

# Cisco IOS H.323 Gateway Configuration for Use with Cisco CallManager

Document ID: 13934

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## Introduction

This document assists with the initial configuration of a basic H.323 gateway between Cisco CallManager and an H.323-capable device such as a Cisco 2620 router. The configuration of both the Cisco CallManager and the H.323 gateway is shown.

## Prerequisites

### Requirements

There are no specific prerequisites for this document. But knowledge of dial peers and the related configurations on an H.323 gateway make this document easier to understand. In order to learn more about dial peers and their configuration, refer to the documents mentioned in the Troubleshooting and Advanced Issues section.

### Components Used

The information in this document is based on these software and hardware versions:

- Cisco CallManager 3.x and 4.x
- A Cisco IOS® Software voice-enabled router/gateway (175x, 2600, 3600, MC3810, AS53xx, AS54xx, AS58xx) with an NM-HDV module serving as H.323 voice gateway for a Cisco CallManager. For the purposes of this document, Cisco IOS Software Release 12.2(19) is used.

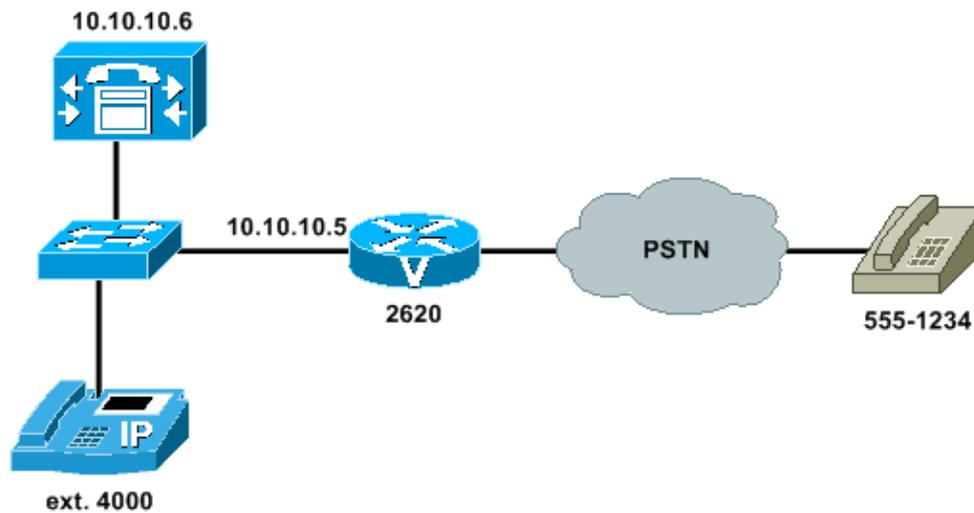
The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

## Background Information

For the sake of this document, the Cisco CallManager has an IP address of 10.10.10.6 and the Cisco 2620 has an Ethernet address of 10.10.10.5.



There are three parts to this document:

- the Cisco CallManager gateway configuration
- the route pattern configuration
- the configuration of the H.323 gateway (the Cisco 2620 router)

When you complete the tasks in this document, you should have a fully functional H.323 gateway, allowing calls to be made from Cisco IP Phones to the phones on the other side of the Public Switched Telephone Network (PSTN), and vice versa.

## H.323 Gateway Configuration on Cisco CallManager 3.x

In order to configure the H.323 gateway, refer to this procedure given in these links for Cisco CallManager 3.2 and 3.3, respectively.

- [H.323 Gateway Configuration on Cisco CallManager 3.2](#)
- [H.323 Gateway Configuration on Cisco CallManager 3.3](#)

