C H A P T E R 3

Understanding PMC Interactions and Supported Features

This chapter provides information about the scenarios where you might use the PMC, information about the server and PMC interactions, PMC supported features, and specific terminology that the Cisco IPICS solution uses.

This chapter includes the following sections:

Voice Interoperability

Cisco IPICS solves the problem of voice interoperability between disparate systems by bridging PTT communications between multiple LMR systems, IP phones and PSTN phones, and the Cisco IPICS PMC.

As a PC-based software application, the PMC comprises a stand-alone PTT audio application that enables users, and dispatch and administrative personnel to participate in one or more VTGs at the same time.

Figure 3-1 shows an illustration of the various components that interoperate with the Cisco IPICS solution.

Figure 3-1   Cisco IPICS Interoperability Solution
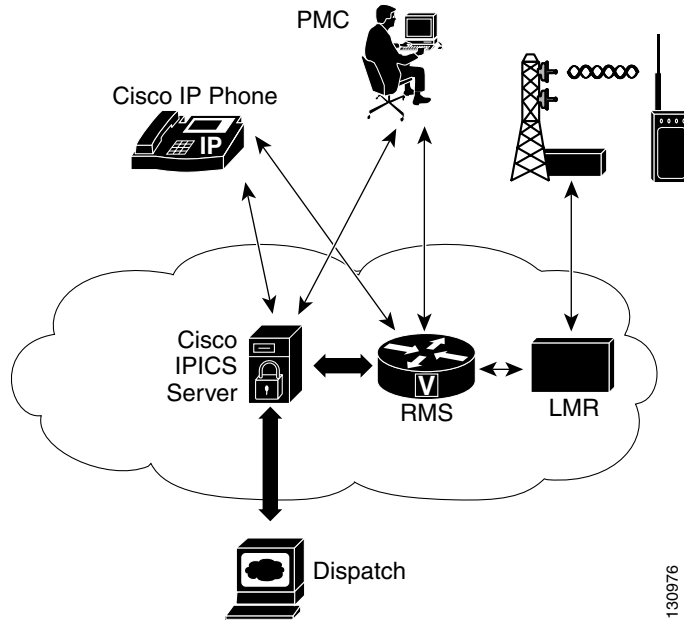
For more information about the Cisco IPICS components, see the
"Cisco IPICS System Components" section on page 1-3.

For information about Cisco IPICS deployment, see the
"Architecture/Deployment" section on page 1-21.

Scenarios for Using the PMC Application

The following scenarios show how the Cisco IPICS solution combines the server
and the PMC to enable voice interoperability. This section describes the following
topics:

- Cisco IPICS Server-PMC Interaction Scenario, page 3-3

- Incident Management Scenario, page 3-6

Cisco IPICS Server-PMC Interaction Scenario

The following sequence of events shows how the Cisco IPICS server interacts with the PMC user, and includes information about the tasks that are performed by the various Cisco IPICS user roles:

1. The Cisco IPICS system administrator sets up the Cisco IPICS server from which the PMC user can download and install the PMC application. The system administrator also sets up and imports the user preference themes, which include graphics, XML, and tones for the PMC.

   The PMC retrieves the PMC installation file from the Cisco IPICS server along with the PMC user configuration data.

2. The Cisco IPICS operator sets up the users and the channels for the PMC user.

3. The Cisco IPICS dispatcher assigns the channels to the PMC user and sets up the talk groups by activating and deactivating the VTGs.

4. The PMC user downloads and installs the PMC application. For more information, see the "Downloading and Installing the PMC Application" section on page 2-4.

   The Cisco IPICS server checks the license count for concurrent license usage. See the "License Information" section on page 4-6 for information about licenses for concurrent PMC usage.

5. The PMC user initiates a session with the server by using the PMC application. See the "Launching the PMC Application" section on page 2-13.

   During the login sequence, the server provides information to the PMC about available versions to ensure compatibility. For more information, see the "Managing PMC Version Numbers" section on page 2-18.

6. The PMC sends a request to the server to authenticate the user. See the "Server-PMC Login Sequence Interaction" section on page 4-6.

