System-Level Configuration Settings

Configure system-level settings before you add devices and configure other Cisco CallManager features. This section covers the following topics:

Server Configuration

Use the server configuration to specify the address of the server where Cisco CallManager is installed. If your network uses Domain Name System (DNS) services, you can specify the host name of the server. If your network does not use DNS services, you must specify the Internet Protocol (IP) address of the server.

Note You must update the DNS server with the appropriate Cisco CallManager name and address information before using that information to configure the Cisco CallManager server.

Adding a Server

The following guidelines apply to adding a server:

- When you perform a fresh installation of Cisco CallManager, you must define any subsequent servers (nodes) in the Cisco CallManager Administration Server Configuration window before you can install the Cisco CallManager software on each subsequent server. To define a subsequent node, click **Add New** and then configure the server. After you add the subsequent server, you can then install the Cisco CallManager software on that server.
- Add each server only once on the Server Configuration window. If you add a server by using the host name and add the same server by using the IP address, Cisco CallManager cannot accurately determine component versions for the server after a Cisco CallManager upgrade. If you have two entries in Cisco CallManager Administration for the same server, delete one of the entries before you upgrade the system.
- Any changes that you make to the server configuration do not take effect until you restart Cisco CallManager.

Deleting a Server

Note You cannot delete a server that has a specific Cisco CallManager that is running on it.

To find out which Cisco CallManagers are using the server, choose **Dependency Records** from the Related Links drop-down list box on the Server Configuration window and click **Go**.

Before deleting a server that is currently in use, you must perform the following tasks:

- Update the Cisco CallManager in question and assign it to a different server or delete the Cisco CallManager that is assigned to that server.
- Delete the conference bridges, MTPs, and MOH servers that use the server that you want to delete.

Note The system may automatically delete some devices, such as MOH servers, when you delete a server.

- Deactivate the services that are running on that server.

For more information, refer to the *Cisco CallManager Administration Guide*, the *Cisco CallManager Serviceability Administration Guide*, and the *Cisco CallManager Features and Services Guide*.

Cisco CallManager Configuration

The Cisco CallManager servers get added to Cisco CallManager at installation time. Use Cisco CallManager configuration to update fields such as the ports and other properties for each Cisco CallManager that is installed in the same cluster. A cluster comprises a set of Cisco CallManagers that enables redundancy.

Any changes that you make to the settings for auto-registration partition, external phone number mask, and voice message box mask do not take effect until you restart Cisco CallManager.

Note When you perform a fresh installation of Cisco CallManager, you must activate the Cisco CallManager service. For information about activating the Cisco CallManager service, refer to the *Cisco CallManager Serviceability Administration Guide*.

Cisco CallManager Groups

A Cisco CallManager group comprises a prioritized list of up to three Cisco CallManagers. The first Cisco CallManager in the list serves as the primary Cisco CallManager for that group, and the other members of the group serve as secondary (backup) Cisco CallManagers.

Cisco CallManager groups associate with devices through device pools. Each device belongs to a device pool, and each device pool specifies the Cisco CallManager group for all of its devices.

Note Some Media Gateway Control Protocol (MGCP) devices, such as gateways and route/hunt lists, can associate directly with Cisco CallManager groups.

Cisco CallManager groups provide two important features for your system:

- Prioritized failover list for backup call processing—When a device registers, it attempts to connect to the primary (first) Cisco CallManager in the group that is assigned to its device pool. If the primary Cisco CallManager is not available, the device tries to connect to the next Cisco CallManager that is listed in the group, and so on. Each device pool has one Cisco CallManager group that is assigned to it.
- Call processing load balancing—You can configure device pools and Cisco CallManager groups to distribute the control of devices across multiple Cisco CallManagers. See the "Balanced Call Processing" section on page 6-3 for more information.

For most systems, you will assign a single Cisco CallManager to multiple groups to achieve better load distribution and redundancy.

Adding a Cisco CallManager Group

- Cisco CallManagers are automatically installed and configured.
- Each Cisco CallManager cluster can have only one default auto-registration group. If you choose a different Cisco CallManager group as the default auto-registration group, the previously chosen auto-registration group no longer serves as the default for the cluster.
- You must reset the devices that use the updated Cisco CallManager group to apply any changes that you make.

Deleting a Cisco CallManager Group

Note You cannot delete a Cisco CallManager group if it is assigned to any device pools or MGCP gateways or if it is the current Auto-registration Cisco CallManager Group for the cluster.

To find out which devices are using the Cisco CallManager group, choose **Dependency Records** from the Related Links drop-down list box on the Cisco CallManager Group Configuration window and click **Go**.

