



IP SLAs VoIP Gatekeeper Registration Delay Monitoring

This document describes how to use the Cisco IOS IP Service Level Agreements (SLAs) VoIP gatekeeper registration delay operation to determine the average, median, or aggregated response time (delay) of registration attempts from a Voice over IP (VoIP) gateway to a VoIP gatekeeper device.

To measure VoIP gatekeeper registration response time, the gatekeeper registration delay operation functions by sending a lightweight Registration Request (RRQ) from an H.323 gateway (GW) to an H.323 gatekeeper (GK), and recording the amount of time taken to receive the Registration Confirmation (RCF) back from the gatekeeper.

History for the IP SLAs VoIP Gatekeeper Registration Delay Monitoring Feature

Release	Modification
12.3(14)T	This feature was introduced.

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Restrictions for the IP SLAs VoIP Gatekeeper Registration Delay Operation

You cannot configure the IP SLAs VoIP gatekeeper registration delay operation if the gatekeeper has already been registered with the gateway.

Information About the IP SLAs VoIP Gatekeeper Registration Delay Operation

To configure the IP SLAs VoIP gateway registration delay operation, you should understand the following concepts:

- [H.323, Gatekeepers, and Gateways, page 2](#)
- [Gateway-to-Gatekeeper Registration Delay Time Monitoring, page 2](#)

H.323, Gatekeepers, and Gateways

H.323 is the ITU-T protocol standard used for managing and facilitating packetized voice and video over local-area networks (LANs, particularly intranets) and over the Internet. H.323 consists of several component standards; see the “[Glossary](#)” section on [page 12](#) for details on these standardized protocols.

H.323 is considered an “umbrella protocol” because it defines all aspects of call transmission, from call establishment to capabilities exchange to network resource availability. H.323 defines Registration, Admission, and Status (RAS) protocols for call routing, H.225 protocols for call setup, and H.245 protocols for capabilities exchange. The IP SLAs VoIP Gatekeeper Registration Delay Monitoring feature focuses on the function of the call control H.323 stack.

For an in-depth discussion of H.323, including gatekeeper and gateway functionality, see the “H.323 Applications” chapter (part of the *Cisco IOS Voice, Video, and Fax Configuration Guide*, Release 12.2) [http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgr/fvfax_c/index.htm].

Gateway-to-Gatekeeper Registration Delay Time Monitoring

The IP SLAs VoIP gatekeeper registration delay operation provides statistical data on the amount of time taken to register a gateway to a gatekeeper. IP SLAs was designed to gather information over time, at intervals you specify, so that statistics can be provided on key metrics often used in Service Level Agreements (SLAs). Aggregated totals, median, or average data can be viewed using the Cisco IOS command-line interface (CLI) on the device running IP SLAs, or retrieved from the device by external applications using SNMP.

Cisco IOS IP SLAs also provides notification options based on performance thresholds and reaction triggering. These notification options allow for proactive monitoring in an environment where IT departments can be alerted to potential network problems, rather than having to manually examine data.

For further information on these functions, see the *Cisco IOS IP SLAs Monitoring Technology Configuration Guide*.

This operation will measure time from when the RRQ message is sent and when RCF message is received. A timeout may be required if a response is not received in a certain timeframe.

How to Configure the IP SLAs VoIP Gatekeeper Registration Delay Operation

This section contains the following procedures:

- [Configuring the VoIP H.323 Gateway, page 3](#)
- [Configuring and Scheduling the IP SLAs VoIP Gatekeeper Registration Delay Operation, page 6](#)

Configuring the VoIP H.323 Gateway

Check the registration status of the gateway to a gatekeeper using the **show gateway** command. If the gateway is not registered, perform the task described in this section.

Prerequisites

Prior to configuring the IP SLAs VoIP gatekeeper registration delay operation, the gatekeeper must be enabled and the gateway must be preregistered. As a best practice, you should confirm the gatekeeper and gateway status first.

If the gateway is not registered, select an interface and configure the gatekeeper in the gateway.

SUMMARY STEPS

1. **configure terminal**
2. **gateway**
3. **exit**
4. **interface** *interface-id*
5. **ip address** *ip-address subnet-mask*
6. **h323-gateway voip interface**
7. **h323-gateway voip id**
8. **h323-gateway voip h323-id**
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 2	gateway Example: Router(config)# gateway	Enables the H.323 VoIP gateway and enters gateway configuration mode.

