



Call Admission Control for H.323 VoIP Gateways

Document Update Alert

This document was originally produced for Cisco IOS Release 12.2(11)T. This feature has been updated in subsequent releases, and more recent documentation is available.

If you are using Cisco IOS Release 12.2(11)T or higher, refer to the following documentation in the Cisco IOS Voice Configuration Library, Release 12.3:

- *Trunk Connections and Conditioning Features*

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/vvfax_c/vcltrunk.htm

Feature History

Release	Modification
12.2(2)XA	This feature was introduced.
12.2(4)T	The new and modified commands introduced in Cisco IOS Release 12.2(2)XA were integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, Cisco AS5350, and Cisco AS5400 is not included in this release.
12.2(2)XB1	This feature was implemented on the Cisco AS5850.
12.2(4)XM	Support for this feature was added for the Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
12.2(8)T	This feature was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
12.2(11)T	This feature was implemented on Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

This document describes Call Admission Control for H.323 VoIP Gateways feature. The PSTN Fallback feature is an additional enhancement. This document includes the following sections:

- [Feature Overview, page 2](#)
- [Supported Platforms, page 4](#)
- [Supported Standards, MIBs, and RFCs, page 5](#)
- [Prerequisites, page 6](#)

- [Configuration Tasks, page 6](#)
- [Configuration Examples, page 8](#)
- [Command Reference, page 10](#)
- [Glossary, page 35](#)

Feature Overview

Before the Call Admission Control for H.323 VoIP Gateways feature, gateways did not have a mechanism to gracefully prevent calls from entering when certain resources were not available to process the call. This inability caused the new call to fail with unreported behavior and potentially caused the calls that were in progress to have quality-related issues.

This feature provides the ability to support resource-based call admission control processes. These resources include system resources such as CPU, memory, and call volume, and interface resources such as call volume.

If system resources are not available to admit the call, two kinds of actions are provided: system denial (which busies out all of T1 or E1) or per call denial (which disconnects, hairpins, or plays a message or tone). If the interface-based resource is not available to admit the call, the call is dropped from the session protocol (such as H.323).

User Selected Call Admission Controls

The Call Admission Control for H.323 VoIP Gateways feature allows a user to configure thresholds for local resources as well as memory and CPU resources. The list of local resources that are configured for call admission are described on the **call threshold poll-interval** command reference page.

With the **call threshold** command, a user is allowed to configure two thresholds, high and low, for each resource. Call treatment is triggered when the current value of a resource goes beyond the configured high. The call treatment remains in effect until the current resource value falls below the configured low. Having high and low thresholds prevents call admission flapping and provides hysteresis in call admission decision making.

With the **call spike** command, a user is allowed to configure the limit for incoming calls during a specified time period. A call spike is the term for when a large number of incoming calls arrive from the Public Switched Telephone Network (PSTN) in a very short period of time (for example:100 incoming calls in 10 milliseconds).

With the **call treatment** command, users are allowed to select how the call should be treated when local resources are not available to handle the call. For example, when the current resource value for any one of the configured triggers for call threshold has exceeded the configured threshold, the call treatment choices are as follows:

- Time-division multiplexing (TDM) hairpinning—Hairpins the calls through the plain old telephone service (POTS) dial peer.
- Reject—Disconnects the call.
- Play message or tone—Plays a configured message or tone to the user.

Resource Unavailable Signaling

The Resource Unavailable Signaling feature supports the autobusyout feature where channels are busied out when local resources are not available to handle the call. Autobusyout is supported on both channel associated signaling (CAS) and Primary Rate Interface (PRI) channels.

- CAS—Uses busyout to signal that local resources are unavailable.
- PRI—Uses either service messages or a cause code to signal that resources are unavailable.

PSTN Fallback

The goal of PSTN fallback is to monitor congestion in the IP network and either redirect calls to the PSTN or reject calls based on the network congestion. Calls can be rerouted to an alternate IP destination or to the PSTN if the IP network is found unsuitable for voice traffic at that time. The user defines the congestion thresholds based on the configured network. This functionality enables the service provider to give a reasonable guarantee about the quality of the conversation to their Voice over IP (VoIP) users at the time of call admission.



Note

PSTN fallback does not provide assurances that a VoIP call that proceeds over the IP network is protected from the effects of congestion. This is the function of the other quality of service (QoS) mechanisms such as IP Real-Time Transport Protocol (RTP) priority or low latency queueing (LLQ).

PSTN fallback includes the following features:

- Offers flexibility to define the congestion thresholds based on the network.
 - Defines a threshold based on Calculated Planning Impairment Factor (ICPIF), which is derived as part of International Telecommunication Union (ITU) G.113.
 - Defines a threshold based solely on packet delay and loss measurements.
- Uses Service Assurance Agent (SAA) probes to provide packet delay, jitter, and loss information for the relevant IP addresses. Based on the packet loss, delay, and jitter encountered by these probes, an ICPIF or delay and loss values are calculated.
- Is supported by calls of any codec. Only G.729 and G.711 have accurately simulated probes. Calls of all other codecs are emulated by a G.711 probe.

