



Cisco IOS Telephony Service

Version 2.02
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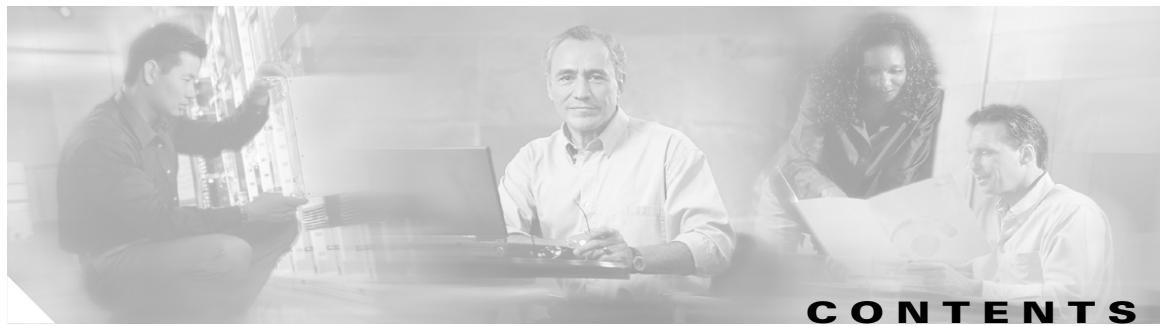
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Preface

This preface discusses the objectives, audience, organization, and conventions of this document. It also provides sources for obtaining documentation from Cisco Systems.

Documentation Objectives

This document describes the tasks and commands necessary to configure and maintain Cisco IOS Telephony Service (ITS) for systems with Cisco CallManager V3.0 and higher.

Audience

This document is intended primarily for users who configure and maintain Cisco ITS but who may not be familiar with the tasks, the relationship between tasks, or the Cisco IOS software commands necessary to perform particular tasks. This configuration guide is also intended for those users experienced with Cisco ITS who need to know about new features, new configuration options, and new software characteristics in the current Cisco IOS software release.

Documentation Organization

This document includes the following chapters:

- “Cisco IOS Telephony Service Overview,” which includes product history, prerequisites, and reference information.
- “Required Configuration Tasks,” which includes prerequisites, restrictions, background information about Cisco ITS, and description of how perform basic, required configuration.
- “Additional Configuration Tasks,” which includes information on the following features:
 - Configuring date and time
 - Configuring dial-plan pattern
 - Configuring local directory
 - Configuring keepalive
 - Configuring interdigit timeout
 - Configuring three-party G.711 conference calls

- Configuring music on hold
- Enabling transfer of calls
- Configuring URL provisioning
- Configuring speed-dial
- Configuring on-hold call notification
- Configuring preference
- Configuring class of restriction
- Configuring call forward
- Configuring caller ID blocking
- Applying translation rule
- Disabling and reenabling huntstop
- Enabling a top-line description
- Configuring intercom
- Configuring paging
- Configuring Interactive Voice Response (IVR) auto-attendant
- “Advanced Configuration Tasks,” which includes information on the following:
 - Configuring a graphical user interface
 - Integrating voice mail
 - Dual Tone Multifrequency (DTMF) integration with legacy voice-mail devices
 - Integrating Cisco ITS with applications
- Command reference

Document Conventions

Within Cisco IOS software documentation, the term *router* is generally used to refer to a variety of Cisco products (for example, routers, access servers, and switches). Routers, access servers, and other networking devices that support Cisco IOS software are shown interchangeably within examples. These products are used only for illustrative purposes; that is, an example that shows one product does not necessarily indicate that other products are not supported.

The Cisco IOS documentation set uses the following conventions:

Convention	Description
^ or Ctrl	The ^ and Ctrl symbols represent the Control key. For example, the key combination ^D or Ctrl-D means hold down the Control key while you press the D key. Keys are indicated in capital letters but are not case sensitive.
<i>string</i>	A string is a nonquoted set of characters shown in italics. For example, when setting an SNMP community string to public, do not use quotation marks around the string or the string will include the quotation marks.

Command syntax descriptions use the following conventions:

Convention	Description
boldface	Boldface text indicates commands and keywords that you enter literally as shown.
<i>italics</i>	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional element (keyword or argument).
	A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.




Nested sets of square brackets or braces indicate optional or required choices within optional or required elements. For example:

Convention	Description
[x {y z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
screen	Examples of information displayed on the screen are set in Courier font.
boldface screen	Examples of text that you must enter are set in Courier bold font.
< >	Angle brackets enclose text that is not printed to the screen, such as passwords.
!	An exclamation point at the beginning of a line indicates a comment line. (Exclamation points are also displayed by the Cisco IOS software for certain processes.)
[]	Square brackets enclose default responses to system prompts.

The following conventions are used to attract the attention of the reader:

 Caution	Means <i>reader be careful</i> . In this situation, you might do something that could result in equipment damage or loss of data.
 Note	Means <i>reader take note</i> . Notes contain helpful suggestions or references to materials not contained in this manual.
 Timesaver	Means the <i>described action saves time</i> . You can save time by performing the action described in the paragraph.

Obtaining Documentation

These sections explain how to obtain documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com>

Translated documentation is available at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which is shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Ordering Documentation

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:
http://www.cisco.com/cgi-bin/order/order_root.pl
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can submit comments electronically on Cisco.com. In the Cisco Documentation home page, click the **Fax** or **Email** option in the “Leave Feedback” section at the bottom of the page.

You can e-mail your comments to bug-doc@cisco.com.

You can submit your comments by mail by using the response card behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from online tools by using the Cisco Technical Assistance Center (TAC) Web Site. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC Web Site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

If you want to obtain customized information and service, you can self-register on Cisco.com. To access Cisco.com, go to this URL:

<http://www.cisco.com>

Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Cisco TAC inquiries are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.



Cisco IOS Telephony Service Overview

Cisco IOS Telephony Service (ITS) provides basic Cisco IP phone call-handling capabilities in a LAN environment on the Cisco routers. This service enables the Cisco multiservice routers to act as the Cisco IOS Telephony Service for the Cisco IP Phone 7960, Cisco IP Phone 7940, Cisco IP Phone 7910, and Cisco IP Conference Station 7935. This service also helps download phone software images and configures and manages the Cisco IP phones in your LAN. Cisco IOS Telephony Service provides a telephony system useful for a small office with a small number of extensions.

Feature Specifications for Cisco ITS, Version 2.02

Feature History

Release	ITS Version	Modification
12.1(5)YD	Version 1.0	<ul style="list-style-type: none"> • This service was introduced on the Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series integrated access devices (IAD)s. • Dial-plan class of restriction (COR) • Call hold and retrieve • Call pickup of on-hold calls • Multiple lines per Cisco IP phone • Multiple line appearance across telephones • Call-forwarding functions: all, busy, and no answer • Call transferring • Speed dialing • Cisco IP phones derive the date and time from the router through Network Time Protocol (NTP) • Interworking with Cisco gatekeeper • Distinctive ringing: for external versus internal calls • Caller identification display and blocking • Analog Foreign Exchange Station (FXS) and Foreign Exchange Office (FXO) ports • On-net calls using Voice over IP (VoIP) H.323, Voice over Frame Relay (VoFR), and Voice over ATM (VoATM) • Function keys

12.2(2)XT	Version 2.0	<ul style="list-style-type: none"> • Graphical user interface (GUI) using a standard web browser. • Web browser recent call history and activity display • Huntstop support • Translation rule support • Two-line support for Cisco IP Phone 7910 • Cisco IP Conference Station 7935 support • Music on hold (MOH) • Three-party G.711 conference calls • Distinctive ringing • Voice-mail integration with Active Voice using Skinny Client Control Protocol (SCCP), including message waiting indication • Cisco IP phone-to-phone intercom • Cisco IP phone audio paging system • On-hold call timeout alert • Session Initiation Protocol (SIP) unsolicited message waiting notification support • Local phone directory display and search on Cisco IP phone • Cisco IP phone URL provisioning command line interface (CLI) • Basic Telephony Application Programming Interface (TAPI)-aware PC application support for incoming call caller-ID and outgoing call address-book dialing • Interactive voice response (IVR) and auto-attendant support per Cisco IP phone directory number using Toolkit Command Language • Third-party H.323 call transfers
12.2(8)T	Version 2.0	This service was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	Version 2.0	This service was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	Version 2.01	<ul style="list-style-type: none"> • This service was implemented on the Cisco 1760 routers and support for Cisco 1750 was removed. • Support was added for a greater number of connected Cisco IP phones. • Support was added for an increased number of directory numbers or virtual voice ports on Cisco IP phones. • Support was added for ATA-186. • Support was added for top-line display description on the Cisco IP Phone 7960 and Cisco IP Phone 7940.

12.2(13)T	Version 2.02	<ul style="list-style-type: none"> • This service was implemented on the Cisco Catalyst 4000 family access gateway modules, Cisco Catalyst 4224 access gateway modules, and Cisco 3640A. Support was removed for Cisco 3620, Cisco 2610, Cisco 2611, Cisco 2620 and Cisco 2621. • Support was added for an increased number of directory numbers or virtual voice ports on Cisco IP phones. See Table 1-1.
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Supported Platforms

Cisco 1751 router, Cisco 1760 router, Cisco 2610-XM router, Cisco 2611-XM router, Cisco 2620-XM router, Cisco 2621-XM, Cisco 2650 router, Cisco 2650-XM router, Cisco 2651 router, Cisco 2651-XM router, Cisco 2691 router, Cisco 3640 router, Cisco 3640A router, Cisco 3660 router, Cisco 3725 router, Cisco 3745 router, Cisco Catalyst 4000 family access gateway modules, and Cisco IAD2400 series,.

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that are supported on specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

Prerequisites

License Requirements

You must purchase a feature license to turn on this feature. You also need an account on Cisco.com to access Cisco IP phone firmware.

Memory Requirements

Table 1-1 list the Cisco platforms, maximum number of Cisco IP phones, maximum number of directory numbers (DNs) or virtual voice ports, and memory requirements for Cisco IOS Release 12.2(13)T.


Note

Although Cisco IOS software can provide a higher number of DN for some of these platforms, the higher limitation may not apply to your platform due to memory restrictions. We recommend that you follow the guidelines in the Specifications tables to configure your network.

Table 1-1 Specifications for Version 2.02 Released in 12.2(13)T

Cisco Platform	Maximum Cisco IP Phones	Maximum DN or Virtual Ports	Minimum DRAM Memory	Recommended DRAM Memory	Minimum Flash Memory	Recommended Flash Memory	Cisco IOS Release
Cisco 1751 routers	24	120	64 MB	96 MB	32 MB	32 MB	12.2(13)T
Cisco 1760 routers	24	120	64 MB	96 MB	32 MB	32 MB	12.2(13)T
Cisco 2600-XM ¹ series	24	96	96 MB	96 MB	32 MB	32 MB	12.2(13)T
Cisco 2650, Cisco 2651, Cisco 2650-XM, and Cisco 2651-XM	48	192	96 MB	96 MB	32 MB	32 MB	12.2(13)T
Cisco 3640 and Cisco 3640A routers	48	288	96 MB	96 MB	32 MB	32 MB	12.2(13)T
Cisco 3660 routers	48	288	96 MB	128 MB	32 MB	32 MB	12.2(13)T
Cisco 2691 router	48	288	128 MB	128 MB	32 MB	32 MB	12.2(13)T
Cisco 3725 routers	48	288	128 MB	128 MB	32 MB	32 MB	12.2(13)T
Cisco 3745 routers	48	288	128 MB	128 MB	32 MB	32 MB	12.2(13)T
Cisco Catalyst 4000 family access gateway modules ²	24	48	64 MB	64 MB	32 MB	32 MB	12.2(13)T
Cisco Catalyst 4224 access gateway switches	48	192	128 MB	128 MB	48 MB	48 MB	12.2(13)T
Cisco IAD2400 series IADs	24	120	64 MB	96 MB	32 MB	32 MB	12.2(13)T

1. Cisco 2610-MX, Cisco 2611-XM, Cisco 2620-XM, and Cisco 2611-XM

2. For IP Plus Image the minimum memory is 64 MB; for Enterprise Plus image the recommended memory is 128 MB.

Cisco IP Phone Requirements

Cisco ITS Version 2.02 supports the following Cisco IP phones:

- Cisco IP Phone 7910
- Cisco IP Phone 7940
- Cisco IP Phone 7960
- Cisco IP Conference Station 7935
- ATA-186

Firmware Requirements

The most current Cisco IP phone firmware versions are at <http://www.cisco.com/cgi-bin/tablebuild.pl/ip-key>.

The Cisco multiservice routers provide support for updating and storing of Cisco IP phone firmware. The Cisco IOS Telephony Service router also provides TFTP support for downloading the phone firmware files to the phone.



Note

When installing new Cisco IP phones to an ITS ATA device configuration, remove the **tftp-server flash:XMLDefault.cnf.xml** command temporarily (see link to Configuration Example, at the end of Chapter 2) until the new phones are installed properly. After the phones are installed and working correctly, restore the **tftp-server flash:XMLDefault.cnf.xml** command.

A way to verify correct phone load installation is to set registration debugging with the **debug ephone register** command, reset the phones, and look at the StationAlarmMessage displayed during phone re-registration. The "Load=" parameter should appear in the display, followed by an abbreviated version name corresponding to the phone load file name.

Where to Go Next

- To configure basic functionality for Cisco ITS, refer to “[Required Configuration Tasks](#)”.
- See “[Additional Configuration Tasks](#)” to configure the following features:
 - Date and time
 - Dial-plan pattern
 - Local directory
 - Keepalive
 - Interdigit timeout
 - Three-party G.711 conference calls
 - Music on hold
 - Transfer of calls
 - URL provisioning
 - Speed-dial

- On-hold call notification
 - Preferences
 - Class of restriction
 - Call forwarding
 - Caller ID blocking
 - Translation rule
 - Huntstop
 - Top-line description
 - Intercom
 - Paging
 - IVR auto-attendant
- To configure the GUI, voice-mail integration, and application integration, see the [“Advanced Configuration Tasks”](#).

Additional References

The following sections provide additional references related to Cisco ITS Version 2.1:

- [Related Documents, page 1-7](#)
- [Standards, page 1-7](#)
- [MIBs, page 1-8](#)
- [RFCs, page 1-8](#)
- [Technical Assistance, page 1-8](#)

Related Documents

Related Topic	Document Title
Cisco IP phones	<ul style="list-style-type: none"> • Getting Started with the Cisco IP Phone 7910 • Cisco IP Phone 7960 and 7940 Series At a Glance • Quick Reference Cisco IP Phone 7910 for IOS Telephony Service Version 2.0 • Quick Reference Cisco IP Phone 7960/7940 for IOS Telephony Service Version 2.0
Command reference and configuration guides	<ul style="list-style-type: none"> • Cisco IOS Voice, Video, and Fax Configuration Guide, Release 12.2 • Cisco IOS Voice, Video, and Fax Command Reference, Release 12.2 • Cisco IOS Debug Command Reference, Release 12.2 • TCL IVR API Version 2.0 Programmer's Guide • Software Configuration Guide
Hardware and software installation guides	<ul style="list-style-type: none"> • Cisco 1750 Series Router Hardware Installation Guide • Cisco 1750 Voice-over-IP Software Configuration Guide • Cisco 1751 Router Hardware Installation Guide • Cisco 1751 Router Software Configuration Guide • Cisco IAD2420 Series Hardware Installation Guide • Cisco IAD2420 Series Integrated Access Devices Software Configuration Guide • Cisco 2600 Series Hardware Installation Guide • Cisco 3600 Series Hardware Installation Guide • Cisco 3700 Series Hardware Installation Guide
Dynamic Host Control Protocol (DHCP)	<ul style="list-style-type: none"> • Cisco IOS DHCP Server

Standards

Standards ¹	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

1. Not all supported standards are listed.

MIBs

MIBs ¹	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing standards has not been modified by this feature.	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

1. Not all supported MIBs are listed.

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

RFCs

RFCs ¹	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

1. Not all supported RFCs are listed.

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and lots more. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml



Required Configuration Tasks

This chapter explains the required tasks for configuring Cisco IOS Telephony Service (ITS).

Contents

- [Prerequisites for ITS Configuration, page 2-1](#)
- [Restrictions for Cisco IOS Telephony Service, page 2-2](#)
- [Information About Cisco ITS Version 2.02, page 2-3](#)
- [How to Configure Cisco IOS Telephony Service, page 2-5](#)
- [Verification and Troubleshooting, page 2-15](#)
- [Monitoring and Maintaining Cisco IOS Telephony Service, page 2-17](#)
- [Configuration Examples, page 2-18](#)

Prerequisites for ITS Configuration

The following are prerequisites that must be met before configuration:

- IP routing must be enabled.
- The network must be configured with Dynamic Host Configuration Protocol (DHCP).
- Cisco IOS Release 12.2(13)T or a later release is required.
- Appropriate Cisco IP phone firmware versions that support the Cisco IP Phone 7960, Cisco IP Phone 7940, and Cisco IP Phone 7910 models, and Cisco IP Conference Station 7935 are required. To get the appropriate Cisco IP phone firmware versions, go to the following URL:

<http://www.cisco.com/cgi-bin/tablebuild.pl/ip-key>



Note You must purchase a feature license to turn on this new feature. You also need an account on Cisco.com to access the Cisco IP phone firmware versions.

- Memory requirements are dependent on the platform and the number of supported Cisco IP phones. See the [“Memory Requirements” section on page 1-4](#) for details.

Restrictions for Cisco IOS Telephony Service

- Cisco 1750 and Cisco 1751 do not support Quality of Service (QoS) features on the asymmetric digital subscriber line (ADSL) link, Cisco Hoot and Holler over IP applications, and G.SHDSL WAN card supported in the current Cisco 1700 image sets.
- Does not support Session Initiation Protocol (SIP) and Media Gateway Control Protocol (MGCP) on-net calls.
- Does not support first-generation Cisco IP phones, such as Cisco IP Phone 30 VIP and Cisco IP Phone 12 SP+.
- Does not support any more Cisco IP phones than the maximum specified number in the “[Memory Requirements](#)” section on page 1-4.
- Does not support any more directory numbers than the maximum specified number in the “[Memory Requirements](#)” section on page 1-4.
- Does not support any more platforms than those listed in the “[Memory Requirements](#)” section on page 1-4.
- Does not support Element Management System (EMS) integration.
- Does not support Cisco Voice Manager (CVM) support of IP phone configuration.
- Does not support H.450 integration for Message Waiting Indication (MWI) and on-net call transfers.
- Does not support analog telephone call transfer.
- Does not support transfer with consult (with H.450 call transfer support).



Note Standards-based H.323 call transfer for interworking with third-party H.323 endpoints is not supported because of lack of H.450 support.

- Call transfer is supported only on the following:
 - Voice over Frame Relay (VoFR), Voice over Asynchronous Transfer Mode (VoATM), and H.323 for Cisco gateway to Cisco gateway using H.323 nonstandard information element (both gateways running Cisco IOS Release 12.2(13)T)
 - Foreign Exchange Office (FXO) and Foreign Exchange Station (FXS) loop-start (analog)
 - FXO and FXS ground-start (analog)
 - Ear and Mouth (E&M) (analog) and Direct Inward Dialing (DID) (analog)
 - T1 channel-associated signaling (CAS) with FXO and FXS ground-start signaling
 - T1 CAS with E&M signaling
 - All PRI and BRI switch types



Note T1 CAS and PRI are not supported on the Cisco 1750 or Cisco 1751 routers.

- Does not support MGCP fallback.
- Does not support Telephone Application Programming Interface (TAPI), Version 2.1.

**Note**

Cisco IOS Telephony Service Version 2.0 implements only a small subset of TAPI functionality. It does support operation of multiple independent clients (for example, one client per phone line). The tagged-switch path (TSP) support does not have full TAPI support for multiple user or multiple call handling, which is required for complex features such as automatic call distribution (ACD) and IP contact center (IPCC). Also, this TAPI version does not have direct media and voice-handling capabilities.

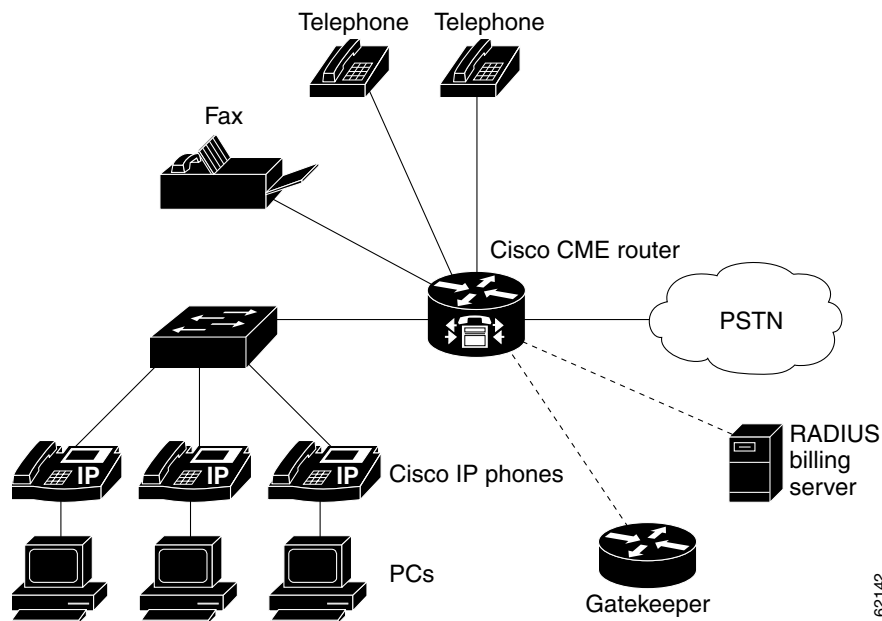
Information About Cisco ITS Version 2.02

Cisco IOS Telephony Service provides basic Cisco IP phone call-handling capabilities in a LAN environment on the Cisco routers. This service enables the Cisco multiservice routers to act as the Cisco IOS Telephony Service for the Cisco IP Phone 7960, Cisco IP Phone 7940, Cisco IP Phone 7910, and Cisco IP Conference Station 7935. This service also helps download phone software images and configures and manages the Cisco IP phones in your LAN. Cisco ITS provides a telephony system perfect for a small office with a small number of extensions.

Cisco IOS Telephony Service Network Scenarios

Figure 2-1 shows a typical deployment of a Cisco IOS Telephony Service router with several Cisco IP phones connected to it. The Cisco IOS Telephony Service router is connected to the public switched telephone network (PSTN). The router can also connect to a gatekeeper and a RADIUS billing server in the same network.

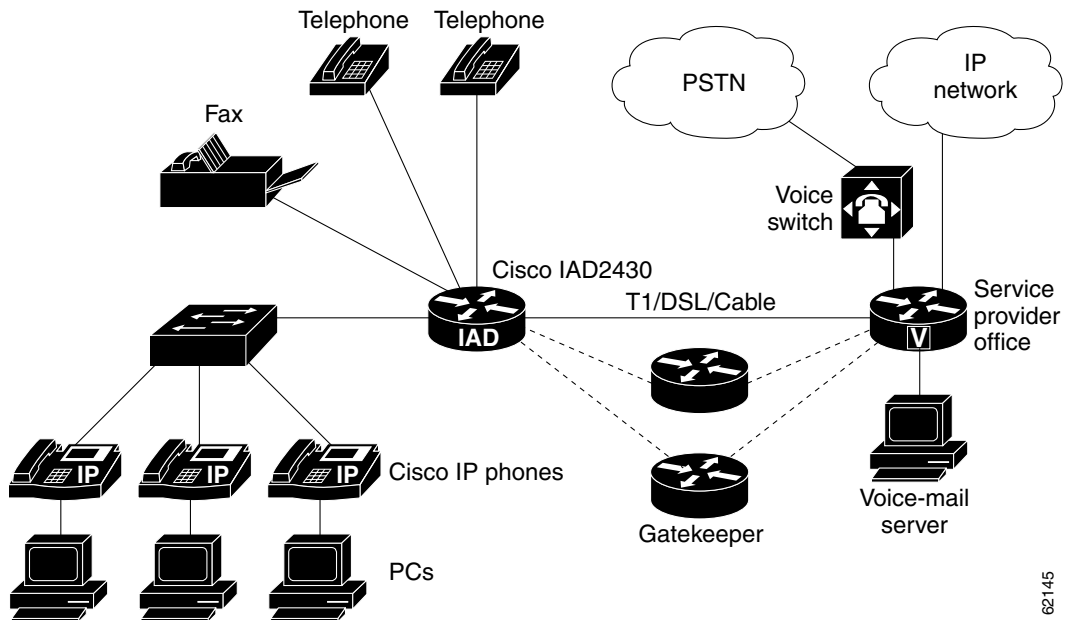
Figure 2-1 Cisco IOS Telephony Service for the Small- and Medium-Size Office



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Figure 2-2 shows a branch office with several Cisco IP phones connected to a Cisco IAD2420 series with the Cisco IOS Telephony Service. The Cisco IAD2420 series IAD is connected to a multiservice router at a service provider office. The multiservice router at the service provider office provides connection to the WAN and PSTN.

Figure 2-2 Cisco IOS Telephony Service for the Service Providers



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Additional Features

Provisioning

The router provides a mechanism to provision Cisco IOS Telephony Service. This provisioning interface allows you to perform the following functions:

- Assign directory numbers to the line appearances on each Cisco IP phone.
- Assign numbers to the speed-dial buttons on each Cisco IP phone.
- Assign caller identification information to each directory number.
- Assign directory numbers to phones other than Cisco IP phones attached to the system by using the standard voice-port and dial-peer configuration command line interface (CLI).
- Provide dial-plan information to route calls either to PSTN lines or voice network connections.

Hot-Plug Cisco IP Phones

The Cisco IP phones can be hot-plugged and unplugged to the Cisco IOS Telephony Service router without requiring a router reboot or manual status reset.

How to Configure Cisco IOS Telephony Service

Perform the following configuration tasks on your router.

- [Configuration Preparation, page 2-5](#) (required)
- [Required Configuration, page 2-9](#) (required)

Configuration Preparation

Before you start the basic configuration of Cisco IOS Telephony Service on your router, perform the following tasks. Each task in the list is required.

- [Downloading Required System Files, page 2-5](#)
- [Configuring DHCP for the Cisco IP Phone, page 2-6](#)

Downloading Required System Files

To download required image from the Software Center and to download other required system files, go to <http://www.cisco.com/cgi-bin/tablebuild.pl/ip-key> and perform the following tasks.



Note If you need to replace individual files, go to the following URL:
<http://www.cisco.com/cgi-bin/tablebuild.pl/ip-iostsp>

Step 1 Download the desired Cisco IOS software image from Software Center to the routers's Flash memory. The software Center button is located on the left panel.

Step 2 Get the appropriate Cisco IP phone firmware and download the firmware file to the router's Flash memory.

Step 3 Get the following GUI files and uncompress the two files:

- GUI_Files.tar for UNIX
- GUI_Files.zip for Windows

When you uncompress the two GUI files, you get the following files:

- admin_user.html
- telephony_service.html
- normal_user.html
- ephone_admin.html
- logohome.gif

Download the files to the router's Flash memory.

Step 4 Get the music-on-hold files and download the files to the router's Flash memory.

- Step 5** Get the tool command line (TCL) interactive voice response (IVR) script and download the files to the router's Flash memory.
- Step 6** Download the CiscoIOSTSP.zip file to a convenient location on your PC. You need the TSP files to set up individual PCs for the Cisco IP phone user. For further details, see [“Cisco IOS TSP Download and Setup”](#).

Configuring DHCP for the Cisco IP Phone

When the Cisco IP phone is turned on, it automatically queries for a DHCP server. Then the DHCP server responds by assigning an IP address to the Cisco IP phone. The IP address of the TFTP server is also provided through DHCP option 150. The Cisco IP phone then attempts to get the configuration file SEPDEFAULT.cnf and phone firmware from the TFTP server.



Note

The SEPDEFAULT.cnf file is autogenerated in the router's Flash memory when Cisco IOS Telephony Service is configured.

You can configure DHCP for the Cisco IP phones by performing any of the following tasks:

- [Configuring the DHCP IP Address Pool](#)
- [Configuring the DHCP IP Address for Each Cisco IP Phone](#)
- [Configuring DHCP Relay](#)

Configuring the DHCP IP Address Pool

This process creates a large shared pool of IP addresses, where all DHCP clients receive the same information, including the option 150 TFTP server IP address, which can be a problem if some (non-IP phone) clients need to use a different TFTP server address.

SUMMARY STEPS

1. `ip dhcp pool pool 1`
2. `network ip-address`
3. `option 150 ip ip-address`
4. `default-router ip-address`

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# <code>ip dhcp pool pool 1</code>	Creates a name for the DHCP server address pool and enters DHCP pool configuration mode.
Step 2	Router(config-dhcp)# <code>network ip-address</code>	Specifies the IP address of the network.

	Command	Purpose
Step 3	Router(config-dhcp)# option 150 ip <i>ip-address</i>	The option 150 command specifies the TFTP server address from which the Cisco IP phone downloads the image configuration file, SEPDEFAULT.cnf. This is your Cisco IOS Telephony Service router address.
Step 4	Router(config-dhcp)# default-router <i>ip-address</i>	The Cisco IP phones are directly connected to this router. This router is either a Cisco IOS Telephony Service router or any Cisco router attached to the Cisco IOS Telephony Service router. Note As long as the Cisco IP phones have connection to the Cisco IOS Telephony Service router, the Cisco IP phones are able to get the required network details.

Configuring the DHCP IP Address for Each Cisco IP Phone

This process creates a name for the DHCP server address pool and specifies IP, MAC, and hardware addresses.

SUMMARY STEPS

1. **ip dhcp pool** *phone 1*
2. **host** *ip-address*
3. **client-identifier** *mac-address*
4. **hardware address** *mac-address*
5. **option 150 ip** *ip-address*
6. **default-router** *ip-address*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ip dhcp pool <i>phone 1</i>	Creates a name for the DHCP server address pool and enters DHCP pool configuration mode.
Step 2	Router(config-dhcp)# host <i>ip-address</i>	Specifies the IP address you want the phone to get.
Step 3	Router(config-dhcp)# client-identifier <i>mac-address</i>	Specifies the MAC address of the phone. The MAC address is printed on a sticker and placed under each Cisco IP phone. Note You must use a 01 prefix number before the MAC address.
Step 4	Router(config-dhcp)# hardware address <i>mac-address</i>	Specifies the hardware address.

	Command	Purpose
Step 5	Router(config-dhcp)# option 150 ip <i>ip-address</i>	Specifies the TFTP server IP address from which the Cisco IP phone downloads the image configuration file, SEPDEFAULT.cnf. This is your Cisco IOS Telephony Service router IP address.
Step 6	Router(config-dhcp)# default-router <i>ip-address</i>	Specifies the IP address of the default router. The Cisco IP phones are directly connected to this router. This router is either a Cisco IOS Telephony Service router or any Cisco router attached to the Cisco IOS Telephony Service router. Note As long as the Cisco IP phones have connection to the Cisco IOS Telephony Service router, the Cisco IP phones are able to get the required network details.

Configuring DHCP Relay

This process configures DHCP Relay on the LAN interface where the Cisco IP phones are connected and enables the Cisco IOS DHCP Server feature. For further details about DHCP configuration, refer to the [Cisco IOS DHCP Server](#) document.



Note

By default, the Cisco IOS DHCP Server feature is enabled on your router. If the feature is disabled, enable the Cisco IOS DHCP Server feature on your router.

SUMMARY STEPS

1. **service dhcp**
2. **interface** *type number*
3. **ip helper-address** *ip-address*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# service dhcp	Enables the Cisco IOS DHCP Server feature on the router.
Step 2	Router(config)# interface <i>type number</i>	Enters interface configuration mode for the specified interface.
Step 3	Router(config-if)# ip helper-address <i>ip-address</i>	Specifies the helper address for any unrecognized broadcast for TFTP server and Domain Name System (DNS) server requests. For each server, a separate ip helper-address command is required if the servers are on different hosts. You can also configure multiple TFTP server targets by using the ip helper-address commands for multiple servers.

Required Configuration

When Cisco IOS Telephony Service is configured, the Cisco IP phones receive initial configuration information and phone firmware from the TFTP server. In most cases, the Cisco IP phones obtain the IP address of their TFTP server with the DHCP **option 150** command. For Cisco IOS Telephony Service operation, the TFTP server address obtained by the Cisco IP phones should point at the Cisco IOS Telephony Service router IP address. The Cisco IP phones attempt to transfer a configuration file called SEPDEFAULT.cnf. This file is automatically generated by the Cisco IOS Telephony Service router through the **ip source-address** command and placed in the router's Flash memory. The SEPDEFAULT.cnf file contains the IP address that the phones use to register for service, using the Skinny Client Control Protocol (SCCP). This IP address should correspond to a valid Cisco IOS Telephony Service router IP address (and may be the same as the router TFTP server address). Access to the SEPDEFAULT.cnf file must be granted through the **tftp-server** command on the router.

Similarly, when an analog telephone adapter (ATA) such as ATA-186 is attached to the Cisco IOS Telephony Service router, the ATA receives very basic configuration information and firmware from the TFTP server XMLDefault.cnf.xml file. Access to the XMLDefault.cnf.xml file must be granted by using the **tftp-server** command on the router. The XMLDefault.cnf.xml file is automatically generated by the Cisco IOS Telephony Service router with the **ip source-address** command and is placed in the router's Flash memory.

See the following sections for configuration tasks for Cisco IOS Telephony Service. Each task in the list is required except the tasks that are marked as optional.

- [Obtaining the IP Address of the Cisco IOS Telephony Service Router, page 2-9](#) (required)
- [Enabling Files on the TFTP Server, page 2-10](#) (required)
- [Associating Cisco IP Phones with the Cisco IOS Telephony Service Router, page 2-11](#) (required)
- [Creating Directory Numbers for Cisco IP Phones, page 2-12](#)(required)
- [Configuring Each Cisco IP Phone, page 2-13](#) (required)
- [Configuring Global Reset on Cisco IP Phones, page 2-14](#) (optional)
- [Configuring Reset for Specific Cisco IP Phones, page 2-15](#) (optional)

Obtaining the IP Address of the Cisco IOS Telephony Service Router

The process for obtaining the IP address of the Cisco IOS Telephony Service router involves the use of the **ip source-address** command in the telephony-service configuration mode:

SUMMARY STEPS

1. **telephony-service**
2. **ip source-address** *ip-address* [**port** *port*] [**any-match** | **strict-match**]

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# ip source-address <i>ip-address</i> [port <i>port</i>] [any-match strict-match]	<p>Identifies the IP address and port number the Cisco IOS Telephony Service router uses for the IP phone service. The default port is 2000.</p> <p>The ip source-address command helps the router to autogenerate the SEPDEFAULT.cnf file and the XMLDefault.cnf.xml file, which are stored in the router's Flash memory. The SEPDEFAULT.cnf file contains the IP address of one of the Ethernet ports of the router to which the phone should register; the XMLDefault.cnf.xml file contains the IP address of one of the Ethernet ports of the router to which the ATA adapter should register. These files are specific to the router and cannot be shared by multiple routers.</p> <p>Use the any-match keyword to instruct the router to permit Cisco IP phone registration, and use the strict-match keyword to instruct the router to reject Cisco IP phone registration attempts if the IP server address used by the phone does not exactly match the source address.</p> <p>Tip Make sure that the SEPDEFAULT.cnf file and the XMLDefault.cnf.xml files are registered to the TFTP server. See the “Enabling Files on the TFTP Server” section on page 2-10.</p>

Enabling Files on the TFTP Server

When the Cisco IP phone contacts the TFTP server, it requests a configuration (SEPDEFAULT.cnf) file. The SEPDEFAULT.cnf file contains the IP address of the Cisco IOS Telephony Service router.

**Tip**

Make sure that the router's Flash memory contains the SEPDEFAULT.cnf file, the XMLDefault.cnf.xml file, and the appropriate phone firmware before enabling access to the phone firmware.

SUMMARY STEPS

1. **tftp-server flash:SEPDEFAULT.cnf**
2. **tftp-server flash:XMLDefault.cnf.xml**
3. **tftp-server flash:firmware**

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# tftp-server flash:SEDEFAULT.cnf	<p>Enables TFTP access to the SEDEFAULT.cnf file on the TFTP server so that the Cisco IP phone can get the file.</p> <p>Note The filename is case-sensitive.</p>
Step 2	Router(config)# tftp-server flash:XMLDefault.cnf.xml	<p>(Optional) This step is required for ATA-186 to register as an analog adapter and not as an IP phone to the Cisco IOS Telephony Service router.</p> <p>This command enables TFTP access to the XMLDefault.cnf.xml file on the TFTP server so that the ATA-186 can get the firmware file. All the voice ports get the XMLDefault.cnf.xml file.</p> <p>Tip For ATA features to work in ATA style, the analog phones attached to an ATA must register as ATA voice ports and not as Cisco IP phone virtual voice ports. For more details, see the ATA-186 documents. To verify the ATA voice ports, use the show ephone command to confirm the ATA registration.</p> <p>Note The filename is case-sensitive.</p>
Step 3	Router(config)# tftp-server flash:firmware	<p>Specifies the phone firmware that the Cisco IP phone can download from the TFTP server.</p> <p>If you are using the Cisco IP Phone 7960, the Cisco IP Phone 7940, the Cisco IP Phone 7910, and Cisco IP Conference Station 7935, enter the tftp-server flash: command and specify the phone firmware for the Cisco IP phone to download.</p> <p>Note You must manually copy all the phone firmware files to the Flash memory of the Cisco IOS Telephony Service router.</p>

Associating Cisco IP Phones with the Cisco IOS Telephony Service Router

Before associating the Cisco IP phones, see the “[Memory Requirements](#)” section on page 1-4 to find out the maximum number of Cisco IP phones you can have on your Cisco IOS Telephony Service router.

