This page describes the components that are required for the Cisco Unified MeetingPlace Video Integration solution.

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Overview of Components

The components shown in Figure: Cisco Unified MeetingPlace Video Integration Components and described in Table: Components Needed to Integrate Video Conferencing in Cisco Unified MeetingPlace work together to provide video conferences that are integrated with Cisco Unified MeetingPlace voice and web conferences.

In the Cisco Unified MeetingPlace Video Integration solution, Cisco Unified MeetingPlace components provide audio conferencing and web conferencing data collaboration, and the Cisco Unified Videoconferencing MCU and its associated components provide video conferencing. Video Integration and Video Administration for Cisco Unified MeetingPlace integrate the two solutions to provide integrated voice, data, and video conferencing.

Figure: Cisco Unified MeetingPlace Video Integration Components

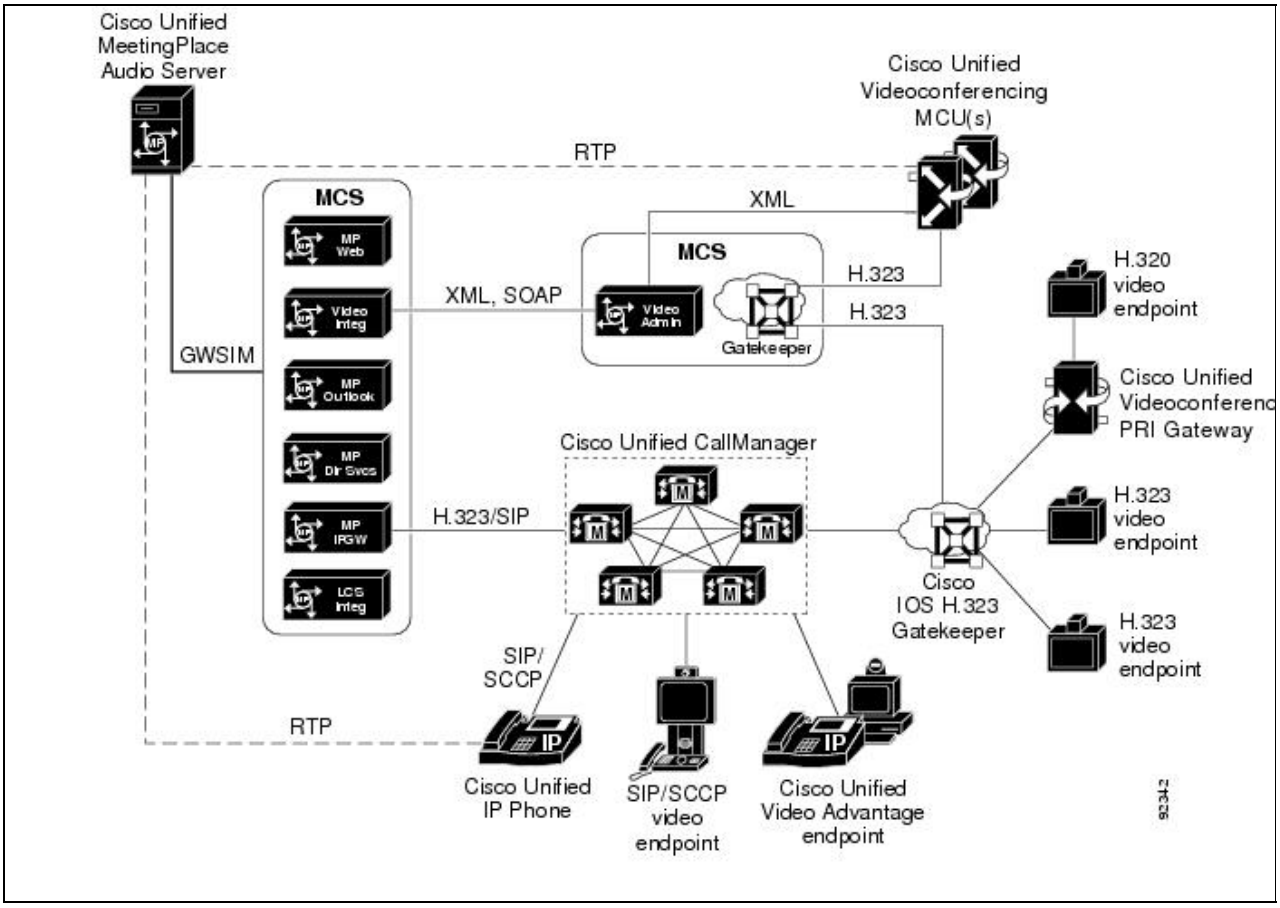


Table: Components Needed to Integrate Video Conferencing in Cisco Unified MeetingPlace