Before deleting a Cisco CallManager group that is currently in use, you must perform some or all of the following tasks:

- Assign a different Cisco CallManager group to the device pools or MGCP gateways that currently use this Cisco CallManager group.
- Create or choose a different Cisco CallManager group to be the Auto-registration Cisco CallManager Group.

For more information, refer to the *Cisco CallManager Administration Guide* and the *Cisco CallManager Serviceability Administration Guide*.

Phone NTP Reference Configuration for SIP Phones

You can configure phone Network Time Protocol (NTP) references in Cisco CallManager Administration to ensure that a Cisco SIP IP Phone gets its date and time from an NTP server. If a SIP phone cannot get its date/time from the provisioned "Phone NTP Reference," the phone will receive this information when it registers with Cisco CallManager.

Adding a Phone NTP Reference

After you add the phone NTP reference to Cisco CallManager Administration, you must add it to a date/time group. In the date/time group, you prioritize the phone NTP references, starting with the first server that you want the phone to contact.

The date/time group configuration gets specified in the device pool, and the device pool gets specified on the phone window.

Deleting a Phone NTP Reference

Before you can delete a phone NTP reference from Cisco CallManager Administration, you must delete the server from the date/time group. To find which date/time groups use the phone NTP reference, choose **Dependency Records** from the Related Links drop-down list box in the Phone NTP Reference Configuration window and click **Go**.

If the dependency records feature is not enabled for the system, the dependency records summary window displays a message that shows the action that you can take to enable the dependency records; the message also displays information about high CPU consumption that is related to the dependency records feature. For more information about dependency records, refer to the "Dependency Records" section in the *Cisco CallManager Administration Guide*.

Date/Time Groups

Use Date/Time Groups to define time zones for the various devices that are connected to Cisco CallManager.

Cisco CallManager provides a default Date/Time Group that is called CMLocal that configures automatically when you install Cisco CallManager; however, Cisco recommends that you configure a group for each local time zone. CMLocal synchronizes to the active date and time of the operating system on the Cisco CallManager server. After installing Cisco CallManager, you can change the settings for CMLocal as desired. Normally, you adjust the server date/time to the local time zone date and time.

Note CMLocal resets to the operating system date and time whenever you restart Cisco CallManager or upgrade the Cisco CallManager software to a new release. Do not change the name of CMLocal.

Tip For a worldwide distribution of Cisco IP Phones, create a Date/Time Group for each of the 24 time zones.

Adding a Date/Time Group

After adding a new date/time group to the database, you can assign it to a device pool to configure the date and time information for that device pool.

You must reset devices to apply any changes that you make.

Deleting a Date/Time Group

Note You cannot delete a date/time group that any device pool uses.

To find out which device pools use the Date/Time Group, choose **Dependency Records** from the Related Links drop-down list box on the Date/Time Group Configuration window and click **Go**.

Before deleting a Date/Time Group that is currently in use, you must perform either or both of the following tasks:

- Assign a different Date/Time Group to device pools that use the Date/Time Group that you want to delete.
- Delete the device pools that use the Date/Time Group that you want to delete.

For more information, refer to the *Cisco CallManager Administration Guide* and the *Cisco CallManager Serviceability Administration Guide*.

Regions

Use regions to specify the bandwidth that is used for audio and video calls within a region and between existing regions.

- The audio codec determines the type of compression and the maximum amount of bandwidth that is used per audio call.
- The video call bandwidth comprises the sum of the audio bandwidth and video bandwidth but does not include overhead.

When you create a region, you specify the codec that can be used for calls between devices within that region, and between that region and other regions. The system uses regions also for applications that only support a specific codec; for example, an application that only uses G.711.

The audio codec type specifies the technology that is used to compress and decompress voice signals. The choice of audio codec determines the compression type and amount of bandwidth that is used per call. See Table 5-1 for specific information about bandwidth usage for available audio codecs.

Note The default audio codec for all calls through Cisco CallManager specifies G.711. If you do not plan to use any other audio codec, you do not need to use regions.

Cisco CallManager supports video stream encryption and various audio/video codecs, such as G.722.

Regions provide capacity controls for Cisco CallManager multisite deployments where you may need to limit the bandwidth for individual calls that are sent across a WAN link, but where you want to use a higher bandwidth for internal calls.

Adding a Region

To specify audio codec usage for devices that are using regions, you must perform the following tasks:

- Configure the default values for audio codec and video call bandwidth in the Cisco CallManager Administration Service Parameters Configuration window.
- Create regions and specify the audio codecs to use for calls within those regions and between other regions.
- Create or modify device pools to use the regions that you created.
- Assign devices to device pools that specify the appropriate region.