7. After successful authentication, the server uses the unique PMC ID to track requests and to manage the session with the PMC. The following activities can occur during these sessions:

     a. The server can execute a command or update the configuration on the PMC.

     b. At regular intervals, as configured in the server, the PMC can check with the server for updates.

8. The PMC retrieves a personalized list of channels from the server, along with the configuration settings that provide user-specific channel restrictions and customization information.

For more information about the user-specific settings, see the "Configurable Server Attributes" section on page 3-17. For more information about reordering PMC channels, see the "Reordering Your Channels" section on page 4-28.

9. The PMC user may modify some of the PMC configuration elements, such as defining the PMC skin, mapping keys to specific channels, and reordering the appearance of the channels on the PMC.

For more information about configuring the PMC, see the "Configuring the PMC End-User Interface" section on page 5-1.

10. The PMC only displays, and the PMC user can only use and activate, those channels that have been assigned by the dispatcher.

The PMC user may also be able to communicate and interact with the dispatcher through a policy channel, which may be configured as a designated channel that remains always open on the PMC. As a PMC user, you could use this policy channel, if it is configured, to initiate a request to the dispatcher to set up a new VTG when the situation arises. For more information about policies, see the "Implementing Policies" section on page 3-11.

11. The PMC user clicks the **Activate** button on the PMC application to directly join the channel. The Activate button highlights and the system attempts to connect to the channel or VTG. After the connection has been established, the remaining PMC buttons for that channel, including the PTT channel button, highlight to indicate that they are in an activated state.

$\mathcal{Q}$

Tip The PMC displays its connection status with the server. When the PMC is connected to the server, a green connectivity indicator displays; when the PMC is not connected to the server, a red connectivity indicator and an alert icon display to make you aware of the disconnection.

Note You may see different channel states on your PMC. For instance, if your ability to transmit on a channel has been disabled by the server, and/or if the channel has been configured by the server as a listen-only channel, the channel will appear dimmed. In this case, you may listen in to the channel but you may not transmit. If the channel has been disabled by the server, you will not be able to activate the channel, as none of the buttons will appear. For more information about the various channel states, see the "Configurable Server Attributes" section on page 3-17.

The type of connection that Cisco IPICS uses depends on the configuration that the PMC retrieved from the server. The PMC connection types include remote connection by using SIP-based trunking into the RMS component (which is directly tuned into the multicast channel) and multicast connection by directly tuning into the multicast channel. See the "Location Support" section on page 3-20 for more information about these types of connections.

12. The PMC user can listen in and talk on one or more channels at the same time. In this case, the PMC mixes the audio on the PMC client machine so that the PMC user can join multiple VTGs simultaneously.

Note Be aware that you may experience echo when you simultaneously listen to a VTG and a channel that is bound to that VTG.

Tip Your ability to latch a channel is configured in the server. If enabled, you can use the PTT latch functionality to talk on multiple channels at the same time. For more information, see the "Using the Latch Functionality" section on page 4-17. (You can also use the All Talk channel to talk on multiple channels that you select. For more information about the All Talk functionality, see the "Selecting One or More Channels and Using the All Talk Channel" section on page 4-25.)

13. The PMC checks the server for updates at regular intervals. When an update occurs (such as the activation or deactivation of a VTG), the PMC retrieves the updated information from the server.

Based on the updates from the server, the PMC display refreshes automatically to reflect the changes that were made by the dispatcher.

14. The PMC logs the details of the channel assignments, including activation and deactivation. At predefined intervals, the Cisco IPICS server retrieves these logs from the PMC. See the "Using the PMC Logs" section on page 7-5 for more information about the logging facility.

Incident Management Scenario

In a Cisco IPICS scenario, the occurrence of an event or incident leads to the creation and activation of a VTG. The dispatcher can perform this VTG setup on an ad hoc (as needed) basis or by preconfiguring the VTG. Preconfigured VTGs could be scheduled to run at defined intervals or activated on demand.

The following example portrays an incident management scenario at an enterprise customer that shows how the various Cisco IPICS system components work together to deliver the Cisco IPICS solution.

1. The dispatcher receives a 911 emergency call and creates a voice channel that correlates to a specific incident.

2. From the Cisco IPICS server administration console, the dispatcher includes the police department in the talk group.

3. By using the PMC application, the dispatcher communicates directly with the police officer at the scene by using push-to-talk (PTT) functionality.