For more information, including configuration tasks and examples, and command reference pages for PSTN fallback, refer to the *Cisco IOS Voice, Video, and Fax Configuration Guide* and *Cisco IOS Voice, Video, and Fax Command Reference*, Release 12.2.

Benefits

- Configurable call treatment — Allows an Internet service provider (ISP) to configure how the call is supposed to be treated when local resources to process the call are not available.
 - TDM hairpinning—Hairpins the calls through the POTS dial peer.
 - Reject—Disconnects the call.
 - Play message—Plays a configured tone to the user.
- Resource unavailable signaling—Allows user to automatically busy out channels when local resources are not available to handle the call.

- CAS—Uses busyout to signal that resources are unavailable.
- PRI—Uses either service messages or disconnects with correct cause code to signal that resources are unavailable.
- User selected threshold—Allows user to configure thresholds for each of the local resources.

PSTN Fallback

- The PSTN Fallback feature automatically routes a call to any alternate destination when the data network is congested at the time of the call setup.
- PSTN fallback provides delay, jitter, and packet loss information for the configured IP addresses.
- PSTN fallback contains a network traffic cache used to maintain ICPIF and delay, loss, and jitter values, which increases performance. A new call does not have to wait for probe results before it is admitted. The value is cached from a previous call.

Restrictions

The following are restrictions applicable to the PSTN Fallback feature only:

- Upon detecting network congestion, the PSTN Fallback feature does not do anything to the existing call. It affects only subsequent calls.
- There is a single ICPIF/delay-loss value per system.
- The PSTN Fallback feature adds a small call setup delay for the first call to a new IP destination.
- H.323 VoIP calls are supported.

Related Documents

- *Single and High-Density VoIP Support for the Cisco AS5300/Voice Gateway*
- *Cisco IOS Voice, Video, and Fax Configuration Guide*, Release 12.2
- *Cisco IOS Voice, Video, and Fax Command Reference*, Release 12.2
- *Cisco AS5300 Software Configuration Guide*
- *Advanced Voice Busyout*, Cisco IOS Release 12.2(4)T.

Supported Platforms

- Cisco 1750
- Cisco 1751
- Cisco 2600 series
- Cisco 3600 series
- Cisco AS5300
- Cisco AS5350
- Cisco AS5400

- Cisco AS5800
- CiscoAS5850
- Cisco 7200 series
- Cisco MC3810

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. 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>



Note

Cisco Feature Navigator does not support Cisco IOS Release 12.2(2)XA or Release 12.2(2)XB1.

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

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

No new or modified RFCs are supported by this feature.

Prerequisites

The Cisco AS5350 and Cisco AS5400 do not support the MICA technologies modem card, the Microcom modem card, or the VoIP feature card. Voice and modem functions are provided by the Universal Port Dial Feature Card running SPE firmware. For more information, refer to the *Cisco AS5350 Universal Gateway Card Installation Guide* and the *Cisco AS5400 Universal Gateway Card Installation Guide*. All references to the Cisco AS5300 in this document apply to the Cisco AS5350 and Cisco AS5400 platforms with the following exceptions:

- Use the Universal Port Dial Feature Card instead of the MICA or Microcom modem cards.
- Use SPE firmware instead of portware version 6.7.7.
- Run Cisco IOS Release 12.1(5)XM2 or higher software for VoIP functionality.

Other Prerequisites

Before you configure PSTN fallback, you must have already configured VoIP. For more information, refer to the *Cisco IOS Voice, Video, and Fax Configuration Guide* and *Cisco IOS Voice, Video, and Fax Command Reference*, Release 12.2.

Use [Table 1](#) to ensure that you have the correct Cisco IOS release for your platform.

Table 1 Cisco IOS Release and Platform Support for this Feature

Platform	12.2(2)XA	12.2(4)T	12.2(2)XB1	12.2(11)T
Cisco 2600 Series	X	X	X	X
Cisco 3600 Series	X	X	X	X
Cisco MC3810 Multiservice Concentrator	X	X	X	X
Cisco AS5300 Universal Access Server	X	Not supported	Not supported	X
Cisco AS5350 Universal Gateway	X	Not supported	Not supported	Not supported
Cisco AS5400 Universal Gateway	X	Not supported	Not supported	Not supported
Cisco AS5850 Universal Gateway	Not supported	Not supported	X	X
Cisco AS5800 Universal Gateway	Not supported	Not supported	Not supported	X

Configuration Tasks

See the following sections for the configuration tasks for the Call Admission Control and PSTN Fallback features. Each task in the list is identified as either required or optional:

- [Configuring Call Spike, page 7](#) (required)
- [Configuring Call Threshold, page 7](#) (required)
- [Configuring Call Threshold Poll Interval, page 7](#) (optional)
- [Configuring Call Treatment, page 7](#) (optional)
- [Configuring PSTN Fallback, page 8](#) (required)

Configuring Call Spike

To configure the limit for the number of incoming calls in a period of time, enter the following command in global configuration mode:

Command	Purpose
Router(config)# call spike <i>call-number</i> [steps <i>number-of-steps</i> size <i>milliseconds</i>]	Configures the limit for the number of incoming calls in a short period of time.