Component	Functions
Cisco Unified MeetingPlace Audio Server	• Handles the audio conference. • Sets the parameters that are interpreted by Cisco Unified MeetingPlace Video Integration, which uses these parameters to control conference resources.
Cisco Unified MeetingPlace H.323/SIP Gateway (MP IPGW)	• Allows the Cisco Unified MeetingPlace system to communicate with IP telephony devices. • Connects the Cisco Unified MeetingPlace Audio Server to the network and to Cisco Unified CallManager or the H.323/SIP Gateway. • Establishes the audio link between the Audio Server and the Cisco Unified Videoconferencing MCU to enable video and audio participants to hear and speak to each other.
Cisco Unified Videoconferencing MCU	• Processes the video streams to provide the video capability of the system. • Communicates with the video endpoints.
Cisco IOS H.323 gatekeeper	

	• Routes calls between the video endpoints and Video Administration for Cisco Unified MeetingPlace based on the number dialed. • Handles the IP protocol signaling.
Cisco Unified MeetingPlace Web Conferencing (MP Web)	• Displays a user interface to schedule and attend meetings. • Displays video participant status. • Provides the web-conferencing meeting room from which users can join and control video conferences. • Includes components that enable the Audio Server to communicate with Video Integration. • Includes a Replication Service that synchronizes video terminal profiles and meeting types from Video Administration to Web Conferencing.
Cisco Unified MeetingPlace for Outlook (Optional)	• Presents a convenient scheduling interface to end users. • Provides meeting notifications that offer users two ways to "click to attend" video, voice, and web conferences.
Cisco Unified MeetingPlace for Lotus Notes (Optional)	• Schedule and attend Cisco Unified MeetingPlace meetings that include video directly from the Lotus Notes environment.
Cisco Unified Videoconferencing PRI Gateway (Optional)	• Enables H.320 video endpoints to participate in video conferences on the Cisco Unified Videoconferencing MCU.
Video endpoints	• Capture and transmit video images and audio from each user or location. • Receive and display video images and audio from other video-conference participants to the user or location.
Cisco Unified CallManager (Optional)	On networks configured with Cisco Unified CallManager: • Allows SCCP and SIP endpoints to participate in Cisco Unified MeetingPlace conferences. • Routes call traffic.
Cisco Unified MeetingPlace Video Integration (Video Integ)	• Authorizes Video Administration to create and initiate video conferences on the Cisco Unified Videoconferencing MCU. • Passes current configuration and status information between Video Administration and the Audio Server. • Initiates the creation of the audio channel between the Cisco Unified Videoconferencing MCU and the Audio Server. • Coordinates capacity by transmitting meeting scheduling, initiation, and termination information between the various components. • Controls entry of participants into video conferences, based on the number of video ports scheduled on the Audio Server for the conference. • Keeps track of information for all conference participants in the Cisco Unified Videoconferencing MCU and their corresponding participant IDs assigned by the Audio Server.

	• Monitors the link between the Audio Server and the Cisco Unified Videoconferencing MCU and supports recovery if the connection is lost. • Tells Video Administration when to terminate video conferences.
Video Administration for Cisco Unified MeetingPlace (Video Admin)	• Monitors the configuration of the Cisco Unified Videoconferencing MCU and passes current status to the Video Integration. • Tells the Cisco Unified Videoconferencing MCU to create and initiate video conferences. • Schedules and tracks the video conference port resources for the Cisco Unified Videoconferencing MCU. • Controls the behavior of the Cisco Unified Videoconferencing MCU based on meeting type and requests placed via the Web Conferencing meeting room. • Tells the Cisco Unified Videoconferencing MCU when to terminate conferences. • Provides a web interface for entering and storing video terminal information. • Provides cascading meeting functionality that combines meetings hosted on multiple Cisco Unified Videoconferencing MCUs. • Includes an internal ECS gatekeeper with which the MCUs must register.