### H.323 Gateway Configuration on Cisco CallManager 3.2

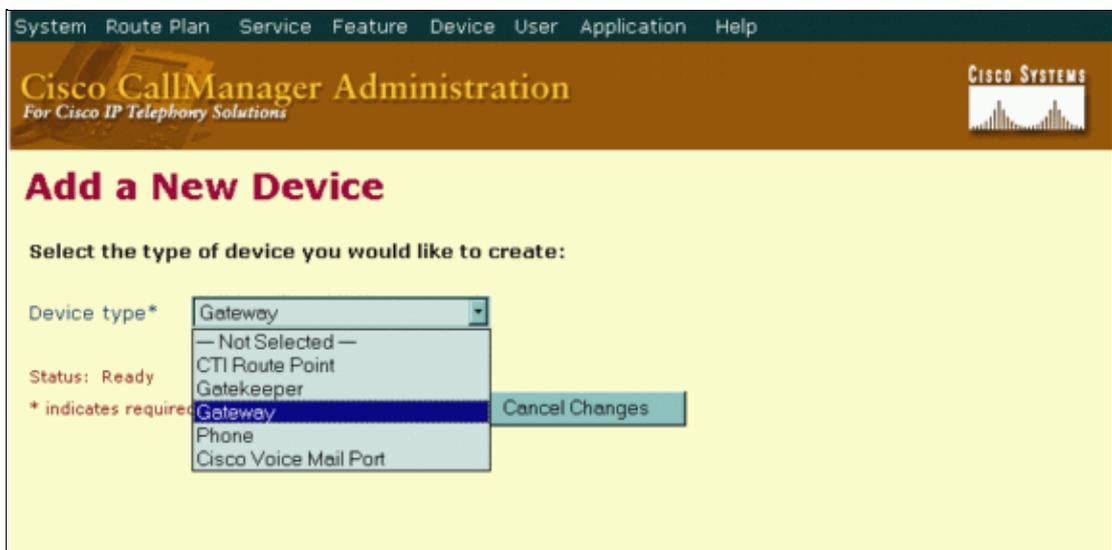
This section describes the necessary steps to create and configure an H.323 gateway on Cisco CallManager 3.2.

Follow these steps to configure an H.323 gateway.

1. From the **Device** menu, choose **Add a New Device**.



2. From the Device Type drop-down list, choose **Gateway**. Click **Next**.



3. From the Add a New Gateway window, choose **H.323 Gateway** from the Gateway type drop-down list and **H.225** from the Device Protocol drop-down list. Click **Next**.

**Note:** The Gateway Selections Cisco 26XX, Cisco 362X, Cisco 364X, and Cisco 366X are for Media Gateway Control Protocol (MGCP) configuration, and are not discussed in this document.

The Device Protocol "Inter-cluster Trunk" is for communication between Cisco CallManager clusters and should only be selected when you configure an H.323 gateway that points to another Cisco CallManager cluster.

4. Enter the details of your gateway in the Gateway Configuration window. Once you have entered the required fields, click **Insert**.

The required fields are identified by an asterisk (\*).

- ◆ **Device Name** The IP address of your router's Ethernet interface. In this scenario, the IP address used is 10.10.10.5.
- ◆ **Device Pool** Specifies the collection of properties for this device, including CallManager Group, Date/Time Group, Region, and Calling Search Space for auto-registration of devices.
- ◆ **Calling Party Selection** Determines which directory number is sent; usually **Originator**.
- ◆ **Presentation Bit** Determines whether the central office transmits or blocks caller ID; usually **Allowed**.
- ◆ **Num Digits** This field is used with the Sig Digits checkbox below it to specify how many of the incoming digits are collected.
- ◆ **Called party IE number type unknown** Determines the format for the type of number in called party directory numbers. The default value is **Cisco CallManager**.
- ◆ **Calling party IE number type unknown** Determines the format for the type of number in calling party directory numbers. The default value is **Cisco CallManager**.
- ◆ **Called Numbering Plan** Determines the format for the numbering plan in called party directory numbers. The default value is **Cisco CallManager**.
- ◆ **Calling Numbering Plan** Determines the format for the numbering plan in calling party directory numbers. The default value is **Cisco CallManager**.

**Note:** Information about the remaining fields can be obtained when you click **For this page** on the Help menu.

## Gateway Configuration

[Back to Find/List Gateways](#)

Product : H.323 Gateway  
 Gateway : 10.10.10.5  
 Device Protocol: H.225  
 Registration: Unknown  
 IP Address: 10.10.10.5

Status: Update completed.

Device Name*	<input type="text" value="10.10.10.5"/>
Description	<input type="text" value="Gateway to PSTN"/>
Device Pool*	<input type="text" value="Default"/>
Media Resource Group List	<input type="text" value="&lt; None &gt;"/>
Network Hold Audio Source	<input type="text" value="&lt; None &gt;"/>
User Hold Audio Source	<input type="text" value="&lt; None &gt;"/>
Calling Search Space	<input type="text" value="&lt; None &gt;"/>
Location	<input type="text" value="&lt; None &gt;"/>
Caller ID DN	<input type="text"/>
Calling Party Selection*	<input type="text" value="Originator"/>
Presentation Bit*	<input type="text" value="Allowed"/>
Display IE Delivery	<input checked="" type="checkbox"/>
Gatekeeper Name	<input type="text" value="&lt; None &gt;"/>
Media Termination Point Required	<input type="checkbox"/>

Num Digits*	<input type="text" value="4"/>
Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	<input type="text"/>
Redirecting Number IE Delivery - Outbound	<input type="checkbox"/>
Redirecting Number IE Delivery - Inbound	<input type="checkbox"/>
Run H225D On Every Node	<input checked="" type="checkbox"/>
Called party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Calling party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Called Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Calling Numbering Plan*	<input type="text" value="Cisco CallManager"/>

\* indicates required item

[Back to Find/List Gateways](#)

**Note:** Make sure that the **Media Termination Point Required** checkbox is **not checked**. A Media Termination Point is just a piece of software that runs on a server, which provides features such as Hold and Conferencing to H323 and SIP devices. While you use a H323 gateway, the endpoints that you use are Skinny (SCCP) clients, so MTP resources are not necessary.

