

# Configuring VoIP Fax Relay Using CallManager and a Voice Gateway

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## Introduction

This document explains how to force fax calls to use Voice over IP (VoIP) Fax Relay rather than local hairpinning. This functionality is useful in a scenario that includes a Primary Rate ISDN (PRI) port accepting voice and fax calls. The voice calls are directed to IP phones and the fax calls are directed to Foreign Exchange Station (FXS) ports on the same router.

Local hairpinning of analog calls on a router without a time-division multiplexing (TDM) bus makes those calls subject to delay on the router backplane and Digital Signal Processor (DSP) buffers, and therefore unreliable. VoIP in general, and Fax Relay specifically, overcomes this problem for fax calls by terminating them directly on the router DSP.

This forced Fax Relay is accomplished when you route the incoming fax call setup to the Cisco CallManager server, and then immediately redirect it to the same gateway.

In summary, the gateway now terminates the fax call using Fax Relay on one leg, establishes a VoIP Fax Relay call between its voice cards routed through the Cisco CallManager, and then re-establishes the fax call on the FXS call leg.

**Note:** Only the call setup messages pass through the Cisco CallManager. After the VoIP call is established, data travels directly between the ingress and egress DSPs on the gateway voice cards.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

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

- Cisco CallManager versions 3.x and 4.x

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 the Cisco Technical Tips Conventions for more information on document conventions.

# Configure the Cisco CallManager Server to Route the Fax Calls

Use this procedure to configure the Cisco CallManager server to route the fax calls.

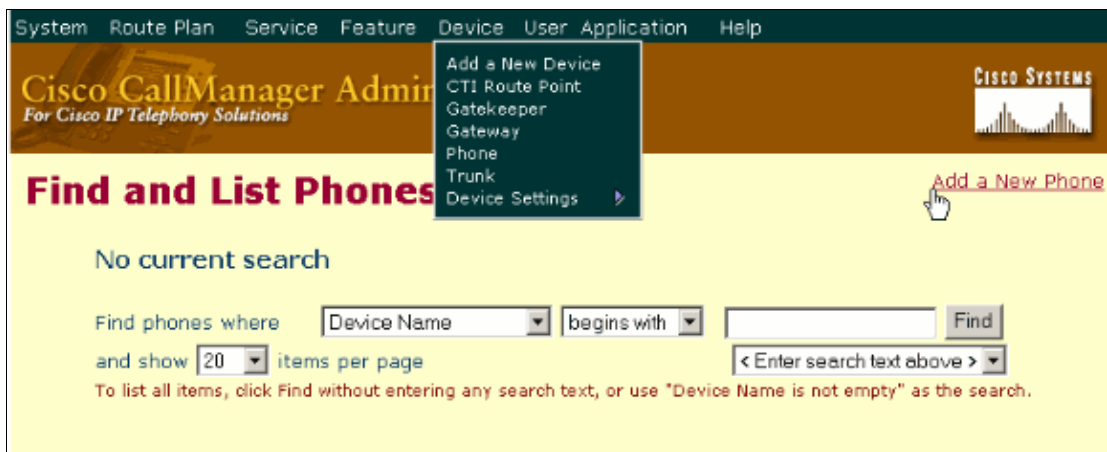
**Note:** The setup in this document makes use of Cisco CallManager 3.0. However, the concept is relevant for all versions of Cisco CallManager including 3.x and 4.x.

## Step-by-Step Instructions

Complete these steps to configure the Cisco CallManager server to route fax calls.

1. Select **Device > Phone > Add New Phone** to create a dummy extension.

In this case, Phone Type Cisco 30 VIP is used.



2. Insert a dummy MAC address in the MAC address field. For instance, 00AABBCCDDEE.
3. In the Button Template field, be sure to select a 30 VIP handset (it has plenty of line appearances) and insert it into the database.

System Route Plan Service Feature Device User Application Help

**Cisco CallManager Administration**  
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## Add a New Phone

Select the type of the phone you would like to create:

Phone type\*

Status: Ready

\* indicates required item

Assume these for the dummy extension (use any numbers that are available on your system):

- ◆ line 1 is extension 4444, call forward always to 5555
- ◆ line 2 is extension 4445, call forward always to 5556
- ◆ line 3 is extension 4446, call forward always to 5557
- ◆ line 4 is extension 4447, call forward always to 5558

The Call Forward Always settings route patterns that point back out to the H.323 gateway, specifically to the FXS ports. This forces the router to establish a VoIP call. Therefore, it should use Fax Relay to terminate the fax call on one leg and bridge it to the FXS call leg.

## Phone Configuration

[Add a new phone](#)  
[Back to Find/List Phones](#)

**Directory Numbers**

Lines can be added after the new phone is inserted in the database.