SUMMARY STEPS

1. **max-ephones** *max-phones*
1. **max-dn** *max-directory-number*
2. **load** {7960-7940 | 7910 | 7935} *firmware*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config-telephony-service)# max-ephones <i>max-phones</i>	Configures the maximum number of Cisco IP phones supported by the Cisco IOS Telephony Service router. The default is 0. The maximum number of IP phones is platform dependent. See the “ Memory Requirements ” section on page 1-4 for details. Note You can increase the number of phones, but after the maximum allowable number is configured, you cannot reduce the maximum number without rebooting the router.
Step 2	Router(config-telephony-service)# max-dn <i>max-directory-number</i>	Configures the maximum number of directory numbers supported by the Cisco IOS Telephony Service router. The default is 0. The maximum directory number is platform dependent. See the “ Memory Requirements ” section on page 1-4 for details. Note You can increase the directory numbers, but after the maximum allowable number is configured, you cannot reduce the maximum number without rebooting the router.
Step 3	Router(config-telephony-service)# load {7960-7940 7910 7935} <i>firmware</i>	Identifies the Cisco IP phone firmware used by the Cisco IP phone type. You must enter this command for each type of phone. Note The Cisco IP Phone 7960 and Cisco IP Phone 7940 have the same phone firmware. Note When you enter the load command, you do not use the extension of the file; for example, .bin. Timesaver ATA does not use the load command. For details see the “ Enabling Files on the TFTP Server ” section on page 2-10.

Creating Directory Numbers for Cisco IP Phones

The process for creating directory numbers involves declaring a directory number, a number for a Cisco IP phone, and a user name associated with the directory number.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number* [**secondary number**] [**no-reg** [**both** | **primary**]]
3. **name** *name*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configure the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. See the “ Memory Requirements ” section on page 1-4.
Step 2	Router(config-ephone-dn)# number <i>number</i> [secondary <i>number</i>] [no-reg [both primary]]	Configures a valid number for the Cisco IP phone. The secondary keyword allows you to associate a second telephone number with an ephone-dn so that the IP phone line can be called by dialing either the main or the secondary phone number. Unless you specify one of the option keywords (both or primary) after the no-reg keyword, the secondary number is not registered.
Step 3	Router(config-ephone-dn)# name <i>name</i>	Configures a username associated with a directory number. You must follow the pattern specified in the directory command in telephony-service configuration mode to associate the usernames for the directory. The pattern for the usernames for the directory is set either with first-name-first or last-name-first .

Configuring Each Cisco IP Phone

Each Cisco IP phone must be configured individually on the Cisco IOS Telephony Service router to receive support in the LAN environment. You must assign a number to the phone lines by entering the **ephone-dn** command and then you configure each physical Cisco IP phone by entering the **ephone** command.

SUMMARY STEPS

1. **ephone** *tag*
2. **mac-address** *mac-address*
3. **button** *button-number:dn-tag button-number:dn-tag*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone <i>tag</i>	Enters ephone (Ethernet phone) configuration mode to register Cisco IP phones. The maximum Cisco IP phone limit is platform dependent. See the “Memory Requirements” section on page 1-4 .
Step 2	Router(config-ephone)# mac-address <i>mac-address</i>	Specifies the MAC address of the registering phone.
Step 3	Router(config-ephone)# button <i>button-number:dn-tag</i> <i>button-number:dn-tag</i>	Assigns a button number to the Cisco IP phone directory number. The argument <i>button-number:dn-tag</i> , for example, can use the values 1:1, 2:4, or 3:14. In this example, button 1 corresponds to directory number 1 (ephone-dn 1), button 2 corresponds to directory number 4, and button 3 corresponds to directory number 14. The buttons correspond to the phone lines on the Cisco IP phone.

Configuring Global Reset on Cisco IP Phones

This process globally resets the Cisco IP phones associated with the Cisco IOS Telephony Service router after the required configuration is complete.

SUMMARY STEPS

1. **telephony-service**
2. **reset** {**all** *seconds* | **mac-address** *mac-address*}

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# reset { all <i>seconds</i> mac-address <i>mac-address</i> }	Resets the Cisco IP phone associated with the Cisco IOS Telephony Service router. Use the all keyword to reset all Cisco IP phones specifying the time interval using the <i>seconds</i> argument. The range is from 0 to 15 seconds. There is no default. Use the mac-address keyword to reset a specific Cisco IP phone.

Configuring Reset for Specific Cisco IP Phones

This process resets a specific Cisco IP phone after the required configuration is complete.

SUMMARY STEPS

1. `ephone tag`
2. `reset`

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# <code>ephone tag</code>	Enters ephone configuration mode to register Cisco IP phones.
Step 2	Router(config-ephone)# <code>reset</code>	Resets a specific Cisco IP phone in ephone configuration mode.

Verification and Troubleshooting

- [Verifying Cisco IOS Telephony Service Configuration, page 2-15](#)
- [Troubleshooting the Cisco IOS Telephony Service Router, page 2-16](#)

Verifying Cisco IOS Telephony Service Configuration

To verify that the Cisco IOS Telephony Service is enabled, perform the following steps:

-
- Step 1** Enter the `show run` command to verify the configuration.
 - Step 2** Enter the `show telephony-service all` command to verify that Cisco IOS Telephony Service router is enabled.
 - Step 3** Verify that DHCP is configured.
 - Step 4** Verify that TFTP is configured.
 - Step 5** Enter the `dir` command to verify that the SEPDEFAULT.cnf file, XMLDefault.cnf.xml file, and the phone firmware files are stored in the router's Flash memory.
 - Step 6** Enter the `show ephone [mac-address]` command to verify all Cisco IP phones in the network.
-

Troubleshooting the Cisco IOS Telephony Service Router

To troubleshoot the Cisco IOS Telephony Service router, perform the following steps:

-
- Step 1** Enter the **show ephone** command to display all registered phones. If no phones are registered, then perform the following tasks:
- Configure the Cisco IOS Telephony Service router.
 - Check DHCP configuration, including the default router and the TFTP server address (option 150).
 - Enter the **dir** command to check that the required files are in the router's Flash memory.
 - Check that the **tftp-server** command is set for the required files.
 - Enter the **debug ephone register mac-address** command to display Cisco IP phone registration activity.
 - Enter the **debug ip dhcp** command to confirm DHCP operation.
- Step 2** Enter the **show ephone command** to display all registered phones. If phones are registered and are displayed, then perform the following:
- Check that the phone button binding to the directory number is correct.
 - Check that the Cisco IP phones show as registered.
 - Verify the IP parameter settings on the Cisco IP phone, using the Settings display on the phone.
 - Check that the keepalive count is being updated when you enter the **show ephone** command.
 - Reset the phone and observe the re-registration by entering the **debug ephone register mac-address** command to display the Cisco IP phones.
 - Enter the **show ephone-dn summary** command to check the state of the Cisco IP phone lines.
 - Check the IP address of the phone and attempt to ping the address.
- Step 3** Enter the **debug ephone keepalive** command to set keepalive debugging for the Cisco IP phones.
- Step 4** Enter the **debug ephone state** command to set state debugging for the Cisco IP phones.
-

To troubleshoot other areas of the Cisco IOS Telephony Service router, use the following commands:

- To set detail debugging for a Cisco IP phone, use the **debug ephone detail** command.
- To set error debugging for a Cisco IP phone, use the **debug ephone error** command.
- To set message waiting indication (MWI) debugging for a Cisco IP phone, use the **debug ephone MWI** command.
- To set call statistics debugging for a Cisco IP phone use the **debug ephone statistics** command.
- To provide voice-packet-level debugging and print the contents of one voice packet in every 1024 voice packets, use the **debug ephone pak** command.
- To provide raw low-level protocol debugging display for all SCCP messages, use the **debug ephone raw** command.
- To provide debugging for local directory search, use the **debug ip http token** command.
- To troubleshoot HTTP authentication problems, use the **debug ip http authentication** command.

- To show the URLs accessed from the router, use the **debug ip http url** command.
- To display HTTP server transaction processing, use the **debug ip http transaction** command.

For further debugging, you can use the **debug** commands in the [Cisco IOS Debug Command Reference](#), Release 12.2.

Monitoring and Maintaining Cisco IOS Telephony Service

To monitor and maintain the Cisco IOS Telephony Service router, enter the following commands:

Command	Purpose
Router# show run	Displays the configuration.
Router# show telephony-service all	Displays the detailed configuration of all the Cisco IP phones, voice ports, and dial peers of the Cisco IOS Telephony Service router.
Router# show telephony-service dial-peer	Displays the output of the dial peers of the Cisco IOS Telephony Service router.
Router# show telephony-service ephone-dn	Displays Cisco IP phone destination number of the Cisco IOS Telephony Service router.
Router# show telephony-service voice-port	Displays output for the voice ports of the Cisco IOS Telephony Service router.
Router# show ephone [mac-address]	Displays Cisco IP phone output.
Router# show ephone-dn tag	Displays Cisco IP phone destination number.
Router# show ephone summary	Displays a summary of all Cisco IP phones.
Router# show ephone-dn summary	Displays a summary of all Cisco IP phone destination numbers.
Router# show voice port summary	Displays a summary of all voice ports.
Router# show dial-peer voice summary	Displays a summary of all voice dial peers.

Configuration Examples

This section provides an example of the required Cisco ITS configuration, with some of the additional options that are discussed in the [“Additional Configuration Tasks”](#) chapter.


Note

Commands found in the [“Additional Configuration Tasks”](#) chapter are in boldface.

```

!
version 12.2
no parser cache
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 3620
!
logging rate-limit console 10 except errors
!
!
    ip dhcp pool mypool
    network 10.0.0.0 255.255.0.0
    option 150 ip 10.0.0.1
    default-router 10.0.0.1

!
ip subnet-zero
!
!
no ip domain-lookup
!
no ip dhcp-client network-discovery
lcp max-session-starts 0
!
!
!
translation-rule 1
    Rule 0 85... 919785
!
!
!
interface FastEthernet0/0
    ip address 10.0.0.1 255.255.0.0
    duplex auto
    speed auto
!
interface Serial0/0
    no ip address
    shutdown
    no fair-queue
    clockrate 2000000
!
interface Serial0/1
    no ip address
    shutdown
    clockrate 2000000
!

```

```

ip classless
ip route 0.0.0.0 0.0.0.0 10.0.0.10
!
!
!
tftp-server flash:SEPDEFAULT.cnf
tftp-server flash:XMLDefault.cnf.xml
tftp-server flash:P004E302.bin
tftp-server flash:P003E302.bin

snmp-server packetsize 4096
snmp-server manager
call rsvp-sync
!
voice-port 1/0/0
!
voice-port 1/0/1
!
!
mgcp profile default
!
dial-peer cor custom
  name call911
  name call1800
  name call1900
!
!
dial-peer cor list allowall
  member call911
  member call1800
  member call1900
!
dial-peer cor list allow1800
  member call1800
!
dial-peer cor list alloww1800and1900
  member call1800
  member call1900
!
!
!
telephony-service
  load 7910 P004E320
  load 7960-7940 P003E320
  url information http://10.0.0.51/GetTelecasterHelpText.ASP
  url directories http://10.0.0.4/localdirectory
  url services http://10.0.0.51/12345/i_want_url/how_long_is_this_url/test.html
  ip source-address 10.0.0.1 port 2000
  max-ephones 24
  max-dn 48
  max-conferences 4
  keepalive 30
  dialplan-pattern 1 408555.... extension-length 4 no-reg
  dialplan-pattern 2 919555.... extension-length 4 no-reg
  moh minuet.au
  time-format 12
  date-format mm-dd-yy
  transfer-pattern 1...
  transfer-pattern 2...
  transfer-pattern 7...
  transfer-pattern 3...
  interdigit timeout 5
!
!

```

```

ephone-dn 1
 number 1111
 name user1
 call-forward busy 4001
 call-forward noan 4001 timeout 10
 cor incoming allowall
 translate called 1
 hold-alert 15 idle
!
!
ephone-dn 2
 number 2222
 name user2
 call-forward busy 4001
 call-forward noan 4001 timeout 10
 cor incoming allow1800
 cor incoming alloww1800and1900
 cor incoming allowall 2 4000 - 4999
 cor incoming allowall 2 4000 - 5000
 hold-alert 30 originator
!
!
ephone-dn 3
 number 3333
 name user2
 call-forward busy 4001
 call-forward noan 4001 timeout 10
 cor outgoing alloww1800and1900
!
!
ephone-dn 4
 number 1222
 name user3
 hold-alert 45 shared
!
!
ephone-dn 5
 number 2111
 name user4
!
!
ephone-dn 6
 number 3111
 name user5
!
!
ephone-dn 7
 number 4111
 name user6
!
!
ephone-dn 8
 number 7111
 name user6
 intercom A2222 barge-in
!
ephone-dn 9
 number 4444
 name "test test"
!
!
ephone-dn 10
 number ABCD1111
 intercom ABCD2222

```



```
!  
!  
ephone-dn 11  
  number ABCD2222  
  intercom ABCD1111  
!  
!  
ephone-dn 12  
  number A5004  
  intercom A5003  
!  
!  
ephone-dn 13  
  number A5003  
  intercom A5004  
!  
!  
ephone-dn 14  
  number 1333  
!  
!  
ephone-dn 15  
  number ABCD3333  
  intercom ABCD4444  
!  
!  
ephone-dn 16  
  number ABCD4444  
  intercom ABCD3333  
!  
!  
ephone-dn 18  
  number ABCD1133  
  intercom ABCD3311 barge-in  
!  
!  
ephone-dn 19  
  number ABCD3311  
  intercom ABCD1133 barge-in  
!  
!  
ephone-dn 21  
  number 1010  
  name "paging"  
  paging  
!  
!  
ephone-dn 22  
  number A5333  
  intercom A5444  
!  
!  
ephone-dn 23  
  number A5444  
  intercom A5333  
!  
!  
ephone-dn 32  
  number 4001  
  name "VOICEMAIL1"  
  no huntstop  
  preference 0  
!  
!
```

```

ephone-dn 33
  number 4001
  name "VOICEMAIL2"
  no huntstop
  preference 1
  !
  !
ephone-dn 40
  number 2333
  !
  !
ephone-dn 41
  number 1222
  !
  !
ephone-dn 48
  number 3030
  name "user8"
  paging ip 224.1.1.112 port 2001
  !
  !
ephone 1
  mac-address 0003.6B54.BB15
  button 1:1 2:4 3:14 4:10 6:18
  paging-dn 21
  !
  !
  !
ephone 2
  mac-address 0003.6B09.63CF
  button 1:2 2:5 3:40 4:11 5:12
  paging-dn 21
  !
  !
  !
ephone 3
  mac-address 0003.6B54.C20F
  button 1:3 2:6 3:22 4:13 5:15 6:19
  paging-dn 21
  !
  !
  !
ephone 4
  mac-address 0003.6B40.892A
  button 1:9 3:7 5:16
  paging-dn 21
  !!
  !
  !
line con 0
line aux 0
line vty 0 4
  login
  !
  !
end

```



Additional Configuration Tasks

This chapter describes additional tasks that are optional for configuring Cisco IIO Telephony Service (ITS).

Contents

- [Information About Additional Configuration Tasks, page 3-1](#)
- [Troubleshooting, Monitoring, and Maintaining Cisco ITS, page 3-20](#)
- [Configuration Examples, page 3-21](#)

Information About Additional Configuration Tasks

Although the additional tasks described in this section are optional, they are worth considering for the possible configuration of the following features:

- Cisco IP date and time display
- Dial-plan patterns
- Local directory naming order
- Keepalive
- Interdigit timeout
- Three-party G.711 conference calls
- Music on hold
- Call transfer
- URL provisioning
- Speed-dial
- On-hold call notification
- Preference for the attached dial peer for a directory number
- Class of restriction
- Call forward
- Caller-ID blocking

- Translation rules
- Huntstop enable or disable
- Top-line description on Cisco IP phone display
- Two-way intercom between two IP phones
- Paging
- Interactive voice response (IVR) auto-attendant

Configuring Date and Time

This process configures the date and time format that appears on Cisco IP phones.

SUMMARY STEPS

1. **telephony-service**
2. **date-format** { **mm-dd-yy** | **dd-mm-yy** }
3. **time-format** { **12** | **24** }

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# date-format { mm-dd-yy dd-mm-yy }	Sets the date display format on all Cisco IP phones attached to the router. The default is set to mm-dd-yy .
Step 3	Router(config-telephony-service)# time-format { 12 24 }	Sets the time display format on all Cisco IP phones attached to the router. The default is set to 12 hours.

Configuring Dial-Plan Pattern

This process configures a global prefix for the expansion of abbreviated extension numbers into fully qualified E.164 numbers.

SUMMARY STEPS

1. **telephony-service**
2. **dialplan-pattern** *tag prefix-pattern extension-length length* [**no-reg**]

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# dialplan-pattern <i>tag prefix-pattern extension-length length [no-reg]</i>	Creates a global prefix that can be used to expand the abbreviated extension numbers into fully qualified E.164 numbers. The extension-length keyword enables the system to convert a full E.164 telephone number back to an extension number for the purposes of caller ID display, received, and missed call lists. The no-reg keyword provides dialing flexibility and prevents the E.164 numbers in the dial peer from registering to the gatekeeper. You have the option not to register some specific numbers to the gatekeeper so that those numbers can be used for other telephony services.

Configuring Local Directory

This task configures the local directory naming order.

SUMMARY STEPS

1. **telephony-service**
2. **directory {first-name-first | last-name-first}**

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# directory <i>{first-name-first last-name-first}</i>	Defines the local directory naming order and points the directory access to an HTTP location. Note The actual directory of names and phone numbers is built using the name command and the number command in ephone-dn configuration mode. When the command is set with the first-name-first keyword, you see the directory information displayed on the phone, for example, Jane E. Smith; and when the command is set with the last-name-first keyword, you see the directory information displayed on the phone, for example, Smith, Jane E.

Configuring Keepalive

This task configures the time intervals for keepalive messages.

SUMMARY STEPS

1. **telephony-service**
2. **keepalive** *seconds*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# keepalive <i>seconds</i>	Configures the time interval between sending keepalive messages to the router used by the Cisco IP phones. The range is 10 to 65,535 seconds. The default keepalive is set at 30 seconds, so the keepalives are sent every 30 seconds.

Configuring Interdigit Timeout

This task configures the interdigit timeout value for all Cisco IP phones.

SUMMARY STEPS

1. **telephony-service**
2. **timeouts interdigit** *seconds*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# timeouts interdigit seconds	<p>Configures the interdigit timeout value for all Cisco IP phones attached to the router.</p> <p>The interdigit timeout specifies the number of seconds that the system waits after the caller has entered the initial digit or a subsequent digit of the dialed string. If the timeout ends before the destination is identified, a tone sounds and the call ends. This value is important when using variable-length dial peer destination patterns (dial plans). For more information on setting dial plans, refer to the “Configuration Dial Plans, Dial Peers, and Digit Manipulation” chapter of the <i>Cisco IOS Voice, Video, and Fax Configuration Guide, Release 12.2</i>.</p> <p>The <i>seconds</i> argument is the interdigit timeout wait time in seconds. A valid entry is an integer from 2 to 120 seconds. The default is 10 seconds.</p>

Configuring Three-Party G.711 Conference Calls

Cisco IOS Telephony Service supports three-party conference for local and on-net calls. To participate in the conference, all conference participants must use G.711. This service also supports conversion between G.711 u-law and a-law. The maximum number of simultaneous conferences is platform-specific.

SUMMARY STEPS

1. **telephony-service**
2. **max-conferences** *max-conference-numbers*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# max-conferences <i>max-conferencenumbers</i>	<p>Sets the maximum number of simultaneous three-party conferences supported by the router. The default is half of the maximum simultaneous three-party conferences per platform.</p> <p>The maximum number of simultaneous three-party conferences supported by the router is platform dependent:</p> <ul style="list-style-type: none"> • Cisco 1750—8 • Cisco 1751—8 • Cisco 2600 series—8 • Cisco 2600-XM series—8 • Cisco 3620—8 • Cisco IAD2420 series—8 • Cisco 3640—8 • Cisco 3660—16 • Cisco 3725—16 • Cisco 3745—16

Configuring Music on Hold

The music on hold (MOH) feature supports .au and .wav format files. Music on hold works only for G.711 on-net Voice over IP (VoIP) calls and Public Switched Telephone Network (PSTN) calls. For all other calls, tone on hold works where the user hears a periodic beep. The internal calls between Cisco IP phones do not get music on hold, instead they get tone on hold.

SUMMARY STEPS

1. **telephony-service**
2. **moh** *filename*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# moh <i>filename</i>	Configures music on hold. Note The music file should be in the router's Flash memory. This file should be in G.711 format. The files can be in .wav or .au file format; however, the file format must contain 8-bit 8-kHz data; for example, Consultative Committee for International Telegraph and Telephone (CCITT) a-law or u-law data format.

Enabling Transfer of Calls

This task enables call transfer between Cisco IP phones and non-IP phones.

SUMMARY STEPS

1. **telephony-service**
2. **transfer-pattern** *transfer-pattern*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# transfer-pattern <i>transfer-pattern</i>	Allows transfer of telephone calls to other non-IP phone numbers.

Configuring URL Provisioning

The Cisco IP Phone 7960 and the Cisco IP Phone 7940 have customized function buttons that show the phone call status and activities on the display panels. These customized function buttons also invoke programmable noncall-related services. The four buttons—Services, Directories, Messages, and Information (the i button)—are linked to appropriate feature operations through programmable URLs. You cannot customize the Settings button.

Specific URLs are provisioned on the Cisco IP phone; these URLs point to XML-based web pages formatted with XML tags that the Cisco IP phone understands and uses. When you press a function button, the Cisco IP phone uses the configured URL to access the appropriate XML web page for instructions. The web page sends instructions to the Cisco IP phone to display information on the screen for you to navigate. You can select options and enter information by using the softkeys and the scroll button.

The Cisco IP Phone 7960 and Cisco IP Phone 7940 can support four URLs in association with the four programmable feature keys on the IP phones. The four feature keys on the IP phone are configured using the keywords. The fifth key—Settings—is managed entirely by the phone. Operation of these services is determined by the IP phone capabilities and the content of the referenced URL.

SUMMARY STEPS

1. **telephony-service**
2. **url** { **directory** | **information** | **messages** | **services** } *url*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# url { directory information messages services } <i>url</i>	<p>Provisions URLs for use by the Cisco IP phones. The four keywords directory, information, messages, and services correspond with the four feature keys on the IP phone: Directories, Information, Messages, and Services. The purpose of the url command is simply to provision the URLs through the SEPDEFAULT.cnf configuration file supplied by the Cisco IOS Telephony Service router to the Cisco IP phones during phone registration. The maximum character length for the URL is 128.</p> <p>You can disable the local directory by entering url directories none. You must reset the Cisco IP phones before the url command can take effect.</p> <p>Note By default, the router automatically uses the local directory service. Provisioning the directory URL to select an external directory resource disables the Cisco IOS Telephony Service local directory service.</p>

Configuring Speed-Dial

This task configures speed-dial for numbers that are used frequently.

SUMMARY STEPS

1. **ephone** *tag*
2. **speed-dial** *button-number directory-number*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone <i>tag</i>	Enters ephone configuration mode to register Cisco IP phones. The maximum number of Cisco IP phones is platform dependent. For details, see the “ Memory Requirements ” section on page 1-4.
Step 2	Router(config-ephone)# speed-dial <i>button-number</i> <i>directory-number</i>	Sets speed-dial buttons on a Cisco IP phone. Note Although 20 speed-dials can be configured on the Cisco IP phone, ATA phones support only 9 speed-dials with Cisco IOS Telephony Service: *1, *2, *3, *4, *5, *6, *7, *8, and *9.

Configuring On-Hold Call Notification

This service adds an audible alert option as a reminder to the IP phone user that a call is waiting on-hold.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **name** *name*
4. **hold-alert** *timeout* { **idle** | **originator** | **shared** }

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “ Memory Requirements ” section on page 1-4.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid directory number for the Cisco IP phone that receives on-hold call notification.

	Command	Purpose
Step 3	Router(config-ephone-dn) # name <i>name</i>	Assigns the IP phone number a name for display.
Step 4	Router(config-ephone-dn) # hold-alert <i>timeout</i> { idle originator shared }	<p>Sets audible alert notification on the Cisco IP phone for alerting the user about on-hold calls. The <i>timeout</i> argument specifies the time interval in seconds from the time the call is placed on hold to the time the on-hold audible alert is generated. The alert is repeated at the end of the set <i>timeout</i> value.</p> <p>When the idle keyword is enabled, a 1-second burst of ringing on the phone is generated on the IP phone that placed the call into the hold state, only if the phone is in the idle state. If the phone is in active use, no on-hold alert is generated.</p> <p>When the originator keyword is enabled, a 1-second burst of ringing is generated on the phone that placed the call into the hold state if the phone is in the idle state. If the phone is in use on another call, an audible beep is generated (call-waiting tone).</p> <p>Note From the perspective of the originator of the call on-hold, the shared and the originator keywords provide the same functionality.</p> <p>When the shared keyword is enabled, a 1- second burst of ringing is generated for all the idle phones that share the same line appearance. If the phones are in use, they do not get an audio beep alert. Only the phone that initiated the call, if busy, hears a call-waiting beep.</p>

Configuring Preference

This task configures the preference for the attached dial peer for a directory number.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **preference** *preference-order*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config) # ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “Memory Requirements” section on page 1-4 .
Step 2	Router(config-ephone-dn) # preference <i>preference-order</i>	Sets preference for the attached dial peer for a directory number. The range is from 0 to 10. The default is 0.

Configuring Class of Restriction

Class of restriction (COR) is used to specify which incoming dial peer can use which outgoing dial peer to make a call. Each dial peer can be provisioned with an incoming and an outgoing COR list.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **cor** {**incoming** | **outgoing**} *cor-list-name*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “Memory Requirements” section on page 1-4 .
Step 2	Router(config-ephone-dn)# cor { incoming outgoing } <i>cor-list-name</i>	Configures a COR on the dial peers associated with a directory number. For more information on setting COR, see the “Configuring Dial Peer Matching Features” section in the “Configuration Dial Plans, Dial Peers, and Digit Manipulation” chapter of the <i>Cisco IOS Voice, Video, and Fax Configuration Guide, Release 12.2</i> .

Configuring Call Forward

This task configures the forwarding of calls to other Cisco IP phones.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **call-forward all** *directory-number*
4. **call-forward busy** *directory-number*
5. **call-forward noan** *directory-number* **timeout** *seconds*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “Memory Requirements” section on page 1-4 .
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid directory number for the Cisco IP phone that receives on-hold call notification.

	Command	Purpose
Step 3	Router(config-ephone-dn) # call-forward all <i>directory-number</i>	Configures call-forwarding for all incoming calls on one of the lines of a Cisco IP phone to another telephone.
Step 4	Router(config-ephone-dn) # call-forward busy <i>directory-number</i>	Configures call-forwarding to another number when the Cisco IP phone is busy.
Step 5	Router(config-ephone-dn) # call-forward noan <i>directory-number timeout seconds</i>	Configures call-forwarding to another number when no answer is received from the Cisco IP phone. The timeout keyword sets the waiting time before the call is forwarded to another phone. The time is set in seconds. The range is from 3 to 60,000. Note It is mandatory to specify and enter a timeout number in seconds, otherwise an error message “incomplete command” will appear on the console.

Configuring Caller ID Blocking

This task configures caller ID blocking for outbound calls from a Cisco IP phone.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **caller-id block**

DETAILED STEPS

	Command	Purpose
Step 1	Router(config) # ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “Memory Requirements” section on page 1-4.
Step 2	Router(config-ephone-dn) # caller-id block	Configures caller ID blocking for outbound calls originated from the ephone-dn. This commands requests that the far-end gateway device blocks display of the calling party information, for calls received by the far-end gateway from the ephone-dn. This configuration does not affect the ephone-dn calling party information display for inbound calls received by the ephone-dn. By default, caller ID is not blocked on calls originating from the Cisco IP phone.

Applying Translation Rule

Translation rules are a powerful general-purpose number manipulation mechanism supported by Cisco IOS software that can be used to perform operations such as automatically adding telephone area and prefix codes to dialed numbers. The translation rules are applied to the voice ports created by the ephone-dn.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **translate** { **called** | **calling** } *translation-rule-tag*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “ Memory Requirements ” section on page 1-4.
Step 2	Router(config-ephone-dn)# translate { called calling } <i>translation-rule-tag</i>	<p>Selects a translation rule to numbers dialed by Cisco IP phone users. The called keyword translates the called number, and the calling keyword translates the calling number.</p> <p>Note Appropriate translation rules should be created on the VoIP configuration level for the translate command to take effect.</p> <p>The <i>translation-rule-tag</i> argument is the reference number of the translation rule. Valid entries are 1 to 2,147,483,647. For further details, see the “Configuration Dial Plans, Dial Peers, and Digit Manipulation” chapter of the <i>Cisco IOS Voice, Video, and Fax Configuration Guide, Release 12.2</i>.</p>

Disabling and Reenabling Huntstop



Note

In ephone-dn configuration mode, huntstop is set by default.

This task disables or reenables huntstop.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **no huntstop**
3. **huntstop**

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “ Memory Requirements ” section on page 1-4.
Step 2	Router(config-ephone-dn)# no huntstop	Disables huntstop.
Step 3	Router(config-ephone-dn)# huntstop	Enables huntstop.

Enabling a Top-Line Description

This task enables an alphanumeric description label in the top black bar on the display screen for a Cisco IP Phone 7960 and Cisco IP Phone 7940 connected to a Cisco IOS Telephony router.

SUMMARY STEPS

1. **ephone-dn** *tag*
2. **number** *number*
3. **description** *text-string-with-spaces*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid number for the Cisco IP phone.
Step 3	Router(config-ephone-dn)# description <i>text-string-with-spaces</i>	<p>Enables an alphanumeric description label in the top black bar on the display screen for a Cisco IP Phone 7960 and Cisco IP Phone 7940.</p> <p>The <i>text-string-with-spaces</i> argument is a meaningful alphanumeric text string up to 16 characters in length, including spaces.</p> <p>Note Although 32 characters can fit in the top line of the phone display, we recommend using 16 characters. If more than 16 characters are used, the extra characters will erase the existing time and date display in the black bar.</p>

Configuring Intercom

The Cisco IOS Telephony Service supports intercom functionality for one-way and press-to-answer voice connections. This functionality is implemented using specially configured (from CLI or web only) speed-dial buttons that allow a call to be placed to the selected directory number (DN) and to make the called DN automatically answer the call in speakerphone mode, with mute activated. An alerting beep is played to the recipient as soon as the call is auto-answered, which provides a one-way voice path from the initiator to the recipient. To respond to the intercom call and open two-way voice, the recipient presses the Mute button to deactivate the mute (or in the case of a Cisco IP Phone 7910, lifts the handset).

The intercom configuration dedicates a pair of ephone-dns for use as a “press to talk” two-way intercom between two IP phones. Intercom lines cannot be used in shared-line configurations. If an ephone-dn is configured for intercom operation, it must be associated to one IP phone only. The intercom attribute causes an IP phone line (ephone-dn) to operate as autodial for outbound calls and auto-answer-with-mute for inbound calls.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **name** *name*
4. **intercom** *directory-number* [**barge-in** | **no-auto-answer**] [**label** *label*]
5. Repeat step 1 through step 4 for the second Cisco IP phone that requires the intercom feature.
6. **exit**
7. **ephone** *tag*
8. **button** *button-number:dn-tag button-number:dn-tag button-number:dn-tag*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines. The maximum directory number is platform dependent. For details, see the “ Memory Requirements ” section on page 1-4.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid intercom number for the Cisco IP phone that receives the intercom.
Step 3	Router(config-ephone-dn)# name <i>name</i>	Configures a username associated with a directory number to receive the intercom. “Intercom” is used in place of the <i>name</i> argument.

	Command	Purpose
Step 4	Router(config-ephone-dn)# intercom <i>directory-number</i> [barge-in no-auto-answer] [label <i>label</i>]	Defines the directory number for the Cisco IP phone that connects with another IP phone for the intercom feature. The intercom command dedicates a pair of ephone-dns for use as a “press to talk” two-way intercom between two IP phones. The barge-in keyword allows inbound intercom calls to force an existing call into the call-hold state and allows the intercom call to be immediately answered. The no-auto-answer keyword creates a connection for the IP phone line resembling private line automatic ringdown (PLAR). The label keyword defines a text label for the intercom.
Step 5	Repeat step 1 through step 4 for the second Cisco IP phone that requires the intercom feature.	Note For the intercom feature to work, you must configure both Cisco IP phones.
Step 6	Router(config-ephone-dn)# exit	Exits ephone-dn configuration mode.
Step 7	Router(config)# ephone <i>tag</i>	(Optional) Enters ephone configuration mode to register Cisco IP phones.
Step 8	Router(config-ephone)# button <i>button-number:dn-tag</i> <i>button-number:dn-tag</i> <i>button-number:dn-tag</i>	(Optional) Assigns a button number to the Cisco IP phone directory number. The argument <i>button-number:dn-tag</i> , for example, can use the values 1:1, 2:4, and 3:14. The third set ephone tag 3 is set to the intercom directory number 14, so that the third button (directory number) is set to receive the intercom.

Configuring Paging

The audio paging feature operates in a way similar to the intercom, but provides only one-way voice, with no press-to-answer option. A dummy DN that associates any number of local IP phones is created. The paging extension number is configured using the existing ephone-dn “number” parameter. Multiple paging DNs are supported per system. The paging number may be dialed from anywhere, including on-net calls. The paging audio stream is heard on all selected IP phones that are in the idle state, using speakerphone mode. The IP phone display shows the “name” information associated with the paging DN used to activate the page. The paging mechanism supports audio distribution using IP multicast, replicated unicast, and a mixture of both (so that multicast is used where possible, and unicast is used for specific phones that cannot be reached using multicast).

To configure paging, complete the following tasks:

- [Configuring Paging for a Single Group, page 3-16](#)
- [Configuring Paging for Multiple Groups, page 3-18](#)

Configuring Paging for a Single Group

The paging feature configures the ephone-dn number to act as an extension number to broadcast unicast audio paging to idle Cisco IP phones. Cisco IP phones must be associated with the ephone-dn tag number of the paging ephone-dn, or need to be included indirectly through a paging group from another paging

ephone-dn. The audio paging feature operates in a similar fashion to intercom, but provides only one-way voice, with no press-to-answer option. A DN is created, which associates the IP phone as part of a paging group.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **name** *name*
4. **paging** [**ip** *multicast-address* **port** *udp-port-number*]
5. **exit**
6. **ephone** *tag*
7. **paging-dn** *paging-dn number-tag* { **multicast** | **unicast** }
8. Repeat Steps 6 and 7 to add phones to the paging group.

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid directory number for the Cisco IP phone that receives paging.
Step 3	Router(config-ephone-dn)# name <i>name</i>	Assigns the paging number a name for display.
Step 4	Router(config-ephone-dn)# paging [ip <i>multicast-address</i> port <i>udp-port-number</i>]	Sets paging numbers that can be called in order to broadcast an audio page to a group of Cisco IP phones. The paging command configures the ephone-dn number to act as an extension number to broadcast unicast audio paging to idle Cisco IP phones. When the optional keyword ip followed by the <i>multicast-address</i> argument and port is configured, the paging is set for multicast paging. If an IP multicast address is not configured, IP phones are paged individually using IP unicast transmission (to a maximum of ten IP phones). The recommended operation is with an IP multicast address. When multiple paging extensions are configured, each extension uses a unique IP multicast address.
Step 5	Router(config-ephone-dn)# exit	Exits ephone-dn configuration mode and returns to global configuration mode.
Step 6	Router(config)# ephone <i>tag</i>	Enters ephone configuration mode to register Cisco IP phones. This adds IP phones to the paging group.

	Command	Purpose
Step 7	Router(config-ephone)# paging-dn <i>paging-dn number-tag {multicast unicast}</i>	Sets audio paging directory number for each Cisco IP phone. The paging extension number is configured using the existing ephone-dn configuration number command. The paging mechanism supports audio distribution using IP multicast, replicated unicast, and a mixture of both (so that multicast is used where possible, and allows unicast to specific phones that cannot be reached through multicast).
Step 8	Repeat Steps 6 and 7 to add phones to the paging group.	

Configuring Paging for Multiple Groups

These tasks configure paging for multiple groups of phones in your network—for example—for combining several departments like Marketing, Engineering, or Finance.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **name** *name*
4. **paging** [**ip** *multicast-address* **port** *udp-port-number*]
5. **paging group** *paging ephone-dn tag-list, paging ephone-dn tag-list*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid directory number for the Cisco IP phone that receives paging.
Step 3	Router(config-ephone-dn)# name <i>name</i>	Assigns the paging number a name for display. The value of the <i>name</i> argument can be “paging all,” “marketing,” or “paging managers-only group,” and so on.

Command	Purpose
Step 4 Router(config-ephone-dn)# paging [ip <i>multicast-address port udp-port-number</i>]	<p>Sets paging numbers that can be called to broadcast an audio page to a group of Cisco IP phones. The paging command configures the ephone-dn number to act as an extension number to broadcast unicast audio paging to idle Cisco IP phones. IP phones must be associated with the DN tag number of the paging ephone-dn, or are included indirectly through a paging group from another paging ephone-dn.</p> <p>When the optional keyword ip followed by the <i>multicast-address</i> argument and port is used, the paging is set for multicast paging. If an IP multicast address is not configured, IP phones are paged individually using IP unicast transmission (to a maximum of ten IP phones). The recommended operation is with an IP multicast address. When multiple paging extensions are configured, each extension should use a unique IP multicast address.</p>
Step 5 Router(config-ephone-dn)# paging group <i>paging ephone-dn tag-list, paging</i> <i>ephone-dn tag-list</i>	<p>Sets the audio paging directory number for a large combined group. The paging group command is used to combine small sets of phones associated with individual paging ephone-dns into a large combined group so that a page can be sent to large numbers of phones at once.</p> <p>Note Configure the paging command for all DNs in the group prior to configuring the paging group command.</p> <p>Use of paging groups allows phones not only to participate in a small local paging set (for example, paging to four phones in a company’s “shipping and receiving” department) but also to support company-wide paging when needed (for example, by combining the paging sets for shipping and receiving, with paging sets for accounting, service, and sales into a paging group).</p> <p>The argument <i>paging ephone-dn tag-list</i> is a comma-separated list of paging group tags that are each configured as paging directory numbers. You can include up to ten paging ephone-dn tags separated by commas; for example, 4, 6, 7, 8.</p>

Configuring IVR Auto-Attendant

The interactive voice response (IVR) auto-attendant mechanism can support the handling of inbound calls on Foreign Exchange Office (FXO) ports and outbound calls on Foreign Exchange Station (FXS) ports including analog phones configured through the plain old telephone system (POTS) and Cisco IP phones configured through the Cisco IP phone directory numbers (ephone-dn)—virtual FXS ports. The tool command line (TCL) scripts play prompts (welcome, phone number, store hours, and store locations), collect digits, and place calls. The IVR prompts must be downloaded on the Cisco IOS Telephony Service router’s Flash memory. The IVR prompts require an audio file (.au) format of 8-bit, u-law, and 8-kHz encoding.

