



# Configuring VoIP Call Setup Monitoring

**Last Updated: March 22, 2011**

The Cisco IOS IP Service Level Agreements (SLAs) VoIP Call Setup (Post-Dial Delay) Monitoring feature provides the ability to measure your network's response time for setting up a Voice over IP (VoIP) call over either H.323 or Session Initiation Protocol (SIP).

- [Finding Feature Information, page 1](#)
- [Prerequisites for VoIP Call Setup Monitoring, page 1](#)
- [Information About VoIP Call Setup Monitoring, page 2](#)
- [How to Configure VoIP Call Setup Monitoring, page 2](#)
- [Configuration Examples for VoIP Call Setup Monitoring, page 11](#)
- [Additional References, page 11](#)
- [Feature Information for VoIP Call Setup Monitoring, page 13](#)
- [, page 13](#)

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

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

## Prerequisites for VoIP Call Setup Monitoring

- The Cisco IOS software image on the source and destination gateway must support the IP SLAs VoIP test-call and IP SLAs VoIP Responder applications. To determine if your Cisco IOS software image is configured with these applications, use the **show call application voice** command in EXEC mode.

```
Router# show call application voice summary
NAME                DESCRIPTION
...
ipsla-testcall      Basic app to place a simple call
ipsla-responder     Basic app to respond to a simple call
...
TCL Script Version 2.0 supported.
Call Treatment Action Application - Version 1.
```

**Note**

The IP SLAs VoIP Responder application is different from the IP SLAs Responder, which is configured using a Cisco IOS command.

## Information About VoIP Call Setup Monitoring

- [IP SLAs VoIP Call Setup Monitoring Using H.323 or SIP, page 2](#)

## IP SLAs VoIP Call Setup Monitoring Using H.323 or SIP

The Cisco IOS IP SLAs VoIP Call Setup Monitoring feature provides the ability to measure your network's response time for setting up a VoIP call. Prior to configuring an IP SLAs VoIP call setup operation, you must enable the IP SLAs VoIP test-call application on the originating gateway (source). With the IP SLAs VoIP test-call application enabled, H.323 or Session Initiation Protocol (SIP) call messages can be sent to and received by the originating (source) and terminating (destination) gateways. The configuration for the IP SLAs VoIP call setup operation is essentially the same for both protocols.

The IP SLAs VoIP call setup operation can measure the total time from when an source gateway sends a call message, containing a call number, to when the source gateway receives a response from the destination gateway indicating that either the called number rang or the called party answered the call. As with all Cisco IOS IP SLAs operations, you can configure the VoIP call setup operation to repeat at specified time intervals, for a specified number of repetitions, and over a specified duration of time.

If a gatekeeper (GK) or directory gatekeeper (DGK) is involved in the H.323 call signaling, additional messages are sent and received between the source and destination gateways before the call message is actually sent. The additional time required for these messages is included in the IP SLAs VoIP call setup response time measurement. Likewise, if a proxy server or redirection server is involved in the SIP call signaling, any additional time required for messages to be sent and received prior to sending the call message, is included in the VoIP call setup response time measurement.

A plain old telephone service (POTS) IP phone can be set up at the terminating gateway to respond to an IP SLAs VoIP call setup test call. As an alternative to an actual IP phone, you can enable the IP SLAs VoIP Responder application in the destination gateway. The IP SLAs VoIP Responder application will respond to incoming call setup messages from the source gateway using H.323 or SIP.

## How to Configure VoIP Call Setup Monitoring

- [Configuring the Source Gateway, page 3](#)

- [Configuring a VoIP Call Setup Monitoring Operation](#), page 4
- [Scheduling IP SLAs Operations](#), page 7
- [Enabling the IP SLAs VoIP Responder Application on the Destination Gateway](#), page 9

## Configuring the Source Gateway



**Note**

The required configuration for setting up the dial peer will vary slightly depending on whether you are using H.323 or SIP.

