Configuring Cisco Fax Relay

This chapter describes how to configure Cisco fax relay on an IP network. Fax relay is one of the suite of features that are part of the SIP and H.323 Fax Enhancements feature.

Feature History for SIP and H.323 Fax Enhancements

Release	Modification
12.2(13)T	This feature was introduced.

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.

Note For more information about this and related Cisco IOS voice features, see the following:

- Chapter 1, "Fax Services over IP Overview"
- Entire Cisco IOS Voice Configuration Library—including library preface and glossary, other feature documents, and troubleshooting documentation—at http://www.cisco.com/en/US/products/ps6441/prod_configuration_guide09186a0080565f8a.htm.

Contents

Prerequisites for Cisco Fax Relay

- Install a software release that supports Cisco fax relay.
- Establish a working H.323 or SIP network for voice calls.
- Complete voice interoperability testing with third-party gateways and gatekeepers.

Restrictions for Cisco Fax Relay

Some platforms— such as the Cisco AS5350, Cisco AS5800, and Cisco AS5850— do not support Cisco-proprietary fax relay.

Information About Cisco Fax Relay

Cisco provides two methods for fax relay. One method is a Cisco-proprietary method called Cisco fax relay, and it is described in this chapter. The second method is based on the ITU-T T.38 standard, and it is described in Chapter 4.

Fax relay is the default mode for passing faxes through a VoIP network, and Cisco fax relay is the default fax relay type on Cisco voice gateways. This capability has been supported in Cisco IOS Release 11.3 and later releases and is widely available. Cisco fax relay uses Real-Time Transport Protocol (RTP) to transport the fax data.

Cisco fax relay is configured on the VoIP dial peers that direct calls into and out of the packet network.Cisco fax relay can be configured under the H.323 and Session Initiation Protocol (SIP) call control protocols.

Note Cisco fax relay is the default on most Cisco platforms if a fax method is not explicitly configured.

Cisco fax relay supports fax relay packet loss concealment, which is a technique that allows gateways to disregard packet loss rates that might otherwise cause fax failures. High-end fax machines with the memory to store page data often are able to use Error Correction Mode (ECM) for error-free page transmission. When ECM is enabled, a fax page is transmitted in a series of blocks that contain frames with packets of data. After receiving the data for a complete page, a receiving fax machine notifies the transmitting fax machine of any frames with errors. The transmitting fax machine then retransmits the specified frames. This process is repeated until all frames are received without errors. If the receiving fax machine is unable to receive an error-free page, the fax transmission may fail and one of the fax machines may disconnect. On networks that have a packet loss rate greater than 2 per cent, fax transmissions routinely fail when ECM is enabled because of ECM's low tolerance for packet loss.

The Fax Relay Packet Loss Concealment feature (described in Chapter 4, "Configuring T.38 Fax Relay") allows you to control whether ECM is enabled or disabled for fax transmissions on a VoIP dial peer. By disabling ECM on networks with a large amount of packet loss, you ensure that more fax transmissions are completed, although they may not be totally error-free.

When ECM is disabled, a fax page is transmitted using high-speed modulation in its raw encoded format. When detecting line errors with ECM disabled, the receiving fax machine has three options (in order of increasing severity):

- Respond to page reception with the ReTrain Positive command. This response causes the transmitting fax to go through the training check process before transmitting the next page.

- Respond to the page reception with the ReTrain Negative command. This response causes the transmitting fax to go through the Training Check Frame (TCF) process with a lower modulation scheme.
- Disconnect immediately.

Fax relay ECM is enabled by default. To disable ECM, you use the **fax-relay ecm disable** command on the VoIP dial peer. After this command is configured, the gateway's Digital Signal Processor (DSP) fax-relay firmware modifies the T.30 Digital Information Signal (DIS) message. This modification is performed on DIS signals in both directions, so that ECM is disabled even when only one gateway is configured to disable ECM.

Disabling of ECM is recommended for dial peers handling fax relay traffic on known lossy networks, especially those with a packet loss rate of 2 percent or greater. The **debug fax relay t30** command provides information about the E.164 destination and T.30 messages associated with fax transmissions. Note than an excessive number of simultaneous debug operations can degrade performance.

How to Configure Fax Relay

Cisco fax relay is enabled by default on platforms that support it, but there are also two commands that allow you to explicitly select Cisco fax relay, either for an individual dial peer or globally for all dial peers. Several other commands allow you to set various fax parameters.

Note Fax relay parameters that are set for an individual dial peer under the **dial-peer voice** command take precedence over global settings made under the **voice service voip** command.

This section contains the following procedures:

- Configuring One or More Individual VoIP Dial Peers, page 3-3 (optional)
- Configuring VoIP Dial Peers Globally, page 3-5 (optional)
- Verifying the Cisco Fax Relay Configuration, page 3-6 (optional)

Configuring One or More Individual VoIP Dial Peers

This task allows you to specify Cisco fax relay parameter values for individual dial peers.

