



Planning for Personal Assistant

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 the following 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 1-8](#)
- [Creating Server Clusters, page 1-10](#)
- [Intercepting Calls with Personal Assistant, page 1-16](#)
- [Customizing Implementation of Personal Assistant, page 1-23](#)
- [Preventing Toll Fraud, page 1-24](#)

Understanding Personal Assistant

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

- [Personal Assistant Features, page 1-1](#)
- [Cisco IP Telephony Terminology, page 1-3](#)
- [Role of Personal Assistant in the Cisco IP Telephony Network, page 1-5](#)
- [Personal Assistant and User Interactions, page 1-7](#)

Personal Assistant Features

Personal Assistant provides the following features:

Follow-Me Call Transferring

Users can tell Personal Assistant to use an alternate phone number as their primary location for a period of time. Personal Assistant routes calls to the follow-me phone. For example, a user could route calls to a hotel room phone during a business trip.

Proxy Access

Users can give other users permission to access and manage their Personal Assistant accounts.

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 meeting status of the user based on the user calendar (considering information such as office hours, meeting schedules, vacations, or holidays). Personal Assistant can also selectively route calls to other phone 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 1-16](#) for additional information.

Your users set up these rules through a web-based interface, and activate different sets of rules through the interface or by talking to Personal Assistant over the phone. See [Chapter 5, “Preparing Users for Personal Assistant,”](#) for information on how users access the user interface.

Simple Automated Attendant for Dial by Name

You can set up a simple automated attendant to allow callers to reach people by saying their names rather than having to know their phone numbers. See the [“Creating a Simple Automated Attendant” section on page 4-15](#) for more information.

Speech-Enabled Directory Dialing

Users can dial phone numbers by telling Personal Assistant the applicable name. Personal Assistant obtains the phone 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 1-10](#) for additional information.

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 or groups.

Speech-Enabled Voice-Mail Browsing

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

Support for Multiple Locales

You can support users or outside callers who speak different languages. For your users, Personal Assistant uses the language they select through the user web interface. If you create a Personal Assistant automated attendant, callers can switch between supported locales.

Systemwide Rules

You can set up rules to apply to all calls that come through the Personal Assistant system. For example, you might want to send all incoming calls to user voice mail after regular work hours. See the [“Setting Up Systemwide Rules” section on page 4-19](#) for more information.

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. The following sections explain these concepts and how Personal Assistant uses them:

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

Personal Assistant Interceptor Ports

The Personal Assistant interceptor ports identify the phone extensions that Personal Assistant will intercept from Cisco CallManager. You configure these ports in Cisco CallManager as CTI route points and identify them in the Personal Assistant server configuration. The route points configuration allows Personal Assistant to intercept the calls.

You can use wildcards when creating the route points so that one route point covers many extensions. For example, the route point 1XXX covers all extensions from 1000 to 1999.

When you configure the interceptor ports, you should also set up the call forwarding configuration for interceptor port error handling to allow calls to go through to the extension if the Personal Assistant server is unavailable. The way you configure interceptor port error handling will differ depending on the version of Cisco CallManager that the system uses (see the [“Why You Need Interceptor Port Error Handling” section on page 1-23](#) for additional information on interceptor port error handling).

CTI Route Points and Media Ports

When you assign a phone 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 3-8](#)). The number you assign as the CTI route point is the phone 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.

When a user calls the Personal Assistant server phone number that is defined as a CTI route point, Personal Assistant assigns the call to an available media port 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 3-10](#)). For example, if you need 24 simultaneous sessions, add 24 ports. Then, in the Personal Assistant server configuration, you enter 24 as the number of media ports (see the [“Server Configuration” section on page A-16](#)).

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 1-13](#)).

**Note**

If you use Personal Assistant to create an automated attendant, you also create a route point for the attendant phone number. The attendant uses media ports in the same manner as Personal Assistant.

Partitions and Calling Search Spaces

In a Cisco CallManager setup, each phone extension is assigned to a partition and a calling 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 that 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 calling search space. The calling search space always includes the none partition.

