



# Planning for Personal Assistant

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Before you install Cisco Personal Assistant into your production network, you should take the time to understand it and how it fits in the rest of the IP telephony network. You should also determine the best server configuration to support your users.

Use these sections to learn about the features and components of Personal Assistant, how it works, and how it fits into your IP telephony network:

- [Understanding Personal Assistant, page 1-1](#)
- [Understanding the Personal Assistant Server and Speech-Recognition Server, page 1-12](#)
- [Creating Server Clusters, page 1-16](#)
- [Intercepting Calls with Personal Assistant, page 1-27](#)
- [Customizing Implementation of Personal Assistant, page 1-34](#)

## Understanding Personal Assistant

Personal Assistant can selectively handle your incoming calls and help you make outgoing calls. These sections provide you with an overview of Personal Assistant and its role in the IP telephony network:

- [Personal Assistant Features, page 1-2](#)
- [Understanding Cisco IP Telephony Terminology, page 1-3](#)
- [Understanding the Role of Personal Assistant in the Cisco IP Telephony Network, page 1-7](#)

- [Understanding Personal Assistant and User Interactions, page 1-10](#)

## Personal Assistant Features

Personal Assistant provides the following features:

### Rule-Based Call Routing

Personal Assistant can forward and screen incoming calls based on rules that users devise. Incoming calls can be handled according to caller ID, date and time of day, or the user's meeting status based on the user's calendar (such as office hours, meeting schedules, vacations, holidays, and so forth). Personal Assistant can also selectively route calls to other telephone numbers. Thus, an incoming call to a desk phone can be routed to a cell phone, home phone, or other phone, based on the call routing rules that your users create. An incoming call can even generate an e-mail-based page.

To use rule-based call routing, you must allow Personal Assistant to intercept incoming calls. See the [“Intercepting Calls with Personal Assistant”](#) section on [page 1-27](#) for additional information.

Your users set up these rules through a web-based interface. See [Chapter 5, “Preparing Users for Personal Assistant,”](#) for information on how users access the user interface.

### Speech-Enabled Directory Dialing

Users can dial phone numbers by telling Personal Assistant the person's name. Personal Assistant obtains the telephone number from the corporate directory or personal address book.

To use any speech-enabled feature, you must add a sufficient number of speech and license servers to your Personal Assistant installation. See the [“Creating Server Clusters”](#) section on [page 1-16](#) for additional information.

### Speech-Enabled Voice Mail Browsing

Users can use voice commands to browse, listen to, and delete voice mail messages.

### Speech-Enabled Simple Ad Hoc Conferencing

Users can initiate conference calls by telling Personal Assistant to set up a conference call with the desired participants.

## Understanding Cisco IP Telephony Terminology

Personal Assistant and other components of the IP telephony network, such as Cisco CallManager, use terminology and concepts that might not be familiar to you. These sections explain these concepts and how Personal Assistant uses them:

- [Understanding Interceptor Ports, page 1-3](#)
- [Understanding CTI Route Points and Media Ports, page 1-4](#)
- [Understanding Partitions and Calling Search Spaces, page 1-4](#)
- [Understanding Cisco CallManager Clusters, page 1-5](#)
- [Understanding How Personal Assistant Uses Directories, page 1-6](#)

## Understanding Interceptor Ports

The interceptor ports identify the telephone extensions that Personal Assistant will intercept from Cisco CallManager. You configure these ports in Cisco CallManager and identify them in the Personal Assistant server configuration. In Cisco CallManager, you must configure an interceptor port for each extension. If you have 600 extensions to be intercepted by Personal Assistant, you must configure 600 interceptor ports. In Personal Assistant, you simply identify the ranges of these extensions.

### Related Topics

- [Creating Personal Assistant Interceptor Ports, page 3-5](#)
- [Configuring Personal Assistant Servers, page 4-15](#)
- [Intercepting Calls with Personal Assistant, page 1-27](#)
- [Creating Server Clusters, page 1-16](#)

## Understanding CTI Route Points and Media Ports

When you assign a telephone number to a Personal Assistant server, you must define the extension as a Computer Telephony Integration (CTI) route point in Cisco CallManager (see the [“Setting Up the Personal Assistant Number”](#) section on page 3-7). The number you assign as the CTI route point is the telephone number your users use to access Personal Assistant.

A CTI route point is a virtual device that lets the Personal Assistant server receive multiple calls simultaneously. In contrast, a regular phone extension can only receive one call at a time; when busy with an active call, callers to the extension receive a busy signal.

When the Personal Assistant server’s phone number is defined as a CTI route point, Personal Assistant assigns incoming calls to media ports until there are no more available media ports on the server. In Cisco CallManager, you add one media port for each simultaneous Personal Assistant session you require (see the [“Adding Media Ports for Personal Assistant”](#) section on page 3-9). For example, if you need 24 simultaneous sessions, add 24 ports. Then, in the Personal Assistant server’s properties, you enter 24 as the number of media ports in the server’s properties (see the [“Server Configuration”](#) section on page A-15).

If all media ports on a Personal Assistant server are in use, subsequent callers receive a busy signal unless you have set up load balancing (see the [“Setting Up Personal Assistant Server Load Balancing”](#) section on page 1-21).

### Related Topics

- [Setting Up the Personal Assistant Number](#), page 3-7
- [Adding Media Ports for Personal Assistant](#), page 3-9
- [Configuring Personal Assistant Servers](#), page 4-15
- [Creating Server Clusters](#), page 1-16

## Understanding Partitions and Calling Search Spaces

In a Cisco CallManager setup, each telephone extension is assigned to a partition and a call search space.

A *partition* is a group of devices with similar reachability characteristics. Devices you can place in partitions include IP phones, extensions, and gateways. By default, extensions are assigned to the “none” partition. The “none” partition is a default setting in Cisco CallManager, which is treated as the null or non-existent partition.

A *calling search space* is an ordered list of partitions. When a user makes a call from an extension, the call can only be completed if the dialed number is within a partition identified in the call search space. The calling search space always includes the none partition.

Calling search spaces and partitions make it possible to separate parts of your telephone network. This can be useful if you are providing telephone service to a large building occupied by separate companies or organizations (such as an office tower).

You must configure partitions and calling search spaces in Cisco CallManager to enable Personal Assistant to intercept calls and support rule-based call routing.

