



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

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### Feature History

Release	Modification
12.2(2)XB	This feature was introduced on the Cisco 2420, the Cisco 3600 series, the Cisco MC3810, the Cisco AS5300, and the Cisco AS5400.
12.2(8)T	This feature was integrated into Cisco IOS Release 12.2(8)T. <b>Note</b> The Cisco AS5300 and Cisco AS5400 are not supported in this release.
12.2(11)T	Support was added for the Cisco AS5300, Cisco AS5400, and Cisco AS5850.
12.2(15)T	Support was added for the Cisco 1751 and Cisco 1760.

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## MGCP Based Fax (T.38)

For a description of MGCP Based Fax (T.38), refer to [Cisco Fax Services over IP Application Guide](#).

## MGCP Based DTMF Relay

DTMF relay conforms to RFC 2833, *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*, developed by the Internet Engineering Task Force (IETF) Audio/Video Transport (AVT) working group. Per RFC 2833, DTMF is relayed using Named Telephony Events (NTEs) in Real-Time Transport Protocol (RTP) packets.

This feature provides two modes of implementation for each component: gateway (GW)-controlled mode and call agent (CA)-controlled mode. In GW-controlled mode, GWs negotiate DTMF transmission by exchanging capability information in Session Description Protocol (SDP) messages. That transmission is transparent to the CA. GW-controlled mode allows use of the DTMF Relay feature without upgrading the CA software to support the feature.

In CA-controlled mode, CAs use MGCP messaging to instruct GWs to process DTMF traffic.

DTMF relay provides a way to transport DTMF digits in an RTP voice stream when the voice codec cannot accurately reproduce the digits, or the sender or receiver digital signal processor (DSP) cannot perform digit sampling. Each DTMF digit is encoded as an RTP named event packet, which is transmitted and received instead of the usual digit samples carried in voice packets. The named events are sent as RTP packets over UDP. The packets are encoded with a payload type which is negotiated during connection establishment between the GWs using SDP.

The three current implementations of DTMF relay for MGCP are Cisco proprietary, Named Signaling Event (NSE), and out-of-band. With the MGCP Based DTMF Relay feature, support is added for RFC 2833 to provide a standardized method of DTMF transport using NTEs. Support of RFC 2833 is standards-based and allows greater interoperability with other GWs and CAs.

If DTMF relay is not configured, the DSPs on the GWs send and receive DTMF digits in band in the voice codec.

During an MGCP call sequence, GWs exchange SDP information using create connection (CRCX) and modify connection (MDCX) requests as shown below:

- CRCX—Sent from the CA to the originating GW (OGW)
- ACK—Sent from the OGW and contains the OGW's SDP information
- CRCX—Sent from the CA to the terminating GW (TGW) and contains the OGW's SDP information
- ACK—Sent from the TGW and contains the TGW's SDP information
- MDCX—Sent from the CA to the OGW and contains TGW's SDP information
- ACK—Sent from the OGW

If either the Cisco proprietary mode or the NSE mode is used, each GW is unaware of the remote GW's DTMF relay configuration because it is not indicated in the SDP. Each side determines whether to use DTMF relay, based on its locally-configured mode setting and a combination of voice codec and codec filter settings. Each side uses its locally configured RTP payload type when encoding RTP named event packets. Interoperability of endpoints relies on matching command line interface (CLI) configurations. The value used for NSE mode is configured using the **mgcp tse payload** command. The payload type for Cisco proprietary mode is 121. This value is used regardless of the configured payload value.

## Benefits

- MGCP support for RFC 2833, *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*.
- More reliable DTMF relay.
- Greater interoperability with third-party equipment.
- GW-controlled and CA-controlled modes allow for phased network upgrades.

## Restrictions

- For DTMF relay, the dynamic RTP payload range supported is 98 through 119.

# Supported Platforms

**Table 1 Cisco IOS Release and Platform Support for this Feature**

Platform	12.2(2)XB	12.2(8)T	12.2(11)T	12.2(15)T
Cisco 1751	Not supported	Not supported	Not supported	X
Cisco 1760	Not supported	Not supported	Not supported	X
Cisco 2420	X	X	X	X
Cisco 3600 series	X	Not supported <sup>1</sup>	Not supported	X
Cisco 3660	X	X	X	X
Cisco 3725/Cisco 3745	Not supported	X	X	X
Cisco MC3810	X	X	X	X
Cisco AS5300	X	Not supported	X	X
Cisco AS5850	Not supported	Not supported	X	X
Cisco AS5400	X	Not supported	X	X
Cisco AS5850	Not supported	Not supported	X	X

1. The entire Cisco 3600 series except for the Cisco 3660 is not supported in Cisco IOS Releases 12.2(8)T and 12.2(11)T.

## Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to [cco-locksmith@cisco.com](mailto:cco-locksmith@cisco.com). An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at <http://www.cisco.com/register>.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

## Availability of Cisco IOS Software Images

Platform support for particular Cisco IOS software releases is dependent on the availability of the software images for those platforms. Software images for some platforms may be deferred, delayed, or changed without prior notice. For updated information about platform support and availability of software images for each Cisco IOS software release, refer to the online release notes or, if supported, Cisco Feature Navigator.