Configuring Call Threshold

To configure the call threshold, use the following command in global configuration mode:

Command	Purpose
Router(config)# call threshold { global <i>trigger-name</i> interface <i>interface-name</i> <i>interface-number</i> int-calls } low <i>value</i> high <i>value</i> [busyout treatment]	Enables a resource and defines associated parameters. Action is enabled when the resource cost goes beyond the high value and is not disabled until the resource cost drops below the low value .

Configuring Call Threshold Poll Interval

To configure the interval at which the call threshold is polled, use the following command in global configuration mode:

Command	Purpose
Router(config)# call threshold poll-interval { cpu-average memory } <i>seconds</i>	Enables a polling interval threshold for CPU or memory.

Configuring Call Treatment

To configure the call treatment, use the following command in global configuration mode:

Command	Purpose
Router(config)# call treatment { on action <i>action</i> [<i>value</i>] cause-code <i>cause-code</i> isdn-reject <i>value</i> }	<p>Configures how calls should be processed when local resources are unavailable and indicates whether the call should be disconnected (with cause code), hairpinned, or play a message or busy tone to the user.</p> <p>Note The isdn-reject keyword takes effect only when all ISDN trunks are busied out and the switch ignores the busyout trunks and still sends ISDN calls into the gateway. Otherwise the keyword has no effect.</p>

Verifying Call Admission Control Tasks

To verify the call admission control, use the following commands:

- **show call spike status**—Displays the configured call spike threshold and statistics for incoming calls.
- **show call threshold**—Displays enabled triggers, current values for configured triggers, and number of Application Programming Interface (API) calls that were made to global and interface resources.
- **show call treatment**—Displays the call treatment configuration and the statistics for handling the calls based upon resource availability.
- **show running-config**—Displays the configuration of all of the configuration tasks commands.

Configuring PSTN Fallback

For configuration information, refer to the *Cisco IOS Voice, Video, and Fax Configuration Guide*, Release 12.2.

Configuration Examples

This section provides the following configuration examples:

- [Call Spike Configuration Example, page 8](#)
- [Call Threshold Configuration Example, page 8](#)
- [Call Threshold Poll Interval Configuration Example, page 9](#)
- [Call Treatment Configuration Example, page 9](#)

Call Spike Configuration Example

The following configuration of the **call spike** command has a call number of 30, 10 steps, and a step size of 2,000 milliseconds:

```
call threshold global cpu-avg low 70 high 80
call spike 30 steps 10 size 2000
cns event-service server
```

Call Threshold Configuration Example

The following example will busy out the total-calls resource of 5 (low) or 5,000 (high):

```
call threshold global total-calls low 5 high 5000 busyout
```

The following example enables thresholds of 5 (low) and 2,500 (high) on interface Ethernet 0:

```
call threshold interface Ethernet 0 int-calls low 5 high 2500
```

The following example will busyout the average CPU utilization if 5 percent (low) or 65 percent (high) is reached:

```
call threshold global cpu-avg low 5 high 65 busyout
```

Call Threshold Poll Interval Configuration Example

The following example enables a polling interval threshold for memory of 10 seconds:

```
call threshold poll-interval memory 10
```

The following example enables a polling interval threshold of 50 seconds:

```
call threshold poll-interval cpu-average 50
```

Call Treatment Configuration Example

The following example enables the Call Treatment feature with a “hairpin” action:

```
call treatment on  
call treatment action hairpin
```

The following example displays proper formatting of the **action playmsg** keywords:

```
call treatment on  
call treatment action playmsg tftp://keyer/prompts/congestion.au
```



Note

The congestion.au file plays when local resources are not available to handle the call.

The following example configures a call treatment cause code to display no-qos when local resources are unavailable to process a call:

```
call treatment on  
call treatment cause-code no-qos
```

Command Reference

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

- [call spike](#)
- [call threshold](#)
- [call threshold poll-interval](#)
- [call treatment](#)
- [clear call threshold](#)
- [clear call treatment stats](#)
- [debug call threshold](#)
- [debug call treatment action](#)
- [ds0-group](#)
- [show call spike status](#)
- [show call threshold](#)
- [show call treatment](#)
- [test call threshold](#)

call spike

To configure the limit of incoming calls in a short period of time, use the **call spike** command in global configuration mode. To disable this command, use the **no** form of this command.

call spike *call-number* [**steps** *number-of-steps* **size** *milliseconds*]

no call spike

Syntax Description		
<i>call-number</i>	Incoming call numbers for spiking threshold. Valid range is from 1 to 2,147,483,647.	
steps <i>number-of-steps</i>	(Optional) Number of steps. Valid range is from 3 to 10.	
size <i>milliseconds</i>	(Optional) Step size in milliseconds. Valid range is from 100 to 2,000.	

Defaults No default behavior or values.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)XA	This command was first introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Usage Guidelines A call spike is the term for a large number of incoming calls arriving from the PSTN in a very short period of time (for example: 100 incoming calls in 10 milliseconds). This command allows you to control the amount of call requests that are received in a configured time period.

