Configuring T.38 Fax Relay

Configuring T.38 Fax Relay

This chapter describes configuration for T.38 fax relay on an IP network. T.38 is an ITU standard that defines how fax communications are packetized and transported over IP networks. T.38 fax relay includes the following features:

- Fax Relay Packet Loss Concealment

- MGCP Based Fax (T.38) and DTMF Relay

- SIP T.38 Fax Relay

- T.38 Fax Relay for T.37/T.38 Fax Gateway

- T.38 Fax Relay for VoIP H.323

- SG3 Fax Support on Cisco Time Division Multiplexing-Internet Protocol (TDM-IP) Voice Gateways and Cisco Unified Border Element (Cisco UBE) platforms

History for the Fax Relay Packet Loss Concealment Feature

Release	Modification
12.1(3)T	This feature was introduced.
12.1(5)XM	This feature was implemented on the Cisco AS5800.
12.1(5)XM2	This feature was implemented on the Cisco AS5350 and Cisco AS5400.
12.2(2)XB1	This feature was implemented on the Cisco AS5850.
12.2(11)T	This feature was integrated into this release and implemented on the Cisco AS5350, Cisco AS5400, Cisco AS5800, and Cisco AS5850.

History for the MGCP Based Fax (T.38) and DTMF Relay Feature

Release	Modification
12.2(2)XB	This feature was introduced.
12.2(8)T	This feature was integrated into this release and implemented on the Cisco 2600 series, Cisco 3600 series, and Cisco 7200 series.
12.2(11)T	This feature was implemented on the Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.
12.2(11)T2	The **gateway force** keyword pair was introduced.
12.2(15)T	This feature was implemented on the Cisco 1751 and Cisco 1760.
12.4T	The **mgcp fax t38 inhibit** command was no longer configured by default for MGCP gateways that use the auto-configuration function.
12.4(4)T	The **mgcp fax-relay sg3-to-g3** command was integrated into Cisco IOS release 12.4(4)T

History for the H.323 and SIP T.38 Fax Relay Feature

Release	Modification
12.2(13)T	This feature was introduced.
12.4(4)T	The **fax-relay sg3-to-g3** command was integrated into Cisco IOS release 12.4(4)T

History for the T.38 Fax Relay for T.37/T.38 Fax Gateway Feature

Release	Modification
12.1(3)X1	This feature was introduced.

History for the SG3 Fax Support Cisco TDM-IP Voice Gateways and Cisco UBE Platforms Feature

Release	Modification
15.1(1)T	This feature was introduced.

Finding Support Information for Platforms and Cisco IOS Software Images

Your software release may not support all the features documented in this chapter. For the latest feature information and caveats, see the release notes for your platform and software release.

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

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. An account on Cisco.com is not required.

Prerequisites for Configuring T.38 Fax Relay

Before you configure T.38 fax relay, perform the following tasks:

H.323 and SIP T.38 Fax Relay

- Ensure that your platform is supported.

- Install a software release that supports fax relay.

- Install appropriate hardware and memory for your platform.

- Establish a working H.323 or SIP network for voice calls. T.38 fax relay interoperability requires H.323 Version 2.

- Complete voice interoperability testing with third-party gateways and gatekeepers.

- To disable fax relay ECM on the AS5xxx series of voice gateways using Nextport DSP models, ensure that you have system processing engine (SPE) firmware version 2.8.3.8 or a higher version.

MGCP T.38 Fax Relay

- Install a software release that supports T.38 fax relay

- Install appropriate hardware and memory for your platform.

- Identify endpoints and configure the MGCP application as described in the appropriate section of the *Cisco IOS MGCP and Related Protocols Configuration Guide* .

- Complete voice interoperability testing with third-party gateways and gatekeepers.

• Ensure that you have adequate memory in the gateway. Although 96 to 128 MB of RAM is recommended, the memory requirement is dependent on the platform and the anticipated number of calls to be made through the system.

SG3 Fax Support on Cisco TDM-IP Voice Gateways and Cisco UBE platforms

• Working familiarity with Cisco IOS command-line interface and basic configuration procedures for voice gateway networks.

• You should be familiar with the configuration information in the Universal Voice Transcoding Support for IP-to-IP Gateways document.

Restrictions for Configuring T.38 Fax Relay

The restrictions for configuring T.38 fax relay are as follows:

H.323 T.38 Fax Relay

• The transport protocols specified in the ITU-T recommendation for T.38 are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). However, for T.38 fax relay on Cisco gateways, only UDP is supported for the transport layer.

• Some third-party gateways and gatekeepers may not be compatible with Cisco voice gateways for T.38 fax relay because different manufacturers can select certain parts of H.323 and T.38 to implement into their gateways and gatekeepers. Voice interoperability testing with these third-party gateways and gatekeepers should be performed to make sure that T.38 fax relay can be successful.

• T.38 fax relay is not supported on Cisco MC3810 series concentrators with Voice Compression Modules (VCMs).

• T.38 fax relay is not supported by Multimedia Conference Manager (MCM) H.323 proxy in Cisco IOS Release 12.1(3)T.

• If the **fax rate disable** command is configured on a dial peer, neither the originating nor the terminating gateway can enter into Cisco fax relay mode, T.38 fax relay mode, or fax pass-through mode. The **fax rate disable** command disables fax transfer support.

SIP T.38 Fax Relay

• The transport protocols specified in the ITU-T recommendation for T.38 are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). However, for T.38 fax relay on Cisco gateways, only UDP is supported for the transport layer.

• If SIP T.38 fax relay is not supported by both gateways, the T.38 negotiation fails and the call reverts to an audio codec.

• T.38 fax relay requires a 64-kbps transmission rate, the same amount of bandwidth as a voice call with the G.711 codec.

- Fax Calling Tones (CNG) are optional and are not used to initiate a switch to T.38 mode. Instead, Called Station Identifier (CED) tones or preamble flags are used.

- SIP fax relay does not rely on named signaling events (NSEs) to signal a switch to T.38 mode. Standard RFC 2543 and RFC 2327 SIP and SDP signaling are used instead.

