



# Configuring Fax Detection

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## Configuring Fax Detection

This chapter describes configuration for the fax detection (single-number voice and fax) feature on an IP network. Fax detection is the capability to detect automatically whether an incoming call is voice or fax.

### History for the Fax Detection Feature

Release	Modification
12.1(5)XM	This feature was introduced on the Cisco AS5300.
12.2(2)XB	This feature was implemented on the Cisco AS5350 and Cisco AS5400.
12.2(8)T	This feature was integrated into this release and implemented on the Cisco 1751, Cisco 2600 series, Cisco 3600 series, Cisco 3725, and Cisco 3745.
12.2(11)T	This feature was implemented on the Cisco AS5300, Cisco AS5350, and Cisco AS5400.
12.4(4)T	This feature was integrated into Cisco IOS release 12.4(4)T.

### Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for Configuring Fax Detection

Before you configure fax detection, perform the following tasks:

- Configure your IP network and ensure that it is operational.
- Install a voice server and ensure that it is working on the IP network; for example, install an H.323 voice-mail server on your network and configure the corresponding outgoing dial peer for VoIP.
- Install fax service and ensure that it is working on the IP network. The fax service can be T.38 fax relay, T.37 store-and-forward fax, or both. By making sure that the fax service is operational before beginning to configure the fax detection application, you can keep fax configuration issues separate and make troubleshooting easier.
  - For information about T.38 fax relay, see the chapter “Configuring T.38 Fax Relay.”
  - For more information about T.37 store-and-forward fax, see the chapter “Configuring T.37 Store-and-Forward Fax.”

## Restrictions for Configuring Fax Detection

The restrictions for fax detection are as follows:

- Prior to TCL IVR script `app_fax_detect.2.1.2.3.tcl` (dated April 3, 2009), Cisco’s fax detection TCL-IVR scripts only support T.37 store-and-forward fax. Beginning with TCL IVR script `app_fax_detect.2.1.2.3.tcl` (dated April 3, 2009), T.38 fax relay is also supported.

**Note**

Although the TCL-IVR scripts have built-in customization options, we recommend that you contact Cisco Developer Support before you add specific IVR prompts. For more information, see the "Developer Support" section on page 23 .

- For TI-549 DSPs, only high-complexity VCWare is supported.
- Cisco’s fax detection feature relies on the originating gateway’s ability to detect the fax identifying either the CNG tone from the called fax machine or a user-initiated action, such as the caller pressing a DTMF digit, to identify a fax call. The following are known issues with fax machines that support fax detection:
  - Certain fax machines, produced before 1995, do not produce the required tone.
  - Fax machines that allow callers to talk before sending a fax temporarily stop the CNG detection when voice is heard. If the tone is not played every 3.5 seconds, the fax detection script on the originating gateway might not detect the fax and the call is not transferred to the terminating fax device.
  - If a single number script call is answered by a person instead of a fax machine, the fax might not be detected and is not transferred.
  - Certain routing schemes, such as call forwarding, might impact the success of fax detection.

## Information About Fax Detection

Voice gateway dial peers for the fax detection application include an inbound dial peer to receive calls from the PSTN and at least two outbound dial peers, one for voice calls and one for fax, as explained in the following paragraphs.

The inbound dial peer describes the inbound call leg from the telephony connection to the gateway, and is called a plain old telephone service (POTS) dial peer. POTS dial peers define the characteristics of the telephony (PSTN) connection between the sending fax device or voice instrument and the gateway to the IP network. In general, the gateway uses the line characteristics defined by POTS dial peers to determine call type and call destination. The gateway then finds an outbound dial peer whose configured parameters match these attributes and routes the call to it. You can establish more than one POTS dial peer if you want different incoming calls to receive different handling. The fax detection application is enabled on the inbound dial peer.

One of the two types of outbound dial peers in the gateway router is the outbound Voice-over-IP (VoIP) dial peer, which describes the VoIP call leg from the router to the voice-mail server or voice path. You configure this dial peer exactly as you would configure an ordinary VoIP dial peer for voice calls.

The second type of outbound dial peer on the on-ramp gateway must be a fax dial peer. The fax dial peer can be either a Multimedia Mail over IP (MMoIP) dial peer, which describes an IP call leg for store-and-forward fax, or a VoIP dial peer configured for T.38 fax relay. The MMoIP dial peer is configured with the `fax_on_vfc_onramp_app` IVR application in the outbound mode, just the same as the standard configuration for store-and-forward fax. The VoIP dial peer for fax is configured exactly the same as the standard configuration for fax relay; no IVR application is required on this dial peer.