Note Cisco CallManager allows addition of a maximum of 500 regions.

Configuring Default Values

Region entries contain two values—audio codec and video call bandwidth.

- Audio Codec—You define audio codec values to be used within the same region, and you also define audio codec values to be used between regions.
- Video Call Bandwidth—You define video call bandwidth values to be used within the same region, and you also define video call bandwidth values to be used between regions.

Tip If you set both the audio codec values and the video call bandwidth values to use the default, the system uses less resources.

You configure the default values for regions in the Cisco CallManager Administration Service Parameters window (**System > Service Parameters**).

- Regions have default values for use within a region—The recommended default value specifies G.711.
- Regions have default values for use between regions—The recommended default value specifies G.729.

Note For enhanced scalability, Cisco recommends that you properly set the default values in the Cisco CallManager Administration Service Parameters Configuration window for both the audio codec and the video call bandwidth values, and then choose the Default settings in the Cisco CallManager Administration Region Configuration window.

For more information about configuring regions, refer to Region Configuration in the *Cisco CallManager Administration Guide.*

See the "Device Pools" section on page 5-10 for more information about device pool settings. For information about codes and video calls, see Understanding Video Telephony.

After adding a new region to the database, you can use it to configure device pools. Devices acquire a region setting from the device pool to which they are assigned.

Note To apply any changes that you make to all devices that use the updated region, you must restart the devices.

Supported Audio Codecs and Bandwidth Usage

Cisco CallManager supports the following audio codecs for use with the regions feature:

- **G.711**—Default codec for all calls through Cisco CallManager.
- **G.722**—Audio codec often used in video conferences.
- **G.723**—Low-bit-rate codec with 6-kbps compression for Cisco IP Phone model 12 SP+ and Cisco IP Phone model 30 VIP devices.
- **G.728**—Low-bit-rate codec that video endpoints support.
- **G.729**—Low-bit-rate codec with 8-kbps compression supported by Cisco IP Phone 7900 models. Typically, you would use low-bit-rate codecs for calls across a WAN link because they use less bandwidth. For example, a multisite WAN with centralized call processing can set up a G.711 and a G.729 region per site to permit placing intrasite calls as G.711 and placing intersite calls as G.729.
- **GSM**—The global system for mobile communications (GSM) codec. GSM enables the MNET system for GSM wireless handsets to operate with Cisco CallManager. Assign GSM devices to a device pool that specifies GSM as the audio codec for calls within the GSM region and between other regions. Depending on device capabilities, this includes GSM EFR (enhanced full rate) and GSM FR (full rate).
- **Wideband**—Currently only supported for calls from IP phone to IP phone. The wideband audio codec, uncompressed with a 16-bit, 16-kHz sampling rate, works with phones with handsets, acoustics, speakers, and microphones that can support high-quality audio bandwidth, such as Cisco IP Phone 7900 model phones.

Tip Regions that specify wideband as the codec type must have a large amount of network bandwidth available because wideband uses four times as much bandwidth as G.711.

The total bandwidth that is used per call stream depends on the audio codec type as well as factors such as data packet size and overhead (packet header size), as indicated in Table 5-1. (The bandwidth information provided in Table 5-1 applies to Ethernet.)

Note Each call includes two streams, one in each direction.

Note The codecs specified in Table 5-1 correlate to an approximate bandwidth usage per call. For more information on bandwidth usage for each codec, refer to the *Cisco IP Telephony Solution Reference Network Design (SRND)* for the current release of Cisco CallManager.

Table 5-1 Bandwidth Used Per Call by Each Codec Type

Audio Codec	Bandwidth Used for Data Packets Only (Fixed Regardless of Packet Size)	Bandwidth Used Per Call (Including IP Headers) With 30-ms Data Packets	Bandwidth Used Per Call (Including IP Headers) With 20-ms Data Packets
G.711	64 kbps	80 kbps	88 kbps
G.722	24 kbps	80 kbps	88 kbps
G.723	6 kbps	24 kbps	Not applicable
G.729	8 kbps	24 kbps	32 kbps

Table 5-1 Bandwidth Used Per Call by Each Codec Type (continued)

Wideband[1]	256 kbps	272 kbps	280 kbps
GSM[2]	13 kbps	29 kbps	37 kbps

1. Uncompressed. Cisco CallManager supports wideband audio from IP phone to IP phone for Cisco IP Phone 7900 Family model phones only.
2. Global system for mobile communications.

3.) The phone configuration file strictly requires the IP address (in the a.b.c.d format) of NTP server(s). Do not use hostname of FQDN.