- If the **fax rate disable** command is configured on a dial peer, neither the originating nor the terminating gateway can enter into Cisco fax relay mode, T.38 fax relay mode, or fax pass-through mode. The **fax rate disable** command disables fax transfer support.

SG3 Fax Support on Cisco TDM-IP Voice Gateways and Cisco UBE Platforms

- SG3 fax capability is not supported for Cisco Fax Relay.

- For T.38 fax sessions to operate at SG3 speeds, all the endpoints involved must support T.38 Version 3 (v3) configuration and have negotiated T.38 v3. If all endpoints are not configured for SG3/V.34 speeds, then the slowest speed in the topology is the one supported by all endpoints.

- SG3 fax support on TDM-IP gateways is available in H.323 and SIP configurations.

MGCP T.38 Fax Relay

- Only UDP is supported for the transport layer.

- The gateway does not dynamically issue a call admission control (CAC) request to increase the bandwidth allocated for a call when the call is switched from voice to fax. A best-effort support of bandwidth requirements for the call is supported.

Information About T.38 Fax Relay

Methods for Fax Relay

Cisco provides two methods for fax relay; Cisco fax relay and T.38 fax relay.

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

- T.38 fax relay is a method based on the ITU-T T.38 standard.T.38 fax relay is real-time fax transmission; that is, two fax machines communicating with each other as if there were a direct phone line between them. Fax relay is configured by using a few additional commands on gateway dial peers that have already been defined and configured for voice over IP calls.

T.38 fax relay is described in this chapter. Cisco fax relay is described in the "Configuring Cisco Fax Relay" chapter.

T.38 Fax Relay Functions

T.38 fax gateways provide the following functions:

- Demodulation of incoming T.30 fax signals at the transmitting gateway (T.30 is the standard procedure for fax transmission in the PSTN.)

- Translation of T.30 fax signals into T.38 Internet Fax Protocol (IFP) packets

- Exchange of IFP packets between the transmitting and receiving T.38 gateways

- Translation of T.38 IFP packets back into T.30 signals at the receiving gateway

T.38 Fax Relay Call Control

The T.38 fax relay feature can be configured for H.323, Session Initiation Protocol (SIP), Media Gateway Control Protocol (MGCP), and Skinny Client Control Protocol (SCCP) call control protocols. For H.323 and SIP networks, the only configuration tasks that differ are configuration of VoIP dial peers.

H.323 and SIP T.38 Fax Relay

This section describes the capabilities available with H.323 and SIP T.38 fax relay.

Fax Relay Packet Loss Concealment

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 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.

H.323 or SIP T.38 Fax Relay Fallback

You can specify a fallback fax method for the gateway to attempt if H.323 or SIP T.38 fax relay cannot be successfully initiated between gateways. A failure to switch to T.38 fax relay can occur if you are interworking with a network that does not support T.38 fax relay. The following are the fallback options:

- Cisco fax relay.

- Fax pass-through using a G.711 codec.

- No fallback. The fax is transmitted using the existing voice codec. If modem pass-through has been configured, the fax is transferred through named signaling event (NSE) pass-through.

H.323 or SIP Support of Resource Reservation Protocol for T.38 Fax Relay

H.323 or SIP gateways that are configured for T.38 fax relay allow Resource Reservation Protocol (RSVP) bandwidth adjustments when the original voice call is configured to use RSVP. When the original voice codec is restored at the end of the fax session, the original RSVP bandwidth is restored as well. When current bandwidth is unavailable, the fax proceeds at a best-effort rate without RSVP and with no performance guarantees. RSVP bandwidth adjustments for fax transmissions are made as follows:

- T.38 fax relay--RSVP bandwidth is adjusted to 80 kbps

- Fax pass-through--RSVP bandwidth is adjusted to 96 kbps

H.323 Support for Call Admission Control

H.323 call admission control (CAC) adjustments are allowed in the case of fax relay and fax pass-through. An H.323 gateway that uses a gatekeeper requests the following bandwidths from the gatekeeper when codec changes are necessary:

- T.38 fax relay--Bandwidth of 80 kbps

- Fax pass-through--Bandwidth of 96 kbps

If the gatekeeper accepts the bandwidth changes, the session is permitted to continue over the fax codec (G.711). If the gatekeeper rejects the bandwidth increase, the fax codec is terminated and the gateway uses the configured fax protocol fallback or the original voice codec, in which case the fax transfer fails.

H.323 or SIP Support for NSEs with T.38 Fax Relay

Use the **fax protocol** command to specify that a gateway should use NSEs for fax signaling. This option allows interoperability with MGCP gateways as well as other H.323 and SIP gateways. The use of NSEs and their payload type is negotiated in Session Description Protocol (SDP) messages. Because NSEs are passed in the media stream, they avoid the signaling delays that can be introduced by MGCP call agents. The addition of the NSE capability to Cisco SIP and H.323 gateways addresses these delays and improves interoperability between MGCP, SIP, and H.323 products.

If NSEs are specified and NSE use is not successfully negotiated between gateways, T.38 fax relay signaled through the protocol stack is attempted. If protocol-stack T.38 fax relay also fails, the configured fallback fax transfer protocol is used.

H.323 or SIP T.38 Fax Relay Interworking with Cisco MGCP Gateways

Specify that gateways must use T.38 fax relay and NSEs even though those gateways may be unable to negotiate those attributes by themselves at the time of call setup. This may happen during negotiations for fax attributes between H.323 or SIP gateways and MGCP gateways.

Both gateways must be configured to use T.38 fax relay and NSEs. On an H.323 or SIP gateway, use the **fax protocol t38 nse force** command. On an MGCP gateway, use the **mgcp fax t38 gateway force** command.

SG3 Fax Support on Cisco TDM-IP Voice Gateways and Cisco UBE Platforms

This feature provides support for V.34 fax relay based on the ITU Specification T.38 version 3 (04/2007) and for fax pass-through at SG3 speed. Prior to Cisco IOS Release 15.1(1)T, SG3-to-SG3 calls would fail because the V.34 modulation was not supported. A fallback solution allowed SG3-to-SG3 connections to be made, but the transmission speed was set to G3 levels.