#### Related Topics

- [Intercepting Calls with Personal Assistant, page 1-27](#)
- [Setting Up Personal Assistant to Intercept Calls, page 3-3](#)

## Understanding Cisco CallManager Clusters

Cisco CallManager allows you to create clusters of Cisco CallManager systems that share a common database. Cisco CallManager clusters provide a mechanism for distributing call processing seamlessly across a converged IP network infrastructure to support IP telephony, to facilitate redundancy, and to provide feature transparency and scalability.

If you are using Cisco CallManager clusters in your IP telephony network, it is important to understand how Personal Assistant interacts with them.

#### Cisco CallManager Clusters and Personal Assistant

The pool of addresses that you create in Cisco CallManager to support Personal Assistant (interceptor ports, CTI route point, and media ports) is registered with the primary Cisco CallManager server in the cluster. Each Personal Assistant server might register with multiple primary Cisco CallManager server, based on the device pool to which these route points and ports belong.

When the primary Cisco CallManager system of a media port goes down, the Personal Assistant server is notified and attempts to register with the secondary Cisco CallManager systems in the cluster, proceeding in a round-robin fashion. Once Personal Assistant establishes a connection with a secondary Cisco CallManager server, it registers the media port with it. When the primary Cisco CallManager system is online, the Personal Assistant server will re-register with it.

### Cisco CallManager Clusters and Rule-Based Call Routing

To understand how Cisco CallManager clusters affect rule-based call routing, assume that you have two users whose IP phones are configured within the same Cisco CallManager cluster. User A configures a Personal Assistant rule that forwards all her calls to User B's extension. When the call is transferred to User B, the call is not intercepted as an incoming call; it is simply transferred. Any Personal Assistant rules configured by User B do not take effect.

However, if these two users are in separate Cisco CallManager clusters, calls are not simply transferred. Instead, the transferred call from User A (in Cisco CallManager Cluster 1) is treated as an incoming call to User B (in Cisco CallManager Cluster 2). Because it is treated as an incoming call, any rules that User B has configured go into effect. This might erroneously cause calls for User A to have rules processed and applied as if they were calls to User B.

### Related Topics

- [Understanding Personal Assistant and User Interactions, page 1-10](#)
- [Intercepting Calls with Personal Assistant, page 1-27](#)

## Understanding How Personal Assistant Uses Directories

Part of the network requirements for Personal Assistant is that you have a supported LDAP directory installed. The directory contains records for each user in your organization, and includes information such as name, phone extension, e-mail address, office location, and so on. This is typically called the *corporate directory*. Personal Assistant accesses this directory when a user asks Personal Assistant to dial a number by telling Personal Assistant the person's name.

Personal Assistant also uses the directory to maintain Personal Assistant configuration information and some Personal Assistant user information (for example, a user's call routing rules and spoken name). For this information, Personal Assistant automatically uses the DC directory that is integrated in Cisco CallManager.

You can also use the DC directory as the corporate directory, but this is not required. Many installations prefer to have a corporate directory that is independent from Cisco CallManager, and Personal Assistant fully supports this separation. In fact, your corporate directory might already be integrated with Cisco CallManager. When you install Personal Assistant, you are asked to provide the location of the corporate directory.

The Personal Assistant system configuration includes a setting for unique user name attribute. This is the name of the field within your directory that is unique for each user. Ask your directory administrator for the name of this field if you do not know it. See the [“Configuring Personal Assistant Global Settings” section on page 4-2](#) for information on updating the Personal Assistant configuration with this information.

#### Related Topics

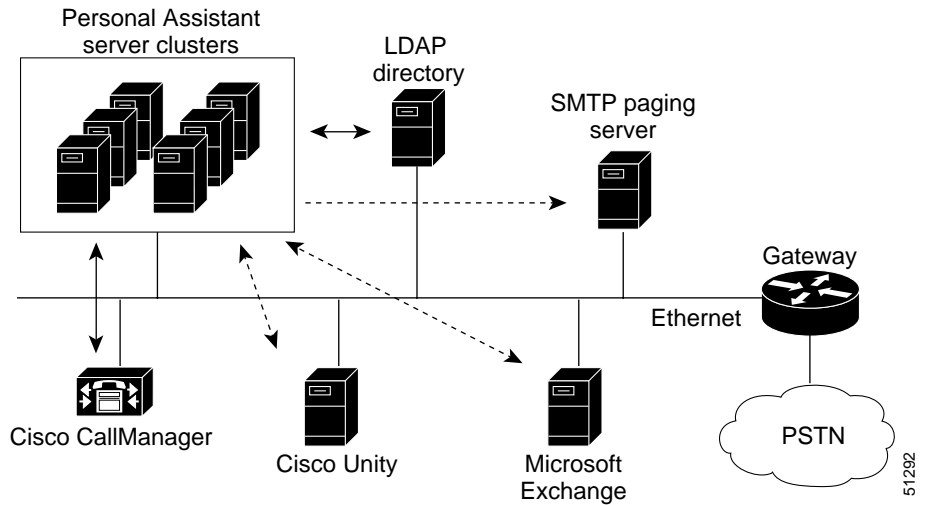
- [Personal Assistant Installation Procedures, page 2-4](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)

## Understanding the Role of Personal Assistant in the Cisco IP Telephony Network

Personal Assistant interacts with many elements in your IP telephony network. Some network elements need to be informed of Personal Assistant's presence; other elements only interact indirectly with Personal Assistant and do not require such information. You should have a fully-functional voice-over-IP network in place before installing Personal Assistant in your telephony network.

[Figure 1-1](#) illustrates Personal Assistant's connection to the IP telephony network.