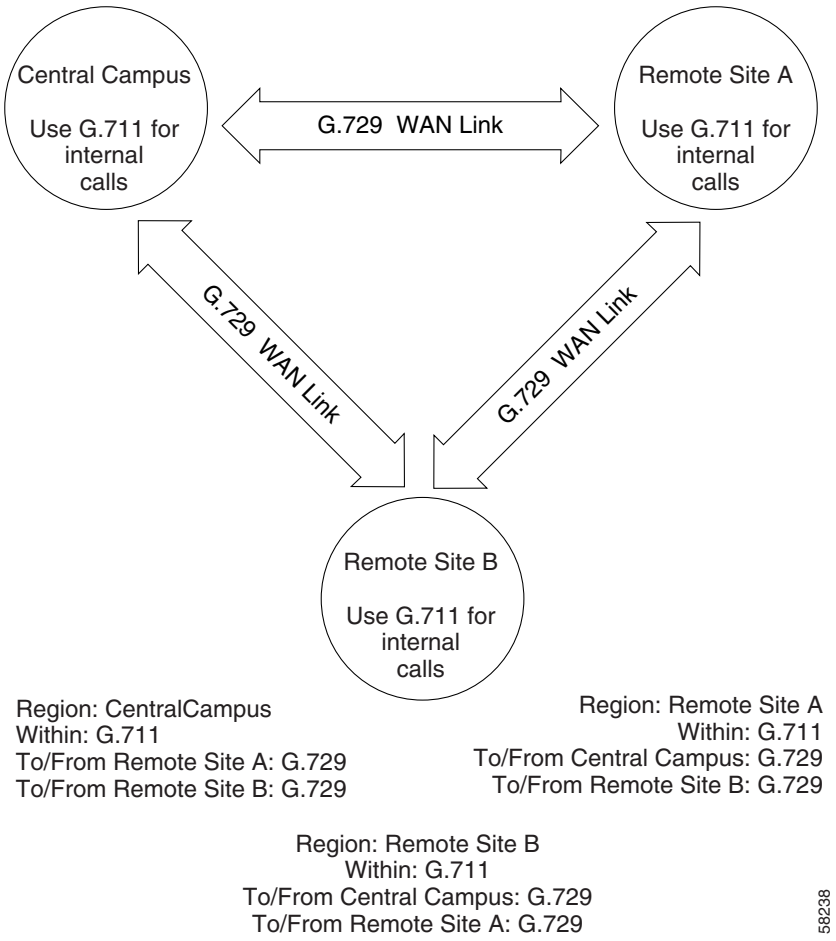
Example

Figure 5-1 shows a very simple region configuration example for deployment with a central site and two remote branches. In the example, an administrator configures a region for each site. The G.711 codec equals the maximum bandwidth codec that is used for calls within each site, and the G.729 codec equals the maximum bandwidth codec that is used for calls between sites across the WAN link.

After region configuration, the administrator assigns devices to the following sites:

- The Central Campus site to device pools that specify CentralCampus as the region setting
- Remote Site A to device pools that specify RemoteSiteA as the region setting
- Remote Site B to device pools that specify RemoteSiteB for the region setting

Figure 5-1 Simple Region Example



Locations and Regions

In Cisco CallManager, locations-based call admission control works in conjunction with regions to define the characteristics of a network link.

- Regions define the type of codec that is used on the link (and therefore, the amount of bandwidth that is used per call).
- Locations define the amount of available bandwidth for the link.

You must assign each device on the network to both a region (by means of a device pool) and a location. See the "Call Admission Control" section on page 5-13.

Deleting a Region

Note You cannot delete a region that any device pools are using.

To find out which device pools use the region, choose **Dependency Records** from the Related Links drop-down list box on the Region Configuration window and click **Go**.

Before deleting a region that is currently in use, you must perform either or both of the following tasks:

- Update the device pools to use a different region.
- Delete the device pools that use the region that you want to delete.

For more information, refer to the *Cisco CallManager Administration Guide* and the *Cisco CallManager Serviceability Administration Guide*.