Customized Script

If you want Cisco to develop customized application scripts for you, contact the Developer Support group at developer-support@cisco.com. This is a fee-based service.

In addition, if you are interested in developing TCL scripts, you can join the Cisco Developer Support Program. This program provides you with a consistent level of support. It also provides an easy process to open, update, and track issues using the Online Case tracking tool available at Cisco.com. This is also a fee-based service.

**Note**

To participate in the Cisco Developer Support Program, you must have a signed Developer Support Agreement. For more details and for access to this agreement, go to the following URL:

<http://www.cisco.com/warp/public/570/index.html>, or contact developer-support@cisco.com.

To configure IVR for the Cisco IOS Telephony Service router, see the “Configuring TCL IVR Applications” chapter of the *Cisco IOS Voice, Video, and Fax Configuration Guide*, Release 12.2.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **application** *application-name*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone.
Step 2	Router(config-ephone-dn)# application <i>application-name</i>	Assigns a TCL IVR application to the Cisco IP phone DN.

Troubleshooting, Monitoring, and Maintaining Cisco ITS

For general information about troubleshooting Cisco ITS, refer to the “[Verification and Troubleshooting](#)” section on page 2-15. For general information about monitoring and maintaining Cisco ITS, refer to the “[Monitoring and Maintaining Cisco IOS Telephony Service](#)” section on page 2-17.

Configuration Examples

Enabling a Top-Line Description Example

The following example shows the configuration for a top black bar description for ephone-dn 5, which is associated with extension number 8001:

```
ephone-dn 5
 number 8001
 description 408 555 1212
```

Configuring Intercom Example

The following example shows intercom configuration between two Cisco IP phones. In this example, directory number (ephone-dn) 18 and directory number (ephone-dn) 19 are set as an intercom pair. DN 18 is associated with button 3 of Cisco IP phone (ephone) 4 and directory number (DN) 19 is associated with button number 3 of Cisco IP phone (ephone) 5. Button 3 on both the Cisco IP phone 4 and Cisco IP phone 5 is set as a pair to provide intercom service to each phone.

```
ephone-dn 18
 number A5001
 name "intercom"
 intercom A5002 barge-in

ephone-dn 19
 name "intercom"
 number A5002
 intercom A5001 barge-in

ephone 4
 button 1:2 2:4 3:18

ephone 5
 button 1:3 2:6 3:19
```

Configuring Paging Examples

The following are paging examples for a single group and multiple groups.

Configuring Paging for a Single Group

In this example, paging calls to 2000 are multicast to Cisco IP phones 1 and 2, and paging calls to 2001 go to Cisco IP phones 3 and 4:

```
ephone-dn 20
 number 2000
 paging ip 224.0.1.20 port 2000

ephone-dn 21
 number 2001
 paging ip 224.0.1.21 port 2000
```

```
ephone 1
  button 1:1
  paging-dn 20
```

```
ephone 2
  button 1:2
  paging-dn 20
```

```
ephone 3
  button 1:3
  paging-dn 21
```

```
ephone 4
  button 1:4
  paging-dn 21
```

Configuring Paging for Multiple Groups

In this example, paging calls to 2000 go to ephones 1 and 2, and paging calls to 2001 go to ephones 3 and 4. Calls to 2002 go to ephones 1, 2, 3, 4, and 5. Ephones 1 and 2 are included into paging ephone-dn 22 through membership of ephone-dn 20 in the paging group. Ephones 3 and 4 are included into paging ephone-22 through membership of ephone-dn 21 in the paging group. Ephone 5 is directly included as using paging-dn 22.

```
ephone-dn 20
  number 2000
  paging ip 224.0.1.20 port 2000
```

```
ephone-dn 21
  number 2001
  paging ip 224.0.1.21 port 2000
```

```
ephone-dn 22
  number 2002
  paging ip 224.0.2.22 port 2000
  paging group 20,21
```

```
ephone 1
  button 1:1
  paging-dn 20
```

```
ephone 2
  button 1:2
  paging-dn 20
```

```
ephone 3
  button 1:3
  paging-dn 21
```

```
ephone 4
  button 1:4
  paging-dn 21
```

```
ephone 5
  button 1:5
  paging-dn 22
```


Configuring IVR Examples

The following example shows how to configure IVR for the Cisco IOS Telephony Service router:

```
call application voice auto_att_flash flash://vespa_aa_ipks_2.4.tcl
call application voice auto_att_flash aa-pilot 6000
call application voice auto_att_flash operator 21111
call application voice auto_att_flash language 1 en
call application voice auto_att_flash set-location en 0 flash://
```

The following example shows how to configure an application for a particular Cisco IP phone directory number:

```
ephone-dn 1
  application <application name> = auto_att_flash
```

Other Configuration Examples

For examples of the following commands described in this chapter, see the boldface commands in the [“Configuration Examples” section on page 2-18](#):

- **call-forward busy**
- **call-forward noan**
- **cor**
- **date-format**
- **hold-alert**
- **intercom**
- **keepalive**
- **max-conferences**
- **moh**
- **paging**
- **preference**
- **time-format**
- **transfer-pattern**
- **translate**
- **url**



Advanced Configuration Tasks

This chapter discusses the configuration for a graphical user interface (GUI), voice-mail integration, and application integration.

Contents

- [Configuring a Graphical User Interface, page 4-1](#)
- [Integrating Voice Mail, page 4-9](#)
- [DTMF Integration with Legacy Voice-Mail Devices, page 4-23](#)
- [Integrating Cisco IOS Telephony Service with Applications, page 4-26](#)
- [Troubleshooting, Monitoring, and Maintaining Cisco ITS, page 4-32](#)
- [Configuration Examples, page 4-32](#)

Configuring a Graphical User Interface

The Cisco IOS Telephony Service (ITS) GUI provides you with comprehensive management features to help configure and maintain the Cisco ITS router. It also provides limited features for end users of the Cisco IP phones. As the administrator, you must set up a username and password for yourself to allow administrator-level login to the GUI and you must set up the username and password for the Cisco IP phone end user to allow end-user-level login to the GUI.

See the following sections for configuration tasks for the GUI. Each task in the list is identified as either required or optional.

- [Configuring a GUI on the Router, page 4-1](#) (required)
- [Getting Started with the GUI, page 4-3](#) (required)

Configuring a GUI on the Router

The GUI interface is intended for two classes of users: the local administrators for the Cisco IOS Telephony Service router and the end users of the Cisco IP phone. For each class of users, passwords can be set to prevent unauthorized personnel from accessing or changing Cisco IOS Telephony Service router configuration and Cisco IP phone configuration. Username and password are configured through the Cisco IOS command line interface (CLI) or through the GUI.

To configure the Cisco IOS Telephony Service router for GUI, perform the following tasks:

- [Enabling an HTTP Server on Cisco IOS Software, page 4-2](#) (required)
- [Setting Up the GUI, page 4-2](#) (required)

Enabling an HTTP Server on Cisco IOS Software

The HTTP server in Cisco IOS software is disabled; so to use GUI, you must enable the HTTP server.

SUMMARY STEPS

1. `ip http server`
2. `ip http path flash`

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# <code>ip http server</code>	Enables the Cisco web browser user interface on the local Cisco IOS Telephony Service router.
Step 2	Router(config)# <code>ip http path flash</code>	Sets the base HTTP path for HTML files.

Setting Up the GUI

This process sets up a username and password for administrator-level login to the GUI and sets up the username and password for the Cisco IP phone end users.

SUMMARY STEPS

1. `telephony-service`
2. `admin-username username`
3. `admin-password password`
4. `dn-webedit`
5. `time-webedit`
6. `exit`
7. `ephone tag`
8. `username username password password`

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# <code>telephony-service</code>	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# <code>admin-username username</code>	Sets username for the local system administrator of the Cisco IOS Telephony Service. The default username is Admin.

	Command	Purpose
Step 3	Router(config-telephony-service)# admin-password <i>password</i>	Sets a password for the local system administrator of the Cisco IOS Telephony Service.
Step 4	Router(config-telephony-service)# dn-webedit	Enables adding of directory numbers through a web interface.
Step 5	Router(config-telephony-service)# time-webedit	Enables setting time through the web interface. This allows the local system administrator to change and set time on the Cisco IOS Telephony Service router.
Step 6	Router(config-telephony-service)# exit	Exits from telephony-service configuration mode.
Step 7	Router(config)# ephone tag	Enters ephone configuration mode to register Cisco IP phones.
Step 8	Router(config-ephone)# username <i>username</i> password <i>password</i>	Assigns a phone user login account name and password. This allows individual phone users to log in to the Cisco IOS Telephony Service router through a web interface and change their personal settings.

**Note**

After completing the GUI configuration, access the GUI for the Cisco IOS Telephony Service through the web browser.

Getting Started with the GUI

To access the Cisco IP phones through the GUI interface on the Cisco ITS router, complete the following tasks:

- [Logging In as the Administrator, page 4-3](#) (required)
- [Setting Up for the Cisco IP Phone End User, page 4-6](#) (required)

Logging In as the Administrator

**Note**

Make sure that the GUI configuration is completed on the router side.

You can assign, modify, or delete usernames and passwords through the GUI interface. You can also assign and modify Cisco IP phones and directory numbers for an end user.

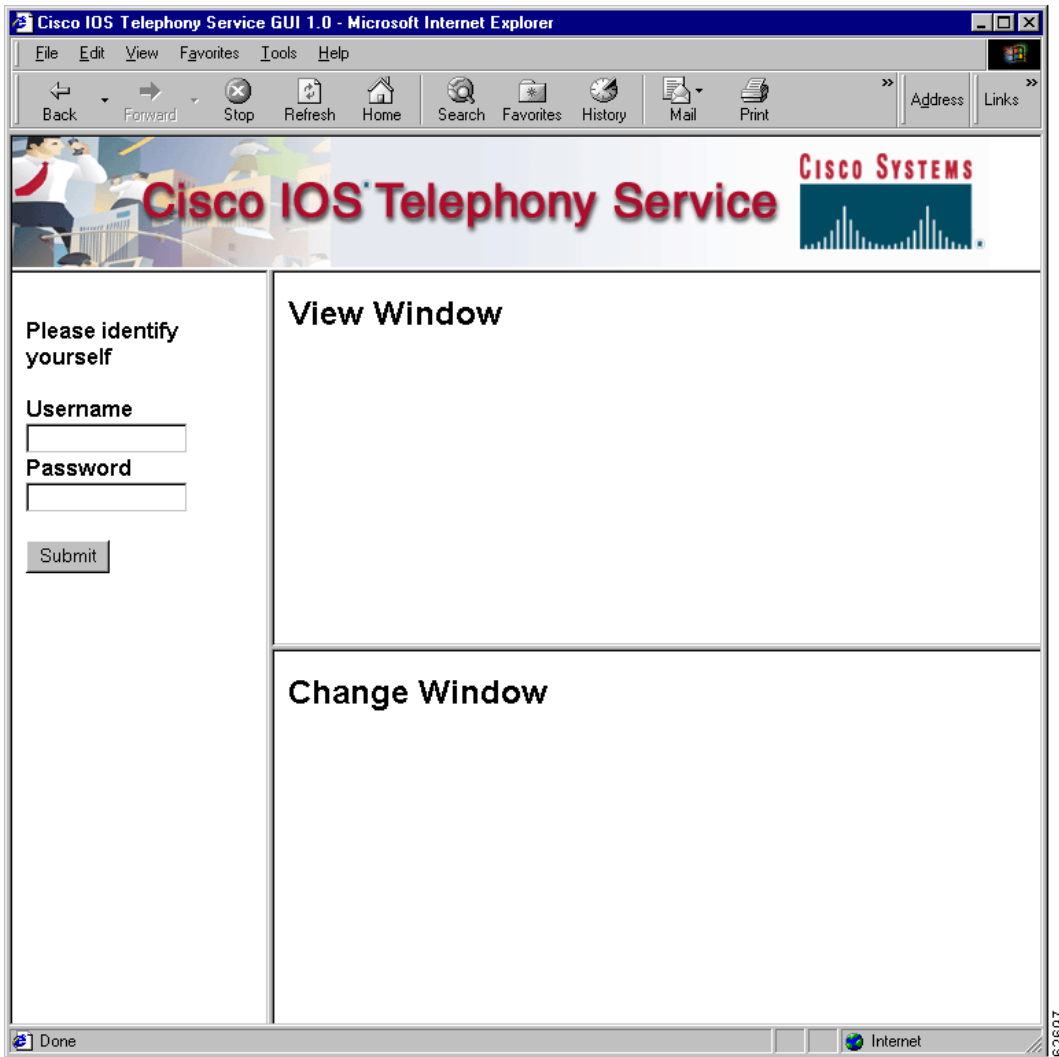
To access the GUI, perform the following steps:

-
- Step 1** Access the GUI for the Cisco IOS Telephony Service by going to the following URL:
http://ip_address/telephony_service.html
 where *ip_address* is the router IP address of the Cisco IOS Telephony Service router.
- Step 2** When you go to the `telephony_service.html` page, you see the window shown in [Figure 4-1](#). Enter your username and password, and click **Submit**.

**Note**

The window shown in [Figure 4-1](#) is the common login page for you and the Cisco IP phone end user.

Figure 4-1 Cisco IOS Telephony Service GUI Login Page

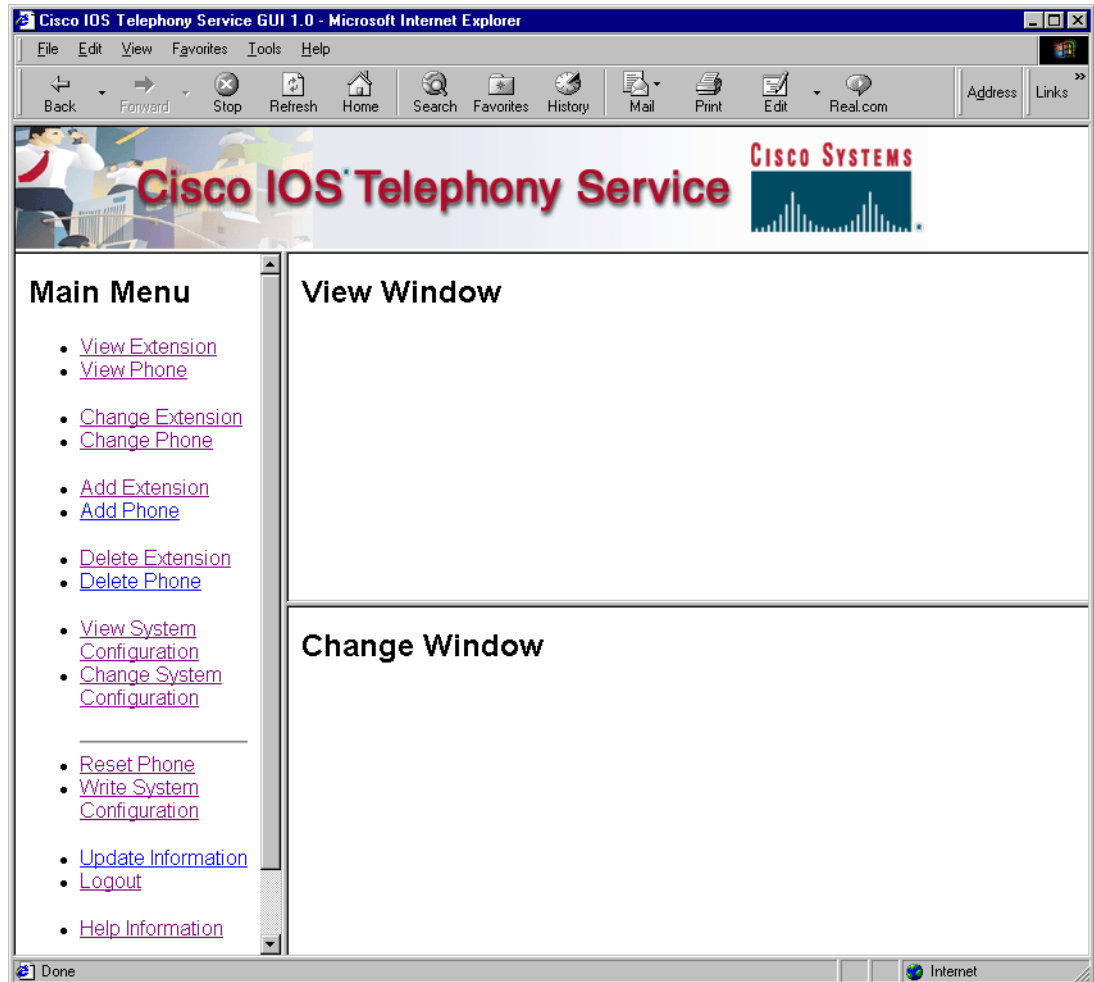


After you identify yourself as the administrator and enter the correct username and password, you see the window shown in [Figure 4-2](#). This is the Cisco IOS Telephony Service home page for the administrator. You can use all the options from the Main menu.

**Tip**

For information on a specific page, click **Help Information**. The links work only in the Microsoft Internet Explorer browser, version 5.5 and later versions.

Figure 4-2 Cisco IOS Telephony Service Home Page for the Administrator



Setting Up for the Cisco IP Phone End User

As the administrator, you also must set a username and password for each Cisco IP phone end user. After you have assigned a username and password for the end user, the user can log in to the GUI to change the password, search local telephone numbers, and change speed-dial settings for the user's IP phone.

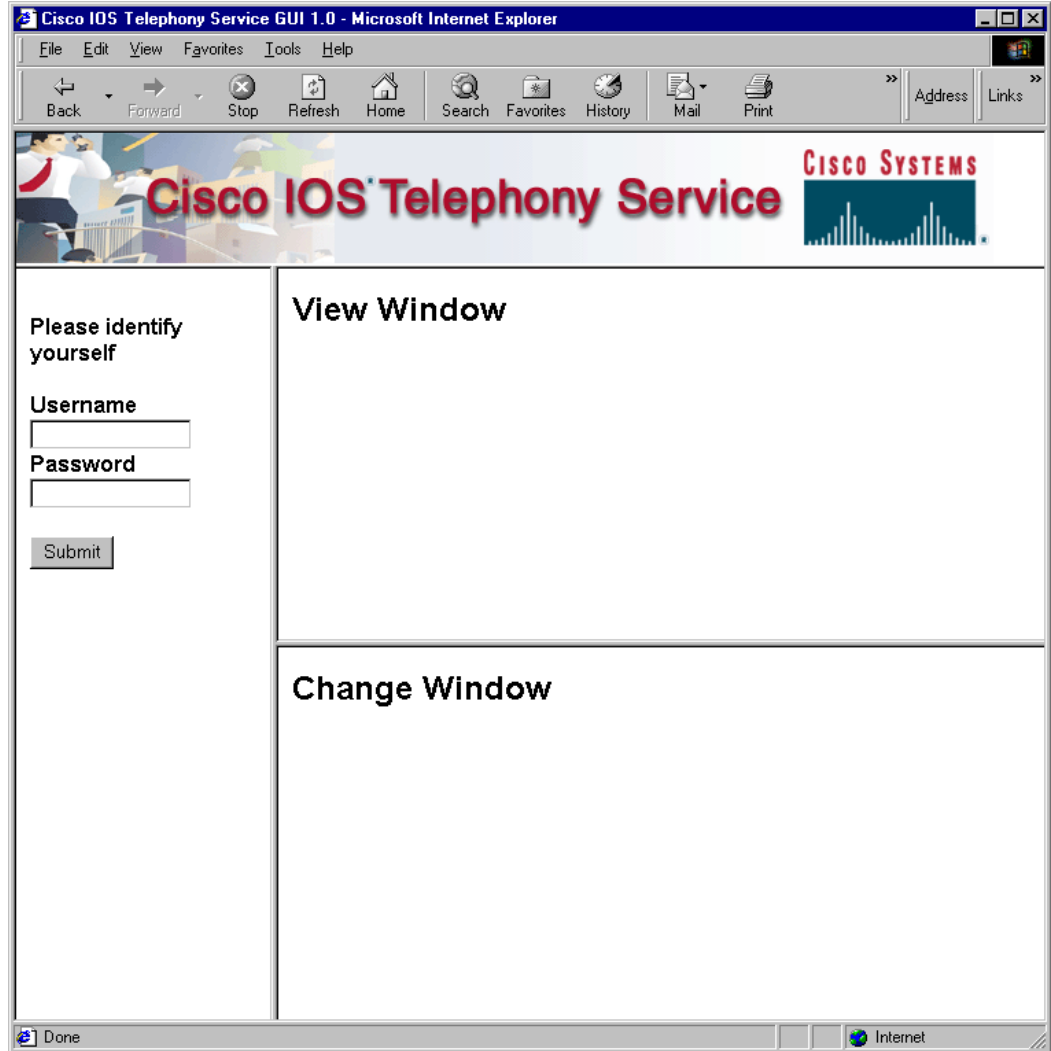
To provide GUI access to the Cisco IP phone end user, perform the following steps:

-
- Step 1** Access the GUI interface for the Cisco IOS Telephony Service by going to the following URL:
`http://ip_address/telephony_service.html`
where *ip_address* is the router IP address of the Cisco IOS Telephony Service router.
- Step 2** When you go to the `telephony_service.html` page, you see the window shown in [Figure 4-3](#). To provide the Cisco IP phone user personal login and initial password, enter the username and initial password of the end user and click **Submit** to log in as the end user.

**Note**

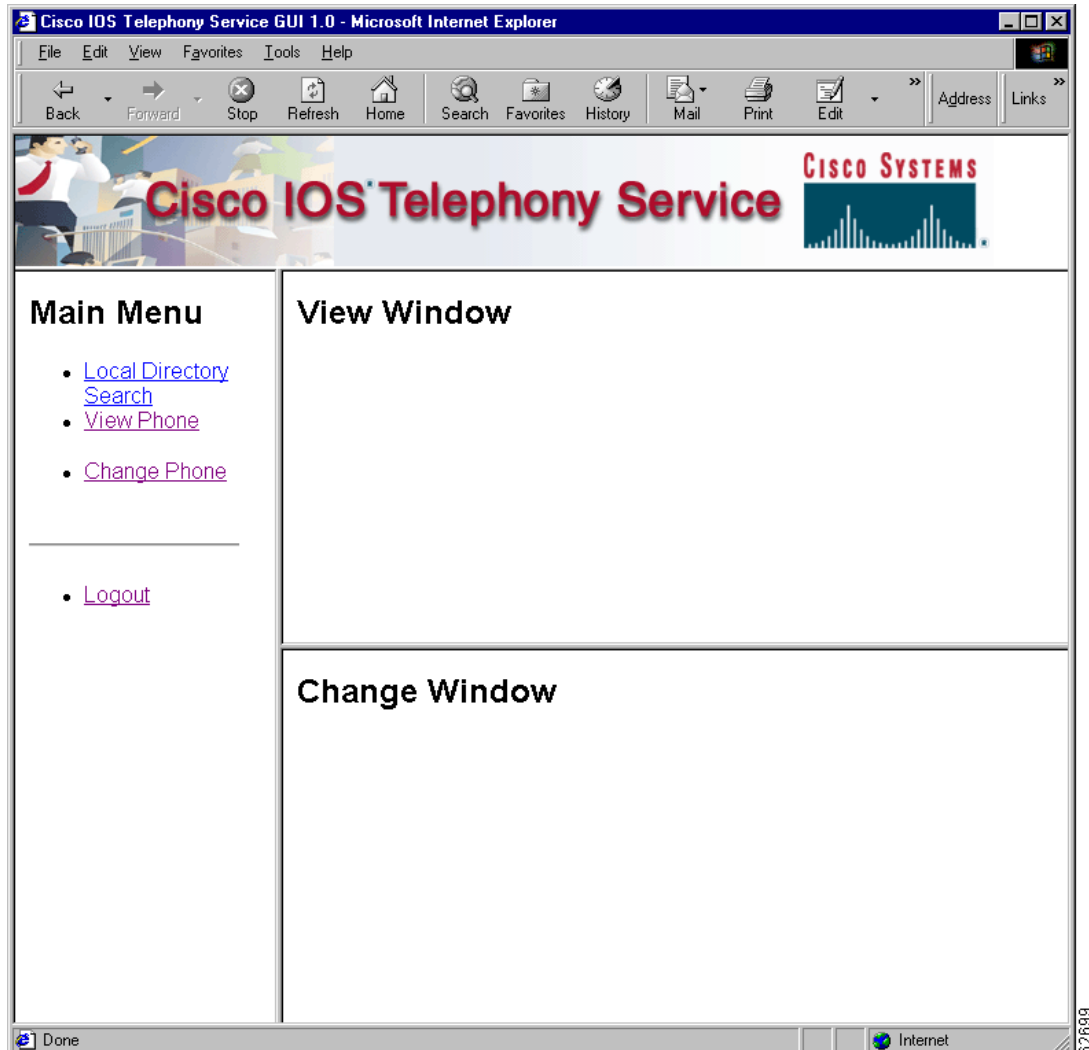
The window shown in [Figure 4-3](#) is the common login window for you and the Cisco IP phone end user.

Figure 4-3 Cisco IOS Telephony Service GUI Login Window



When the Cisco IP phone users log in to the GUI, they see the window as shown in [Figure 4-4](#). This page allows the Cisco IP phone users to change the password, search local telephone numbers, and change speed-dial settings for their individual IP phone.

Figure 4-4 Cisco IOS Telephony Service GUI User Main Window



Verifying GUI Configuration



Note

The configuration changes made on the GUI automatically reset and change the settings on the Cisco IP phone.

Check the Cisco IP phone display screen to verify each configuration change made on the GUI.

Integrating Voice Mail

The Cisco Unity Voice Mail system supports voice-mail integration with the Cisco IOS Telephony Service. If you want voice-mail integration, you must configure the Cisco IOS Telephony Service router for voice mail and then configure the Cisco Unity software on the PC to get voice-mail service.

See the following sections for configuration tasks for integrating voice mail. Each task in the list is identified as either required or optional.

- [Configuring an Access Number for Voice Mail, page 4-9](#) (required)
- [Configuring the Router for Cisco Unity Voice Mail, page 4-9](#) (required)
- [Associating a Voice-Mail Device, page 4-10](#) (required)
- [Configuring Message Waiting Indication, page 4-11](#) (optional)
- [Configuring Cisco Unity TSP, page 4-18](#) (required)
- [Configuring Cisco Unity Ports, page 4-20](#) (required)

Configuring an Access Number for Voice Mail

You must configure an access number to connect to the voice-mail system. This number is required for any kind of voice-mail integration.



Note

The same number is configured on all the Cisco IP phone directory number (DN) to connect to voice mail. For more information, see the [“Configuring the Router for Cisco Unity Voice Mail”](#) section on [page 4-9](#).

SUMMARY STEPS

1. **telephony-service**
2. **voicemail** *phone-number*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# voicemail <i>phone-number</i>	Configures the telephone number that is speed-dialed when the messages button on a Cisco IP phone is pressed to dial in to a configured voice-mail system.

Configuring the Router for Cisco Unity Voice Mail

To configure a voice-mail system on a Cisco IOS Telephony Service router, you allocate and configure one or more Cisco IP phone DN to link your Cisco IOS Telephony Service router to your voice-mail system. Use a Cisco IP phone DN and configure it with the same access number for the voice-mail (configured in telephony-service configuration mode), for example 4001. This configuration is required for all voice-mail system integration, including Cisco Unity Voice Mail.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **name** *name*
4. **no huntstop**
5. **preference** *preference-order*

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid directory number for voice mail.
Step 3	Router(config-ephone-dn)# name <i>name</i>	Configures a username associated with voice mail and message waiting indication (MWI). For example, specify “Voice mail” or “MWI only” as the <i>name</i> value.
Step 4	Router(config-ephone-dn)# no huntstop	Disables huntstop.
Step 5	Router(config-ephone-dn)# preference <i>preference-order</i>	Sets preference for the attached dial peer for a directory number. The default is 0.

Associating a Voice-Mail Device

To associate the actual voice-mail device (vm-device-id) to the phone number, associate the Cisco IP phone with the voice-mail device.

**Note**

The default vm-device-id name is CiscoUM-VI and it should match the device name prefix configuration on the Cisco Unity Telephony Service Provider (TSP) side. You also must complete the configuration on the TSP side.

SUMMARY STEPS

1. **ephone** *tag*
2. **vm-device-id** *id-string*
3. **button** *button-number:dn-tag button-number:dn-tag*

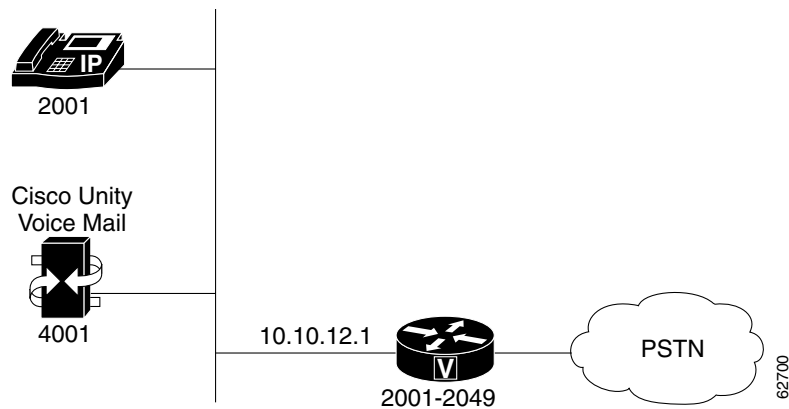
DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone tag	Enters ephone configuration mode to register Cisco IP phones.
Step 2	Router(config-ephone)# vm-device-id id-string	Defines the voice-mail ID string. For example, CiscoUM-VI1 for the first port and CiscoUM-VI2 for the second port, and so on. The default is CiscoUM-VI1.
Step 3	Router(config-ephone)# button button-number:dn-tag button-number:dn-tag	Assigns a button number to the Cisco IP phone directory number. The argument <i>button-number:dn-tag</i> , for example, can use the values 1:1, 2:4, or 3:14. In this example, button 1 corresponds to directory number 1 (ephone-dn 1), button 2 corresponds to directory number 4, and button 3 corresponds to directory number 14. The buttons correspond to the phone lines on the Cisco IP phone.

Configuring Message Waiting Indication

The MWI mechanism turns on the light indicator on Cisco IP phones to inform you that you have a voice-mail message. Figure 4-5 shows a network with a Cisco IP phone and a Cisco IOS Telephony Service router connected to a Cisco Unity Voice Mail system.

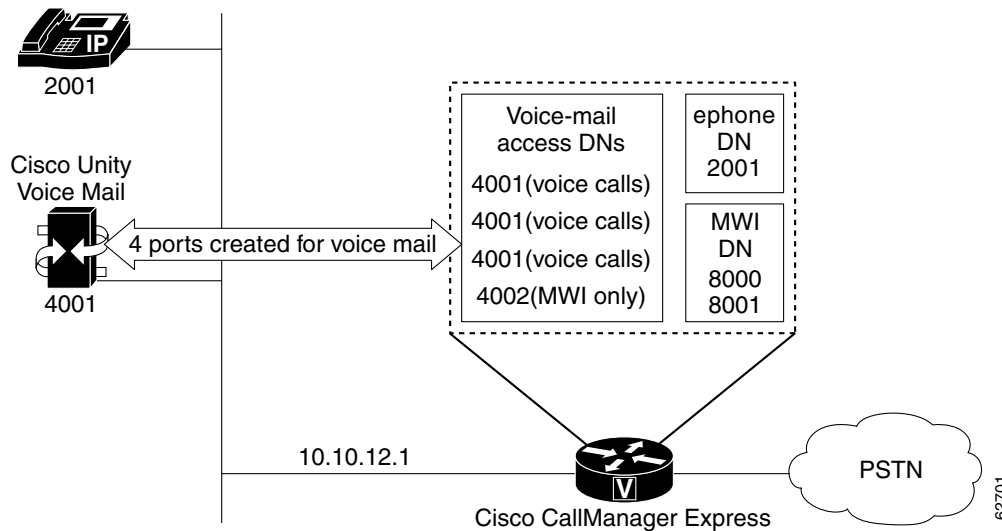
Figure 4-5 Basic MWI Network



MWI Mechanism

The MWI mechanism is initiated after someone leaves a voice-mail message. The internal MWI mechanism of the Cisco IOS Telephony Service router is explained in [Figure 4-6](#).

Figure 4-6 MWI Mechanism



In the network topology in [Figure 4-6](#), the following events take place:

1. The Cisco IP phone with the extension 2001 receives a call and the call is not answered.
2. The Cisco IP phone with the extension 2001 forwards the call to the voice-mail access port 4001.
3. The Cisco Unity Voice Mail system (extension 4001) stores the new message for extension 2001.
4. The Cisco Unity Voice Mail then places an MWI notification call to the MWI processing ephone-dn 8000 (through the MWI access port 4002) with the calling party ID for the notification call set to 2001.
5. The Cisco ITS DN 8000 accepts the MWI notification call and switches on the message waiting light for extension 2001.

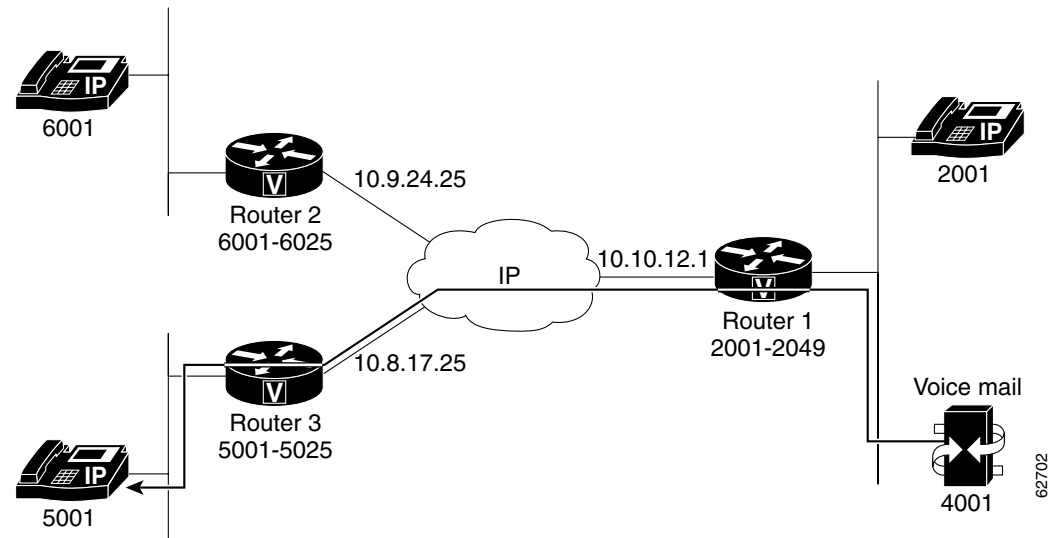
The Cisco IOS Telephony Service router can convey MWI information to the Cisco IP phone DNs if the Cisco IP phones are associated with the router.

If the Cisco IP phones are not associated with the Cisco IOS Telephony Service router connected to the Cisco Unity Voice Mail system, the MWI information is conveyed by using the MWI relay feature. For further details, see the [“Configuring MWI Relay”](#) section on page 4-16.

When a voice-mail system has MWI information for any extension local or remote, it dials the central site Cisco IOS Telephony Service router. When the central site receives the MWI information, it attempts to find out whether the extension is local to the central site. If it cannot find the extension, it passes the MWI information to its notifier interface of SIP MWI. If the notifier interface on central site has the extension as a subscriber, it relays the MWI information to the remote Cisco IOS Telephony Service router.

In [Figure 4-7](#), Router 1 is the central site Cisco IOS Telephony Service router—the MWI notifier—and uses the MWI integration mechanism described earlier to interface with the Cisco Unity Voice Mail system. The Cisco IP phone directory numbers on Router 2 and Router 3 register with Router 1 by using the Session Initiation Protocol (SIP) subscriber mechanism. Router 1 as the SIP notifier recognizes the Cisco IP phone directory numbers associated with Router 2 and Router 3 to relay MWI.

Figure 4-7 Network with MWI Relay



MWI Relay Mechanism

The MWI relay mechanism is initiated after someone leaves a voice-mail message on the remote voice-mail message system. In the network topology in [Figure 4-7](#), the following events take place:

1. The Cisco IP phone with the extension 5001 receives a call and the call is not answered.
2. The Cisco IP phone with the extension 5001 forwards the call to the voice-mail access port 4001.
3. The Cisco Unity Voice Mail system (extension 4001) stores the new message for extension 5001.
4. Cisco Unity Voice Mail then places an MWI notification call to the MWI processing ephone-dn 8000 (through the MWI access port 4002) to the central Cisco IOS Telephony Service router, Router 1, with the calling party ID for the notification as extension 5001.
5. Router 1, acting as the SIP notifier, relays MWI notification to Router 3, one of the SIP subscribers.
6. Router 3, the local Cisco IOS Telephony Service router for extension 5001, turns the MWI light to ON on the Cisco IP phone 5001.

To configure the MWI mechanism, perform the following tasks:

- [Configuring the SIP-Based MWI Server, page 4-14](#)
- [Configuring MWI for Each Directory Number, page 4-14](#)
- [Configuring a Directory Number for MWI Notification, page 4-15](#)
- [Configuring MWI Relay, page 4-16](#)

Configuring the SIP-Based MWI Server

This task configures the IP address and port for the SIP-based MWI server.

SUMMARY STEPS

1. **telephony-service**
2. **mwi sip-server** *ip-address* [[**transport tcp** | **transport udp**] | [**port** *port-number*] | [**reg-e164**]]

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# mwi sip-server <i>ip-address</i> [[transport tcp transport udp] [port <i>port number</i>] [reg-e164]]	Configures the IP address and port for the SIP-based MWI server in the same LAN as the voice-mail server. The MWI SIP server is a Cisco IOS Telephony Service router. This IP address is used in conjunction with the mwi sip command in ephone configuration mode to subscribe individual ephone-dn extension numbers to the MWI SIP server's notification list. SIP MWI client runs TCP as default. The transport tcp keyword is the default setting. The transport udp keyword allows you to integrate with the SIP MWI client. The port keyword is used to specify a port number. The default SIP port number is 5060. The default registration is with an extension number, so the reg-e164 keyword allows you to register with an E.164 10 digit number.

Configuring MWI for Each Directory Number

This process configures MWI notification for each DN.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number*
3. **name** *name*
4. **mwi sip**

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
Step 2	Router(config-ephone-dn)# number <i>number</i>	Configures a valid directory number for the Cisco IP phone that receives the MWI notification.

