc conference linking.

**Figure 22-2 Nonlinear Ad Hoc Conference Linking Example**

To enable nonlinear conference linking, set the Non-linear Ad Hoc Conference Linking Enabled clusterwide service parameter to True. Non-linear ad hoc conference linking will not work unless you set both the Non-linear Ad Hoc Conference Linking Enabled and Advanced Ad Hoc Conference Enabled service parameters to True.

You can access the Non-linear Ad Hoc Conference Linking Enabled service parameter only in the Advanced view of the Service Parameters Configuration window. For more information on the Advanced view of the Service Parameters Configuration window, see “[Service Parameter Configuration](#)” section in the *Cisco Unified Communications Manager Administration Guide*.

**Note**

Keep the Non-linear Ad Hoc Conference Linking Enabled service parameter set to the default value (False) unless a Cisco support engineer instructs otherwise.

**Caution**

When conferences are linked in nonlinear fashion, the conference resources may not get released when all real participants have dropped out of the conference, which leaves the conference bridges connected to each other when no one is using them. This can happen because each conference only recognizes the participants that connect directly to its own conference bridge. They cannot detect when all the real participants in the other conferences have dropped out. To reduce the risk of tying up conference resources, restart conference bridges more frequently when the Non-linear Ad Hoc Conference Linking Enabled service parameter is set to True.

## Ad Hoc Conference Settings

Three clusterwide service parameters affect ad hoc conferencing:

- Drop Ad Hoc Conference

- Advanced Ad Hoc Conference Enabled
- Non-linear Ad Hoc Conference Linking Enabled

## Drop Ad Hoc Conference

The Drop Ad Hoc Conference parameter allows you to choose when to drop an ad hoc conference.



### Note

To use the additional functionality that advanced ad hoc conferencing provides, Cisco recommends that you set this service parameter to Never. Any other setting can result in unintentional termination of a conference.

Cisco Unified Communications Manager Administration provides the clusterwide service parameter, Drop Ad Hoc Conference, to allow the prevention of toll fraud (where an internal conference controller disconnects from the conference while outside callers remain connected). The service parameter settings specify conditions under which an ad hoc conference gets dropped.



### Note

The Drop Ad Hoc Conference service parameter works differently for conference calls that are initiated from a Cisco Unified IP Phone 7940 or 7960 that is running SIP, or a third-party phone that is running SIP. See the [“Ad Hoc Conference Settings Restrictions for Phones That Are Running SIP”](#) section on page 22-16.

To configure the value of the service parameter, perform the following procedure:

### Procedure

- Step 1** From Cisco Unified Communications Manager Administration, choose **System > Service Parameters**.
- Step 2** From the Server drop-down list box, choose the server.
- Step 3** From the Service drop-down list box, choose Cisco Unified Communications Manager.
- Step 4** From the Drop Ad Hoc Conference drop-down list box, which is listed in the Clusterwide Parameters (Features - General) area of the window, choose one of the following options:

- **Never**—The conference does not get dropped. (This represents the default option.)
- **When No OnNet Parties Remain in the Conference**—The system drops the active conference when the last on-network party in the conference hangs up or drops out of the conference. Cisco Unified Communications Manager releases all resources that are assigned to the conference.

For more information about OnNet and OffNet, see [Chapter 32, “Understanding Cisco Unified Communications Manager Voice Gateways,”](#) [Chapter 35, “Understanding Cisco Unified Communications Manager Trunk Types,”](#) and [Chapter 14, “Understanding Route Plans.”](#)

- **When Conference Controller Leaves**—The active conference terminates when the primary controller (conference creator) hangs up. Cisco Unified Communications Manager releases all resources that are assigned to the conference.

**Note**

If the conference controller transfers, parks, or redirects the conference to another party, the party that retrieves the call acts as the virtual controller for the conference. A virtual controller cannot add new parties to the conference nor remove any party that was added to the conference, but a virtual controller can transfer, park, or redirect the conference to another party, who would, in turn, become the virtual controller of the conference. When this virtual controller hangs up the call, the conference ends.