For T.38 fax sessions to operate at SG3 speeds, all the endpoints involved must support T.38 Version 3 (v3) configuration and have negotiated T.38 v3. For example:

Originating Gateway(T.38 v3)--IP-(T.38 v3)Cisco UBE or TDM-IP GW(T.38 v3)-IP--Terminating Gateway(T.38 v3)

In this context, all currently supported TDM-IP gateways and Cisco UBE T.38 flows (H.323-H.323, H.323-SIP and SIP-SIP) are supported in Release 15.1(1)T. However, in topologies where at least one endpoint has a T.38 v0 configuration, the TDM-IP gateway or Cisco UBE configuration must be T.38 v0 (the lowest common version). Any other combination of T.38 v3 or v0 configuration involved in the Cisco UBE topologies is not supported.

When two endpoints are involved in negotiating the T.38 parameter, the mandatory parameter is the "FaxVersion." That is, when one of the endpoints supports Version 0 (v0), the resulting session operates as a v0 session. As long as Cisco UBE is configured for the lowest common version of the traffic expected, calls are completed successfully.

The information for supported calls is summarized in the tables below.

Table 1: Supported Call Flows with Mixed Endpoints at v0 and v3 Speeds

Emitting End	Receiving End	Resulting Session
v0	v0	v0
v0	v3	v0
v3	v0	v0
v3	v3	v3

Table 2: Supported Call Flows with Mixed Endpoints and Cisco UBE

Emitting End	Cisco UBE	Receiving End	Resulting Session
v0	v0	v0	v0
v0	v0	v3	v0

Emitting End	Cisco UBE	Receiving End	Resulting Session
v3	v0	v0	v0
v3	v3	v3	v3

Beginning in Cisco IOS Release 15.1(1)T, full SG3 fax support is enabled on Cisco TDM-IP voice gateways and Cisco UBE platforms. To enable this feature, complete the procedures in the *How to Configure H.323 and SIP Fax Pass-Through* section of the Configuring Fax Pass-Through chapter of the *Cisco IOS Fax, Modem, and Text Support over IP Configuration Guide,* Release 15.1 and the procedures in the How to Configure H.323 and SIP T.38 Fax Relay, on page 12.

MGCP T.38 Fax Relay

When MGCP-based fax relay is disabled, MGCP networks use passthrough for fax relay transmission. However, when MGCP-based fax relay is enabled, ITU-T T.38 support is added, providing a standardized method of supporting reliable fax transmission in the MGCP network. With MGCP-based fax relay, interworking is allowed between the T.38 application that already exists on Cisco gateways and the MGCP applications on call agents (CAs).

MGCP-based fax relay provides two modes of implementation: gateway-controlled mode and CA-controlled mode. In gateway-controlled mode, a gateway advertises its capabilities using Session Description Protocol (SDP) messages during the establishment of a call, using the call-control protocol that was used to establish the call. After the call is established, the connected gateways negotiate the actual switch from voice to T.38 fax relay by exchanging named signaling event (NSE) or named telephony event (NTE) messages embedded in the RTP stream. That transmission is transparent to the CA, which knows only about the voice call. Gateway-controlled mode allows you to use MGCP-based fax relay (T.38) without upgrading the CA software to support the capability.

In CA-controlled mode, the gateways rely on the MGCP CA to direct the T.38 fax relay call flow.

Gateway-Controlled MGCP T.38 Fax Relay

In gateway-controlled mode, the gateways do not need instruction from the CA to switch to T.38 mode. This mode should be used if the CA has not been upgraded to support T.38 and MGCP interworking or if the CA does not want to manage fax calls.

Gateway-controlled mode can also be used to bypass the message delay overhead caused by CA handling; for example, to meet time requirements for switchover to T.38 mode. If the CA does not specify a mode to the gateway, the gateway defaults to gateway-controlled mode.

In gateway-controlled mode, the gateways exchange NSEs that provide the following services:

- Instruct the peer gateway to switch to T.38 for the call.

- Either acknowledge the switch and a readiness to accept packets or indicate that a gateway cannot accept T.38 packets.

MGCP-based fax relay in gateway-controlled mode uses the following call flow:

1 An incoming call is initially established as a voice call.

2 The gateways advertise capabilities in an SDP exchange during connection establishment.

3 If both gateways do not support T.38, fax passthrough is used for fax transmission. If both gateways do support T.38, they attempt to switch to T.38 upon fax tone detection. The existing audio channel is used for T.38 fax relay, and the existing connection port is reused to minimize delay. If failure occurs at some point during the switch to T.38, the call reverts to the original settings that it had as a voice call. If this failure occurs, a fallback to fax passthrough is not supported.

4 Upon completion of the fax image transfer, the connection remains established and reverts to a voice call using the previously designated codec, unless the CA instructs the gateway to do otherwise. If the CA has been configured to control fax relay, the CA instructs the gateway on processing the call with the fx: extension of the local connection option (LCO).

CA-Controlled MGCP T.38 Fax Relay

CA-controlled MGCP T.38 fax relay enables T.38 fax relay interworking between H.323 gateways and MGCP gateways and between two MGCP gateways under the control of a call agent. In Cisco IOS Release 12.3(1) and later releases, the feature has been modified. The new method supersedes previous methods for CA-controlled fax relay and introduces the following gateway capabilities to enable this functionality:

• Ability to accept the MGCP FXR package, to receive the fxr prefix in commands from the call agent, and to send the fxr prefix in notifications to the call agent.

• Ability to accept a new port when switching from voice to fax transmission during a call. This new ability allows successful T.38 CA-controlled fax between H.323 and MGCP gateways for those occasions in which the H.323 gateway assigns a new port when changing the call type from voice to fax. New ports are assigned in H.323 gateways using Cisco IOS images from Release 12.2(2)T to Release 12.2(7.5)T. Note that gateways in MGCP-to-MGCP fax calls simply reuse the same port. CA-controlled T.38 fax relay enables MGCP gateways to handle both situations, either switching to a new port or reusing the same port, as directed by the call agent.