	Command	Purpose
Step 3	Router(config-ephone-dn)# name <i>name</i>	Configures a username associated with a directory number to receive MWI notification. For example, “MWI” is used in place of the <i>name</i> argument.
Step 4	Router(config-ephone-dn)# mwi sip	Subscribes an extension in a Cisco IOS Telephony Service router to receive MWI notification from a SIP MWI server. This integrates a Cisco IOS Telephony Service router with an MWI service based on SIP protocol. Note The mwi sip-server command under telephony-service configuration mode should be set prior to enabling the mwi sip command in ephone configuration mode.

Configuring a Directory Number for MWI Notification

MWI integration on the Cisco IOS Telephony Service router is performed by dedicating Cisco IP phone DN (ephone-DN) to process MWI status notification calls originating from the Cisco Unity Voice Mail system. You must allocate a minimum of one MWI processing ephone-dn for each MWI ephone-dn access port. The MWI processing ephone-dn extension numbers are configured to match the MWI dial-out notification numbers configured on the Cisco Unity Voice Mail system.

SUMMARY STEPS

1. **ephone-dn** *dn-tag*
2. **number** *number* [**secondary** *number*]
3. **mwi** {**on** | **off** | **on-off**}

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# ephone-dn <i>dn-tag</i>	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

	Command	Purpose
Step 2	Router(config-ephone-dn)# number <i>number</i> [secondary <i>number</i>]	Configures a valid number for the Cisco IP phone. The secondary keyword allows you to associate a second telephone number with an ephone-dn so that the IP phone line can be called by dialing either the main or the secondary phone number. Note Two numbers should be set for the MWI mechanism to work. The first number turns the MWI light to ON and the second number turns the MWI light to OFF when the message is picked up by the IP phone user.
Step 3	Router(config-ephone-dn)# mwi { on off on-off }	Configures specific Cisco IP phone directory numbers to receive MWI notification from an external voice-mail system. The MWI notification is set for all the IP phones connected to the Cisco IOS Telephony Service router. The external voice-mail systems are often able to communicate MWI status by making telephone calls to dummy extension numbers, where the MWI information is embedded in either the called or calling party IP phone number. Note This command cannot be configured unless the number command is configured in ephone-dn configuration mode.

Configuring MWI Relay

MWI relay is required when one Cisco Unity Voice Mail system is shared by multiple Cisco IOS Telephony Service routers. All Cisco IOS Telephony Service routers can do MWI relay using the SIP subscriber and notifier mechanism. Figure 4-7 shows a network topology with MWI relay mechanism. The Cisco IOS Telephony Service router attached to the Cisco Unity Voice Mail system, running the SIP MWI relay server, is the SIP notifier and the other remote Cisco IOS Telephony Service routers are the SIP subscribers.

SUMMARY STEPS

1. **telephony-service**
2. **mwi relay**
3. **mwi expires** *seconds*
4. **mwi sip-server** *ip-address* [[**transport tcp** | **transport udp**] | [**port** *port-number*] | [**reg-e164**]]

DETAILED STEPS

	Command	Purpose
Step 1	Router(config)# telephony-service	Enters telephony-service configuration mode.
Step 2	Router(config-telephony-service)# mwi relay	Enables the Cisco IOS Telephony Service router to relay MWI information to remote Cisco IP phones.

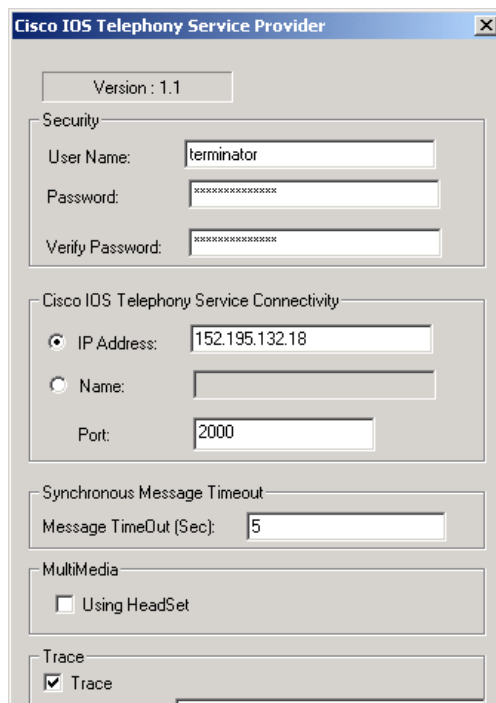
	Command	Purpose
Step 3	Router(config-telephony-service)# mwi expires <i>seconds</i>	Sets the expire timer for registration for either the client or server.
Step 4	Router(config-telephony-service)# mwi sip-server <i>ip-address</i> [[transport tcp transport udp] [port <i>port-number</i>] [reg-e164]]	<p>Configures the IP address and port for the SIP-based MWI server in the same LAN as the voice-mail server. The MWI SIP server is a Cisco IOS Telephony Service router. This IP address is used with the mwi sip command in ephone configuration mode to subscribe individual ephone-dn extension numbers to the MWI SIP server's notification list. SIP MWI client runs TCP as default.</p> <p>The transport tcp keyword is the default setting. The transport udp keyword allows you to integrate with SIP MWI client. The port keyword is used to specify a port number. The default SIP port number is 5060. The default registration is with an extension number, so the reg-e164 keyword allows you to register with an E.164 ten digit number.</p>

Configuring Cisco Unity TSP

To configure Cisco Unity Voice Mail software, perform the following steps:

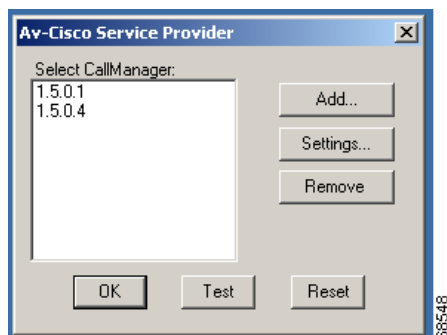
- Step 1** Go to the **Start>Settings>Control Panel>Phone and Modem Options** and the Phone and Modem Options window appears. Click the **Advanced** tab and choose **Av-Cisco Service Provider** and click **Configure**, shown in [Figure 4-8](#) and the Av-Cisco Service Provider window appears, shown in [Figure 4-9](#).

Figure 4-8 Phone and Modem Options Window



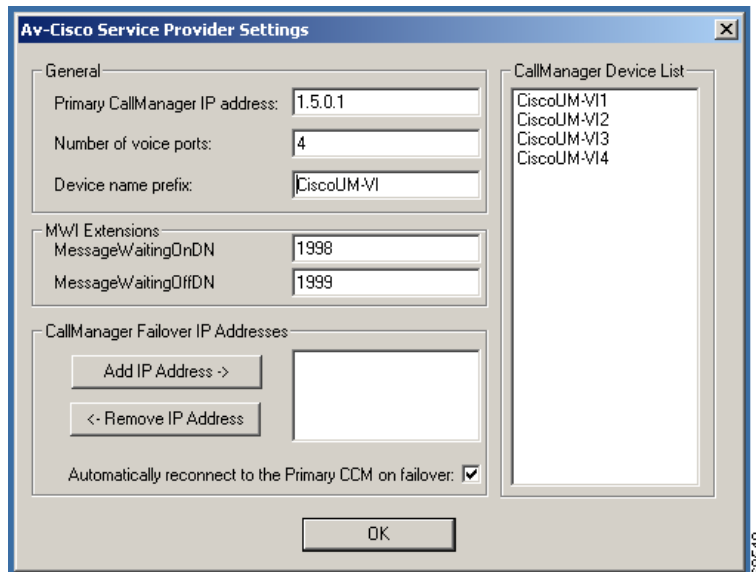
- Step 2** Add the IP address of the Cisco IOS Telephony Service router in the Av-Cisco Service Provider dialog box, shown in [Figure 4-9](#). Click **OK**.

Figure 4-9 Av-Cisco Service Provider Dialog Box



Step 3 In the Av-Cisco Service Provider Settings dialog box, shown in [Figure 4-10](#), perform the following steps.

Figure 4-10 Av-Cisco Service Provider Settings Dialog Box



- a. Confirm the IP address of the Cisco IOS Telephony Service router.
- b. Confirm the number of Cisco Unity ports.
- c. Confirm the Device name prefix. The default name is CiscoUM-VI. The voice-mail device name must match the device name configured on the Cisco IOS Telephony Service router.
- d. Enter the directory numbers next to MessageWaitingOnDN and MessageWaitingOffDN.



Note These directory numbers must match the extension numbers configured on the Cisco IOS Telephony Service router.

- e. Confirm that the CallManager Device List displays the correct number of Cisco Unity Ports.
- f. Click **OK**.

Step 4 The Av-Cisco Service Provider dialog box, shown in [Figure 4-9](#) reappears. Click **Test**. If you do not receive an error message, click **OK**.

Step 5 Restart Cisco Unity.

Step 6 To modify any configuration, repeat Step 1 through Step 4.

Configuring Cisco Unity Ports



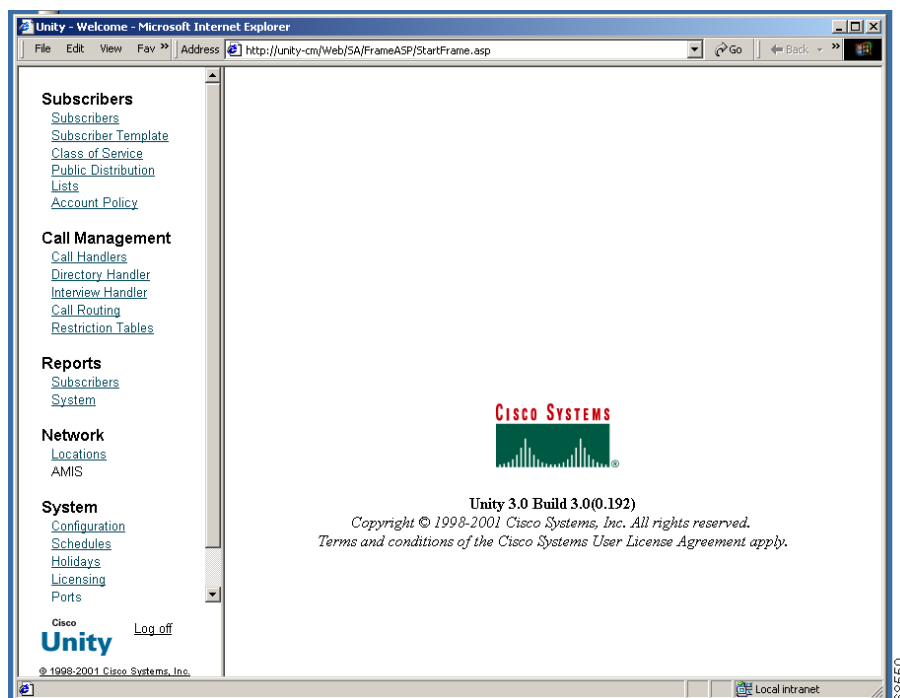
Note

After Cisco Unity software is installed on the PC, you see two icons on the desktop: System Administration and Status Monitor.

The port configuration on the Cisco Unity software must match the port configuration on the Cisco IOS Telephony Service router. To configure the Cisco Unity ports, perform the following steps:

- Step 1** Click the **System Administration** icon on the desktop. The screen shown in [Figure 4-11](#) appears.

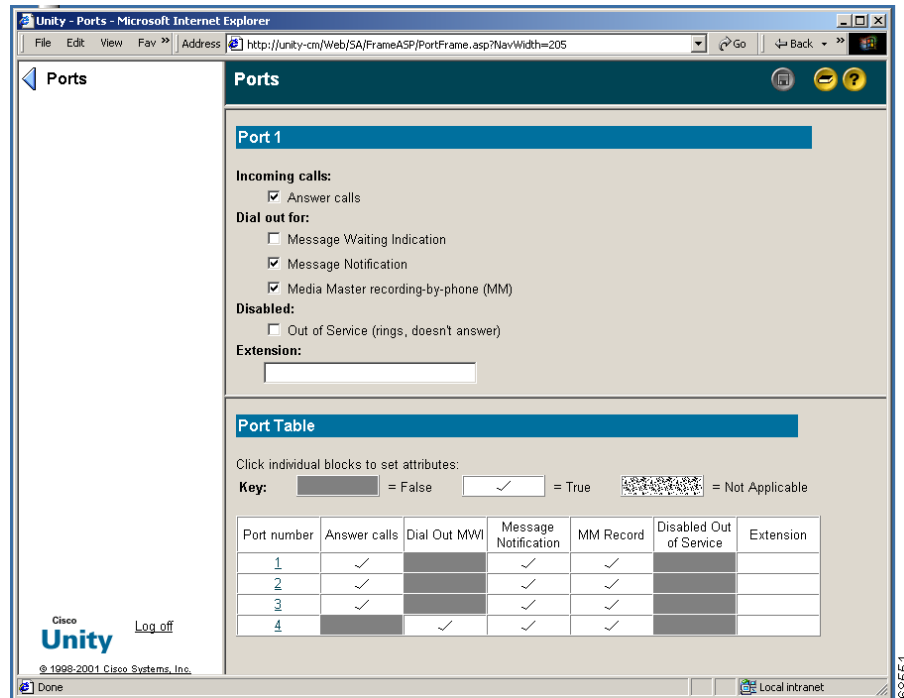
Figure 4-11 System Administration Window



- Step 2** In the System menu, click **Ports**. The Port Configuration dialog box, shown in [Figure 4-12](#), appears.
- Step 3** To match the settings from Cisco Unity, click port number **1** and choose **Answer Calls**. Make sure that Dial Out MWI is not chosen, as shown in [Figure 4-12](#).
- Step 4** Click port number **2** and repeat Step 3.
- Step 5** Click port number **3** and repeat Step 3.

- Step 6** Click port 4. Make sure that the Answer Calls option is not chosen and that the **Dial Out MWI** option is selected, as shown in Figure 4-12.

Figure 4-12 Port Configuration Window

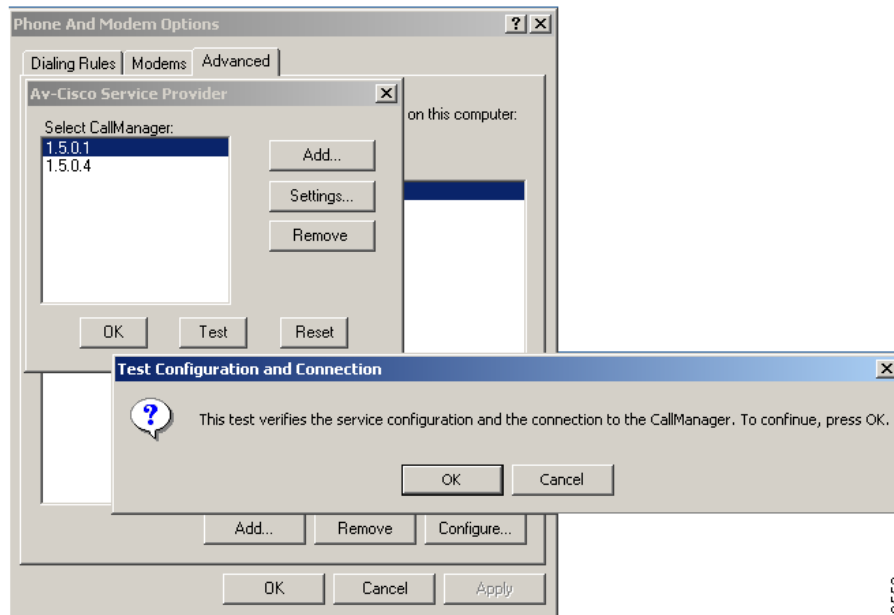


Verifying Cisco Unity Configuration

To verify Cisco Unity configuration, perform the following steps:

- Step 1** Go to **Start>Settings>Control Panel>Telephony>Telephony Drivers>Unity Service Provider for CallManager**. Choose **Configure**. The Av-Cisco Service Provider window appears, as shown in Figure 4-13.
- Step 2** Click **Test** in the Av-Cisco Service Provider window, shown in Figure 4-13, and complete the subsequent steps as needed.

Figure 4-13 Av-Cisco Service Provider Window



Troubleshooting Tips

On the Cisco IOS Telephony Service Router

If you are having problems with calls not getting forwarded to the Cisco Unity Voice Mail or problems with the MWI light not turning on or off, use the **debug** commands for debugging the Cisco IOS Telephony Service router to verify that the appropriate calls are set up between Cisco Unity and the router.

On the Cisco Unity TSP

For specific problems on the Cisco Unity side, refer to the Cisco Unity documentation. Go to the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/voice/c_unity/unity24/tsg/tsg246.pdf

DTMF Integration with Legacy Voice-Mail Devices

For dual tone multifrequency (DTMF) integrations, information on how to route incoming or forwarded calls is sent by the telephone system in the form of DTMF digits. The DTMF digits are in the form of a pattern and depend on the voice-mail system connected to the Cisco IOS Telephony Service router. These patterns are required for the DTMF integration with most voice-mail systems. The DTMF integration configuration on the Cisco IOS Telephony Service router works with any analog voice-mail system. Voice-mail systems are designed to respond to DTMF after the system has answered the incoming calls. The following tasks are required.

- [Configuring DTMF Patterns on the Router, page 4-23](#) (required)
- [Configuring Integration Files on Legacy Voice-Mail Systems, page 4-25](#) (required)

Configuring DTMF Patterns on the Router

The Cisco IOS Telephony Service router provides flexibility for the integration with any legacy voice-mail system. You can configure multiple tags and tokens for each pattern, depending on the voice-mail system and type of access. The *tag* in the configuration pattern must match the number defined in the voice-mail system's integration file to identify the type of call. The keywords—**CGN**, **CDN**, and **FDN**—define the type of call information sent to the voice-mail system.

SUMMARY STEPS

1. **vm-integration**
2. **pattern direct** *tag1* {CGN | CDN | FDN} [*tag2* {CGN | CDN | FDN}] [*tag3* {CGN | CDN | FDN}] [*last-tag*]
3. **pattern ext-to-ext busy** *tag1* {CGN | CDN | FDN} [*tag2* {CGN | CDN | FDN}] [*tag3* {CGN | CDN | FDN}] [*last-tag*]
4. **pattern ext-to-ext no-answer** *tag1* {CGN | CDN | FDN} [*tag2* {CGN | CDN | FDN}] [*tag3* {CGN | CDN | FDN}] [*last-tag*]
5. **pattern trunk-to-ext busy** *tag1* {CGN | CDN | FDN} [*tag2* {CGN | CDN | FDN}] [*tag3* {CGN | CDN | FDN}] [*last-tag*]
6. **pattern trunk-to-ext no-answer** *tag1* {CGN | CDN | FDN} [*tag2* {CGN | CDN | FDN}] [*tag3* {CGN | CDN | FDN}] [*last-tag*]

DETAILED STEPS

	Command	Purpose
Step 1	vm-integration Example: Router(config) vm-integration	Enters voice-mail integration mode and enables voice-mail integration with DTMF and analog voice-mail system.
Step 2	pattern direct tag1 {CGN CDN FDN} [tag2 {CGN CDN FDN}] [tag3 {CGN CDN FDN}] [last-tag] Example: Router(config-vm-int) pattern direct 2 CGN *	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone. <ul style="list-style-type: none"> The <i>tag</i> attribute is an alphanumeric string fewer than four DTMF digits in length. The alphanumeric string consists of a combination of four letters (A, B, C, and D), two symbols (* and #), and ten digits (0 to 9). The tag numbers match the numbers defined in the voice-mail system's integration file, immediately preceding either the number of the calling party, the number of the called party, or a forwarding number. The Cisco SRS Telephony router supports a maximum of four tags. The keywords—CGN, CDN, and FDN—configure the type of call information sent to the voice-mail system, such as calling number (CGN), called number (CDN), or forwarding number (FDN).
Step 3	pattern ext-to-ext busy tag1 {CGN CDN FDN} [tag2 {CGN CDN FDN}] [tag3 {CGN CDN FDN}] [last-tag] Example: Router(config-vm-integration) pattern ext-to-ext busy 7 FDN * CGN *	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension attempts to connect to a busy extension and the call is forwarded to voice mail.
Step 4	pattern ext-to-ext no-answer tag1 {CGN CDN FDN} [tag2 {CGN CDN FDN}] [tag3 {CGN CDN FDN}] [last-tag] Example: Router(config-vm-integration) pattern ext-to-ext no-answer 5 FDN * CGN *	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail.

	Command	Purpose
Step 5	<pre>pattern trunk-to-ext busy tag1 {CGN CDN FDN} [tag2 {CGN CDN FDN}] [tag3 {CGN CDN FDN}] [last-tag]</pre> <p>Example: Router(config-vm-integration) pattern trunk-to-ext busy 6 FDN * CGN *</p>	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voice mail.
Step 6	<pre>pattern trunk-to-ext no-answer tag1 {CGN CDN FDN} [tag2 {CGN CDN FDN}] [tag3 {CGN CDN FDN}] [last-tag]</pre> <p>Example: Router(config-vm-integration) pattern trunk-to-ext no-answer 4 FDN * CGN *</p>	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voice mail.

**Note**

Although it is unlikely that you will use multiple instances of the **CGN**, **CDN**, or **FDN** keyword in a single command line, it is permissible to do so.

Configuring Integration Files on Legacy Voice-Mail Systems

To configure the integration files on the third-party legacy voice-mail system, follow the instructions in the accompanying voice-mail system documents. You must design the DTMF integration patterns appropriately, so that the voice-mail system and the Cisco IOS Telephony Service router work with each other.

Integrating Cisco IOS Telephony Service with Applications

Cisco IOS Telephony Service provides an interface that enables simple one-to-one remote control of a Cisco IP phone by an associated PC running Cisco IOS TSP, a Telephony Application Programming Interface (TAPI) that supports placing outbound calls from an application address and phone address book. This interface is intended to support only basic TAPI services to enable caller ID-based screen pop ups for incoming calls and to support simple outgoing call placement using one-click address-book-style speed-dialing from the PC application.

**Note**

This service does not add full TAPI support for multiple users or the multiple call handling required to implement complex features like automatic call distributor (ACD) or IP contact center (IPCC).

The PC applications software for the Cisco IOS Telephony Service—Cisco IOS TSP, a TAPI service provider software package—works as an interface between the TAPI running on Microsoft Windows and the Cisco IOS Telephony Service router. This software:

- Communicates with the TAPI using the Telephony Service Provider Interface (TSPI).
- Implements a required set of APIs and works with TAPI.
- Enables other TAPI-based applications to provide call control to the Cisco IP phones connected to the Cisco IOS Telephony Service router.

**Note**

The Cisco IOS Telephony Service Version 2.01 implements only a small subset of TAPI functionality. It supports only TAPI clients that operate on one phone line at a time. The Cisco IOS TSP support does not have full TAPI support for multiple users or for complex features. Also, this TAPI version does not have direct media and voice handling capabilities.

The Cisco IOS TSP software increases your personal productivity, because you can handle phone call management from your PC without picking up the handset or dialing the numbers on the dial pad. The following features are available:

- Answering incoming calls
- Forwarding incoming calls to voice mail
- Address book dialing (placing outbound calls from an application address and phone and address book)
- Screen pop ups with caller-ID (caller ID-based screen pop ups for incoming calls; simple outgoing call placement using one-click address-book-style speed-dialing from the PC application)
- Placing calls on hold

**Note**

Cisco IOS TSP software does not support media or voice. Media or voice is sent to the phone.

Cisco IOS TSP Download and Setup

On the Cisco ITS Service Router

-
- Step 1** On the router collect the following information for TSP configuration:
- Identify the Cisco IP phone that needs to be associated and controlled by a TAPI client.
 - Get the username and password for the Cisco IP phone by entering the **show ephone** command.
 - Get the IP address or name of the Cisco IOS Telephony Service router (if DNS is enabled) and the port number by entering the **show telephony-service** command.
-

On the PC



Note Download the CiscoIOSTSP.zip file from <http://www.cisco.com/cgi-bin/tablebuild.pl/ip-iostsp> to your PC. Uncompress the file and run the Setup program on the PC where you want to install the TSP, and that is running Windows 2000.

- Step 1** Make sure that there is network connectivity between your PC and the Cisco IOS Telephony Service router. To verify the network connectivity, enter the **ping ip-address** command on your PC, specifying the IP address of the Cisco IOS Telephony Service router.
- Step 2** Install CiscoIOSTSP.zip by running the Setup program that was downloaded. This program installs the following dynamic link library (DLL) files in the system directory of the PC:
- CiscoIOSTSP.tsp
 - CiscoIOSTUISP.dll
 - LogTrace.dll



Note After the DLL files are installed, a configuration dialog window, Cisco IOS Telephony Service Provider, appears before the installation is complete (shown in [Figure 4-14](#)).

- Step 3** Enter the information in the required fields in the dialog box, as shown in [Figure 4-14](#).
- a. Enter the username and password that will be used by the Cisco IP phone user.
 - b. Enter the IP address and port number of the Cisco IOS Telephony Service router.
 - c. Set the Synchronous Timeout response from the Cisco IOS Telephony Service to the desired value in seconds. (The default is 3 seconds.)
 - d. If you are using the headset, check the Using **HeadSet** box.

Figure 4-14 Cisco IOS Telephony Service Provider Configuration Dialog Box

**Note**

When the Trace box is checked, the trace function slows down the TAPI application. Use the trace feature for troubleshooting. For further information, see the [“Troubleshooting TSP”](#) section on page 4-30.

Step 4

Restart the PC, following the prompt.

**Note**

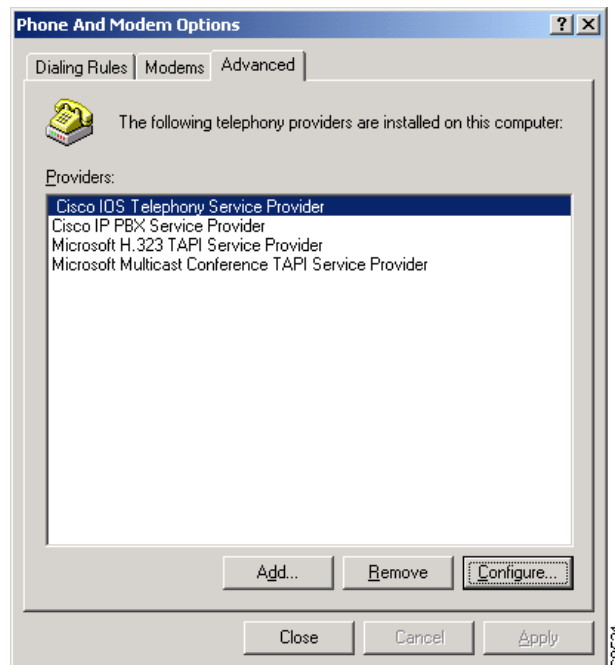
After the PC restarts, you have the option to launch third-party applications, such as ACT! or Phone Dialer software. For further information on third-party applications, see the documents provided by those vendors.

Modifying TSP Configuration

On the PC

- Step 1** To change the initial TSP configuration, choose the **Phone and Modem** option in the control panel. The name of the option may vary, depending on the operating system.
- Step 2** Choose the **Advanced** tab in the Phone and Modem Options dialog box, displaying Cisco IOS Telephony Service Provider in the Providers list (shown in [Figure 4-15](#)).

Figure 4-15 Phone and Modem Options Dialog Box



- Step 3** Choose **Cisco IOS Telephony Service Provider** and click **Configure**, shown in [Figure 4-15](#).



Note The configuration dialog box, shown in [Figure 4-14](#), appears.

- Step 4** Enter the information in the required fields in the dialog box, shown in [Figure 4-14](#).
- Step 5** After changing username, password and IP address or port of the Cisco IOS Telephony Service Provider, close all the TAPI applications for the changes to take effect. If any services, such as Remote Access ConnectionManager, that depend on the Telephony service are running, restart the system for the changes to take effect. You might get a prompt to reboot your system.

Removing TSP

-
- Step 1** Choose **Cisco IOS Telephony Service Provider** under the Control Panel and click the **Change/Remove** button to remove the TSP software.
- Step 2** Go to the Add Remove Programs option under the Control Panel and remove the TSP files from your PC.
-

Verifying Basic TAPI Operation

To verify basic TAPI operations, perform the following steps:

-
- Step 1** Place an incoming call from another Cisco IP phone to the phone you are verifying.
- Step 2** Place an outgoing call from the Cisco IP phone you are verifying.
-

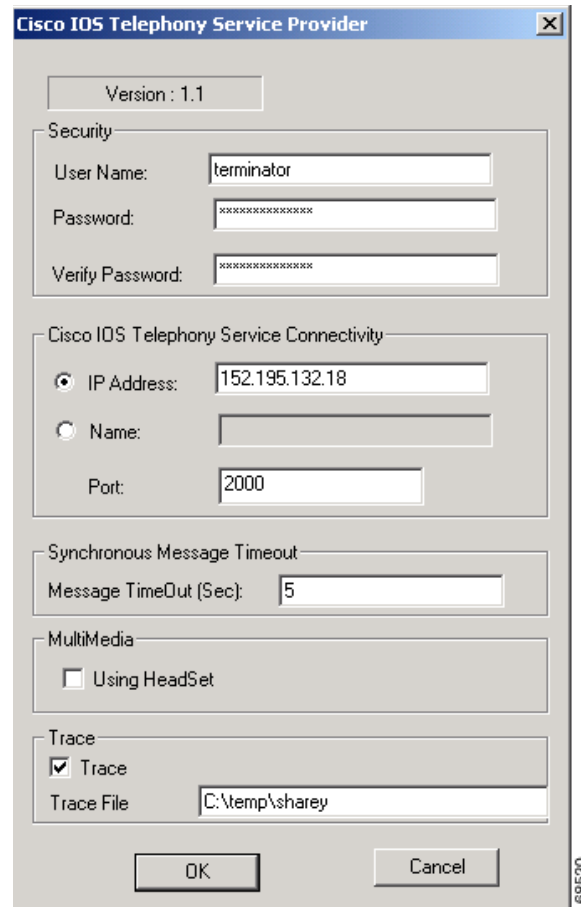
Troubleshooting TSP

On the Cisco IOS Telephony Service Router

- Verify the IP address and the port number for the router and make sure that they match those on the Cisco IOS Telephony Service router.
- Verify connectivity between the phone and the router.
- If the TSP fails to connect to the Cisco IOS Telephony Service router, a message box with the title “Cisco IOS Telephony Service TSP status” displays the cause for failure.
- If the Line or Address are not listed in the Preferences>Dialer dialog box:
 - Verify that the username and password have been configured correctly (case sensitive) and that Synchronous timeout is configured to a reasonable value (3 seconds).
 - Verify that the IP address and the port number for the Cisco IOS Telephony Service router match those on the Cisco IOS Telephony Service router.
 - Verify connectivity between the Cisco IP phone and the Cisco IOS Telephony Service router.
- Check the **Trace** box as shown in [Figure 4-16](#). The trace feature runs the trace utility logs and saves the files in a specified trace file.



Note To save the trace utility logs, name a file that you can recognize to save the trace utility logs. Each time you run the trace log, a new trace file is created, so you may need to regularly remove the old trace files that are not required.

Figure 4-16 Using Trace in Cisco IOS Telephony Service Provider Configuration Dialog Box

On the PC

If the Cisco IOS Telephony Service Provider is not listed as one of the available providers in the Control Panel>Phone and Modem Options>Add dialog box, verify whether all the DLL files have been installed in the PC's system directory.

Troubleshooting, Monitoring, and Maintaining Cisco ITS

For general information about troubleshooting Cisco ITS, refer to the [“Verification and Troubleshooting” section on page 2-15](#). For general information about monitoring and maintaining Cisco ITS, refer to the [“Monitoring and Maintaining Cisco IOS Telephony Service” section on page 2-17](#).

Configuration Examples

This section contains voice-mail integration examples.

In the following example, there are four ephone-dns configured to provide four voice-mail access ports. Three of the ephone-dns are configured with the same extension number to provide ports dedicated for leaving and retrieving voice messages. The fourth ephone-dn is provided for use as a MWI access port. The first three ephone-dns are configured with the same extension number (4001), using preferences 0, 1, and 2; so if the first port is busy, the call goes to the second port, and so on. Port 4 is configured with the extension number 4002 and is used for MWI dial-out notification by the Cisco Unity Voice Mail system. Separate access ports are required for voice access and MWI access to prevent problems with call collision between voice calls placed by the Cisco IOS Telephony Service to the Cisco Unity Voice Mail system, and MWI calls placed in the opposite direction.

```
ephone-dn 32
 number 4001
 name "VOICEMAIL1"
 no huntstop
 preference 0
!
ephone-dn 33
 number 4001
 name "VOICEMAIL2"
 no huntstop
 preference 1
!
ephone-dn 34
 number 4001
 name "VOICEMAIL3"
 no huntstop
 preference 2
!
ephone-dn 35
 number 4002
 name "MWI ONLY"
```

In this example, the `vm-device-id` is used within the ephone configuration in place of the `mac-address` parameter that is used for configuring a regular Cisco IP phone:

```
ephone 5
 vm-device-id CiscoUM-VI1
 button 1:32
!
ephone 6
 vm-device-id CiscoUM-VI2
 button 1:33
!
ephone 7
 vm-device-id CiscoUM-VI3
 button 1:34
!
```

```
ephone 8
  vm-device-id CiscoUM-VI4
  button 1:35
```

In the following example, the Cisco Unity Voice Mail system places MWI notification calls to the extension numbers 8000 and 8001 to activate and deactivate message waiting lights. The DN responds to calls placed to extension numbers 8000 and 8001, and trigger an MWI ON event when 8000 is called, and an MWI OFF event when 8001 is called.

```
ephone-dn 32
  number 8000 secondary 8001
  mwi on-off
```

The following example shows the MWI configuration for the central site Router 1, the MWI notifier:

```
telephony-service
  mwi relay
  mwi expires 8600
```

The MWI SIP configuration should be added for each DN on the remote router that requires MWI service. For more information, see the [“Configuring the SIP-Based MWI Server”](#) section on page 4-14. The following is a configuration example for a remote Cisco IOS Telephony Service router, Router 2, the MWI subscriber:

```
telephony-service
  mwi sip-server 1.10.12.1
  !
ephone-dn 1
  number 6001
  mwi sip
  !
```




Command Reference

This chapter documents new commands. All other commands used with the Cisco IOS Telephony Service are documented in the Cisco IOS Release 12.2 command reference publications.

- [admin-password \(telephony-service\)](#)
- [admin-username \(telephony-service\)](#)
- [application \(ephone-dn\)](#)
- [button \(ephone\)](#)
- [call-forward all \(ephone-dn\)](#)
- [call-forward busy \(ephone-dn\)](#)
- [call-forward noan \(ephone-dn\)](#)
- [caller-id block \(ephone-dn\)](#)
- [cor \(ephone-dn\)](#)
- [date-format \(telephony-service\)](#)
- [debug ephone alarm](#)
- [debug ephone detail](#)
- [debug ephone error](#)
- [debug ephone keepalive](#)
- [debug ephone mwi](#)
- [debug ephone pak](#)
- [debug ephone raw](#)
- [debug ephone register](#)
- [debug ephone state](#)
- [debug ephone statistics](#)
- [debug mwi relay errors](#)
- [debug mwi relay events](#)
- [description \(ephone-dn\)](#)
- [dialplan-pattern \(telephony-service\)](#)
- [directory \(telephony-service\)](#)
- [dn-webedit \(telephony-service\)](#)

- **ephone**
- **ephone-dn**
- **hold-alert (ephone-dn)**
- **huntstop (ephone-dn)**
- **intercom (ephone-dn)**
- **ip source-address (telephony-service)**
- **keepalive (telephony-service)**
- **load (telephony-service)**
- **loopback-dn (ephone-dn)**
- **mac-address (ephone)**
- **max-conferences (telephony-service)**
- **max-dn (telephony-service)**
- **max-ephones (telephony-service)**
- **moh (telephony-service)**
- **mwi (ephone-dn)**
- **mwi expires (telephony-service)**
- **mwi relay (telephony-service)**
- **mwi sip (ephone-dn)**
- **mwi sip-server (telephony-service)**
- **name (ephone-dn)**
- **number (ephone-dn)**
- **paging (ephone-dn)**
- **paging group (ephone-dn)**
- **paging-dn (ephone)**
- **pattern direct (vm-integration)**
- **pattern ext-to-ext busy (vm-integration)**
- **pattern ext-to-ext no-answer (vm-integration)**
- **pattern trunk-to-ext busy (vm-integration)**
- **preference (ephone-dn)**
- **preference (ephone-dn)**
- **reset (ephone)**
- **reset (telephony-service)**
- **show ephone**
- **show ephone-dn**
- **show ephone-dn loopback**
- **show mwi relay clients**
- **show telephony-service admin**
- **show telephony-service all**

- **show telephony-service dial-peer**
- **show telephony-service ephone**
- **show telephony-service ephone-dn**
- **show telephony-service voice-port**
- **speed-dial (ephone)**
- **telephony-service**
- **time-format (telephony-service)**
- **timeouts interdigit (telephony-service)**
- **time-webedit (telephony-service)**
- **transfer-pattern (telephony-service)**
- **translate (ephone-dn)**
- **url (telephony-service)**
- **username (ephone)**
- **vm-device-id (ephone)**
- **vm-integration**
- **voicemail (telephony-service)**

admin-password (telephony-service)

To set a password for the local system administrator of the Cisco IOS Telephony Service router, use the **admin-password** command in telephony-service configuration mode. To disable the password for the local system administrator, use the **no** form of this command.

admin-password *password*

no admin-password *password*

Syntax Description

password Password used by the administrator to prevent unauthorized access to the Cisco IOS Telephony Service router or Cisco IP phone configuration.

Defaults

No default behavior or values.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **admin-password** command sets a password for the local system administrator to prevent unauthorized access to the Cisco IOS Telephony Service router or Cisco IP phone configuration. The specific password for the local system administrator is associated with the username set with the **admin-username** command. The password and the username for the local system administrator, as a pair, are associated with a specific Cisco IP phone.



Note

The password and username are used from the graphical user interface (GUI) interface for the Cisco IOS Telephony Service administration.

