



Understanding Video Telephony

Cisco CallManager supports video calls, thus unifying the world of voice and video calls. Video endpoints use Cisco CallManager call-handling features and access a unified voice and video solution for dialing and connecting video calls.

The Cisco CallManager video telephony solution offers these features:

- Supports video and video-related features, such as far-end camera control (FECC).
- Supports multiple logical channels that are needed to allow the transmission of video streams.
- Transmits midcall media-related messages that are needed for video (that is, transmits commands or indications needed for video calls).
- Supports both H.323 and Skinny Client Control Protocol protocols.
- Enhances locations and regions to provide bandwidth management.
- Provides serviceability information, such as Call Detail Records (CDRs), about video calls.

This section covers the following topics:

- [Introducing Video Telephony, page 40-2](#)
- [Video Telephony and Cisco Serviceability, page 40-9](#)
- [Video Telephony Configuration Checklist, page 40-11](#)
- [Where to Find More Information, page 40-13](#)

Introducing Video Telephony

The following topics discuss the details of video telephony in the Cisco CallManager environment:

- [Video Calls, page 40-2](#)
- [Video Codecs, page 40-3](#)
- [Video Network, page 40-4](#)
- [H.323 Video, page 40-5](#)
- [Skinny Client Control Protocol Video, page 40-6](#)
- [Skinny Client Control Protocol Video Bridging, page 40-6](#)
- [Bandwidth Management, page 40-6](#)
- [Phone Configuration for Video Calls, page 40-8](#)
- [Additional Configuration for Video Calls, page 40-8](#)

Video Calls

The typical video call includes two or three Real-Time Protocol (RTP) streams in each direction (that is, four or six streams). The call can include the following stream types:

- Audio (same codecs as a normal call with additional codecs G.722 and G.728)
- Video (H.261, H.263, and Cisco Video Link codecs) at a different port
- Far-end camera control (FECC) (optional)

Call control for video calls operates the same way as the call control that governs all other calls. Refer to the [“Call Control” section on page 18-3](#) in the [Media Resource Management](#) chapter.

Video Codecs

Common video codecs include H.261, an older video codec, and H.263, a newer codec that gets used to provide internet protocol (IP) video. These codecs exhibit the following parameters and typical values:

- Bit rates: 64 kbps, 320 kbps. These bit rates can be any multiple of 100 bps.
- Resolution:
 - One-quarter Common Interchange Format (QCIF) (Resolution is 176x144.)
 - Common Interchange Format (CIF) (Resolution is 352x288.)
 - 4CIF (Resolution is 704x576.)
 - Sub QCIF (SQCIF) (Resolution is 128x96.)
 - 16CIF (Resolution is 1408x1152.)
 - Custom Picture Format
- Frame Rate: 15 frames per second (fps), 30 fps
- Annexes: D.1, D.2, F, I, J, K, L.4, L.8, N, P.5, T, U, N, U, W

The Cisco Video Link proprietary codec, which is a fixed-bit-rate codec, runs on a PC that is linked to a phone. The Cisco Video Link codec enables the PC to associate with a call that the phone receives. Cisco CallManager currently supports intracluster Cisco Video Link codec calls but not intercluster Cisco Video Link codec calls. Cisco Video Link can use the H.263 protocol to communicate intercluster.

The bandwidth of video calls equals the sum of the audio bandwidth and the video bandwidth. The total bandwidth does not include overhead.