## Supported MIBs and RFCs

### MIBs

None

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

### RFCs

- RFC 2833, *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*

## Prerequisites

Complete the following tasks on your network before configuring this feature:

- Configure IP routing
- Configure Voice over IP
- Configure voice ports on the GWs
- Set up the call agent
- Configure MGCP on the GWs

## Configuring DTMF Relay

	Command	Purpose
Step 1	Router(config)# <b>mgcp</b>	Initiates the MGCP application.
Step 2	Router(config)# <b>mgcp dtmf-relay voip codec {all - low-bit-rate} mode {nte-gw   nte-ca}</b>	Configures MGCP DTMF relay. The <b>nte-gw</b> and <b>nte-ca</b> keywords allow you to configure the GW-controlled or CA-controlled mode of transporting NTE packets.  The <b>nte-gw</b> keyword indicates GW-controlled mode, where the GWs exchange capability information and negotiate DTMF relay by transparently exchanging SDP information through the CA.  The <b>nte-ca</b> keyword indicates CA-controlled mode, where the CA uses Local Connection options to control DTMF relay between the GWs.

## Verifying DTMF Relay

- Step 1** Enter the show running command to display the current configuration settings. [Example 1](#) shows that DTMF relay is configured in GW-controlled mode.

### **Example 1** *DTMF Relay in GW-Controlled Mode*

```
!  
mgcp  
mgcp call-agent 172.18.195.147 2427 service-type mgcp version 0.1  
mgcp dtmf-relay voip codec all mode nte-gw  
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 profile default  
!
```

## Troubleshooting Tips

To minimize adverse impact when upgrading your network to use the DTMF Relay feature, perform the following general procedures:

- Step 1** Upgrade the CA, if necessary, to insure that it can pass DTMF SDP transparently. Then transition the Cisco GW portion of the network, if necessary, to MGCP.
- Step 2** For each node in the network, upgrade to an image compatible with the MGCP Based DTMF Relay feature, but leave it configured in its current (legacy) DTMF relay mode. In this configuration, the new DTMF transfer mode in the DTMF Relay feature is used only if asked for in a request; otherwise, the legacy configuration is used.
- Step 3** Configure the DTMF Relay feature for each node in the network. Also configure GW-controlled mode.
- Step 4** Upgrade the call agent, if necessary, to support the DTMF Relay feature.
- Step 5** Configure each node in the network to CA-controlled mode.

Two strategies are presented in this section. The first assumes a network configured to run in Cisco proprietary mode, while the second assumes that DTMF Relay is disabled. In each case, it is assumed that the CA communicates with Cisco GWs using MGCP and passes DTMF information transparently in SDP. In addition, the CA may already have support for the DTMF Relay feature. Two levels of CA capability are supported:

- Type I—No DTMF relay LCO, but can blindly pass DTMF relay SDP between GWs
- Type II—DTMF relay LCO and recovery from DTMF relay NACK, with no SDP interpretation

### Upgrading from Cisco Proprietary Mode

This procedure assumes that the following prerequisites have been met:

- Each GW in the network is configured with DTMF Relay mode **cisco**, and identical values for DTMF relay codec and Telephony Signaling Events (TSE) payload.
- Each CA has been upgraded to one of the supported types.

For each GW, perform the following steps:

- 
- Step 1** Enter the **copy run start .** command.
- Step 2** Install the image containing the MGCP Based DTMF Relay feature.
- Step 3** Reboot the GW and return it to service.
- 

Verify that all GWs have the software containing the DTMF Relay feature and are running legacy configurations.

For each GW, then change the configured DTMF Relay mode to **nte-gw**.

### Upgrading from DTMF Disabled

This procedure assumes that the following prerequisites have been met:

- Each GW in the network is configured with DTMF relay disabled, and identical TSE payload values.
- Each CA has been upgraded to support the new LCO and SDP for DTMF relay.

For each GW, perform the following steps:

- 
- Step 1** Enter the **copy run start .** command.
- Step 2** Install the image containing the DTMF Relay feature.
- Step 3** Reboot the GW and return it to service.
- 

Verify that all GWs have the software containing the MGCP Based DTMF Relay feature and are running legacy configurations.

For each GW, change the configured DTMF relay mode to **nte-gw**, and the configured DTMF relay codec to a valid value (for example, **low-bit-rate**).

All GWs in the network should be set to **nte-gw** mode.