## Configure a Route Pattern in Cisco CallManager 3.2 to Use H.323 Gateway

Once the H.323 gateway has been created, the next step is to configure Cisco CallManager to route calls toward it. This is done through these steps:

1. From the **Route Plan** menu, choose **Route Pattern**.



2. Specify the values used to route calls to the H.323 gateway in the Route Pattern Configuration window.

The required fields are identified by an asterisk (\*).

- ◆ **Route Pattern** When the digits in this field are dialed, Cisco CallManager routes those digits to the gateway.
- ◆ **Numbering Plan** North American Numbering Plan is the only option at this release.
- ◆ **Gateway/Route List** You can specify a single gateway, or for more advanced call routing, use route lists.

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## Route Pattern Configuration

[Add a New Route Pattern](#)  
[Back to Find/List Route Patterns](#)

**Route Pattern: 9.@**

Status: Insert completed  
Note: Any update to this route pattern automatically resets the associated gateway/route list

Copy Update Delete Cancel Changes

### Pattern Definition

Route Pattern*	<input type="text" value="9.@"/>
Partition	< None >
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Gateway/Route List*	10.10.10.5 (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Urgent Priority

### Calling Party Transformations

Use Calling Party's External Phone Number Mask

Calling Party Transform Mask

Prefix Digits (Outgoing Calls)

### Called Party Transformations

Discard Digits < None >

Called Party Transform Mask

Prefix Digits (Outgoing Calls)

\* indicates required item.

In this example, the Route Pattern uses the @ symbol, which is a macro for the more than 300 dialing patterns that make up the North American Numbering Plan. Calls that begin with a 9 are sent to gateway 10.10.10.5. Cisco CallManager provides the outside dialtone, and the **Discard Digits** field is set to **None**, so that all digits are sent to the gateway.

**Note:** Information about the remaining fields can be obtained when you click **For this page** on the **Help** menu.

## H.323 Gateway Configuration on Cisco CallManager 3.3

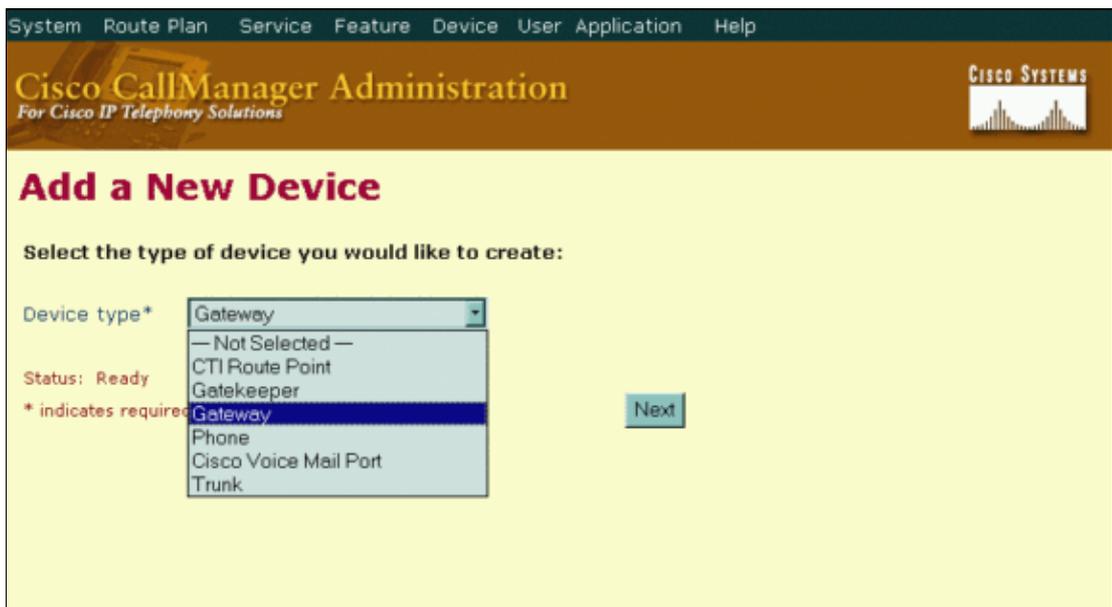
This section describes the necessary steps to create and configure an H.323 gateway on Cisco CallManager 3.3.