Calling search spaces and partitions make it possible to separate parts of your phone network. This can be useful if you are providing phone 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.

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. The number of clusters you have affects the number of Personal Assistant servers you need.

Cisco CallManager Clusters and Personal Assistant

The pool of addresses that you create in Cisco CallManager to support Personal Assistant (interceptor ports, CTI route points, translation patterns, and media ports) is registered with the primary Cisco CallManager server in the cluster. Each Personal Assistant server can register with multiple primary Cisco CallManager servers, based on the telephony provider 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 the extension of User B. 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.

How Personal Assistant Uses Directories

With Personal Assistant, you must have a supported LDAP directory installed, to meet network requirements. The directory contains records for each user in your organization, and includes information such as name, phone extension, e-mail address, and office location. This LDAP directory 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 applicable name.

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

You can also use the Cisco CallManager directory as the corporate directory, but this is not required. Many installations prefer a corporate directory that is independent from Cisco CallManager, and Personal Assistant fully supports this separation. Or, your corporate directory might already be integrated with Cisco CallManager. See the [“Configuring the Corporate Directory” section on page 4-7](#) for information on identifying the directory to Personal Assistant.

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 [“Corporate Directory Settings” section on page A-3](#) for information on updating the Personal Assistant configuration with this information.

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 the presence of Personal Assistant; other elements 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 the connection of Personal Assistant to the IP telephony network.

Figure 1-1 Personal Assistant in the IP Telephony Network

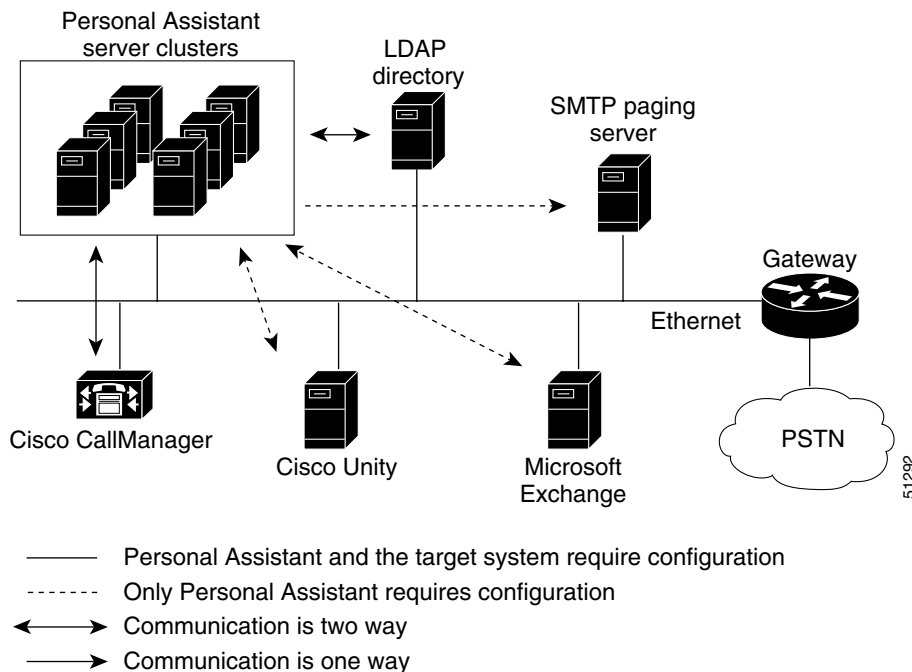


Table 1-1 further describes the components of the IP telephony network that are critical to using Personal Assistant. For information on supported software versions, refer to the “Software Requirements” section of the *Release Notes for Personal Assistant Version 1.4*. The release notes are available at http://www.cisco.com/en/US/products/sw/voicesw/ps2026/prod_release_notes_list.html.