## Monitoring and Maintaining DTMF Relay

Command	Purpose
Router# <b>show mgcp</b> [connection   endpoint   statistics]	Displays all active MGCP connections on the GW.
Router# <b>debug mgcp</b> [all   errors   events   packets   parser]	Turns on debugging for the GW.
Router# <b>debug voip rtp session named-event</b>	Enables the new debug flag and displays reception or transmission of RTP named events. The default is to enable the currently-supported debug flag. <b>Note</b> The <b>debug voip rtp session named-event</b> command severely impacts performance and should only be used for single-call debug capture.
Router# <b>debug vtsp all</b>	Cisco AS5400 debug command.
Router# <b>debug nextport vsmgr detail</b>	Cisco AS5400 debug command.
Router# <b>debug csm voice</b>	Cisco AS5400 debug command.
Router# <b>clear mgcp statistics</b>	Resets the MGCP statistical counters.

## DTMF Relay Configuration Example

In the following example, DTMF relay is configured in GW-controlled mode:

```
!  
mgcp  
mgcp call-agent 172.18.195.147 2427 service-type mgcp version 0.1  
mgcp dtmf-relay voip codec all mode nte-gw  
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 profile default  
!
```

# Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

## New Commands

- [debug voip rtcp](#)
- [debug voip rtp](#)

## Modified Commands

- [mgcp dtmf-relay](#)
- [mgcp timer](#)
- [show mgcp](#)

# debug voip rtcp

To enable debugging for Real-Time Transport Control Protocol (RTCP) packets, use the **debug voip rtcp** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

**debug voip rtcp {error | packet | session}**

**no debug voip rtcp**

## Syntax Description

<b>error</b>	Prints out a trace for error cases.
<b>packet</b>	Provides debug output for RTCP packets.
<b>session</b>	Provides all session debug information.

## Defaults

Debugging for RTCP packets is not enabled.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
12.2(2)T	This command was introduced.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.2(11)T	This command was implemented on the Cisco AS5300, Cisco AS5400, and Cisco AS5850.
12.2(15)T	This command was implemented on the Cisco 1751 and Cisco 1760.

## Usage Guidelines

When used without a keyword, this command turns on debugging for all events. This command severely impacts performance; use with caution.

## Examples

The following example shows sample output for the **debug voip rtcp** command.

```
Router# debug voip rtcp

1w0d: voip_rtcp_create_session: callID=37, dstCallID=36 laddr=172.19.169.85, lp0
1w0d: voip_rtcp_get_cname: cname=0.0.0@172.19.169.85
1w0d: voip_rtcp_send_event: event=EV_NEW
1w0d: voip_rtcp_new: rtcp_interval=1893
Router#
1w0d: voip_rtcp_send_event: event=EV_STATS
1w0d: voip_rtcp_stats_req: rtcp_interval=3448
1w0d: voip_rtcp_stats_req:delay=45 lost_packets=0 rtt=0
Router#
1w0d: recv:
1w0d: SR: ssrc=0x1272A94D sr_ntp_h=0xAF44E045 sr_ntp_l=0xA6CE39C sr_timestamp=02
1w0d: SDES: ssrc=0x1272A94D name=1 len=19 data=0.0.0@172.19.169.77
1w0d: rtcp_round_trip_delay: ssrc=0x1D86A955
```

```
Router#
1w0d: voip_rtcp_send_event: event=EV_STATS
1w0d: voip_rtcp_stats_req: rtcp_interval=6394
1w0d: voip_rtcp_stats_req:delay=40 lost_packets=0 rtt=0
1w0d: recv:
1w0d: SR: ssrc=0x1272A94D sr_ntp_h=0xAF44E047 sr_ntp_l=0xFFB007F6 sr_timestamp=6
1w0d: SDES: ssrc=0x1272A94D name=1 len=19 data=0.0.0@172.19.169.77
1w0d: rtcp_round_trip_delay: ssrc=0x1D86A955
Router#
1w0d: voip_rtcp_remove_ccb
1w0d: voip_rtcp_send_event: event=EV_DESTROY
1w0d: voip_rtcp_destroy_idle
1w0d: voip_rtcp_close_session
1w0d: Cleaning up sess=62F95F58, sp=19544, dp=17130
```

# debug voip rtp

To enable debugging for Real-Time Transport Protocol (RTP) named event packets, use the **debug voip rtp** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

```
debug voip rtp {error | session [nse | multicast | conference | dtmf-relay | named-event] | packet
remote-ip ipaddress remote-port portnum packetnum | packet callid idnum packetnum}}
```

```
no debug voip rtp
```