**Step 5** Click **Save**.

**Note**

Cisco Unified Communications Manager does not support multiple selections; that is, all conferences will support the same functionality depending on the option that you choose.

### Advanced Ad Hoc Conference Enabled

The Advanced Ad Hoc Conference Enabled parameter allows you to choose whether advanced ad hoc conferencing functionality is available to users. This includes the ability of non-controller participants to add and remove other participants and the ability of all participants to link ad hoc conferences together.

To configure the value of the service parameter, perform the following procedure:

#### Procedure

- Step 1** From Cisco Unified Communications Manager Administration, choose **Service > Service Parameter**.
- Step 2** From the Server drop-down list box, choose the server.
- Step 3** From the Service drop-down list box, choose Cisco Unified Communications Manager.
- Step 4** From the Advanced Ad Hoc Conference Enabled drop-down list box, choose one of the following options:
  - **False**—This default option specifies that advanced ad hoc conference functionality is not enabled.
  - **True**—This option specifies that advanced ad hoc conference functionality is enabled.
- Step 5** Click **Update**.

### Non-linear Ad Hoc Conference Linking Enabled

The Non-linear Ad Hoc Conference Linking Enabled parameter allows you to choose whether participants can link conferences in nonlinear fashion (three or more conferences linked to any one conference).

**Note**

Do not change this setting from the default except with the guidance of a Cisco support engineer.

To configure the value of the service parameter, perform the following procedure:

**Procedure**

- 
- Step 1** From Cisco Unified Communications Manager Administration, choose **Service > Service Parameter**.
- Step 2** From the Server drop-down list box, choose the server.
- Step 3** From the Service drop-down list box, choose Cisco Unified Communications Manager.
- Step 4** Click the Advanced button near the top of the window. For information on the Advanced view of the Service Parameters Configuration window, see “[Service Parameter Configuration](#)” section in the *Cisco Unified Communications Manager Administration Guide*.
- Step 5** From the Non-linear Ad Hoc Conference Linking Enabled drop-down list box, choose one of the following options:
- **False**—This default option specifies that nonlinear conference linking is not allowed. Do not change this setting from the default except with the guidance of a Cisco support engineer.
  - **True**—This option specifies that nonlinear ad hoc conference linking is allowed. See the section, [Nonlinear Ad Hoc Conference Linking, page 22-12](#), for a caution about this setting.
- Step 6** Click **Update**.
- 

**Ad Hoc Conference Settings Restrictions for Phones That Are Running SIP**

The following sections describe the ad hoc conference differences for the Cisco Unified IP Phones that are running SIP.

**Ad Hoc Conference Restrictions for Cisco Unified IP Phones 7911, 7941, 7961, 7970 and 7971 that are Running SIP**

- Cisco Unified Communications Manager uses “beep” and “beep beep” tones when a new party is added and when the new party drops from the ad hoc conference, respectively. When a party is added to an ad hoc conference, a user on a phone that is running SIP may or may not receive the beep; when a participant drops from the ad hoc conference, a user on a phone that is running SIP may not receive the beep beep. Users might not hear the beeps because of the time it takes Cisco Unified Communications Manager to set up and tear down connections during the conferencing process.

**Ad Hoc Conference Restrictions for Cisco Unified IP Phones 7940/7960 that are Running SIP and Third-Party Phones that are Running SIP**

- When a local conference is created, the display on a phone that is running SIP display differs from the display on a phone that is running SCCP; for example, phones that are running SCCP display the call as a conference call whereas phones that are running SIP display the calls that are conferenced as individual calls (with a conference icon next to each call). Even though Cisco Unified IP Phone 7940/7960 that is running SIP cannot create an ad hoc conference, it can create a local conference.
- You cannot use Conference list (ConfList), which is not available.
- You cannot use Remove last conference participant (RmLstC), which is not available.
- Because Cisco Unified Communications Manager does not recognize the preceding phones that are running SIP that initiated a conference call as a conference, the Drop Ad Hoc Conference service parameter settings do not apply.