Examples

The following example shows how to set the password U2021 for an administrator:

```
Router(config)# telephony-service
Router(config-telephony-service)# admin-password U2021
```


Related Commands	Command	Description
	admin-username (telephony-service)	Sets the username for the local system administrator of the Cisco IOS Telephony Service router.
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
	username (ephone)	Assigns a phone user login account username and password to permit user login to the Cisco IOS Telephony Service router through a web browser.

admin-username (telephony-service)

To set the username for the local system administrator of the Cisco IOS Telephony Service router, use the **admin-username** command in telephony-service configuration mode. To disable the username, use the **no** form of this command.

admin-username *username*

no admin-username *username*

Syntax Description

<i>username</i>	Assigned username for the administrator; designed to prevent unauthorized access to the Cisco IOS Telephony Service router or Cisco IP phone configuration.
-----------------	---

Defaults

The default username is Admin.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **admin-username** command sets the username for the local system administrator of the Cisco IOS Telephony Service router to prevent unauthorized access to the router or Cisco IP phone configuration. The specific username of the local administrator is associated with the password set with the **admin-password** command. The username and password for the local system administrator, as a pair, are associated with a specific Cisco IP phone.



Note

The username and password are used from the graphical user interface (GUI) interface for the Cisco IOS Telephony Service administration.

Examples

The following example shows how to set the username for a local administrator:

```
Router(config)# telephony-service
Router(config-telephony-service)# admin-username jsmith
```

Related Commands

Command	Description
admin-password (telephony-service)	Sets a password for the local system administrator of the Cisco IOS Telephony Service.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
username (ephone)	Assigns a phone user login account username and password to permit user login to the Cisco IOS Telephony Service router through a web browser.

application (ephone-dn)

To select the session-level application for each Cisco IP phone directory number, use the **application** command in ephone-dn configuration mode. To disable this feature, use the **no** form of this command.

application *application-name*

no application *application-name*

Syntax Description

<i>application-name</i>	Selected interactive voice response (IVR) application name.
-------------------------	---

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **application** command selects the session-level application for each Cisco IP phone directory number. Use this command to assign a tool command language (TCL) interactive voice response (IVR) application to the Cisco IP phone directory number (ephone-dn).

Examples

The following example shows how to set the IVR application for directory number 1:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn) application TCLIVR
```

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

button (ephone)

To associate directory numbers (ephone-dn) with individual buttons on a Cisco IP phone, use the **button** command in ephone configuration mode. To delete directory numbers from the buttons on a Cisco IP phone, use the **no** form of this command.

button *button-number:dn-tag button-number:dn-tag*

no button *button-number:dn-tag button-number:dn-tag*

Syntax Description

<i>button-number</i>	Button numbers for telephone lines on a Cisco IP phone. The valid range is from 1 to 6 telephone lines for the Cisco IP Phone 7960 and 1 to 2 lines for the Cisco IP Phone 7940, Cisco IP Phone 7910, and Cisco IP Conference Station 7935.
	Note The Cisco IP Phone 7910 has only one physical line button, but you can assign up to two lines to the phone.
<i>dn-tag</i>	Previously defined directory number tag.

Defaults

No default behavior or values.

Command Modes

Ephone configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **button** command assigns telephone lines to the Cisco IP phones by assigning a button number to the Cisco IP phone directory number.

Telephone services such as call waiting and three-party conferences require a minimum of two phone lines (ephone-dn) to be available and configured on the Cisco IP phone. The Cisco IP Phone 7910 has only one physical line button. To support call waiting and three-party conferences on a Cisco IP Phone 7910, a second (hidden) line is required. This line can not be selected directly using a line button. You can access the second line when you press the conference button.

button (ephone)**Examples**

The following example shows how to assign a button number on the phone to directory number tags:

```
Router(config)# ephone 1  
Router(config-ephone)# button 1:1 2:4 3:16 4:19
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
show ephone	Displays Cisco IP phone output.

call-forward all (ephone-dn)

To configure call forwarding for all the incoming calls on one of the lines of a Cisco IP phone to another telephone, use the **call-forward all** command in ephone-dn configuration mode. To disable call forwarding, use the **no** form of this command.

call-forward all *directory-number*

no call-forward all [*directory-number*]

Syntax Description

directory-number Selected directory number. Represents a fully qualified E.164 number.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The call forwarding feature is applied to the individual telephone line associated with a directory number and cannot be configured for all the directory numbers of a Cisco IP phone. The **call-forward all** command enables call forwarding for all the incoming calls on one of the lines of a Cisco IP phone to another telephone. Using the *director-number* argument is optional when using the **no** form of this command.



Note

The **call-forward all** command takes precedence over the **call-forward busy** and **call-forward noan** commands.

Examples

The following example shows how to set call forwarding of all calls on line 1, directory number 5001, to directory number 5005. All incoming calls destined for extension 5001 are forwarded to another Cisco IP phone with the extension number 5005:

■ call-forward all (ephone-dn)

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 5001
Router(config-ephone-dn)# call-forward all 5005
```

Related Commands

Command	Description
call-forward busy	Configures call forwarding to another number when the Cisco IP phone is busy.
call-forward noan	Configures call forwarding to another number when no answer is received from the Cisco IP phone.
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

call-forward busy (ephone-dn)

To configure call forwarding to another number when the Cisco IP phone is busy, use the **call-forward busy** command in ephone-dn configuration mode. To disable call forwarding during busy, use the **no** form of this command.

call-forward busy *directory-number*

no call-forward busy [*directory-number*]

Syntax Description

directory-number Selected directory number. Represents a fully qualified E.164 number.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The call-forwarding feature is applied to the individual telephone line associated with a directory number and cannot be configured on all directory numbers of the Cisco IP phone. The **call-forward busy** command enables call forwarding to another number when the Cisco IP phone is busy. Using the *directory number* attribute is optional, when using the **no** form of this command.

Examples

The following example shows how to set call forwarding of incoming calls to another Cisco IP phone with the directory number 5005 when line 1, directory number 5001, is busy:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 5001
Router(config-ephone-dn)# call-forward busy 5005
```

Related Commands	Command	Description
	call-forward all	Configures call forwarding for all the incoming calls on one of the lines of a Cisco IP phone to another telephone.
	call-forward noan	Configures call forwarding to another number when no answer is received from the Cisco IP phone.
	ephone	Enters ephone configuration mode to register Cisco IP phones.
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

call-forward noan (ephone-dn)

To configure call forwarding to another number when no answer is received from a Cisco IP phone, use the **call-forward noan** command in ephone-dn configuration mode. To disable call forwarding, use the **no** form of this command.

call-forward noan *directory-number* **timeout** *seconds*

no call-forward noan [*directory-number*]

Syntax Description

<i>directory-number</i>	Selected directory number. Represents a fully qualified E.164 number.
timeout	Ring no answer timeout duration. It is the waiting time before the call is forwarded to another phone. The time is set in seconds.
<i>seconds</i>	Time set for the call forwarding to start. The range is 3 to 60000 seconds.
Note	It is mandatory to specify and enter a timeout number in seconds, otherwise an error message "incomplete command" will appear on the console.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The call-forwarding feature is applied to the individual telephone line associated with a directory number and cannot be configured for all the directory numbers of the Cisco IP phone. The **call-forward noan** command enables call forwarding to another number when no answer is received from a Cisco IP phone. The **timeout** keyword sets the waiting time before the call is forwarded to another phone. The time is set in seconds. The range is 3 to 60000 seconds. Using the *directory number* attribute is optional, when using the **no** form of this command.

Examples

The following example shows how to set call forwarding of incoming calls to directory number 5005 when line 1, directory number 5001, does not answer. The **timeout** period before the call is forwarded to the directory number 5005 is set for 10 seconds.

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 5001
Router(config-ephone-dn)# call-forward noan 5005 timeout 10
```

Related Commands

Command	Description
call-forward all	Configures call forwarding for all the incoming calls on one of the lines of a Cisco IP phone to another telephone.
call-forward busy	Configures call forwarding to another number when the Cisco IP phone is busy.
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

caller-id block (ephone-dn)

To enable caller-ID blocking for outbound calls, use the **caller-id block** command in ephone-dn configuration mode. To disable caller ID, use the **no** form of this command.

caller-id block

no caller-id block

Syntax Description

This command has no arguments or keywords.

Defaults

Caller ID is not blocked on calls originating from a Cisco IP phone.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **caller-id block** command sets caller-ID blocking for outbound calls originated from the ephone-dn. This command requests that the far-end gateway device block display of the calling party information for calls received by the far-end gateway from the ephone-dn. This command does not affect the ephone-dn calling party information display for inbound calls received by the ephone-dn.

Examples

The following example shows how to set caller-ID blocking for the directory number 5001:

```
Router(config) ephone-dn 1
Router(config-ephone-dn)# number 5001
Router(config-ephone-dn)# caller-id block
```

Related Commands	Command	Description
	ephone	Enters ephone configuration mode to register Cisco IP phones.
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

cor (ephone-dn)

To configure a class of restriction (COR) on the dial peers associated with a directory number, use the **cor** command in ephone-dn configuration mode. To disable COR associated with a directory number, use the **no** form of this command.

```
cor {incoming | outgoing} cor-list-name
```

```
no cor cor-list-name
```

Syntax Description

incoming	COR list to be used by incoming dial peers.
outgoing	COR list to be used by outgoing dial peers.
<i>cor-list-name</i>	COR list name.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **cor** command sets the dial-peer class of restriction (COR) parameter for dial peers and the directory numbers created for the Cisco IP phones associated with the Cisco IOS Telephony Service router. The COR functionality provides the ability to deny certain call attempts based on the incoming and outgoing class of restrictions provisioned on the dial peers. This functionality provides flexibility in network design, allows users to block calls (for example, to 900 numbers), and applies different restrictions to call attempts from different originators.

COR is used to specify which incoming dial peer can use which outgoing dial peer to make a call. Each dial peer can be provisioned with an incoming and an outgoing COR list.

Examples

The following example shows how to set dial-peer COR parameter for incoming calls to dial-peer 1:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# cor incoming corlist1
```

Related Commands	Command	Description
	corlist-incoming	Specifies the COR list to be used when a specified dial peer acts as the incoming dial peer.
	corlist-outgoing	Specifies the COR list to be used by an outgoing dial peer.
	dial-peer cor list	Defines a COR list name.
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

date-format (telephony-service)

To set the date display format on all the Cisco IP phones attached to the router, use the **date-format** command in telephony-service configuration mode. To disable the date display format, use the **no** form of this command.

```
date-format {mm-dd-yy | dd-mm-yy}
```

```
no date-format {mm-dd-yy | dd-mm-yy}
```

Syntax Description

mm-dd-yy	Set to month, day, and year. Each slot needs a two-digit number. This format is the default setting.
dd-mm-yy	Set to day, month, and year. Each slot needs a two-digit number.

Defaults

The default is set to **mm-dd-yy**.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers; and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Examples

The following example sets the date format on the Cisco IP phones to date, month, and year:

```
Router(config)# telephony-service
Router(config-telephony-service)# date-format dd-mm-yy
```

Related Commands

Command	Description
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

debug ephone alarm

To set SkinnyStation alarm messages debugging for the Cisco IP phone, use the **debug ephone alarm** debug command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

```
debug ephone alarm [mac-address mac-address]
```

```
no debug ephone alarm [mac-address mac-address]
```

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series multiservice routers and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone alarm** command shows all the SkinnyStation alarm messages sent by the Cisco IP phone. Under normal circumstances, this message is sent by the Cisco IP phone just before it registers, and the message has the severity level for the alarm set to “Informational” and contains the reason for the phone reboot or reregister. This type of message is entirely benign and does not indicate an error condition.

If the **mac-address** keyword is not used, the **debug ephone alarm** command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a SkinnyStation alarm message that is sent before the Cisco IP phone registers:

```
Router# debug ephone alarm
phone keypad reset
CM-closed-TCP
```

CM-bad-state

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone detail

To set detail debugging for the Cisco IP phone, use the **debug ephone detail** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone detail [**mac-address** *mac-address*]

no debug ephone detail [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone detail** command output includes the error and state levels.

If the **mac-address** keyword is not used, the **debug ephone detail** command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of detail debugging of the Cisco IP phone with MAC address 0030.94c3.8724. The sample is an excerpt of some of the activities that takes place during call setup, connected state, active call, and the call being disconnected:

```
Router# debug ephone detail mac-address 0030.94c3.8724
Ephone detail debugging is enabled

1d04h: ephone-1[1]:OFFHOOK
```

```
.
.
1d04h: Skinny Call State change for DN 1 SIEZE
.
.
1d04h: ephone-1[1]:SetCallState line 1 DN 1 TsOffHook
.
.
1d04h: ephone-1[1]:SetLineLamp 1 to ON
.
.
1d04h: ephone-1[1]:KeypadButtonMessage 5
.
.
1d04h: ephone-1[1]:KeypadButtonMessage 0
.
.
1d04h: ephone-1[1]:KeypadButtonMessage 0
.
.
1d04h: ephone-1[1]:KeypadButtonMessage 2
.
.
1d04h: ephone-1[1]:Store ReDial digit: 5002
.
SkinnyTryCall to 5002 instance 1
.
.
1d04h: ephone-1[1]:Store ReDial digit: 5002
1d04h: ephone-1[1]:
SkinnyTryCall to 5002 instance 1
.
.
1d04h: Skinny Call State change for DN 1 ALERTING
.
.
1d04h: ephone-1[1]:SetCallState line 1 DN 1 TsRingOut
.
.
1d04h: ephone-1[1]:SetLineLamp 1 to ON
1d04h: SetCallInfo calling dn 1 dn 1
calling [5001] called [5002]
.
.
1d04h: ephone-1[1]: Jane calling
1d04h: ephone-1[1]: Jill
.
.
1d04h: SkinnyUpdateDnState by EFXS_RING_GENERATE
for DN 2 to state RINGING
.
.
1d04h: SkinnyGetCallState for DN 2 CONNECTED
.
.
1d04h: ephone-1[1]:SetLineLamp 3 to ON
1d04h: ephone-1[1]:UpdateCallState DN 1 state 4 calleddn 2
.
.
1d04h: Skinny Call State change for DN 1 CONNECTED
.
.
1d04h: ephone-1[1]:OpenReceive DN 1 codec 4:G711Ulaw64k duration 10 ms bytes 80
.
```

```

.
1d04h: ephone-1[1]:OpenReceiveChannelAck 1.2.172.21 port=20180
1d04h: ephone-1[1]:Outgoing calling DN 1 Far-ephone-2 called DN 2
1d04h: SkinnyGetCallState for DN 1 CONNECTED
.
.
1d04h: ephone-1[1]:SetCallState line 3 DN 2 TsOnHook
.
.
1d04h: ephone-1[1]:SetLineLamp 3 to OFF
.
.
1d04h: ephone-1[1]:SetCallState line 1 DN 1 TsOnHook
.
.
1d04h: ephone-1[1]:Clean Up Speakerphone state
1d04h: ephone-1[1]:SpeakerPhoneOnHook
1d04h: ephone-1[1]:Clean up activeline 1
1d04h: ephone-1[1]:StopTone sent to ephone
1d04h: ephone-1[1]:Clean Up phone offhook state
1d04h: SkinnyGetCallState for DN 1 IDLE
1d04h: called DN -1, calling DN -1 phone -1
1d04h: ephone-1[1]:SetLineLamp 1 to OFF
1d04h: UnBinding ephone-1 from DN 1
1d04h: UnBinding called DN 2 from DN 1
1d04h: ephone-1[1]:ONHOOK
1d04h: ephone-1[1]:SpeakerPhoneOnHook
1d04h: ephone-1[1]:ONHOOK NO activeline
.
.
.

```

Related Commands

Command	Description
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone error

To set error debugging for the Cisco IP phone, use the **debug ephone error** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone error [**mac-address** *mac-address*]

no debug ephone error [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug phone error** command cancels debugging at the detail and state level.

If the **mac-address** keyword is not used, the **debug ephone error** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of error debugging for the Cisco IP phone with MAC address 0030.94c3.8724:

```
Router# debug ephone error mac-address 0030.94c3.8724
EPHONE error debugging is enabled

socket [2] send ERROR 11
Skinny Socket [2] retry failure
```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone keepalive

To set keepalive debugging for the Cisco IP phone, use the **debug ephone keepalive** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

```
debug ephone keepalive [mac-address mac-address]
```

```
no debug ephone keepalive [mac-address mac-address]
```

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone keepalive** command sets keepalive debugging.

If the **mac-address** keyword is not used, the **debug ephone keepalive** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of the keepalive status for the Cisco IP phone with MAC address 0030.94C3.E1A8:

```
Router# debug ephone keepalive mac-address 0030.94c3.E1A8
EPHONE keepalive debugging is enabled for phone 0030.94C3.E1A8

1d05h: ephone-1 Set interface FastEthernet0/0 ETHERNET
1d05h: ephone-1[1]:Keepalive socket[1] SEP003094C3E1A8
```

debug ephone keepalive

```

1d05h: ephone-1 Set interface FastEthernet0/0  ETHERNET
1d05h: ephone-1[1]:Keepalive socket[1] SEP003094C3E1A8
1d05h: Skinny Checking for stale sockets
1d05h: ephone-1 Set interface FastEthernet0/0  ETHERNET
1d05h: ephone-1[1]:Keepalive socket[1] SEP003094C3E1A8
1d05h: ephone-1 Set interface FastEthernet0/0  ETHERNET
1d05h: ephone-1[1]:Keepalive socket[1] SEP003094C3E1A8
1d05h: Skinny active socket list (3/96):  1 2 4

```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone mwi

To set message waiting indication (MWI) debugging for the Cisco IOS Telephony Service router, use the **debug ephone mwi** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone mwi

no debug ephone mwi

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone mwi** command sets message waiting indication debugging for the Cisco IOS Telephony Service router. Because the MWI protocol activity is not specific to any individual Cisco IP phone, setting the MAC address keyword qualifier for this command is not allowed.



Note

Unlike the other related **debug ephone** commands, the **mac-address** keyword does not help debug a particular Cisco IP phone.

Examples

The following example shows a sample output of the MWI status for the Cisco IOS Telephony Service router:

```
Router# debug ephone mwi
```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.

Command	Description
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone pak

To provide voice packet level debugging and to print the contents of one voice packet in every 1024 voice packets, use the **debug ephone pak** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone pak [**mac-address** *mac-address*]

no debug ephone pak [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone pak** command provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.

If the **mac-address** keyword is not used, the **debug ephone pak** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of packet debugging for the Cisco IP phone with MAC address 0030.94c3.8724:

```
Router# debug ephone pak mac-address 0030.94c3.8724
EPHONE packet debugging is enabled for phone 0030.94c3.8724
```

```

01:29:14: ***ph_xmit_ephone DN 3 tx_pkts 5770 dest=10.2.1.1 orig len=32
   pakcopy=0 discards 27 ip_encatype 0 0 last discard: unsupported payload type
01:29:14: to_skinny_duration 130210 offset -30 last -40 seq 0 adj 0
01:29:14: IP:   45B8 003C 0866 0000 3F11 3F90 2800 0001 0A02 0101
01:29:14: TTL 63 TOS B8 prec 5
01:29:14: UDP:  07D0 6266 0028 0000
01:29:14: sport 2000 dport 25190 length 40 checksum 0
01:29:14: RTP:  8012 16AF 9170 6409 0E9F 0001
01:29:14: is_rtp:1 is_frfl1:0 vlen:0 delta_t:160 vofr1:0 vofr2:0
scodec:11 rtp_bits:8012 rtp_codec:18 last_bad_payload 19
01:29:14: vencap FAILED
01:29:14: PROCESS SWITCH
01:29:15: %SYS-5-CONFIG_I: Configured from console by console
01:29:34: ***SkinnyPktIp DN 3 10.2.1.1 to 40.0.0.1 pkts 4880 FAST sw
01:29:34: from_skinny_duration 150910
01:29:34: nw 3BBC2A8 addr 3BBC2A4 mac 3BBC2A4 dg 3BBC2C4 dgs 2A
01:29:34: MAC:  1841 0800
01:29:34: IP:   45B8 0046 682E 0000 3E11 E0BD 0A02 0101 2800 0001
01:29:34: TTL 62 TOS B8 prec 5
01:29:34: UDP:  6266 07D0 0032 0000
01:29:34: sport 25190 dport 2000 length 50 checksum 0
01:29:34: RTP:  8012 55FF 0057 8870 3AF4 C394
01:29:34: RTP: rtp_bits 8012 seq 55FF ts 578870 ssrc 3AF4C394
01:29:34: PAYLOAD:
01:29:34:      1409 37C9 54DE 449C 3B42 0446 3AAB 182E
01:29:34:      56BC 5184 58E5 56D3 13BE 44A7 B8C4
01:29:34:
01:29:37: ***ph_xmit_ephone DN 3 tx_pkts 6790 dest=10.2.1.1 orig len=32
   pakcopy=0 discards 31 ip_encatype 0 0 last discard: unsupported payload type
01:29:37: to_skinny_duration 153870 offset -150 last -40 seq 0 adj 0
01:29:37: IP:   45B8 003C 0875 0000 3F11 3F81 2800 0001 0A02 0101
01:29:37: TTL 63 TOS B8 prec 5
01:29:37: UDP:  07D0 6266 0028 0000
01:29:37: sport 2000 dport 25190 length 40 checksum 0
01:29:37: RTP:  8012 1AAF 9173 4769 0E9F 0001
01:29:37: is_rtp:1 is_frfl1:0 vlen:0 delta_t:160 vofr1:0 vofr2:0

```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone raw

To provide raw low-level protocol debugging display for all Skinny Client Control Protocol (SCCP), use the **debug ephone raw** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone raw [**mac-address** *mac-address*]

no debug ephone raw [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone raw** command provides raw low-level protocol debugging display for all SCCP. The debug display provides byte level display of Skinny TCP socket messages.

If the **mac-address** keyword is not used, the **debug ephone raw** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of raw protocol debugging for the Cisco IP phone with MAC address 0030.94c3.E1A8:

```
Router# debug ephone raw mac-address 0030.94c3.E1A8
EPHONE raw protocol debugging is enabled for phone 0030.94C3.E1A8
```

debug ephone raw

```

1d05h: skinny socket received 4 bytes on socket [1]
0 0 0 0
1d05h:
1d05h: SkinnyMessageID = 0
1d05h: skinny send 4 bytes
4 0 0 0 0 0 0 0 0 1 0 0
1d05h: socket [1] sent 12 bytes OK (incl hdr) for ephone-(1)

1d06h: skinny socket received 4 bytes on socket [1]
0 0 0 0
1d06h:
1d06h: SkinnyMessageID = 0
1d06h: skinny send 4 bytes
4 0 0 0 0 0 0 0 0 1 0 0
1d06h: socket [1] sent 12 bytes OK (incl hdr) for ephone-(1)

```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone register

To set registration debugging for the Cisco IP phone, use the **debug ephone register** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone register [**mac-address** *mac-address*]

no debug ephone register [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

If the **mac-address** keyword is not used, the **debug ephone register** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of registration debugging for the Cisco IP phone with MAC address 0030.94c3.8724:

```
Router# debug ephone register mac-address 0030.94c3.8724
Ephone registration debugging is enabled

1d06h: New Skinny socket accepted [1] (2 active)
1d06h: sin_family 2, sin_port 50778, in_addr 10.1.0.21
1d06h: skinny_add_socket 1 10.1.0.21 50778
```

debug ephone register

```

1d06h: ephone-(1)[1] StationRegisterMessage (2/3/12) from 10.1.0.21
1d06h: ephone-(1)[1] Register StationIdentifier DeviceName SEP003094C3E1A8
1d06h: ephone-(1)[1] StationIdentifier Instance 1 deviceType 7
1d06h: ephone-1[-1]:stationIpAddr 10.1.0.21
1d06h: ephone-1[-1]:maxStreams 0
1d06h: ephone-(1) Allow any Skinny Server IP address 10.1.0.6
.
.
.
1d06h: ephone-1[1]:RegisterAck sent to ephone 1: keepalive period 30
.

```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone state	Sets state debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone state

To set state debugging for the Cisco IP phone, use the **debug ephone state** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone state [**mac-address** *mac-address*]

no debug ephone state [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

If the **mac-address** keyword is not used, the **debug ephone state** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of state debugging for the Cisco IP phone with MAC address 0030.94c3.E1A8:

```
Router# debug ephone state mac-address 0030.94c3.E1A8
EPHONE state debugging is enabled for phone 0030.94C3.E1A8

1d06h: ephone-1[1]:OFFHOOK
1d06h: ephone-1[1]:SIEZE on activeline 0
1d06h: ephone-1[1]:SetCallState line 1 DN 1 TsOffHook
```

■ debug ephone state

```

1d06h: ephone-1[1]:Skinny-to-Skinny call DN 1 to DN 2 instance 1
1d06h: ephone-1[1]:SetCallState line 1 DN 1 TsRingOut
1d06h: ephone-1[1]:Call Info DN 1 line 1 ref 158 called 5002 calling 5001
1d06h: ephone-1[1]: Jane calling
1d06h: ephone-1[1]: Jill
1d06h: ephone-1[1]:SetCallState line 3 DN 2 TsRingIn
1d06h: ephone-1[1]:Call Info DN 2 line 3 ref 159 called 5002 calling 5001
1d06h: ephone-1[1]: Jane calling
1d06h: ephone-1[1]: Jill
1d06h: ephone-1[1]:SetCallState line 3 DN 2 TsCallRemoteMultiline
1d06h: ephone-1[1]:SetCallState line 1 DN 1 TsConnected
1d06h: ephone-1[1]:OpenReceive DN 1 codec 4:G711Ulaw64k duration 10 ms bytes 80
1d06h: ephone-1[1]:OpenReceiveChannelAck 1.2.172.21 port=24010
1d06h: ephone-1[1]:StartMedia 1.2.172.22 port=24612
1d06h: DN 1 codec 4:G711Ulaw64k duration 10 ms bytes 80
1d06h: ephone-1[1]:CloseReceive
1d06h: ephone-1[1]:StopMedia
1d06h: ephone-1[1]:SetCallState line 3 DN 2 TsOnHook
1d06h: ephone-1[1]:SetCallState line 1 DN 1 TsOnHook
1d06h: ephone-1[1]:SpeakerPhoneOnHook
1d06h: ephone-1[1]:ONHOOK
1d06h: ephone-1[1]:SpeakerPhoneOnHook
1d06h: SkinnyReportDnState DN 1 ONHOOK

```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets ephone debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone statistics	Sets statistics debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug ephone statistics

To set call statistics debugging for the Cisco IP phone, use the **debug ephone statistics** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug ephone statistics [**mac-address** *mac-address*]

no debug ephone statistics [**mac-address** *mac-address*]

Syntax Description

mac-address	(Optional) Defines the MAC address of the Cisco IP phone.
<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **debug ephone statistics** command provides a debug monitor display of the periodic messages from the Cisco IP phone to the router. These messages include transmit-and-receive packet counts and an estimate of drop packets. The call statistics can also be displayed for live calls using the **show ephone** command.

If the **mac-address** keyword is not used, the **debug ephone statistics** debug command debugs all Cisco IP phones that are registered to the router. You can remove debugging for the Cisco IP phones that you do not want to debug by using the **mac-address** keyword with the **no** form of this command.

You can enable or disable debugging on any number of Cisco IP phones. To display the Cisco IP phones that have debugging enabled, enter the **show ephone** command and look at the debug field in the output. When debugging is enabled for a Cisco IP phone, the debug output is displayed for the directory numbers associated with the Cisco IP phone.

Examples

The following example shows a sample output of statistics debugging for the Cisco IP phone with MAC address 0030.94C3.E1A8:

```
Router# debug ephone statistics mac-address 0030.94C3.E1A8
```

```

EPHONE statistics debugging is enabled for phone 0030.94C3.E1A8

1d06h: Clear Call Stats for DN 1 call ref 162
1d06h: Clear Call Stats for DN 1 call ref 162
1d06h: Clear Call Stats for DN 1 call ref 162
1d06h: Clear Call Stats for DN 2 call ref 163
1d06h: ephone-1[1]:GetCallStats line 1 ref 162 DN 1: 5001
1d06h: ephone-1[1]:Call Stats for line 1 DN 1 5001 ref 162
1d06h: ephone-1[1]:TX Pkts 0 bytes 0 RX Pkts 0 bytes 0
1d06h: ephone-1[1]:Pkts lost 4504384 jitter 0 latency 0
1d06h: ephone-1[1]:Src 0.0.0.0 0 Dst 0.0.0.0 0 bytes 80 vad 0 G711Ulaw64k
1d06h: ephone-1[1]:GetCallStats line 1 ref 162 DN 1: 5001
1d06h: STATS: DN 1 Packets Sent 0
1d06h: STATS: DN 2 Packets Sent 0
1d06h: ephone-1[1]:Call Stats found DN -1 from Call Ref 162
1d06h: ephone-1[1]:Call Stats for line 0 DN -1 5001 ref 162
1d06h: ephone-1[1]:TX Pkts 275 bytes 25300 RX Pkts 275 bytes 25300
1d06h: ephone-1[1]:Pkts lost 0 jitter 0 latency 0

```

Related Commands

Command	Description
debug ephone detail	Sets detail debugging for the Cisco IP phone.
debug ephone error	Sets error debugging for the Cisco IP phone.
debug ephone keepalive	Sets keepalive debugging for the Cisco IP phone.
debug ephone mwi	Sets message waiting indication (MWI) debugging for the Cisco IP phone.
debug ephone pak	Provides voice packet level debugging and prints the contents of one voice packet in every 1024 voice packets.
debug ephone raw	Provides raw low-level protocol debugging display for all SCCP.
debug ephone register	Sets registration debugging for the Cisco IP phone.
debug ephone state	Sets state debugging for the Cisco IP phone.
show debugging	Displays information about the types of debugging that are enabled for your router.

debug mwi relay errors

To debug message waiting indication (MWI) relay errors, use the **debug mwi relay errors** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug mwi relay errors

no debug mwi relay errors

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **debug mwi relay errors** command provides a debug monitor display of any error messages when MWI Relay Server (Cisco IOS Telephony Server) is trying to do MWI Relay to extensions on remote Cisco IOS Telephony Service.

Examples The following examples show errors when MWI Relay Server tries to do a MWI Relay to extension 7004, but location of 7004 is not known to the MWI Relay Server:

```
Router# debug mwi relay errors mwi-relay error info debugging is on
Router#
01:46:48: MWI-APP: mwi_notify_status: No ClientID (7004) registered
```

Related Commands	Command	Description
	debug mwi events	Sets MWI relay events debugging for the Cisco IOS Telephony Service router.
	debug ephone mwi	Sets MWI debugging for the Cisco IOS Telephony Service router.

debug mwi relay events

To set message waiting indication (MWI) relay events debugging, use the **debug mwi relay events** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug mwi relay events

no debug mwi relay events

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **debug mwi relay events** command provides a debug monitor display of events, when MWI Relay Server (Cisco IOS Telephony Server) is trying to do MWI Relay to extensions on remote Cisco IOS Telephony Server (ITS).

Examples The following debug messages are shown when MWI Relay Server tries to send MWI Information to remote client 7001 and the location of 7001 is known by the MWI Relay Server:

```
Router# debug mwi relay events

mwi-relay events info debugging is on

01:45:34: mwi_notify_status: Queued event for mwi_app_queue
01:45:34: MWI-APP: mwi_app_process_event:
01:45:34: MWI-APP: mwi_app_process_event: MWI Event for ClientID(7001)@(1.8.17.22i
```

Related Commands	Command	Description
	debug mwi errors	Sets MWI relay errors debugging for the Cisco IOS Telephony Service router.
	debug ephone mwi	Sets MWI debugging for the Cisco IOS Telephony Service router.

description (ephone-dn)

To enable an alphanumeric description label in the top black bar on the display screen for a Cisco IP Phone 7960 and Cisco IP Phone 7940, use the **description** command in ephone-dn configuration mode. To remove the alphanumeric description label, use the **no** form of this command.

description *text-string-with-spaces*

no description *text-string-with-spaces*

Syntax Description

text-string-with-spaces

Definition of the alphanumeric description for the Cisco IP phone. A text string up to 16 characters in length, including spaces, is used.

Note Although 32 characters can fit in the top line of the phone display, we recommend using 16 characters. If more than 16 characters are used, the extra characters will erase the existing time and date display in the black bar.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(11)T	This command was introduced on the following platforms: Cisco 1751, Cisco 1760, Cisco 2600 series, Cisco 3600 series, Cisco 3725, Cisco 3745 routers, and Cisco IAD2420 series IADs.

Usage Guidelines

The **description** command enables a meaningful alphanumeric description label in the top black bar on the display screen for a Cisco IP Phone 7960 and Cisco IP Phone 7940 connected to the Cisco IOS Telephony Service router. The description consists of a text string up to 16 characters in length, including spaces, and is associated with the first (top) button of the Cisco IP phone.

Examples

The following example sets directory number (DN) 5 (extension number 8001) with the description 408 555 1212 for the top line display:

```
Router(config)# ephone-dn 5
Router(config-ephone-dn)# number 8001
Router(config-ephone-dn)# description 408 555 1212
```

■ description (ephone-dn)

Related Commands	Command	Description
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
	number	Configures a valid number for the Cisco IP phone.

dialplan-pattern (telephony-service)

To create a global prefix that can be used to expand the abbreviated extension numbers into fully qualified E.164 numbers, use the **dialplan-pattern** command in telephony-service configuration mode. To disable, use the **no** form of this command.

dialplan-pattern *tag pattern extension-length length* [**no-reg**]

no dialplan-pattern *tag [pattern extension-length length]*

Syntax Description

<i>tag</i>	Dial-plan string tag used before a ten-digit telephone number. The tag number is from 1 to 5.
<i>pattern</i>	Dial-plan pattern, such as the area code, the prefix, and the first one or two digits of the extension number.
extension-length	The number of extension digits.
<i>length</i>	The number of extension digits. The range is from 1 - 32.
no-reg	(Optional) Prevents the E.164 numbers in the dial-peer from registering to the gatekeeper.

Defaults

No default behavior or values.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

Directory numbers for the Cisco IP phones are expected to be entered in extension number format. The extension number should be greater or equal to the extension length. Otherwise, the extension number cannot be converted to a qualified E.164 number. The **dialplan-pattern** command creates a global prefix that can be used to expand the abbreviated extension numbers to fully qualified E.164 numbers. The

dialplan-pattern is also required to register the Cisco IP phone lines with a gatekeeper. The **dialplan-pattern** command can resolve an incoming call with a full E.164 number to a Cisco IP phone extension number.

The **extension-length** keyword enables the system to convert a full E.164 telephone number back to an extension number for the purposes of caller-ID display, received, and missed call lists. For example, a company uses the extension number range 5000-5099 across several sites, with only the extensions 5000-5009 present on the local router. An incoming call from 5044 arrives from the company's internal VoIP H.323 network and this call includes the calling number as 4083335044 in its full E.164 format.

The **no-reg** keyword provides dialing flexibility. You have the option not to register some specific numbers to the gatekeeper so that those numbers can be used for other telephony services.

When the called number matches the dial-plan pattern, the call is considered a local call and has a distinctive ringing identifying the call as internal. Any call that does not match the dial-plan pattern, is considered an external call and has a distinctive ringing different from the internal ringing. The valid dial-plan pattern with the lowest tag is used as a prefix to all local Cisco IP phones.

Examples

The following example shows how to create dialplan-pattern 1 for extension numbers 5001 to 5099 with the telephone prefix starting with 408555. If the following example is set, the routers sees that the 4085555044 matches dialplan-pattern 1, and uses the **extension-length** keyword to extract the last four digits of the number 5044 and present this as the caller ID for the incoming call.

```
Router(config)# telephony-service
Router(config-telephony-service)# dialplan-pattern 1 40833350.. extension-length 4 no-reg
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

directory (telephony-service)

To define Cisco IP phone local directory naming order, use the **directory** command in telephony-service configuration mode. To disable the directory URL, use the **no** form of this command.