Figure 1-1 Personal Assistant in the IP Telephony Network



- Personal Assistant and the target system require configuration
- Only Personal Assistant requires configuration
- ↔ Communication is two way
- Communication is one way

Table 1-1 further describes the components of the IP telephony network that are critical to using Personal Assistant

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**Table 1-1 Software Requirements for Using Personal Assistant**

System	Supported Software	Usage
Call Intercepting	Cisco CallManager 3.0(9) or higher	Cisco CallManager sends incoming calls to Personal Assistant for processing. Personal Assistant uses Cisco CallManager to connect Personal Assistant users to dialed numbers.
LDAP directory	LDAP-enabled directory services such as Cisco CallManager's integrated DC directory, Microsoft Active Directory, or Netscape Directory Services	The LDAP directory contains corporate and personal directories, with names, phone numbers, e-mail addresses, and so on. Personal Assistant uses the directory to look up numbers when a Personal Assistant user requests that Personal Assistant dial a number.
Voice mail	Cisco Unity 2.4.6 or higher	Personal Assistant connects users to their voice mailboxes, and sends incoming calls to voice mail when a Personal Assistant user's call routing rule indicates that a call should be directed to voice mail.
Personal calendar	Microsoft Exchange 5.5 or higher	Personal Assistant accesses a user's Exchange calendar when evaluating a call routing rule that includes calendar-based options.
SMTP paging server	Any SMTP-compliant e-mail paging server	Personal Assistant sends e-mail pages to a Personal Assistant user when a call routing rule indicates that the user should be paged.
Web browser application	Netscape Navigator 4.5 or Internet Explorer 5.0 or higher.	To manage and use Personal Assistant, you access web-based interfaces.

**Related Topics**

- [Configuring Personal Assistant, page 4-1](#)
- [Configuring Cisco CallManager for Personal Assistant, page 3-1](#)

# Understanding Personal Assistant and User Interactions

These sections can assist you in understanding how Personal Assistant interacts with users:

- [Understanding Interaction Terminology, page 1-10](#)
- [Understanding Incoming Call Handling, page 1-10](#)
- [Understanding Access to Personal Assistant, page 1-11](#)

## Understanding Interaction Terminology

The following terms can be useful in understanding how Personal Assistant works:

- A *grammar* includes a list of words and possible sequences in which a user can state them.
- An *utterance* is a user response or command that Personal Assistant recognizes as valid.
- A *dialog* is a prompt from Personal Assistant, followed by a response from the user.
- A *session* represents any interaction with Personal Assistant or call interception by Personal Assistant. For example, a session occurs when a user uses the dial-by-name feature (interaction), or when Personal Assistant routes a call based on a user's rule (interception).

### Related Topics

- [Fine-Tuning Speech Recognition \(Dial By Name\), page 4-5](#)
- [Dial By Name Configuration, page A-5](#)

## Understanding Incoming Call Handling

The following sequence illustrates an overview of the processes involved when incoming calls arrive at extensions configured to use Personal Assistant:

1. An incoming call arrives at a Personal Assistant-enabled number.
2. Because an interceptor port is configured for this extension, Cisco CallManager routes the call to Personal Assistant.

3. Personal Assistant retrieves user information from the LDAP directory.
4. If the user has configured rules, the rules initiate depending on the type of destination included in the rules:
  - Calendar information—Personal Assistant accesses information from the Exchange Server.
  - An e-mail or page—Personal Assistant sends e-mail using the messaging system.
  - Phone number—Personal Assistant transfers the call through Cisco CallManager.

#### Related Topics

- [Understanding Access to Personal Assistant, page 1-11](#)
- [Intercepting Calls with Personal Assistant, page 1-27](#)

## Understanding Access to Personal Assistant

The following sequence illustrates an overview of the processes involved when users access Personal Assistant:

1. Users dial the Personal Assistant's number (the extension of the CTI route-point configured for Personal Assistant in Cisco CallManager).
2. The call is routed to the first available media port. If no port is available, the call is rejected.
3. If a media port is available, the speech channel opens, and Personal Assistant plays a welcome prompt. Users can then dial other users by name or access voice mail.

If speech resources are not available, Personal Assistant opens a non-speech session with the user, enabling the user to use the telephone keypad for touch-tone dial-by-name.

4. If users use dial-by-name to call another user:
  - a. User states: "Call 'John Smith'."
  - b. The command is received and processed by the speech-recognition server.

- c. The user name is passed to Personal Assistant, and Personal Assistant retrieves user information from the LDAP directory.
- d. Based on the confidence level, Personal Assistant either prompts the user, or transfers the call.

#### Related Topics

- [Fine-Tuning Speech Recognition \(Dial By Name\), page 4-5](#)
- [Understanding Incoming Call Handling, page 1-10](#)

## Understanding the Personal Assistant Server and Speech-Recognition Server

Personal Assistant has a modular structure, which allows you to install various pieces of the product on different server platforms. This provides a fault-tolerant redundant structure that you need for ensuring that the Personal Assistant system is always available to your users.

These sections provide information about the Personal Assistant servers and their interactions with each other:

- [Understanding the Speech-Recognition Server, page 1-12](#)
- [Understanding the Personal Assistant Server, page 1-13](#)
- [Understanding the License and Resource Managers, page 1-14](#)
- [Understanding the Interactions of the Personal Assistant Server and Speech-Recognition Server, page 1-15](#)

## Understanding the Speech-Recognition Server

If you plan to implement any of the speech-enabled features of Personal Assistant, you must install at least one speech-recognition server. During installation, you are given the option to install a speech-recognition server, and you can either install it on the same system as the Personal Assistant server or on a separate one.

The speech-recognition server prompts users and recognizes users' responses based on a pre-defined grammar, which includes a list of words and possible sequences in which a user can state them. The online help included with the Personal Assistant end-user interface helps define this grammar, using examples of valid prompts and responses.

For specific items, such as user names in the corporate directory, the grammar is generated and automatically compiled during the server refresh (see the [“Configuring Personal Assistant Global Settings”](#) section on page 4-2). As new users are added to the directory, their names are automatically recognized after the refresh.

#### Related Topics

- [Configuring Personal Assistant Global Settings, page 4-2](#)
- [Creating Server Clusters, page 1-16](#)

## Understanding the Personal Assistant Server

The Personal Assistant server manages the interaction between the user and Personal Assistant, processes call routing and dial rules, and manages the overall configuration of the Personal Assistant system.

You must install the Personal Assistant server during installation, and you manage its functions and processes from the administrator web-based interface (see the [“Logging Into and Out of the Personal Assistant Administration Interface”](#) section on page 4-1 for information about accessing the interface).

You can have more than one Personal Assistant server configured. In fact, you should do this if you want to provide failover protection (see the [“Creating Server Clusters”](#) section on page 1-16 for details). When you configure multiple Personal Assistant servers, one acts as the primary server; the primary server is selected automatically based on alphabetical order.

#### Related Topics

- [Understanding the Interactions of the Personal Assistant Server and Speech-Recognition Server, page 1-15](#)
- [Configuring Personal Assistant Servers, page 4-15](#)
- [Creating Server Clusters, page 1-16](#)

## Understanding the License and Resource Managers

The license and resource managers are subcomponents of the Personal Assistant server; they are installed with it. However, they actually work in conjunction with the speech-recognition and Personal Assistant servers. Although the license manager and resource managers provide different services, they are closely linked, in that every system that functions as a license manager also functions as a resource manager.