Supported Cisco Unified MeetingPlace System Configurations

Supported Cisco Unified MeetingPlace system configurations include the following. For complete information, see the System Requirements and the Compatibility Matrix.

- One Cisco Unified MeetingPlace 8100 series server.
- One or more Cisco Unified MeetingPlace H.323/SIP Gateway servers.
- Cisco Unified MeetingPlace Web Conferencing servers in any configuration that is supported in this release. Cisco Unified MeetingPlace Video Integration must be installed on all Web Conferencing servers. However, the Video Integration can only be activated to host video conferences on one Web Conferencing server.
- Cisco Unified MeetingPlace Video Integration installed on all Cisco Unified MeetingPlace Web Conferencing servers. If your system has a DMZ configuration, see the Preparing to Install the Video Integration with DMZ Configurations for important considerations before installing Video Integration. A DMZ configuration includes one or more servers in a DMZ outside the corporate firewall.
- Video Administration for Cisco Unified MeetingPlace installed on a separate server.
- One or more Cisco Unified Videoconferencing MCU with all components including an H.323 gatekeeper.
- (Optional) Cisco Unified MeetingPlace for Outlook.
- (Optional) Cisco Unified MeetingPlace for Lotus Notes.
- (Optional) Cisco Unified MeetingPlace SMTP E-Mail Gateway.
- (Optional) Cisco Unified CallManager.

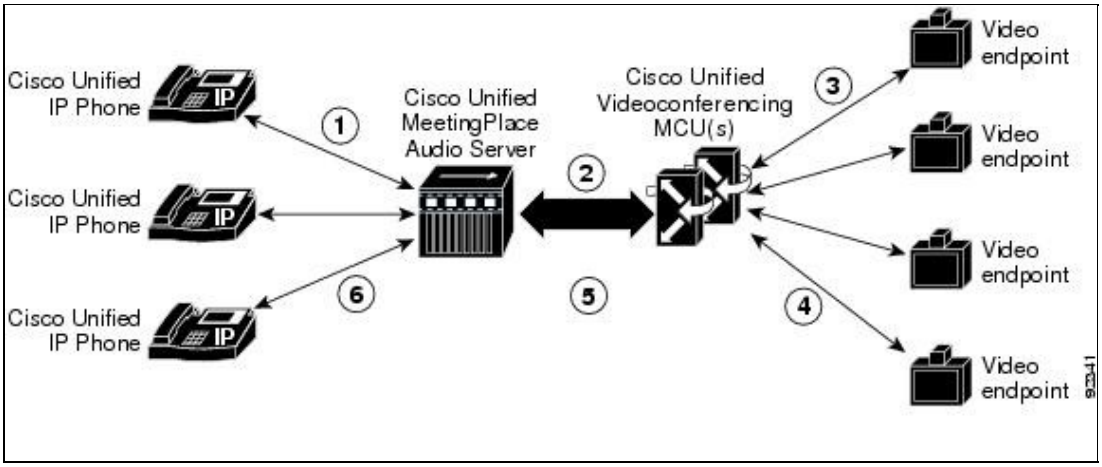
For detailed information on deployment options, refer to the "Cisco Unified MeetingPlace" chapter of the applicable *Cisco Unified Communications Solution Reference Network Design (SRND)* guide, available at http://www.cisco.com/en/US/products/sw/voicesw/ps556/products_implementation_design_guides_list.html

About the Cisco Unified MeetingPlace Video Conferencing Process

The process of creating, running, and terminating an integrated video, audio, and web conference is described in this section.

Participants who are using audio-only devices connect to the Cisco Unified MeetingPlace Audio Server. Participants with video equipment connect to the Cisco Unified Videoconferencing MCU, which processes both the video and the audio channel of the video endpoints. Cisco Unified MeetingPlace Video Integration mixes the audio streams from both systems to allow all participants to hear and speak to each other. Figure: Cisco Unified MeetingPlace Video Conferencing Process shows this process.