Table 1-1 Software Requirements for Using Personal Assistant

System	Usage
Call intercepting	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	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	Personal Assistant connects users to their voice mailboxes, and sends incoming calls to voice mail when a call routing rule of a Personal Assistant user indicates that a call should be directed to voice mail. With Cisco Unity systems, Personal Assistant can only work with the G.711 Mu-Law wave file record format. With Octel systems, Personal Assistant can only redirect calls to the system. Users cannot browse Octel voice mail from within Personal Assistant.

Table 1-1 **Software Requirements for Using Personal Assistant (continued)**

System	Usage
Personal calendar	Personal Assistant accesses the Exchange calendar of a user when evaluating a call routing rule that includes calendar-based options.
SMTP 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	You access web-based interfaces to manage and use Personal Assistant.

Personal Assistant and User Interactions

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

- [Interaction Terminology, page 1-7](#)
- [Incoming Call Handling, page 1-7](#)
- [Access to Personal Assistant, page 1-8](#)

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 rule (interception).

Incoming Call Handling

The following sequence illustrates 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 a Personal Assistant interceptor port (CTI route point) 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 by using the messaging system.
 - Phone number—Personal Assistant transfers the call through Cisco CallManager.

Access to Personal Assistant

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

1. Users dial the Personal Assistant 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 and the caller hears a busy signal.
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 phone keypad for touch-tone dial-by-name.
4. If users use dial-by-name to call another user:
 - a. User says: "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.

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.

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

- [Speech-Recognition Server, page 1-8](#)
- [Personal Assistant Server, page 1-9](#)
- [License and Resource Managers, page 1-9](#)
- [Interactions of the Personal Assistant Server and Speech-Recognition Server, page 1-10](#)

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 user responses based on a pre-defined grammar, which includes a list of words and possible sequences in which a user can state them. During a call to Personal Assistant, you can ask for help and Personal Assistant will tell you the available commands. Also, the Help included with the Personal Assistant end-user interface defines this grammar by 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 system refresh (see the [“Configuring Speech Recognition”](#) section on page 4-4). As new users are added to the directory, their names are automatically recognized after the refresh.

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 On to and Out of the Personal Assistant Administration Interface”](#) section on page 4-3 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 1-10 for details).

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 work only 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 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.

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

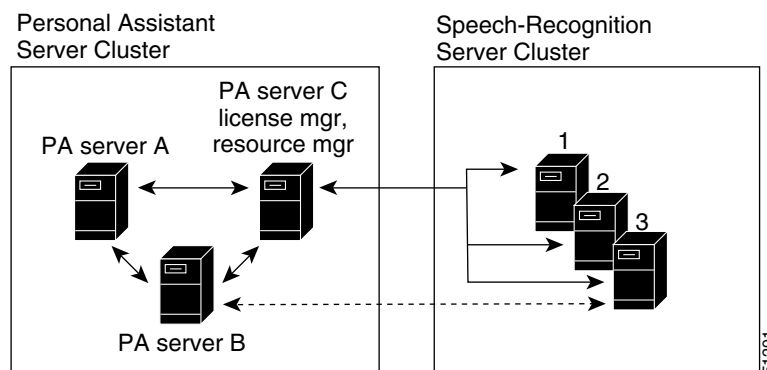


Figure 1-2 assumes that you are installing Personal Assistant servers and speech-recognition servers on separate platforms. However, you can install the Personal Assistant servers and speech-recognition servers on the same platform. When installed on the same platform, the servers still establish communications 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 Speech Recognition](#)” section on page 4-4 for information on how to do this.

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 applicable 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.

It is also affected by the number of Cisco CallManager clusters you have, and the distribution of WAN connections between them.

During server installation, you must specify the same Cisco CallManager publisher for all of the Personal Assistant and speech-recognition servers in the same Personal Assistant cluster.

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 that an active, valid license be available at all times for it to work. See the “[Configuring Speech Recognition](#)” section on page 4-4 for information about adding speech-recognition servers to the server cluster.