4. Upon discovering the magnitude of the emergency, the police officer informs the dispatcher of the need to communicate directly with the fire department.

5. Again, from the Cisco IPICS server administration console, the dispatcher adds the fire department into the talk group.

6. The police officer, dispatcher, and the fire department are all included in the expanded VTG and they are enabled to use PTT capabilities to communicate with each other.

7. Next, as a decision is made to dispatch fire engines to the scene, the dispatcher communicates with the public utility department and adds their radio channel into the talk group. During this time, the participants who are included in the talk group can make real-time decisions about items such as road conditions, routes to follow, and any necessary lane clearances.

8. Finally, the dispatcher seamlessly patches the enterprise security team and the facilities team, who use their own radio channels, into the talk group and they discuss evacuation procedures with all of the various agencies that are included in the call.

PMC User Interaction

The PMC user interacts with the PMC to join the VTG by clicking the PMC buttons after the dispatcher assigns channels to the user.

1. The PMC retrieves the personalized list of voice channels that the dispatcher assigns; the PMC display then refreshes automatically based on the updates that it receives from the server. The order of the channels, as they display on the PMC, is determined by the server. However, you can rearrange the order of your channels by navigating to the **Settings > Channels** menu. For detailed instructions, see the "Configuring the Channels Menu Options" section on page 5-10.

2. After the PMC has completed its startup processes, the PMC user clicks the **Activate** button on the PMC application to turn on and join in the VTG.

3. The Activate button highlights and the system attempts to connect to the channel or VTG. After the connection has been established, the remaining PMC buttons for that channel, including the PTT button, highlight to indicate that they are in an active state.

Note   You may see different channel states on your PMC. For instance, the appearance of dimmed channels may indicate that your ability to transmit on a channel has been disabled by the server. For more information about the various channel states, see the "Configurable Server Attributes" section on page 3-17.

4. The PMC user clicks and holds the **PTT** button to talk. The PTT channel button highlights and changes color to indicate the occurrence of voice transmission. To return to listen-only mode, release the button.

Note   Some PMC skins include a transmit indicator; for more information, see the "Traffic Activity" section on page 4-45.

5. When the incident has ended, the dispatcher deactivates the VTG; the server automatically refreshes the PMC, based on the new configuration, and removes the VTG from the PMC application.

Related Topics

- Cisco IPICS System Components, page 1-3
- Architecture/Deployment, page 1-21
- Launching the PMC Application, page 2-13
- Location Support, page 3-20
- Server-PMC Login Sequence Interaction, page 4-6
- Activating the PMC Buttons, page 4-13
- Joining a VTG, page 4-14

The Role of the Cisco IPICS Server

This section includes information about the role of the Cisco IPICS server and how it interacts with the PMC; it includes the following topics:

- Server-PMC Interaction, page 3-8
- Cisco IPICS Server Commands, page 3-9
- Implementing Policies, page 3-11

Server-PMC Interaction

The PMC depends on the Cisco IPICS server to provide its configuration, connection, management, authentication, and alert tone distribution information. Some of the specific features that the server provides are included in the following list:

- Detecting and preventing audio looping, which causes recurring echo, by determining when the addition of a channel into an active VTG may cause a loop
- Configuring and managing multicast and SIP resources and ensuring that the appropriate resource types are provided to the PMC

- Authenticating Cisco IPICS users
- Providing indication of user-specific restrictions and/or customization that may apply to channels
- Configuring and distributing alert tones and the associated button names, along with user permissions

While Cisco IPICS allows the PMC to operate in offline mode when the connection to the server is not available, the following operations require that the server be online and that an operable link with the PMC exists:

- Notification of assignment, removal or change of channel characteristics
- Updates to user access permissions (allowing or revoking user access)
- Download of new alert tones, skins, online help or PMC versions
- Upload of the PMC log files

For more information about PMC operations in offline mode, see the "PMC Offline Mode Caveats" section on page 4-7.

Cisco IPICS Server Commands

Table 3-1 describes the commands that can be sent from the Cisco IPICS server to the PMC in XML format.