### License Manager

The license manager maintains the license for the speech-recognition software. The speech-recognition servers only work if there is at least one active license manager with a valid license. Although every Personal Assistant server includes a license manager, not every Personal Assistant server needs to have an active license manager.

You only need one license manager within a single Personal Assistant server cluster, although Cisco recommends that you define two license managers for redundancy.

### Resource Manager

The resource manager manages the interaction between the Personal Assistant server cluster and the speech-recognition servers in the speech-recognition server cluster. Although every Personal Assistant server includes a resource manager, only one resource manager is used as the active connection between the Personal Assistant server cluster and the speech-recognition server cluster. Personal Assistant automatically chooses the resource manager to be used, and if that manager becomes disabled, another resource manager takes over.

Once a resource manager establishes a connection between a Personal Assistant server and an available speech-recognition server for a particular call, the Personal Assistant server and speech-recognition server interact directly for the duration of that call. The resource manager is not a permanent communication link between the servers.

The resource manager does not manage communication between Personal Assistant servers; Personal Assistant servers communicate directly.

You only need one resource manager within a single Personal Assistant server cluster, although Cisco recommends that you define two resource managers for redundancy.

### Related Topics

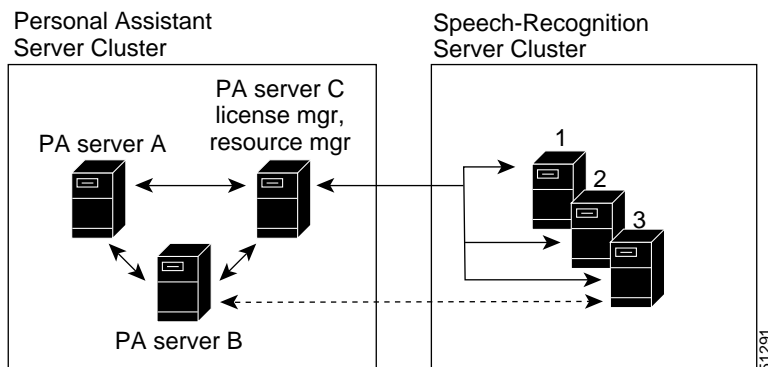
- [Understanding the Interactions of the Personal Assistant Server and Speech-Recognition Server, page 1-15](#)
- [Creating Server Clusters, page 1-16](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)

## Understanding the Interactions of the Personal Assistant Server and Speech-Recognition Server

Personal Assistant separates the speech-recognition functions from call routing and other basic functions of the Personal Assistant server. Because these functions are separate, you must configure the interaction between the cluster of Personal Assistant servers and the cluster of speech-recognition servers. This section describes how the clusters interact, and what you need to do to enable the interaction.

[Figure 1-2](#) illustrates the Personal Assistant server structure. The dotted line between Personal Assistant server B and speech-recognition server 3 illustrates the direct interaction between these servers after the connection is established through the resource manager on Personal Assistant server C.

**Figure 1-2** *Personal Assistant Server Structure*



This illustration assumes that you are installing Personal Assistant servers and speech-recognition servers on separate platforms. However, you can install the Personal Assistant servers and speech-recognition servers on the same platform.

When installed on the same platform, the servers still establish communications through a resource manager, even if the resource manager is on the same system. In fact, you could create a redundant Personal Assistant speech cluster with two systems, each running a Personal Assistant server, license manager, and speech-recognition server. Logically, this minimal cluster looks the same as the one illustrated in [Figure 1-2](#).

To enable the interaction between the Personal Assistant servers and speech-recognition servers, you must identify the license managers to a Personal Assistant server. See the [“Configuring Personal Assistant Global Settings” section on page 4-2](#) for information on how to do this.

#### Related Topics

- [Understanding the Personal Assistant Server and Speech-Recognition Server, page 1-12](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)
- [Configuring Personal Assistant Servers, page 4-15](#)

## Creating Server Clusters

Personal Assistant servers and speech-recognition servers work together in server clusters. This makes it possible to share the load among servers, and to set up failover relationships so that if a server becomes disabled, another server can take over with minimal interruption for your users.

To set up the server clusters, you must:

1. Determine your server and speech-recognition requirements and install the Personal Assistant server and speech-recognition software on an appropriate number of servers.

The number of servers required is based on the number of sessions each server supports, the number of users you are supporting, and how many users you are willing to support per session.

2. Configure the Personal Assistant servers.

During server configuration, you can configure the Personal Assistant servers either to balance the call load among themselves or to support failover. If you use failover, you need more servers than you would otherwise need for a given number of media ports.

### 3. Configure the speech-recognition servers.

You must also identify at least one license manager for the speech software. The speech software requires an active, valid license be available at all times for it to work. See the [“Configuring Personal Assistant Global Settings” section on page 4-2](#) for information about adding speech-recognition servers to the server cluster.

See these topics for detailed discussions on determining the number of Personal Assistant servers required, how to use load balancing, and how failover affects your calculations:

- [Determining the Required Number of Personal Assistant Servers and Speech-Recognition Servers, page 1-17](#)
- [Setting Up Personal Assistant Server Load Balancing, page 1-21](#)
- [Creating a Personal Assistant Server Cluster With Failover, page 1-24](#)

## Determining the Required Number of Personal Assistant Servers and Speech-Recognition Servers

The quantity of servers you install should be adequate to support the number of sessions defined in the Personal Assistant server cluster (that is, the sum of sessions on all active Personal Assistant servers in the cluster).

The number of Personal Assistant servers and speech-recognition servers that are required in your clusters depends on several factors:

- The number of concurrent calls to Personal Assistant that you need to support. For example, a sales and marketing organization that is very telephone-dependent would probably need more servers than an engineering group that uses the telephone less frequently.

When considering this, you should make separate calculations of the number of simultaneous sessions with Personal Assistant and the number of simultaneous sessions with the speech-recognition server. For example:

- Call-interception sessions—how many users are likely to set up rules to enable Personal Assistant to intercept calls for them.
- Speech-recognition sessions—how many users are going to be accessing voice mail and dialing other users by name.