## Syntax Description

<b>error</b>	Prints out a trace for error cases.
<b>session</b>	Provides all session debug information. If used with a keyword, supplies more specific debug information according to the keywords used.
<b>nse</b>	Provides debug information for named signaling events (NSEs).
<b>multicast</b>	Provides debug information for multicast packets.
<b>conference</b>	Provides debug information for conference packets.
<b>dtmf-relay</b>	Provides debug information for dual-tone multifrequency (DTMF) packets.
<b>named-event</b>	Provides debug information for named telephony event (NTE) packets.
<b>packet remote-ip</b> <i>ipaddress</i> <b>remote-port</b> <i>portnum</i> <i>packetnum</i>	Provides debug information for a remote IP address and port number. Using the <i>packetnum</i> argument specifies the number of packets to trace so that the display is not flooded.
<b>packet callid</b> <i>idnum</i> <i>packetnum</i>	Provides debug information for a specific call ID number (obtained by using the <b>show voip rtp connections</b> command). Using the <i>packetnum</i> argument specifies the number of packets to trace so that the display is not flooded.

## Defaults

Debugging for RTP named event packets is not enabled.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
12.2(2)XB	This command was introduced.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.2(11)T	This command was implemented on the Cisco AS5300, Cisco AS5400, and Cisco AS5850.
12.2(15)T	This command was implemented on the Cisco 1751 and Cisco 1760.

## Usage Guidelines

This command severely impacts performance and should be used only for single-call debug capture. Cisco does not recommend using this command when using fax relay, because it can adversely affect fax relay.

**Examples**

The following example illustrates the output for the **debug voip rtp session named-event** command. The example is for a gateway that sends digits 1, 2, 3, then receives digits 9,8,7. The payload type, event ID, and additional packet payload are shown in each log.

The first three packets indicate the start of the tone (initial packet and two redundant). The last three packets indicate the end of the tone (initial packet and two redundant). The packets in between are refresh packets that are sent every 50 milliseconds (without redundancy).

Router# **debug voip rtp session named-event**

```

00:09:29:      Pt:99      Evt:1      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:03 01 90 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:03 03 20 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:03 04 B0 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:83 04 C8 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:83 04 C8 <<<Rcv>
00:09:29:      Pt:99      Evt:1      Pkt:83 04 C8 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:03 01 90 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:03 03 20 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:03 04 B0 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:83 05 18 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:83 05 18 <<<Rcv>
00:09:29:      Pt:99      Evt:2      Pkt:83 05 18 <<<Rcv>
00:09:29:      Pt:99      Evt:3      Pkt:03 00 00 <<<Rcv>
00:09:29:      Pt:99      Evt:3      Pkt:03 00 00 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:03 01 90 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:03 03 20 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:03 04 B0 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:03 06 40 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:83 06 80 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:83 06 80 <<<Rcv>
00:09:30:      Pt:99      Evt:3      Pkt:83 06 80 <<<Rcv>
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 01 90
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 03 20
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 04 B0
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:02 06 40
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:82 06 58
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:82 06 58
00:09:31: <Snd>>> Pt:99      Evt:9      Pkt:82 06 58
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 01 90
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 03 20
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 04 B0
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:02 06 40
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:82 06 90
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:82 06 90
00:09:31: <Snd>>> Pt:99      Evt:8      Pkt:82 06 90
00:09:31: <Snd>>> Pt:99      Evt:7      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:7      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:7      Pkt:02 00 00
00:09:31: <Snd>>> Pt:99      Evt:7      Pkt:02 01 90
00:09:31: <Snd>>> Pt:99      Evt:7      Pkt:02 03 20

```

---

00:09:31:	<Snd>>>	Pt:99	Evt:7	Pkt:02 04 B0
00:09:32:	<Snd>>>	Pt:99	Evt:7	Pkt:02 06 40
00:09:32:	<Snd>>>	Pt:99	Evt:7	Pkt:82 06 58
00:09:32:	<Snd>>>	Pt:99	Evt:7	Pkt:82 06 58
00:09:32:	<Snd>>>	Pt:99	Evt:7	Pkt:82 06 58

## mgcp dtmf-relay

To ensure accurate forwarding of digits on compressed codecs, use the **mgcp dtmf-relay** command in global configuration mode. To disable this process for noncompressed codecs, use the **no** form of this command.