Device Pools

Device pools provide a convenient way to define a set of common characteristics that can be assigned to devices. You can specify the following device characteristics for a device pool:

- Device Pool Name—Specifies the name for the new device pool.
- Cisco CallManager group—Specifies a prioritized list of up to three Cisco CallManagers to facilitate redundancy. The first Cisco CallManager in the list serves as the primary Cisco CallManager for that group, and the other members of the group serve as secondary (backup) Cisco CallManagers. See the "Cisco CallManager Groups" section on page 5-3 for more details.
- Date/Time group—Specifies the date and time zone for a device. See the "Date/Time Groups" section on page 5-4 for more details.
- Region—Specifies the audio and video codecs that are used within and between regions. Use regions only if you have different types of codecs within the network. See the "Regions" section on page 5-5 for more details.
- Softkey template—Manages the softkeys that are associated with applications on Cisco IP Phones. See the "Softkey Template Configuration" section in the *Cisco CallManager Administration Guide* for more details.
- Survivable Remote Site Telephony (SRST) reference—Specifies the gateway that provides SRST functionality for the devices in a device pool. See the "Survivable Remote Site Telephony References" section on page 5-13 for more details.
- Calling search space for auto-registration (optional)—Specifies the partitions that an auto-registered device can reach when a call is placed. See the "Partitions and Calling Search Spaces" section on page 15-1 for more details.
- Media resource group list (optional)—Specifies a prioritized list of media resource groups. An application chooses the required media resource (for example, a Music On Hold server, transcoder, or conference bridge) from the available media resource groups according to the priority order that is defined in the media resource group list. See the "Media Resource Group Lists" section on page 22-4 for more details.
- Network hold music on hold (MOH) audio sources (optional)—Specifies the audio source for network hold. See the "Music On Hold Audio Sources" section in the *Cisco CallManager Features and Services Guide* for more details.
- User hold music on hold (MOH) audio source (optional)—Specifies the audio source for user hold. See the "Music On Hold Audio Sources" section in the *Cisco CallManager Features and Services Guide* for more details.
- Network locale—Contains a definition of the tones and cadences that the phones and gateways use in a device pool in a specific geographic area.

Note You must choose only a network locale that is already installed and that the associated devices support. The list contains all available network locales for this setting, but not all are necessarily installed. If the device is associated with a network locale that it does not support in the firmware, the device will fail to come up.

- User locale—Identifies a set of detailed information to support users, including language and font. This characteristic associates with the phones and gateways in a device pool.
- Connection Monitor Duration—Resolves WAN link flapping issues between Cisco CallManager and SRST. See the "Survivable Remote Site Telephony References" section on page 5-13 for more information.
- MLPP Precedence and Preemption Information—Manages MLPP settings:
  - MLPP Indication—Specifies whether devices in the device pool that are capable of playing precedence tones will use the capability when the devices plan an MLPP precedence call.
  - MLPP Preemption—Specifies whether devices in the device pool that are capable of preempting calls in progress will use the capability when the devices plan an MLPP precedence call.
  - MLPP Domain—Specifies a hexadecimal value for the MLPP domain that is associated with the device pool. Device pools refer to the configured MLPP domain.

Note You must configure the preceding items before you configure a device pool if you want to choose the items for the device pool.

After adding a new device pool to the database, you can use it to configure devices such as Cisco IP Phones, gateways, conference bridges, transcoders, media termination points, voice-mail ports, and CTI route points.

If using auto-registration, you can assign all devices of a given type to a device pool by using the Device Defaults window in Cisco CallManager Administration.

For more information, refer to Updating Device Defaults in the *Cisco CallManager Administration Guide*.

Updating Device Pools

If you make changes to a device pool, you must reset the devices in that device pool before the changes will take effect.

You cannot delete a device pool that has been assigned to any devices or one that is used for Device Defaults configuration.

To find out which devices are using the device pool, choose **Dependency Records** from the Related Links drop-down list box on the Device Pool Configuration window and click **Go**.

If you try to delete a device pool that is in use, a message displays. Before deleting a device pool that is currently in use, you must perform either or both of the following tasks:

- Update the devices to assign them to a different device pool.
- Delete the devices that are assigned to the device pool that you want to delete.

LDAP

Cisco CallManager uses the Lightweight Directory Access Protocol (LDAP) directory to store authentication and authorization information about users of Cisco CallManager applications, which interface with Cisco CallManager. Authentication establishes the user right to access the system, while authorization identifies the telephony resources that a user is permitted to use, such as a specific telephone extension.

The LDAP directory provides applications with a standard method for accessing and modifying the information that is stored in the directory. This capability provides the benefit of enabling companies to centralize all user information in a single repository that is available to several applications, thereby reducing maintenance costs through the ease of adds, moves, and changes.

Cisco CallManager provides support for an optional, external LDAP directory. When used, Cisco CallManager and related applications store all application data in a local database instead of in the directory. Cisco CallManager supports integration with the customer directory, and it provides default user authentication with the database as well as user authentication with the customer directory.

To use the LDAP directory with Cisco CallManager, modify information directly from the LDAP server and then configure the following LDAP parameters by using Cisco CallManager Administration.