```
directory {first-name-first | last-name-first}
```

```
no directory {first-name-first | last-name-first}
```

Syntax Description

first-name-first	First name is entered first in the Cisco IP phone directory name field.
last-name-first	Last name is entered first in the Cisco IP phone directory name field.

Defaults

The local directory support is enabled by default.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **directory** command defines the local directory naming order and points to the directory access to any HTTP location. The actual directory of names and phone numbers is built using the **name** command and the **number** command in ephone-dn configuration mode.

When the command is set to **first-name-first** keyword, you see the directory information displayed on the phone, for example, Jane E. Smith; and when the command is set with the **last-name-first** keyword, you see the directory information displayed on the phone, for example, Smith, Jane E.

Examples

The following example shows how to configure the local directory with the first name first:

```
Router(config)# telephony-service
Router(config-telephony-service)# directory first-name-first
```

The following example shows how to configure the local directory with the last name first:

```
Router(config)# telephony-service
Router(config-telephony-service)# directory last-name-first
```

Related Commands	Command	Description
	name	Configures a username associated with a directory number.
	number	Configures a valid number for the Cisco IP phone.
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
	url	Provisions URLs for use by the Cisco IP phones connected to the Cisco IOS Telephony Service router.

dn-webedit (telephony-service)

To enable adding of directory numbers through a web interface, use the **dn-webedit** command in telephony-service configuration mode. To disable this feature, use the **no** form of this command.

dn-webedit

no dn-edit

Syntax Description

This command has no arguments or keywords.

Defaults

dn-webedit command is disabled.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **dn-webedit** command enables adding of the directory through the Cisco IOS Telephony Service web-based graphical user interface (GUI). If the **dn-webedit** command is enabled, the GUI administrator can modify and assign the phone numbers associated with the Cisco IOS Telephony Service router. This action may not be desirable in cases where the set of numbers used by the Cisco IOS Telephony Service router are part of a larger telephone network. Disabling the **dn-webedit** command prevents the administrator from allocating phone numbers and also prevents assignment of numbers that may already be used elsewhere in the network.

Examples

The following example shows how to enable editing of directory numbers through the web-based GUI interface:

```
Router(config)# telephony-service
Router(config-telephony-service)# dn-webedit
```

Related Commands	Command	Description
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
	time-webedit	Enables setting time through the web interface.

ephone

To enter the Ethernet phone (ephone) configuration mode, use the **ephone** command in global configuration mode. To disable the ephone configuration mode, use the **no** form of this command.

ephone *tag*

no ephone *tag*

Syntax Description	<i>tag</i>	Number of the Ethernet phone tag. The maximum number is platform dependent:
		<ul style="list-style-type: none"> • Cisco 1750—24 Cisco IP phones • Cisco 1751—24 Cisco IP phones • Cisco 2600 series—24 Cisco IP phones • Cisco 2600-XM series—24 Cisco IP phones • Cisco 3620—24 Cisco IP phones • Cisco 3640—48 Cisco IP phones • Cisco 3660—48 Cisco IP phones • Cisco 3725—48 Cisco IP phones • Cisco 3745—48 Cisco IP phones • Cisco IAD2420—24 Cisco IP phones

Defaults No Cisco IP phone is configured.

Command Modes Global configuration

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

This is a top-level command used to configure Cisco IP phones on the Cisco IOS Telephony Service router. By default, no Cisco IP phone is configured. Therefore, you must manually enter the number of Cisco IP phones you need to configure in your network by entering the **max-ephones** and **max-dn** commands.

Examples

The following example shows how to enter ephone configuration mode for phone 4:

```
Router(config)# ephone 4
Router(config-ephone)#
```

Related Commands

Command	Description
button	Assigns a button number to the Cisco IP phone directory number.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
mac-address	Configures the MAC address of the Cisco IP phone
max-dn	Sets the maximum number of directory numbers that can be supported by the router.
max-ephones	Configures the maximum number of Cisco IP phones that can be supported by the router.
paging-dn	Sets audio paging directory number for each Cisco IP phone.
reset	Resets the Cisco IP phones in ephone configuration mode.
speed-dial	Sets speed-dial buttons on a Cisco IP phone.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
username	Assigns a phone user login account username and password to permit user login to the Cisco IOS Telephony Service router through a web browser.
vm-device-id	Defines a voice-mail ID string.

ephone-dn

To configure the directory numbers for the Cisco IP phone lines, voice-mail ports, and message waiting indication (MWI) code, and to enter ephone-dn configuration mode, use the **ephone-dn** command in global configuration mode. To disable the directory numbers for the Cisco IP phone lines, use the **no** form of this command.

ephone-dn *dn-tag*

no ephone-dn *dn-tag*

Syntax Description	<i>dn-tag</i>	<p>Directory number tag.</p> <p>The maximum directory number is platform dependent:</p> <ul style="list-style-type: none"> • Cisco 1750—96 directory number • Cisco 1751—96 directory numbers • Cisco 2600 series—96 directory numbers • Cisco 2600-XM series—96 directory numbers • Cisco 3620—96 directory numbers • Cisco 3640—192 directory numbers • Cisco 3660—192 directory numbers • Cisco 3725—192 directory numbers • Cisco 3745—192 directory numbers • Cisco IAD2420 series—96 directory numbers
---------------------------	---------------	--

Defaults No directory number is configured.

Command Modes Global configuration

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

This is a top-level command used to configure Cisco IP phones on the Cisco IOS Telephony Service router. By default, no directory number is configured. Therefore, you must manually enter the number of Cisco IP phones you need to configure in your network by entering the **max-ephones** and **max-dn** commands.

Examples

The following example shows how to configure the directory numbers for the Cisco IP phone lines and enter ephone-dn configuration mode:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)#
```

Related Commands

Command	Description
application	Selects session-level application on a per-Cisco IP phone directory number basis.
call-forward all	Configures call forwarding for all the incoming calls on one of the lines of a Cisco IP phone to another telephone.
call-forward busy	Configures call forwarding to another number when the Cisco IP phone is busy.
call-forward noan	Configures call forwarding to another number when no answer is received from the Cisco IP phone.
caller-id block	Configures caller-ID blocking for outbound calls.
cor	Configures a COR on the dial peers associated with a directory number.
description	Enables an alphanumeric description label in the top black bar on the display screen for a Cisco IP Phone 7960 and Cisco IP Phone 7940.
ephone	Enters ephone configuration mode to register Cisco IP phones.
hold-alert	Sets audible alert notification on the Cisco IP phone for alerting the user about on-hold calls.
huntstop	Sets the huntstop attribute for the dial peers associated with the Cisco IP phone lines.
intercom	Defines the directory number for the Cisco IP phone that connects with another IP phone for the intercom feature.
max-dn	Sets the maximum number of directory numbers that can be supported by the router.
max-ephones	Configures the maximum number of Cisco IP phones that can be supported by the router.
mwi	Configures specific Cisco IP phone directory numbers to receive MWI notification from an external voice-mail system.
mwi sip	Subscribes an extension in a Cisco IOS Telephony Service router to receive MWI notification from a SIP MWI server.
name	Configures a username associated with a directory number.
number	Configures a valid number for the Cisco IP phone.
paging	Sets paging numbers that can be called in order to broadcast an audio page to a group of Cisco IP phones.
paging group	Sets audio paging directory number for a large combined group.
preference	Sets preference for the attached dial peer for a directory number.

Command	Description
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
translate	Selects a translation rule to numbers dialed by the Cisco IP phone users.

hold-alert (ephone-dn)

To set audible alert notification on the Cisco IP phone for alerting the user about on-hold calls, use the **hold-alert** command in ephone-dn configuration mode. To disable this feature, use the **no** form of this command.

```
hold-alert timeout { idle | originator | shared }
```

```
no hold-alert timeout { idle | originator | shared }
```

Syntax Description

<i>timeout</i>	Time interval in seconds the audible alert notification is repeated.
idle	Alert only during the idle state.
originator	Alert always: on idle or busy state.
shared	Alert all phones that share the line during the idle state.

Defaults

Audible alert for on-hold calls is disabled by default. Only a visual indication is provided.

Command Modes

Ephone-dn

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **hold-alert** command sets audible alert notification on the Cisco IP phone for alerting the user about on-hold calls. The *timeout* argument specifies the time interval in seconds from the time the call is placed on hold to the time the on-hold audible alert is generated. The alert is repeated every *timeout* seconds.

When the **idle** keyword is enabled, a 1-second burst of ringing on the phone is generated on the IP phone that placed the call into the hold state, only if the phone is in the idle state. If the phone is in active use, no on-hold alert is generated.

When the **originator** keyword is enabled, a 1-second burst of ringing is generated on the phone that placed the call into the hold state if the phone is in the idle state. If the phone is in use on another call, an audible beep is generated (call-waiting beep).

**Note**

From the perspective of the originator of the call-on-hold, the **shared** and the **originator** keywords provide the same functionality.

When the **shared** keyword is enabled, a 1-second burst of ringing is generated for all the idle phones that share the same line appearance. If the phones are in use, they do not get an audio beep alert. Only the phone that initiated the call, if busy, hears a call-waiting beep.

Examples

The following example shows how to set audible alert notification to idle on the Cisco IP phone for alerting the user about on-hold calls:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 1111
Router(config-ephone-dn)# name phone1
Router(config-ephone-dn)# hold alert 10 idle
```

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

huntstop (ephone-dn)

To set the huntstop attribute for the dial peers associated with the Cisco IP phone lines, use the **huntstop** command in ephone-dn configuration mode. To disable huntstop, use the **no** form of this command.

huntstop

no huntstop

Syntax Description This command has no arguments or keywords.

Defaults Huntstop is set by default.

Command Modes Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

In the ephone-dn configuration mode, the huntstop attribute is set by default for the dial peers associated with the Cisco IP phone lines on a line-by-line basis. This allows you to prevent hunt-on-busy from redirecting a call to a busy phone into a dial-peer setup with a catch-all default destination.



Note

Use the **no huntstop** command only if you want to disable huntstop.

Examples

The following example shows how to disable huntstop for the destination dial peer with the extension 5001. The huntstop for the dial-peer is set to OFF and prevents calls to extension 5001 from being re-routed to the on-net H.323 dial-peer for 5... (The three decimal points are used as wildcards.) destination when 5001 is busy.

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 5001
Router(config-ephone-dn)# no huntstop
```


The following example shows a typical configuration where ephone-dn huntstop (default) is required:

```
ephone-dn 1
  number 5001

ephone 4
  button 1:1
  mac-address 0030.94c3.8724

dial-peer voice 5000 voip
  destination-pattern 5...
  session target ipv4:223.223.223.223
```

In the previous example, the huntstop attribute is set to ON by default and prevents calls to extension 5001 from being re-routed to the on-net H.323 dial-peer for 5... when the 5001 extension is busy.

The following example shows another instance in which huntstop is not desired and is explicitly disabled:

```
ephone-dn 1
  number 5001
  no huntstop
  preference 1
  call-forward noan 6000

ephone-dn 2
  number 5001
  preference 2
  call-forward busy 6000
  call-forward noan 6000

ephone 4
  button 1:1 2:2
  mac-address 0030.94c3.8724

dial-peer voice 6000 pots
  destination-pattern 6000
  huntstop
  port 1/0/0
  description answering-machine
```

In this example, ephone 4 is configured with two lines, each with the same extension number 5001. This is done in order to allow the second line to provide call waiting notification for extension number 5001 when the first line is in use. Setting no huntstop on the first line (ephone-dn 1) allows incoming calls to hunt to the second line (ephone-dn 2) on ephone 4 when the ephone-dn 1 line is busy.

The ephone-dn 2 has call forwarding set to extension 6000, which corresponds to a locally attached answering machine connected to a Foreign Exchange Station (FXS) voice-port. In this example, the plain old telephone service (POTS) dial-peer for extension 6000 also has the dial-peer huntstop attribute explicitly set to prevent further hunting.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
huntstop (dial-peer)	Disables all further dial-peer hunting if a call fails using hunt groups.

intercom (ephone-dn)

To define the directory number for the Cisco IP phone that connects with another Cisco IP phone for the intercom feature, use the **intercom** command in ephone-dn configuration mode. To disable this feature, use the **no** form of this command.

```
intercom directory-number [barge-in | no-auto-answer] [label label]
```

```
no intercom directory-number
```

Syntax Description

<i>directory-number</i>	The telephone number where the intercom calls are placed.
barge-in	(Optional) Allows inbound intercom calls to force an existing call into the call-hold state and allows the intercom call to be immediately answered.
no-auto-answer	(Optional) Disables the intercom auto-answer feature.
label	(Optional) Defines a text label for the intercom.
<i>label</i>	(Optional) The actual text label.

Defaults

By default, intercom functionality is disabled for the ephone-dn.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **intercom** command dedicates a pair of ephone-dns for use as a “press to talk” two-way intercom between two IP phones. Intercom lines cannot be used in shared line configurations. If an ephone-dn is configured for intercom operation, it must be associated to one Cisco IP phone only. The intercom attribute causes an IP phone line (ephone-dn) to operate as auto-dial for outbound calls and auto-answer-with-mute for inbound calls.

The **barge-in** keyword allows inbound intercom calls to force an existing call into the call-hold state and allows the intercom call to be immediately answered. The **label** keyword defines a text label for the intercom. The **no-auto-answer** keyword creates a connection for the IP phone line resembling a private line automatic ringdown (PLAR).

Examples

The following example shows how to set the intercom on Cisco IP phone directory number 1:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn) number A5001
Router(config-ephone-dn) name "intercom"
Router(config-ephone-dn) intercom A5002 barge-in
```

The following example shows intercom configuration between two Cisco IP phones:

```
ephone-dn 18
 number A5001
 name "intercom"
 intercom A5002 [barge-in]
ephone-dn 19
 number A5002
 name "intercom"
 intercom A5001 [barge-in]
ephone 4
 button 1:2 2:4 3:18
ephone 5
 button 1:3 2:6 3:19
```

In this example, directory number (ephone-dn) 18 and directory number (ephone-dn) 19 are set as an intercom pair. Directory number (DN) 18 is associated with button 3 of Cisco IP phone (ephone) 4 and directory number (DN) 19 is associated with button number 3 of Cisco IP phone (ephone) 5. Button 3 on both the Cisco IP phone 4 and Cisco IP phone 5 is set as a pair to provide intercom service to each phone.

The intercom feature acts as a combination speed-dial PLAR and auto-answer with mute. If the **barge-in** argument is set on the DN receiving the intercom call, the existing call is forced into the hold state, and the intercom call is accepted. If the phone user has the handset off hook (that is, not in speakerphone mode), the user hears a warning beep, and the intercom call is immediately connected with two-way audio. If the phone user is using speakerphone mode, the intercom connects with the microphone mute activated.

**Note**

Dialing in to an intercom by any caller and auto-dial to a nonintercom destination are not prohibited. Calls to an intercom DN originated by a nonintercom caller triggers auto-answer. To prevent nonintercom originators from manually dialing to an intercom destination, use of the special A, B, C, or D dual-tone multifrequency (DTMF) digits in the intercom phone numbers is recommended because these digits cannot be dialed from a normal phone.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.

ip source-address (telephony-service)

To enable the router to receive messages from the Cisco IP phones through the specified IP addresses and ports, use the **ip source-address** command in telephony-service configuration mode. To disable the router from receiving messages from Cisco IP phones, use the **no** form of this command.

ip source-address *ip-address* [**port** *port*] [**any-match** | **strict-match**]

no ip source-address *ip-address* [**port** *port*] [**any-match** | **strict-match**]

Syntax Description

<i>ip-address</i>	The preexisting router IP address, typically one of the addresses of the Ethernet port of the router.
port	(Optional) TCP/IP port used for Skinny Protocol.
<i>port</i>	(Optional) The port number.
any-match	(Optional) Disables strict IP address checking for registration.
strict-match	(Optional) Requires strict IP address checking for registration.

Defaults

The default port is 2000.
The default for the server address match is **any-match**.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **ip source-address** command is a mandatory command. The Cisco IOS Telephony Service router does not start if the IP address and the port information are not provided. If the port number is not provided, then the default is port 2000. The IP address is usually the IP address of the Ethernet port to which the phones are connected.

Use the **any-match** keyword to instruct the router to permit Cisco IP phone registration, and use the **strict-match** keyword to instruct the router to reject IP phone registration attempts if the IP server address used by the phone does not exactly match the source-address.

The **ip source-address** command enables the router to receive messages from the Cisco IP phones through the specified IP address and port.

The **ip source-address** command helps the router to autogenerate the SEPDEFAULT.cnf file and the XMLDefault.cnf.xml file, which are stored in the router's Flash memory. The SEPDEFAULT.cnf file contains the IP address of one of the Ethernet ports of the router to which the phone should register; the XMLDefault.cnf.xml file contains the IP address of one of the Ethernet ports of the router to which the ATA adapter should register.

**Note**

The SEPDEFAULT.cnf file and the XMLDefault.cnf.xml file are specific to the router and cannot be shared by multiple routers.

At some point, you must use the following commands to enable access to the SEPDEFAULT.cnf file and XMLDefault.cnf.xml file:

```
Router# tftp-server flash:SEPDEFAULT.cnf
Router# tftp-server flash:XMLDefault.cnf.xml
```

The Flash file system on some routers limits the number of times the Flash file can be written to or modified. After this limit is exceeded, the Flash memory must be manually erased and the files contained in the Flash file must be reloaded.

The **ip source-address** command can write or modify the SEPDEFAULT.cnf file or the XMLDefault.cnf.xml file only when parameters are actually changed. The file is not deleted by executing the **no ip source-address** command. However, the SEPDEFAULT.cnf file or the XMLDefault.cnf.xml file can be manually removed using the **delete** command.

If the **ip source-address** command is executed with changed parameters after the Flash file write limit is exceeded, the command fails. To see the detailed operation of the **ip source-address** command, turn on the **debug ephone detail** command.

Examples

The following example shows how to set the IP source address and port:

```
Router(config)# telephony-service
Router(config-telephony-service)# ip source-address 1.6.21.4 port 2000 strict-match
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
max-dn	Sets the maximum number of directory numbers that can be supported by the router.
max-ephones	Configures the maximum number of Cisco IP phones that can be supported by the router.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
tftp-server	Enables TFTP access to firmware files on the TFTP server so that the Cisco IP phone can get the file.

keepalive (telephony-service)

To configure the time interval between sending keepalive messages to the router used by the Cisco IP phones, use the **keepalive** command in telephony-service configuration mode. To return the default, use the **no** form of this command.

keepalive *seconds*

no keepalive *seconds*

Syntax Description	<i>seconds</i>	The interval time in seconds. The range is 10 to 65,535 seconds. The default timeout is set at 30 seconds.
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Defaults	The default is 30 seconds.
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Command Modes	Telephony-service configuration
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Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines	The keepalive command configures the time interval between sending keepalive messages to the router used by the Cisco IP phone. The default is 30 seconds. If the router fails to receive three successive keepalive messages, it considers the phone to be out of service until the phone re-registers.
------------------	---

Examples	The following example shows how to set keepalive timeout at 40 seconds:
----------	---

```
Router(config)# telephony-service
Router(config-telephony-service)# keepalive 40
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

load (telephony-service)

To download a new phone firmware on the Cisco IP phones, use the **load** command in telephony-service configuration mode. To disable a new phone firmware on the Cisco IP phones, use the **no** form of this command.

```
load {7960-7940 | 7910 | 7935} phone-load
```

```
no load {7960-7940 | 7910 | 7935} phone-load
```

Syntax Description

7960-7940	Specifies the IP phone firmware for Cisco IP Phone 7960 and Cisco IP phone 7940.
7910	Specifies the IP phone firmware for Cisco IP phone 7910.
7935	Specifies the IP phone firmware for Cisco IP Conference Station 7935.
<i>phone-load</i>	Specifies Cisco IP phone firmware.

Defaults

No default behavior or values.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

Use the **load** command to download a new phone firmware on the Cisco IP phones. You must enter this command for each type of phone. The Cisco IP Phone 7960 and Cisco IP Phone 7940 have the same phone firmware. The phone firmware should be downloaded on the HTTP server of the router.



Note

When you enter the **load** command, you do not use the extension of the file, for example, .bin.

Examples

The following example shows how to download the correct phone firmware for the specific Cisco IP phones:

**Note**

The filenames are case-sensitive.

```
Router(config)# telephony-service
Router(config-telephony-service)# load 7960-7940 P003E302
Router(config-telephony-service)# load 7910 P004E302
```

```
Router(config)# tftp-server flash:P003E302.bin
Router(config)# tftp-server flash:P004E302.bin
```

**Note**

The .bin suffix is not required by the **load** command; however, the .bin suffix is required by the **tftp-server** command.

The Cisco IP phone is updated with a different phone firmware only when the Cisco IP phone reboots.

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
tftp-server	Enables TFTP access to firmware files on the TFTP server so that the Cisco IP phone can get the file.

loopback-dn (ephone-dn)

To create a virtual loopback voice port (loopback-dn) to establish a demarcation point for VoIP calls and supplementary services, use the **loopback-dn** command in ephone-dn configuration mode. To delete a loopback-dn configuration, use the **no** form of this command.

loopback-dn *dn-tag* [**forward** *number-of-digits*] [**prefix** *prefix-digit-string*] [**suffix** *suffix-digit-string*] [**retry** *seconds*] [**auto-con**]

no loopback-dn

Syntax Description

<i>dn-tag</i>	Unique sequence number that identifies the ephone-dn that is being paired for loopback with the ephone-dn that is currently being configured. The paired ephone-dn must be one that is already defined in the system.
forward <i>number-of-digits</i>	(Optional) Number of digits in the original called number to forward to the other ephone-dn in the loopback-dn pair. Range is from 1 to 32 digits. Default is to forward all digits.
prefix <i>prefix-digit-string</i>	(Optional) Defines a string of digits to add in front of the forwarded called number. Maximum number of digits in the string is 32. Default is that no prefix is defined.
suffix <i>suffix-digit-string</i>	(Optional) Defines a string of digits to add to the end of the forwarded called number. Maximum number of digits in the string is 32. Default is that no suffix is defined. If you add a suffix that starts with the pound character (#), the string must be enclosed in quotation marks.
retry <i>seconds</i>	(Optional) Number of seconds to wait before retrying the loopback target when it is busy or unavailable. Range is from 0 to 32767. Default is that retry is disabled and appropriate call-progress tones are passed to the call originator.
auto-con	(Optional) Immediately connects the call and provides in-band alerting while waiting for the far-end destination to answer. Default is that automatic connection is disabled.

Defaults

All calls are set to forward all digits and not to strip any digits.
Prefix is not defined.
Suffix is not defined.
Retry is disabled.
Automatic connection is disabled.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series, and Cisco IAD2420 series.
12.2(2)XT3	The suffix keyword was added.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers. The auto-con keyword was added.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers. The suffix keyword was added.

Usage Guidelines

The **loopback-dn** command is used to configure two ephone-dn virtual voice ports as back-to-back-connected voice-port pairs. A call presented on one side of the loopback-dn pair is reoriginated as a new call on the opposite side of the loopback-dn pair. The **forward**, **prefix**, and **suffix** keywords can be used to manipulate the original called number that is presented to the incoming side of the loopback-dn pair to generate a modified called number to use when reoriginating the call at the opposite side of the loopback-dn pair. For loopback-dn configurations, you must always configure ephone-dn virtual voice ports as cross-coupled pairs.

**Note**

Use of loopback-dn configurations within a VoIP network should be restricted to resolving critical network interoperability service problems that cannot otherwise be solved. Loopback-dn configurations are intended to be used in VoIP network interworking situations in which the only other alternative would be to make use of back-to-back-connected physical voice ports. Loopback-dn configurations emulate the effect of a back-to-back physical voice-port arrangement without the expense of the physical voice-port hardware. A disadvantage of loopback-dn configurations is that, because digital signal processors (DSPs) are not involved in a loopback-dn arrangement, the configuration does not support interworking or transcoding between calls that use different voice codecs. In many cases, the use of back-to-back physical voice ports that do use DSPs to resolve VoIP network interworking issues is preferred, because it introduces fewer restrictions in terms of supported codecs and call flows. Also, loopback-dns do not support T.38 fax relay.

**Note**

Cisco recommends that you create the basic ephone-dn configuration for both ephone-dn entries before configuring the loopback-dn option under each ephone-dn. The loopback-dn mechanism should be used only in situations where the voice call parameters for the calls on either side of the loopback-dn use compatible configurations; for example, compatible voice codec and DTMF relay parameters. Loopback-dn configurations should only be used for G.711 voice calls.

The loopback-dn arrangement allows an incoming telephone call to be terminated on one side of the loopback-dn port pair and a new pass-through outgoing call to be originated on the other side of the loopback-dn port pair. The loopback-dn port pair normally works with direct cross-coupling of their call states; the alerting call state on the outbound call segment is associated with the ringing state on the inbound call segment.

The loopback-dn mechanism allows for call operations (such as call transfer and call forward) that are invoked for the call segment on one side of the loopback-dn port pair to be isolated from the call segment that is present on the opposite side of the loopback-dn port pair. This approach is useful when the endpoint devices associated with the two different sides have mismatched call transfer and call forwarding capabilities. The loopback-dn arrangement allows for call transfer and call forward requests to be serviced on one side of the loopback-dn port pair by creating hairpin-routed calls when necessary. The loopback-dn arrangement avoids the propagation of call transfer and call forward requests to endpoint devices that do not support these functions.

The **loopback-dn** command provides options for controlling the called-number digits that are passed through from the incoming side to the outgoing side. The available digits can be manipulated with the **forward**, **prefix**, and **suffix** keywords.

The **forward** keyword defines the number of digits in the original called number to forward to the other ephone-dn in the loopback-dn pair. The default is set to forward all digits. The **forward** keyword can be used with any combination of the **prefix** and **suffix** keywords.

The **prefix** keyword defines a string of digits to add in front of the forwarded number.

The **suffix** keyword is most commonly used to add a terminating “#” (pound-sign) character to the end of the forwarded number to indicate that no more digits should be expected. The pound-sign character indicates to the call-routing mechanism that is processing the forwarded number that the forwarded number is complete. Providing an explicit end-of-number character also avoids a situation in which the call-processing mechanism waits for the interdigit timeout period to expire before routing the call onward using the forwarded number.

**Note**

The Cisco IOS command-line interface (CLI) requires that arguments with character strings that start with the pound-sign (#) character be enclosed within quotation marks; for example, “#”.

The **retry** keyword is used to suppress a far-end busy indication on the outbound call segment. Instead of returning a busy signal to the call originator (on the incoming call segment), a loopback-dn presents alerting or ringing tone to the caller and then periodically retries the call to the final far-end destination (on the outgoing call segment). This is not bidirectional. To prevent calls from being routed into the idle outgoing side of the loopback-dn port pair during the idle interval that occurs between successive outgoing call attempts, configure the outgoing side of the loopback-dn without a number so that there is no number to match for the inbound call.

The **auto-con** keyword is used to configure a premature trigger for a connected state for an incoming call segment while the outgoing call segment is still in the alerting state. This setup forces the voice path to open for the incoming call segment and support the generation of in-band call progress tones for busy, alerting, or ringback. The disadvantage of the **auto-con** keyword is premature opening of the voice path during the alerting stage and also triggering of the beginning of billing for the call before the call has been answered by the far end. These disadvantages should be considered carefully before you use the **auto-con** keyword.

Examples

The following example creates a loopback-dn configured with the **forward** and **prefix** keywords:

```
Router(config)# ephone-dn 7
Router(config-ephone-dn)# loopback-dn 15 forward 5 prefix 41
```

The following example creates a loopback-dn that appends the pound-sign (#) character to forwarded numbers to indicate the end of the numbers:

```
Router(config)# ephone-dn 7
Router(config-ephone-dn)# loopback-dn 16 suffix "#"
```

The following example shows a loopback-dn configuration that pairs ephone-dns 15 and 16. An incoming call (for example, from VoIP) to 4085550101 matches ephone-dn 16. The call is then reoriginated from ephone-dn 15 and sent to extension 50101. Another incoming call (for example, from a local IP phone) to extension 50151 matches ephone-dn 15. It is reoriginated from ephone-dn 16 and sent to 4085550151.

```

ephone-dn 15
 number 5015.
 loopback-dn 16 forward 5 prefix 40855
 caller-id block
 no huntstop
!
!
ephone-dn 16
 number 408555010.
 loopback-dn 15 forward 5
 caller-id block
 no huntstop
!

```

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode.
show ephone-dn loopback	Displays information about loopback ephone-dns that have been created in a Cisco CallManager Express (Cisco CME) system.

mac-address (ephone)

To configure the MAC address of the Cisco IP phone, use the **mac-address** command in ephone configuration mode. To disable the MAC address of the Cisco IP phone, use the **no** form of this command.

mac-address *mac-address*

no mac-address *mac-address*

Syntax Description

<i>mac-address</i>	Identifies a specific Cisco IP phone. The MAC address is typically found on a sticker located on the bottom of the Cisco IP phone.
--------------------	--

Defaults

No default behavior or values.

Command Modes

Ephone configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **mac-address** command configures the MAC address of a specific Cisco IP phone to uniquely identify the Cisco IP phone. The MAC address is printed on a sticker and placed on the bottom of each Cisco IP phone.

Examples

The following example shows how to configure the actual MAC address CFBA.321B.96FA for a Cisco IP phone:

```
Router(config-ephone)# mac-address CFBA.321B.96FA
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
show ephone	Displays Cisco IP phone output.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

max-conferences (telephony-service)

To set the maximum number of simultaneous three-party conferences supported by the router, use the **max-conferences** command in telephony-service configuration mode. To return to the default conferencing numbers, use the **no** form of this command.

max-conferences *max-conference-numbers*

no max-conferences *max-conference-numbers*

Syntax Description

max-conference-numbers The maximum number of simultaneous three-party conferences supported by the router. The maximum number of three-party conferences is platform dependent:

- Cisco 1750—8
- Cisco 1751—8
- Cisco 2600 series—8
- Cisco 2600-XM series—8
- Cisco 3620—8
- Cisco 3640—8
- Cisco 3660—16
- Cisco 3725—16
- Cisco 3745—16
- Cisco IAD2420 series—8

Defaults

The default is half of the maximum simultaneous three-party conferences numbers per platform.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **max-conferences** command supports three-party conferences for local and on-net calls only when all conference participants are using G.711. Conversion between G.711 u-law and a-law is supported. Mixing of the media streams is supported by the Cisco IOS processor. The maximum number of simultaneous conferences is limited to the platform-specific maximum.

Examples

The following example shows how to set the maximum number of conferences for a Cisco IP phone to 4:

```
Router(config)# telephony-service
Router(config-telephony-service)# max-conferences 4
```

Related Commands

Command	Description
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

max-dn (telephony-service)

To set the maximum number of directory numbers that can be supported by the router, use the **max-dn** command in telephony-service configuration mode. To return to the default directory numbers, use the **no** form of this command.

max-dn *max directory numbers*

no max-dn

Syntax Description

max directory numbers Maximum number of extensions (ephone-dns) supported by the router. The maximum number is version- and platform-dependent; for a range of values, refer to Cisco IOS command-line interface (CLI) help. The default is 0.

Defaults

The default is 0.

Syntax Description

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **max-dn** command limits the number of extensions (ephone-dns) available. The maximum number supported by a router is platform- and version-dependent. Use CLI help to determine the maximum number of extensions you can set using this command, as shown in this example:

```
Router(config-telephony-service)# max-dn ?
<1-192> Maximum directory numbers supported
```



Note

You can increase the directory numbers; but after the maximum allowable number is configured, you cannot reduce the limit of the directory numbers without rebooting the router.

Examples

The following example shows how to set the maximum number of directory numbers to 12:

```
Router(config)# telephony-service
Router(config-telephony-service)# max-dn 12
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
max-ephones	Configures the maximum number of Cisco IP phones that can be supported by the router.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

max-ephones (telephony-service)

To configure the maximum number of Cisco IP phones that can be supported by the router, use the **max-ephones** command in telephony-service configuration mode. To return to the default number of Cisco IP phones, use the **no** form of this command.

max-ephones *max phones*

no max-ephones

Syntax Description

<i>max phones</i>	Maximum number of phones supported by the router. The maximum number is version- and platform-dependent; for a range of values, refer to Cisco IOS command-line interface (CLI) help. Default is 0.
-------------------	---

Defaults

The default is 0.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **max-ephones** command limits the number of Cisco IP phones (ephones) available. The maximum number supported by a router is platform- and version-dependent. Use CLI help to determine the maximum number of ephones you can set using this command, as shown in this example:

```
Router(config-telephony-service)# max-ephones ?
<1-48> Maximum phones to support
```



Note

You can increase the number of phones; but after the maximum allowable number is configured, you cannot reduce the limit of the Cisco IP phones without rebooting the router.

Examples

The following example shows how to set the maximum number of Cisco IP phones to 24 for a Cisco router:

```
Router(config)# telephony-service
Router(config-telephony-service)# max-ephones 24
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
max-dn	Sets the maximum number of directory numbers that can be supported by the router.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

moh (telephony-service)

To configure Music On Hold (MOH), use the **moh** command in telephony-service configuration mode. To disable music on hold, use the **no** form of this command.

moh *filename*

no moh *filename*

Syntax Description

filename The music file name.

Defaults

No default behavior or values.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers; and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **moh** command configures .au and .wav format music files. Music on hold only works for G.711 calls and on-net Voice over IP (VoIP) and Public switched Telephone Network (PSTN) calls. For all other calls, tone on hold works where the user hears a periodic beep. The internal calls between Cisco IP phones do not get music on hold, instead the IP phones get tone on hold. The MOH files are downloaded to the router's Flash memory.



Note

The music on hold file can be in .wav or .au file format; however, the file format must contain 8-bit 8KHz data, for example, Consultative Committee for International Telegraph and Telephone (CCITT) a-law or u-law data format.

Examples

The following example sets the music on hold with the music files:

```
Router(config)# telephony-service
Router(config-telephony-service)# moh minuet.wav
Router(config-telephony-service)# moh minuet.au
```

Related Commands	Command	Description
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

mwi (ephone-dn)

To configure specific Cisco IP phone directory numbers to receive message waiting indication (MWI) notification from an external voice-mail system, use the **mwi** command in ephone-dn configuration mode. To disable this feature, use the **no** form of this command.

mwi {**off** | **on** | **on-off**}

no mwi {**off** | **on** | **on-off**}

Syntax Description

off	Sets Cisco IP phone directory number to process MWI notification to OFF setting using either the main or secondary phone number.
on	Sets Cisco IP phone directory number to process MWI notification to ON setting using either the main or secondary phone number.
on-off	Sets Cisco IP phone directory number to process MWI notification to both ON and OFF setting using the main or secondary phone number.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **mwi** command configures specific Cisco IP phone directory numbers to receive MWI notification from an external voice-mail system. The notification is set for all the Cisco IP phones connected to the Cisco IOS Telephony Service router. The external voice-mail systems are often able to communicate MWI status by making telephone calls to dummy extension numbers, where the MWI information is embedded in either the called or calling party IP phone number. This command cannot be configured unless the **number** command is configured in ephone-dn configuration mode.

Examples

The following example shows how to MWI indication to ON:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn) number 8000
```



```
Router(config-ephone-dn) mwi on
```

The following example shows how to set message waiting indication to OFF:

```
Router(config)# ephone-dn 2
Router(config-ephone-dn) number 8001
Router(config-ephone-dn) mwi off
```

The following example shows how to set message waiting indication to ON-OFF for the primary and secondary number, where the MWI information is embedded in the calling party number:

```
Router(config)# ephone-dn 3
Router(config-ephone-dn) number 8002 secondary 8003
Router(config-ephone-dn) mwi on-off
```

In the previous example, a call placed by the voice-mail system to 8002 turns on the MWI light for the extension number indicated by the calling party number for the MWI call. A call placed to 8003 turns off the MWI light.

The following example shows how to set message waiting indication to ON-OFF for the primary and secondary number, where the MWI information is embedded in the called party number:

```
Router(config)# ephone-dn 20
Router(config-ephone-dn) number 8000*....*1 secondary 8000*....*2
Router(config-ephone-dn) mwi on-off
```

In the previous example, a call placed by the voice-mail system to 8000*5001*1 turns on the MWI light for extension 5001. A call to 8000*5001*2 turns off the MWI light.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
mwi expires	Sets the expire timer for registration for either the client or server.
mwi sip (ephone-dn)	Subscribes an extension in a Cisco IOS Telephony Service router to receive MWI notification from a SIP MWI server.
mwi sip-server (telephony-service)	Configures IP address and port for the external SIP-based MWI server.

mwi expires (telephony-service)

To set the expire timer for registration for either the client or server, use the **mwi expires** command in telephony-service configuration mode. To disable the expire timer for a subscription, use the **no** form of this command.

mwi expires *seconds*

no mwi expires *seconds*

Syntax Description	<i>seconds</i>	Expire time set in seconds. The default is set to 86,400 seconds (24 hours).
---------------------------	----------------	--

Defaults	Default is set to 86,400 seconds (24 hours).
-----------------	--

Command Modes	Telephony-service configuration
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Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers; and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines	The mwi expires command sets the expire timer for registration for either the client or server.
-------------------------	--

Examples	The following example shows how to set the message waiting indication (MWI) expires time to 10 seconds:
-----------------	---

```
Router(config)# telephony-service
Router(config-telephony-service)# mwi expires 10
```

Related Commands	Command	Description
	mwi relay (telephony-service)	Enables the Cisco IOS Telephony Service router to relay MWI information to remote Cisco IP phones.

Command	Description
mwi sip-server (telephony-service)	Configures IP address and port for the external SIP-based MWI server.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

mwi relay (telephony-service)

To enable the Cisco IOS Telephony Service router to relay message waiting indication (MWI) information to remote Cisco IP phones, use the **mwi relay** command in telephony-service configuration mode. To disable MWI relay, use the **no** form of this command.

mwi relay

no mwi relay

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **mwi relay** command enables the Cisco IOS Telephony Service router to relay MWI information to remote Cisco IP phones. The Cisco IOS Telephony Service router at the central site acts as a notifier after the **mwi relay** command is configured.

Examples

The following example shows how to set MWI relay:

```
Router(config)# telephony-service
Router(config-telephony-service)# mwi relay
```

Related Commands

Command	Description
mwi expires	Sets the expire timer for registration for either the client or server.
show mwi relay clients	Displays the list of MWI relay clients' registration information.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

mwi sip (ephone-dn)

To subscribe an extension in a Cisco IOS Telephony Service router to receive message waiting indication (MWI) notification from a Session Initiation Protocol (SIP) protocol-based MWI server, use the **mwi sip** command in ephone-dn configuration mode. To delete the configuration, use the **no** form of this command.

mwi sip

no mwi sip

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Ephone-dn configuration

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **mwi sip** command subscribes an extension in a Cisco IOS Telephony Service router to receive MWI notification from a SIP MWI server, integrating a Cisco IOS Telephony Service router with a SIP-protocol-based MWI service.

Examples The following example shows how to subscribe MWI notification from an external SIP MWI server and to request the SIP MWI server to send MWI notification messages to the Cisco IOS Telephony Service router for the extension number:

```
Router(config) ephone-dn 1
Router(config-ephone-dn) number 5001
Router(config-ephone-dn) name user1
Router(config-ephone-dn) mwi sip

Router(config) telephony-service
Router(config-telephony-service) mwi sip-server 192.168.255.255
```

This command requests that the SIP server configured for the Cisco IOS Telephony Service router send MWI notification messages through the SIP protocol for extension 5001.

Related Commands	Command	Description
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
	mwi (ephone-dn)	Configures specific Cisco IP phone directory numbers to receive MWI notification from an external voice-mail system.
	mwi sip-server (telephony-service)	Configures IP address and port for the external SIP-based MWI server.
	show mwi relay clients	Displays the list of MWI relay clients' registration information.

mwi sip-server (telephony-service)

To configure IP address and port for the external Session Initiation Protocol (SIP)-based message waiting indication (MWI) server, use the **mwi sip-server** command in telephony-service configuration mode. To disable the MWI server, use the **no** form of this command.