Examples The following configuration of the **call spike** command has a call number of 30, 10 steps, and a step size of 2,000 milliseconds:

```
call spike 30 steps 10 size 2000
```

■ call spike

Related Commands!	Command	Description
	show call spike status	Displays the configuration of the threshold for incoming calls.

call threshold

To enable the global resources of this gateway, use the **call threshold** command in global configuration mode. To disable this command, use the **no** form of this command.

```
call threshold { global trigger-name / interface interface-name interface-number int-calls } low
value high value [busyout | treatment]
```

```
no call threshold { global trigger-name / interface interface-name int-calls }
```

Syntax Description	
global <i>trigger-name</i>	Specifies the global resources on the gateway. The <i>trigger-name</i> arguments are as follows: <ul style="list-style-type: none"> • cpu-5sec—CPU utilization in the last 5 seconds. • cpu-avg—Average CPU utilization. • io-mem—IO memory utilization. • proc-mem—Processor memory utilization. • total-calls—Total number of calls. The valid range is from 1 to 10,000. • total-mem—Total memory utilization.
interface <i>interface-name interface-number</i>	Specifies the gateway. Types of interfaces and their numbers will depend upon the configured interfaces.
int-calls	Number of calls through the interface. The valid range is from 1 to 10,000 calls.
low <i>value</i>	Value of low threshold. The valid range is from 1 to 100 (percent) for the utilization triggers.
high <i>value</i>	Value of high threshold. The valid range is from 1 to 100 (percent) for the utilization triggers.
busyout	(Optional—global only) Automatically busies out the T1/E1 channels if the resource is not available.
treatment	(Optional—global only) Applies call treatment from session application if the resource is not available.

Defaults The defaults for the **busyout** and **treatment** keywords are for global resource triggers only. There are no other defaults.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)XA	This command was introduced and replaces the call-denial command.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples

The following example will busyout the total-calls resource of 5 (low) or 5,000 (high) is reached:

```
call threshold global total-calls low 5 high 5000 busyout
```

The following example enables thresholds of 5 (low) and 2,500 (high) for interface calls on interface Ethernet 0:

```
call threshold interface Ethernet 0 int-calls low 5 high 2500
```

The following example will busyout the average CPU utilization if 5 percent (low) or 65 percent (high) is reached:

```
call threshold global cpu-avg low 5 high 65 busyout
```

Related Commands

Command	Description
call threshold poll-interval	Enables a polling interval threshold for CPU or memory.
clear call threshold	Clears enabled resources and their associated parameters.
show call threshold	Displays enabled triggers, current values for configured triggers, and number of API calls that were made to global and interface resources.

call threshold poll-interval

To enable a polling interval threshold for CPU or memory, use the **call threshold poll-interval** command in global configuration command. To disable this command, use the **no** form of this command.

call threshold poll-interval { **cpu-average** | **memory** } *number-of-seconds*

no call threshold poll-interval { **cpu-average** | **memory** }

Syntax Description		
	cpu-average	The CPU average interval. Default is 60 seconds.
	memory	The memory average polling interval. Default is 5 seconds.
	<i>number-of-seconds</i>	Window of polling interval. The valid range is from 1 to 60 seconds.

Defaults The default value for the **cpu-average** keyword is 60 seconds. The default value for the **memory** keyword is 5 seconds.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)XA	This command was introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples The following example enables a polling interval threshold for memory of 10 seconds:

```
call threshold poll-interval memory 10
```

Related Commands	Command	Description
	call threshold	Enables the global resources of the gateway.

Command	Description
clear call threshold	Clears enabled resources and their associated parameters.
show call threshold	Displays enabled triggers, current values for configured triggers, and number of API calls that were made to global and interface resources.

call treatment

To configure how calls should be processed when local resources are unavailable, use the **call treatment** command in global configuration mode. To disable the call treatment triggers, use the **no** form of this command.

```
call treatment { on | action action [value] | cause-code cause-code | isdn-reject value }
```

```
no call treatment { on | action action [value] | cause-code cause-code | isdn-reject value }
```

Syntax Description	
on	Enables call treatment from default session application.
action <i>action</i>	Action to take when call treatment is triggered. The <i>action</i> argument has the following possible values: <ul style="list-style-type: none"> • hairpin—Hairpin. • playmsg—Specifies the audio file to play (URL). • reject—Disconnect the call and pass down cause code.
<i>value</i>	(Optional) (For the <i>action</i> playmsg argument only) Specifies the audio file to play. URL format.
cause-code <i>cause-code</i>	Specifies reason for disconnect to caller. The <i>cause-code</i> argument can have the following values: <ul style="list-style-type: none"> • busy — Indicates gateway is busy. • no-QoS — Indicates the gateway cannot provide Quality of Service (QoS). • no-resource — Indicates the GW has no resources available.
isdn-reject <i>value</i>	Select the ISDN reject cause-code. The value argument has the following: <ul style="list-style-type: none"> • 34-47 (ISDN cause code for rejection) <p>Note The isdn-reject keyword takes effect only when all ISDN trunks are busied out and the switch ignores the busyout trunks and still sends ISDN calls into the gateway. Otherwise the keyword has no effect.</p>

Defaults The treatment is inactive by default.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)XA	This command was introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.