Follow these steps to configure an H.323 gateway.

1. From the **Device** menu, choose **Add a New Device**.



2. From the Device Type drop-down list, choose **Gateway**. Click **Next**.



3. From the Add a New Gateway window, choose **H.323 Gateway** as the Gateway type and **H.225** as the Device Protocol. Click **Next**.

**Note:** The Gateway Selections Cisco 26XX, Cisco 362X, Cisco 364X, and Cisco 366X are for MGCP configuration, and are not discussed in this document.

For Cisco CallManager 3.3, **H.225** is the only option available for an H.323 gateway configuration, unlike Cisco CallManager 3.2 and earlier. In Cisco CallManager 3.2 and earlier, both the H.323 gateway and an Intercluster Trunk are configured using the same menus with the different Device Protocols. In Cisco CallManager 3.3, the Trunk configuration is separate.

4. Enter the details of your gateway in the Gateway Configuration window. Once you have entered the required fields, click **Insert**.

These are the required fields, which must be filled in order to add the H.323 gateway:

- ◆ **Device Name** The IP address of your router's Ethernet interface. In this scenario, the IP address used is 10.10.10.5.
- ◆ **Device Pool** Specifies the collection of properties for this device, including CallManager Group, Date/Time Group, Region, and Calling Search Space for auto-registration of devices.
- ◆ **Significant Digits** Significant Digits represent the number of final digits that are retained on inbound calls. Use to process incoming calls and to indicate the number of digits that are used to route calls that come into the H.323 device. The default value **All** is used in this scenario.
- ◆ **Calling Party Selection** This field determines which directory number is sent. The default value is **Originator**.
- ◆ **Calling Party Presentation** Determines whether the Cisco CallManager transmits or blocks caller ID. The default is **Allowed**.
- ◆ **Called Party IE number type Unknown** This field determines the format for the number type in called party directory numbers. The default value **Cisco CallManager** is recommended.
- ◆ **Calling Party IE number type Unknown** This field determines the format for the number type in calling party directory numbers. The default value **Cisco CallManager** is recommended.
- ◆ **Called Numbering Plan** This field determines the format for the numbering plan in called party directory numbers. The default value **Cisco CallManager** is recommended.
- ◆ **Calling Numbering Plan** This field determines the format for the numbering plan in calling party directory numbers. The default value **Cisco CallManager** is recommended.

**Note:** Information about the remaining fields which are optional, can be obtained when you click **For this page** on the **Help** menu.

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## Gateway Configuration

[Back to Find/List Gateways](#)

Product : H.323 Gateway  
Gateway : New  
Device Protocol: H.225

Status: Ready

### Device Information

Device Name*	<input type="text" value="10.10.10.5"/>
Description	<input type="text" value="Gateway to the PSTN"/>
Device Pool*	<input type="text" value="Default"/>
Media Resource Group List	<input type="text" value="&lt; None &gt;"/>
Location	<input type="text" value="&lt; None &gt;"/>
AAR Group	<input type="text" value="&lt; None &gt;"/>

Media Termination Point Required

### Call Routing Information

#### Inbound Calls

Significant Digits*	<input type="text" value="All"/>
Calling Search Space	<input type="text" value="&lt; None &gt;"/>
AAR Calling Search Space	<input type="text" value="&lt; None &gt;"/>
Prefix DN	<input type="text"/>

Redirecting Number IE Delivery - Inbound

#### Outbound Calls

Calling Party Selection*	<input type="text" value="Originator"/>
Calling Party Presentation*	<input type="text" value="Allowed"/>
Called party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Calling party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Called Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Calling Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Caller ID DN	<input type="text"/>

Display IE Delivery

Redirecting Number IE Delivery - Outbound

\* indicates required item

[Back to Find/List Gateways](#)

**Note:** Make sure that the **Media Termination Point Required** checkbox is **not checked**. A Media Termination Point is just a piece of software that runs on a server, which provides features such as Hold and Conferencing to H323 and SIP devices. While you use a H323 gateway, the endpoints that you use are Skinny (SCCP) clients, so MTP resources are not necessary.