Note The CA-controlled mode described in this document makes obsolete the previous method that was described in *Media Gateway Control Protocol-Based Fax (T.38) and Dual Tone Multifrequency (IETF RFC 2833) Relay* . The previous CA-controlled mode for T.38 fax relay used the ca parameter to communicate with the call agent, and the ca parameter is no longer supported as of Cisco IOS Release 12.3(1). The previous method has been superseded by the CA-controlled mode described in this document. Note that the gateway (GW)-controlled mode that is described in the previous document remains supported and is the same as the GW-controlled mode that is described in this document.

The sequence for T.38 CA-controlled fax is as follows:

1 The MGCP call agent determines that CA-controlled mode is necessary for fax relay because the far end of the connection is an H.323 gateway or other entity incapable of directly negotiating T.38 with the Cisco IOS MGCP gateway.

2 The call agent establishes a voice call with the local MGCP gateway and specifies that any subsequent fax transmissions should take place using T.38 fax relay in CA-controlled mode. The call agent includes an "fxr/fx:t38" or "fxr/fx:t38-loose" parameter in the Local Connection Options parameter of the Create Connection (CRCX) command that it sends to the MGCP gateway. The term "loose" indicates that a description of T.38 capabilities is not required in the resulting Session Description Protocol (SDP) message.

3 When the voice call is established between the gateways, the call agent asks the MGCP gateway to notify it of any T.38 events with an "R: fxr/t38" requested event parameter in a Notification Request(RQNT) or Modify Connection (MDCX) command. If the MGCP gateway detects fax transmission during this call,

it generates a Notify (NTFY) command with an "O: fxr/t38(start)" observed event parameter and sends it to the call agent.

4 The call agent responds with an MDCX containing one or both of the following:

- "a:image/t38" descriptor in the Local Connection Options parameter

- "m=image *port* udptl t38" line in the included SDP message

Note that *port* is replaced in the MDCX with the actual port number for the fax transmission. This port number can be the same as or different from the port number negotiated earlier when the voice call was established. T.38 CA-controlled fax supports either using the same port or switching to a new port for fax. Note that if the MGCP gateway does not detect fax first, it may receive the same MDCX prior to sending a NTFY.

1 When the fax transmission is complete, the MGCP gateway sends the call agent a NTFY command with an "O: fxr/t38(stop)" parameter. The call agent then has the option of either sending another MDCX to return to voice or using a Delete Connection (DLCX) command to terminate the call.

MGCP T.38 Fax Relay Interworking with Cisco H.323 and SIP Gateways

Some MGCP call agents do not properly pass those portions of Session Description Protocol (SDP) messages that advertise T.38 and NSE capabilities. As a result, gateways that are controlled by these call agents are unable to use NSEs to signal T.38 fax relay to other gateways that use NSEs. As of Cisco IOS Release 12.2(13)T, you can configure gateways to use T.38 fax relay and NSEs even though those gateways may be unable to negotiate those attributes by themselves at the time of call setup.

The **mgcp fax t38 gateway force** command provides a way to ensure gateway-controlled T.38 fax relay between an MGCP gateway and another gateway. The other gateway in the negotiation can be an H.323, Session Initiation Protocol (SIP), or MGCP gateway. Both gateways must be configured to use NSEs to signal T.38 fax relay mode switchover. On H.323 and SIP gateways, use the **fax protocol t38 nse force** command to specify the use of NSEs for T.38 fax relay. On MGCP gateways, use the **mgcp fax t38 gateway force** command.

NSEs are the Cisco-proprietary version of named telephony events (NTEs), which are defined in IETF RFC 2833. NSEs and NTEs are used to communicate telephony signaling events that are normally indicated by the presence of tones, such as dual-tone multifrequency (DTMF) or fax transmissions. NSEs and NTEs do not transmit audible signaling tones across the network, but instead work by sending a binary code that is later used to recreate a tone. NSEs use different values to represent events and tones than NTEs use.

NSEs and NTEs are passed in the media stream. They consist of Real-Time Transport Protocol (RTP) packets that have the same source and destination IP addresses and User Datagram Protocol (UDP) ports as the rest of the media stream. However, NSE and NTE packets use different RTP payload types than the rest of the media stream so that they can stand apart from the audio packets in the stream. NSEs are normally sent with RTP payload type 100.

SCCP and T.38 Fax Relay

For information about this capability, refer to the Configuring DTMF Relay, Fax Relay and Modem Relay chapter in the *Supplementary Services Features for FXS Ports on Cisco IOS Voice Gateways Configuration Guide*.

Fax CM Message Tone Suppression

Super Group 3 (SG3) is a new generation of fax machines that support speeds of up to 33.6 kbps through V.34 half duplex (HD) modulation and V.8 signaling.

SG3 V.8 fax CM message tone suppression enables SG3 fax machines to scale down without end-user interaction and without using the extra bandwidth required by modem pass-through and allows SG3 fax machines to interoperate over a fax-relay network at G3 speeds by blocking the SG3 V.8 CM message, or fax tone, from reaching the called fax machine. This causes the called fax machine to time out on the ANSam tone and scale down to G3 speeds by initiating V.21 negotiations.

SG3 V.8 fax CM message tone suppression supports both one-gateway and two-gateway solutions:

- With a one-gateway solution, the gateway on one end of the call can be configured to suppress the SG3 V.8 fax CM message independently of the gateway on the other end of the call. The one-gateway solution suppresses the fax CM tone on both TDM and IP interfaces (TI C5510 DSPs only), and can interoperate with third-party gateways when the fax CM tone suppression gateway is the originating gateway.

- With a two-gateway solution, the gateways on both ends of the call must have this feature enabled. The two-gateway solution suppresses the fax CM tone only on the TDM interface (TI C5421 and TI C549 DSPs). Both gateways must support this feature to interoperate at G3 speeds, or the fax tone suppression gateway must be the originating gateway.

How to Configure H.323 and SIP T.38 Fax Relay

There are two ways to configure T.38 fax relay on VoIP gateways:

Note   Beginning in Cisco IOS Release 15.1(1)T, you can configure SG3 Fax Support when you enter the **fax protocol t38** command. This is described in the following sections.