See the following sections 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 1-11
- [Setting Up Personal Assistant Server Load Balancing](#), page 1-13
- [Creating a Personal Assistant Server Cluster With Failover](#), page 1-15

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 phone-dependent would probably need more servers than an engineering group that uses the phone 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—the number of users who will set up rules to enable Personal Assistant to intercept calls for them.
- Speech-recognition sessions—the number of users who will access voice mail and dial other users by name.
- The server model that you use. A more powerful server can support more concurrent calls than a less powerful server.
- Whether you run 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 enable automatic failover for Personal Assistant server redundancy. Failover ensures that if a server goes down, another server takes over the responsibilities of the failed server. If you configure failover, you should enable only half of the ports that would otherwise be supported on a server.
- The number of Cisco CallManager clusters in your network, and the distribution of WAN links between them.

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.

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. However, depending on your particular system usage, 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 Series		MCS-7835 Series	
	Interceptor Ports ¹	Media Ports ²	Interceptor Ports ¹	Media Ports ²
Personal Assistant server and speech-recognition server installed on different systems	50 sessions	24 sessions	70 sessions	36 sessions
Personal Assistant server and speech-recognition server installed on the same system	22 sessions	20 sessions	30 sessions	24 sessions

1. We recommend that you estimate approximately 25 users per session using interceptor ports.
2. We recommend that you estimate approximately 50 users per session using media ports.

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, we recommend that you estimate approximately 25 users per call-interception session, and approximately 50 users per speech-recognition session.
- These estimates represent the system capacities and might not necessarily reflect the number of licenses you have purchased.

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-H1-IPC1.
3. Determine how to install the Personal Assistant components, for example, whether you want 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-H1-IPC1 systems (for a total of two systems) you can support:
 - 70 call-interception sessions
 - 36 speech-recognition sessions

Therefore, you can support 1750 users by using two MCS-7835-H1-IPC1 systems: one system for the Personal Assistant server and one system for the speech-recognition server.

6. Be sure to add the servers by using the Personal Assistant administrative interface:
 - Add the speech-recognition servers to the System Configuration settings. See the [“Configuring Speech Recognition”](#) section on page 4-4.
 - Add the Personal Assistant servers to the Server Configuration settings. See the [“Configuring Personal Assistant Servers”](#) section on page 4-10.
7. You also must add the number of supported ports by using the Personal Assistant administrative interface:
 - Add the supported number of media ports in the Server Configuration settings. See the [“Configuring Personal Assistant Servers”](#) section on page 4-10. Although your selected server configuration supports up to 36 ports, you only need 35 ports for your users.
 - Add the interceptor port addresses in Server Configuration settings. See the [“Configuring Personal Assistant Servers”](#) section on page 4-10. In this setting, enter the interceptor ports that cover all 1750 users. Although your configuration supports 70 simultaneous sessions, the interceptor ports must cover all users you are supporting.
8. Consider configuring load balancing (see the [“Setting Up Personal Assistant Server Load Balancing”](#) section on page 1-13) or adding failover servers (see the [“Creating a Personal Assistant Server Cluster With Failover”](#) section on page 1-15) for greater redundancy.

Setting Up Personal Assistant Server Load Balancing

A single Personal Assistant server can handle a number of simultaneous sessions, which you define when you set the number of media ports (see the [“Server Configuration”](#) section on page A-16). 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.

If you are not using failover servers, and if a Personal Assistant server becomes disabled, no other server takes over the media ports of the disabled server. 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 4-10 for information on configuring the Personal Assistant servers into a cluster, and the “[Server Configuration](#)” section on page A-16 for reference information on the server configuration settings.)

The following sections describe how to configure load balancing:

- [Configuring Load Balancing](#), page 1-14
- [Effect of Load Balancing on Users Who Access Personal Assistant](#), page 1-14
- [Effect of Load Balancing on Rule-Based Call Routing](#), page 1-15

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 phone 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 need only one phone 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 (phone number)	5600	5700	5800
Call forward busy	5700	5800	5600
Call forward no answer	5700	5800	5600

Effect of Load Balancing on Users Who Access Personal Assistant

If you are using load balancing without a failover server, and if a Personal Assistant server becomes disabled, all calls that the server is currently handling are cut off. However, if Personal Assistant has already completed its role in the call process (for example, has 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.