Table 3-1 **Cisco IPICS Server Commands**

Command	Description
Channel List	Upon log in to the server, the PMC retrieves the channel list from the server. This list includes the names of the channels that the dispatcher assigns for each PMC user along with the connection type (location information).
	Note The PMC retrieves the entire channel list, even if the PMC has been configured to display fewer channels than that which is contained in the list. In this case, a message displays to alert you of the channel mismatch and that you may not be able to view all of the assigned channels/VTGs. See the "Skin Caveats" section on page 5-5 for more information. For information about reordering your channels, see the "Reordering Your Channels" section on page 4-28.
Disable User	This command disables the PMC user from accessing the Cisco IPICS system. If the user is disabled while the PMC is communicating with the server, Cisco IPICS logs the PMC user off after processing this command.
Disable Channel	This command disables one or more channels on the PMC. Channels that are in a disabled state appear as non-activated channels but they cannot be activated.
Retrieve Logs	This command retrieves the logs from the PMC.
Set Logging Level	This command turns on and off the individual logs on the PMC. It also sets the debug levels within the debug log.
Mute User	This command mutes a PMC user from talking or transmitting voice on one or more channels.
	Note The PMC displays a pop-up message and the PTT channel appears dimmed to alert you that permission to transmit has been revoked.

Implementing Policies

The Cisco IPICS server includes the functionality to create/update/delete, enable/disable, and execute/run policies. Policies associate events or triggers to an action.

The following list includes the events or triggers that can initiate a policy:

- Selecting a button on the PMC
- Dialing in to the policy engine by using PSTN devices
- Explicitly triggering a policy (this action can be done by the dispatcher from the administration console)
- Using time-based triggering

Policies can include a set sequence of actions, such as activating and deactivating VTGs, inviting VTG participants to join the VTG, and sending messages to a list of recipients.

Cisco IPICS provides the functionality for the dispatcher to predefine these policies as recurring or non-recurring policies. By using policies, talk groups can be quickly set up or predefined to operate on a regular basis.

For more information about policies, refer to the *Cisco IPICS Server Administration Guide*.

Dispatcher Channel

The dispatcher may also set up a policy channel by which you can communicate through the PMC. This policy channel, if it is configured and designated by the dispatcher on the PMC, acts as a channel that is always open and enables your interaction with the dispatcher.

By using this channel on the PMC, you could initiate a request to the dispatcher to set up a new VTG when the situation arises.

Supported Features

Cisco IPICS provides support for the following features:

Channel Support

This section includes information about channel terminology, the types of channels that Cisco IPICS supports, and the configurable server attributes that pertain to the channel, user, and connection information. It contains the following topics:

Channel Terminology

Channels form the fundamental building blocks of all the talk groups in the Cisco IPICS solution. A Cisco IPICS channel defines and describes the specific content stream of the channel regardless of the source of that content. Channel connections, which are determined by location, distinguish one stream source from another.

A channel refers to a multicast address and port that can be transported via SIP and carries traffic to and from a VTG, an LMR gateway, or IP phone and PMC users.

A channel can also refer to a radio control interface (radio or radio channel), which also has an audio stream. Radios include different frequencies. When a radio is set to a specific radio frequency (RF), the content usually differs from the content that is set to another frequency.

Additionally, a channel can refer to the RF channel, which is included within the radio channel and which the radio is actually tuned to and streaming content on.

- A radio frequency alone does not define a channel, and depending on the location of the frequency, the audio content may differ. That is, a channel that is tuned to one frequency in one location may receive completely different content from the same type of radio that is tuned to the same radio frequency in a different location.

- A channel may appear on more than one frequency such that the same content may be audible on several different frequencies.

- Any particular radio frequency in a specific location may simultaneously carry multiple different content streams.

Each channel on the PMC contains a PTT button with various controls, such as send and/or receive feedback, volume control, and an activation control button that toggles on and off. Some skins include additional functionality, such as radio channel control buttons, voice replay controls, alert tone buttons, the All Talk button, multiselect channel check boxes, and channel selector buttons; be aware that you must have permission to use some of these features.