- The SIP Profile parameter, Conference Join Enabled, controls behavior of the phone that is running SIP when the conference controller exits a locally hosted conference. If the Conference Join Enabled check box is unchecked, all legs disconnect when the conference controller exits the ad hoc conference call. If the Conference Join Enabled check box is checked, the remaining two parties stay connected.
- To achieve the same level of control that the Drop Ad Hoc Conference parameter settings provides for conference calls that a phone that is running SCCP initiates, the administrator can use a combination of the Conference Join Enabled SIP profile parameter and the Block OffNet to OffNet Transfer service parameter for conferences that are initiated on the phone that is running SIP (Cisco Unified IP Phone 7940/60). (Because the phone that is running SIP performs a transfer when it drops out of the conference call, the Block OffNet to OffNet Transfer can prevent toll fraud by not allowing two offnet phones to remain in the call.)
- Cisco Unified Communications Manager uses “beep” and “beep beep” tones when a new party is added and when the new party drops from the ad hoc conference, respectively. When a party is added to an ad hoc conference, a user on a phone that is running SIP may or may not hear the beep; when a participant drops from the ad hoc conference, a user on a phone that is running SIP may not hear the beep beep. Users might not hear the beeps because of the time it takes Cisco Unified Communications Manager to set up and tear down connections during the conferencing process.

## Ad Hoc Conference Limitations

The following limitations apply to ad hoc conferencing:

- Cisco Unified Communications Manager supports a maximum of 100 simultaneous ad hoc conferences for each Cisco Unified Communications Manager server.
- Cisco Unified Communications Manager supports a maximum of 64 participants per ad hoc conference (provided adequate conference resources are available). In the case of linked ad hoc conferences, the system considers each conference as one participant. This remains true regardless of whether the conferences are linked in linear or nonlinear fashion.

## Initiating a Meet-Me Conference

Meet-me conferences require that a range of directory numbers be allocated for exclusive use of the conference. When a meet-me conference is set up, the conference controller chooses a directory number and advertises it to members of the group. The users call the directory number to join the conference. Anyone who calls the directory number while the conference is active joins the conference. (This situation applies only when the maximum number of participants that is specified for that conference type has not been exceeded and when sufficient streams are available on the conference device.)

When you initiate a meet-me conference by pressing Meet-Me on the phone, Cisco Unified Communications Manager considers you the conference controller. The conference controller provides the directory number for the conference to all attendees, who can then dial that directory number to join the conference. If other participants in a meet-me conference press Meet-Me and the same directory number for the conference bridge, the Cisco Unified Communications Manager ignores the signals.

The conference controller chooses a directory number from the range that is specified for the Meet-Me Number/Pattern. The Cisco Unified Communications Manager administrator provides the meet-me conference directory number range to users, so they can access the feature.

A meet-me conference continues even if the conference controller hangs up.

## Meet-Me Conference Limitations

Cisco Unified Communications Manager supports a maximum of 100 simultaneous meet-me conferences for each Cisco Unified Communications Manager server.

# Conferences and the Party Entrance Tone

With the party entrance tone feature, a tone plays on the phone when a basic call changes to a multiparty call; that is, when a basic call changes to a barged call, cBarged call, ad hoc conference, meet-me conference, or a joined call. In addition, a different tone plays when a party leaves the multiparty call.

When a meet-me conference gets created, the party entrance tone configuration for the first party to enter the conference determines whether Cisco Unified Communications Manager plays the tone. Cisco Unified Communications Manager uses the configuration for the first party until the conference ends.

When a joined call or ad hoc conference begins, Cisco Unified Communications Manager uses the party entrance tone configuration from the conference controller. Cisco Unified Communications Manager uses this configuration until the conference ends.

