Conference Bridges

Conference Bridge for Cisco CallManager 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:

Understanding Conference Devices

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

Cisco CallManager 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 24-3 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 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 CallManager.

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

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 CallManager. 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 CallManager 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 or NM-HDV2 network modules. This feature supports eight parties in a conference. (Choose the Cisco IOS Enhanced Conference Bridge from the Conference Bridge Configuration window in Cisco CallManager Administration to support this feature.)

For more information about these conferencing routers, refer to 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 CallManager.

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 CallManager Administration" section on page 24-4.

Video Conference Devices

The Cisco video conference bridge, a dual multimedia bridge, provides video conferencing. Cisco CallManager 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 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 CallManager 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. Refer to the Conference Bridge Configuration, Media Resource Group Configuration, Media Resource Group List Configuration, and Device Pool Configuration sections of the *Cisco CallManager Administration Guide* for details. Refer to the *Cisco IP/VC 3511 MCU and Cisco IP/VC 3540 MCU Module Administrator Guide* for more information about the Cisco video conference bridge.

Cisco Conference Devices (WS-SVC-CMM)

Applications can control a Cisco Conference Bridge (WS-SVC-CMM). For more information on Cisco Conference Devices (WS-SVC-CMM), see the "Conference Bridge Types in Cisco CallManager Administration" section on page 24-4.

To configure this type of conference device, the user chooses the Cisco Conference Bridge (WS-SVC-CMM) conference bridge type in Cisco CallManager 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 CallManager 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, which makes it available to all devices in the cluster.

Cisco CallManager 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 CallManager Administration

The conference bridge types in Table 24-1 exist in Cisco CallManager Administration.

Table 24-1 Conference Bridge Types

Conference Bridge Type	Description
Cisco Conference Bridge Hardware (WS-6608-T1 or WS-6608-E1)	This type supports the Cisco Catalyst 4000 and 6000 Voice Gateway Modules and the following number of conference sessions. **Cisco Catalyst 6000** • 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 • GSM—24 participants per port; six participants maximum per conference; 192 total participants per module **Cisco Catalyst 4000** • G.711 conference only—24 conference participants; maximum of four conferences with six participants each

Table 24-1 Conference Bridge Types (continued)

Conference Bridge Type	Description
Cisco Conference Bridge Software	Software conference devices support G.711 codecs by default. 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. **Caution** 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.
Cisco IOS Conferencing and Transcoding for Voice Gateway Routers	• Uses the NM-HDV or NM-HDV-FARM network modules. • G.711 a/u-law, G.729, G.729a, G.729b, and G.729ab participants joined in a single conference • Up to six parties joined in a single conference call Cisco CallManager assigns conference resources to calls on a dynamic basis. In a Cisco CallManager 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. For more information about Cisco IOS Conferencing and Transcoding for Voice Gateway Routers, see the IOS documentation that you received with this product.
Cisco IOS Enhanced Conferencing and Transcoding for Voice Gateway Routers	• 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. • 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 • Up to eight parties joined in a single call. **Tip** In Cisco CallManager Administration, ensure that you enter the same conference bridge name that exists in the gateway Command Line Interface. Cisco CallManager assigns conference resources to calls on a dynamic basis. In a Cisco CallManager 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. For more information about Cisco IOS Enhanced Conferencing and Transcoding for Voice Gateway Routers, see the IOS documentation that you received with this product.

Table 24-1 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 IP Phones.
Cisco Conference Bridge (WS-SVC-CMM)	This conference bridge type supports the Cisco Catalyst 6500 series and Cisco 7600 series Communication Media Module (CMM). 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.

Using Different Conference Types: Meet Me and Ad Hoc

Cisco CallManager 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 to let only certain participants into the conference.

Initiating an Ad Hoc Conference

Initiate ad hoc conferences in the following ways:

- When in an existing call, press the Conference softkey, dial another participant, and conference additional participants.
- Join established calls by using the Select and Join softkeys.
- Conference established call by using the cBarge softkey.

Using Conference Softkey for Ad Hoc Conference

The conference controller controls ad hoc conferences. When you initiate an ad hoc conference, Cisco CallManager considers you the conference controller. In an ad hoc conference, only a conference controller can add and remove participants from a conference. If sufficient streams are available on the conference device, the conference controller 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 in Cisco CallManager Administration, Cisco CallManager Service Parameters Configuration by using the Maximum Ad Hoc Conference service parameter setting.)
Cisco CallManager supports multiple, concurrent ad hoc conferences on each line appearance of a device.

When the conference controller initiates a conference call, Cisco CallManager 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 CallManager then connects the conference controller, the first participant, and the new conference participant to a conference bridge. Each participating Cisco IP Phone display reflects the connection to the conference.

The conference controller can view the list of conference participants by pressing the Conference List (ConfList) softkey (any participant can view the list of participants) and can drop the last conference participant from the conference by pressing the Remove Last Conference Party (RmLstC) softkey on the Cisco 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 CallManager 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. A conference continues even when the conference controller hangs up, although the remaining conference participants cannot add new participants to the conference. See the "Ad Hoc Conference Settings" section on page 24-7 for more information about configuring ad hoc conferences and their behavior.

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 CallManager treats the ad hoc conference the same way as one that is established by using the Conference softkey method.

Conference by Using cBarge Softkey

You can initiate a conference by pressing the cBarge softkey. When cBarge gets pressed, 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 get reconnected as a point-to-point call, which releases the shared conference resource.

For more information about shared conferences using cBarge, see Barge and Privacy in the *Cisco CallManager Features and Services Guide*.