	Command or Action	Purpose
Step 3	exit Example: Router(config-gateway)# exit	(Optional) Exits from gateway configuration mode and returns the CLI to global configuration mode.
Step 4	interface <i>interface-id</i> Example: Router(config)# interface Ethernet1/1	Specifies an interface and enters interface configuration mode.
Step 5	ip address <i>ip-address subnet-mask</i> Example: Router(config-if)# ip address 172.29.129.123 255.255.255.0	Configures the IP address of the interface.
Step 6	h323-gateway voip interface Example: Router(config-if)# h323-gateway voip interface	Configures the interface as an H.323 gateway interface.
Step 7	h323-gateway voip id <i>gatekeeper-id {ipaddr ip-address [port-number] multicast} [priority number]</i> Example: Router(config-if)# h323-gateway voip id zone1 ipaddr 172.29.129.124 1719 Router(config-if)# h323-gateway voip id saagk ipaddr 172.29.129.28 1719	Defines the name and location of the gatekeeper for a specific gateway. <ul style="list-style-type: none"> Repeat as needed for multiple IDs (see example).
Step 8	h323-gateway voip h323-id <i>interface-id</i> Example: Router(config-if)# h323-gateway voip h323-id GWZ	Configures the H.323 name of the gateway that identifies this gateway to its associated gatekeeper.
Step 9	end Example: Router(config-if)# end	Ends your configuration session and returns the CLI to Privileged EXEC mode.

Examples

Use the **show gateway** command to verify the registration status of the gateway to a gatekeeper.

The following example shows sample output from the **show gateway** command if the gateway (named GW3) is registered to a gatekeeper (named slagk):

```
Router# show gateway
H.323 ITU-T Version: 4.0   H323 Stack Version: 0.1

H.323 service is up
Gateway GW3 is registered to Gatekeeper slagk

Alias list (CLI configured)
```

```

E164-ID 2073418
E164-ID 5251212
H323-ID GW3
Alias list (last RCF)
E164-ID 2073418
E164-ID 5251212
H323-ID GW3

```

H323 resource thresholding is Disabled

The following example shows sample output for the **show gateway** command if the gateway is not registered to a gatekeeper:

```
Router# show gateway
```

```
Gateway gw3 is not registered to any gatekeeper
```

```
Alias list (CLI configured)
E164-ID 2073418
E164-ID 5251212
H323-ID gw3/ww
Alias list (last RCF)

```

H323 resource thresholding is Disabled

Use the **show gatekeeper endpoint** command to verify the endpoint's registration status to the gatekeeper. The following example shows the common output of this command if an endpoint is registered:

```
Router# show gatekeeper endpoint
```

```

GATEKEEPER ENDPOINT REGISTRATION
=====
CallSignalAddr  Port  RASignalAddr  Port  Zone Name  Type  Flags
-----
172.16.13.35    1720  172.16.13.35  50890  gk         VOIP-GW
E164-ID: 2073418
E164-ID: 5251212
H323-ID: gw3
Total number of active registrations = 1

```

The following example shows the common output of the **show gatekeeper endpoint** command if an endpoint is not registered:

```
Router# show gatekeeper endpoint
```

```

GATEKEEPER ENDPOINT REGISTRATION
=====
CallSignalAddr  Port  RASignalAddr  Port  Zone Name  Type  Flags
-----
Total number of active registrations = 0

```

The following configuration example shows a properly configured gateway:

```

gateway
interface Ethernet1/1
ip address 172.29.129.123 255.255.255.0
h323-gateway voip interface
h323-gateway voip id zone1 ipaddr 172.29.129.124 1719
h323-gateway voip id saagk ipaddr 172.29.129.28 1719
h323-gateway voip h323-id GWZ

```

Troubleshooting Tips

If there appears to be registration issues, see the *Troubleshooting Gatekeeper Registration Issues* technical assistance document for suggestions on resolving the issue.

<http://www.cisco.com/warp/public/788/voip/gk-reg-issues.html>

What to Do Next

Configure and schedule the IP SLAs VoIP gatekeeper registration delay operation.

Configuring and Scheduling the IP SLAs VoIP Gatekeeper Registration Delay Operation

Perform this task to begin gathering IP SLAs VoIP gatekeeper registration delay data.