```
mwi sip-server ip-address [[transport tcp | transport udp] | [port port-number] | [reg-e164]]
```

```
no mwi sip-server ip-address
```

Syntax Description

<i>ip-address</i>	The IP address and port of the MWI server.
transport tcp	(Optional) Transport layer protocol is TCP. The default is TCP.
transport udp	(Optional) Transport layer protocol is User Datagram Protocol (UDP).
port	(Optional) Default SIP port.
<i>port-number</i>	(Optional) The SIP port number. The default SIP port number is 5060.
reg-e164	(Optional) Regular E.164 ten-digit number.

Defaults

Default transport layer protocol is TCP.
 Default port number is 5060 (SIP standard port).
 Default registration is with an extension number.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **mwi sip-server** command configures the IP address of an external SIP MWI server. This IP address is used in conjunction with the **mwi sip** (ephone-dn) command to subscribe individual ephone-dn extension numbers to the MWI SIP server's notification list. SIP MWI client runs TCP as default.

The **transport tcp** keyword is the default setting. The **transport udp** keyword allows you to integrate with SIP MWI client. The optional **port** keyword is used to specify a port number. The default SIP port number is 5060. The default registration is with an extension number, so the **reg-e164** keyword allows you to register with an E.164 te- digit number.

Examples

The following example shows how to set the MWI for the SIP server and set the individual ephone-dn extension numbers to the MWI SIP server's notification list:

```
Router(config) ephone-dn 1
Router(config-ephone-dn) number 5001
Router(config-ephone-dn) name user1
Router(config-ephone-dn) mwi sip

Router(config) telephony-service
Router(config-telephony-service) mwi sip-server 192.168.255.255 transport udp
```

Related Commands

Command	Description
mwi expires	Sets the expire timer for registration for either the client or server.
mwi (ephone-dn)	Configures specific Cisco IP phone directory numbers to receive MWI notification from an external voice-mail system.
mwi sip (ephone-dn)	Subscribes an extension in a Cisco IOS Telephony Service router to receive MWI notification from a SIP MWI server.
show mwi relay clients	Displays the list of MWI relay clients' registration information.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

name (ephone-dn)

To configure a username associated with a directory number, use the **name** command in ephone-dn configuration mode. To disable a username associated with a directory number, use the **no** form of this command.

name *name*

no name *name*

Syntax Description

<i>name</i>	Directory number username.
-------------	----------------------------

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **name** command configures a username associated with a directory number. The *name* variable information is used to provide caller ID for calls originated on the Cisco IP phone directory number. The **name** command is also used to generate directory information for XML directory accessible from a Cisco IP phone directories button.



Note

You must follow the pattern specified in the **directory** command in the telephony-service configuration mode to associate the username for the directory. The pattern for the surnames for the directory is set either with the **first-name-first** or **last-name-first** keyword.

Examples

The following example shows how to configure the username John Smith with the pattern **first-name-first**:

■ name (ephone-dn)

```
Router(config)# ephone-dn 1
Router(config-ephone-dn) name John Smith
```

The following example shows how to configure the username Jane Smith with the pattern **last-name-first**:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn) name Smith, Jane
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
number	Configures a valid number for the Cisco IP phone.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

number (ephone-dn)

To configure a valid number for the Cisco IP phone, use the **number** command in ephone-dn configuration mode. To disable a number for the Cisco IP phone, use the **no** form of this command.

```
number number [secondary number] [no-reg [both | primary]]
```

```
no number number [secondary number] [no-reg [both | primary]]
```

Syntax Description

<i>number</i>	E.164 telephone number.
secondary	(Optional) A second telephone number with an ephone-dn.
no-reg	(Optional) The E.164 numbers in the dial peer do not register to the gatekeeper. If you do not specify any option (both or primary) after the no-reg keyword, then only the secondary number is not registered.
both	(Optional) Both numbers are not registered.
primary	(Optional) Primary number is not registered.

Defaults

No secondary phone number is associated with the ephone-dn.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **number** command configures a valid number for the Cisco IP phone. The **secondary** keyword allows you to associate a second telephone number with an ephone-dn so that the Cisco IP phone line can be called by dialing either the main or secondary phone number. The secondary number may contain wildcards; for example, 50.. (number 50 followed by wildcards). The **no-reg** keyword specifies an E.164 number in the dial peer to not register to the gatekeeper. If you do not specify either **both** or **primary** after the **no-reg** keyword, then only the **secondary** number is not registered.

Examples

The following example shows that 5001 is set as the primary extension number for a Cisco IP phone and 0 as the secondary number. This action allows the telephone number 5001 to act as a regular extension number and also to act as the operator line such that callers who dial 0 are routed to the phone line with extension number 5001.

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 5001 secondary 0
```

In the following example, 5001 is set as the primary extension number for a Cisco IP phone and “500.” (the number 500 followed by a decimal point) is set as the secondary number. This action allows any calls to extension numbers in the range from 5000 to 5009 to be routed to extension 5001 in the event that the actual extension number dialed cannot be found. For example, IP phones may be active in the system with lines that correspond to 5001, 5002, 5004, 5005, and 5009. A call to 5003 or 5006 to 5009 would be unable to locate a phone with the 5003 or 5006 to 5008 extensions, so the call would be routed to extension 5001.

```
Router(config-ephone-dn)# number 5001 secondary 500.
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
huntstop	Sets the huntstop attribute for the dial peers associated with the Cisco IP phone lines.
name	Configures a username associated with a directory number.
preference	Sets preference for the attached dial peer for a directory number.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

paging (ephone-dn)

To set paging numbers that can be called to broadcast an audio page to a group of Cisco IP phones, use the **paging** command in ephone-dn configuration mode. To disable this feature, use the **no** form of this command.

paging [**ip** *multicast-address* **port** *udp-port-number*]

no paging [**ip** *multicast-address* **port** *udp-port-number*]

Syntax Description

ip	(Optional) IP multicast.
<i>multicast-address</i>	(Optional) IP multicast address to use to multicast voice packets for audio paging; for example, 224.0.1.1. Note that multicast addresses always take the form of 224.x.x.x.
port	(Optional) User Data Protocol (UDP) port.
<i>udp-port-number</i>	(Optional) UDP port number to use in association with the IP multicast address. The default is the Skinny Client Protocol port 2000.

Defaults

A Cisco IP phone directory number is not configured as a paging number.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **paging** command configures the ephone-dn number to act as an extension number to use to broadcast audio paging to idle Cisco IP phones. Cisco IP phones must be associated with the paging directory number (ephone-dn) using the ephone-dn tag number of the paging ephone-dn, or they are included indirectly through a paging group from another paging ephone-dn.

When the optional **ip** keyword followed by the *multicast-address* argument is used, the paging is set for multicast paging. If an IP multicast address is not configured, IP phones are paged individually using IP unicast transmission (to a maximum of ten IP phones). The recommended operation is with an IP multicast address. When multiple paging extensions are configured, each extension should use a unique IP multicast address.

Examples

The following example configures IP multicast paging:

```
Router(config)# ephone-dn 20
Router(config-ephone-dn) number 2000
Router(config-ephone-dn) paging ip 192.0.1.1 port 2000
```

The configuration is as follows:

```
ephone-dn 20
number 2000
paging ip 224.0.1.20 port 2000
```

```
ephone-dn 21
number 2001
paging ip 224.0.1.21 port 2000
```

```
ephone 1
button 1:1
paging-dn 20
```

```
ephone 2
button 1:2
paging-dn 20
```

```
ephone 3
button 1:3
paging-dn 21
```

```
ephone 4
button 1:4
paging-dn 21
```

In this example paging calls to 2000 are multicast to Cisco IP phones (ephones) 1 and 2; paging calls to 2001 go to ephones 3 and 4.

**Note**

The maximum number of unique IP address and router physical interfaces (or subinterfaces) combinations supported for output of audio paging voice packets is ten. Paging using a single IP multicast address that requires output on three different Ethernet interfaces represents use of three counts out of the maximum ten. The limit of ten is likely to be exceeded only if unicast addressing is used for the paging ephone-dn or if individual IP phones are configured for unicast paging support only.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
paging-dn (ephone)	Sets an audio paging directory number for each Cisco IP phone.
paging group (ephone-dn)	Sets the audio paging directory number for a large combined group.

paging group (ephone-dn)

To set the audio paging directory number for a large combined group, use the **paging group** command in ephone-dn configuration mode. To remove a paging group, use the **no** form of this command.

paging group *paging-ephone-dn-tag-list, paging-ephone-dn-tag-list*

no paging group *paging-ephone-dn-tag-list, paging-ephone-dn-tag-list*

Syntax Description

paging -phone-dn-tag-list A comma-separated list of directory number (DN) tags that are each configured as paging directory numbers. You can include up to ten paging Cisco IP phone DN tags separated by commas; for example, 4, 6, 7, 8.

Defaults

By default, paging is disabled on all Cisco IP phones

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **paging group** command is used to combine small sets of phones associated with individual paging directory numbers (ephone-dns) into a large combined group so that a page can be sent to large numbers of phones at once. To remove a paging group, use the **no** form of the command. All ephone-dn tags included in the list must have the **paging** command set.

The use of paging groups allows phones to participate in a small local paging set (for example, paging to four phones in a company's shipping and receiving department) but also supports company-wide paging when needed (for example, by combining the paging sets for shipping and receiving with paging sets for accounting, customer support, and sales into a paging group).

Examples

The following example shows how to set paging groups:

```
ephone-dn 20
number 2000
```

■ paging group (ephone-dn)

```

paging ip 224.0.1.20 port 2000

```

```

ephone-dn 21
number 2001
paging ip 224.0.1.21 port 2000

```

```

ephone-dn 22
number 2002
paging ip 224.0.2.22 port 2000
paging group 20,21

```

```

ephone 1
button 1:1
paging-dn 20

```

```

ephone 2
button 1:2
paging-dn 20

```

```

ephone 3
button 1:3
paging-dn 21

```

```

ephone 4
button 1:4
paging-dn 21

```

```

ephone 5
button 1:5
paging-dn 22

```

In this example, paging calls to 2000 go to Cisco IP phones (ephones) 1 and 2, and paging calls to 2001 go to ephones 3 and 4. Calls to 2002 go to ephones 1, 2, 3, 4, and 5. Ephones 1 and 2 are included in paging directory number (ephone-dn) 22 through membership of ephone-dn 20 in the paging group. Ephones 3 and 4 are included in paging ephone-dn 22 through membership of ephone-dn 21 in the paging group. Ephone 5 is directly subscribed to paging-dn 22. Note that multicast addresses always take the form of 224.x.x.x.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
paging (ephone-dn)	Sets paging numbers that can be called in order to broadcast an audio page to a group of Cisco IP phones.
paging-dn (ephone)	Sets an audio paging directory number for each Cisco IP phone.

paging-dn (ephone)

To set an audio paging directory number for each Cisco IP phone, use the **paging-dn** command in ephone configuration mode. To disable this feature, use the **no** form of this command.

```
paging-dn paging-dn-number-tag { multicast | unicast }
```

```
no paging-dn paging-dn-number-tag { multicast | unicast }
```

Syntax Description

<i>paging-dn-number-tag</i>	Directory tag number of the paging directory number (ephone-dn) to associate with the Cisco IP phone. Paging calls to the specified ephone-dn sends the page to the Cisco IP phone.
multicast	Multicast paging for groups. By default, audio paging is sent to the Cisco IP phone using multicast.
unicast	Unicast paging for a single Cisco IP phone. This keyword indicates that the Cisco IP phone cannot receive audio paging through multicast and requests that the phone receives the audio paging through a unicast transmission directed to the individual phone. Note The number of phones supported through unicast is limited to a maximum of ten phones.

Defaults

By default, paging is disabled on all Cisco IP phones.

Command Modes

Ephone configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **paging-dn** command sets an audio paging directory number (DN) for each Cisco IP phone. The audio paging feature operates in a fashion similar to intercom, but provides only one-way voice, with no press-to-answer option. A DN is created, which is associated with a certain number of local IP phones. The paging extension number is configured using the existing **number** command in ephone-dn configuration mode. Multiple paging DN's can be supported for each system. The paging number can be dialed from anywhere, including on-net calls. The paging audio stream is heard on all selected Cisco IP

phones that are in the idle state through the speakerphone mode. The IP phone display shows the “name” information associated with the paging DN used to activate the page. During an active paging, incoming or outgoing call for an answered or initiated call disconnects the IP phone from the paging output.

The paging mechanism supports audio distribution using IP multicast, replicated unicast, and a mixture of both (so that multicast is used where possible, and unicast is used with specific phones that cannot be reached through multicast).

Each Cisco IP phone can be associated with only one paging directory number (paging-dn); however, paging-dns may be grouped in order to join groups of IP phones together. Only single-level grouping is supported (no support for groups of groups), which allows for paging to IP phones for individual departments (for example, sales, support, shipping, and accounting) and then allows these sets to be combined into a group for “all employees” or “everyone in building 2.” Any number of phones may be added into the same paging set using multicast. A Cisco IP phone (ephone) may directly belong to only a single paging set. A paging set consists of all phones configured with the same paging-dn. Each paging set uses a DN.

Examples

The following example shows how to set up an ephone-dn for multicast paging:

```
ephone-dn 22
name Paging Shipping
number 5001
paging ip 224.1.1.10 port 2000

ephone 4
mac 0030.94c3.8724
button 1:1 2:2
paging-dn 22 multicast
```

This example creates a paging number for 5001 on ephone-dn 22 and adds ephone 4 as a member of the paging set. Multicast is set for the paging-dn. Note that multicast addresses always take the form of 224.x.x.x.



Note

For unicast paging to all phones, omit the IP multicast address in the ephone-dn configuration. For unicast paging to a specific phone using an ephone-dn configured for multicast, add the **unicast** keyword after the **paging-dn** command in ephone configuration mode.

Each ephone-dn used for paging can support a maximum of ten distinct targets (IP addresses and interfaces). A multicast address counts as a single target for each physical interface in use (regardless of the number of phones connected via the interface). Each unicast target counts as a single target, such that paging that does not use multicast at all is limited to paging ten phones. For example, ten IP phones paged through multicast on Fast Ethernet interface 0/1.1 plus five IP phones paged through multicast on FastEthernet interface 0/1.2 is counted as two targets.

For simultaneous paging to more than one paging ephone-dn, we recommend that you use different IP multicast addresses (not just different port numbers) for paging configuration. Note that multicast addresses always take the form of 224.x.x.x.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
number	Configures a valid number for the Cisco IP phone.

Command	Description
paging (ephone-dn)	Sets paging numbers that can be called in order to broadcast an audio page to a group of Cisco IP phones.
paging group (ephone-dn)	Sets the audio paging directory number for a large combined group.

pattern direct (vm-integration)

To configure the dual-tone multifrequency (DTMF) digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone, use the **pattern direct** command in voice-mail integration configuration mode. To disable DTMF digit pattern forwarding when the user presses the messages button on the phone, use the **no** form of this command.

```
pattern direct tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
[tag3 {CGN | CDN | FDN}] [last-tag]
```

```
no pattern direct tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
[tag3 {CGN | CDN | FDN}] [last-tag]
```

Syntax Description	
<i>tag1</i>	(Required) Alphanumeric string fewer than four DTMF digits in length. The alphanumeric string consists of a combination of four letters (A, B, C, and D), two symbols (* and #), and ten digits (0 to 9). The tag numbers match the numbers defined in the voice-mail system's integration file, immediately preceding either the number of the calling party, the number of the called party, or a forwarding number.
<i>tag2, tag3</i>	(Optional) See <i>tag1</i> . The Cisco IOS Telephony Service router supports a maximum of four tags.
<i>last-tag</i>	(Optional) See <i>tag1</i> . This tag indicates the end of the pattern.
CGN	Calling number (CGN) information is sent to the voice-mail system.
CDN	Called number (CDN) information is sent to the voice-mail system.
FDN	Forwarding number (FDN) information is sent to the voice-mail system.

Defaults This feature is disabled by default.

Command Modes Voice-mail integration configuration

Command History	Release	Modification
	12.2(2)XT	For Cisco IOS Telephony Service, this command was introduced on the Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	For Cisco IOS Telephony Service, this command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.
	12.2(13)T	This command was implemented in Cisco Survivable Site Remote Telephony, Version 2.02.

Usage Guidelines

The **pattern direct** command is used to configure the sequence of DTMF digits passed to a voice-mail system attached to the Cisco IOS Telephony Service router through one or more voice ports. When a call is placed directly from a Cisco IP phone attached to the Cisco IOS Telephony Service router, the voice-mail system expects to receive a sequence of DTMF digits at the beginning of the call that identify the mailbox of the user calling the voice-mail system accompanied by a string of digits indicating that the caller is attempting to access the designated mailbox in order to retrieve messages.

Although it is unlikely that you will use multiple instances of the **CGN**, **CDN**, or **FDN** keyword in a single command line, it is permissible to do so.

Examples

The following example sets the DTMF pattern for a calling number (\$CGN) for a direct call to the voice-mail system:

```
Router(config) vm-integration
Router(config-vm-integration) pattern direct 2 CGN *
```

Related Commands

Command	Description
pattern ext-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to a busy extension and the call is forwarded to voice mail.
pattern ext-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension attempts to connect to an extension that does not answer and the call is forwarded to voice mail.
pattern trunk-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voice mail.
pattern trunk-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voice-mail.
vm-integration	Enters voice-mail integration mode and enables voice-mail integration with DTMF and the analog voice-mail system.

pattern ext-to-ext busy (vm-integration)

To configure the dual-tone multifrequency (DTMF) digit pattern forwarding necessary to activate the voice-mail system once an internal extension attempts to connect to a busy extension and the call is forwarded to voice mail, use the **pattern ext-to-ext busy** command in voice-mail integration configuration mode. To disable DTMF digit pattern forwarding when an internal extension calls a busy extension and the call is forwarded to a voice-mail system, use the **no** form of this command.

```
pattern ext-to-ext busy tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
    [tag3 {CGN | CDN | FDN}] [last-tag]
```

```
no pattern ext-to-ext busy tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
    [tag3 {CGN | CDN | FDN}] [last-tag]
```

Syntax Description	
<i>tag1</i>	(Required) Alphanumeric string fewer than four DTMF digits in length. The alphanumeric string consists of a combination of four letters (A, B, C, and D), two symbols (* and #), and ten digits (0 to 9). The tag numbers match the numbers defined in the voice-mail system's integration file, immediately preceding either the number of the calling party, the number of the called party, or a forwarding number.
<i>tag2, tag3</i>	(Optional) See <i>tag1</i> . The Cisco IOS Telephony Service router supports a maximum of four tags.
<i>last-tag</i>	(Optional) See <i>tag1</i> . This tag indicates the end of the pattern.
CGN	Calling number (CGN) information is sent to the voice-mail system.
CDN	Called number (CDN) information is sent to the voice-mail system.
FDN	Forwarding number (FDN) information is sent to the voice-mail system.

Defaults This feature is disabled by default.

Command Modes Voice-mail integration configuration

Command History	Release	Modification
	12.2(2)XT	For Cisco IOS Telephony Service, this command was introduced on the Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	For Cisco IOS Telephony Service, this command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.
	12.2(13)T	This command was implemented in Cisco Survivable Site Remote Telephony, Version 2.02.

Usage Guidelines

The **pattern ext-to-ext busy** command is used to configure the sequence of DTMF digits passed to a voice-mail system attached to the Cisco IOS Telephony Service router through one or more voice ports. When a call is routed to the voice-mail system by call forward on busy from a Cisco IP phone attached to the Cisco IOS Telephony Service router, the voice-mail system expects to receive a sequence of digits identifying the mailbox associated with the forwarding phone together with digits that identify the extension number of the calling IP phone.

Although it is unlikely that you will use multiple instances of the **CGN**, **CDN**, or **FDN** keyword in a single command line, it is permissible to do so.

Examples

The following example sets the DTMF pattern for a local call forwarded on busy to the voice-mail system:

```
Router(config) vm-integration
Router(config-vm-integration) pattern ext-to-ext busy 7 FDN * CGN *
```

Related Commands

Command	Description
pattern direct	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone.
pattern ext-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension that does not answer and the call is forwarded to voice-mail.
pattern trunk-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voice mail.
pattern trunk-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voice mail.
vm-integration	Enters voice-mail integration mode and enables voice-mail integration with DTMF and analog voice-mail system.

pattern ext-to-ext no-answer (vm-integration)

To configure the dual-tone multifrequency (DTMF) digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail, use the **pattern ext-to-ext no-answer** command in voice-mail integration configuration mode. To disable DTMF digit pattern forwarding, use the **no** form of this command.

```
pattern ext-to-ext no-answer tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
[tag3 {CGN | CDN | FDN}] [last-tag]
```

```
no pattern ext-to-ext no-answer tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
[tag3 {CGN | CDN | FDN}] [last-tag]
```

Syntax Description	
<i>tag1</i>	(Required) Alphanumeric string fewer than four DTMF digits in length. The alphanumeric string consists of a combination of four letters (A, B, C, and D), two symbols (* and #), and ten digits (0 to 9). The tag numbers match the numbers defined in the voice-mail system's integration file, immediately preceding either the number of the calling party, the number of the called party, or a forwarding number.
<i>tag2, tag3</i>	(Optional) See <i>tag1</i> . The Cisco IOS Telephony Service router supports a maximum of four tags.
<i>last-tag</i>	(Optional) See <i>tag1</i> . This tag indicates the end of the pattern.
CGN	Calling number (CGN) information is sent to the voice-mail system.
CDN	Called number (CDN) information is sent to the voice-mail system.
FDN	Forwarding number (FDN) information is sent to the voice-mail system.

Defaults This feature is disabled by default.

Command Modes Voice-mail integration configuration

Command History	Release	Modification
	12.2(2)XT	For Cisco IOS Telephony Service, this command was introduced on the Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	For Cisco IOS Telephony Service, this command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.
	12.2(13)T	This command was implemented in Cisco Survivable Site Remote Telephony, Version 2.02.

Usage Guidelines

The **pattern ext-to-ext no-answer** command is used to configure the sequence of DTMF digits passed to a voice-mail system attached to the Cisco IOS Telephony Service router through one or more voice ports. When a call is routed to the voice-mail system by call forward on no-answer from an IP phone attached to the Cisco IOS Telephony Service router, the voice-mail system expects to receive a sequence of digits identifying the mailbox associated with the forwarding phone together with digits that identify the extension number of the calling IP phone.

Although it is unlikely that you will use multiple instances of the **CGN**, **CDN**, or **FDN** keyword in a single command line, it is permissible to do so.

Examples

The following example sets the DTMF pattern for a local call forwarded on no-answer to the voice-mail system:

```
Router(config) vm-integration
Router(config-vm-integration) pattern ext-to-ext no-answer 5 FDN * CGN *
```

Related Commands

Command	Description
pattern direct	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone.
pattern ext-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail.
pattern trunk-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voice mail.
pattern trunk-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voice mail.
vm-integration	Enters voice-mail integration mode and enables voice-mail integration with DTMF and analog voice-mail system.

pattern trunk-to-ext busy (vm-integration)

To configure the dual-tone multifrequency (DTMF) digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voice mail, use the **pattern trunk-to-ext busy** command in voice-mail integration configuration mode. To disable DTMF digit pattern forwarding when an external trunk call reaches a busy extension and the call is forwarded to a voice-mail system, use the **no** form of this command.

```
pattern trunk-to-ext busy tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
    [tag3 {CGN | CDN | FDN}] [last-tag]
```

```
no pattern trunk-to-ext busy tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
    [tag3 {CGN | CDN | FDN}] [last-tag]
```

Syntax Description

<i>tag1</i>	(Required) Alphanumeric string fewer than four DTMF digits in length. The alphanumeric string consists of a combination of four letters (A, B, C, and D), two symbols (* and #), and ten digits (0 to 9). The tag numbers match the numbers defined in the voice-mail system's integration file, immediately preceding either the number of the calling party, the number of the called party, or a forwarding number.
<i>tag2, tag3</i>	(Optional) See <i>tag1</i> . The Cisco IOS Telephony Service router supports a maximum of four tags.
<i>last-tag</i>	(Optional) See <i>tag1</i> . This tag indicates the end of the pattern.
CGN	Calling number (CGN) information is sent to the voice-mail system.
CDN	Called number (CDN) information is sent to the voice-mail system.
FDN	Forwarding number (FDN) information is sent to the voice-mail system.

Defaults

This feature is disabled by default.

Command Modes

Voice-mail integration configuration

Command History

Release	Modification
12.2(2)XT	For Cisco IOS Telephony Service, this command was introduced on the Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	For Cisco IOS Telephony Service, this command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.
12.2(13)T	This command was implemented on Cisco Survivable Site Remote Telephony, Version 2.02.

Usage Guidelines

The **pattern trunk-to-ext busy** command is used to configure the sequence of DTMF digits passed to a voice-mail system attached to the Cisco IOS Telephony Service router through one or more voice ports. When a call is routed to the voice-mail system by call forward on busy from an IP phone attached to the Cisco IOS Telephony Service router, the voice-mail system expects to receive a sequence of digits identifying the mailbox associated with the forwarding phone together with digits indicating that the call originated from a Public Switched Telephone Network (PSTN) or Voice over IP (VoIP) caller.

Although it is unlikely that you will use multiple instances of the **CGN**, **CDN**, or **FDN** keyword in a single command line, it is permissible to do so.

Examples

The following example sets the DTMF pattern for call forwarding when an external trunk call reaches a busy extension and the call is forwarded to the voice-mail system:

```
Router(config) vm-integration
Router(config-vm-integration) pattern trunk-to-ext busy 6 FDN * CGN *
```

Related Commands

Command	Description
pattern direct	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone.
pattern ext-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail.
pattern ext-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail.
pattern trunk-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voice mail.
vm-integration	Enters voice-mail integration mode and enables voice-mail integration with DTMF and analog voice-mail system.

pattern trunk-to-ext no-answer (vm-integration)

To configure the dual-tone multifrequency (DTMF) digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voice mail, use the **pattern trunk-to-ext no-answer** command in voice-mail integration configuration mode. To disable DTMF digit pattern forwarding when an external trunk call reaches another extension where the called party does not answer and the call is forwarded to a voice-mail system, use the **no** form of this command.

```
pattern trunk-to-ext no-answer tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
[tag3 {CGN | CDN | FDN}] [last-tag]
```

```
no pattern trunk-to-ext no-answer tag1 {CGN | CDN | FDN} [tag2 {CGN | CDN | FDN}]
[tag3 {CGN | CDN | FDN}] [last-tag]
```

Syntax Description		
<i>tag1</i>	(Required) Alphanumeric string fewer than four DTMF digits in length. The alphanumeric string consists of a combination of four letters (A, B, C, and D), two symbols (* and #), and ten digits (0 to 9). The tag numbers match the numbers defined in the voice-mail system's integration file, immediately preceding either the number of the calling party, the number of the called party, or a forwarding number.	
<i>tag2, tag3</i>	(Optional) See <i>tag1</i> . The Cisco IOS Telephony Service router supports a maximum of four tags.	
<i>last-tag</i>	(Optional) See <i>tag1</i> . This tag indicates the end of the pattern.	
CGN	Calling number (CGN) information is sent to the voice-mail system.	
CDN	Called number (CDN) information is sent to the voice-mail system.	
FDN	Forwarding number (FDN) information is sent to the voice-mail system.	

Defaults This feature is disabled by default.

Command Modes Voice-mail integration configuration

Command History	Release	Modification
	12.2(2)XT	For Cisco IOS Telephony Service, this command was introduced on the Cisco 1750, Cisco 1751, Cisco 2600 series, Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	For Cisco IOS Telephony Service, this command was implemented on the Cisco 2600-XM and Cisco 2691 routers.

Release	Modification
12.2(11)T	For Cisco IOS Telephony Service, this command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.
12.2(13)T	This command was implemented on Cisco Survivable Site Remote Telephony, Version 2.02.

Usage Guidelines

The **pattern trunk-to-ext no-answer** command is used to configure the sequence of DTMF digits passed to a voice-mail system attached to the Cisco IOS Telephony Service router through one or more voice ports. When a call is routed to the voice-mail system by call forward on no-answer from an IP phone attached to the Cisco IOS Telephony Service router, the voice-mail system expects to receive a sequence of digits identifying the mailbox associated with the forwarding phone together with digits indicating that the call originated from a Public Switched Telephone Network (PSTN) or Voice over IP (VoIP) caller.

Although it is unlikely that you will use multiple instances of the **CGN**, **CDN**, or **FDN** keyword in a single command line, it is permissible to do so.

Examples

The following example sets the DTMF pattern for call forwarding when an external trunk call reaches an unanswered extension and the call is forwarded (FDN) to a voice-mail system:

```
Router(config) vm-integration
Router(config-vm-integration) pattern trunk-to-ext no-answer 4 FDN * CGN *
```

Related Commands

Command	Description
pattern direct	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone.
pattern ext-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail.
pattern ext-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voice mail.
pattern trunk-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voice mail.
vm-integration	Enters voice-mail integration mode and enables voice-mail integration with DTMF and analog voice-mail system.

preference (ephone-dn)

To set preference order for the directory number associated with a Cisco IP phone, use the **preference** command in ephone-dn configuration mode. To put the directory number in default preference order, use the **no** form of this command.

preference *preference-order*

no preference *preference-order*

Syntax Description

<i>preference-order</i>	The preference order is 0 to 10; 0 is the highest preference and 10 is the lowest preference.
-------------------------	---

Defaults

The default is 0 (the highest preference).

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **preference** command sets preference order for the directory number (ephone-dn) associated with a Cisco IP phone. Use the **preference** command to indicate the preference order for matching dial peers in a Cisco IP phone virtual dial-peer group. Setting the preference enables the desired dial peer to be selected when multiple dial peers within a hunt group are matched for a dial string.

Examples

The following example sets a preference of 2 for the directory number 3000:

```
Router(config)# ephone-dn 1
Router(config-ephone-dn)# number 3000
Router(config-ephone-dn)# preference 2
```

The configuration is as follows:

```
ephone-dn 4
  number 1222
  preference 0
!
!
ephone-dn 5
  number 1222
  preference 1
```

In this example, number 1222 under directory number (ephone-dn) 4 has a higher preference than the number 1222 under ephone-dn 5.

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
huntstop	Sets the huntstop attribute for the dial-peers associated with the Cisco IP phone lines.
name	Configures a username associated with a directory number.
number	Configures a valid number for the Cisco IP phone.
preference (dial-peer)	Indicates the preferred order of a dial peer within a hunt group.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

reset (ephone)

To reset the Cisco IP phones in ephone configuration mode, use the **reset** command in ephone configuration mode.

reset

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Ephone configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **reset** command does not have a **no** form.

The **reset** command resets the Cisco IP phone in ephone configuration mode.

The **reset** command does not have a **no** form.

Examples

The following example shows how to reset the Cisco IP phones:

```
Router(config)# ephone 1
Router(config-ephone)# reset
```


Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

reset (telephony-service)

To reset the Cisco IP phones associated with the Cisco IOS Telephony Service router, use the **reset** command in telephony-service configuration mode.

```
reset {all seconds | mac-address mac-address}
```

Syntax Description		
all		All Cisco IP phones.
<i>seconds</i>		Time interval, in seconds, between each phone reset. The range is from 0 to 15 seconds.
mac-address <i>mac-address</i>		MAC address of a particular Cisco IP phone.

Defaults No default behavior or values.

Command Modes Telephony-service configuration

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **reset** command does not have a **no** form.

The **reset** command resets the Cisco IP phones attached to the router. You can use the **all** keyword to reset all Cisco IP phones attached to the router or to reset a specific Cisco IP phone by entering the **mac-address** keyword and the MAC address of that specific Cisco IP phone.

The **reset** command does not have a **no** form.

Examples The following example shows how to reset all Cisco IP phones:

```
Router(config)# telephony-service
Router(config-telephony-service)# reset all
```

The following example shows how to configure the Cisco IP phone with the MAC address CFBA.321B.96FA:

```
Router(config)# telephony-service
Router(config-telephony-service)# reset mac-address CFBA.321B.96FA
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

show ephone

To display Cisco IP phone output, use the **show ephone** EXEC command.

```
show ephone [mac-address | summary | registered | unregistered | 7910 | 7940 | 7960 | ringing |
offhook | dn dn-tag | remote | telephone-number phone-number]
```

Command Modes

<i>mac-address</i>	(Optional) Specifies the MAC address of the Cisco IP phone.
summary	(Optional) Displays summary information for all Cisco IP phones registered with the Cisco IOS Telephony Service router.
registered	(Optional) Displays status information for any Cisco IP phones that are currently registered with the Cisco IOS Telephony Service router.
unregistered	(Optional) Displays status information for all unregistered Cisco IP phones.
7910	(Optional) Displays information about any Cisco 7910 IP Phones registered with the Cisco IOS Telephony Service router.
7940	(Optional) Displays information about any Cisco 7940 IP Phones registered with the Cisco IOS Telephony Service router.
7960	(Optional) Displays information about any Cisco 7960 IP Phones registered with the Cisco IOS Telephony Service router.
ringing	(Optional) Displays status information for all Cisco IP phones registered with the Cisco IOS Telephony Service router that are currently in ringing mode.
offhook	(Optional) Displays a list of Cisco IP phones that are currently engaged or off hook.
dn <i>dn-tag</i>	(Optional) Cisco IP phone associated with a directory number tag.
remote	(Optional) Displays status information about all non-local Cisco IP phones (that is, phones that have no ARP entry).
telephone-number <i>phone-number</i>	(Optional) Displays status information for a Cisco IP phone featuring the specified telephone number.

EXEC

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.

Release	Modification
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **show ephone** command displays statistical information for registered and unregistered Cisco IP phones. If a MAC address is not specified, all phones that can be identified by the Cisco IOS Telephony Service router are displayed. This command includes several keywords to enable you to get different types of output specific to your needs.

Examples

The following is a sample output from the **show ephone** command:

```
Router# show ephone

ephone-1 Mac:0003.E3E7.F627 TCP socket:[1] activeLine:1 REGISTERED
mediaActive:1 offhook:1 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.0.0.51 50570 Telecaster 7940 keepalive 49
button 1: dn 1 number 3001 CONNECTED
Active Call on DN 1:3001 10.0.0.51 31808 to 1.2.159.100 22708
Tx Pkts 452 bytes 41584 Rx Pkts 452 bytes 41584 Lost 0
Jitter 0 Latency 0

ephone-2 Mac:0030.94C3.E1A8 TCP socket:[2] activeLine:1 REGISTERED
mediaActive:1 offhook:1 ringing:0 reset:0 reset_sent:0 debug:0
IP:1.2.159.100 50942 Telecaster 7960 keepalive 78
button 1: dn 2 number 3002 CONNECTED
Active Call on DN 2:3002 1.2.159.100 22708 to 10.0.0.51 31808
Tx Pkts 452 bytes 41584 Rx Pkts 452 bytes 41584 Lost 0
Jitter 0 Latency 0

ephone-3 Mac:0030.94C3.F946 TCP socket:[-1] activeLine:0 UNREGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.2.1.2 52163 Telecaster 7960 keepalive 59

ephone-4 Mac:0030.94C3.F43A TCP socket:[-1] activeLine:0 UNREGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.2.1.1 51768 Telecaster 7960 keepalive 59
```

The following is a sample output from the **show ephone mac-address** command for the Cisco IP phone with the MAC address 0030.94C3.F43A:

```
Router# show ephone 0030.94c3.f43a

ephone-3 Mac:0030.94C3.F43A TCP socket:[3] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:1.5.81.13 Telecaster 7960 keepalive 28
button 1: dn 3 number 5003 IDLE
button 2: dn 5 number 5005 IDLE
button 3: dn 6 number 5006 IDLE
speed dial 1:3005
speed dial 2:3006
```

The following is a sample output from the **show ephone dn dn-tag** command:

```
Router# show ephone dn 5
```

```
Tag 5, Normal or Intercom dn
ephone 1, mac-address 0030.94C3.CAA2, line 2
ephone 2, mac-address 0030.94c2.9919, line 3
```

The following is a sample output from the **show ephone 7910** command:

```
Router# show ephone 7910

ephone-5 Mac:0004.DD1E.56ED TCP socket:[1] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 paging 0 debug:0
IP:10.30.0.83 52234 Telecaster 7910 keepalive 270 max_line 2 dual-line
button 1: dn 15 number 5000 IDLE
button 2: dn 16 number 5500 IDLE
```

The following is a sample output from the **show ephone 7960** command:

```
Router# show ephone 7960

ephone-11 Mac:0007.0EA6.2AA9 TCP socket:[13] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 paging 0 debug:0
IP:10.30.0.53 52548 Telecaster 7960 keepalive 272 max_line 6
button 1: dn 16 number 9001 IDLE
button 2: dn 17 number 9002 IDLE
button 3: dn 18 number 9003 IDLE
button 4: dn 26 number A5001 auto dial A5002 IDLE
button 5: dn 31 number 1111 IDLE
speed dial 1:8001

ephone-12 Mac:0002.B9EB.0CB1 TCP socket:[14] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 paging 0 debug:0
IP:10.30.0.54 50387 Telecaster 7960 keepalive 272 max_line 6
button 1: dn 20 number 9005 IDLE
button 2: dn 21 number 9006 IDLE
button 3: dn 22 number 9007 IDLE
button 4: dn 23 number 9008 IDLE
button 5: dn 30 number 1110 IDLE
```

The following is a sample output from the **show ephone registered** command:

```
Router# show ephone registered

ephone-1 Mac:0653.D6B4.C601 TCP socket:[4] activeLine:0 REGISTERED
ephone-2 Mac:0653.D6B4.C602 TCP socket:[6] activeLine:0 REGISTERED
ephone-3 Mac:0653.D6B4.C603 TCP socket:[2] activeLine:0 REGISTERED
ephone-4 Mac:0653.D6B4.C604 TCP socket:[7] activeLine:0 REGISTERED
ephone-5 Mac:0653.D6B4.C605 TCP socket:[9] activeLine:0 REGISTERED
ephone-6 Mac:0653.D6B4.C608 TCP socket:[1] activeLine:0 REGISTERED
ephone-7 Mac:0653.D6B4.C609 TCP socket:[8] activeLine:0 REGISTERED
ephone-8 Mac:0653.D6B4.C614 TCP socket:[5] activeLine:0 REGISTERED
ephone-9 Mac:0653.D6B4.C622 TCP socket:[11] activeLine:0 REGISTERED
ephone-10 Mac:0653.D6B4.C623 TCP socket:[3] activeLine:0 REGISTERED
ephone-11 Mac:0007.0EA6.2AA9 TCP socket:[13] activeLine:0 REGISTERED
ephone-12 Mac:0002.B9EB.0CB1 TCP socket:[14] activeLine:0 REGISTERED
ephone-13 Mac:0653.D6B4.C625 TCP socket:[10] activeLine:0 REGISTERED
ephone-14 Mac:0653.D6B4.C624 TCP socket:[12] activeLine:0 REGISTERED
```

The following is a sample output from the **show ephone telephone-number *phone-number*** command:

```
Router# show ephone telephone-number 4085998001

DP tag: 1, primary
Tag 1, Normal or Intercom dn
ephone 1, mac-address 0030.94c3.CAA2, line 1
```

[Table 5-1](#) provides an alphabetic listing of the command fields in the sample output.