Release	Modification
12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Usage Guidelines

This command indicates whether the call is to be disconnected with a cause code, hairpinned, message played to the user, or busy tone to the user.

Examples

The following example enables the Call Treatment feature with a ‘hairpin’ action:

```
call treatment on
 call treatment action hairpin
```

The following example displays proper formatting of the **playmsg action** keyword:

```
call treatment action playmsg tftp://keyer/prompts/congestion.au
```



Note

The congestion.au file plays when local resources are not available to handle the call.

The following example configures a call treatment cause-code to display no-Qos when local resources are unavailable to process a call:

```
call treatment cause-code no-qos
```

Related Commands

Command	Description
clear call treatment stats	Clears the call treatment stats.
show call treatment	Displays the call treatment configuration and the statistics for handling the calls due to resource availability.

clear call threshold

To clear enabled triggers and their associated parameters, use the **clear call threshold** command in EXEC mode.

```
clear call threshold {stats | total-calls [value] | interface int-name int-calls [value]}
```

Syntax Description		
stats		Resets all call threshold stats.
total-calls		Resets the counter for the call volume in the gateway. The default is 0.
<i>value</i>		(Optional) Represents the call volume. The valid range is from 0 to 10,000 calls. The default is 0.
interface <i>int-name</i>		Resets the counter for the call volume through the specified interface.
int-calls		The number of calls transmitted through the interface.

Defaults

The default for the **total-calls** keyword and the *value* argument is 0.

Command Modes

EXEC mode

Command History

Release	Modification
12.2(2)XA	This command was introduced.
12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples

The following example resets all call threshold stats:

```
clear call threshold stats
```

The following example resets the counter for the call volume in the gateway:

```
clear call threshold total-calls
```

The following example resets the counter for the call volume on interface Ethernet 0:

```
clear call threshold interface e 0 int-calls
```

■ clear call threshold

Related Commands	Command	Description
	call threshold	Enables a resource and define associated parameters.
	call threshold poll-interval	Enables a polling interval threshold for CPU or memory.
	show call treatment	Displays the call threshold stats.

clear call treatment stats

To clear the call treatment stats, use the **clear call treatment stats** command in EXEC mode.

clear call treatment stats

Syntax Description There are no keywords for this command.

Defaults No default behavior or values.

Command Modes EXEC mode

Release	Modification
12.2(2)XA	This command was introduced.
12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples See the following sample output from the **clear call treatment stats** command in EXEC mode:

```
Router# clear call treatment stats
```

Command	Description
call treatment	Configures how calls should be processed when local resources are unavailable.
show call treatment	Displays the call treatment configuration and the statistics for handling the calls due to resource availability.

debug call threshold

To see details of the trigger actions, use the **debug call threshold** command in privileged EXEC command. To disable debugging output, use the **no** form of this command.

debug call threshold *module*

no debug call threshold

Syntax Description	<i>module</i>	The <i>module</i> argument can be: <ul style="list-style-type: none"> • core—Traces the resource information. • detail—Traces for detail information.
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Defaults	Debugging is disabled.	
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Command Modes	EXEC mode	
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Command History	Release	Modification
	12.2(2)XA	This command was introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples	<pre>Router# debug call threshold core RSCCAC Core info debugging is on Router# debug call threshold detail All RSCCAC info debugging is on</pre>
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debug call treatment action

To debug the call treatment actions, use the **debug call treatment action** command in privileged EXEC command. Use the **no** form of this command to disable debugging output. .

debug call treatment action

no debug call treatment action

Syntax Description This command has no arguments or keywords.

Defaults Debugging is disabled.

Command Modes EXEC

Command History	Release	Modification
	12.2(2)XA	This command was introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples Debug actions are performed on calls by call treatment. The following sample output shows that call treatment is turned on:

```
Router# debug call treatment action
Call treatment action debugging is on
```

ds0-group

To define T1 or E1 channels for compressed voice calls and the channel-associated signaling (CAS) method by which the router connects to the PBX or PSTN, enter the **ds0-group** controller configuration command. To remove the group, signaling, and direction settings, use the **no** form of the command.

```
ds0-group ds0-group-number timeslots timeslot-list [service {data | fax | voice} | type {e&m-fgd
| e&m-fgd | e&m-immediate-start | fgd-eana | fgd-os | fxs-ground-start | fxs-loop-start |
none | r1-itu | r1-modified | r1-turkey | sas-ground-start | sas-loop-start}]
```

```
no ds0-group ds0-group-number
```