Effect of Load Balancing on Rule-Based Call Routing

If you are not using failover servers, and if a Personal Assistant server becomes disabled, the interceptor port route points 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 applicable extensions.

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 1-13](#), 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 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 ports, the failover server registers itself with Cisco CallManager as the disabled server 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 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 1-15](#)
- [Using Spare Personal Assistant Servers for Failover, page 1-16](#)

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-H1-IPC1 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 the 18 ports of server A, and server B will temporarily run with 36 ports (its original 18 plus the 18 of server A).

If you defined more than 18 media 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 (because 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 ports are not distributed among the designated failover servers.

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 interceptor ports (see the [“Server Configuration” section on page A-16](#)), thus preventing 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-H1-IPC1 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 seldom become disabled, 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.

Intercepting Calls with Personal Assistant

Personal Assistant interacts with Cisco CallManager to intercept incoming calls to user extensions. By intercepting these calls, Personal Assistant can redirect them based on user 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 the rule-based call routing feature or Personal Assistant.

If you are not yet using partitions 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 set up and configure partitions and calling search spaces, Personal Assistant cannot intercept user 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 [“Speech-Recognition Server” section on page 1-8](#)).

The following 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 1-17](#)

- [Defining Partitions and Call Search Spaces for Personal Assistant, page 1-18](#)

Using Partitions and Calling Search Spaces Without Personal Assistant

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

The following partitions were created to support lobby phones, employee phones, and 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)

The following calling search spaces were created and the partitions were assigned to them to provide different services. For example, to disallow external calls from the lobby phones, the cssLobby calling search space does not include the PSTN partition.

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

The following partitions and calling search spaces were assigned to individual extensions.

Cisco CallManager Setting	User 1001	User 1002	User 3000	User 5555
Phone extension	1001	1002	3000	5555
Partition	Employee	Employee	Lobby	PSTN
Calling search space	cssEmp	cssEmp	cssLobby	cssGW

When User 3000 dials User 1001, Cisco CallManager looks in the calling search space of User 3000, cssLobby. Because cssLobby includes the Employee partition in which the extension of User 1001 exists, the call goes through successfully.

However, if User 3000 dials User 5555, the call cannot be completed, because the cssLobby calling search space does not include the PSTN partition in which the extension of User 5555 exists. Effectively, this means that people using the lobby phone cannot make outside calls.

On the other hand, User 5555 can dial User 3000, because the calling search space of User 5555, `cssGW`, includes the Lobby partition in which the extension of User 3000 exists.

To understand how Personal Assistant uses partitions and call search spaces to intercept user calls, see the [“Defining Partitions and Call Search Spaces for Personal Assistant”](#) section on page 1-18.

Defining Partitions and Call Search Spaces for Personal Assistant

You need to create or 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.

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

- [Adding Personal Assistant to Existing Partitions, page 1-18](#)
- [Adding Personal Assistant Without Previously Defined Partitions, page 1-20](#)

Adding Personal Assistant to Existing Partitions

To understand how Personal Assistant uses partitions and calling search spaces, recall that the previous example (the [“Using Partitions and Calling Search Spaces Without Personal Assistant”](#) section on page 1-17) showed partitions (Employee, Lobby, and PSTN) and calling search spaces (`cssLobby`, `cssEmp`, and `cssGW`). To add Personal Assistant to this scenario, you must do the following:

1. Add a Personal Assistant partition, for example PA, and a Personal Assistant managed phones partition, for example PAManaged.

Add the interceptor ports (to intercept incoming calls) to the PA partition.

Add the phones of all employees who will use Personal Assistant to the PAManaged partition.