If two ad hoc conferences are chained together and the controlling device for one conference has the party entrance tone set to True while the other controlling device for the other conference has a party entrance tone of False, Cisco Unified Communications Manager determines whether to play the tone based on the conference to which the new party is added.

To use the party entrance feature, ensure that you turned the privacy feature off for the devices and ensure that the controlling device for the multiparty call has a built-in bridge. In addition, either configure the Party Entrance Tone service parameter, which supports the Cisco CallManager service, or configure the Party Entrance Tone setting per directory number in the Directory Number Configuration window (Call Routing > Directory Number). For information on the service parameter, click the question-mark button in the Service Parameter window. For information on the Party Entrance Tone setting in the Directory Number Configuration window, see [“Directory Number Configuration Settings”](#) in the *Cisco Unified Communications Manager Administration Guide*.

## Intelligent Bridge Selection



### Note

The Intelligent Bridge Selection feature applies only to ad hoc conferences and does not impact how conference bridges are allocated for meet-me conferences. The conference bridge for a meet-me conference is allocated on the basis of the configured Media Resource Group List (MRGL) for the endpoint that initiates the conference. Cisco Unified Communications Manager does not take into account whether the conference initiator is video-capable to allocate a conference bridge for meet-me conference calls.

Cisco Unified Communications Manager can intelligently select a video conference bridge from the configured MRGL if two or more of the original conference participants are video enabled. If only one or no video participants exist, Cisco Unified Communications Manager selects an audio conference bridge from the configured MRGL.

Cisco Unified Communications Manager selects an audio or a video conference bridge from the configured MRGL of the conference initiator. However, if no MRGL is configured for the conference initiator, Cisco Unified Communications Manager allocates the video or audio conference bridge from the default MRGL.



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**Note** Any conference resource that is not added to a media resource group becomes a part of the default MRGL and is available to everyone.

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If a video conference bridge needs to be allocated but none is available, Cisco Unified Communications Manager allocates an audio conference bridge for the conference. Similarly, if an audio conference bridge is needed but is unavailable, Cisco Unified Communications Manager allocates a video conference bridge.



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**Note** Certain endpoints, like a phone that is running SCCP with CUVA installed, may report that they are not video capable if the phone is not configured for video capability (though Cisco Unified Communications Manager Administration) or if the CUVA application is not running.

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When a conference is established by using an audio bridge and then additional video-capable participants join the conference, the conference remains on the audio bridge and does not transfer to a video bridge. Similarly, when the conference is established on a video conference bridge and video capable participants drop out, the conference does not convert to an audio conference bridge.



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**Note** In certain shared-line cases, the video capability that is used might not be accurate. For example, when a blind conference call rings on two shared-line devices, video capability gets used from the device that rings first.

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If the endpoints that are joining the conference are video capable but not enough bandwidth exists to support a video conference in the region where the devices are located, and the region where conference bridge is; a video conference bridge gets allocated if one exists in the configured MRGL of the conference initiator. However, the devices cannot take advantage of the video capability of the conference bridge, and a video cannot be exchanged between them.

The System supports Intelligent Bridge Selection feature for both inter cluster calls over SIP, and H323 ICT and intracluster calls.



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**Note** The video conference bridge gets allocated on the basis of the video capability of the endpoints and the MRGL that is configured for the conference initiator. As long as the device capability is correctly reported to Cisco Unified Communications Manager, it can allocate appropriate conference resources.

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## Configuring Intelligent Bridge Selection

You can change the default behavior of Intelligent Bridge Selection by configuring the following service parameters:

- [Choose Encrypted Audio Conference Instead of Video Conference, page 22-20](#)
- [Minimum Video-Capable Participants to Allocate Video Conference, page 22-20](#)
- [Allocate Video Conference Bridge for Audio-only Conferences When Video Conference Bridge Has Higher Priority, page 22-20](#)

## Choose Encrypted Audio Conference Instead of Video Conference

This parameter determines whether Cisco Unified Communications Manager chooses an encrypted audio conference bridge or an unencrypted video conference bridge for an ad hoc conference call, when

- The conference controller Device Security Mode is set to either Authenticated or Encrypted
- At least two conference participants are video-capable

Because no encrypted video conference bridges exist, Cisco Unified Communications Manager chooses between an encrypted audio conference bridge and an unencrypted video conference bridge.