Syntax Description

<i>ds0-group-number</i>	A value from 0 to 23 that identifies the DS-0 group.
timeslots <i>timeslot-list</i>	The <i>timeslot-list</i> is a single timeslot number, a single range of numbers, or multiple ranges of numbers separated by commas. For T1, allowable values are from 1 to 24. For E1, allowable values are from 1 to 30. Examples are: <ul style="list-style-type: none"> • 2 • 1-15, 17-24 • 1-23 • 2, 4, 6-12
service	(Optional) Specifies the type of service. The keywords are as follows: <ul style="list-style-type: none"> • data—Data service • fax—Fax store and forward service • voice—Voice service

type	<p>(Optional) The signaling method selection for type depends on the connection that you are making. The E&M interface allows connection for PBX trunk lines (tie lines) and telephone equipment. The FXS interface allows connection of basic telephone equipment and PBX.</p> <p>The keywords are as follows:</p> <ul style="list-style-type: none"> • e&m-fgb—RecEive and transMit Type II FGB • e&m-fgd—RecEive and transMit Type II FGD • e&m-immediate-start—No specific off-hook and on-hook signaling. • fgd-eana—Feature Group-D Exchange Access North American • fgd-os—Feature Group-D operator services • fxs-ground-start—Foreign Exchange Station ground-start signaling support • fxs-loop-start—Foreign Exchange Station loop-start signaling support • none—Null signalling for external call control • r1-itu—R1 ITU • r1-modified—R1 modified • r1-turkey—R1 signaling for Turkey • sas-ground-start—Single attachment station ground-start signaling support • sas-loop-start—Single attachment station loop-start signaling support
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Defaults

There is no DS-0 group. Calls are allowed in both directions by default.

Command Modes

Controller configuration

Command History

Release	Modification
11.3 MA	The command was introduced as the voice-group command for the Cisco MC3810 multiservice access concentrator.
12.0(5)XE	The command was introduced for the Cisco 7200 series with a different name and some keyword modifications.
12.2(2)XA	The command was introduced for the Cisco AS5300.
12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.

12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Usage Guidelines

The **ds0-group** command automatically creates a logical voice port that is numbered as follows on Cisco AS5300 with a T1 controller: *slot/port*. Although only one voice port is created for each group, applicable calls are routed to any channel in the group.

Examples

The following example configures ranges of T1 controller timeslots for FXS ground-start signaling

```
controller T1 1/0
 ds0-group 1 timeslots 1-4 type fxs-ground-start
```

Related Commands

Command	Description
cas-group	Configures channelized T1 timeslots with robbed bit signaling.

show call spike status

To display the configured call spike threshold and statistics for incoming calls, use the **show call spike status** command in EXEC mode.

show call spike status

Syntax Description There are no keywords or descriptions for this command.

Defaults No default behavior or values.

Command Modes EXEC mode

Command History	Release	Modification
	12.2(2)XA	This command was first introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples

```
Router# show call spike status

Call Spiking:Configured
Call spiking:NOT TRIGGERED
total call count in sliding window::20
```

Table 2 *show call spike status Fields and Descriptions*

Field	Description
Call Spiking: Configured	Current enabled state of call spiking.
Call Spiking: NOT TRIGGERED	Details if call spiking limit has been triggered.
total call count in sliding window	Number of calls during spiking interval.

Related Commands

■ show call spike status

Command	Description
call spike	Configures the limit for the number of incoming calls in a short period of time.

show call threshold

To display enabled triggers, current values for configured triggers, and number of Application Programming Interface (API) calls that were made to global and interface resources, use the **show call threshold** command in EXEC mode.

show call threshold { configuration | status [unavailable] | stats }

Syntax Description	configuration	Displays the current threshold configuration.
	status	Displays the status of all configured triggers and whether or not the CPU is available.
	unavailable	(Optional) Displays the status for all unavailable resources.
	stats	Displays stats of API calls (resource-based measurement).

Defaults No default behavior or values.

Command Modes EXEC mode

Command History	Release	Modification
	12.2(2)XA	This command was introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples

```
Router# show call threshold config
```

```
Some resource polling interval:
```

```
CPU_AVG interval: 60
```

```
Memory interval: 5
```

IF	Type	Value	Low	High	Enable
Serial3/1:23	int-calls	0	107	107	N/A
N/A	cpu-avg	0	70	90	busy&treat

Table 3 *show call threshold config Fields and Descriptions*

Field	Description
CPU_AVG interval	Interval of configured trigger CPU_AVG.
Memory interval	Interval of configured trigger Memory.
IF	Interface.
Type	Type of resource.
Value	Value of call to be matched against low and high thresholds.
Low	Low threshold
High	High threshold
Enable	Displays if the busyout and/or treatment keywords are enabled.

Related Commands

Command	Description
call threshold	Enables a resource and define associated parameters.
call threshold poll-interval	Enables a polling interval threshold for CPU or memory.
clear call threshold	Clears enabled triggers and their associated parameters.

show call treatment

To display the call treatment configuration and the statistics for handling the calls based upon resource availability, use the **show call treatment** command in EXEC mode.

show call treatment {config | stats}

Syntax Description	config	stats
	Displays the call treatment configuration.	Displays the statistics for handling the calls due to resource availability.

Defaults No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	12.2(2)XA	This was command introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples

```
Router# show call treat config
```

```
Call Treatment Config
-----
```

```
Call treatment is OFF.
Call treatment action is: Reject
Call treatment disconnect cause is: no-resource
Call treatment ISDN reject cause-code is: 41
```

Table 4 *show call treatment config Fields and Descriptions*

Field	Description
Call treatment is:	State of call treatment, either ON or OFF.
Call treatment action is:	Action trigger assigned for call treatment.