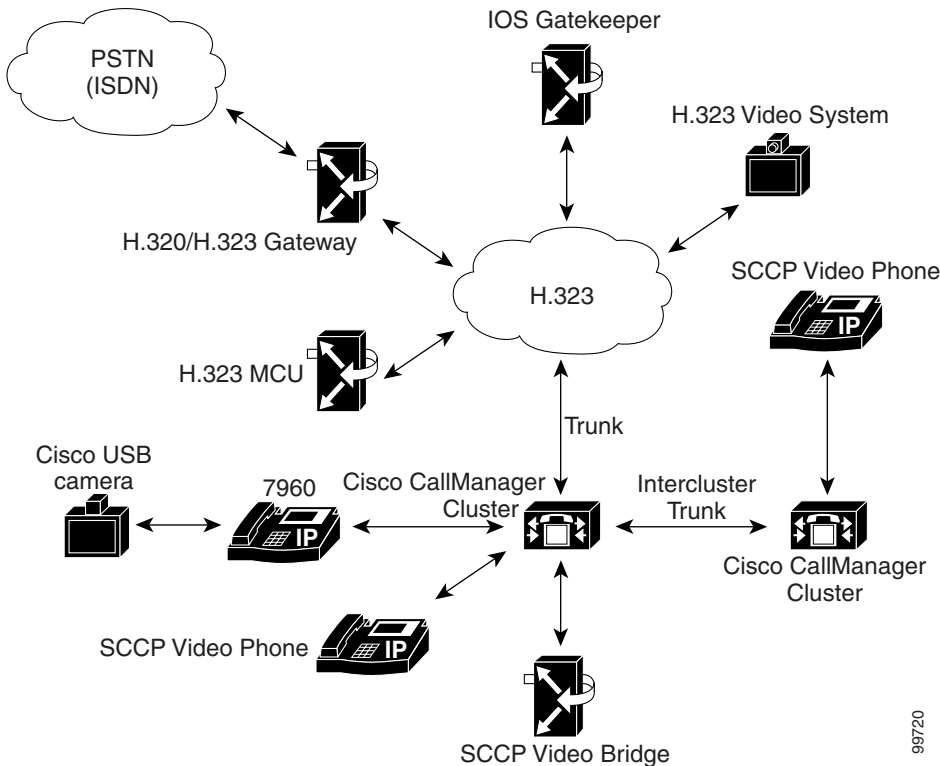
Example

A 384-kbps video call may be G.711 at 64 kbps (for audio) plus 320 kbps (for video). This sum does not include overhead. If the audio codec for a video call is G.729 (at 24 kbps), the video rate increases to maintain a total bandwidth of 384 kbps. If the call involves an H.323 endpoint, the H.323 endpoint may use less than the total video bandwidth that is available. Regardless of protocol, the endpoint may always choose to send at less than the max bit rate for the call.

Video Network

Figure 40-1 provides an example of a video network. In a successful video network, any endpoint can call any other endpoint. Video availability only exists if both endpoints are video enabled. Video capabilities extend across trunks.

Figure 40-1 Video Network Example



The Cisco video conference portfolio comprises the following H.323 devices:

- Cisco IP/VC 3511 (Video Bridge or Media Control Unit [MCU])
- Cisco IP/VC 3520 (BRI H.323/H.320 gateway)
- Cisco IP/VC 3526 (PRI H.323/H.320 gateway)

- Cisco IP/VC 3540 (chassis-based bridge/gateway unit, which accepts multiple cards, and which supports the Skinny Client Control Protocol)
- IOS H.323 Gatekeeper

Each of these devices supports the Internet Protocol (IP) network; the gateways support the Integrated Services Digital Network (ISDN).

Refer to the “[Conference Bridge Configuration](#)” section of the *Cisco CallManager Administration Guide* for details of configuring the Cisco IP/VC 3511 (MCU) in Cisco CallManager Administration.

H.323 Video

H.323 video exhibits the following characteristics:

- H.323 endpoints can be configured as H.323 phones, H.323 gateways, or H.323 trunks.
- Call forwarding, dial plan, and other call-routing-related features work with H.323 endpoints.
- H.323 video endpoints cannot initiate hold, resume, transfer, park, and other similar features.
- If an H.323 endpoint supports the empty capability set (ECS), the endpoint can be held, parked, and so forth.
- Some vendors implement call setup such that they cannot increase the bandwidth of a call when the call gets transferred or redirected. In such cases, if the initial call is audio, users may not receive video when they are transferred to a video endpoint.
- No video media termination point (MTP) nor video transcoder exists currently. If an audio transcoder or MTP is inserted into a call, that call will be audio only.
- For H.323 video calls, users must specify video call bandwidth.

Skinny Client Control Protocol Video

Skinny Client Control Protocol video exhibits the following characteristics:

- If a Skinny Client Control Protocol phone reports video capabilities, Cisco CallManager automatically opens a video channel if the other end supports video.
- For Skinny Client Control Protocol video calls, system administration determines video call bandwidth by using regions. The system does not ask users for bit rate.

Skinny Client Control Protocol Video Bridging

Video conferencing requires a Skinny Client Control Protocol video bridge. Skinny Client Control Protocol video bridging exhibits the following characteristics:

- Skinny Client Control Protocol video bridging requires the same setup as an audio bridge.
- Skinny Client Control Protocol video bridging supports a mix of audio and video in a conference.
- Media resource group lists determine whether an endpoint receives an audio or video bridge. That is, the media resource group list configuration of the user who sets up the conference determines whether the conference is a video conference or an audio-only conference. Refer to the [“Media Resource Group List Configuration”](#) section for details of configuring a media resource group list.