- The server model you are using. A more powerful server can support more concurrent calls than a less powerful server.
- Whether you are running the Personal Assistant servers and speech-recognition servers on the same system. Running both servers on a single system reduces the number of concurrent calls the server can support.
- Whether you are enabling automatic failover for Personal Assistant server redundancy. Failover ensures that if a server goes down, another server takes over the failed server's responsibilities. If you configure failover, you should only enable half of the ports that would otherwise be supported on a server.

Because you can easily add and remove servers from a cluster, you do not have to be precise on your first estimate. As users become familiar with Personal Assistant, and their use of Personal Assistant increases, you can add servers to accommodate the increased usage.

#### Related Topics

- [Understanding the Personal Assistant Server and Speech-Recognition Server, page 1-12](#)
- [Configuring Personal Assistant Servers, page 4-15](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)
- [Using the Session Estimates in Your Planning, page 1-20](#)
- [Understanding the Estimated Number of Simultaneous Sessions, page 1-18](#)

## Understanding the Estimated Number of Simultaneous Sessions

[Table 1-2](#) explains the estimated number of simultaneous sessions supported on each server platform, based on server model and session type. Depending on your particular system usage, though, these values can vary considerably. Use the information in [Table 1-2](#) as a starting point to estimate your server needs.

**Table 1-2** Estimated Number of Simultaneous Sessions

Server Installation	MCS-7825-800		MCS-7835-1000	
	Interceptor Ports <sup>1</sup>	Media Ports <sup>2</sup>	Interceptor Ports <sup>1</sup>	Media Ports <sup>2</sup>
Personal Assistant server and speech-recognition server installed on <i>different</i> systems	50 sessions	24 sessions	70 sessions	36 sessions <sup>3</sup>
Personal-Assistant server and speech-recognition server installed on the <i>same</i> system	22 sessions	20 sessions <sup>3</sup>	30 sessions	24 sessions

1. Cisco suggests that you estimate approximately 25 users per session using interceptor ports.
2. Cisco suggests that you estimate approximately 50 users per session using media ports.
3. These estimates represent the system capacities and might not necessarily reflect the number of licenses you have purchased.

When evaluating the information in [Table 1-2](#), keep in mind that:

- Media port sessions indicate how many simultaneous sessions use speech-recognition features such as dialing by name, browsing voice mail, and initiating conference calls. In these sessions, users are directly interacting with Personal Assistant.
- Interceptor port sessions indicate how many simultaneous sessions involve Personal Assistant intercepting incoming calls for users. In these sessions, once users have configured their dial rules, they do not directly interact with Personal Assistant. Personal Assistant seamlessly routes the incoming calls based on the dial rules.
- As an initial guideline, Cisco suggests that you estimate approximately 25 users per call interception session, and approximately 50 users per speech-recognition session.

#### Related Topics

- [Understanding the Personal Assistant Server and Speech-Recognition Server, page 1-12](#)
- [Configuring Personal Assistant Servers, page 4-15](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)
- [Using the Session Estimates in Your Planning, page 1-20](#)

## Using the Session Estimates in Your Planning

To estimate how many ports you need to support your users, consider the following example:

1. Determine the number of users, for example 1750.
2. Choose a server, for example the MCS-7835-1000.
3. Determine how to install the Personal Assistant components, for example, whether you want the Personal Assistant the Personal Assistant server and speech-recognition servers on separate systems.
4. Determine how many sessions you must support for your users:
  - 1750 users divided by 25: 70 call-interception sessions
  - 1750 users divided by 50: 35 speech-recognition sessions

You need enough servers to support at least this number of sessions. When you configure the servers, you specify the actual number of ports in use, so if you intend to use fewer than the maximum, take this into consideration when determining the number of servers that you need.

5. Use the information in [Table 1-2](#) to determine that if you install the Personal Assistant server and the speech-recognition server on separate MCS-7835-1000 systems (for a total of two systems) you can support:
  - 70 call-interception sessions
  - 36 speech-recognition sessions

Therefore, you can support 1750 users using two MCS-7835-1000 systems: one system for the Personal Assistant server and one system for the speech-recognition server.

6. Be sure to add the servers using the Personal Assistant administrative interface:
  - Add the speech-recognition servers to the System Configuration settings. See the [“Configuring Personal Assistant Global Settings”](#) section on [page 4-2](#).
  - Add the Personal Assistant servers to the Server Configuration settings. See [“Configuring Personal Assistant Servers”](#) section on [page 4-15](#).

7. You also must add the number of supported ports using the Personal Assistant administrative interface:
  - Add the supported number of media ports in the Server Configuration settings. See [“Configuring Personal Assistant Servers” section on page 4-15](#). Although your selected server configuration supports up to 36 ports, you only need 35 ports for your users; enter 35.
  - Add the range of interceptor port addresses in Server Configuration settings. See [“Configuring Personal Assistant Servers” section on page 4-15](#). In this setting, enter the total range of interceptor port addresses for all 1750 users. Although your configuration supports 70 simultaneous sessions, you must include the entire range of users using Personal Assistant.
8. Consider configuring load balancing (see [“Setting Up Personal Assistant Server Load Balancing” section on page 1-21](#)) or adding failover servers (see [“Creating a Personal Assistant Server Cluster With Failover” section on page 1-24](#)) for greater redundancy.

#### Related Topics

- [Understanding the Estimated Number of Simultaneous Sessions, page 1-18](#)
- [Understanding the Personal Assistant Server and Speech-Recognition Server, page 1-12](#)
- [Configuring Personal Assistant Servers, page 4-15](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)

## Setting Up Personal Assistant Server Load Balancing

A single Personal Assistant server can handle a number of simultaneous sessions, that you define when you set the number of media ports (see the [“Server Configuration” section on page A-15](#)). When all media ports are being used, new callers receive a busy signal from Personal Assistant unless you set up load balancing among the Personal Assistant servers in each Personal Assistant server cluster.

Because there are no failover servers, if a Personal Assistant server becomes disabled, no other server takes over the disabled server's media ports. This reduces the number of available simultaneous sessions with Personal Assistant. However, you can set up load balancing in the cluster to mitigate the effects of a disabled server.

To create a simple Personal Assistant server cluster, do not specify failover servers in the server configurations when you configure each server through the Personal Assistant administration interface. (See the [“Configuring Personal Assistant Servers”](#) section on page 4-15 for information on configuring the Personal Assistant servers into a cluster, and the [“Server Configuration”](#) section on page A-15 for reference information on the server configuration settings.)