The appearance of the channels on the various PMC skins varies based on user permissions and the skin that is used. For illustrations of the 18-channel advanced console skin and the 36-channel radio console skin, see Figure 1-1 on page 1-9 and Figure 1-2 on page 1-14. For more information about PMC skins, see the "Configuring the PMC End-User Interface" section on page 5-1.

Table 3-2 describes the terminology that Cisco IPICS uses.

Table 3-2   Cisco IPICS Terminology

Term	Description
Channel	A channel consists of a single unidirectional or bidirectional path for sending and/or receiving signals. In the Cisco IPICS solution, a channel represents one LMR gateway port that maps to a conventional radio physical radio frequency channel. **Note** If a name, or label, has been configured in the server for the PTT button, that name displays in the channel area as part of the PTT button on the PMC. In this area, you may also see certain background text colors to uniquely identify a channel and a type indication for the channel, such as channel, VTG or 2-way.
Direct Two-way Channel	A PMC direct two-way channel directly connects two PMC users. Both of the PMC users must be online to engage in this direct, point-to-point connection. The channel type for this channel displays as 2-way. For more information, see the "Communicating with PMC Users via Direct Two-Way Channels" section on page 4-29.
Direct Dial Channel	A PMC direct dial channel supports the use of direct, point-to-point connections that enable a PMC user to directly dial a phone number that is connected via the PSTN or an IP phone that is reachable via the customer network. The channel type for this channel displays as direct dial. For more information, see the "Communicating with Phone Users via Direct Dial Channels" section on page 4-31.

Table 3-2   Cisco IPICS Terminology (continued)

Term	Description
Radio Channel	A PMC radio channel supports tone control for radios. Each defined radio channel represents a physical radio that the administrator configures with one or more tone sequences. With this support, PMC users may change frequencies by pressing channel selector buttons that display within the radio channel or use other radio channel control buttons to invoke a specific action. The PMC generates the necessary radio control tone sequences when users press the associated button. For more information, see the "Communicating with Cisco IPICS Users via Tone-Controlled Radios" section on page 4-32 and the "Radio Skin Caveats" section on page 5-7.
Talk Group	A talk group comprises a subgroup of radio users who, under normal circumstances, only coordinate actions amongst users who are in the same talk group; radio interface with other subgroups is not required. With Cisco IPICS, a channel maps to a logical talk group; that is, all the participants who talk on the same radio frequency belong to a talk group
Virtual Talk Group	A virtual talk group (VTG), or audio meeting, represents interoperability of a group of channels and maps to a voice channel that users attach to based on a specific incident. The PMC directly joins the VTG based on the location configuration that is configured in the server. See the "Location Support" section on page 3-20 for more information.
Virtual Channel	A virtual channel is similar to a channel but a radio system may not be attached. By creating a virtual channel, participants who do not use physical handheld radios to call into a VTG become enabled by using the PMC application or a supported Cisco Unified IP Phone model.

Channel Information

This section includes information about the channels that display on the PMC; it also includes information about channel visual indicators in the "Channel Visual Indicators" section on page 3-16.

By accessing the administration console, Cisco IPICS authorized personnel can register, assign, activate, and deactivate channels for PMC users; these activities affect the channel, configuration, and connection information for each PMC.

The PMC retrieves the channel information, along with other configuration data, when the server sends notification to the PMC about the availability of the channel. The order in which the channels display on the PMC may be initially determined by the server; however, you may reorder the appearance of the channels on the PMC.

For more information, see the "Reordering Your Channels" section on page 4-28 and the "Configuring the Channels Menu Options" section on page 5-10.

Channel Visual Indicators

The PMC may display the following visual indicators on the channel, depending on configuration, type of skin, and/or connectivity status:

- The channel name, or label, that displays in the channel area as part of the PTT button on your PMC represents a logical name that has been assigned to the channel and defined in the server. (Likewise, the associated button names for the alert tones that display on the PMC, if you are permitted to use them, also represent the names that have been configured in the server.)

- The channel also includes information about the type of channel, such as channel or VTG, and other visual indicators to uniquely identify specific channels, such as the addition of an icon on the channel.