Leave other employees phones in the NonPAManaged partition, and add the following devices and ports to it:

- CTI route point (the pilot port to access Personal Assistant)
- Media ports (to support Personal Assistant sessions)

Partition Name	Designated Devices Assigned to Partition
Lobby	All lobby phones
NonPAManaged	All employee IP phones not managed by Personal Assistant, Personal Assistant CTI route point, and Personal Assistant media ports
PA	Personal Assistant interceptor ports
PAManaged	All employee IP phones managed by Personal Assistant
PSTN	All externally destined route patterns (local PSTN)

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, in this example, cssPA, and add the partitions indicated in the following table to it.

Calling Search Space	Partitions	Assigned To
cssPA	PAManaged Lobby NonPAManaged PSTN	Devices that will not have Personal Assistant evaluate the called number for interception.
cssLobby	PA NonPAManaged Lobby	Devices (such as lobby IP phones) that can dial internal numbers and access Personal Assistant.
cssEmp	PA Lobby NonPAManaged PSTN	Devices (such as employee IP phones) that can dial internal and external numbers and access Personal Assistant.
cssGW	PA Lobby NonPAManaged	PSTN voice gateway used for outside callers to access lobby phones, employees, and Personal Assistant.

4. Change the partition of User 1002 to PAManaged (see the [“Why You Need a Partition for Personal Assistant Managed Phones”](#) section on page 1-22 for a complete explanation of this task)

Cisco CallManager Setting	User 1001	User 1002	User 1003	PA Interceptor Port Route Point
Phone extension	1001	1002	1003	1XXX
Partition	NonPAManaged	PAManaged-Employee	NonPAManaged	PA
Calling search space	cssEmp	cssEmp	cssEmp	cssPA

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

When User 1001 calls User 1002, Cisco CallManager uses the calling search space of User 1001, cssEmp. Cisco CallManager determines that the best match to extension 1002 within the cssEmp is 1XXX (where X matches any digit), which exists in the PA partition. Therefore, Cisco CallManager routes the call to Personal Assistant instead of sending it to the phone of User 1002. Personal Assistant processes the active call routing rules of User 1002 and uses the applicable rule. If no rule applies, the call goes directly to the extension of User 1002, because the calling search space of Personal Assistant, cssPA, contains the partition PAManaged, which is the partition in which the extension of User 1002 exists. If the applicable rule instructs Personal Assistant to transfer User 1002 calls to the phone of User 1003, Cisco CallManager finds the best match to extension 1003 in the NonPAManaged partition of the calling search space of Personal Assistant, cssPA, and sends the call directly to User 1003.

Note that because `cssPA` contains the `NonPAManaged` partition and does not contain the `PA` partition, Personal Assistant does not intercept the call a second time to process the active call routing rules of User 1003.

When User 1002 calls User 1001, Cisco CallManager uses the calling search space of User 1002, `cssEmp`, and finds the best match to extension 1001 in the `NonPAManaged` partition. (While `cssEmp` includes the `PA` partition, and `1XXX` in the `PA` partition is a match for extension 1001, 1001 exists in the `NonPAManaged` partition and is the best match.) The call is sent directly to extension 1001. Because Personal Assistant does not intercept the call, no call routing rules are applied.

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 by using Personal Assistant.

When you have not yet created any partitions or calling search spaces specific to your needs, all of your IP phones currently exist by default in the “none” partition 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 applicable phone.

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

1. Create a Personal Assistant partition, for example `PA`, and a Personal Assistant managed phones partition, for example `PAManaged`.

Add the interceptor ports (to intercept incoming calls) to the `PA` partition.

Add the phones of all employees who will use Personal Assistant to the `PAManaged` partition. (Placing these phones in the `PAManaged` partition effectively removes them from the “none” partition.)

Leave all other phones in the “none” partition, including the CTI route point (the pilot port to access Personal Assistant) and the media ports (to support Personal Assistant sessions).