Bandwidth Management

Bandwidth management for video calls gets managed through the call admission control that regions and locations provide in Cisco CallManager Administration.

Regions

Enhancements to regions in Cisco CallManager allow the bandwidth of video calls to be set. Video call bandwidth, which is the sum of the video bandwidth and the audio bandwidth, does not include overhead.

Refer to the [“Region Configuration”](#) section of the *Cisco CallManager Administration Guide* for details of configuring regions in Cisco CallManager.

Locations

Locations in Cisco CallManager Administration include two pools, one pool for video calls and a separate pool for audio calls.

Refer to the [“Location Configuration”](#) section of the *Cisco CallManager Administration Guide* for details of configuring locations in Cisco CallManager.

Alternate Routing

If an endpoint cannot obtain the bandwidth that it needs for a video call, a video call retries as an audio call for the default behavior. To use route/hunt lists or Automated Alternate Routing (AAR) groups to try different paths for such video calls, uncheck the Retry Video Call as Audio setting in the configuration settings for applicable gateways, trunks, and phones. Refer to the [“Route/Hunt List Configuration”](#) and [“Automated Alternate Routing Group Configuration”](#) sections of the *Cisco CallManager Administration Guide* for details.

DSCP Marking

Differentiated Services Code Point (DSCP) packet marking includes the following characteristics:

- Audio streams in audio-only calls default to EF.
- Video streams and associated audio streams in video calls default to AF41.
- You can change these defaults through the use of a service parameter. The following service parameter settings affect DSCP packet marking:
 - DSCPForAudioCalls (for media [RTP] streams)
 - DSCPForVideoCalls (for media [RTP] streams)

Phone Configuration for Video Calls

The following setting for video-enabled devices affects video calls:

- **Retry Video Call as Audio**—By default, this check box remains checked. Thus, if an endpoint (phone, gateway, trunk) cannot obtain the bandwidth that it needs for a video call, call control retries the call as an audio call. This setting applies to the destination devices of video calls.

Additional Configuration for Video Calls

The following configuration considerations also affect the ability to make video calls in Cisco CallManager:

- Trunk interaction with the H.323 client
- Call routing considerations
- Resetting gateway timer parameters

Trunk Interaction with H.323 Client

Trunk interaction with the H.323 Client for video calls functions identically to interaction functions for audio calls. Refer to the [“Trunks and Gatekeepers in Cisco CallManager” section on page 38-2](#) in the [Understanding Cisco CallManager Trunk Types](#) chapter.

Call Routing for Video Calls

Call routing for video calls functions identically to call routing for audio calls.

Gateway Timer Parameter

For some bonding calls through the H.323/H.320 gateway, the gateway requires a longer time to exchange the H.323 TCS message. If the time required is greater than the timer setting for several Cisco CallManager service parameters, Cisco CallManager will drop the call. Therefore, Cisco recommends increasing the following service parameter timers to avoid call failure:

- H245TCSTimeout
- Media Exchange Interface Capability Timer
- Media Exchange Timer

Video Telephony and Cisco Serviceability

Cisco Serviceability tracks video calls and conferences by updating performance monitoring counters, video bridge counters, and call detail records (CDRs).

Performance Monitoring Counters

Video telephony events cause updates to the following Cisco CallManager Serviceability performance monitoring counters:

- Cisco CallManager
 - VideoCallsActive
 - VideoCallsCompleted
 - VideoOutOfResources
- Cisco H.323
 - VideoCallsActive
 - VideoCallsCompleted
- Cisco Locations
 - VideoBandwidthAvailable
 - VideoBandwidthMaximum
 - VideoOutOfResources

- Cisco Gatekeeper
 - VideoOutOfResources

Refer to the *Cisco CallManager Serviceability System Guide* and *Cisco CallManager Serviceability Administration Guide* for details.

Video Bridge Counters

Video conference events cause updates to these Cisco video conference bridge performance monitoring counters:

- ConferencesActive
- ConferencesAvailable
- ConferencesCompleted
- ConferencesTotal
- OutOfConferences
- OutOfResources
- ResourceActive
- ResourceAvailable
- ResourceTotal

These counters also display in the Cisco CallManager object with the VCB prefix.