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.

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

Use the following tasks to configure T.38 Fax Relay for an individual VoIP dial peer.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **dial-peer voice** *tag* **voip**
4. **dtmf-relay h245-signal**
5. **fax protocol t38** [**nse** [**force**]] [**version** {**0** | **3**}] [**ls-redundancy** *value* [**hs-redundancy** *value*]] [**fallback** {**cisco** | **none**| **pass-through** {**g711ulaw**| **g711alaw**}}]
6. **fax rate** {**12000** | **14400** | **2400** | **4800** | **7200** | **9600** | **disable** | **voice**} [**bytes** *rate*]
7. **fax-relay ecm disable**
8. **fax-relay sg3-to-g3 system**
9. **session protocol sipv2**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**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. Range: 1 to 2147483647. • **voip** --Calls from this dial peer use voice encapsulation on the packet network.
Step 4	**dtmf-relay h245-signal** **Example:** `Router(config-dial-peer)# dtmf-relay h245-signal`	Specifies how an H.323 or Session Initiation Protocol (SIP) gateway relays dual tone multifrequency (DTMF) tones between telephony interfaces and an IP network. • **h245-signal** --(Optional) Forwards DTMF tones by using the H.245 signal User Input Indication method. Supports tones from 0 to 9, *, #, and from A to D.
Step 5	**fax protocol t38** [**nse** [**force**]] [**version** {**0**	**3**}] [**ls-redundancy** *value* [**hs-redundancy** *value*]] [**fallback** {**cisco**	**none**| **pass-through** {**g711ulaw**| **g711alaw**}}]	Specifies the global default ITU-T T.38 standard fax protocol to be used for all VoIP dial peers. • **nse** --(Optional) Uses Named Signaling Events (NSEs) to switch to T.38 fax relay.

Command or Action	Purpose

Example:
 	
`Router(config-dial-peer)# fax protocol t38 version 3`
	• **force** --(Optional) Unconditionally, uses Cisco NSE to switch to T.38 fax relay. This option allows T.38 fax relay to be used between Cisco H.323 or Session Initiation Protocol (SIP) gateways and Media Gateway Control Protocol (MGCP) gateways.
	
	• **version** --(Optional) Specifies a version for configuring fax speed:
	
	   • **0**--Configures version 0, which uses T.38 version 0 (1998, G3 faxing)
	
	   • **3**--Configures version 3, which uses T.38 version 3 (2004, V.34 or SG3 faxing)
	
	Note The **version 0**| **3** option was added in Cisco IOS Release 15.1(1)T to enable SG3 fax support.
	
	• **ls-redundancy** *value* --(Optional) Specifies the number of redundant T.38 fax packets to be sent for the low-speed V.21-based T.30 fax machine protocol. Range varies by platform from 0 (no redundancy) to 5 or 7. The default is 0.
	
	• **hs-redundancy** *value* --(Optional) Specifies the number of redundant T.38 fax packets to be sent for high-speed V.17, V.27, and V.29 T.4 or T.6 fax machine image data. Range varies by platform from 0 (no redundancy) to 2 or 3. The default is 0.
	
	Note Setting the **hs-redundancy** parameter to a value greater than 0 causes a significant increase in the network bandwidth consumed by the fax call.
	
	• **fallback** --(Optional) A fallback mode is used to transfer a fax across a VoIP network if T.38 fax relay could not be successfully negotiated at the time of the fax transfer.
	
	• **cisco** --(Optional) Cisco-proprietary fax protocol.
	
	Note Do not use the **cisco** keyword for the fallback option if you specified **version 3** for SG3 fax transmission.
	
	• **none** --(Optional) No fax pass-through or T.38 fax relay is attempted. All special fax handling is disabled, except for modem pass-through if configured with the modem pass-through command.
	
	• **pass-through** --(Optional) The fax stream uses one of the following high-bandwidth codecs:
	
	   • **g711ulaw**--Uses the G.711 u-law codec.
	
	   • **g711alaw**--Uses the G.711 a-law codec.

Step 6 **fax rate** {**12000** | **14400** | **2400** | **4800** | **7200** | **9600** | **disable** | **voice**} [**bytes** *rate*]	(Optional) Selects the fax transmission speed to be attempted when this dial peer is used. • **12000** , **14400**, **2400**, **4800**, **7200**, **9600**--Maximum bits-per-second speed.

	Command or Action	Purpose
	Example: Router(config-dial-peer)# fax rate 14400	• **bytes** *rate* --(Optional) Fax packetization rate, in ms. Range: 20 to 48. Default: 20. For T.38 fax relay, this keyword-argument pair is valid only on Cisco 5350, Cisco 5400, and Cisco 5850 routers. For other routers, the packetization rate for T.38 fax relay is fixed at 40 ms and cannot be changed with this keyword-argument pair. • **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. This is the default.
Step 7	**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. **Note** If you are using Cisco IOS Release 15.1(1)T and enabling SG3 fax support, do not enter this command.
Step 8	**fax-relay sg3-to-g3 system** **Example:** Router(config-dial-peer)# fax-relay sg3-to-g3 system	Specifies that for SIP and H.323 signaling types, V.8 fax CM message suppression is enabled on the specific dial peer. Enabled by default. • **system** --Uses the protocol set under the voice-service configuration mode. **Note** If you are using Cisco IOS Release 15.1(1)T and enabling SG3 fax support, do not enter this command.
Step 9	**session protocol sipv2** **Example:** Router(config-dial-peer)# session protocol sipv2	(Optional) Specifies the IETF SIP session protocol for calls between the local and remote routers using the packet network. **Note** This command is required for SIP calls.

Configuring T.38 Fax Relay on VoIP Dial Peers Globally

Use the following steps to configure T.38 fax relay globally for previously defined VoIP dial peers.