- Another type of visual indicator for a channel includes the use of a specific background color for the label text on the channel button to uniquely identify the channel. The system administrator may configure channels in the server by using a predefined color to differentiate and add prominence to certain channels. When this configuration is performed, the PMC displays the channel with a specific color indicator so that it can be easily distinguished from other channels on the PMC. These visual indicators display on a per-channel basis on the PMC.

> **Note** If the channel name that was configured in the server includes more characters than the PMC can display, the PMC may truncate the name on the channel.

- When SIP-based remote connections fail, the PMC displays a visual indicator in the form of a yellow triangle next to the channel. For more information, see the "Support for Cisco IPICS Recovery" section on page 6-1 and the "Identifying Channel Activation Issues" section on page 8-25.

- Some PMC skins include a separate transmit indicator to provide visual indication of voice transmission. For more information, see the "Traffic Activity" section on page 4-45.

- When you use the radio console skin, the PMC may also display up to nine channel selector buttons per radio channel. You can use these channel selector buttons to change channels, control tones, or for signaling functionality. For more information, see the "Communicating with Cisco IPICS Users via Tone-Controlled Radios" section on page 4-32.

Configurable Server Attributes

This section contains information about the configurable server attributes that pertain to the channel, user, and connection information. It includes the following topics:

- Server Channel Provisions, page 3-17
- User Privileges, page 3-19
- Connection Support, page 3-20

Server Channel Provisions

The server configuration includes provisions for the following per-channel features, as shown in Table 3-3, to ensure that the PMC properly authorizes and displays data about the channels that are assigned to each PMC user:

Table 3-3   Server Channel Provisions for the PMC

Feature	Description
Channel color	This setting, as configured in the server, uniquely identify specific channels by using predefined colors for the background text that appears on the channel. This feature enables specific channels to be easily distinguished from other channels on the PMC.
Secure channel indicator	Setting this attribute in the server enables the PMC to provide a visual indication of a secure channel. The location of this indicator depends on the skin that you use. For example, this indicator may display in the lower left corner of the PTT button or along the top of the PTT button.
Listen-only channel	This setting specifies whether the user has permission to talk on the channel or VTG. When enabled, you may listen in to the channel but you cannot transmit.
	When enabled, this attribute enables the PMC to display a channel in listen-only mode. In this case, the channel appears dimmed on the PMC to indicate that you may not transmit.
Allow latch	This channel latch permission setting specifies whether you have permission to use the latch functionality to latch a channel.
Enable Voice Activity Detection (VAD)	This setting specifies if VAD should be enabled; if VAD is enabled, the PMC only sends voice traffic when it detects a voice transmission.
	Note If the VAD attribute is changed in the server, the PMC channel restarts to configure the new value. If you previously selected the PMC channel by checking the Channel Select check box, you will need to reselect it after the channel restarts.
Mute RX on PTT	This attribute specifies the transmission settings for all channels or only one channel; it controls the audio from the active channels while you are transmitting.
Disable audio	This setting specifies whether the user has permission to talk and listen on the channel or VTG. When enabled, the user cannot talk or listen in to the channel or VTG.

User Privileges

In addition, the server configuration contains the level of user privileges that are provided to the PMC. These user privileges enable or disable your ability to perform certain activities, such as latching a channel or using alert tones on the PMC.

The Cisco IPICS server maintains the user privileges for each PMC user.

- These privileges extend to the list of PMC channels that you can view and use.

- When the dispatcher activates a VTG for you, you are granted VTG privileges that may allow greater interaction than the privileges of the channel itself. For example, a channel may be configured as listen only, but the VTG may allow transmission.

The server configuration includes provisions for the following per-user features, as shown in Table 3-4, to ensure that the PMC properly authorizes and displays data about the channels based on user permissions:

Table 3-4   Server User Provisions for the PMC

Feature	Description
Disable audio	This setting specifies whether the user has permission to talk and listen on the channel or VTG. When enabled, the user cannot talk or listen in to the channel or VTG.
Listen only	This attribute specifies that you are restricted to listening only on the channel; no transmission is allowed.
Allow latch	This latch permission setting specifies whether you have permission to use the latch functionality.
Advanced PMC permissions	These attributes specify whether you are enabled for the following features on the PMC: • Channel multiselect for voice and tone transmissions • Alert tones transmissions • DTMF tones transmissions • All Talk channel transmissions

Connection Support

The Cisco IPICS server also contains the associated connection configuration, which correlates to locations, to determine how the PMC should connect. Cisco IPICS provides connection support for both multicast and unicast communications.