- LDAP System—Configure this parameter to enable synchronization from the LDAP server. Choose the LDAP server type, such as Microsoft Active Directory (AD) or Netscape LDAP Server, and the LDAP attribute for the user ID.
- LDAP Directory—Use this parameter to find and list LDAP directories and to add information to the LDAP directory, such as LDAP configuration name, LDAP directory synchronization schedule, user fields to be synchronized, and LDAP server information. You must enable synchronization from the LDAP server on the LDAP System window before you can make any changes to this information.
- LDAP Authentication—Configure this parameter to enable LDAP authentication for end users. When the LDAP authentication is turned on, the system authenticates the user's password against the LDAP server instead of the Cisco CallManager database, and it synchronizes the end user information from the LDAP server to the Cisco CallManager database. You must enable synchronization from the LDAP server on the LDAP System window before you can make any changes to this information.

Note You can switch between LDAP parameters by choosing the menu option that you want to configure from the Related Links drop-down list box on the LDAP Configuration windows.

If you want to use your Active Directory or Netscape corporate directory with Cisco CallManager, you must synchronize the directory with the Cisco CallManager database by accessing **System > LDAP > LDAP System**. You set up the directory synchronization agreements by accessing **System > LDAP > LDAP Directory**.

You must activate the Cisco DirSync service from Cisco CallManager Serviceability to synchronize the AD/Netscape directories. The Cisco DirSync service interacts with these directories by synchronizing the data, reading the customer directory information, and updating the Cisco CallManager database.

To activate Cisco DirSync, access **Control Center > Feature Services** and navigate to Directory Services.

- Set up the directory synchronization agreements by accessing **System > LDAP > LDAP Directory**.
- Set up the configuration used by Cisco DirSync by accessing **System > LDAP > LDAP System** and **System > LDAP > LDAP Directory.**

See "Understanding the Directory" for more information about using directories with Cisco CallManager.

Call Admission Control

Use call admission control to maintain a desired level of voice quality over a WAN link. For example, you can use call admission control to regulate the voice quality on a 56-kbps frame relay line that connects your main campus and a remote site.

Voice quality can begin to degrade when too many active calls exist on a link and the amount of bandwidth is oversubscribed. Call admission control regulates voice quality by limiting the number of calls that can be active at the same time on a particular link. Call admission control does not guarantee a particular level of audio quality on the link, but it does allow you to regulate the amount of bandwidth that active calls on the link consume.

Cisco CallManager supports two types of call admission control:

- Locations—Use locations to implement call admission control in a centralized call-processing system. Call admission control lets you regulate voice quality by limiting the amount of bandwidth that is available for calls over links between the locations.
- H.323 Gatekeeper—Use an H.323 gatekeeper, also known as a Cisco Multimedia Conference Manager (MCM), to provide call admission control in a distributed system with a separate Cisco CallManager or Cisco CallManager cluster at each site.

Note If you do not use call admission control to limit the voice bandwidth on an IP WAN link, the system allows an unlimited number of calls to be active on that link at the same time. This can cause the voice quality of each call to degrade as the link becomes oversubscribed.

See the "Call Admission Control" section on page 8-1 for more information.

Survivable Remote Site Telephony References

Survivable Remote Site Telephony (SRST) gets used at sites that depend on a centralized Cisco CallManager cluster that is accessible via a WAN connection. SRST provides telephony service to IP phones at the remote site in the event of a WAN outage. An SRST-enabled router has features that allow calls between IP phones at the remote site to call each other, allow calls from the PSTN to reach the IP phones, and allow calls from the IP phones to reach the external world through the PSTN. Intelligence in the SRST router that can accept registrations from the IP phones and route calls based on the directory numbers that are registered, and based on the routing that is configured for the PSTN link, accomplishes that.

Survivable remote site telephony (SRST) references, a configurable option in Cisco CallManager Administration, provide limited call capability in the event of a WAN outage. Using SRST references, IP gateways can take over limited Cisco CallManager functionality. When phones lose connectivity to all associated Cisco CallManagers, the phones in a device pool attempt to make a Cisco CallManager connection to the SRST reference IP gateway.

The status line indication on the IP phone that shows the phone has failed over to the backup proxy (SRST gateway) provides the only user interactions with SRST.

Device Pool Settings for SRST

The system administrator can configure the SRST configuration for a device pool of phones. The following list gives Device Pool configuration options that are available:

- Disable–If a phone cannot reach any Cisco CallManagers, it does not try to connect to an SRST gateway.
- Use Default Gateway–If a phone cannot reach any Cisco CallManagers, it tries to connect to its IP gateway as an SRST gateway.
- User-defined–If a phone cannot reach any Cisco CallManagers, it tries to connect to an administrator-specified SRST gateway. The SRST Reference field of the Device Pool Configuration lists user-defined SRST references.