Valid values specify

- True: Cisco Unified Communications Manager allocates an encrypted audio conference bridge instead of video

OR

- False: Cisco Unified Communications Manager allocates an unencrypted video conference bridge.

The default value for this parameter specifies True.

## Minimum Video-Capable Participants to Allocate Video Conference

This parameter specifies the number of video-capable conference participants that must be present in an ad hoc conference for Cisco Unified Communications Manager to allocate a video conference bridge. If the number of video-capable participants is fewer than the number that this parameter specifies, Cisco Unified Communications Manager allocates an audio conference bridge. If the number of video-capable participants equals to or is greater than the number that this parameter specifies, Cisco Unified Communications Manager allocates a video conference bridge, when available, from the configured media resource group list (MRGL).

Specifying a value of 0 means that a video conference bridge will always be allocated, even when none of the participants on the conference is video-capable.

The default value for this service parameter specifies 2. The minimum value specifies 0 and the maximum value specifies 10.

## Allocate Video Conference Bridge for Audio-only Conferences When Video Conference Bridge Has Higher Priority

This parameter determines whether Cisco Unified Communications Manager chooses a video conference bridge, when available, for an ad hoc audio-only conference call when a video conference bridge has a higher priority than an audio conference bridge in the MRGL.

If an audio conference bridge has higher priority than any video conference bridge in the MRGL, Cisco Unified Communications Manager ignores this parameter.

This parameter proves useful in situations where the local conference bridge is a video bridge (and configured in the MRGL with the highest priority) and audio conference bridges are only available in remote locations. In such a situation, enabling this parameter enables Cisco Unified Communications Manager to attempt to use the local video conference bridge first, even for audio-only conference calls.

Valid values specify

- True: Cisco Unified Communications Manager allocates a video conference bridge from the MRGL
- OR

- False: Cisco Unified Communications Manager allocates an audio conference bridge from the MRGL.

The default value for this service parameter specifies False.



**Note** This parameter is visible under the Advanced options.

## Limitations of Intelligent Bridge Selection

- [Blind Conference over SIP ICT, page 22-21](#)
- [Conference over H323 ICT, page 22-21](#)

### Blind Conference over SIP ICT

The Intelligent Bridge Selection feature assumes that the video capability of each device joining the conference is available prior to conference getting setup. However, for a conference over SIP ICT, the device capability of the far end is not available until media connect time. Therefore, when a blind conference is initiated, the video capability of only two endpoints is available and this can cause an incorrect conference bridge to be allocated.

Consider the following scenario to understand this limitation:

#### Example Scenario

1. Video Endpoint (CCM1) calls Audio Endpoint (CCM1).
2. The Audio Endpoint (CCM1) presses the “Confrn” softkey and then calls a Video Endpoint (CCM2) over SIP ICT.
3. The Audio Endpoint then presses the “Confrn” softkey again before Video Endpoint (CCM2) answers the call.

#### Result

The conference gets created and an audio conference bridge gets allocated even though there are two video endpoints in the conference. This is because the video capability of Video Endpoint (CCM2) is not available when the conference is created.

### Conference over H323 ICT

If an audio endpoint calls a video endpoint over H323 ICT, the video endpoint reports its capabilities as audio only, instead of video. Therefore, if a conference is now setup using another video endpoint, Intelligent Bridge Selection feature assumes that there is only 1 video endpoint and this causes an incorrect conference bridge to be allocated.

Consider the following scenario to understand this limitation:

#### Example Scenario

1. A Video Endpoint (CCM1) calls Audio Endpoint (CCM1).
2. The Audio Endpoint (CCM1) presses the “Confrn” softkey and then calls a Video Endpoint (CCM2) over H323 ICT.