**Phone: New**

Status: Ready

**Phone Configuration (Model = Cisco 30 VIP)**

**Device Information**

MAC Address\*

Description

Device Pool\*  [\(View details\)](#)

Calling Search Space

AAR Calling Search Space

Media Resource Group List

User Hold Audio Source

Network Hold Audio Source

Location

**Phone Button Template Information**

Phone Button Template\*  [\(View button list\)](#)

**Firmware Load Information (leave blank to use default)**

Phone Load Name

\* indicates a required item.

[Back to top of page](#)  
[Back to Find/List Phones](#)

4. Click on the first line appearance and enter a dummy number in the Directory Number field. In this example 4444 is used. Then, enter a Forward All number that points back to the FXS destination pattern. This example uses 5555.

# Directory Number Configuration [Configure Device](#)

**Associated With**

SEP222222222222  
790E (Line 1)

**Directory Number: 4444**

Status: Ready  
Note: Any update to this Directory Number automatically resets the ass

**Directory Number**

Directory Number\*

Partition

**Directory Number Settings**

Voice Mail Profile   
(Choose <None> to use de

Calling Search Space

AAR Group

User Hold Audio Source

Network Hold Audio Source

Auto Answer

**Call Forward and Pickup Settings**

|             | Voice Mail                          | Coverage/<br>Destination          | Calling Se                                  |
|-------------|-------------------------------------|-----------------------------------|---|
| Forward All | <input checked="" type="checkbox"/> | <input type="text" value="5555"/> | <input type="text" value="&lt; None &gt;"/> |

5. In the VoIP world, route patterns are the equivalent of static routes. The only difference is that route patterns point to an E.164 number instead of an IP address. Create and insert a Route Pattern that matches the forward all number from the dummy extension and direct this to the H.323 gateway with the FXS ports (the H.323 gateway must have been added previously). In order to do this, go to the Route Plan menu and select **Route Plan > Route Pattern > Add a New Pattern**.

The screenshot shows the Cisco Unified Communications Manager Administration web interface. The top navigation bar includes 'System', 'Route Plan', 'Service', 'Feature', 'Device', 'User', 'Application', and 'Help'. A dropdown menu is open under 'Route Plan', listing options like 'Application Dial Rules', 'Partition', 'Calling Search Space', 'Route Filter', 'Route Group', 'Route List', 'Route Pattern', 'Translation Pattern', 'External Route Plan Wizard', and 'Route Plan Report'. The 'Route Pattern' option is highlighted. On the main page, the heading 'Route Patterns' is visible, and a link 'Add a New Route Pattern' is present. Below this, there is a search box with 'Find route patterns where' and 'and show 20 items per page'.

System Route Plan Service Feature Device User Application Help

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## Route Pattern Configuration

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

**Route Pattern: New**  
Status: Ready  
Note: Any update to this route pattern automatically resets the associated gateway/route list

Insert

**Pattern Definition**

Route Pattern\*

Partition

Description

Numbering Plan\*

Route Filter

Gateway/Route List\*

Route Option  Route this pattern  Block this pattern

Provide Outside Dial Tone  Urgent Priority

**Calling Party Transformations**

Use Calling Party's External Phone Number Mask

Calling Party Transform Mask

Prefix Digits (Outgoing Calls)

Calling Party Presentation

- Go back to the Dummy Extension Configuration page and add a new line number, (for example, 4445) and call forward all numbers (5556). Create a new Route Pattern that matches the Call Forward All number and points to the H.323 gateway. Repeat this for each fax line you have.

## Configure the Gateway

On the gateway, create these VoIP and plain old telephone server (POTS) dial-peers:

```

!
dial-peer voice 1 voip
 destination-pattern 444.

!--- Wildcard match for 444X numbers.

 session target ipv4:172.16.1.252
 codec g711ulaw
 ip precedence 5
 dtmf-relay h245-alpha
!
dial-peer voice 5555 pots
 destination-pattern 5555
 port 1/0/0
!
dial-peer voice 5556 pots
 destination-pattern 5556
 port 1/0/1
!
dial-peer voice 5557 pots
 destination-pattern 5557
 port 1/1/0

```

```
!  
dial-peer voice 5558 pots  
  destination-pattern 5558  
  port 1/1/1
```

You should now be able to receive fax calls on your system.

## Verify

Use the **show voice call summary** command to verify the change of the codec when the fax call is processed by the DSP.

Certain **show** commands are supported by the Output Interpreter Tool ( registered customers only) , which allows you to view an analysis of **show** command output.

## Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

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## Related Information

- [Configuring Cisco Fax Relay](#)
  - [Fax Relay Troubleshooting Guide](#)
  - [Configuration on a Cisco WS-X6624 with an H.323 Gateway](#)
  - [Voice Technology Support](#)
  - [Voice and IP Communications Support](#)
  - [Troubleshooting Cisco IP Telephony](#)
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