The administrator defines SRST configurations in the SRST Reference Configuration window. Any preceding SRST configuration option can apply to a device pool. The Cisco TFTP reads the SRST configuration and provides it to the IP phone in a .cnf.xml file. The IP phone reacts appropriately to the SRST configuration.

Connection Monitor Duration

An IP phone that connect to the SRST over a Wide Area Network (WAN) reconnects itself to Cisco CallManager as soon as it can establish a connection with Cisco CallManager over the WAN link. However, if the WAN link is unstable, the IP phone switches back and forth between the SRST and Cisco CallManager. This situation causes temporary loss of phone service (no dial tone). These reconnect attempts, known as WAN link flapping issues, continue until the IP phone successfully reconnects itself to Cisco CallManager. These WAN link disruptions fit into two classifications: infrequent random outages that occur on an otherwise stable WAN and the sporadic, frequent disruptions that last a few minutes.

To resolve the WAN link flapping issues between Cisco CallManager and SRST, Cisco CallManager provides an enterprise parameter and a setting in the Device Pool Configuration window that is called Connection Monitor Duration. Depending upon system requirements, the administrator decides which parameter to use. The value of the parameter gets delivered to the IP phone in the XML configuration file.

- The default for the enterprise parameter specifies 120 seconds. Use the enterprise parameter to change the connection duration monitor value for all IP phones in the Cisco CallManager cluster.
- Use the Device Pool Configuration window to change the connection duration monitor value for all IP phones in a specific device pool.

SRST Reference Configuration Options for SIP Phones

A remote site may have a mix of SCCP and SIP endpoints in addition to PSTN gateway access. For calls to be routed between the different protocols and the PSTN, three different features will be configured in one SRST router that will allow calls to be routed between SCCP phones, SIP phones, and the PSTN during a WAN outage. In addition, the SRST Reference Configuration window in Cisco CallManager Administration provides two fields.

- SIP Network/IP Address—The SIP network/IP address applies for SIP SRST. This address notifies the SIP phone where to send SIP Register message for SIP SRST.
- SIP Port—SIP port of the SRST gateway. Default specifies 5060.

For more information, refer to "SRST Reference Configuration Settings" in the *Cisco CallManager Administration Guide*.

For information about configuring security for the SRST reference and the SRST-enabled gateway, refer to *Cisco CallManager Security Guide*.

MLPP Domain

Because the MLPP service applies to a domain, Cisco CallManager only marks a precedence level to connections and resources that belong to calls from MLPP users in a given domain. The MLPP domain subscription of the originating user determines the domain of the call and its connections. Only higher precedence calls in one domain can preempt connections that calls in the same domain are using.

To define an MLPP domain, configure the following MLPP domain information:

- Domain Name—Name of the MLPP domain.
- Domain Identifier—Configure the MLPP domain identifier as a hexadecimal value of zero or greater (the default value specifies zero).

The MLPP domain identifier comprises the collection of devices and resources that are associated with an MLPP subscriber. When an MLPP subscriber (who belongs to a particular domain) places a precedence call to another MLPP subscriber (who belongs to the same domain), the MLPP service can preempt the existing call that the called MLPP subscriber is on for a higher precedence call. The MLPP service availability does not cross domains. Device pools refer to the configured MLPP domain.

Note You must reset all devices for a change to this setting to take effect.

Enterprise Parameters

Enterprise parameters provide default settings that apply to all devices and services in the same cluster. When you install a new Cisco CallManager, it uses the enterprise parameters to set the initial values of its device defaults.

You cannot add or delete enterprise parameters, but you can update existing enterprise parameters. Cisco CallManager Administration segments enterprise parameters by categories; for example, CCMAdmin parameters, CCMUser parameters, and CDR parameters.

You can display additional descriptions for enterprise parameters by using the question mark button on the Enterprise Parameters Configuration window.

Service Parameters

Service parameters for Cisco CallManager allow you to configure different services on selected servers. You can view a list of parameters and their descriptions by clicking the question mark button that displays on the Service Parameters Configuration window. You can view the list with a particular parameter at the top by clicking that parameter.

If you deactivate a service by using Cisco CallManager Serviceability, Cisco CallManager retains any updated service parameter values. If you start the service again, Cisco CallManager sets the service parameters to the changed values.