Prerequisites

Prior to configuring the IP SLAs VoIP gatekeeper registration delay operation, the gatekeeper must be enabled and the gateway must be preregistered. As a best practice, you should confirm the gatekeeper and gateway status first.

If the gateway is not registered, select an interface and configure the gatekeeper in the gateway.

SUMMARY STEPS

1. **configure terminal**
2. **ip sla monitor** *operation-number*
3. **type voip delay gatekeeper registration**
4. Configure additional characteristics for the operation. (optional)
5. **threshold** *value* (optional)
6. **exit**
7. **ip sla monitor schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {hh:mm[:ss] [*month day* | *day month*] | **pending** | **now** | **after** hh:mm:ss}] [*ageout seconds*]
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 2	ip sla monitor operation-number Example: Router(config)# ip sla monitor 1	Specifies an IP SLAs operation (operation number) and enters IP SLA Monitor configuration mode.
Step 3	type voip delay gatekeeper registration Example: Router(config-sla-monitor)# type voip delay gatekeeper registration	Configures the operation as a VoIP gatekeeper registration delay operation. <ul style="list-style-type: none"> If the gatekeeper has not been registered with the gateway prior to entering this command, the following error message will be displayed: No gatekeeper has been registered!
Step 4	(Optional) Configure additional optional characteristics for the IP SLAs operation.	—
Step 5	threshold value Example: Router(config-sla-monitor-voip)# threshold 12	(Optional) Establishes an upper threshold, which can be used to trigger an IP SLAs threshold violation notification. For example, the command threshold 12 will, when the snmp-server enable traps rtr command is enabled, generate a notification if the response time exceeds 12 milliseconds.
Step 6	exit Example: Router(config-sla-monitor-voip)# exit	(Optional) Exits IP SLA Monitor configuration mode and returns the CLI to global configuration mode.
Step 7	ip sla monitor schedule operation-number [life {forever seconds}] [start-time {hh:mm[:ss] [month day day month] pending now after hh:mm[:ss]}] [ageout seconds] Example: Router(config)# ip sla monitor schedule 1 life forever start-time now	Schedules the IP SLAs operation.
Step 8	end Example: Router(config)# end Router#	Ends your configuration session and returns the CLI to privileged EXEC mode.

What to Do Next

Allow the operation to run for the desired amount of time or for the desired number of repetitions. Then use the **show ip sla monitor** command to view the collected data, or retrieve the collected data using SNMP.

Configuration Examples for the IP SLAs VoIP Gatekeeper Registration Delay Operation

This section contains the following configuration example:

- [Configuring the IP SLAs VoIP gatekeeper registration delay operation: Example, page 8](#)

Configuring the IP SLAs VoIP gatekeeper registration delay operation: Example

In the following example, a VoIP gatekeeper registration delay operation is configured and scheduled to start immediately. This example assumes the gateway to gatekeeper relationship has already been configured.

```
Router# configure terminal
Router(config)# ip sla monitor 1
Router(config-sla-monitor)# ?

IP SLA Monitoring Operation configuration commands:
  exit  Exit operation configuration
  type  Type of entry

Router(config-sla-monitor)# type ?
  dhcp          DHCP Operation
  dlsw          DLSW Operation
  dns           DNS Query Operation
  echo          Echo Operation
  frame-relay   Frame relay operation
  ftp           FTP Operation
  http          HTTP Operation
  jitter        Jitter Operation
  pathEcho      Path Discovered Echo Operation
  pathJitter    Path Discovered Jitter Operation
  slm           SLM Operation
  tcpConnect    TCP Connect Operation
  udpEcho       UDP Echo Operation
  voip          Voice Over IP Operation

Router(config-sla-monitor)# type voip ?
  delay  Delay measurement

Router(config-sla-monitor)# type voip delay ?
  post-dial      Post dial delay measurement
  gatekeeper     Gatekeeper delay measurement

Router(config-sla-monitor)# type voip delay gatekeeper ?
  registration   Registration delay measurement

Router(config-sla-monitor)# type voip delay gatekeeper registration
```

```
Router(config-sla-monitor-voip)# exit

Router(config)# ip sla schedule 1 start-time now life forever
```

Additional References

The following sections provide references related to the IP SLAs VoIP gatekeeper registration delay operation.