## Fax Detection Modes

Fax detection supports the use of a single E.164 number for both voice mail and fax mail by providing the capability to detect automatically whether an incoming call is voice or fax. Fax detection can be configured to use the distinctive fax calling tones (CNG), a manually dialed digit, or both to distinguish fax calls from voice calls. Fax detection supports the following modes of operation:

The fax detection modes are explained in the following sections.

### Connect-First Mode

(Default) When you configure connect-first mode on the gateway, incoming calls are connected immediately to the voice-mail server, which plays a greeting, or audio prompt, based upon the number called. Because this greeting is generated by the voice-mail application rather than by the gateway, each E.164 number can have its own custom prompt.

The gateway listens for distinctive CNG (fax) tones during the prompt and for the remainder of the call. If the gateway hears CNG at any time, the voice-mail application is disconnected and the call is passed on to the fax relay or store-and-forward fax application, depending on which was configured on the gateway. Note that non-CNG faxes are not supported in this mode.

If any dialed digits, or DTMF tones, are detected during the call, they are relayed to the voice-mail server using the DTMF signaling protocol configured on the dial peer. The gateway does not listen for DTMF and does not interpret DTMF.

The connect-first mode is useful when you expect that most incoming calls will be voice. The cost of this mode is the added load on the voice-mail application, which is now required to answer fax calls also.

This mode is the default if no mode is configured.

### Listen-First Mode

When listen-first mode is configured on the gateway and an incoming call is received, the gateway can play a configurable audio prompt to greet the caller or provide instructions.



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**Note** If an audio file for this prompt has not been specified during configuration, the caller hears 9 seconds of silence. We recommend configuring a prompt.

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The gateway listens for CNG for 9 seconds before passing the call to an application or server. If CNG is detected, the call is passed to the fax relay or store-and-forward fax application, whichever is configured on the gateway. If CNG is not heard during the first 9 seconds, the call is passed to the voice-mail server. Non-CNG faxes are not supported in this mode.

If any DTMF tones are detected, the call is connected to the voice server. Once a call is connected to the voice server, DTMF tones are relayed using the DTMF signaling protocol that has been configured on the dial peer.

In listen-first mode, CNG fax calls are never automatically connected to the voice-mail server, so this mode is useful when CNG fax calls constitute a significant proportion of the calls to this E.164 number.

### Default-Voice Mode

When default-voice mode is configured on the gateway and an incoming call is received, the gateway can play a configurable audio prompt to greet the caller or provide instructions.



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**Note** If the audio file for this prompt has not been specified during configuration, the caller hears 9 seconds of silence. We recommend configuring a prompt.

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In default-voice mode, during configuration you can specify a DTMF digit for incoming callers to press to manually select the voice-mail server and another digit that they can press to select the fax application. When the gateway detects either of these configured DTMF digits, the call is connected as requested.

The gateway listens for CNG for 9 seconds before passing the call to an application. If CNG is detected, the call is passed to the fax relay or store-and-forward fax application, whichever is configured on the gateway. If CNG is not heard during the first 9 seconds, the call is passed to the voice-mail server.

If any DTMF tones are detected, the gateway interprets the DTMF. If the tones match the DTMF digit configured for voice, the call is passed to the voice-mail server. If the tones match the DTMF digit configured for fax, the call is passed to the fax application. If the tones do not match either the voice or fax digit, the prompt is replayed. Once a call has been connected to the voice server, subsequent DTMF tones are relayed using the DTMF signaling protocol that has been configured on the dial peer.

Non-CNG-compliant faxes are supported in the default-voice mode when the caller manually selects the fax application by pressing the keypad key to send the DTMF digit designated for fax.

### Default-Fax Mode

When default-fax mode is configured on the gateway and an incoming call is received, the gateway can play a configurable audio prompt to greet the caller or provide instructions.



**Note** If the audio file for this prompt has not been specified during configuration, the caller hears 9 seconds of silence. We recommend configuring a prompt.

During configuration you can specify a DTMF digit that incoming callers can press to manually select the voice-mail server and another digit that they can press to select the fax application. When the gateway detects either of these configured DTMF digits, the call is immediately connected as requested.

The gateway listens for CNG for 9 seconds before passing the call to an application. If CNG is detected, the call is passed to the fax relay or store-and-forward fax application, whichever is configured on the gateway. If CNG is not heard during the first 9 seconds, the call is passed to the fax relay or store-and-forward fax application.

If any DTMF tones are detected, the gateway interprets the DTMF. If the tones match the DTMF digit configured for voice, the call is passed to the voice-mail server. If the tones match the DTMF digit configured for fax, the call is passed to the fax application. If the tones do not match either the voice digit or the fax digit, the prompt is replayed. Once a call has been connected to the voice server, subsequent DTMF tones are relayed using the DTMF signaling protocol that has been configured on the dial peer.

The default-fax mode is useful when fax calls constitute a significant proportion of the calls. In addition, this mode supports non-CNG-compliant faxes, without requiring the manual activation of a DTMF tone.