Partition Name	Designated Devices Assigned to Partition
none	All other phones (including lobby phones, employee IP phones not managed by Personal Assistant), PSTN, and the Personal Assistant CTI route point and media ports
PA	Personal Assistant interceptor ports
PAManaged	All employee IP phones managed by Personal Assistant

2. Next, create the following calling search spaces:
 - `cssPA`—Add the `PAManaged` partition to it.
 - `cssPhones`—Add the `PA` partition to it.

Note that every calling search space includes the “none” partition by default.

Calling Search Space	Partitions	Assigned To
cssPA	PAManaged none	Devices that will not have Personal Assistant evaluate the called number for interception.
cssPhones	PA none	Devices (such as employee IP phones) that can dial internal and external numbers and access Personal Assistant.

- Update each IP phone extension that you want managed with the new PAManaged 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 user extensions, consider using the Cisco CallManager Bulk Administration Tool (BAT).

Cisco CallManager Setting	User 1001	User 1002	User 1003	PA Interceptor Port Route Point
Phone extension	1001	1002	1003	1XXX
Partition	none	PAManaged	none	PA
Calling search space	cssPhones	cssPhones	cssPhones	cssPA

- It is important to understand how these changes affect User 1001 and User 1002.

In this example, we have reconfigured the phone of User 1002 to use Personal Assistant by adding it to the PAManaged partition. We have also left the phone of User 1001 in the “none” partition. Finally, we have updated the calling search spaces to search the Personal Assistant partition (PA).

These changes enable the call routing rules of User 1002 to be applied to all incoming calls. To complete the configuration, we have created the 1XXX interceptor port (X matches any digit) in the PA partition so that Personal Assistant will intercept calls to the extension of User 1002.

When User 1001 calls User 1002, Cisco CallManager uses the calling search space of User 1001, cssPhones. Cisco CallManager determines that the best match to extension 1002 within cssPhones is 1XXX, which exists in the PA partition. Therefore, Cisco CallManager routes the call to Personal Assistant instead of sending it to the phone of User 1002. Personal Assistant processes the active call routing rules of User 1002 and uses the applicable rule. If no rule applies, the call goes directly to the extension of User 1002, because the calling search space of Personal Assistant, cssPA, contains the partition PAManaged, which is the partition in which the extension of User 1002 exists. If the applicable rule instructs Personal Assistant to transfer the calls of User 1002 to the phone of User 1003, Cisco CallManager finds the best match to extension 1003 in the “none” partition of the calling search space of Personal Assistant, cssPA, and sends the call directly to User 1003.

Note that because cssPA contains the NonPAManaged partition and does not contain the PA partition, Personal Assistant does not intercept the call a second time to process the active call routing rules of User 1003.

When User 1002 dials User 1001, Cisco CallManager uses the calling search space of User 1002, `cssPhones`, and finds that `1XXX`, in the PA partition matches. Because Cisco CallManager looks for the best match within the partitions of the calling search space, it continues to search and finds 1001 in the “none” partition. Cisco CallManager rings the phone of User 1001.

Why You Need a Partition for Personal Assistant Managed Phones

When you create the partitions needed for Personal Assistant, you create a partition that will contain the phones that Personal Assistant will manage (in our examples, this partition is `PAManaged`). You also create a partition that will contain the interceptor port route points (in our examples, `PA`). This section explains why you need both partitions.

Recall how Cisco CallManager routes calls:

1. Cisco CallManager identifies the calling search space assigned to the extension from which the call is made. For example, if User A calls User B, the calling search space of the phone of User A is used to complete the call.
2. Cisco CallManager tries to find the best match for the called extension, searching top to bottom in the list of partitions contained in the calling search space. If the first match uses wildcards (for example, `1XXX`), subsequent partitions are searched in an attempt to find a better match. If an exact match is found, it is used, even if a wildcard match exists in a partition higher in the list of partitions in the calling search space.

Because you are going to use wildcards when you create interceptor port route addresses, you must prevent Cisco CallManager from finding exact matches to use in place of the interceptor addresses.