## Configure a Route Pattern in Cisco CallManager 3.3 to Use H.323 Gateway

Once the H.323 gateway is created, the next step is to configure Cisco CallManager to route calls toward it. This is done through these steps:

1. From the **Route Plan** menu, choose **Route Pattern**.



2. Specify the values used to route calls to the H.323 gateway in the Route Pattern Configuration window.

These are the required fields, which must be filled in order to add the Route Pattern:

- ◆ **Route Pattern** Enter the route pattern, including numbers and wildcards. For example, for North American Numbering Plan, enter 9.@ for typical local access, or 8XXX for a typical private network numbering plan. When these digits are dialed, Cisco CallManager routes them to the gateway.
- ◆ **Numbering Plan** North American Numbering Plan is the only option for Cisco CallManager 3.x.
- ◆ **Gateway/Route** Choose the Gateway/Route List for which you add a route pattern. In this example, the gateway 10.10.10.5 is chosen.

**Note:** Information about the remaining fields, which are optional, can be obtained when you click **For this page** on the **Help** menu.

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## Route Pattern Configuration

[Add a New Route Pattern](#)  
[Back to Find/List Route Patterns](#)

**Route Pattern: 9.@**

Status: Insert completed  
Note: Any update to this route pattern automatically resets the associated gateway/route list

Copy Update Delete

### Pattern Definition

Route Pattern*	9.@
Partition	< None >
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Gateway/Route List*	10.10.10.5 (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Urgent Priority

### Calling Party Transformations

<input type="checkbox"/> Use Calling Party's External Phone Number Mask	
Calling Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Calling Party Presentation	Default

### Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	

In this example, the Route Pattern uses the @ symbol, which is a macro for the more than 300 dialing patterns that make up the North American Numbering Plan. Calls that begin with a 9 are sent to gateway 10.10.10.5. Cisco CallManager provides the outside dialtone, and the Discard Digits field has been set to **None**, so that all digits are sent to the gateway.

## H.323 Gateway Configuration on Cisco CallManager 4.x

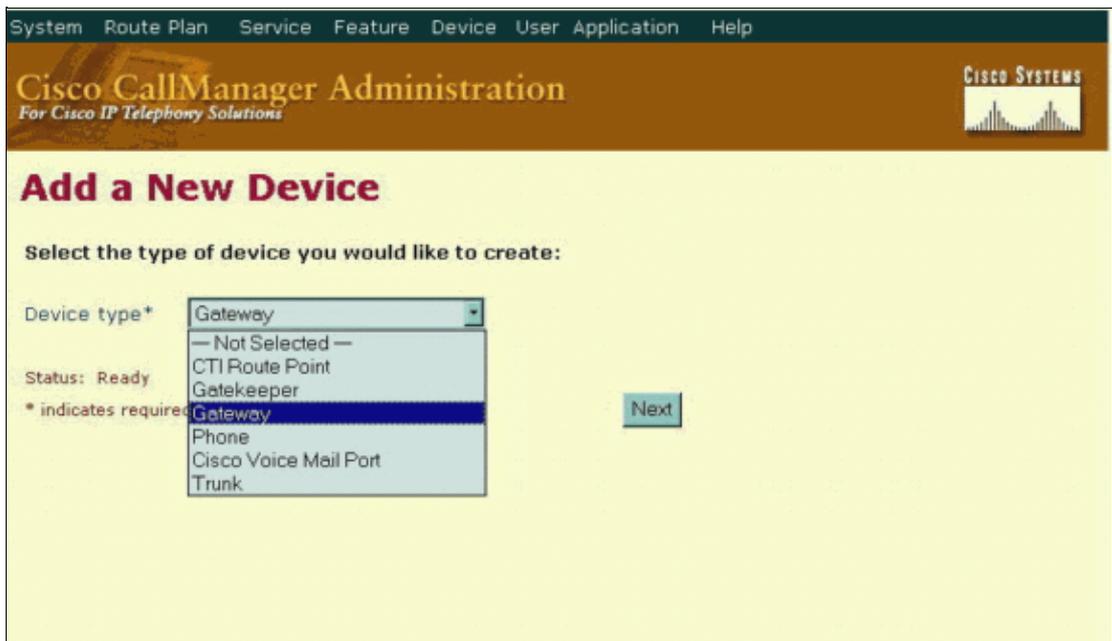
This section describes the necessary steps to create and configure an H.323 gateway on Cisco CallManager 4.0.

Follow these steps to configure an H.323 gateway.

1. From the **Device** menu, choose **Add a New Device**.



2. From the **Device Type** drop-down list, choose **Gateway**. Click **Next**.



3. From the Add a New Gateway window, choose **H.323 Gateway** as the Gateway type and **H.225** as the Device Protocol. Click **Next**.