## Audio Prompts

All of the fax detection modes except connect-first require you to install audio prompt files, or greetings, to tell callers how to send voice or fax to the called number. Default audio prompt files are included in the same zip file on Cisco.com that contains the TCL script. You may also create your own audio prompts to customize the greeting. In either case, the audio files must be installed in a location that is accessible by the gateway. The wording of the default gateway prompts is shown in the table below.

**Table 1: Fax Detection Default Prompts**

Mode	Default Prompt	Audio Filename
listen-first	To send a fax, press the <b>Start</b> key on your fax machine now.  For voice calls, press any key or stay on the line.	<ul style="list-style-type: none"> <li>• en_listen_first.au (English)</li> <li>• en_Uone_listen-first.au (English; same voice as prompts for Cisco uOne voice messaging service)</li> <li>• ch_listen_first.au (Mandarin)</li> <li>• sp_listen_first.au (Spanish)</li> </ul>
default-voice	To send a fax, press <b>2</b> , then press the <b>Start</b> key on your fax machine.  For voice calls, press <b>1</b> or stay on the line.	<ul style="list-style-type: none"> <li>• en_default_voice.au (English)</li> <li>• en_Uone_default-voice.au (English; same voice as prompts for Cisco uOne voice messaging service)</li> <li>• ch_default_voice.au (Mandarin)</li> <li>• sp_default_voice.au (Spanish)</li> </ul>

Mode	Default Prompt	Audio Filename
default-fax	For voice calls, press <b>1</b> .  To send a fax, press the <b>Start</b> key on your fax machine now.	<ul style="list-style-type: none"> <li>• en_default_fax.au (English)</li> <li>• en_Uone_default-fax.au (English; same voice as prompts for Cisco uOne voice messaging service)</li> <li>• ch_default_fax.au (Mandarin)</li> <li>• sp_default_fax.au (Spanish)</li> </ul>

## How to Download the Fax-Detection Application and Default Audio-Prompt Files

This section describes how to download the TCL script and default audio prompt files used with the fax detection application. You must download these files before you can configure the fax detection application. The script and the prompts are contained in a single zip file on Cisco.com.

The Cisco IOS File System (IFS) reads the files, so any IFS-supported URL can be used as a location for the files. URLs can include TFTP, FTP, or a pointer to a device on the router. For more information, see the *TCL IVR API Version 2.0 Programmer's Guide*.

### SUMMARY STEPS

1. Log in to the Cisco website and go to <http://www.cisco.com/cgi-bin/tablebuild.pl/tclware>.
2. Select and download the following zip file which contains the fax detection application.
3. Unzip the file.
4. Move the application script file (app\_fax\_detect.2.1.2.3.tcl) and audio prompt files (\*.au) to a location that can be accessed by your gateway using a URL address.
5. If you create your own audio files, ensure that they are in the proper format.

### DETAILED STEPS

**Step 1** Log in to the Cisco website and go to <http://www.cisco.com/cgi-bin/tablebuild.pl/tclware>.

When you are logged in to the Cisco website, you can navigate to the TCLWare page from the Cisco home page by following this path: Technical Support / Software Center / Access Software / TCLWare.

**Step 2** Select and download the following zip file which contains the fax detection application.

You are asked for the following information:

- Cisco Connection Online (CCO) server nearest your physical location
- Where to save the files on your disk

**Step 3** Unzip the file.

The zip file that you download includes the following files:

- Fax detection application TCL script file (app\_fax\_detect.2.1.2.3.tcl or a later version)

- Default audio prompt files.
- README file

**Step 4** Move the application script file (`app_fax_detect.2.1.2.3.tcl`) and audio prompt files (`*.au`) to a location that can be accessed by your gateway using a URL address.

The URL of a TCL script or audio prompt is a standard URL that points to the location of the script. Examples include the following:

- `flash:myscript.tcl`--The script called `myscript.tcl` is located in Flash memory on the router.
- `slot0:myscript.tcl`--The script called `myscript.tcl` is located in a device in slot 0 on the router.
- `tftp://BigServer/myscripts/MouseTrap.tcl`--The script called `MouseTrap.tcl` is located in a server called `BigServer` in a directory within the `tftpboot` directory called `myscripts`.

**Step 5** If you create your own audio files, ensure that they are in the proper format.

The IVR prompts require an audio file format (`.au`) with 8-bit, u-law, and 8-kHz encoding. To encode the audio files, it is recommended that one of the following two audio tools (or a similar tool of comparable quality) be used:

- Cool Edit, manufactured by Syntrillium Software Corporation.
- AudioTool, manufactured by Sun Microsystems.

The default files supplied by Cisco are in the proper format.