Caution Some changes to service parameters may cause system failure. Cisco recommends that you do not make any changes to service parameters unless you fully understand the feature that you are changing or unless the Cisco Technical Assistance Center (TAC) requests that you make changes.

Dependency Records

To find specific information about system-level settings such as servers, device pools, and date/time groups, choose **Dependency Records** from the Related Links drop-down list box on the Cisco CallManager Administration configuration windows for each system-level setting and click **Go**.

If the dependency records are not enabled for the system, the dependency records summary window displays a message.

Note You cannot view Dependency Records from the Device Defaults and Enterprise Parameters Configuration windows.

The Cisco CallManager Configuration Dependency Records window provides information about Cisco CallManager groups that it accesses. The Date/Time Group Configuration Dependency Records window provides information about Device Pools that it accesses.

For more information about Dependency Records, refer to Accessing Dependency Records, *Cisco CallManager Administration Guide*.

System Configuration Checklist

Table 5-2 lists the general steps for configuring system-level settings.

Table 5-2 System Configuration Checklist

Configuration Steps		Procedures and Related Topics
Step 1	Configure the server to specify the address of the server where Cisco CallManager is installed.	Server Configuration, page 5-1 Server Configuration, *Cisco CallManager Administration Guide*
Step 2	Specify the ports and other properties for each Cisco CallManager that is installed in the same cluster.	Cisco CallManager Configuration, page 5-2 Cisco CallManager Configuration, *Cisco CallManager Administration Guide*
Step 3	Configure Cisco CallManager groups for redundancy.	Cisco CallManager Groups, page 5-3 Redundancy, page 7-1 Cisco CallManager Group Configuration, *Cisco CallManager Administration Guide*
Step 4	Configure phone NTP references, so SIP phones can get the date and time from the NTP server (optional).	Phone NTP Reference Configuration for SIP Phones, page 5-4 Phone NTP Reference Configuration, *Cisco CallManager Administration Guide*
Step 5	Configure Date/Time groups to define time zones for the various devices that are connected to Cisco CallManager.	Date/Time Groups, page 5-4 Date/Time Group Configuration, *Cisco CallManager Administration Guide*

Table 5-2 System Configuration Checklist (continued)

Configuration Steps		Procedures and Related Topics
Step 6	Configure regions to specify the codec that can be used for calls between devices within that region, and between that region and other regions, if needed. **Tip** You do not need to configure regions if you are using only the default G.711 audio codec.	Regions, page 5-5 Region Configuration, *Cisco CallManager Administration Guide*
Step 7	Configure device pools to define a set of common characteristics that can be assigned to devices.	Device Pools, page 5-10 Device Pool Configuration, *Cisco CallManager Administration Guide*
Step 8	Configure media resource groups and media resource group lists.	Media Resource Management, page 22-1 Media Resource Group Configuration, *Cisco CallManager Administration Guide*
Step 9	Configure LDAP to store authentication and authorization information about users who interface with Cisco CallManager.	LDAP, page 5-12 Understanding the Directory
Step 10	Configure locations or gatekeepers for call admission control.	Locations and Regions, page 5-9 Call Admission Control, page 8-1
Step 11	Configure survivable remote site telephony (SRST) references to preserve rudimentary call capability.	Survivable Remote Site Telephony References, page 5-13 Survivable Remote Site Telephony Configuration, *Cisco CallManager Administration Guide*
Step 12	Configure the MLPP domain.	MLPP Domain, page 5-15 Multilevel Precedence and Preemption, *Cisco CallManager Features and Services Guide*
Step 13	Update enterprise parameters, if necessary.	Enterprise Parameters, page 5-15 Enterprise Parameters Configuration, *Cisco CallManager Administration Guide*
Step 14	Update service parameters, if necessary. For example, configure the DRF backup and restore master agent in the Cisco CallManager Administration Service Parameters Configuration window.	Service Parameters, page 5-15 Dependency Records, page 5-16 Service Parameters Configuration, *Cisco CallManager Administration Guide*

Where to Find More Information

Related Topics

- Server Configuration, page 5-1
- Cisco CallManager Configuration, page 5-2
- Cisco CallManager Groups, page 5-3
- Date/Time Groups, page 5-4

- Regions, page 5-5
- Device Pools, page 5-10
- LDAP, page 5-12
- Call Admission Control, page 5-13
- Survivable Remote Site Telephony References, page 5-13
- MLPP Domain, page 5-15
- Enterprise Parameters, page 5-15
- Service Parameters, page 5-15
- Dependency Records, page 5-16
- Redundancy, page 7-1

Additional Cisco Documentation

- *Cisco CallManager Administration Guide*