Figure: Cisco Unified MeetingPlace Video Conferencing Process



1	The audio of the phone participants is processed by the Cisco Unified MeetingPlace Audio Server.	4	The audio and video channels of the video endpoints are processed by the Cisco Unified Videoconferencing MCU(s).
2	The audio channels from phone participants are sent to join the audio on the Cisco Unified Videoconferencing MCU(s).	5	The audio channels of the video endpoints are sent to join the audio in Cisco Unified MeetingPlace audio conferencing.
3	Video participants hear the audio from phone participants.	6	Phone participants hear the audio from video endpoints.

How Video Conferences Are Scheduled

A user fills in a standard Cisco Unified MeetingPlace conference scheduling form in Microsoft Outlook, Lotus Notes, or Cisco Unified MeetingPlace Web Conferencing, and then the user submits that form to the Cisco Unified MeetingPlace Audio Server. If the user has indicated that the conference will include video participants, the Audio Server verifies with the Video Administration component that resources are available, and if so, schedules the requested number of video ports and (depending on system configuration) notifies invitees.

When using Microsoft Outlook or Lotus Notes to schedule video meetings, users can specify only the number of video ports they need for a meeting. When using Cisco Unified MeetingPlace Web Conferencing to schedule video meetings, users can:

- Invite specific video terminals from a list
- Choose to have video endpoints automatically outdialed at the start of the meeting
- Choose the specific meeting video layout and characteristics that are available
- Schedule a video-only meeting type

How Video Conferences Start

The Cisco Unified Videoconferencing MCU is configured to allow Video Administration for Cisco Unified MeetingPlace to control all H.323 video-conferencing resources and meeting operations on the Cisco Unified Videoconferencing MCU, including initiating meetings. Cisco Unified MeetingPlace does not control SCCP resources on the Cisco Unified Videoconferencing MCU. (Note that SCCP video endpoints that are connected to the Cisco Unified Videoconferencing MCU will also be using the H.323 resources on the MCU. This is made possible by the Cisco Unified CallManager to which the SCCP video endpoints are registered.)

If video ports are reserved, Video Administration starts the video conference on the Cisco Unified Videoconferencing MCU at the same time as the audio conference is started on the Audio Server. Both the video and audio conferences use the same guard times.

If video ports are not reserved, participants can attempt to join the video conference on an ad-hoc basis. In this case, the first Cisco Unified MeetingPlace conference participant who joins the video conference initiates the creation of the video conference on the Cisco Unified Videoconferencing MCU. Cisco Unified MeetingPlace Video Integration verifies that the conference is currently in session or within the guard times of the existing meeting, then tells Video Administration, which in turn tells the Cisco Unified Videoconferencing MCU to immediately create a video conference with the Meeting ID.

The Meeting ID for the video conference includes the MeetingPlace video service code that was chosen by the meeting scheduler plus the standard Cisco Unified MeetingPlace Meeting ID for that conference. The Meeting ID is used by the gatekeeper or Cisco Unified CallManager to route incoming calls for this conference over the network to Video Administration. Video Administration then routes the call to the applicable Cisco Unified Videoconferencing MCUs.

Conferences cannot be created by dialing in to Video Administration unless the meeting has been scheduled on Audio Server. If a participant dials in to Video Administration to start a conference, Video Administration

sends information about the new video conference to Cisco Unified MeetingPlace Video Integration. If the conference has not been scheduled in Cisco Unified MeetingPlace is not currently in session, or is outside the guard times of a scheduled meeting, Video Integration instructs Video Administration not to create the conference.

How the Link Between the Cisco Unified Videoconferencing MCU and the Cisco Unified MeetingPlace Audio Server Is Established

When the first video participant joins an authorized video conference, either by outdialing from the Cisco Unified MeetingPlace Web Conferencing meeting room or by dialing in to Video Administration, Cisco Unified MeetingPlace creates the link that connects the audio channel of the video conference and the audio channel of the Cisco Unified MeetingPlace Audio Server.