## Configuring Load Balancing

Personal Assistant load balancing is based on the “call forward busy” and “call forward no answer” numbers assigned to each Personal Assistant server's telephone number (CTI route point). If you configure these settings correctly in Cisco CallManager, the Personal Assistant servers in the cluster can answer calls for busy servers without the knowledge of your users.

If you create a chain of servers, your users will only need one telephone number to reach Personal Assistant. This can make it easier for your users to use Personal Assistant.

[Table 1-3](#) shows an example setup in which three Personal Assistant servers are chained so that they share the call load. In this example, users have been told to call extension 5600 to reach Personal Assistant. If Personal Assistant Server 1 has an available media port, it handles an incoming call. If it does not have an available media port, the call is forwarded to 5700 (Personal Assistant Server 2). If Personal Assistant Server 2 has an available media port, it handles the call; otherwise, the call is forwarded to 5800 (Personal Assistant Server 3). If Personal Assistant Server 3 does not have an available media port, the call is forwarded to 5600 (Personal Assistant Server 1). Users can also reach Personal Assistant by calling Personal Assistant Server 2 or 3 directly.

**Table 1-3 Personal Assistant Server Load Balancing**

Cisco CallManager Setting	Personal Assistant Server 1	Personal Assistant Server 2	Personal Assistant Server 3
CTI route point (telephone number)	5600	5700	5800
call forward busy	5700	5800	5600
call forward no answer	5700	5800	5600

**Related Topics**

- [Understanding the Effect on Users Accessing Personal Assistant, page 1-23](#)
- [Understanding the Effect on Rule-Based Call Routing, page 1-24](#)
- [Determining the Required Number of Personal Assistant Servers and Speech-Recognition Servers, page 1-17](#)
- [Configuring Personal Assistant Servers, page 4-15](#)
- [Configuring Personal Assistant Global Settings, page 4-2](#)

**Understanding the Effect on Users Accessing Personal Assistant**

Using load balancing without a failover server, if a Personal Assistant server becomes disabled, all calls that the server is currently handling are cut off. However, Personal Assistant has already completed its role in the call process (for example, transferred a call based on call-routing rules), the call remains in progress. Subsequent calls to the disabled server are forwarded to another server based on the “call forward no answer number” configured in Cisco CallManager. However, the number of available simultaneous sessions is reduced because the active server must support the sessions from the disabled server in addition to its normal load.

**Related Topics**

- [Configuring Load Balancing, page 1-22](#)
- [Determining the Required Number of Personal Assistant Servers and Speech-Recognition Servers, page 1-17](#)
- [Configuring Personal Assistant Servers, page 4-15](#)

## Understanding the Effect on Rule-Based Call Routing

If you are not using failover servers, and a Personal Assistant server becomes disabled, the interceptor ports registered with that particular server are unavailable. Because the remaining servers were not configured as failover servers, these interceptor ports cannot re-register with these servers. Instead, Personal Assistant cannot intercept calls for these extensions. Thus, all rule-based call routing for the affected users will be unavailable and all calls will ring directly through to the users' extensions.

### Related Topics

- [Configuring Load Balancing, page 1-22](#)
- [Determining the Required Number of Personal Assistant Servers and Speech-Recognition Servers, page 1-17](#)
- [Configuring Personal Assistant Servers, page 4-15](#)

## Creating a Personal Assistant Server Cluster With Failover

If load balancing, as explained in the [“Setting Up Personal Assistant Server Load Balancing” section on page 1-21](#), does not provide you with sufficient redundancy, you can configure failover servers in the Personal Assistant cluster.

If you are using failover and a Personal Assistant server becomes disabled, the failover server takes control of the media ports and interceptor ports that were configured on the disabled server. For example, if you configured 15 media ports on the disabled server, the failover server would add 15 media ports to its configuration. Thus, if you use failover servers, you must have twice as many servers for a given number of media ports as would be required if you were not using failover servers.

Although the failover server takes on the media and interceptor ports of the disabled server, it cannot take over active calls. Any active user calls on the disabled server are dropped. However, if Personal Assistant has completed its role in the call process (for example, it had transferred a call based on call-routing rules), the call remains in progress.

In addition to taking over the disabled server's ports, the failover server registers itself with Cisco CallManager as the disabled server's CTI route point.

When the disabled server becomes active again, it asks the failover server to return its ports. The failover server returns the ports as they become available; no active user calls are dropped. When the reactivated server regains all media ports, it reregisters itself as the CTI route point with Cisco CallManager.

There are two main techniques for setting up failover servers:

- [Using Active Personal Assistant Servers for Failover, page 1-25](#)
- [Using Spare Personal Assistant Servers for Failover, page 1-26](#)

## Using Active Personal Assistant Servers for Failover

When you use an active Personal Assistant server as a failover server, the server works as a regular Personal Assistant server managing calls with users. The server is not idle.

However, if the primary server becomes disabled, the failover server must be able to handle the media and interceptor ports of the disabled server, as well as its own. Thus, you must have sufficient capacity on the failover server to accommodate the ports defined on the disabled server.

For example, if you are using two MCS-7835-1000 Personal Assistant servers, each server supports a maximum of 36 media ports (see [Table 1-2](#)). If you use the servers as failover servers for each other, you must reduce the media ports on each server to no more than 18. So, if server A goes down, server B will take over server A's 18 ports, and server B will temporarily run with 36 ports (its original 18 plus server A's 18).

If you defined more than 18 ports on server A and server B, the servers will not be able to take on the full load of the other server if it becomes disabled. For example, if you define 18 ports on server A and 24 on server B, and server A fails, Personal Assistant assigns 42 ports to B. If the simultaneous call load exceeded 36, calls would be dropped (since each server supports a maximum of 36 media ports) and the quality of service experienced by your users would deteriorate.

In general, if you use active Personal Assistant servers as failovers, you should divide the ports per server in half, and double the number of Personal Assistant servers in the cluster.

Although you can assign more than one Personal Assistant server to handle failover for any given server (for example, server A could use server B and server C as failovers), only one server is actually used if a server becomes disabled. The disabled server's ports are not distributed among the designated failover servers.

### Related Topics

- [Configuring Personal Assistant Servers, page 4-15](#)
- [Server Configuration, page A-15](#)

## Using Spare Personal Assistant Servers for Failover

When you use a spare Personal Assistant server as a failover server, it sits idle unless an active server becomes disabled.