**Note** Flash memory is limited to 32 entries, which may prevent your loading all TCL and audio files there.

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## How to Load the Fax Detection Application

Fax detection is an IVR application that is written in a TCL script. The script must be downloaded from Cisco.com and installed on your network before the fax detection application can be loaded on the gateway. After you have installed the script at a location that is accessible by the gateway, load it using a name of your choice.



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**Note** All subsequent commands that refer to the fax detection application use the name that you select when you load the application on the gateway.

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### Before you begin

This section describes the prerequisites for configuring fax detection.

- Download the fax detection application script named `app_fax_detect.2.1.2.3.tcl` to your TFTP server.

The `app_fax_detect.2.1.2.3.tcl` script is used to automatically route single-number fax calls to an MMoIP dial peer when configured in a T.37 fax store-and-forward environment or to a VoIP dial peer in a T.38 fax relay environment. The script automatically appends a prefix to the dialed digits for the fax call, allowing the router to match the call to the appropriate user-defined dial peer based on its "new" destination pattern.

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **application**
4. **service** *service-name location*

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Router&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Router# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>application</b> <b>Example:</b> <pre>Router(config)# application</pre>	Enters application configuration mode to configure voice applications and services.
<b>Step 4</b>	<b>service</b> <i>service-name location</i> <b>Example:</b> <pre>Router(config-app)# service fax_detect flash:app_fax_detect.2.1.2.2.tcl</pre>	Loads a VoiceXML document or Tcl script and defines its application name. <ul style="list-style-type: none"> <li>• <i>service name location</i> --Directory and filename of the Tcl script or VoiceXML document in URL format. For example, Flash memory (flash:filename), a TFTP (tftp://../filename) or an HTTP server (http://../filename) are valid locations.</li> </ul>

**How to Configure Fax Detection for a Voice Gateway**

Use the following tasks to configure the fax detection application on the voice gateway:



**Note** Starting with Cisco IOS Release 12.3(14)T, the **call application voice** configuration commands were restructured. This application guide uses the new command structure.



**Note** These configuration tasks assume that your network uses separate routers for a voice gateway running a TCL IVR script and for a remote, terminating gateway. For smaller networks that use a single router for both of these functions, configure the following tasks on the same router.



## Configuring Fax Detection on the Voice Gateway Running a TCL IVR Script

Perform the following task to configure fax detection on the voice gateway running a TCL IVR script.



**Note** The commands in this section configure an IVR application, and they are not supported by Cisco IOS help. If you type **param mode ?**, for example, the Cisco IOS help does not supply a list of entries that are valid in place of the question mark, because the IVR application commands pass parameters to the named TCL script, rather than to the Cisco IOS software.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **application**
4. **service *service-name location***
5. **param mode {connect-first | default-fax | default-voice | listen-first}**
6. **param prompt *prompt-url***
7. **param voice-dtmf {0|1|2|3|4|5|6|7|8|9|\*|#}**
8. **param fax-dtmf {0|1|2|3|4|5|6|7|8|9|\*|#}**
9. **param fax-prefix {0|1|2|3|4|5|6|7|8|9|\*|#}**
10. **param account-id-method {none | ani | dnis | gateway}**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>application</b> <b>Example:</b> Router(config)# application	Enters application configuration mode to configure voice applications and services.
<b>Step 4</b>	<b>service <i>service-name location</i></b> <b>Example:</b> Router(config-app)# service fax_detect flash:app_fax_detect.2.1.2.2.tcl	Loads a VoiceXML document or Tcl script and define its application name. <ul style="list-style-type: none"> <li>• <i>service-name</i> --Name that identifies the voice application. This is a user-defined name and does not have to match the script name.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <i>location</i> --Directory and filename of the Tcl script or VoiceXML document in URL format. For example, Flash memory (flash:filename), a TFTP (tftp://./filename) or an HTTP server (http://./filename) are valid locations.</li> </ul>
<b>Step 5</b>	<p><b>param mode</b> {connect-first   default-fax   default-voice   listen-first}</p> <p><b>Example:</b></p> <pre>Router(config-app)# param mode default-fax</pre>	<p>(Optional) Sets the mode of the fax detection application to one of the four available modes.</p> <ul style="list-style-type: none"> <li>• <b>connect-first</b> --Connects the call to the voice application and then listens for CNG. This is the default.</li> <li>• <b>default-fax</b> --Listens for CNG or DTMF and then connects; defaults to fax if no CNG or DTMF is heard</li> <li>• <b>default-voice</b> --Listens for CNG or DTMF and then connects; defaults to voice if no CNG or DTMF is heard</li> <li>• <b>listen-first</b> --Listens for CNG; if not detected, connects to voice.</li> </ul>
<b>Step 6</b>	<p><b>param prompt</b> <i>prompt-url</i></p> <p><b>Example:</b></p> <pre>Router(config-app)# param prompt tftp://BigServer/myscripts/detect.au</pre>	<p>(Optional) Specifies the audio file to use when the fax detection application is called.</p> <ul style="list-style-type: none"> <li>• <i>prompt-url</i> --URL or IFS on the TFTP server of the audio file containing the prompt.</li> </ul> <p><b>Note</b> The audio file is used only in listen-first, default-voice, and default-fax modes.</p>
<b>Step 7</b>	<p><b>param voice-dtmf</b> {0 1 2 3 4 5 6 7 8 9 * #}</p> <p><b>Example:</b></p> <pre>Router(config-app)# param voice-dtmf 3</pre>	<p>(Optional) Specifies the key that a calling party should press to indicate a voice call when the fax detection application is operating in default-voice or default-fax mode.</p> <ul style="list-style-type: none"> <li>• <b>0</b> through <b>9</b>, <b>*</b>, <b>#</b>--Key to dial for a voice call. The default key is 1.</li> </ul> <p><b>Note</b> This key must be different than the key configured for fax calls.</p>
<b>Step 8</b>	<p><b>param fax-dtmf</b> {0 1 2 3 4 5 6 7 8 9 * #}</p> <p><b>Example:</b></p> <pre>Router(config-app)# param fax-dtmf 4</pre>	<p>(Optional) Specifies the key that a calling party should press to indicate a fax call when the fax detection application is operating in default-voice or default-fax mode.</p> <ul style="list-style-type: none"> <li>• <b>0</b> through <b>9</b>, <b>*</b>, <b>#</b>--Key to dial for a fax call. The default key is 2.</li> </ul>