Consider an example of a call between non-Personal Assistant users:

- The `PA` partition includes `1XXX` as the interceptor route points.
- The `NonPAManaged` partition includes the extensions of User 1001 and User 1003.
- The `cssEmp` calling search space includes the `PA` and `NonPAManaged` partitions, in that order.
- The extensions of User 1001 and User 1003 use the `cssEmp` calling search space.

Now, when User 1001 calls User 1003, Cisco CallManager first checks the `PA` partition, and finds a match: `1XXX`. However, because this match uses wildcards, the search continues to the `NonPAManaged` partition, where an exact match, 1003, is found. Cisco CallManager then routes the call to the extension of User 1003, found in the `NonPAManaged` partition. Thus, Personal Assistant has no role in the call.

Now, consider the case of a phone in the `PAManaged` partition:

- The `PA` partition includes `1XXX` as the interceptor route points.
- The `NonPAManaged` partition includes the extension of User 1001 and User 1003.
- The `PAManaged` partition includes the extension of User 1002.
- The `cssEmp` calling search space includes the `PA` and `NonPAManaged` partitions, in that order.
- The extensions of User 1001, User 1003, and User 1002 use the `cssEmp` calling search space.

In this example, when User 1001 calls User 1002, Cisco CallManager first checks the `PA` partition, and finds a match: `1XXX`. Again, because this match uses wildcards, the search continues to the `NonPAManaged` partition, but this time, an exact match is not found because the extension of User 1002 is no longer in the `NonPAManaged` partition. Cisco CallManager routes the call based on the `1XXX` route point found in the `PA` partition. Thus, Personal Assistant intercepts the call, and applies the call routing rules of User 1002 to it.

Why You Need Interceptor Port Error Handling

You configure interceptor port error handling to tell Cisco CallManager how to route calls to Personal Assistant users when the Personal Assistant server is unavailable. If you do not configure interceptor port error handling, and if Personal Assistant is unavailable, a user phone will not ring when called, and the caller will hear a fast busy tone.

The way you configure interceptor port error handling differs according to which version of Cisco CallManager you are using, as follows.

Cisco CallManager Version 3.x

If you are using Cisco CallManager version 3.x, when you create an interceptor port, you create two entities: a route point, and a translation pattern. Cisco CallManager uses the translation pattern for error handling. Each translation pattern must match the set of numbers in the corresponding interceptor port route point. The translation patterns must not be placed in the PA partition, as this could cause a match even when the Personal Assistant server is available.

Cisco CallManager Version 4.0 or Later

If you are using Cisco CallManager version 4.0 or later, you configure interceptor port error handling by setting the Forward No Answer destination and calling search space to the same values as the directory number configured for the interceptor CTI route point.

Customizing Implementation of Personal Assistant

Personal Assistant provides users with the ability to access their voice mail, to call other users by 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 1-23](#)
- [Using Personal Assistant Without Rule-Based Call Routing, page 1-23](#)

Using Personal Assistant Without Speech Recognition

You can use Personal Assistant without using the speech-recognition capability. Without speech recognition, your users can interact with Personal Assistant only by 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.

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.

Preventing Toll Fraud

To prevent or limit name-dialing transfers from Personal Assistant to external numbers, we recommend that you use one of the following solutions:

- Configure your Cisco CallManager route plans, partitions, and calling search spaces to disable Personal Assistant from making long-distance calls.
- Configure Personal Assistant to operate in speech-enabled Auto Attendant mode so that callers and employees can access names in the corporate directory only from an external or internal route point.
- Configure an internal (non-DID) route point for Personal Assistant so that employees can access all Personal Assistant functionality only from the office.

In addition, you can customize Personal Assistant to use the following restriction settings:

- Restrict access to Personal Assistant only to Cisco CallManager users.
- Restrict access to Personal Assistant only to registered phones.
- Enforce PIN authentication from personal destinations.

For details on how to configure these settings, see the [“Miscellaneous Settings” section on page A-12](#).