- Multicast refers to communications that are sent between a single sender and multiple recipients on a network.

Tip Be sure to prequalify your PMC client machine for multicast communications. Certain Windows XP PMC client machines may encounter issues with sending multicast communications; in these situations, the PMC client machine may be able to receive but not transmit traffic. For more information, see the "Troubleshooting Multicast Communications Issues" section on page 8-21.

- Unicast refers to communications that are sent between a single sender and a single recipient on a network.

Note For more information about choosing your location and your type of connection, see the "Location Support" section on page 3-20.

For more information about the multicast technology, refer to the following URL: http://www.cisco.com/en/US/products/ps6552/products_ios_technology_home.html

Location Support

In the Cisco IPICS solution, location signifies "reachability;" that is, channels or users who are associated with the same location can communicate with each other without additional network configuration. Location is functionally equivalent to a multicast domain such that users who are in the same multicast domain are also in the same Cisco IPICS location.

The label that the system administrator configures in the Cisco IPICS server may refer to the location; this label could correspond to a physical or a virtual location.

Tip The location determines the type of channel communication that is appropriate for the location. If you choose a location and you do not hear any voice traffic, choose a different location until you hear the audio on the channel. You can change your location by restarting the PMC and then choosing another available location from the drop-down list box in the location selection dialog box.

The system administrator configures the channel and the location information in the Cisco IPICS server for each PMC user.

- These location definitions correspond to the different locations from which a PMC user can access assigned channels or VTGs.

Note The PMC may truncate the location name that was configured in the server if the location name includes more characters than the PMC can display.

As a PMC user, you can directly join the channel by using one of the following connection types:

- Remote connection—This type of connection uses SIP-based trunking into the RMS component, which is directly tuned into the multicast channel. This communication flows over a unicast channel that establishes a point-to-point session with the RMS.

    - When SIP-based communications are used, the RMS tracks and enforces the maximum allowable number of voice streams that the PMC can transmit.

    - When SIP-based remote connections fail, the PMC displays a visual indicator in the form of a yellow triangle next to the channel. For more information, see the "Identifying Channel Activation Issues" section on page 8-25.

Cisco IPICS may deactivate channels that are connected via remote connection if there is no traffic activity after a specified time interval, as configured in the server. To reactivate a channel after it has been deactivated, click the **Activate** button on the PMC.

- Multicast address/port—This type of connection enables the PMC to directly tune in to the multicast channel. See the "Troubleshooting Multicast Communications Issues" section on page 8-21 for information about troubleshooting multicast communications.

   - The PMC supports a maximum of three simultaneous multicast voice streams per channel or VTG.

   - The PMC does not transmit any voice streams that exceed the maximum allowable number. The PMC continually tracks the number of voice streams and transmits only when the limit is not exceeded.

   - The PMC does not provide any visual or audible indication when the channel or VTG is not transmitting.

Tip   Be sure to always monitor the receive indicator for PMC traffic so that you do not talk over other Cisco IPICS users. When the receive indicator shows activity, you are receiving traffic. If you talk while the receive indicator shows activity, you are likely not being heard.

Table 3-5 describes the PMC behavior when it stops transmitting because the maximum number of voice streams has been exceeded.

Table 3-5   *PMC Behavior When Exceeding Maximum Number of Voice Streams*

Feature	Behavior
Latching a channel	If you try to latch a channel when the maximum number of streams has been exceeded, the PTT channel button and the latch indicator highlight, as if you were transmitting. The PMC attempts to transmit at random intervals.
Latched channel	If the channel had been latched and then the PMC stops transmission because the maximum number of streams has been exceeded, the PTT channel button and the latch indicator remain highlighted, as if you were transmitting. The PMC attempts to transmit at random intervals.