Alternately, you can configure fax relay for individual VoIP dial peers. See the

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. **enable**
2. **configure terminal**
3. **voice service voip**
4. **fax protocol t38** [**nse** [**force**]] [**version**{**0** | **3**}] [**ls-redundancy** *value* [**hs-redundancy** *value*]] [**fallback** {**cisco** | **none** | **pass-through** {**g711ulaw** | **g711alaw**}}]
5. **fax-relay sg3-to-g3**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**voice service voip** **Example:** `Router(config)# voice service voip`	Enters voice-service configuration mode.

Step 4	**fax protocol t38** [**nse** [**force**]] [**version**{**0**	**3**}] [**ls-redundancy** *value* [**hs-redundancy** *value*]] [**fallback** {**cisco**	**none**	**pass-through** {**g711ulaw**	**g711alaw**}}]
					
					Example:
					
					`Router(config-voi-srv)# fax protocol t38 version 3`
						Specifies the global default ITU-T T.38 standard fax protocol to be used for all VoIP dial peers.
						
						• **nse** --(Optional) Uses Named Signaling Events (NSEs) to switch to T.38 fax relay.
						
						• **force** --(Optional) Unconditionally, uses Cisco NSE to switch to T.38 fax relay. This option allows T.38 fax relay to be used between Cisco H.323 or Session Initiation Protocol (SIP) gateways and Media Gateway Control Protocol (MGCP) gateways.
						
						• **version** --(Optional) Specifies a version for configuring fax speed:
						
						    • **0**--Configures version 0, which uses T.38 version 0 (1998, G3 faxing)
						
						    • **3**--Configures version 3, which uses T.38 version 3 (2004, V.34 or SG3 faxing)
						
						Note The **version 0**| **3** option was added in Cisco IOS Release 15.1(1)T to enable SG3 fax support.

	Command or Action	Purpose
		• **ls-redundancy** *value* --(Optional) Specifies the number of redundant T.38 fax packets to be sent for the low-speed V.21-based T.30 fax machine protocol. Range varies by platform from 0 (no redundancy) to 5 or 7. The default is 0.
		• **hs-redundancy** *value* --(Optional) Specifies the number of redundant T.38 fax packets to be sent for high-speed V.17, V.27, and V.29 T.4 or T.6 fax machine image data. Range varies by platform from 0 (no redundancy) to 2 or 3. The default is 0.
		Note Setting the **hs-redundancy** parameter to a value greater than 0 causes a significant increase in the network bandwidth consumed by the fax call.
		• **fallback** --(Optional) A fallback mode is used to transfer a fax across a VoIP network if T.38 fax relay could not be successfully negotiated at the time of the fax transfer.
		• **cisco** --(Optional) Cisco-proprietary fax protocol.
		Note Do not use the **cisco** keyword for the fallback option if you specified **version 3** for SG3 fax transmission.
		• **none** --(Optional) No fax pass-through or T.38 fax relay is attempted. All special fax handling is disabled, except for modem pass-through if configured with the modem pass-through command.
		• **pass-through** --(Optional) The fax stream uses one of the following high-bandwidth codecs:
		• **g711ulaw**--Uses the G.711 u-law codec.
		• **g711alaw**--Uses the G.711 a-law codec.

Step 5	**fax-relay sg3-to-g3**
	
	Example:
	
	`Router(config-voi-serv)#`
	`fax-relay sg3-to-g3`
		Specifies that for SIP and H.323 signaling types, V.8 fax CM message suppression is enabled for all dial peers on the digital signal processor (DSP) firmware. Enabled by default.
		
		Note If you are using Cisco IOS Release 15.1(1)T and enabling SG3 fax support, do not enter this command.

Troubleshooting Tips for H.323 or SIP T.38 Fax Relay

To troubleshoot T.38 fax relay, perform the following steps:

- Ensure that you can make a voice call.

- Ensure that the desired fax protocol was set using the **fax protocol** command on both the originating and terminating gateways.

- Ensure that the fax protocol is configured as T.38 at the global configuration level or at the dial-peer configuration level for both the originating and terminating gateways.

- Use the **show call active voice** command to display information for the active call table.

- Use the **show call history fax** command to display recent call history for faxes.

- Use the **show dial-peer voice** command to display configuration information for dial peers.

- For H.323 gateways, use the **debug cch323 all** command to enable all H.323 debugging capabilities, or use one of the following commands to debug problems while making the call:

  - **debug cch323 error**

  - **debug cch323 h225**

  - **debug cch323 h245**

  - **debug cch323 RAS**

  - **debug cch323 session**

  - **debug voip ccapi inout**

  - **debug vtsp session**

- For SIP gateways, use the **debug ccsip all** command to enable all SIP debugging capabilities, or use one of the following SIP debug commands:

  - **debug ccsip calls**

  - **debug ccsip error**

  - **debug ccsip events**for T.38 fax relay

  - **debug ccsip info**

  - **debug ccsip media**

  - **debug ccsip messages**

  - **debug ccsip states**

How to Configure MGCP T.38 Fax Relay

Cisco supports two modes of MGCP T.38 fax relay:

- In gateway-controlled mode, a call agent uses the fx: extension of the local connection option (LCO) to instruct a gateway about how to process a call. Gateways do not need instruction from the call agent to switch to T.38 mode.

- In call-agent (CA)-controlled mode, the call agent can instruct the gateway to switch to T.38 for a call. In Cisco IOS Release 12.3(1) and later releases, CA-controlled mode enables T.38 fax relay interworking between H.323 gateways and MGCP gateways and between two MGCP gateways under the control of a call agent.