SUMMARY STEPS

1. **dial-peer voice** *tag* **voip**
2. **fax protocol** {**cisco** | **none** | **system** | **pass-through** {**g711ulaw** | **g711alaw**}}
3. **fax rate** {**12000** | **14400** | **2400** | **4800** | **7200** | **9600** | **disable** | **voice**} [**bytes** *rate*]
4. **fax-relay ecm disable**
5. **fax nsf** *word*
6. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**dial-peer voice** *tag* **voip** **Example:** `Router(config)# dial-peer voice 25 voip`	Enters dial-peer configuration mode and defines a dial peer that directs traffic to or from a packet network. • *tag*—Dial-peer identifier that consists of one or more digits. Valid entries are from 1 to 2147483647. • **voip**—Calls from this dial peer use voice encapsulation on the packet network.
Step 2	**fax protocol** {**cisco** | **none** | **system**} **Example:** `Router(config-dial-peer)# fax protocol cisco`	Specifies the fax protocol for this dial peer. The keywords and arguments are as follows: • **cisco**— Cisco-proprietary fax protocol (not available on some platforms; see the "Restrictions for Cisco Fax Relay" section on page 3-2). This is the default. • **none**—No fax protocol. • **system**—Global configuration for this dial peer. **Note** This command has other keywords and arguments that are used for fax pass-through and T.38 fax relay, as described in Chapter 2 and Chapter 4.
Step 3	**fax rate** {**12000** | **14400** | **2400** | **4800** | **7200** | **9600** | **disable** | **voice**} [**bytes** *rate*] **Example:** `Router(config-dial-peer)# fax rate 14400`	(Optional) Selects the fax transmission speed to be attempted when this dial peer is used. The keywords and argument are as follows: • **12000**, **14400**, **2400**, **4800**, **7200**, **9600**—Maximum bits-per-second speed. • **bytes** *rate*—(Optional) Fax packetization rate, in ms. Range: 20 to 48. Default: 20. For Cisco fax relay, this keyword-argument pair is valid only on the Cisco 2600 series, Cisco 3600 series, Cisco 5300, and Cisco 7200 series. • **disable**—Disables fax relay transmission capability. • **voice**—Highest possible transmission speed allowed by the voice rate. For example, if the voice codec is G.711, fax transmission occurs at up to 14400 bps because 14400 bps is less than the 64-kbps voice rate. If the voice codec is G.729 (8 kbps), the fax transmission speed is 7200 bps. Default: **voice**.

	Command or Action	Purpose
Step 4	**fax-relay ecm disable** **Example:** `Router(config-dial-peer)# fax-relay ecm disable`	(Optional) Disables fax-relay ECM. **Note** To enable ECM, use the **no** form of this command.
Step 5	**fax nsf** *word* **Example:** `Router(config-dial-peer)# fax nsf 000000`	(Optional) Allows the router to override the settings made by fax machines that try to implement proprietary encodings (non-standard facilities, or NSF). By default, the NSF code is not overridden. • *word*—Two-digit hexadecimal country code and a four-digit hexadecimal manufacturer code. Setting this command to all zeroes prevents transfer of NSF during fax negotiation and overwrites the NSF so that only standard fax transactions occur. Because a router demodulates and decodes fax tones based on the T.30 specification, transactions or encoding that are proprietary can cause fax relay transmissions to fail.
Step 6	**exit** **Example:** `Router(config-dial-peer)# exit`	Exits dial-peer configuration mode.

Configuring VoIP Dial Peers Globally

This task can be used to set all VoIP dial peers to Cisco fax relay.

Note Fax relay parameters that are set for an individual dial peer under the **dial-peer voice** command take precedence over global settings made under the **voice service voip** command.

SUMMARY STEPS

1. **voice service voip**
2. **fax protocol** {**cisco** | **none**}
3. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**voice service voip** **Example:** `Router(config)# voice service voip`	Enters voice-service configuration mode.
Step 2	**fax protocol** {**cisco** | **none**} **Example:** `Router(config-voi-serv)# fax protocol cisco`	Specifies the fax protocol for all dial peers. The keywords are as follows: • **cisco**— Cisco-proprietary fax protocol. (Not available on some platforms; see the "Restrictions for Cisco Fax Relay" section on page 3-2.) • **none**—Disables fax relay and fax pass-through. **Note** This command has other keywords and arguments that are used for fax pass-through and T.38 fax relay, as described in Chapter 2 and Chapter 4.
Step 3	**exit** **Example:** `Router(config-voi-serv)# exit`	Exits voice-service configuration mode.

Verifying the Cisco Fax Relay Configuration

This task allows you to confirm that the settings you have made are present in the router configuration.

SUMMARY STEPS

1. **show running-config**
2. **show dial-peer voice** [*tag*] [**summary**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show running-config** **Example:** `Router# show running-config`	Displays the gateway running configuration, including dial-peer configuration.
Step 2	**show dial-peer voice** [*tag*] [**summary**] **Example:** `Router# show dial-peer voice 25`	Displays configuration information for dial peers so that you can verify that fax relay is enabled. The argument and keyword are as follows: • *tag*—A particular dial peer with an identifier that consists of one or more digits. Valid entries are from 1 to 2147483647. • **summary**—Brief form of the output.

Configuration Example for Cisco Fax Relay

The following example shows a partial configuration for Cisco fax relay in an H.323 network:

```
.
.
.
interface Ethernet0/0
 ip address 10.0.47.47 255.255.0.0
 h323-gateway voip interface
 h323-gateway voip id ipaddr 10.0.47.36 1719
 h323-gateway voip h323-id 36402
.
.
.
dial-peer voice 14152 voip       !!! Uses Cisco fax for a specific dial peer
 destination-pattern 14152..
 session target ras
 fax protocol cisco

gateway
.
.
.
```