Related Documents

Related Topic	Document Title
Cisco IOS IP SLAs configuration	<i>Cisco IOS IP SLAs Monitoring Technology Configuration Guide</i> , Release 12.4
Gateway and gatekeeper configuration using Cisco IOS Release 12.3 and later releases	<i>Cisco IOS Voice Configuration Library</i> http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123cgcr/vcl.htm
Troubleshooting gatekeeper configurations	<i>Troubleshooting Gatekeeper Registration Issues</i> (Tech Note document) http://www.cisco.com/warp/public/788/voip/gk-reg-issues.html

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
CISCO-RTTMON-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents one new command only.

- [type voip delay gatekeeper registration](#)

type voip delay gatekeeper registration

To configure a Cisco IOS IP Service Level Agreements (SLAs) VoIP gatekeeper delay operation, use the **type voip delay gatekeeper registration** command in IP SLA Monitor configuration mode. To remove or replace a previously configured IP SLAs operation, use the **no ip sla monitor operation-number** command in global configuration mode.

type voip delay gatekeeper registration

Syntax Description This command has no keywords or arguments.

Command Default The IP SLAs operation type is not defined.

Command Modes IP SLA Monitor configuration

Command History	Release	Modification
	12.3(14)T	This command was introduced.
	Note	Two IP SLAs VoIP operation types were introduced in Cisco IOS Release 12.3(14)T:
		<ul style="list-style-type: none"> • type voip delay post-dial—Call setup (post-dial) delay measurement • type voip delay gatekeeper—Gatekeeper delay measurement

Usage Guidelines The IP SLAs gatekeeper registration delay operation provides statistical data on the amount of time taken to register a gateway to a gatekeeper. IP SLAs was designed to gather information over time, at intervals you specify, so that statistics can be provided on key metrics often used in Service Level Agreements (SLAs). Aggregated totals, median, or average data can be viewed using the Cisco IOS command-line interface (CLI) on the device running the IP SLAs operation, or retrieved from the device by external applications using SNMP.

Examples In the following example IP SLAs operation 10 is configured as a VoIP gatekeeper registration delay operation, and the operation is configured to start immediately.

```
ip sla monitor 10
  type voip delay gatekeeper registration
  exit

ip sla monitor schedule 10 start-time now life forever
```

Related Commands	Command	Description
	ip sla monitor	Specifies an IP SLAs operation (operation number) and enters IP SLA Monitor configuration mode.

Glossary

Gatekeepers—Network devices that help to facilitate and control H.323-based voice and video communications across networks. Gatekeepers are responsible for providing address translation between LAN aliases and IP addresses, call control and routing services to H.323 endpoints, system management, and security policies. These services provided by the gatekeeper in communicating between H.323 endpoints are defined in RAS.

Gateways—Network devices that provide translation between circuit-switched networks (particularly, H.320 ISDN) and packet-based networks (for example, H.323 LANs), allowing endpoints in networks with different transmission formats, codecs, and protocols to communicate.

H.225.0—Protocol standard that defines the establishment and disconnection of H.323 calls.

H.225.0 RAS—H.225.0 Registration/Admission/Status. Standard that facilitates communication between H.323 gateways (endpoints) and H.323 gatekeepers.

H.235—Protocol standard that defines security solutions for H.323 protocols (Q.931, H.245, RAS, Streams). H.235 was formerly called H.SECURE.

H.245—Protocol standard that defines connection management and negotiation capabilities between H.323 devices on the network once the call is established by Q.931.

H.323—An ITU protocol standard for the transmission of real-time audio (Voice/VoIP), video (for example, videoconferencing), and data information over packet switching-based networks. Such networks include IP-based (including the Internet) networks, Internet packet exchange-based local-area networks (LANs), enterprise networks and metropolitan and wide-area networks (WANs). H.323 can also be applied to multipoint multimedia communications. H.323 defines a distributed architecture for IP telephony applications, including multimedia, video conferencing, video over the Internet, and VoIP.

Q.931—Protocol standard that defines the establishment and disconnection of H.323 calls.

RTP/RTCP—Real-time Protocol/Real-Time Control Protocol serves as the standardized means for transmitting and receiving audio and video streams across the network once the call is established.

VoIP—Voice or Video over Internet Protocol. Sometimes used to refer to all IP telephony applications.



Note

See [Internetworking Terms and Acronyms](#) for terms not included in this glossary.

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