Select one of the following MGCP T.38 fax relay configuration tasks:

Configuring Gateway-Controlled MGCP T.38 Fax Relay

Use the following steps to configure gateway-controlled MGCP T.38 fax relay.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mgcp fax t38** {**ecm** | **gateway force**| **hs_redundancy** *value* | **inhibit** | **ls_redundancy** *value* | **nsf** *word*}
4. **mgcp tse payload** *value*
5. **mgcp timer nse-response t38** *timer*
6. **mgcp fax rate** {**2400** | **4800** | **7200** | **9600** | **12000** | **14400** | **voice**
7. **mgcp fax-relay sg3-to-g3**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**mgcp fax t38** {**ecm**	**gateway force**| **hs_redundancy** *value*	**inhibit**	**ls_redundancy** *value*	**nsf** *word*} **Example:** `Router(config)# mgcp fax t38 ls_redundancy 2`	(Optional) Configures MGCP T.38 fax relay parameters. • **ecm** --Enables Error Correction Mode (ECM) for the gateway. By default, ECM is not enabled. • **gateway force** --Forces gateway-controlled T.38 fax relay using Cisco-proprietary named signaling events (NSEs) even if the capability to use T.38 and NSEs cannot be negotiated by the MGCP call agent at call setup time. By default, force is not enabled. • **hs_redundancy** *value* --Number of redundant T.38 fax packets to send for high-speed V.17, V.27, and V.29 T.4 or T.6 fax machine image data. Range: 0 (no redundancy) to 2. The default is 0. • **ls_redundancy** *value* --Number of redundant T.38 fax packets to send for low-speed V.21-based T.30 fax machine protocol. Range: 0 (no redundancy) to 5. The default is 0. **Note** Setting the **hs_redundancy** parameter greater than 0 causes a significant increase in network bandwidth consumed by a fax call.

Command or Action	Purpose
	• **inhibit** --Disables MGCP-based T.38 fax relay on the gateway. By default, T.38 is enabled. **Note** If the MGCP gateway uses the auto-configuration function, the **mgcp fax t38 inhibit**command is automatically configured on the gateway each time a new configuration is downloaded. Beginning with Cisco IOS Software Release 12.4T, the auto-configuration of this command is removed. For MGCP gateways running Cisco IOS version 12.4T or later, you must manually configure the **mgcp fax t38 inhibit**command to use T.38 fax relay. • **nsf** --Overrides the non-standard facilities (NSF) code with the code provided in the *word* argument. NSFs are capabilities that fax manufacturers have built into fax machines to distinguish their products from others. By default, the NSF code is not overridden. • *word*--Two-digit country code and four-digit manufacturer code, in hexadecimal.
Step 4 **mgcp tse payload** *value* **Example:** Router(config)# mgcp tse payload 106	(Required) Enables inband telephony signaling events (TSEs) and specifies the payload value to be used during fax and modem pass-through and network continuity tests. • *value* --TSE payload value. The range is 98 to 119. The default is 100.
Step 5 **mgcp timer nse-response t38** *timer* **Example:** Router(config)# mgcp timer nse-response t38 250	Configures how a gateway detects the Real-Time Transport Protocol (RTP) stream host. • **nse-response t38** *timer* --Timeout period, in milliseconds, for awaiting T.38 named signaling event (NSE) responses from a peer gateway. Range is from 100 to 3000. The default is 200.
Step 6 **mgcp fax rate** {**2400** | **4800** | **7200** | **9600** | **12000** | **14400** | **voice** **Example:** Router(config)# mgcp fax rate 9600	(Optional) Establishes the maximum fax rate for MGCP T.38 sessions. • **2400** , **4800**, **7200**, **9600**, **14400**--Maximum bits-per-second speed. • **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. This is the default. **Note** MGCP normally limits the maximum fax rate on a voice port to the bandwidth of the configured voice codec. This ensures that the fax session does not exceed the bandwidth initially authorized for the voice call. In some cases an administrator may desire to exceed the voice bandwidth when the call switches to fax in order to offer the best possible fax rate. The **mgcp fax rate** command allows you to override this limitation. **Note** When the MGCP fax rate is set to the highest possible transmission speed allowed by the voice codec (**mgcp fax rate voice**), all MGCP endpoints limit T.38 fax calls to this speed.

	Command or Action	Purpose
		Note The values for this command apply only to the fax transmission speed and do not affect the quality of the fax itself.

Step 7	**mgcp fax-relay sg3-to-g3**
	
	Example:
	
	`Router(config)# mgcp`
	`fax-relay sg3-to-g3`
		Specifies that for MGCP signaling types, V.8 fax CM message suppression is enabled on the digital signal processor (DSP) firmware.

Configuring CA-Controlled MGCP T.38 Fax Relay

Use the following steps to configure CA-controlled MGCP T.38 fax relay.

SUMMARY STEPS

1. **enable**
2. **configure   terminal**
3. **no   mgcp fax t38 inhibit**
4. **mgcp package-capability   fxr-package**
5. **mgcp default-package   fxr-package**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

Step 3	**no mgcp fax t38 inhibit**
	
	Example:
	
	`Router(config)# no mgcp fax t38`
	`inhibit`
		(Optional) Enables T.38 fax relay on the gateway if it has been previously disabled.
		
		Note T.38 fax relay is enabled on the gateway by default. The command is included here to illustrate how you would enable T.38 if it were disabled by a previous command.

	Command or Action	Purpose
		Note If the MGCP gateway uses the auto-configuration function, the **mgcp fax t38 inhibit** command is automatically configured on the gateway each time a new configuration is downloaded. Beginning with Cisco IOS Software Release 12.4T, the auto-configuration of this command is removed. For MGCP gateways running Cisco IOS version 12.4T or later, you must manually configure the **mgcp fax t38 inhibit** command to use T.38 fax relay.
Step 4	**mgcp package-capability fxr-package** **Example:** Router(config)# mgcp package-capability fxr-package	(Optional) Specifies an MGCP package capability type for a media gateway. • **fxr-package** --FXR package for fax transmissions.
Step 5	**mgcp default-package fxr-package** **Example:** Router(config)# mgcp default-package fxr-package	(Optional) Configures the default package capability type for the media gateway. • **fxr-package** --FXR package for fax transmissions.

Troubleshooting Tips for MGCP T.38 Fax Relay

Use the following steps to troubleshoot MGCP T.38 fax relay:

- Ensure that you have a working MGCP network and that you can make a voice call.

- Ensure that T.38 fax relay for MGCP is configured on both the originating and terminating gateways.

- Use the following commands during the call:

    - The **show mgcp** [**connection** | **endpoint** | **statistics**] command displays information about MGCP calls.