Refer to the *Cisco CallManager Serviceability System Guide* and *Cisco CallManager Serviceability Administration Guide* for details.

Call Detail Records

Video telephony events cause updates to Call Detail Records (CDRs) in Cisco CallManager Serviceability. These CDRs include the following information:

- IP address and port for video channels
- Codec: H.261, H.263, or Cisco Video Link
- Call bandwidth
- Resolution: QCIF, CIF, SQCIF, 4CIF, 16CIF, or Custom Picture Format

Refer to the *Cisco CallManager Serviceability System Guide* and *Cisco CallManager Serviceability Administration Guide* for details.

Video Telephony Configuration Checklist

Table 40-1 provides a checklist to configure video telephony in Cisco CallManager Administration.

Table 40-1 Video Telephony Configuration Checklist

Configuration Steps	Related procedures and topics
<p>Step 1 If you use regions for call admission control, configure regions for video call bandwidth.</p> <p>Note All devices have a default region, which defaults to 384 kbps for video.</p>	<p>Region Configuration, <i>Cisco CallManager Administration Guide</i></p> <p>Call Admission Control, <i>Cisco CallManager System Guide</i></p>
<p>Step 2 If you use locations for call admission control, configure locations for video call bandwidth.</p>	<p>Location Configuration, <i>Cisco CallManager Administration Guide</i></p> <p>Call Admission Control, <i>Cisco CallManager System Guide</i></p>
<p>Step 3 To use a Cisco video conference bridge, configure the appropriate conference bridge for your network.</p>	<p>Conference Bridge Configuration, <i>Cisco CallManager Administration Guide</i></p>
<p>Step 4 To configure a user to use the video conference bridge instead of using other conference bridges, configure the user's media resource groups and media resource group lists accordingly.</p>	<p>Media Resource Group Configuration, <i>Cisco CallManager Administration Guide</i></p> <p>Media Resource Group List Configuration, <i>Cisco CallManager Administration Guide</i></p>

Table 40-1 Video Telephony Configuration Checklist (continued)

Configuration Steps	Related procedures and topics
Step 5 Configure the H.323 gateways in your system to retry video calls as audio calls (default behavior) or configure AAR groups and route/hunt lists to use alternate routing for video calls that do not connect.	Gateway Configuration , <i>Cisco CallManager Administration Guide</i> Automated Alternate Routing Group Configuration , <i>Cisco CallManager Administration Guide</i> Route/Hunt List Configuration , <i>Cisco CallManager Administration Guide</i>
Step 6 Configure the H.323 phones in your system to retry video calls as audio calls (default behavior) or configure AAR groups and route/hunt lists to use alternate routing for video calls that do not connect.	Cisco IP Phone Configuration , <i>Cisco CallManager Administration Guide</i> Automated Alternate Routing Group Configuration , <i>Cisco CallManager Administration Guide</i> Route/Hunt List Configuration , <i>Cisco CallManager Administration Guide</i>
Step 7 Configure the H.323 trunks in your system to retry video calls as audio calls (default behavior) or configure AAR groups and route/hunt lists to use alternate routing for video calls that do not connect.	Trunk Configuration , <i>Cisco CallManager Administration Guide</i> Automated Alternate Routing Group Configuration , <i>Cisco CallManager Administration Guide</i> Route/Hunt List Configuration , <i>Cisco CallManager Administration Guide</i>

Where to Find More Information

Related Topics

- [Call Admission Control](#), *Cisco CallManager System Guide*
- [Region Configuration](#), *Cisco CallManager Administration Guide*
- [Location Configuration](#), *Cisco CallManager Administration Guide*
- [Conference Bridge Configuration](#), *Cisco CallManager Administration Guide*
- [Media Resource Group Configuration](#), *Cisco CallManager Administration Guide*
- [Media Resource Group List Configuration](#), *Cisco CallManager Administration Guide*
- [Automated Alternate Routing Group Configuration](#), *Cisco CallManager Administration Guide*
- [Route/Hunt List Configuration](#), *Cisco CallManager Administration Guide*
- [Gateway Configuration](#), *Cisco CallManager Administration Guide*
- [Cisco IP Phone Configuration](#), *Cisco CallManager Administration Guide*
- [Trunk Configuration](#), *Cisco CallManager Administration Guide*

Additional Cisco Documentation

- Cisco IP Phone administration documentation and release notes (all models)
- 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*

■ Where to Find More Information