To create a spare server, do not define a CTI route point in Cisco CallManager for that server. When an active server becomes disabled, the spare server registers itself with Cisco CallManager as the CTI route point, in place of the disabled server.

When adding a spare server to a Personal Assistant server cluster, do not define any media ports or enter an interceptor port address range (see the “[Server Configuration](#)” section on page A-15). This prevents the server from being used for anything except failover.

Because a spare failover server does not have any active ports, it can take over for a fully-loaded Personal Assistant server. For example, if you are using MCS-7835-1000 systems for your active and spare servers, you can configure 36 media ports on the active server. If the active server becomes disabled, the spare will be able to take over the 36 media ports.

Because servers should become disabled infrequently, you can have fewer failover servers than you have active servers. For example, you might define two failover servers for six active servers. The ratio you use depends on your network reliability and uptime service level agreements. The key is that a failover server must be able to take over all the media ports you define on an active server.

### Related Topics

- [Configuring Personal Assistant Servers, page 4-15](#)
- [Server Configuration, page A-15](#)

# Intercepting Calls with Personal Assistant

Personal Assistant interacts with Cisco CallManager to intercept incoming calls to users' extensions. By intercepting these calls, Personal Assistant can redirect them based on user's rules. For example, a user can configure a rule that instructs Personal Assistant to send all incoming calls to voice mail.

Although Cisco CallManager does not require that you set up partitions, you must create partitions if you install Personal Assistant and want to enable rule-based call routing and allow Personal Assistant to intercept users' calls.

If you are not yet using these partition and calling search spaces in Cisco CallManager, the following examples provide tips on setting them up with the minimum amount of effort. If you do not want to set up and configure partitions, and calling search spaces, Personal Assistant cannot intercept users' calls. You can, however, still use the speech features provided by Personal Assistant, such as dial-by-name and speech-enabled voice mail access (see the [“Understanding the Speech-Recognition Server”](#) section on page 1-12).

These sections provide examples of using partitions and calling search space in your IP telephony network before and after adding Personal Assistant:

- [Using Partitions and Calling Search Spaces Without Personal Assistant, page 1-28](#)
- [Defining Partitions and Call Search Spaces for Personal Assistant, page 1-30](#)

## Using Partitions and Calling Search Spaces Without Personal Assistant

To illustrate partitions and calling search spaces, consider this simple example in which partitions and calling search spaces are used without Personal Assistant:

1. First, create partitions to support lobby phones, employee phones, and all calls destined for the PSTN.

Partition Name	Designated Devices Assigned to Partition
Lobby	All lobby phones
Employee	All employee IP phones
PSTN	All externally destined route patterns (local PSTN)

2. Next, create the calling search spaces and assign partitions to them, providing different services. For example, you do not want to allow external calls from the lobby phones, so you limit the cssLobby calling search space to include only the Employee and Lobby partitions.

Calling Search Space	Partitions	Assigned To
cssLobby	Employee Lobby	Devices (such as lobby IP phones) that can dial internal numbers and access Personal Assistant.
cssEmp	Lobby Employee PSTN	Devices (such as employee IP phones) that can dial internal and external numbers and access Personal Assistant.
cssGW	Lobby Employee	PSTN voice gateway used for outside callers to access lobby phones, employees, and Personal Assistant.

- Assign these partitions and calling search spaces to individual's extensions.

Cisco CallManager Setting	User A	User B	User C	User D
Telephone extension	1006	1005	1200	5555
Partition	Employee	Employee	Lobby	PSTN
Calling search space	cssEmp	cssEmp	cssLobby	cssGW

- Finally, put all this information together to understand what happens when the users attempt to call each other.

When 1200 dials 1006, Cisco CallManager looks in the cssLobby calling search space, which includes both the Employee and Lobby partitions, so, the call goes through successfully.

However, if 1200 dials 5555, the call is not completed, because 5555 exists in the PSTN partition, and cssLobby does not include the PSTN partition. Effectively, this means that people using the lobby telephone cannot make outside calls.

On the other hand, 5555 can dial 1200, because its CSS (cssGW) includes the partition for 1200 (Lobby).

To understand how Personal Assistant uses partitions and call search spaces to intercept a user's calls, see the [“Defining Partitions and Call Search Spaces for Personal Assistant”](#) section on page 1-30.

#### Related Topics

- [Understanding Partitions and Calling Search Spaces, page 1-4](#)
- [Setting Up Cisco IP Phone Route Plans, page 3-2](#)

## Defining Partitions and Call Search Spaces for Personal Assistant

You need to update partitions and calling search spaces in Cisco CallManager to support Personal Assistant. If you are already using these features, you simply need to update your existing settings and add ones specific to Personal Assistant. If you are not currently using these features in Cisco CallManager, you must add a minimal set to enable Personal Assistant to intercept calls.

These sections provide examples of using partitions and calling search spaces with Personal Assistant:

- [Adding Personal Assistant to Existing Partitions, page 1-30](#)
- [Adding Personal Assistant without Previously Defined Partitions, page 1-32](#)

### Adding Personal Assistant to Existing Partitions

To understand how Personal Assistant uses partitions and calling search spaces, recall that in the previous example we had configured partitions (Employee, Lobby, and PSTN) and calling search spaces (cssLobby, cssEmp, and csGW). To add Personal Assistant to this scenario, you must do the following:

1. Create a Personal Assistant partition, such as **PA**.
2. Add the PA partition to the cssLobby, cssEmp, and cssGW calling search spaces. Be sure to add the PA partition to the top of the list to force Cisco CallManager to search the PA partition first.
3. Create the calling search space for Personal Assistant, such as **cssPA**.

Calling Search Space	Partitions	Assigned To
cssLobby	PA Employee Lobby	Devices (such as lobby IP phones) that can dial internal numbers and access Personal Assistant.
cssEmp	PA Lobby Employee PSTN	Devices (such as employee IP phones) that can dial internal and external numbers and access Personal Assistant.
cssGW	PA Lobby Employee	PSTN voice gateway used for outside callers to access lobby phones, employees, and Personal Assistant.
cssPA	Lobby Employee PSTN	Devices that interact directly with the Personal Assistant server.