### Voice Over IP

```
mgcp dtmf-relay voip codec { all | low-bit-rate } mode { cisco | nse | out-of-band | nte-gw | nte-ca }
```

```
no mgcp dtmf-relay voip
```

### Voice over AAL2

```
mgcp dtmf-relay voaal2 codec [ all | low-bit-rate ]
```

```
no mgcp dtmf-relay voaal2
```

Syntax Description	
<b>voip</b>	Specifies Voice-over-IP calls.
<b>voaal2</b>	Specifies Voice-over-AAL2 calls (using Annex K type 3 packets).
<b>all</b>	Configures Dual Tone Multifrequency (DTMF) relay to be used with all voice codecs.
<b>low-bit-rate</b>	Configures DTMF relay to be used with only low-bit-rate voice codecs, such as G.729.
<b>cisco</b>	Real-time Transport Protocol (RTP) digit events are encoded using a proprietary format similar to frame relay as described in the FRF.11 specification. The events are transmitted in the same RTP stream as non-digit voice samples, using payload type 121.
<b>nse</b>	RTP digit events are encoded using the format specified in RFC 2833, Section 3.0, and are transmitted in the same RTP stream as non-digit voice samples, using the payload type that is configured using the <b>mgcp tse payload</b> command.
<b>out-of-band</b>	Media gateway control protocol (MGCP) digit events are sent using NTFY messages to the call agent (CA), which plays them on the remote GW using RQNT messages with <b>S:</b> (signal playout request).
<b>nte-gw</b>	RTP digit events are encoded using the format specified in RFC 2833, Section 3.0, and are transmitted in the same RTP stream as non-digit voice samples. The payload type is negotiated by the GWs before use. The configured value for payload type is presented as the preferred choice at the beginning of the negotiation.
<b>nte-ca</b>	Identical to the <b>nte-gw</b> keyword behavior except that the CA's local connection options <b>a:</b> line is used to enable or disable DTMF relay.

**Defaults** no mgcp dtmf-relay for all codecs

**Command Modes** Global configuration

## Command History

Release	Modification
12.1(3)T	This command was added to media gateway control protocol (MGCP).
12.1(5)XM	Support for this command was expanded to include the Cisco MC3810 series platform.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(2)XB	The <b>n-te-gw</b> and <b>n-te-ca</b> keywords were added to this command.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.2(11)T	This command was implemented on the Cisco AS5300, Cisco AS5400, and Cisco AS5850.
12.2(15)T	This command was implemented on the Cisco 1751 and Cisco 1760.

## Usage Guidelines

Only Voice over IP supports the **mode** options for forwarding digits on codecs.

## Examples

The following example shows how to configure a codec for VoAAL2:

```
Router(config)# mgcp dtmf-relay voaal2 codec all
```

The following example shows how to set the **dtmf-relay** codec and mode to GW:

```
Router(config)# mgcp dtmf-relay codec mode nte-gw
```

## Related Commands

Command	Description
<b>mgcp</b>	Initiates the MGCP daemon.

## mgcp timer

To configure how the gateway detects the Real-Time Transport Protocol (RTP) stream host, use the **mgcp timer** command in global configuration mode. Use the **no** form of this command to restore the default value.

```
mgcp timer { receive-rtcp timer | net-cont-test timer | nse-response t38 timer }
```

```
no mgcp timer
```

### Syntax Description

<b>receive-rtcp timer</b>	Sets multiples of the Real-Time Control Protocol (RTCP) transmission interval in milliseconds. The valid range is 1 to 100, and the default is 5. This parameter is valid only for VoIP calls.
<b>net-cont-test timer</b>	Sets the continuity test timeout in milliseconds. The valid range is 100 to 3000, and the default is 200. This parameter is valid for Voice over IP and Voice over AAL2 calls.  <b>Note</b> This option was previously named <b>rtp-nse</b> .
<b>nse-response t38 timer</b>	Sets the timeout period (in milliseconds) for awaiting T.38 named signaling event (NSE) responses from a peer gateway. Valid values are 100 through 3000. The default value is 200.

### Defaults

The **receive-rtcp** timer default is 5.  
The **net-cont-test** timer default is 200.  
The **nse-response t38** timer default is 200.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(5)T	This command was introduced as simple gateway control protocol (SGCP) on the Cisco AS5300.
12.0(7)XK	Support for this command was extended to the Cisco MC3810 series and Cisco 3600 series routers (except for the Cisco 3620).
12.1(5)XM	The command was modified to support media gateway control protocol (MGCP). The option <b>rtp-nse</b> was changed to <b>net-cont-test</b> . Functionality was not changed, only the option name.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(2)XB	The <b>nse-response t38</b> option was added to support MGCP T.38.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Release	Modification
12.2(11)T	This command was implemented on the Cisco AS5300, Cisco AS5400, and Cisco AS5850.
12.2(15)T	This command was implemented on the Cisco 1751 and Cisco 1760.

### Usage Guidelines

The **receive-rtcp** option is the timer used by a gateway to disconnect a VoIP call when the IP connectivity is lost with the remote gateway. After receiving each packet from the remote gateway, the receiving gateway starts a timer for the *timer* period. If the timer expires before receiving the next packet from the remote gateway, the receiving gateway disconnects the call and notifies the call agent.