Table 4 *show call treatment config Fields and Descriptions*

Call treatment disconnect cause is:	Reason for disconnect.
Call treatment ISDN reject cause-code is:	Reject code number assigned.

```
Router# show call treat stats

Call Treatment Statistics
-----

Total Calls by call treatment: 0
Calls accepted by call treatment: 0
Calls rejected by call treatment: 0
Reason          Num. of calls rejected
-----
cpu-5sec:       0
cpu-avg:        0
total-mem:      0
io-mem:         0
proc-mem:       0
total-calls:    0
```

Table 5 *show call treatment stats Fields and Descriptions*

Field	Description
Total Calls by call treatment:	Number of calls received and treated.
Calls accepted by call treatment:	Calls that passed treatment parameters.
Calls rejected by call treatment:	Calls that failed treatment parameters.
cpu-5sec	Number of calls rejected for failing cpu-5sec parameter.
cpu-avg	Number of calls rejected for failing cpu-avg parameter.
total-mem	Number of calls rejected for failing total-mem parameter.
io-mem	Number of calls rejected for failing io-mem parameter.
proc-mem	Number of calls rejected for failing proc-mem parameter.
total-calls	Number of calls rejected for failing total-calls parameter.

Related Commands

Command	Description
call treatment	Configures how calls should be processed when local resources are unavailable.
clear call treatment stats	Clears the call treatment stats.

test call threshold

To test how the core Application Programming Interfaces (APIs) behave based on the resource configuration, use the **test call threshold** command in EXEC mode.

```
test call threshold {enable [busyout / treatment] [global | ipaddress ipaddress] |  
interface interface-name interface-number}
```

Syntax Description		
enable		Enables busyout or treatment action. Default is both.
busyout		(Optional) Automatically busies out the T1 or E1 if the resource is not available.
treatment		(Optional) Applies call treatment from session application if the resource is not available.
global		(Optional) Specifies the test to be on the global resources on the gateway.
ipaddress <i>ipaddress</i>		(Optional) The remote address. This allows users to test how the core behaves.
interface <i>interface-name interface-number</i>		Specifies interface configured as gateway.

Defaults No default behavior or values.

Command Modes EXEC mode

Command History	Release	Modification
	12.2(2)XA	This command was introduced.
	12.2(4)T	The command was integrated into Cisco IOS Release 12.2(4)T. Support for the Cisco AS5300, AS5350, and AS5400 is not included in this release.
	12.2(2)XB1	This command was implemented on the Cisco AS5850 platform.
	12.2(4)XM	This command was implemented on Cisco 1750 and Cisco 1751 routers. This release does not support any other Cisco platforms.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T and implemented on Cisco 7200 series routers. Support for the Cisco AS5300 universal access server, Cisco AS5350, Cisco AS5400, and Cisco AS5850 universal gateway is not included in this release.
	12.2(11)T	This feature was integrated into Cisco IOS Release 12.2(11)T and support was added for Cisco AS5300, Cisco AS5350, Cisco AS5400, and Cisco AS5800.

Examples The following example specifies the test to be on the global resources.

```
Router# test call threshold enable global
```

■ test call threshold

Related Commands	Command	Description
	call spike	Enables a trigger and defines associated parameters.
	call threshold poll-interval	Enables a polling interval threshold for CPU or memory.
	show call treatment	Displays enabled triggers, current values for configured triggers, and number of API calls that were made to global and interface resources.

Glossary

ABCD signaling—Four-bit telephony line signaling coding in which each letter of “ABCD” represents one of the four bits. This is often associated with CAS or Robbed-Bit signaling on a T1 or E1 telephony trunk.

AIS—Alarm indication signal. In a T1 transmission, an all-ones signal transmitted in lieu of the normal signal to maintain transmission continuity and to indicate to the receiving terminal that there is a transmission fault that is located either at, or upstream from, the transmitting terminal

API—Application Programming Interface. Specification of function-call conventions that defines an interface to a service.

AVBO—Advanced Voice Busy Out.

Cisco-trunk (private line) call—A Cisco-trunk (private line) call is established by the forced connection of a dynamic switched call. A Cisco-trunk call is established during configuration of the trunk and stays up for the duration of the configuration. Optionally, it provides a pass-through connection path to pass signaling information between the two telephony interfaces at either end of the connection.

CLI—Command line interface. Interface that allows the user to interact with the operating system by entering commands and optional arguments.

CODEC—Coder-Decoder. An integrated circuit device that typically uses pulse code modulation to transform analog signals into a digital bit stream and digital signals back into analog signals. In Voice over IP, Voice over Frame Relay, and Voice over ATM, a DSP software algorithm used to compress/decompress speech or audio signals.

DLCI—Data-link connection identifier. Value that specifies a PVC or SVC in a Frame Relay network. In the basic Frame Relay specification, DLCIs are locally significant (connected devices might use different values to specify the same connection). In the LMI extended specification, DLCIs are globally significant (DLCIs specify individual end devices).

Dial peer—An addressable call endpoint that contains configuration information including voice protocol, a CODEC type, and a telephone number associated with the call endpoint. There are five kinds of dial peers: POTS, VoIP, VoFR, VoATM, and VoHDL.