4. Using the example from the [“Using Partitions and Calling Search Spaces Without Personal Assistant”](#) section on page 1-28, add the following to Cisco CallManager:
  - CTI route point (to access Personal Assistant)
  - Media ports (to support Personal Assistant sessions)
  - Interceptor ports (to intercept incoming calls)

Cisco CallManager Setting	User A	User B	CTI Route Point	Media Port	Interceptor Port
Telephone extension	1006	1005	4000	5001	1005
Partition	Employee	Employee	Employee	Employee	PA
Calling search space	cssEmp	cssEmp	cssPA	cssPA	cssPA

5. With Personal Assistant now added to this example, you can understand how users’ calls are intercepted.

User A calls User B. Cisco CallManager recognizes that User B has `cssEmp` as its calling search space, which includes the PA partition, indicating that Cisco CallManager should send the call to Personal Assistant. Therefore, Cisco CallManager routes the call to Personal Assistant.

When Personal Assistant intercepts the call to User B (1005), it processes User B's call routing rules and applies whatever rule is appropriate. If no rule applies, or if the rule instructs Personal Assistant to transfer User B's calls to User A's telephone, Personal Assistant transfers the call to 1006.

If the call is transferred from User B (1005) to User A (1006), Personal Assistant does not intercept the transferred call because the interceptor port for extension 1005 has a calling search space of `cssPA`, which does not contain the PA partition. Instead, Cisco CallManager routes the call directly to User A's phone without applying any rules. The exception to this is if the two users are in different Cisco CallManager clusters (see the [“Understanding Cisco CallManager Clusters”](#) section on page 1-5 for details.

#### Related Topics

- [Understanding Partitions and Calling Search Spaces, page 1-4](#)
- [Understanding Cisco CallManager Clusters, page 1-5](#)
- [Defining Partitions and Call Search Spaces for Personal Assistant, page 1-30](#)
- [Setting Up Personal Assistant to Intercept Calls, page 3-3](#)

## Adding Personal Assistant without Previously Defined Partitions

If you are not already using partitions, then you must create a minimal set in order to implement rule-based call routing using Personal Assistant.

Although you have not yet created any partitions or calling search spaces specific to your needs, all your IP phones currently exist in the `none` partition by default in Cisco CallManager. Because the `none` partition exists in all calling search spaces, you can selectively enable Personal Assistant for different extensions. If Personal Assistant is not intercepting the dialed number, Cisco CallManager will find the number in the `none` partition, and ring the appropriate telephone.

You can selectively support Personal Assistant depending on how you assign the partitions and calling search spaces. Consider this example:

1. First, create at least two partitions:
  - AllPhones (for phones, including employees, lobby, PSTN)
  - PA (for Personal Assistant)
2. Next, create at least two calling search spaces:
  - cssPA—add the AllPhones partition to it
  - cssPhones—add the PA and AllPhones partitions to it.
3. Then add the following to Cisco CallManager:
  - CTI route point (to access Personal Assistant)
  - Media ports (to support Personal Assistant sessions)
  - Interceptor ports (to intercept incoming calls)
4. Update each IP phone extension with the new AllPhones partition and the cssPhones calling search space.

If you do not want to enable Personal Assistant on a particular phone (such as a lobby phone), you can leave the extension assigned to the none partition, but you must update the calling search space.

If you need to update hundreds or thousands of users' extensions, consider using the Cisco CallManager Bulk Administration Tool (BAT).

Cisco CallManager Setting	User A	User C	CTI Route Point	Media Port	Interceptor Port
Telephone extension	1006	1200	4000	5001	1006
Partition	AllPhones	none	AllPhones	AllPhones	PA
Calling search space	cssPhones	cssPhones	cssPA	cssPA	cssPA

5. It is important to understand how these changes affect User A and User C.

In this example, we have reconfigured User A's phone (1006) to use Personal Assistant by adding it to the AllPhones partition. We have also left User C's phone (1200) in the none partition. Finally, we have updated everyone's calling search space to search the Personal Assistant partition.

These changes enable User A's call routing rules to be applied to all incoming calls. To complete User A's configuration, we have also placed the 1006 extension in a partition (Allphones), and told Personal Assistant to intercept calls to 1006 (the Personal Assistant interceptor route address).

Now, when 1200 dials 1006, Cisco CallManager searches the Personal Assistant partition, and finds that it belongs to the Personal Assistant server. Personal Assistant receives the call, processes the user's rules and, if appropriate, rings the real 1006 extension.

Conversely, if 1006 dials 1200, Cisco CallManager searches the Personal Assistant partition but does not find extension 1200. Cisco CallManager then searches the none partition, finds 1200, and rings User C's telephone.

#### Related Topics

- [Understanding Partitions and Calling Search Spaces, page 1-4](#)
- [Understanding Cisco CallManager Clusters, page 1-5](#)
- [Defining Partitions and Call Search Spaces for Personal Assistant, page 1-30](#)
- [Setting Up Personal Assistant to Intercept Calls, page 3-3](#)

## Customizing Implementation of Personal Assistant

Personal Assistant provides users with the ability to access their voice mail, to call other users using speech commands, and to configure rules for handling incoming calls. If you choose not to use some of these features, the following sections can assist you in determining what you need to do:

- [Using Personal Assistant Without Speech Recognition, page 1-34](#)
- [Using Personal Assistant without Rule-Based Call Routing, page 1-35](#)

## Using Personal Assistant Without Speech Recognition

You can use Personal Assistant without using the speech-recognition capability. Without speech recognition, your users can only interact with Personal Assistant using the touch-tone interface. Thus, instead of talking to Personal Assistant, the user must learn the key sequences required to navigate through voice mail, and they must spell out names using the keypad.

If you do not want to use speech recognition, do not install speech-recognition servers.

#### Related Topics

- [Understanding Personal Assistant, page 1-1](#)
- [Understanding the Personal Assistant Server and Speech-Recognition Server, page 1-12](#)

## Using Personal Assistant without Rule-Based Call Routing

If you do not allow Personal Assistant to intercept incoming calls, you can use Personal Assistant without rule-based call routing. Without rule-based call routing, your users cannot have Personal Assistant intercept and handle their incoming calls.

If you do not want to use rule-based call routing, do not configure partitions and calling search spaces in Cisco CallManager. You also do not need to configure intercept ports. However, if you use speech recognition, you must configure the CTI route point and media ports in Cisco CallManager.

#### Related Topics

- [Understanding Personal Assistant, page 1-1](#)
- [Intercepting Calls with Personal Assistant, page 1-27](#)