The **net-cont-test** option uses the terminating gateway to verify the network connectivity with the originating gateway before ringing the called party. To do this, the terminating gateway sends a command packet to the originating gateway and starts a timer for the *timer* period. If the timer expires before receiving any acknowledgement from the originating gateway, the terminating gateway does not ring the called party, disconnects the call, and alerts the call agent.

The **nse-response t38** option sets the timer for awaiting T.38 NSE responses. This timer is configured to tell the terminating GW how long to wait for an NSE from a peer GW. The NSE from the peer GW can either acknowledge the switch and its readiness to accept packets, or indicate that it cannot accept T.38 packets.

### Examples

The following example sets the **receive-rtcp** timer to 25 milliseconds:

```
Router(config)# mgcp timer receive-rtcp 25
```

The following example sets the **net-cont-test** timer to 1500 milliseconds (1.5 seconds):

```
Router(config)# mgcp timer net-cont-test 1500
```

The following example shows the MGCP fax relay feature enabled and a GW wait time of 300 milliseconds for an NSE from a peer GW.

```
Router(config)# mgcp timer nse-response t38 300
```

### Related Commands

Command	Description
<b>mgcp</b>	Starts the MGCP daemon.
<b>mgcp modem passthrough mode</b>	Sets the upspeed method for fax and modem calls.
<b>mgcp tse payload</b>	Sets the Telephony Signaling Events (TSE) payload for fax and modem calls.

# show mgcp

To display values for MGCP parameters, use the **show mgcp** command in privileged EXEC mode.

**show mgcp**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.1(1)T	The <b>show mgcp</b> command was introduced for the Cisco AS5300.
	12.1(3)T	The <b>show mgcp</b> command output was updated to show additional gateway and platform information.
	12.1(5)XM	The <b>show mgcp</b> command output was updated to show additional gateway and platform information.
	12.2(2)XA	The keyword <b>profile</b> was added to the <b>show mgcp</b> command.
	12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
	12.2(2)XB	The keywords and arguments <b>nas dump slot port chan</b> and <b>nas info</b> were added to the <b>show mgcp</b> command. The <b>show mgcp</b> command output was updated to show T.38 information.  Because the number of keywords has increased, the command reference for the <b>show mgcp</b> command was divided into entries for the following commands: <ul style="list-style-type: none"> <li>• <b>show mgcp</b></li> <li>• <b>show mgcp connection</b></li> <li>• <b>show mgcp endpoint</b></li> <li>• <b>show mgcp nas</b></li> <li>• <b>show mgcp profile</b></li> <li>• <b>show mgcp statistics</b></li> </ul>
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
	12.2(11)T	This command was implemented on the Cisco AS5300, Cisco AS5400, and Cisco AS5850.
	12.2(15)T	This command was implemented on the Cisco 1751 and Cisco 1760.

**Usage Guidelines** The **show mgcp** command provides administrative high-level information about the values configured for MGCP parameters on the router. For more specific types of information, see the **show mgcp connection**, **show mgcp endpoint**, **show mgcp nas**, **show mgcp profile**, and **show mgcp statistics** commands.

## Examples

The following is sample output for the **show mgcp** command:

```
Router# show mgcp
MGCP Admin State ACTIVE, Oper State ACTIVE - Cause Code NONE
MGCP call-agent: 172.18.195.147 2300 Initial protocol service is SGCP 1.5
MGCP block-newcalls DISABLED
MGCP send RSIP for SGCP is ENABLED
MGCP quarantine mode discard/step
MGCP quarantine of persistent events is ENABLED
MGCP dtmf-relay for VoIP disabled for all codec types
MGCP dtmf-relay voaal2 codec all
MGCP voip modem passthrough mode: NSE, codec: g711ulaw, redundancy: DISABLED,
MGCP voaal2 modem passthrough mode: NSE, codec: g711ulaw
MGCP TSE payload: 100
MGCP T.38 Named Signalling Event (NSE) response timer: 200
MGCP Network (IP/AAL2) Continuity Test timer: 3000
MGCP 'RTP stream loss' timer: 2
MGCP request timeout 500
MGCP maximum exponential request timeout 4000
MGCP gateway port: 2427, MGCP maximum waiting delay 3000
MGCP restart delay 0, MGCP vad DISABLED
MGCP xpc-codec: DISABLED, MGCP persistent hookflash: DISABLED
MGCP persistent offhook: ENABLED, MGCP persistent onhook: DISABLED
MGCP piggyback msg DISABLED, MGCP endpoint offset DISABLED
MGCP simple-sdp DISABLED
MGCP undotted-notation DISABLED
MGCP codec type g711ulaw, MGCP packetization period 20
MGCP JB threshold lwm 30, MGCP JB threshold hwm 150
MGCP LAT threshold lwm 150, MGCP LAT threshold hwm 300
MGCP PL threshold lwm 1000, MGCP PL threshold hwm 10000
MGCP CL threshold lwm 1000, MGCP CL threshold hwm 10000
MGCP playout mode is adaptive 60, 4, 200 in msec
MGCP IP ToS low delay disabled, MGCP IP ToS high throughput disabled
MGCP IP ToS high reliability disabled, MGCP IP ToS low cost disabled
MGCP IP RTP precedence 5, MGCP signaling precedence: 3
MGCP default package: line-package
MGCP supported packages: gm-package dtmf-package trunk-package line-package
                        hs-package atm-package ms-package dt-package res-packa
                        mt-package

MGCP T.38 Fax is ENABLED
MGCP T.38 Fax ECM is DISABLED
MGCP T.38 Fax NSF Override is DISABLED
MGCP T.38 Fax Low Speed Redundancy: 0
MGCP T.38 Fax High Speed Redundancy: 0
```