3. After the Video Endpoint (CCM2) answers the call, Audio Endpoint (CCM1) presses the “Confrn” softkey again.

**Result**

The conference gets created and an audio conference bridge gets allocated even though there are two video endpoints in the conference. This is because the Video Endpoint (CCM2) reports itself as audio capable only, because it is talking to another audio endpoint (CCM1).

However, if the capability of endpoints is switched so that the Video Endpoint (CCM1) calls an Audio Endpoint (CCM2), the system allocates the correct conference bridge.

## Dependency Records

To find out which media resource groups are associated with a conference bridge, click the Dependency Records link that is provided on the Cisco Unified Communications Manager Administration Conference Bridge Configuration window. The Dependency Records Summary window displays information about media resource groups that are using the conference bridge. To find out more information about the media resource group, click the media resource group, and the Dependency Records Details window displays. If the dependency records are not enabled for the system, the dependency records summary window displays a message.

For more information about Dependency Records, see “[Accessing Dependency Records](#)” in the *Cisco Unified Communications Manager Administration Guide*.

## Conference Bridge Performance Monitoring and Troubleshooting

The Real Time Monitoring Tool counters for conference bridges allow you to monitor the number of conference bridges that are currently registered with the Cisco Unified Communications Manager but are not currently in use, the number of conferences that are currently in use, the number of times that a conference completed, and the number of times that a conference was requested for a call but no resources were available.

For more information about Real Time Monitoring Tool counters, see the *Cisco Unified Serviceability Administration Guide*.

Cisco Unified Communications Manager writes all errors for conference bridges to the Local SysLog Viewer in the Real Time Monitoring Tool. In Cisco Unified Serviceability, you can set traces for the Cisco IP Voice Media Streaming Application service (using Trace Configuration); to troubleshoot most issues, you must choose the Significant or Detailed option for the service, not the Error option. After you troubleshoot the issue, change the Debug Trace Level back to the Error option.

Cisco Unified Communications Manager generates registration and connection alarms for conference bridges in Cisco Unified Serviceability. For more information on alarms, see the *Cisco Unified Serviceability Administration Guide*.

If you need technical assistance, use the following CLI commands to locate the conference bridge logs:

```
file list activelog cm/trace/cms/sdi/*.txt
file get activelog cm/trace/cms/sdi/*.txt
file view activelog cm/trace/cms/sdi/cms00000000.txt
file tail activelog cm/trace/cms/sdi/cms00000000.txt
```

Locate the logs before you contact your Cisco Partner or the Cisco Technical Assistance Center (TAC).

## Where to Find More Information

### Related Topics

- [Conference Bridge Configuration Checklist](#), page 22-1
- [Understanding Conference Devices](#), page 22-2
- [Using Different Conference Types: Meet Me and Ad Hoc](#), page 22-9
- [Intelligent Bridge Selection](#), page 22-18
- [Dependency Records](#), page 22-22
- [Conference Bridge Performance Monitoring and Troubleshooting](#), page 22-22
- [Server Configuration](#), *Cisco Unified Communications Manager Administration Guide*
- [Phone Button Template Configuration](#), *Cisco Unified Communications Manager Administration Guide*
- [Cisco Unified IP Phone Configuration](#), *Cisco Unified Communications Manager Administration Guide*
- [Partition Configuration](#), *Cisco Unified Communications Manager Administration Guide*
- [Conference Bridge Configuration](#), *Cisco Unified Communications Manager Administration Guide*
- [Cisco DSP Resources for Transcoding, Conferencing, and MTP](#), page 26-1

### Additional Cisco Documentation

- *Cisco Unified IP Phone Administration Guide for Cisco Unified Communications Manager*
- Cisco Unified IP Phone user documentation and release notes (all models)
- *Cisco Unified Serviceability Administration Guide*
- *Cisco Unified Videoconferencing 3511 MCU and Cisco Unified Videoconferencing 3540 MCU Module Administrator Guide*