Ad Hoc Conference Settings

Cisco CallManager 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 SIP IP Phone 7940 or 7960 or a third-party SIP phone. See the "Ad Hoc Conference Settings Restrictions for SIP Phones" section on page 24-8.

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

Procedure

Step 1 From Cisco CallManager Administration, choose **System > Service Parameter**.

Step 2 From the Server drop-down list box, choose a server in the cluster.

Step 3 From the Service drop-down list box, choose **Cisco CallManager**.

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 is not dropped. (This is 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 CallManager releases all resources that are assigned to the conference.

  For more information about OnNet and OffNet, refer to the Understanding Cisco CallManager Voice Gateways, Understanding Cisco CallManager Trunk Types, and Understanding Route Plans chapters in the *Cisco CallManager System Guide*.
- **When Conference Controller Leaves**—The active conference terminates when the primary controller (conference creator) hangs up. Cisco CallManager 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 CallManager does not support multiple options; that is, all conferences will support the same functionality depending on the option that you choose.

Ad Hoc Conference Settings Restrictions for SIP Phones

Conference calls that are initiated by a SIP phone (Cisco SIP IP Phone 7940/60 and third-party SIP phones) have limitations when using ad-hoc conferencing. Cisco CallManager does not see this type of call as a conference call, it sees them as individual calls; therefore, the following restrictions apply:

- The SIP phone display differs from the SCCP phone display; for example, SCCP phones display the call as a conference call whereas SIP phones display the calls that are conferenced as individual calls (with a conference icon next to each call).
- Conference list (ConfList) is not available
- Remove last conference participant (RmLstC) is not available
- Because Cisco CallManager does not recognize the SIP phone-initiated conference call as a conference, the Drop Ad Hoc Conference service parameter settings do not apply.
- The SIP Profile parameter, Conference Join Enabled, controls SIP phone behavior when the conference controller exits a locally hosted conference. If the Conference Join Enabled check box is unchecked, all legs are disconnected 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 SCCP phone-initiated conference calls, 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 SIP phone. (Because the SIP phone 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.)

Ad Hoc Conference Limitations

Cisco CallManager supports a maximum of 100 simultaneous ad hoc conferences for each Cisco CallManager server.

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 CallManager 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 CallManager ignores the signals.

The conference controller chooses a directory number from the range that is specified for the Meet-Me Number/Pattern. The Cisco CallManager 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 CallManager supports a maximum of 100 simultaneous meet-me conferences for each Cisco CallManager server.

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 CallManager 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, refer to Accessing Dependency Records in the *Cisco CallManager 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 CallManager 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, refer to the *Cisco CallManager Serviceability System Guide* and the *Cisco CallManager Serviceability Administration Guide*.

Cisco CallManager writes all errors for conference bridges to the Local SysLog Viewer in the Real Time Monitoring Tool. In Cisco CallManager 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 CallManager generates registration and connection alarms for conference bridges in Cisco CallManager Serviceability. For more information on alarms, refer to the *Cisco CallManager Serviceability Administration Guide* and the *Cisco CallManager Serviceability System Guide*.

If you need technical assistance, locate conference bridge logs from

/var/log/active/cm/trace/cms/sdi/cms* and /var/log/active/cm/trace/ccm before you contact your Cisco Partner or the Cisco Technical Assistance Center (TAC).

Use the following commands to access the 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

Conference Bridge Configuration Checklist

Table 24-2 provides a checklist to configure conference bridge.

Table 24-2 Conference Bridge Configuration Checklist

Configuration Steps		Related procedures and topics
Step 1	Configure the hardware or software conference bridge(s).	Adding a Hardware Conference Device, *Cisco CallManager Administration Guide* Adding a Cisco IOS Conference Bridge Device, *Cisco CallManager Administration Guide* Adding a Cisco Video Conference Bridge Device, *Cisco CallManager Administration Guide* Adding a Cisco Conference Bridge (WS-SVC-CMM) Device, *Cisco CallManager Administration Guide* Software Conference Bridge Configuration Settings, *Cisco CallManager Administration Guide*
Step 2	Configure the Meet-Me Number/Pattern.	Meet-Me Number/Pattern Configuration, *Cisco CallManager Administration Guide*
Step 3	Add a Conference button for ad hoc or Meet Me Conference button for the meet-me conference to the phone templates, if needed. You only need to do this for Cisco IP Phone models 12 SP, 12 SP+, and 30 VIP.	Deleting a Phone Button Template, *Cisco CallManager Administration Guide*
Step 4	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.	Modifying Softkey Templates, *Cisco CallManager Administration Guide*
Step 5	Configure the ad hoc conference settings.	Initiating an Ad Hoc Conference, page 24-6.
Step 6	Notify users that the Conference Bridge feature is available. If applicable, notify users of the meet-me conference number range.	Refer to the phone documentation for instructions on how users access conference bridge features on their Cisco IP Phone.

Where to Find More Information

Related Topics

- Server Configuration, *Cisco CallManager Administration Guide*
- Phone Button Template Configuration, *Cisco CallManager Administration Guide*
- Cisco IP Phone Configuration, *Cisco CallManager Administration Guide*
- Partition Configuration, *Cisco CallManager Administration Guide*

- Conference Bridge Configuration, *Cisco CallManager Administration Guide*
- Cisco DSP Resources for Transcoding, Conferencing, and MTP, page 28-1

Additional Cisco Documentation

- *Cisco IP Phone Administration Guide for Cisco CallManager*
- Cisco IP Phone user documentation and release notes (all models)
- *Cisco CallManager Serviceability System Guide*
- *Cisco CallManager Serviceability Administration Guide*
- *Cisco IP/VC 3511 MCU and Cisco IP/VC 3540 MCU Module Administrator Guide*