Table 5-1 *show ephone Field Descriptions*

Field	Description
Active Call	An active call is in progress.
activeLine	Indicates the line (button) on the phone that is in use. Zero indicates that no line is in use.
button 1 : dn 1	Shows the directory number (DN) tag number associated with the phone button.
bytes	Total number of voice data bytes sent or received by the Cisco IP phone.
debug	If set to 1, indicates that debug for the phone is enabled; otherwise, it is set to 0.
DP tag	Dial-peer tag for the destination-pattern matching the specified telephone number.
dual_line	Indicates that the dual telephone line feature available on single-line Cisco IP phones (the Cisco 7905 or Cisco 7910, for example) has been activated.
ephone-1	Cisco IP phone tag number.
IDLE	The state of the DN is idle.
IP	Assigned IP address of the Cisco IP phone.
Jitter	The amount of variation (in milliseconds) of the time interval between voice packets received by the Cisco IP phone.
keepalive	Number of keepalive messages received from the Cisco IP phone by the router.
Latency	The estimated playout delay for voice packets received by the Cisco IP phone.
line 1	Indicates which line on the IP phone is associated with the specified telephone number.
Lost	Number of voice packets lost, as calculated by the Cisco IP phone, based on examining voice packet timestamp and sequence numbers during playout.
Mac	MAC address.
max_line	Indicates the maximum number of lines that may be assigned to the Cisco IP phone in question.
mediaActive	If set to 1, indicates that an active conversation is going on; otherwise, it is set to 0.
number	The telephone number associated with the Cisco IP phone button and its DN tag.
offhook	If set to 1, indicates that the Cisco IP phone is off the hook.
paging	Indicates the paging group to which the Cisco IP phone has been assigned.

Table 5-1 show ephone Field Descriptions (continued)

Field	Description
REGISTERED	Indicates that the Cisco IP phone is active and registered. Alternatives states are UNREGISTERED (indicating that the connection to the Cisco IP phone was closed in a normal manner) and DECEASED (indicating that the connection to the Cisco IP phone was closed because of a keepalive timeout).
reset	Pending reset.
reset_sent	Request for reset sent to the Cisco IP phone.
ringing	If set to 1, indicates that the IP phone's ringer is turned on and the phone is ringing; otherwise, it is set to 0.
Rx Pkts	Number of received voice packets.
speed dial	Speed-dial is set to a specific directory number.
Tag number	Specifies the tag number identified in the ephone-dn command output.
TCP socket	Indicates the TCP socket number used to communicate with the IP phone. This can be correlated with the output of various other debug and show commands.
Telecaster <i>model number</i>	Indicates the type and model of the Cisco IP phone. This information is received from the phone during its registration with the router.
Tx Pkts	Number of transmitted voice packets.

The following is a sample output from the **show ephone summary** command:

```
Router# show ephone summary

ephone-1 Mac:0030.94C3.37CB TCP socket:[-1] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.1.1.1 Telecaster 7910 keepalive 45 1:1
sp1:5002 sp2:5003

ephone-2 Mac:0030.94C3.F96A TCP socket:[-1] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.1.1.2 Telecaster 7960 keepalive 45 1:2 2:3 3:4
sp1:5004 sp2:5001

ephone-3 Mac:0030.94C3.F946 TCP socket:[-1] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.2.1.2 Telecaster 7960 keepalive 59

ephone-4 Mac:0030.94C3.F43A TCP socket:[-1] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:10.2.1.1 Telecaster 7960 keepalive 59
```


Table 5-2 provides an alphabetic listing of the command fields in the sample output.

Table 5-2 show ephone summary Field Descriptions

Field	Description
activeLine	Indicates the line (button) on the phone that is in use. Zero indicates that no line is in use
debug	If set to 1, indicates that debug for the phone is enabled; otherwise, it is set to 0.
ephone-1	Cisco IP phone tag number.
IP	Assigned IP address of the Cisco IP phone.
keepalive	Number of keepalive messages received from the IP phone by the router.
Mac	MAC address.
mediaActive	If set to 1, indicates that an active conversation is going on; otherwise, it is set to 0.
offhook	If set to 1, indicates that the phone is off the hook.
REGISTERED	Indicates that the phone is active and registered. Alternatives states are UNREGISTERED (indicating that the connection to the Cisco IP phone was closed in a normal manner) and DECEASED (indicating that the connection to the Cisco IP phone was closed because of a keepalive timeout).
reset	Pending reset.
reset_sent	Request for reset sent to the Cisco IP phone.
ringing	If set to 1, indicates that the Cisco IP phone's ringer is turned on and the phone is ringing; otherwise, it is set to 0.
sp1	Speed-dial 1 set to a directory number.
sp2	Speed-dial 2 set to a directory number.
TCP socket	Indicates the TCP socket number used to communicate with the Cisco IP phone. This can be correlated with the output of various other debug and show commands.
Telecaster <i>model number</i>	Indicates the type and model of the IP phone. This information is received from the phone during its registration with the router.

Related Commands

Command	Description
show ephone-dn	Displays the Cisco IP phone destination number.
show ephone-dn summary	Displays summary of the Cisco IP phone destination numbers.
show telephony-service	Displays the detailed configuration of all Cisco IP phones.

show ephone-dn

To display a Cisco IP phone destination number of the Cisco IOS Telephony Service router, use the **show ephone-dn EXEC** command.

```
show ephone-dn [tag | summary]
```

Syntax Description	
<i>tag</i>	(Optional) Destination number tag. The destination number can be from 1 to 24.
summary	(Optional) Summary of all Cisco IP phone destination numbers.

Command Modes	
	EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Examples

The following is sample output from the **show ephone-dn** command:

```
Router# show ephone-dn 1

EFXS 50/0/1 Slot is 50, Sub-unit is 0, Port is 1
Type of VoicePort is EFXS
Operation State is UP
Administrative State is UP
No Interface Down Failure
Description is not set
Noise Regeneration is enabled
Non Linear Processing is enabled
Music On Hold Threshold is Set to -38 dBm
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 8 ms
Playout-delay Mode is set to default
Playout-delay Nominal is set to 60 ms
Playout-delay Maximum is set to 200 ms
Connection Mode is normal
Connection Number is not set
Initial Time Out is set to 10 s
```

```
Interdigit Time Out is set to 10 s
Ringing Time Out is set to 180 s
Companding Type is u-law
Region Tone is set for US
Wait Release Time Out is 30 s
Station name None, Station number 5001
```

```
Caller ID Info Follows:
Standard BELLCORE
```

```
Voice card specific Info Follows:
Digit Duration Timing is set to 100 ms
```

The following is sample output from the **show ephone-dn summary** command:

```
Router# show ephone-dn summary
```

```
PORT      DN STATE  MWI_STATE  CODEC    VAD      VTSP STATE  VPM STATE
=====  =====  =====  =====  ==  =====  =====
50/0/1    DOWN     NONE       -        -        -           EFXS_ONHOOK
50/0/2    DOWN     SUBSCRIBED -        -        -           EFXS_ONHOOK
50/0/3    DOWN     NONE       -        -        -           EFXS_ONHOOK
50/0/4    DOWN     CONNECTING -        -        -           EFXS_ONHOOK
```

Table 5-3 provides an alphabetic listing of the command fields in the sample output.

Table 5-3 show ephone-dn Field Descriptions

Field	Description
Administrative State	Administrative (configured) state of the voice port.
Caller ID Info	Information about the caller ID.
CODEC	Codec type.
Companding Type	Not applicable to the Cisco IP phone.
CONNECTING	Contacting MWI Server.
Connection Mode	Not applicable to the Cisco IP phone.
Connection Number	Not applicable to the Cisco IP phone.
Description	Not applicable to the Cisco IP phone.
DN STATE	State of the Cisco IP phone line associated with a directory number (DN).
Echo Cancellation	Not applicable to the Cisco IP phone.
Echo Cancel Coverage	Not applicable to the Cisco IP phone.
EFXS	The voice port type.
In Gain	Not applicable to the Cisco IP phone.
Initial Time Out	Amount of time in seconds the system waits for an initial input digit from the caller.
Interdigit Time Out	Amount of time in seconds the system waits for a subsequent input digit from the caller.
Music-On-Hold Threshold	Not applicable to the Cisco IP phone.
MWI_STATE	MWI registration status of the extension number.

Table 5-3 *show ephone-dn Field Descriptions*

Field	Description
No Interface Down Failure	State of the interface.
NONE	DN is not assigned with any MWI type.
Noise Regeneration	Not applicable to the Cisco IP phone.
Non-Linear Processing	Not applicable to the Cisco IP phone.
Operational State	Operational state of the voice port.
Out Attenuation	Not applicable to the Cisco IP phone.
Playout-delay Maximum	Not applicable to the Cisco IP phone.
Playout-delay Mode	Not applicable to the Cisco IP phone.
Playout-delay Nominal	Not applicable to the Cisco IP phone.
Port	Port number for this interface associated with the voice interface card.
Region Tone	Not applicable to the Cisco IP phone.
Ringing Time Out	Ringing time out in seconds.
Station name	Station name.
Station number	Station number.
Slot	Slot used in the voice interface card for this port.
SUSBCRIBED	Registered with the MWI server.
Sub-unit	Subunit used in the voice interface card for this port.
Type of VoicePort	Indicates the voice port type.
VAD	Voice activity detection.
Voice card specific Info	Information specific to the voice card.
VPM STATE	State indication for the voice port module (VPM) software component.
VTSP STATE	State indication for the voice telephony service provider (VTSP) software component.
Wait Release Time Out	The time in seconds that a voice port stays in the call-failure state while the router sends a busy tone, reorder tone, or an out-of-service tone to the port.

Related Commands

Command	Description
show ephone	Displays Cisco IP phone output.

show ephone-dn loopback

To display information about loopback ephone-dns that have been created in a Cisco CallManager Express (Cisco CME) system, use the **show ephone-dn loopback** command in privileged EXEC mode.

show ephone-dn loopback

Syntax Description This command has no arguments or keywords.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the Cisco 2600 series, Cisco 3600 series, and Cisco IAD2420 series.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745.
	12.2(8)T1	This command was implemented on the Cisco 2600XM and Cisco 2691.
	12.2(11)T	This command was implemented on the Cisco 1760.

Examples The following example displays information for a loopback using ephone-dn 21 and ephone-dn 22:

```
Router# show ephone-dn loopback
```

```
LOOPBACK DN status (min 21, max 22):
DN 21 51... Loopback to DN 22 CH1 IDLE
CallingDn -1 CalledDn -1 Called Calling G711Ulaw64k
Strip NONE, Forward 2, prefix 10 retry 10 Media 0.0.0.0 0
callID 0 srcCallID 0 ssrc 0 vector 0
DN 22 11... Loopback to DN 21 CH1 IDLE
CallingDn -1 CalledDn -1 Called Calling G711Ulaw64k
Strip NONE, Forward 2, prefix 50 retry 10 Media 0.0.0.0 0
callID 0 srcCallID 0 ssrc 0 vector 0
```

Significant fields in the output from this command are described in [Table 1](#), in alphabetical order.

Table 1 show ephone-dn loopback Field Descriptions

Field	Description
Called, Calling	Called number and calling number when there is a call present.
CalledDn, CallingDn	Ephone-dn tag numbers of the called and calling ephone-dn. Set to -1 if the call is not to or from an ephone-dn, or if there is no active call.
callID	Internal call reference. This usage is the same as in other Cisco IOS voice gateway commands.
DN	Ephone-dn tag (sequence number).

Table 1 show ephone-dn loopback Field Descriptions (continued)

Field	Description
Forward	Number of digits in the original called number to forward to the other ephone-dn in the loopback-dn pair.
G711...	G711Ulaw64k indicates G.711 codec, mu-law, 64000-bit stream. G711alaw64k indicates G.711 codec, a-law, 64000-bit stream.
Loopback to ...	Indicates the opposite ephone-dn in the loopback pair and the status of that ephone-dn.
Media	IP destination address, if any, for any voice packets that are passing through the loopback DN
min, max	Lowest and highest dn-tag numbers of ephone-dns that are configured as loopback-dns.
prefix	Digit string to add to the beginning of forwarded called numbers.
retry	Number of seconds to wait before retrying the loopback target when busy.
srcCallID	Internal call reference for the destination.
ssrc	RTP synchronization source (SSRC) of the most recent RTP packet.
Strip	Number of leading digits to strip before forwarding to the other extension in the loopback-dn pair.
vector	The following values describe the media path for voice packets that pass through the loopback-dn: <ul style="list-style-type: none"> • 0—No media path or not a loopback-dn path (inactive). • 1—Normal path. Loopback-dn has identified the final media destination as a local IP phone. The media IP address field shows a valid, non-zero value. • 2—Hairpin. Media packets are routed back through paired loopback-dns. The final destination is not known. For example, this can be a VoIP-to-VoIP call path by a loopback-dn. • 3—Hairpin. The final destination is an ephone-dn in a special mode such as paging. • 4—Loopback-dn chain has been detected, in which two loopback-dn pairs have been connected together. • 5—Loopback-dn chain has been detected in which more than two loopback-dn pairs are connected in series.

Related Commands

Command	Description
loopback-dn	Creates a virtual loopback voice port (loopback-dn) to establish a demarcation point for VoIP voice calls and supplementary services.
show ephone-dn	Displays status and information or call statistics for one ephone-dn or all ephone-dns in a Cisco CME system.

show mwi relay clients

To display registration information for the list of message waiting indication (MWI) relay clients, use the **show mwi relay clients** EXEC mode.

show mwi relay clients

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **show mwi relay clients** command displays registration information for the list of MWI relay clients.

Examples The following is sample output from the **show mwi relay clients** command:

```
Router# show mwi relay clients

Client          IPADDR          EXPIRES(sec)  MWI
=====
4085551234     10.8.17.25      89077         ON
6505551213     10.8.17.34      87654         OFF
```

Table 5-4 show mwi relay clients Field Descriptions

Field	Description
Client	Telephone number of the client
IPADDR	Client's IP address
Expires (sec)	Time in seconds that MWI expires
MWI	Client's MWI status

■ show mwi relay clients

Related Commands	Command	Description
	mwi relay	Enables the Cisco IOS Telephony Service router to relay MWI information to remote Cisco IP phones.

show telephony-service admin

To display the username and password association of the local administrator of the Cisco IOS Telephony Service router, use the **show telephony-service admin** command in EXEC mode.

show telephony-service admin

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Examples The following is sample output from the **show telephony-service admin** command:

```
Router# show telephony-service admin
admin_username Admin
admin_password word
edit DN through Web: enabled.
edit TIME through web: enabled.
assign IP Address through Web: disabled.
```

Related Commands	Command	Description
	show telephony-service all	Displays the detailed configuration of all the Cisco IP phones.
	show telephony-service dial-peer	Displays Cisco IP phone dial peers of the Cisco IOS Telephony Service router.
	show telephony-service ephone-dn	Displays Cisco IP phone destination number output of the Cisco IOS Telephony Service router.
	show telephony-service voice-port	Displays the virtual voice-port configuration of the Cisco IOS Telephony Service router.

show telephony-service all

To display the detailed configuration of all Cisco IP phones, voice ports, and dial peers of the Cisco IOS Telephony Service router, use the **show telephony-service all** command in EXEC mode.

show telephony-service all

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Examples The following is sample output from the **show telephony-service all** command:

```
Router# show telephony-service all

CONFIG
=====
ip source-address 10.0.0.1 port 2000
max-ephones 24
max-dn 24
dialplan-pattern 1 408734....
voicemail 11111
transfer-pattern 510734....
keepalive 30

ephone-dn 1
number 5001
huntstop

ephone-dn 2
number 5002
huntstop
call-forward noan 5001 timeout 8

ephone-dn 3
number 5003
```

```

huntstop

ephone 1
mac-address 0030.94C3.37CB
type 0
button 1:1
speed-dial 1 5002
speed-dial 2 5003
cos 0
!
ephone 2
mac-address 0030.94C3.F96A
type 0
button 1:2 2:3 3:4
speed-dial 1 5004
speed-dial 2 5001
cos 0
!

voice-port 50/0/1
station-id number 5001
!
voice-port 50/0/2
station-id number 5002
timeout ringing 8
!

dial-peer voice 20025 pots
destination-pattern 5001
huntstop
port 50/0/1

dial-peer voice 20026 pots
destination-pattern 5002
huntstop
call-forward noan 5001
port 50/0/2

dial-peer voice 20027 pots
destination-pattern 5003
huntstop
port 50/0/3

```

Table 5-5 provides an alphabetic listing of the command fields in the sample output.

Table 5-5 *show telephony-service all Field Descriptions*

Field	Description
button	Button on the Cisco IP phone.
call-forward noan	Call forward no answer is set.
cos	Not applicable; unused.
destination-pattern	Destination pattern (telephone number) configured for this dial peer.
dial-peer voice	Voice dial peer.

Table 5-5 show telephony-service all Field Descriptions

Field	Description
dialplan-pattern	Dial-plan pattern is set to expand the abbreviated extension numbers to fully qualified E.164 numbers.
ephone	Cisco IP phone.
ephone-dn	Cisco IP phone directory number.
huntstop	Huntstop is set.
ip source address	IP address used by Cisco IP phones to register with the router for service.
keepalive	The IP phone keepalive period in seconds.
mac-address	MAC address.
max-ephones	Maximum numbers of Cisco IP phones.
max-dn	Maximum directory numbers.
number	Cisco IP phone number.
port	The TCP port number used by Cisco IP phones to communicate with the router.
pots	Plain old telephone service (POTS) dial peer set.
station-id number	The number used for caller ID purposes when calls are made using the line.
speed-dial	Speed-dial is set.
timeout	Timeout is set.
timeout ringing	The maximum amount of time in seconds that the phone is allowed to ring before the call is disconnected.
transfer-pattern	Transfer pattern is set to allow transfer of calls to a specified number.
type	Not applicable; unused.
voicemail	A voice-mail (speed-dial) number is set.
voice-port	(Virtual) voice port designator.

Related Commands

Command	Description
show telephony-service dial-peer	Displays Cisco IP phone dial peers of the Cisco IOS Telephony Service router.
show telephony-service voice-port	Displays the virtual voice port configuration of the Cisco IOS Telephony Service router.

show telephony-service dial-peer

To display the Cisco IP phone dial peers of the Cisco IOS Telephony Service router, use the **show telephony-service dial-peer** command in EXEC mode.

show telephony-service dial-peer

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The dial peers cannot be edited manually. You can change the dial peers by entering the **ephone-dn** command.

Examples The following is sample output from the **show telephony-service dial-peer** command:

```
Router# show telephony-service dial-peer

dial-peer voice 20025 pots
 destination-pattern 5001
 huntstop
 port 50/0/1

dial-peer voice 20026 pots
 destination-pattern 5002
 huntstop
 call-forward noan 5001
 port 50/0/2

dial-peer voice 20027 pots
 destination-pattern 5003
 huntstop
 port 50/0/3
```

show telephony-service dial-peer

```
dial-peer voice 20028 pots
 destination-pattern 5004
 huntstop
 port 50/0/4
```

Table 5-6 provides an alphabetic listing of the command fields in the sample output.

Table 5-6 show telephony-service dial-peer Field Descriptions

Field	Description
destination pattern	Destination pattern (telephone number) configured for this dial peer.
dial-peer voice	Voice dial peer.
huntstop	Huntstop is set.
port	(Virtual) voice port designator.
pots	Plain old telephone service (POTS) dial peer set.

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
show telephony-service all	Displays the detailed configuration of all the Cisco IP phones.
show telephony-service ephone-dn	Displays Cisco IP phone destination number output of the Cisco IOS Telephony Service router.
show telephony-service voice-port	Displays the virtual voice-port configuration of the Cisco IOS Telephony Service router.

show telephony-service ephone

To display configuration for the Cisco IP phones, use the **show telephony-service ephone** command in EXEC mode.

show telephony-service ephone

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Examples The following is sample output from the **show telephony-service ephone** command:

```
Router# show telephony-service ephone

ephone 1
mac-address 0030.94C3.37CB
type 0
button 1:1
speed-dial 1 5002
speed-dial 2 5003
cos 0
!
ephone 2
mac-address 0030.94C3.F96A
type 0
button 1:2 2:3 3:4
speed-dial 1 5004
speed-dial 2 5001
cos 0
!
```

[Table 5-7](#) provides an alphabetic listing of the command fields in the sample output.

Table 5-7 *show telephony-service ephone Field Descriptions*

Field	Description
button	Button on the Cisco IP phone.
cos	Not applicable/unused.
ephone	Cisco IP phone.
mac-address	MAC address of the Cisco IP phone.
type	Not applicable; unused.
speed-dial	Speed-dial is set.

Related Commands

Command	Description
show telephony-service all	Displays the detailed configuration of all the Cisco IP phones.
show telephony-service dial-peer	Displays the Cisco IP phone dial peers of the Cisco IOS Telephony Service router.
show telephony-service ephone-dn	Displays the Cisco IP phone destination number output of the Cisco IOS Telephony Service router.
show telephony-service voice-port	Displays the virtual voice-port configuration of the Cisco IOS Telephony Service router.

show telephony-service ephone-dn

To display the Cisco IP phone destination number output of the Cisco IOS Telephony Service router, use the **show telephony-service ephone-dn** command in EXEC mode.

show telephony-service ephone-dn

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Examples The following is sample output from the **show telephony-service ephone-dn** command:

```
Router# show telephony-service ephone-dn

ephone-dn 1
number 5001
huntstop

ephone-dn 2
number 5002
huntstop
call-forward noan 5001 timeout 8

ephone-dn 3
number 5003
huntstop

ephone-dn 4
number 5004
huntstop
```

Table 5-8 provides an alphabetic listing of the command fields in the sample output.

Table 5-8 *show telephony-service ephone-dn Field Descriptions*

Field	Description
call-forward noan	Call forward is set to no answer. Other available options are call-forward busy and call-forward all.
ephone-dn	Cisco IP phone directory number.
huntstop	Huntstop is set.
number	Cisco IP phone number.
timeout	Timeout setting for call forwarding during no answer.

Related Commands

Command	Description
show telephony-service all	Displays the detailed configuration of all the Cisco IP phones.
show telephony-service dial-peer	Displays the Cisco IP phone dial peers of the Cisco IOS Telephony Service router.
show telephony-service voice-port	Displays the virtual voice-port configuration of the Cisco IOS Telephony Service router.

show telephony-service voice-port

To display virtual voice-port configuration of the Cisco IOS Telephony Service router, use the **show telephony-service voice-port** command in EXEC mode.

show telephony-service voice-port

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **show telephony-service voice-port** command displays virtual voice-port configuration of the Cisco IOS Telephony Service router. Each Cisco IP phone corresponds to a virtual voice port. For example, Cisco IP phone directory number 7 corresponds to virtual voice port 50/0/7. The virtual voice port provides the telephone line associated with the Cisco IP phone directory number (ephone-dn).

Examples The following is sample output from the **show telephony-service voice-port** command:

```
Router# show telephony-service voice-port

voice-port 50/0/1
  station-id number 5001
!
voice-port 50/0/2
  station-id number 5002
  timeout ringing 8
!
voice-port 50/0/3
  station-id number 5003
!
voice-port 50/0/4
  station-id number 5004
!
```

Table 5-9 provides an alphabetic listing of the command fields in the sample output.

Table 5-9 *show telephony-service voice-port Field Descriptions*

Field	Description
station-id number	The phone number used for caller ID purposes for calls made from this voice port.
timeout ringing	The maximum amount of time in seconds that the phone is allowed to ring before the call is disconnected.
voice-port	(Virtual) voice port.

Related Commands

Command	Description
show telephony-service all	Displays the detailed configuration of all the Cisco IP phones.
show telephony-service dial-peer	Displays the Cisco IP phone dial peers of the Cisco IOS Telephony Service router.
show telephony-service ephone-dn	Displays the Cisco IP phone destination number output of the Cisco IOS Telephony Service router.

speed-dial (ephone)

To set speed-dial buttons on a Cisco IP phone, use the **speed-dial** command in ephone configuration mode. To disable speed-dial buttons on a Cisco IP phone, use the **no** form of this command.

speed-dial *button-number directory-number*

no speed-dial *button-number directory-number*

Syntax Description

<i>button-number</i>	Speed-dial string tag for the Cisco IP phone speed-dial button number. The button number ranges from 1 to 4.
<i>directory-number</i>	Directory number on a phone.

Defaults

No default behavior or values.

Command Modes

Ephone configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **speed-dial** command sets speed-dial buttons on a Cisco IP phone.



Note

If more speed-dial buttons are defined than are actually supported by the physical phone, then the extra speed-dial configurations are ignored.



Note

Although 20 speed dials can be configured on the Cisco IP phone, ATA phones support only 9 speed-dials with Cisco IOS Telephony Service: *1, *2, *3, *4, *5, *6, *7, *8, and *9.

Examples

The following example shows how to set the speed-dial button 1 for the directory number 5001:

■ speed-dial (ephone)

```
Router(config)# ephone 1
Router(config-ephone)# speed-dial 1 5001
```

Related Commands

Command	Description
ephone	Enters ephone configuration mode to register Cisco IP phones.

telephony-service

To enable Cisco IOS Telephony Service and enter telephony-service configuration mode, use the **telephony-service** command in global configuration mode. To disable Cisco IOS Telephony Service, use the **no** form of this command.

telephony-service

no telephony-service

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Global configuration

Command History	Release	Modification
	12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **telephony-service** command is the top-level command for all other commands related to Cisco IOS Telephony Service configuration.

Examples The following example shows how to enter telephony-service configuration mode:

```
Router(config)# telephony-service
Router(config-telephony-service)#
```

Related Commands	Command	Description
	dialplan-pattern	Creates a global prefix that can be used to expand the abbreviated extension numbers into fully qualified E.164 numbers.
	ephone	Enters ephone configuration mode to register Cisco IP phones.

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
ip source-address	Identifies the IP address and port number that the Cisco IOS Telephony Service router uses for the IP phone service.
keepalive	Configures the time interval between sending keepalive messages to the router used by the Cisco IP phones.
load	Downloads the Cisco IP phone firmware used by the Cisco IP phone type.
max-dn	Configures the maximum number of directory numbers supported by the Cisco IOS Telephony Service router.
max-ephones	Configures the maximum number of Cisco IP phones supported by the Cisco IOS Telephony Service router.
reset	Resets the Cisco IP phone.
timeouts interdigit	Configures the interdigit timeout value for all Cisco IP phones attached to the router.
transfer-pattern	Allows transfer of telephone calls to other non-IP phone numbers.
url	Provisions URLs for use by the Cisco IP phones connected to the Cisco IOS Telephony Service router.
voicemail	Configures the telephone number that is speed-dialed when the message button on a Cisco IP phone is pressed.

time-format (telephony-service)

To set the time display format on all the Cisco IP phones attached to the router, use the **time-format** command in telephony-service configuration mode. To disable the time display format, use the **no** form of this command.

time-format {12 | 24}

no time-format {12 | 24}

Syntax Description	12	Set in 12-hour increments.
	24	Set in 24-hour increments.

Defaults The default is set to 12 hours.

Command Modes Telephony-service configuration

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers; and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **time-format** command sets the time display format on all the Cisco IP phones attached to the router.

Examples The following example sets the time format on the Cisco IP phones to the 24-hour setting:

```
Router(config)# telephony-service
Router(config-telephony-service)# time-format 24
```

Related Commands	Command	Description
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

timeouts interdigit (telephony-service)

To configure the interdigit timeout value for all Cisco IP phones attached to the router, use the **timeouts interdigit** command in telephony-service configuration mode. To disable the interdigit timeout value, use the **no** form of this command.

timeouts interdigit *seconds*

no timeouts interdigit *seconds*

Syntax Description

<i>seconds</i>	Interdigit timeout duration, in seconds, set on the timer for all the Cisco IP phones. Valid entries are from 2 to 120 seconds.
----------------	---

Defaults

The default is 10 seconds.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XB	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **timeouts interdigit** command specifies the number of seconds the system waits after a caller enters the initial digit or a subsequent digit of the dialed string. The timeouts interdigit timer is activated when the caller enters a digit and is restarted each time the caller enters subsequent digits until the destination address is identified. If the configured timeout value is exceeded before the destination address is identified, a tone sounds and the call is terminated. The default is 10 seconds.

To disable the timeouts interdigit timer, set the *seconds* value to zero.

Examples

The following example shows the interdigit timeout value set to 5 seconds for all Cisco IP phones:

```
Router(config)# telephony-service
Router(config-telephony-service)# timeouts interdigit 5
```

In this example, the 5 seconds refers to the time in seconds after which an incompletely dialed number will timeout. For example, if you dial nine digits (408739898) instead of the required 10 digits (4087398984) you hear a busy tone after 5 “timeout” seconds.

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
timeouts interdigit	Configures the interdigit timeout value for a specified voice port.

time-webedit (telephony-service)

To enable setting time through the web interface, use the **time-webedit** command in telephony-service configuration mode. To disable this feature, use the **no** form of this command.

time-webedit

no time-webedit

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Telephony-service configuration

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **time-webedit** command allows a local administrator of the Cisco IOS Telephony Service router to change and set time through the graphical user interface (GUI).

Examples The following example shows how to enable web editing of time:

```
Router(config)# telephony-service
Router(config-telephony-service)# time-webedit
```

Related Commands	Command	Description
	dn-webedit	Enables adding of directory numbers through a web interface.
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

transfer-pattern (telephony-service)

To allow transfer of telephone calls by Cisco IP phones to other phone numbers, use the **transfer-pattern** command in telephony-service configuration mode. To disable transfer of calls to other numbers, use the **no** form of this command.

transfer-pattern *transfer-pattern*

no transfer-pattern

Syntax Description

transfer-pattern Digit string for permitted call transfers.

Defaults

Cisco IP phone to Cisco IP phone transfer only.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **transfer-pattern** command allows you to transfer a call to non-IP phone numbers. The call is established between the other calling party and the new recipient. By default, all Cisco IP phone directory numbers are allowed as transfer targets.

Examples

The following example shows how to set the transfer pattern:

```
Router(config)# telephony-service
Router(config-telephony-service)# transfer-pattern 55540..
```

A maximum of 32 transfer patterns can be entered. In the previous example, 55540.. (the two decimal points are used here as wild cards) permits transfers to any numbers in the range 555-4000 to 525-4099.

Related Commands	Command	Description
	ephone	Enters ephone configuration mode.
	ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
	telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

translate (ephone-dn)

To select a translation rule to numbers dialed by the Cisco IP phone users, use the **translate** command in ephone-dn configuration mode. To disable this feature, use the **no** form of this command.

translate { **called** | **calling** } *translation rule tag*

no translate { **called** | **calling** } *translation rule tag*

Syntax Description

called	Translate the called number.
calling	Translate the calling number.
<i>translation rule tag</i>	The tag number by which the rule set is referenced. This is an arbitrarily chosen number. The range is 1 to 2,147,483,647.

Defaults

No default behavior or values.

Command Modes

Ephone-dn configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series and Cisco 3600 series multiservice routers; and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **translate** command allows you to select a preconfigured number translation rule to modify the number dialed by a specific extension (ephone-dn). The **called** keyword translates the called number, and the **calling** keyword translates the calling number.



Note

For the **translate** command to take effect, appropriate translation rules should be created on the VoIP configuration level.

Translation rules are a powerful general purpose number manipulation mechanism supported by Cisco IOS that can be used to perform operations such as automatically adding telephone area and prefix codes to dialed numbers. The translation rules are applied to the voice ports created by the ephone-dn.

Examples

The following example shows how to set translation rule 20 to the number called by the Cisco IP phone:

translate (ephone-dn)

```
Router(config)# translation-rule 20  
Router(config-translate)# rule 0 1234 2345 abbreviated  
Router(config)# ephone-dn 1  
Router(config-ephone-dn) translate called 20
```

Related Commands

Command	Description
ephone-dn	Enters ephone-dn configuration mode and configures the directory numbers for the Cisco IP phone lines.
translation-rule	Creates a translation name and enters translation-rule configuration mode.

url (telephony-service)

To provision URLs for the Cisco IP phones connected to the Cisco IOS Telephony Service router, use the **url** command in telephony-service configuration mode. To remove URLs, use the **no** form of this command.

```
url {directory | information | messages | services} url
```

```
no url {directory | information | messages | services} url
```

Syntax Description

directory	The directory URL.
information	The information URL.
messages	The messages URL.
services	The services URL.
<i>url</i>	A URL string.

Defaults

By default, the router automatically uses the local directory service.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **url** command provisions URLs for use by the connected Cisco IP phones. The Cisco IP Phone 7960 and Cisco IP Phone 7940 can support four URLs in association with the four programmable feature keys on the IP phones. The four feature keys are Directories, Information, Messages, and Services. (The fifth key—Settings—is managed entirely by the phone.) Operation of these services is determined by the Cisco IP phone capabilities and the content of the referenced URL. The purpose of the **url** command is simply to provision the URLs through the SEPDEFAULT.cnf configuration file supplied by the Cisco IOS Telephony Service router to the Cisco IP phones during phone registration. You can disable local directory by entering **url directories none**. You must reset the Cisco IP phones before the **url** command can take effect.

**Note**

Provisioning of the directory URL to select an external directory resource disables the Cisco IOS Telephony Service local directory service.

Examples

The following example shows how to configure the **url** command to provision the Information, Directories, and Services keys:

```
Router(config) telephony-service
Router(config-telephony-service) url information
http://1.4.212.4/CCMUser/GetTelecasterHelpText.asp
Router(config-telephony-service) url directories http://1.4.212.11/localdirectory
Router(config-telephony-service) url services http://1.4.212.4/CCMUser/123456/urltest.html
```

The Messages key is configured by the **voicemail** command. This key acts like a redial key to retrieve messages from a specified telephone number.

Related Commands

Command	Description
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.

username (ephone)

To assign a phone user a login account username and password to permit user login to the Cisco IOS Telephony Service router through a web browser, use the **username** command in ephone configuration mode. To disable this feature, use the **no** form of this command.

username *username* **password** *password*

no username *username* **password** *password*

Syntax Description

<i>username</i>	The username of the local Cisco IP phone user.
password	Enables password for the Cisco IP phone user.
<i>password</i>	Password string.

Defaults

The default username for the administrator is Admin.

Command Modes

Ephone configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **username** command assigns a login account username and password for a phone user and establishes a login account associated with each Cisco IP phone (ephone).

A login account must also be created to allow Telephone Application Programming Interface (TAPI)-aware PC applications to register with the Cisco IOS Telephony Service router and exercise remote control operation of a Cisco IP phone.



Note

This configuration can be completed only by the local system administrator of the Cisco IOS Telephony Service router.

This configuration permits the phone user to log in to the Cisco IOS Telephony Service to display and change attributes associated only with the user's IP phone.

Examples

The following example shows how to set the username and password:

```
Router(config)# ephone 1
Router(config-ephone)# username user1 password password1
```

Related Commands

Command	Description
admin-password	Sets a password for the local system administrator of the Cisco IOS Telephony Service.
admin-username	Sets the username for the local system administrator of the Cisco IOS Telephony Service router.
ephone	Enters ephone configuration mode to register Cisco IP phones.

vm-device-id (ephone)

To define the voice-mail ID string, use the **vm-device-id** command in ephone configuration mode. To disable this feature, use the **no** form of this command.

vm-device-id *id-string*

no vm-device-id *id-string*

Syntax Description

<i>id-string</i>	Voice-mail device port identification (ID) string. For example, CiscoUM-VI1 for the first port and CiscoUM-VI2 for the second port.
------------------	---

Defaults

No default behavior or values.

Command Modes

Ephone configuration

Command History

Release	Modification
12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **vm-device-id** command defines the voice-mail device ID string. The voice-mail port registers with a device ID instead of a MAC address. To distinguish among different voice-mail ports, voice-mail device ID is used. The voice-mail device ID is configured to a Cisco IP phone port that maps to a corresponding voice-mail port.

Examples

The following example shows how to set the voice-mail device ID to CiscoUM-VI1:

```
Router(config) ephone 1
Router(config-ephone) vm-device ID CiscoUM-VI1
```

Related Commands

Command	Description
voicemail (telephony-service)	Configures the telephone number that is speed-dialed when the message button on a Cisco IP phone is pressed.

vm-integration

To enter voice-mail integration configuration mode and enable voice-mail integration with dual tone multifrequency (DTMF) and analog voice-mail systems, use the **vm-integration** command in global configuration mode. To disable voice-mail integration, use the **no** form of this command.

vm-integration

no vm-integration

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)XT	This command was introduced on the following platforms: Cisco 1750, Cisco 1751, Cisco 2600 series, and Cisco 3600 series multiservice routers; and Cisco IAD2420 series IADs.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
	12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
	12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines The **vm-integration** command allows you to enter the voice-mail integration configuration mode and allows integration with DTMF and analog voice-mail systems.

Examples The following example shows how to enter the voice-mail integration configuration mode:

```
Router(config) vm-integration
Router(config-vm-integration)
```

Related Commands	Command	Description
	pattern direct	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when the user presses the messages button on the phone.
	pattern ext-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voicemail.
	pattern ext-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an internal extension fails to connect to an extension and the call is forwarded to voicemail.
	pattern trunk-to-ext busy	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system once an external trunk call reaches a busy extension and the call is forwarded to voicemail.
	pattern trunk-to-ext no-answer	Configures the DTMF digit pattern forwarding necessary to activate the voice-mail system when an external trunk call reaches an unanswered extension and the call is forwarded to voicemail.

voicemail (telephony-service)

To configure the telephone number that is speed-dialed when the message button on a Cisco IP phone is pressed, use the **voicemail** command in telephony-service configuration mode. To disable the messages button, use the **no** form of this command.

voicemail *phone-number*

no voicemail

Syntax Description

<i>phone-number</i>	The phone number that is configured as a speed-dial number to retrieve messages.
---------------------	--

Defaults

No phone number is configured and the messages button is ineffective.

Command Modes

Telephony-service configuration

Command History

Release	Modification
12.1(5)YD	This command was introduced on the following platforms: Cisco 2600 series and Cisco 3600 series multiservice routers, and Cisco IAD2420 series IADs.
12.2(2)XT	This command was implemented on the Cisco 1750 and Cisco 1751 multiservice routers.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on the Cisco 3725 and Cisco 3745 routers.
12.2(8)T1	This command was implemented on the Cisco 2600-XM and Cisco 2691 routers.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T and implemented on the Cisco 1760 routers.

Usage Guidelines

The **voicemail** command configures the telephone number that is speed-dialed when the message button on a Cisco IP phone is pressed. The same telephone number is configured for voice mail for all Cisco IP phones connected to the router.

The default behavior is that no phone number is configured and the messages button is ineffective.

Examples

The following example shows that the phone number 914085551000 is set as the speed-dial number that is dialed to retrieve messages when the messages button is pressed:

```
Router(config)# telephony-service
Router(config-telephony-service)# voicemail 914085551000
```

The number 914085551000 is called when the Cisco IP phone messages button is pressed to retrieve messages.

Related Commands

Command	Description
telephony-service	Enables Cisco IOS Telephony Service and enters telephony-service configuration mode.
vm-device-id (ephone)	Defines the voice-mail ID string.