DS0—Digital signal level 0. Framing specification used in transmitting digital signals over a single channel at 64-kbps on a T1 facility.

DSP—Digital Signal Processor. A specialized computer chip designed to perform speedy and complex operations on digitized waveforms.

DTMF—Dual tone multifrequency. Uses two simultaneous voice-band tones for dial such as touch tone.

DTMF relay—Enables the generation of FRF.11 Annex A frames for a VoFR dial peer. The DSP generates Annex A frames instead of passing a DTMF tone through the network as a voice sample.

Dynamic switched call—A telephone call dynamically established across a packet data network based on a dialed telephone number. In the case of VoFR, a Cisco proprietary session protocol similar to Q.931 is used to achieve call switching and negotiation between calling endpoints. The proprietary session protocol runs over FRF.11-compliant subchannels.

E&M—Stands for receive and transmit (or Ear and Mouth). E&M is a trunking arrangement generally used for two-way switch-to-switch or switch-to-network connections. Cisco’s analog E&M interface is an RJ-48 connector that allows connections to PBX trunk lines (tie lines). E&M is also available on E1 and T1 digital interfaces.

E1—European equivalent of T1. 32-64kbps channels include 1-channel for framing and 1-channel for D-channel information at a 2.048 Mhz clock rate.

FRF—Frame Relay Forum. An association of corporate members consisting of vendors, carriers, users, and consultants committed to implementing Frame Relay in accordance with national and international standards. See <http://www.frforum.com>.

FXS—Foreign Exchange Station. An FXS interface connects directly to a standard telephone and supplies ring, voltage, and dial tone. Cisco's FXS interface is an RJ-11 connector that allows connections to basic telephone service equipment, keysets, and PBXs.

ICPIF—Calculated Planning Impairment Factor. Calculated and used as per the ITU G.113 specification.

IO—Input/output.

LLQ—Low latency queuing. LLQ brings strict priority queuing to Class-Based Weighted Fair Queuing (CBWFQ). Strict priority queuing allows delay-sensitive data such as voice to be dequeued and sent first (before packets in other queues are dequeued), giving delay-sensitive data preferential treatment over other traffic.

MD5—Message Digest 5. Algorithm used for message authentication in SNMP v.2. MD5 verifies the integrity of the communication, authenticates the origin, and checks for timeliness.

MEL CAS—Mercury Exchange Limited (MEL) Channel Associated Signaling. A voice signaling protocol used primarily in the United Kingdom.

OOS—Out of service state of the call or trunk.

PBX—Private Branch Exchange. A privately owned central switching office.

Permanent calls—Permanent calls are private line calls used for fixed point-to-point calls, connections between PBXs (E&M to E&M), or for remote telephone extensions (FXO to FXS).

POTS—Plain old telephone service. Basic telephone service supplying standard single line telephones, telephone lines, and access to the PSTN.

POTS dial peer—Dial peer connected by a traditional telephony network. POTS peers point to a particular voice port on a voice network device.

PRI—Primary Rate Interface. ISDN interface to primary rate access. Primary rate access consists of a single 64-Kbps D channel plus 23 (T1) or 30 (E1) B channels for voice or data.

PSTN—Public Switched Telephone Network. PSTN refers to the local telephone company.

RAI—Resource Availability Indicator.

SAA—Service Assurance Agent, formerly known as Response Time Reporter (RTR). Works alongside TCP to carry streaming data over the network. RTP uses packet headers that contain sequencing information, time stamps required to time the output (for example, display of frames) and synchronize different data streams (for example, audio and video), and information on the packet's "payload" (for example, MPEG versus H.261 encoding). This payload descriptor allows RTP to support multiple compression types.

Switched calls—Switched calls are normal telephone calls when a user picks up a phone, hears a dial tone and enters the destination phone number to reach the other phone. Switched calls can also be private line auto-ringdown (PLAR) calls, or tie-line calls for fixed point-to-point connections.

T1—Digital WAN carrier facility. T1 transmits DS-1-formatted data at 1.544 Mbps through the telephone-switching network by using AMI or B8ZS coding.

Trunk—Service that allows quasi-transparent connections between two PBXs, a PBX and a local extension, or some other combination of telephony interfaces with signaling passed transparently through the packet data network.

Voice over Frame Relay—Voice over Frame Relay enables a router to carry voice traffic (for example, telephone calls and faxes over a Frame Relay network. When sending voice traffic over Frame Relay, the voice traffic is segmented and encapsulated for transit across the Frame Relay network by using FRF.12 encapsulation.

Voice over IP—Voice over IP enables a router to carry voice traffic, for example, telephone calls and faxes) over an IP network. In Voice over IP, the DSP segments the voice signal into frames, which are then coupled in groups of two and stored in voice packets that are transported by using IP in compliance with ITU-T specification H.323.

**Note**

For a list of other internetworking terms, see *Internetworking Terms and Acronyms*, available on the Documentation CD-ROM and Cisco Connection Online (CCO) at the following URL:
<http://www.cisco.com/univercd/cc/td/doc/cisintwk/ita/index.htm>