**Note:** The Gateway Selections Cisco 26XX, Cisco 362X, Cisco 364X and Cisco 366X are for MGCP configuration, and are not discussed in this document.

For Cisco CallManager 4.0, **H.225** is the only option available for an H.323 gateway configuration, unlike Cisco CallManager 3.2 and earlier. In Cisco CallManager 3.2 and earlier, both the H.323 gateway and an Intercluster Trunk are configured using the same menus with the different Device Protocols. In Cisco CallManager 4.0, the Trunk configuration is separate.

4. Enter the details of your gateway in the Gateway Configuration window. Once you have entered the required fields, click **Insert**.

These are the required fields, which must be filled in order to add the H.323 gateway.

- ◆ **Device Name** The IP address of your router's Ethernet interface. In this scenario, the IP address used is 10.10.10.5.
- ◆ **Device Pool** Specifies the collection of properties for this device, including CallManager Group, Date/Time Group, Region, and Calling Search Space for auto-registration of devices.
- ◆ **Signaling Port** Specifies the port used for Signaling. The default value is **1720**.
- ◆ **Significant Digits** Significant Digits represent the number of final digits that are retained on inbound calls. This is used for the processing of incoming calls and to indicate the number of digits that are used to route calls that come into the H.323 device. The default value, **All**, is used in this scenario.
- ◆ **Calling Party Selection** Determines which directory number is sent. The default value is **Originator**.
- ◆ **Calling Party Presentation** Determines whether the central office transmits or blocks caller ID. The default is **Allowed**.
- ◆ **Called Party IE number type Unknown** Determines the format for the number type in called party directory numbers. The default value **Cisco CallManager** is recommended.
- ◆ **Calling Party IE number type Unknown** Determines the format for the number type in calling party directory numbers. The default value **Cisco CallManager** is recommended.
- ◆ **Called Numbering Plan** Determines the format for the numbering plan in called party directory numbers. The default value **Cisco CallManager** is recommended.
- ◆ **Calling Numbering Plan** Determines the format for the numbering plan in calling party directory numbers. The default value **Cisco CallManager** is recommended.

**Note:** Information about the remaining fields, which are optional, can be obtained when you click **For this page** on the **Help** menu.

## Gateway Configuration

[Back to Find/List Gateways](#)

Product : H.323 Gateway  
Gateway : New  
Device Protocol: H.225

Status: Ready

### Device Information

Device Name*	<input type="text" value="10.10.10.5"/>
Description	<input type="text" value="10.10.10.5"/>
Device Pool*	<input type="text" value="Default"/>
Media Resource Group List	<input type="text" value="&lt; None &gt;"/>
Location	<input type="text" value="&lt; None &gt;"/>
AAR Group	<input type="text" value="&lt; None &gt;"/>
Signaling Port*	<input type="text" value="1720"/>

Media Termination Point Required

Retry Video Call as Audio

Wait for Far End H.245 Terminal Capability Set

Multilevel Precedence and Preemption (MLPP) Information	
MLPP Domain (e.g., "0000FF")	<input type="text"/>
MLPP Indication	Not available on this device
MLPP Preemption	Not available on this device
Call Routing Information	
Inbound Calls	
Significant Digits*	<input type="text" value="All"/>
Calling Search Space	<input type="text" value="&lt; None &gt;"/>
AAR Calling Search Space	<input type="text" value="&lt; None &gt;"/>
Prefix DN	<input type="text"/>
<input type="checkbox"/> Redirecting Number IE Delivery - Inbound	
Outbound Calls	
Calling Party Selection*	<input type="text" value="Originator"/>
Calling Party Presentation*	<input type="text" value="Allowed"/>
Called party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Calling party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Called Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Calling Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Caller ID DN	<input type="text"/>
<input checked="" type="checkbox"/> Display IE Delivery	
<input type="checkbox"/> Redirecting Number IE Delivery - Outbound	
* indicates required item	
<a href="#">Back to Find/List Gateways</a>	

**Note:** Make sure that the **Media Termination Point Required** checkbox is **not checked**. A Media Termination Point is just a piece of software that runs on a server, which provides features such as Hold and Conferencing to H323 and SIP devices. While you use a H323 gateway, the endpoints that you use are Skinny (SCCP) clients, so MTP resources are not necessary.