To initiate this link, Cisco Unified MeetingPlace Video Integration tells the Audio Server to outdial to Video Administration, and then the call is routed through the H.323/SIP Gateway to Cisco Unified CallManager or to the H.323 gatekeeper, either of which has been configured to route the call to Video Administration. Video Administration then routes the call to the correct Cisco Unified Videoconferencing MCU and conference. The routing pattern (outdialed number) for this transaction is composed of one of the service prefixes that identify Cisco Unified MeetingPlace conferences on the Cisco Unified Videoconferencing MCU (and also are unique among the routing patterns configured on the gatekeeper and Cisco Unified CallManager) plus the Cisco Unified MeetingPlace Meeting ID of the conference. Video Integration tries three times to establish this link.

After the link is established, the entire audio channel of the video conference on the Cisco Unified Videoconferencing MCU becomes a participant in the Cisco Unified MeetingPlace audio conference and vice versa.

Note: The audio link appears as a "Video Participant" in the in-session tab in MeetingTime, but not in the Cisco Unified MeetingPlace Web Conferencing meeting room. It also is included in some reports, but not all. See the About Video-Conferencing Statistics.

After the link is established, all further communication between the Cisco Unified Videoconferencing MCU and the Cisco Unified MeetingPlace Audio Server is handled through the Cisco Unified MeetingPlace Video Integration and Video Administration components, which communicate with the Audio Server through MPAgent. MPAgent is a component of Cisco Unified MeetingPlace Web Conferencing, which is a prerequisite to installation of Video Integration. Video Integration communicates with Video Administration by using proprietary XML and SOAP messaging. The Video Administration component communicates with the Cisco Unified Videoconferencing MCU by using proprietary XML messaging.

If the link between Cisco Unified MeetingPlace and the Cisco Unified Videoconferencing MCU is disconnected, Video Integration attempts to reestablish it three times, checking every minute, or when another participant joins the conference.

About Cascading Video MCUs

Beginning with Cisco Unified MeetingPlace version 5.4, video conferences are no longer limited to a single MCU. The new Video Administration component enables Cisco Unified MeetingPlace to communicate with multiple MCUs transparently. If there are multiple MCUs in the same conference, the Video Administration component designates one of the MCUs as the primary MCU for that conference; the rest of the MCUs are designated secondary MCUs. Cisco Unified MeetingPlace establishes an audio link with only the primary MCU. The secondary MCUs all connect to the primary MCU.

Cascading is only supported with Cisco Unified Videoconferencing 5.x and later. With Cisco Unified Videoconferencing 5.x, video capabilities are provided by Enhanced Media Processors (EMPs) in the MCU. One port on each of the secondary EMPs will be used to connect to the primary EMP, leaving a maximum of 23 ports on each EMP for participants. The primary EMP must use one port to connect to the Cisco Unified MeetingPlace Audio Server and one port to connect with each of the secondary EMPs. Therefore, the maximum number of EMPs that you can connect to the primary EMP is 23. The maximum number of video participants in a single video conference that has been tested is 244.

On the Audio Server, there will always be only one port per meeting used to connect to the primary Cisco Unified Videoconferencing MCU.

How Video Conference Participants Join Meetings

There are several ways that additional participants can join the video conference. The process of adding participants to the conference depends on how they enter the meeting.

If a Participant Joins a Scheduled Video Conference by Outdialing from the Cisco Unified MeetingPlace Web Conferencing Meeting Room

When a participant clicks Connect from within Cisco Unified MeetingPlace Web Conferencing, or in a calendar entry in Cisco Unified MeetingPlace for Lotus Notes, or in the MeetingPlace tab of a meeting notification in Cisco Unified MeetingPlace for Outlook, Video Administration for Cisco Unified MeetingPlace sends a message to the Cisco Unified Videoconferencing MCU to outdial to the endpoint of the participant. When the participant has successfully joined the video conference, the Cisco Unified Videoconferencing MCU notifies Video Administration, which notifies Video Integration, and the status of the participant is recorded in the participant list that is displayed in the Web Conferencing meeting room.

If a Participant Joins a Scheduled Video Conference by Dialing in to Video Administration for Cisco Unified MeetingPlace

If a video conference does not have password restriction, participants can dial in to the conference from their video endpoint. Participants dial in to the conference from their endpoint by using the number provided in the Connect dialog box in the Cisco Unified MeetingPlace Web Conferencing meeting room. This number is the service prefix on the Cisco Unified Videoconferencing MCU that the meeting scheduler chose for the Cisco Unified MeetingPlace conference, plus the Cisco Unified MeetingPlace Meeting ID. Cisco Unified CallManager or the gatekeeper routes all incoming H.323 calls that begin with the specified service prefix to Video Administration for Cisco Unified MeetingPlace which routes each call to the correct Cisco Unified

Videoconferencing MCU and video conference based on the Cisco Unified MeetingPlace meeting ID number portion of the number that was dialed.