    - The **show voice call summary** command indicates, during a T.38 fax transmission, a change of state from S_CONNECT to S_FAX in the VTSP STATE column and a change from the codec name to a numeric fax rate in the CODEC column (for example, g711u changes to 14400).

    - The **debug mgcp packets** command displays the MGCP side of the call flow.

For CA-controlled T.38 fax relay, you can verify the MGCP side of the call flow by using the **debug mgcp packets** command. You should see the following output:

- CRCX from the call agent with "fxr/fx:t38-loose" or "fxr/fx:t38" parameter

- RQNT from the call agent with "R: fxr/t38" parameter

- NTFY from the gateway with "O: fxr/t38(start)" parameter (optionally)

- MDCX from the call agent with either "m=image" in the SDP message, or "a:image/t38" in the Local Connection Options message, or both.

For CA-controlled T.38 fax relay, you should see the following messages in the output from a **show voice call summary** command on the MGCP gateway during a T.38 fax transmission:

- Change of state from S_CONNECT to S_FAX in the VTSP STATE column

- Change from codec name to numeric fax rate (such as "g711u" to 14400") in the CODEC column

Configuration Examples for T.38 Fax Relay

H.323 T.38 Fax Relay with ECM Enabled Example

This example configuration shows T.38 fax relay in an H.323 network with ECM enabled:

```
.
.
.
voice service voip
 fax protocol t38
.
.
.
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 14151 voip  ! Uses t38 fax from voice service voip.
 destination-pattern 14151..
 session target ras
dial-peer voice 14152 voip  ! Uses Cisco fax for a specific dial peer.
 destination-pattern 14152..
 session target ras
 fax protocol cisco
gateway
end
```

T.38 Fax Relay with ECM Disabled on Dial Peer Example

This example shows ECM disabled on dial peer 50:

```
.
.
.
dial-peer voice 100 pots
 destination-pattern 5550919
 port 2/0:D
 prefix 5550
!
dial-peer voice 50 voip
 incoming called-number 5550919
 codec g711ulaw
 fax-relay ecm disable
 fax rate 9600
 fax protocol t38 ls-redundancy 0 hs-redundancy 0
```

.
.
.

Gateway-Controlled MGCP T.38 Fax Relay Example

The following example shows a configuration for gateway-controlled T.38 fax in an MGCP network. This configuration uses the defaults for the **mgcp fax t38** command and the **mgcp timer nse-response t38** commands, so they do not appear in the running configuration presented in the example.

```
.
.
.
!
mgcp
mgcp call-agent 192.168.195.147 2427 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode nse
mgcp modem passthrough voip mode ca
mgcp package-capability dtmf-package
mgcp default-package mo-package
mgcp tse payload 110
no mgcp timer receive-rtcp
mgcp timer net-nse-rsp 300
.
.
.
```

CA-Controlled MGCP T.38 Fax Relay Example

This example configuration shows CA-controlled MGCP T.38 fax relay.

```
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname tyler
!
boot system tftp project/c2600-is-mz.0711 192.168.222.10
no logging buffered
no logging rate-limit
enable password mary
!
ip subnet-zero
!
!
no ip domain lookup
ip domain name abctrading.com
ip host jackson 192.168.184.144
ip host lincoln 192.168.222.10
ip name-server 192.168.12.13
ip name-server 192.168.12.134
ip name-server 192.168.222.72
!
!
no voice hpi capture buffer
no voice hpi capture destination
!
mrcp client session history duration 0
mrcp client session history records 0
fax interface-type fax-mail
mta receive maximum-recipients 0
!
!
interface FastEthernet0/0
```

```
 ip address 192.168.191.132 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
ip classless
ip route 0.0.0.0 0.0.0.0 172.16.184.1
ip route 192.168.0.0 255.255.0.0 192.168.184.1
ip http server
ip http port 1111
ip pim bidir-enable
!
!
access-list 101 permit tcp any any
access-list 101 permit udp host 192.168.184.144 any
access-list 101 permit udp host 192.168.222.10 any
access-list 102 permit ip any any
access-list 111 permit udp host 192.168.184.144 any
access-list 111 permit udp host 192.168.191.132 any
access-list 111 permit icmp any any
!
snmp-server packetsize 4096
snmp-server enable traps tty
call rsvp-sync
!
voice-port 1/0/0
!
voice-port 1/0/1
!
voice-port 1/1/0
!
voice-port 1/1/1
!
mgcp
mgcp call-agent 192.168.184.144 3562 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode nse
mgcp tse payload 102
no mgcp timer receive-rtcp
!
mgcp profile default
!
dial-peer cor custom
!
!
dial-peer voice 110 pots
 application mgcpapp
 port 1/1/0
!
dial-peer voice 111 pots
 application mgcpapp
 port 1/1/1
!
!
line con 0
 exec-timeout 0 0
line aux 0
 exec-timeout 0 0
line vty 0 4
 exec-timeout 0 0
 password lab
 login
line vty 5 15
 exec-timeout 0 0
 password lab
 login
!
end
```

SG3 Fax Support on the Cisco TDM-IP Voice Gateways and Cisco UBE Platforms Example

The following example shows fax protocol T.38 version 3 enabled to provide SG3 fax support:

```
!
voice service voip
 fax protocol t38 version 3 ls-redundancy 0 hs-redundancy 0 fallback cisco
!
!
interface FastEthernet0/0
 ip address 1.2.103.1 255.255.0.0
!
!
!
dial-peer voice 100 voip
 destination-pattern 1.....
 session target ipv4:1.2.103.3
 dtmf-relay h245-signal
 fax protocol t38 version 3 ls-redundancy 0 hs-redundancy 0 fallback cisco
!
dial-peer voice 200 voip
 destination-pattern 2.....
 session protocol sipv2
 session target ipv4:1.2.103.3
 dtmf-relay rtp-nte
 fax protocol pass-through g711ulaw
!
dial-peer voice 6789 voip
 destination-pattern 6789
 session target ipv4:1.2.102.2
 dtmf-relay rtp-nte
 fax protocol pass-through g711ulaw
!
!
sip-ua
```