	Command or Action	Purpose
		<b>Note</b> This key must be different than the key configured for voice calls.
<b>Step 9</b>	<b>param fax-prefix</b> {0 1 2 3 4 5 6 7 8 9 * #} <b>Example:</b> <pre>Router(config-app)# param fax-prefix 3</pre>	(Optional) Specifies the key that is to be added to the called telephone number (DNIS) by the fax detection application when you want to direct a fax call as a T.38 fax relay session instead of a T.37 onramp session.
<b>Step 10</b>	<b>param account-id-method</b> {none   ani   dnis   gateway} <b>Example:</b> <pre>Router(config-app)# param account-id-method ani</pre>	(Optional) Specifies the method to assign an account identifier for the fax detection application. <ul style="list-style-type: none"> <li>• <b>none</b> --No account identifier is assigned. This is the default.</li> <li>• <b>ani</b> --Calling telephone number is the account identifier.</li> <li>• <b>dnis</b> --Called telephone number is the account identifier.</li> <li>• <b>gateway</b> --Gateway host and domain names form the account identifier.</li> </ul>

## Configuring Dial Peers on the Voice Gateway Running a TCL IVR Script

Configuration of dial peers for fax detection is described in the following sections:

### Configuring One or More Inbound POTS Dial Peers

The purpose of configuring inbound POTS dial peers on the on-ramp gateway is to associate a destination pattern and call type with each incoming call so that the call is properly routed to an outbound dial peer. The fax detection application is enabled on inbound POTS dial peers to assign call types by distinguishing between fax and voice calls.



**Note** When configuring store-and-forward fax on on-ramp gateways that have voice DSPs, do not configure the **information-type fax** command on the POTS dial peer. If this command is configured, fax calls fail.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **dial-peer voice** *tag* **pots**
4. **application** *application-name*
5. **direct-inward-dial**
6. **incoming called-number** *string*

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Router&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Router# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>dial-peer voice tag pots</b> <b>Example:</b> <pre>Router(config)# dial-peer voice 77 pots</pre>	Enters dial-peer configuration mode and defines a local dial peer that directs traffic to or from a POTS interface. <ul style="list-style-type: none"> <li>• <i>tag</i> --Dial-peer identifier that consists of one or more digits. Range: 1 to 2147483647.</li> <li>• <i>pots</i> --Specifies that this dial peer directs traffic to or from a POTS interface.</li> </ul>
<b>Step 4</b>	<b>application application-name</b> <b>Example:</b> <pre>Router(config-dial-peer)# application detect-app</pre>	Associates the fax detection application with the dial peer.
<b>Step 5</b>	<b>direct-inward-dial</b> <b>Example:</b> <pre>Router(config-dial-peer)# direct-inward-dial</pre>	Enables the Direct Inward Dialing (DID) call treatment for incoming called numbers, in which the entire incoming dial string is used to find a matching outbound dial peer. The gateway does not present a dial tone to the caller and does not collect digits; the setup message contains all the digits necessary to route the call.
<b>Step 6</b>	<b>incoming called-number string</b> <b>Example:</b> <pre>Router(config-dial-peer)# incoming called-number 14085557896</pre>	Defines the called number (dialed number identification service or DNIS) string. The called number is used to match the incoming call leg to an inbound dial peer. <ul style="list-style-type: none"> <li>• <i>string</i> --Incoming called telephone number. Valid entries are any series of digits that specify the E.164 telephone number.</li> </ul>

## Configuring One or More Outbound VoIP Dial Peers for Voice

The purpose of configuring an outbound VoIP dial peer is to provide call handling for voice calls that enter the packet network. The outbound VoIP dial peer for voice defines the characteristics of the IP connection between the gateway and the voice messaging application or IP voice path.