**Table 2** *show mgcp Field Descriptions*

Field Name	Description
MGCP Admin State...Oper State	The administrative and operational state of the MGCP daemon. The administrative state controls starting and stopping the application using the <b>mgcp</b> and <b>mgcp block-newcalls</b> commands. The operational state controls normal MGCP operations.
MGCP call-agent	The address of the call agent specified in the <b>mgcp call-agent</b> or <b>call-agent</b> command.
Initial protocol service is...	Indicates the protocol initiated for this session.
MGCP block-newcalls	The state of the <b>mgcp block-newcalls</b> command.
MGCP send RSIP for SGCP	The setting for the <b>mgcp sgcp restart notify</b> command.
MGCP quarantine mode	Indicates how the quarantine buffer is to handle events.

**Table 2** *show mgcp Field Descriptions (continued)*

MGCP quarantine of persistent events	Indicates if persistent events will be handled by the quarantine buffer.
MGCP dtmf-relay	The setting for the <b>mgcp dtmf-relay</b> command.
MGCP voip modem passthrough	Indicates the settings for mode, codec, and redundancy from the commands <b>mgcp modem passthrough mode</b> , <b>mgcp modem passthrough codec</b> , and <b>mgcp modem passthrough voip redundancy</b> .
MGCP voaal2 modem passthrough	Indicates the settings for mode, codec, and redundancy from the commands <b>mgcp modem passthrough mode</b> and <b>mgcp modem passthrough codec</b> .
MGCP TSE payload	The setting for the <b>mgcp tse payload</b> command.
MGCP Network (IP/AAL2) Continuity Test timer	The setting for the <b>net-cont-test</b> option in the <b>mgcp timer</b> command.
MGCP 'RTP stream loss' timer	The setting for the <b>receive-rtcp</b> option in the <b>mgcp timer</b> command.
MGCP request timeout	The setting for the <b>mgcp request timeout</b> command.
MGCP maximum exponential request timeout	The setting for the <b>mgcp request timeout max</b> command.
MGCP gateway port	The User Datagram Protocol (UDP) port specification for the gateway.
MGCP maximum waiting delay	The setting for the <b>mgcp max-waiting-delay</b> command.
MGCP restart delay	The setting for the <b>mgcp restart-delay</b> command.
MGCP vad	The setting for the <b>mgcp vad</b> command.
MGCP rtrcac	Indicates whether MGCP SA Agent CAC has been enabled with the <b>mgcp rtrcac</b> command.
MGCP system resource check	Indicates whether MGCP SRC CAC has been enabled with the <b>mgcp src-cac</b> command.
MGCP xpc-codec	Indicates whether <b>mgcp sdp xpc-codec</b> has been configured to generate the X-pc codec field for Session Description Protocol (SDP) codec negotiation in NCS and TGCP.
MGCP persistent hookflash	Indicates whether <b>mgcp persistent hookflash</b> has been configured to send persistent hookflash events to the call agent.
MGCP persistent offhook	Indicates whether <b>mgcp persistent offhook</b> has been configured to send persistent offhook events to the call agent.
MGCP persistent onhook	Indicates whether <b>mgcp persistent hookflash</b> has been configured to send persistent onhook events to the call agent.
MGCP piggyback msg	Indicates whether <b>mgcp piggyback message</b> has been configured to enable piggyback messaging.
MGCP endpoint offset	Indicates whether <b>mgcp endpoint offset</b> has been configured to enable incrementing of the POTS or DS0 portion of an endpoint name for NCS.
MGCP simple-sdp	Indicates whether <b>mgcp sdp simple</b> has been configured to enable simple mode SDP operation.
MGCP undotted notation	Indicates whether <b>mgcp sdp notation undotted</b> has been configured to enable undotted SDP notation for the codec string.