Table 3-5   ***PMC Behavior When Exceeding Maximum Number of Voice Streams (continued)***

Feature	Behavior
DTMF tone transmissions	When you transmit a DTMF tone on one or more channels, the PMC does not provide any indication when it stops transmission on any one of the channels. The DTMF tone continues to play out on all channels except the channel(s) that stopped transmitting. When the PMC is able to resume transmission, it continues to play out the DTMF tone from its current point. All of the PTT channel buttons return to non-transmit mode at the end of the transmission.
Alert tone transmissions	When you transmit an alert tone on one or more channels, the PMC does not provide any indication when it stops transmission on any one of the channels. The alert tone continues to play out on all channels except the channel(s) that stopped transmitting. When the PMC is able to resume transmission, it continues to play out the alert tone from its current point. All of the PTT channel buttons return to non-transmit mode at the end of the transmission.
All Talk channel transmissions	When you transmit by using the All Talk channel, the PMC does not provide any indication when it stops transmission on any one of the channels. The voice transmission continues on all other channels except the channel(s) that stopped transmitting. When the PMC is able to resume transmission, the voice transmission continues from its current point.

Upon initial PMC login, the PMC retrieves the personalized channel list and list of defined locations from the server. A dialog box displays to prompt you to choose a location from the list. (This prompt occurs only one time per PMC instance and immediately after your initial login.) For more information about choosing your location, see the "Launching the PMC Application" section on page 2-13.

You choose a location that corresponds to the type of network access connectivity that you will use for the PMC session.

- The server uses this location to specify the type of channel communication (SIP-based unicast or multicast) that is appropriate for the location.

• In the event that you move to another location, the system allows you to explicitly change the location by choosing another available location.

⌕

Tip Your system administrator can provide instructions about how to choose the proper location. If you choose an incorrect location and you do not hear any voice traffic, choose a different location until you hear the audio on the channel. You can change your location by choosing another available location from the drop-down list box in the location selection dialog box. If no location seems appropriate, you can choose the remote location, although this location increases network resource utilization and transmission delay on the channel.

Default Location

A default location may be defined for each PMC user.

• As part of its configuration, the Cisco IPICS server communicates the default location to the PMC.

• The PMC notifies the server about whether the default location, or another system-defined location, is being used.

• The system preselects the default location, or the location that you most recently chose, in the list that displays in the location selection window.

Codec Support

Voice-compression algorithms are commonly referred to as codecs (coder/decoder). Coding involves the process of encoding a digitized signal into a more efficient form for transmission; decoding encompasses the process of restoring the coded signal to its original form.

Codecs differ in terms of voice quality, compression rate and bandwidth, ability to carry dual-tone multifrequency (DTMF) and modem traffic, and the number of channels (calls) that can be supported.

The Cisco IPICS server defines the codecs that the PMC uses on a per-channel basis and sends this information to the PMC. (The PMC may override the codec setting, if necessary.)

The PMC supports the following codecs:

- G.711—G.711 performs pulse code modulation (PCM); it is the standard digital channel that is used in the public telephone network. PCM provides no compression and it does not require any digital signal processor (DSP) resources for transcoding.

- G.729—G.729 is a medium complexity codec that compresses speech or audio signal components into 8-kbps streams. G.729 requires DSP resources for transcoding.

> **Note** Be aware that misconfigured codecs can cause an audio problem on the PMC. For more information, see the "Resolving Codec Mismatch Issues" section on page 8-26.

For more information about VoIP per-call bandwidth requirements and guidelines, refer to Voice Over IP - Per Call Bandwidth Consumption at http://www.cisco.com/en/US/tech/tk652/tk698/technologies_tech_note09186a00 80094ae2.shtml.

An interactive tool that provides guidance about how to calculate bandwidth requirements for packet voice calls is available by accessing the Voice Codec Bandwidth Calculator at http://tools.cisco.com/Support/VBC/do/CodecCalc1.do. This tool provides information about the bandwidth that is used by different codecs for various voice protocols over different types of media.

Related Topics

- Cisco IPICS System Components, page 1-3
- Architecture/Deployment, page 1-21
- Launching the PMC Application, page 2-13
- Location Support, page 3-20
- Configuring the PMC End-User Interface, page 5-1
- Troubleshooting Voice Quality Issues, page 8-14

Where to Find More Information

- *Cisco IPICS Server Administration Guide*

Supported Features