**Note** If you already configured an outgoing VoIP dial peer for voice calls with the appropriate destination pattern when you set up your VoIP network, you do not have to configure another dial peer for voice calls; there are no different parameters for the fax detection application.

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **dial-peer voice tag voip**
4. **destination-pattern** *[+]string[T]*
5. **dtmf-relay h245-signal**
6. **fax rate disable**
7. **session target** {*ipv4: destination-address* | **dns:** {*\$d\$. | \$e\$. | \$s\$. | \$u\$.*}*host-name*} | **ras**}

**DETAILED STEPS**

	Command or Action	Purpose
Step 1	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>dial-peer voice tag voip</b> <b>Example:</b> Router(config)# dial-peer voice 37 voip	Enters dial-peer configuration mode and defines a dial peer that directs traffic to or from a packet network. <ul style="list-style-type: none"> <li>• <b>tag</b> --Dial-peer identifier that consists of one or more digits. Range: 1 to 2147483647.</li> <li>• <b>voip</b> --Calls from this dial peer use voice encapsulation on the packet network.</li> </ul>
Step 4	<b>destination-pattern</b> <i>[+]string[T]</i> <b>Example:</b> <b>Example:</b> Router(config-dial-peer)# destination-pattern 14085556688	Specifies a pattern that represents either the prefix or the full E.164 telephone number (depending on your dial plan) that identifies the destination telephone number. This pattern of numbers should fall within the pattern of numbers that was configured as the incoming called number on the inbound POTS dial peer. <ul style="list-style-type: none"> <li>• <b>+ --(Optional) Plus sign</b> indicates that an E.164 standard number follows. The plus sign (+) is not supported on the Cisco MC3810.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <i>string</i> --E.164 or private dialing plan telephone number. Valid entries are the digits 0 through 9, the letters A through D, and the following special characters: <ul style="list-style-type: none"> <li>• Asterisk (*) and pound sign (#) that appear on standard touch-tone dial pads. These characters cannot be used as leading characters in a string (for example, *650).</li> <li>• Comma (,), which inserts a pause between digits.</li> <li>• Period (.), which matches any entered digit (this character is used as a wildcard). The period cannot be used as a leading character in a string (for example, .650).</li> </ul> </li> <li>• <b>T</b> --(Optional) Timer, or control, character indicates that the destination-pattern value is a variable-length dial string. Instructs the router to collect dialed digits until the interdigit timer expires (10 seconds, by default) or until a termination character (#, by default) is dialed. The timer character must be a capital T.</li> </ul>
<b>Step 5</b>	<b>dtmf-relay h245-signal</b> <b>Example:</b> <pre>Router(config-dial-peer)# dtmf-relay h245-signal</pre>	Forwards dual tone multifrequency (DTMF) tones by using the H.245 "signal" User Input Indication method to compress the tones at one end of the call and decompress them at the other end. Supports tones 0 through 9, *, #, and A through D.
<b>Step 6</b>	<b>fax rate disable</b> <b>Example:</b> <pre>Router(config-dial-peer)# fax rate disable</pre>	Disables fax relay transmission capability on this dial peer.
<b>Step 7</b>	<b>session target {ipv4: destination-address   dns: {Sd\$.   Se\$.   Ss\$.   Su\$.}host-name}   ras}</b> <b>Example:</b> <pre>Router(config-dial-peer)# session target dns: Sd\$.faxserver.abcinc.com</pre>	Designates a network-specific address to receive calls from this dial peer. <ul style="list-style-type: none"> <li>• <b>ipv4:</b> --Argument that follows is an IP address.</li> <li>• <i>destination-address</i> --String that contains the IP address of the network-specific address to receive calls from this dial peer.</li> <li>• <b>dns:</b> --Argument that follows is a router host name to be resolved by the domain name server.</li> <li>• <b>Sd\$.</b> --Wildcard to be replaced by the destination (called) number, followed by a period (.)</li> <li>• <b>Se\$.</b> --Wildcard to be replaced by the digits in the called number in reverse order with periods added between the digits, followed by a period (.)</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>\$s\$.</b> --Wildcard to be replaced by the source destination pattern, followed by a period (.).</li> <li>• <b>\$u\$.</b> --Wildcard to be replaced by the unmatched portion of the destination pattern (such as a defined extension number), followed by a period (.).</li> <li>• <i>host-name</i> --String that contains the host name of the network-specific address to receive calls from this dial peer.</li> <li>• <b>ras</b> --(H.323 only) Registration, Admission, and Status (RAS) signaling function protocol is being used, and a gatekeeper should be consulted to translate the E.164 address into an IP address.</li> </ul>