**Table 2** *show mgcp Field Descriptions (continued)*

MGCP codec type	The setting for the <b>mgcp codec</b> command.
MGCP packetization period	The <b>packetization period</b> parameter setting for the <b>mgcp codec</b> command.
MGCP JB threshold lwm	The jitter buffer minimum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP JB threshold hwm	The jitter buffer maximum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP LAT threshold lwm	The latency minimum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP LAT threshold hwm	The latency maximum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP PL threshold lwm	The packet loss minimum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP PL threshold hwm	The packet loss maximum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP CL threshold lwm	The cell loss minimum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP CL threshold hwm	The cell loss maximum threshold parameter setting for the <b>mgcp quality-threshold</b> command.
MGCP playout mode	The jitter buffer packet size type and size.
MGCP IP ToS low delay	The <b>low-delay</b> parameter setting for the <b>mgcp ip-tos</b> command.
MGCP IP ToS high throughput	The <b>high-throughput</b> parameter setting for the <b>mgcp ip-tos</b> command.
MGCP IP ToS high reliability	The <b>high-reliability</b> parameter setting for the <b>mgcp ip-tos</b> command.
MGCP IP ToS low cost	The <b>low-cost</b> parameter setting for the <b>mgcp ip-tos</b> command.
MGCP IP RTP precedence	The <b>rtp precedence</b> parameter setting for the <b>mgcp ip-tos</b> command.
MGCP signaling precedence	The <b>signaling precedence</b> parameter setting for the <b>mgcp ip-tos</b> command.
MGCP default package	The package configured as the default package with the <b>mgcp default-package</b> command.
MGCP supported packages	The packages configured with <b>mgcp package-capability</b> to be supported on this gateway in this session.
MGCP T.38 Fax	The settings for the <b>mgcp fax t.38</b> command. The following values are displayed: <ul style="list-style-type: none"> <li>• MGCP T.38 fax: Enabled or disabled</li> <li>• Error correction mode (ECM): enabled or disabled</li> <li>• Non-standard facilities (NSF) override: enabled or disabled. If enabled, the override code is displayed.</li> <li>• MGCP T.38 fax low-speed redundancy: the factor set on the GW for redundancy.</li> <li>• MGCP T.38 fax high-speed redundancy: the factor set on the GW for redundancy.</li> </ul>

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>debug mgcp</b>	Enables debug traces for MGCP errors, events, media, packets, and parser.
	<b>show mgcp connection</b>	Displays information for active MGCP-controlled connections.
	<b>show mgcp endpoint</b>	Displays information for MGCP-controlled endpoints.
	<b>show mgcp nas</b>	Displays MGCP network access server (NAS) information for data ports.
	<b>show mgcp profile</b>	Displays values for MGCP profile-related parameters.
	<b>show mgcp statistics</b>	Displays MGCP statistics regarding received and transmitted network messages.

# Glossary

**AAL2**—ATM Adaptation Layer 2. Supports traffic needing precise timing, such as compressed voice and video.

**CA**—call agent.

**call agent**—An intelligent entity in an IP telephony network that handles call control in an MGCP model Voice-over-IP network.

**CRCX**—Create Connection request. Used in an MGCP call sequence by GWs to exchange SDP information.

**DTMF**—dual-tone multifrequency. Tones made by pushing buttons on a telephone.

**fx: extension**—An extension of the local connection option used by the CA to instruct the GW to be in CA-controlled mode or GW-controlled mode.

**GWs**—gateways.

**MDCX**—modify connection request. Used in an MGCP call sequence by GWs to exchange SDP information.

**media gateway**—Equipment that connects the PSTN or a PBX with the Voice-over-IP network. It is controlled by a call agent using MGCP.

**MGC**—media gateway controller. Another name for call agent.

**MGCP**—Media Gateway Control Protocol.

**NSE**—Named Signaling Event. Format of RTP packets used for applications such as modem relay and fax relay. NSEs have different payload values than NTEs.

**NTE**—Named Telephony Event. Format of RTP packets used to transport DTMF digits as defined in RFC 2833, *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*.

**payload type**—Payload types are defined in RFC 2833, *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*. A payload type is a number from 96 through 127 that identifies the type of payload carried in the packet (for example, a payload type of 121 denotes a Cisco DTMF relay payload; a payload type of 122 denotes a fax payload). The payload type should be identical on the GW and call agent.

**PSTN**—Public Switched Telephone Network.

**RTCP**—RTP Control Protocol. The protocol monitors an RTP connection and conveys information about the ongoing session.

**RTP**—Real-Time Transport Protocol. The protocol provides end-to-end network transport functions for applications transmitting real-time data and services such as payload type identification, sequence numbering, time stamping, and delivery monitoring.

**SDP**—Session Description Protocol. Messages containing capabilities information that are exchanged between GWs.

**TGW**—see trunking gateway.

**trunking gateway**—An external gateway control protocol (xGCP) media gateway that provides connectivity between the PSTN and VoIP networks.