### Configure a Route Pattern in Cisco CallManager 4.0 to Use H.323 Gateway

Once the H.323 gateway is created, the next step is to configure Cisco CallManager to route calls toward it. This is done through these steps:

1. From the **Route Plan** menu, choose **Route Pattern/Hunt Pilot**.



2. Specify the values used to route calls to the H.323 gateway in the Route Pattern/Hunt Pilot Configuration window.

These are the required fields, which must be filled in order to add the Route Pattern:

- ◆ **Route Pattern/Hunt Pilot** Enter the route pattern/hunt pilot, including numbers and wildcards. For example, for North American Numbering Plan, enter **9.@** for typical local access, or **8XXX** for a typical private network numbering plan. When these digits are dialed, the Cisco CallManager routes them to the gateway.
- ◆ **Numbering Plan** North American Numbering Plan is the only option for Cisco CallManager 4.0.
- ◆ **Gateway or Route/Hunt List** Choose the gateway or route/hunt list for which you add a route pattern/hunt pilot. In this example, the gateway 10.10.10.5 is chosen.

**Note:** Information about the remaining fields, which are optional, can be obtained when you click **For this page** on the **Help** menu.

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## Route Pattern/Hunt Pilot Configuration

[Add a New Route Pattern/Hunt Pilot](#)  
[Back to Find/List Route Patterns and Hunt Pilots](#)

**Route Pattern/Hunt Pilot: 9.@**

Status: Update completed  
Note: Any update to this Route Pattern or Hunt Pilot automatically resets the associated gateway or Route/Hunt List

### Pattern Definition

Route Pattern/Hunt Pilot\*

Partition

Description

Numbering Plan\*

Route Filter

MLPP Precedence

Gateway or Route/Hunt List\*  [\(Edit\)](#)

Route Option  
 Route this pattern  
 Block this pattern

Provide Outside Dial Tone  Allow Overlap Sending  Urgent Priority

### Calling Party Transformations

Use Calling Party's External Phone Number Mask

Calling Party Transform Mask

Prefix Digits (Outgoing Calls)

Calling Line ID Presentation

Calling Name Presentation

### Connected Party Transformations

Connected Line ID Presentation

Connected Name Presentation

### Called Party Transformations

Discard Digits

Called Party Transform Mask

Prefix Digits (Outgoing Calls)

### ISDN Network-Specific Facilities Information Element

Carrier Identification Code

Network Service Protocol

Network Service	Service Parameter Name	Service Parameter Value
<input type="text" value="— Not Selected —"/>	<input type="text" value="&lt; Not Exist &gt;"/>	<input type="text"/>

\* indicates required item.

In this example, the Route Pattern uses the @ symbol, which is a macro for the more than 300 dialing patterns that make up the North American Numbering Plan. Calls that begin with a 9 are sent to gateway 10.10.10.5. Cisco CallManager provides the outside dialtone, and the Discard Digits field has been set to **None**, so that all digits are sent to the gateway.

# Configure a Cisco IOS Software Voice-enabled Router as an H.323 Gateway

In this example, the Cisco IOS Software router/gateway uses a T1 ISDN PRI trunk to the PSTN.

**Note:** This example uses a Cisco 2620 with a High Density Voice Network Module (HDV-NM) and a T1 Multi-Flex Trunk Voice/WAN card (VWIC-1MFT-T1). These Cisco IOS Software configuration guidelines can also be used with other Cisco IOS Software router/gateways that support T1/E1 voice interfaces. For more information, refer to Cisco Voice Modules and Interface Cards.

1. Because a T1-PRI is used in this example, it is necessary to define the ISDN switch type in the global configuration.

```
IOS-GWY(config)#isdn switch-type ?
  primary-4ess      AT&T 4ESS switch type for the U.S.
  primary-5ess      AT&T 5ESS switch type for the U.S.
  primary-dms100    Northern Telecom switch type for the U.S.
  primary-net5      European switch type for NET5
  primary-ni        National ISDN switch type
  primary-ntt       Japan switch type
  primary-ts014     Australia switch type
IOS-GWY(config)#isdn switch-type primary-ni
```

2. Configure the T1 controller for ISDN PRI signaling.

```
IOS-GWY(config)#controller t1 1/0

!--- This is the first VWIC port on NM-HDV.

IOS-GWY(config-controller)#framing esf
IOS-GWY(config-controller)#linecode b8zs
IOS-GWY(config-controller)#pri-group timeslots 1-24

!--- This defines the T1/PRI port for common channel signaling.
```

After you configure the **pri-group** command, the D-channel (interface serial 1/0:23) and the voice port (voice-port 1/0:23) are created automatically by the router.