### Configuring One or More Outbound VoIP Dial Peers for T.38 Fax Relay

The purpose of configuring an outbound VoIP dial peer for T.38 fax relay is to enable call handling from the voice gateway running a TCL IVR script to a destination in the packet network. For fax relay, this destination is typically an incoming dial peer on a remote, terminating gateway. If you are configuring T.38 fax relay as the fax component of your fax detection application, see the "Configuring One or More Individual VoIP Dial Peers for T.38 Fax Relay" section on page 10 .

### Configuring One or More Outbound MMoIP Dial Peers for T.37 Store-and-Forward Fax

The purpose of configuring an outbound MMoIP dial peer for store-and-forward fax is to enable call handling from the voice gateway running a TCL IVR script to a destination in the packet network. For store-and-forward fax, this destination is typically an SMTP or ESMTP server.

### Terminating a Fax Detection Call

The fax detection application requires that you configure a remote, terminating gateway if you are handling calls that exit the packet network to the PSTN, as follows:

- Voice calls--If you have voice calls that are not terminated on the packet network, configure inbound dial VoIP dial peers and outbound POTS dial peers on a gateway using standard commands for voice networks.
- Fax relay calls--If you have fax relay calls that are exiting the packet network to the PSTN, follow the instructions for configuring a gateway in the chapter "Configuring T.38 Fax Relay."
- Store-and-forward fax calls--If you have store-and-forward fax calls that are exiting the packet network to the PSTN, follow the instructions for configuring an off-ramp gateway in the chapter "Configuring T.37 Store-and-Forward Fax."

### Troubleshooting Tips

Use the following tips to help resolve problems that keep fax detection from working correctly.

- Ensure that you are using a Cisco IOS software release that supports fax detection. For more information, see Cisco Feature Navigator at <http://www.cisco.com/go/fn>.

- Before configuring fax detection, make sure that your voice application is functional by putting a series of calls through.
- Before configuring fax detection, make sure that your fax application is functional by sending a series of faxes.
- After configuring fax detection, issue the **debug voip ivr script** command to display debug information from the fax detection script. Then, put through a series of voice calls and fax calls to ensure correct operation. The debug output that is displayed when you put calls through is indispensable for diagnosing failing calls and finding the source of a problem. It is the only way to verify that parameters are set to the values that you want and that they are actually taking effect. Also note that mistakes such as typing errors in command-line interface (CLI) parameters (for example, typing "moode" for "mode") are not recognized as errors by Cisco IOS software. They are accepted without complaint when typed, yet cannot have the desired effect during operation. It is only by watching the debug output during operation that you find these mistakes.
- Make sure that you have configured different DTMF digits for fax and for voice. If you configure both to be the same number, you are not notified immediately as with other Cisco IOS command errors. You find this error only if the **debug voip ivr script** command is enabled before a failing call comes in.

Use the following **show** commands to troubleshoot fax detection:

- **show dial-peer voice** [*tag*] [**summary**]**--**Displays configuration information for MMoIP, VoIP, and POTS dial peers to help you verify that dial peers are properly configured for all legs of voice and fax calls.
- **show call application voice summary** **--**Lists all voice applications that are loaded on the router to help you confirm that the scripts that you are interested in are loaded.
- **show call application voice** *application-name* **--**Displays the line-by-line contents of the TCL script associated with the specified application.

## Configuration Example for Fax Detection

### Fax Detection Example

This example uses both fax relay and store-and-forward fax on different dial peers. It is a basic configuration for T1 fax detection for incoming calls to any 4-digit DNIS with the leading digit 7. The mode is default-fax, an audio file that contains a voice prompt and DTMF digits to select voice and fax routing is specified, and the application is called fax\_detect on the gateway. The account identifier is the router-specific name derived from the host name and domain name. Two fax applications have been configured, and calls are routed to one or the other based on dialed number (DNIS). One fax application is fax relay, which is configured on an outbound VoIP dial peer; the other is store-and-forward fax, which has been configured on an outbound MMoIP dial peer.

A gateway with this configuration handles voice and fax calls as follows:

- Answers all calls to 7xxx (4-digit DNIS starting with 7) with the fax\_detect application.
- Routes voice calls with 4-digit DNIS of 7xxx to VoIP dial peer 2 (voice).
- Routes fax calls with 4-digit DNIS of 71xx to MMoIP dial peer 3 (store-and-forward).
- Routes fax calls with 4-digit DNIS of 72xx to VoIP dial peer 4 (fax relay).