When participants attempt to join the video conference by dialing in from their video endpoint, Video Administration checks with Cisco Unified MeetingPlace Video Integration to see if the conference is restricted to profiled or invited users and does not require a password. If the conference is restricted to profiled or invited users, participants will be granted access if their video terminal has a profile or was invited to the meeting. If the participant is granted access, Video Integration checks to see if the meeting is in session and within the guard times and if so, tells Video Administration to admit the participant to the video conference on the Cisco Unified Videoconferencing MCU. Video Administration notifies Video Integration that the participant has joined the conference. Video Integration notifies Web Conferencing and the Cisco Unified MeetingPlace Audio Server of the status of the participant.

If a Participant Joins a Video Conference on an Ad-Hoc Basis

If all scheduled video-conferencing ports for a meeting that is already in progress are in use, and an additional participant attempts to join the video conference, the user may be able to join on an ad-hoc basis. In this case, Video Administration for Cisco Unified MeetingPlace checks to see if video-conferencing ports are available, and if they are, Video Administration allows the participant to join the conference.

How Video Conferences Run

About the Video Images

The visual stream to and from the video endpoints is entirely processed by the Cisco Unified Videoconferencing MCU. After the call is connected, the media stream is routed from the video endpoint, through the Cisco Unified Videoconferencing MCU for processing into a unified video stream, and back to the video endpoints for display to the users. However, users control the status of the transmission (for example, started, paused, or terminated) from within the Cisco Unified MeetingPlace Web Conferencing meeting room. See the About Displaying the Status and Options of Video Participants in the Meeting Room.

About the Audio Channel

The audio streams of the Cisco Unified Videoconferencing MCU and Cisco Unified MeetingPlace are mixed to allow audio and video-conferencing participants to hear and speak to each other. The audio channel from each video endpoint is routed to the Cisco Unified Videoconferencing MCU, then passed through the audio link to the Cisco Unified MeetingPlace Audio Server, where it is mixed with the audio from audio-only endpoints and sent back to all users, to form a seamless audio experience for participants on both video and audio-only endpoints.

About Displaying the Status and Options of Video Participants in the Meeting Room

When Video Administration for Cisco Unified MeetingPlace admits a participant to a video conference, Video Administration notifies Cisco Unified MeetingPlace Video Integration, which notifies Cisco Unified

MeetingPlace Web Conferencing. Web Conferencing identifies the participant as a video participant in the participant list in the Web Conferencing meeting room. The participant name that is displayed comes from the participant profile or guest information if they outdialed from Cisco Unified MeetingPlace and from the gatekeeper if they dialed in to the video conference. When a participant mutes, pauses, changes the view of, or terminates their video connection, Web Conferencing registers this change in the meeting room user interface and passes the request to Cisco Unified MeetingPlace Video Integration, which passes the request to Video Administration, which passes the request to the Cisco Unified Videoconferencing MCU where it is performed. If the user terminates the connection by hanging up the video endpoint, the Cisco Unified Videoconferencing MCU notifies Video Administration, which notifies Video Integration, which then notifies Web Conferencing so that the status of that participant can be updated.

When a video participant speaks, the Now Speaking display shows the participant name or the name of the video endpoint of the participant.

How Cisco Unified MeetingPlace Video Integration Tracks Port Availability

The number of available video ports is determined by the Video Administration component. The Audio Server queries Video Administration real-time to determine whether video resources are available to schedule a video conference. Video port availability is not displayed in MeetingTime.

How Video Conferences End

The video conference on the Cisco Unified Videoconferencing MCU ends when the Cisco Unified MeetingPlace conference ends, according to the standard rules for ending conferences on the Cisco Unified MeetingPlace Audio Server. At this time, Cisco Unified MeetingPlace Video Integration tells Video Administration, which in turn tells the Cisco Unified Videoconferencing MCU(s) to terminate the video conference.