3. Verify the ISDN D-channel (interface serial 1/0:23) configuration.

After you complete step 2, the **show running-configuration** command output should display the D-channel configuration as this output shows.

```
interface Serial1/0:23

!--- This is the D-channel for PRI.

no ip address
no logging event link-status
isdn switch-type primary-ni

!--- This switch-type takes precedence over the global.

isdn incoming-voice voice

!--- This defines incoming calls from PSTN as voice.

no cdp enable
```

**Note:** The relevant command under the interface serial 1/0:23 configuration is **isdn incoming-voice voice**.

#### 4. Configure dial-peer statements.

```
Router(config)#dial-peer voice 4000 voip

!--- The dial peer points to the Cisco CallManager.

Router(config-dial-peer)#destination-pattern 4...

!--- Route this pattern to the Cisco CallManager. The periods are
!--- wildcards, so they stand for 4000-4999.

Router(config-dial-peer)#session target ipv4:10.10.10.6

!--- This is the Cisco CallManager's IP address.

Router(config-dial-peer)#codec g711ulaw

!--- Use this codec.

Router(config-dial-peer)#dtmf-relay h245-alphanumeric

!--- Use Dual Tone Multifrequency (DTMF) Relay to transport DTMF digits.

Router(config-dial-peer)#incoming called-number 1234

!--- Match the call to this dial peer to utilize nondefault
!--- features such as G711.

Router(config)#dial-peer voice 1 pots

!--- The dial peer points to the PRI trunk to the PSTN.

Router(config-dial-peer)#destination-pattern 9T

!--- Route this pattern to the PSTN cloud through the T1/PRI.
!--- T is a wildcard for any digits.

Router(config-dial-peer)#direct-inward-dial

!--- Direct-inward-dial (DID) does not generate a secondary dialtone on
!--- incoming calls from PSTN.

!--- In order to use two stage dialing, remove DID from the dial peer.

Router(config-dial-peer)#port 2/0:23
```

The configuration described here routes incoming calls from the PSTN to any IP phone in the range 4000 through 4999, and all outbound calls to any number in the North American Numbering Plan. For more advanced call routing options and troubleshooting, see the issues in the Troubleshoot and Advanced Issues section.

## Troubleshoot and Advanced Issues

### Symptoms

This is a list of possible symptoms/resolutions you can encounter with this configuration:

- H.323 does not show as registered with the Cisco CallManager. This is normal behavior. You can use the H323 gateway, and it works even though it does not show as registered.

- Calls from the PSTN receive a secondary dial tone. Ensure that you add the **direct-inward-dial** command to the POTS dial-peer.
- Calls from the PSTN experience some delay before you hear a ringback tone. Disable the caller ID on the voice port to rule out any caller-ID cause.
- One-way audio is experienced. Bind the H.323 signaling to a specific IP address on Cisco IOS® Gateway. Refer to Troubleshooting One Way Voice Issues.
- No ringback tone on ISDN-VoIP (H.323) calls. Refer to Troubleshooting No Ringback Tone on ISDN-VoIP (H.323) Calls.
- An inbound call to Cisco CallManager gets a busy signal after the last digit dialed. Check for a missing codec statement. Refer to Busy Signal after Last Digit Dialed on H323 Incoming Call to Cisco CallManager with Missing Codec Statement.
- Unexpected behavior occurs for Direct-Inward-Dial (DID). Ensure that the inbound call matches the correct POTS dial-peer where the **direct-inward-dial** command is configured. Refer to Understanding Direct-Inward-Dial (DID) on IOS Voice Digital (T1/E1) Interfaces.

Troubleshoot Issues with H.323 Gateways
Troubleshooting One Way Voice Issues
Troubleshooting No Ringback Tone on ISDN-VoIP (H.323) Calls
Busy Signal after Last Digit Dialed on H323 Incoming Call to Cisco CallManager
Troubleshooting and Debugging VoIP Call Basics
Cisco CallManager 3.0 and H.323 Gateway Interaction Issues
Echo Analysis for Voice over IP
Advanced Issues
Configuring H323 Gateway Dial Peers for Cisco CallManager 3.x Server Redundancy
Understanding Dial Peers and Call Legs on Cisco IOS Platforms
Understanding Inbound and Outbound Dial Peers on Cisco IOS Platforms
Understanding Inbound and Outbound Dial Peers Matching on Cisco IOS Platforms
Understanding the Operational Status of Dial Peers on Cisco IOS Platforms
Understanding Direct-Inward-Dial (DID) on Cisco IOS Voice Digital (T1/E1) Interfaces
Supporting Variable Length Dial Plans for CallManager Route Patterns – an Exercise in Designing a Route Pattern that Covers a National Dial Plan

## Related Information

- [Voice Technology Support](#)
- [Voice and Unified Communications Product Support](#)
- [Troubleshooting Cisco IP Telephony](#) 
- [Technical Support – Cisco Systems](#)

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