This example includes configuration of a unified communications (UC) server and a gatekeeper, which is described in the *Cisco IOS H.323 Configuration Guide*.

```

!
version 12.1
service timestamps debug datetime localtime
service timestamps log datetime localtime
no service password-encryption
!
hostname zebra
!
!
resource-pool disable
!
!
clock timezone AEST 10
ip subnet-zero
ip domain-name cisco.com
!
isdn switch-type primary-5ess
call rsvp-sync
!
! IVR script configuration for fax detection
application
service
application voice fax_detect tftp://10.1.1.1/eng/tcl/app_fax_detect.2.1.2.3.tcl
call application voice fax_detect prompt tftp://10.1.1.1/eng/prompts/en_default_fax.au
call application voice fax_detect mode default-fax
call application voice fax_detect voice-dtmf 1
call application voice fax_detect fax-dtmf 2
call application voice fax_detect account-id-method gateway
cns event-service server
!
!
fax receive called-subscriber $d$
fax send transmitting-subscriber $$s$
fax send left-header $$s$
fax send center-header $t$
fax send right-header Page $p$
fax send coverpage enable
fax send coverpage email-controllable
fax send coverpage comment Cisco cover page comment
fax interface-type vfc
mta send server 172.16.1.25
mta send subject Test Message
mta send origin-prefix Cisco Fax
mta send postmaster postmaster@mail-server.unified-messages.com
mta send mail-from hostname zebra.unified-messages.com
mta send mail-from username $$s$
mta send return-receipt-to username $$s$
mta receive aliases sydney.com
mta receive maximum-recipients 120
mta receive generate-mdn
!
!
controller T1 0
 framing esf
 clock source line primary
 linecode b8zs
 pri-group timeslots 1-24
!
controller T1 1
 framing esf

```

```

    clock source line secondary 1
    linecode b8zs
    pri-group timeslots 1-24
    !
controller T1 2
    framing esf
    clock source line secondary 2
    linecode b8zs
    pri-group timeslots 1-24
    !
controller T1 3
    clock source line secondary 3
    !
controller T1 4
    clock source line secondary 4
    !
controller T1 5
    clock source line secondary 5
    !
controller T1 6
    clock source line secondary 6
    !
controller T1 7
    clock source line secondary 7
    !
    !
interface Ethernet0
    ip address 10.2.14.90 255.0.0.0
    !
interface Serial0
    no ip address
    no ip mroute-cache
    shutdown
    no fair-queue
    clockrate 2015232
    !
interface Serial1
    no ip address
    shutdown
    no fair-queue
    clockrate 2015232
    !
interface Serial2
    no ip address
    shutdown
    no fair-queue
    clockrate 2015232
    !
interface Serial3
    no ip address
    shutdown
    no fair-queue
    clockrate 2015232
    !
interface Serial0:23
    no ip address
    ip mroute-cache
    isdn switch-type primary-5ess
    isdn incoming-voice modem
    isdn T203 10000
    no cdp enable
    !
interface Serial1:23
    no ip address

```

```
isdn switch-type primary-5ess
isdn incoming-voice modem
no cdp enable
!
interface Serial2:23
no ip address
isdn switch-type primary-5ess
isdn incoming-voice modem
isdn guard-timer 3000
isdn T203 10000
no cdp enable
!
interface FastEthernet0
ip address 172.16.14.90 255.255.0.0
duplex auto
speed auto
h323-gateway voip interface
h323-gateway voip h323-id 5300-voip
h323-gateway voip tech-prefix 2#
!
ip classless
no ip http server
!
!
voice-port 0:D
!
voice-port 1:D
!
voice-port 2:D
!
! POTS dial-peer configuration for fax detection
dial-peer voice 1 pots
application fax_detect
incoming called-number 7...
direct-inward-dial
!
! Voice dial-peer configuration for fax detection
dial-peer voice 2 voip
destination-pattern 7...
session target ras
tech-prefix 5#
dtmf-relay h245-signal
codec g711ulaw
fax rate disable
no vad
!
! Store-and-forward fax dial-peer configuration for fax detection
dial-peer voice 3 mmoip
application fax_on_vfc_onramp_app out-bound
destination-pattern 71..
information-type fax
session target mailto:$d$email-server.unified-messages.com
!
! Fax relay dial-peer configuration for fax detection
dial-peer voice 4 voip
destination-pattern 72..
session target ras
tech-prefix 3#
!
gateway
!
!
line con 0
exec-timeout 0 0
```

```
transport input none
line aux 0
line vty 0 4
  login
!
ntp clock-period 17180419
ntp source Ethernet0
ntp server 10.1.1.1
end
```