### SUMMARY STEPS

1. **enable**
2. **call application session start** *instance-name* [*application-name*]
3. **configure terminal**
4. **dial-peer voice** *tag* **voip**
5. **destination-pattern** [+]  
*string* [T]
6. **session target** {**ipv4:** *destination-address* | **dns:**[*\$s\$*. | *\$d\$*. | *\$e\$*. | *\$u\$*.] *host-name* | **enum:** *table-num* | **loopback:**rtp | **ras** | **sip-server**}
7. **session protocol sipv2**
8. **exit**

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><b>enable</b></p> <p><b>Example:</b></p> <pre>Router&gt; enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<p><b>call application session start</b> <i>instance-name</i> [<i>application-name</i>]</p> <p><b>Example:</b></p> <pre>Router# call application session start ipsla-testcall ipsla-testcall</pre>	<p>Starts a new session of the Cisco IOS IP SLAs VoIP test-call application.</p>
Step 3	<p><b>configure terminal</b></p> <p><b>Example:</b></p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
Step 4	<p><b>dial-peer voice</b> <i>tag</i> <b>voip</b></p> <p><b>Example:</b></p> <pre>Router(config)# dial-peer voice 6789 voip</pre>	<p>Defines a VoIP dial peer and enters dial-peer configuration mode.</p>

	Command or Action	Purpose
<b>Step 5</b>	<p><b>destination-pattern</b> [+]<i> string</i> [T]</p> <p><b>Example:</b></p> <pre>Router(config-dial-peer)# destination-pattern 6789</pre>	Specifies either the prefix or the full E.164 telephone number to be used for a dial peer.
<b>Step 6</b>	<p><b>session target</b> {<b>ipv4:</b> <i>destination-address</i>   <b>dns:</b>[<i>\$\$</i>.   <i>\$d</i>\$.   <i>\$e</i>\$.   <i>\$u</i>\$.] <i>host-name</i>   <b>enum:</b> <i>table-num</i>   <b>loopback:</b><i>rtp</i>   <b>ras</b>   <b>sip-server</b>}</p> <p><b>Example:</b></p> <pre>Router(config-dial-peer)# session target ipv4:172.29.129.123</pre>	Designates a network-specific address to receive calls from the VoIP dial peer.
<b>Step 7</b>	<p><b>session protocol sipv2</b></p> <p><b>Example:</b></p> <pre>Router(config-dial-peer)# session protocol sipv2</pre>	<p>(Optional) Specifies SIP as the session protocol for the VoIP dial peer.</p> <p><b>Note</b> Perform this step only if configuring a SIP call.</p>
<b>Step 8</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-dial-peer)# exit</pre>	Exits dial-peer configuration mode and returns to global configuration mode.

## Configuring a VoIP Call Setup Monitoring Operation

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **ip sla *operation-number***
4. **voip delay post-dial [detect-point {alert-ringing | connect-ok}] destination *tag***
5. **history buckets-kept *size***
6. **history distributions-of-statistics-kept *size***
7. **history enhanced [interval *seconds*] [buckets *number-of-buckets*]**
8. **history filter {none | all | overThreshold | failures}**
9. **frequency *seconds***
10. **history hours-of-statistics-kept *hours***
11. **history lives-kept *lives***
12. **owner *owner-id***
13. **history statistics-distribution-interval *milliseconds***
14. **tag *text***
15. **threshold *milliseconds***
16. **timeout *milliseconds***
17. **end**

**DETAILED STEPS**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<p><b>enable</b></p> <p><b>Example:</b> Router&gt; enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<p><b>configure terminal</b></p> <p><b>Example:</b> Router# configure terminal</p>	<p>Enters global configuration mode.</p>
<b>Step 3</b>	<p><b>ip sla <i>operation-number</i></b></p> <p><b>Example:</b> Router(config)# ip sla 10</p>	<p>Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.</p>
<b>Step 4</b>	<p><b>voip delay post-dial [detect-point {alert-ringing   connect-ok}] destination <i>tag</i></b></p> <p><b>Example:</b> Router(config-ip-sla)# voip delay post-dial detect-point alert-ringing destination 6789</p>	<p>Enters IP SLA VoIP configuration mode and configures the operation as a VoIP call setup (post-dial delay) operation that will generate VoIP call setup response time measurements.</p>

	Command or Action	Purpose
Step 5	<b>history buckets-kept</b> <i>size</i>  <b>Example:</b> Router(config-ip-sla-voip)# history buckets-kept 25	(Optional) Sets the number of history buckets that are kept during the lifetime of an IP SLAs operation.
Step 6	<b>history distributions-of-statistics-kept</b> <i>size</i>  <b>Example:</b> Router(config-ip-sla-voip)# history distributions-of-statistics-kept 5	(Optional) Sets the number of statistics distributions kept per hop during an IP SLAs operation.
Step 7	<b>history enhanced</b> [ <i>interval seconds</i> ] [ <i>buckets number-of-buckets</i> ]  <b>Example:</b> Router(config-ip-sla-voip)# history enhanced interval 900 buckets 100	(Optional) Enables enhanced history gathering for an IP SLAs operation.
Step 8	<b>history filter</b> { <i>none</i>   <i>all</i>   <i>overThreshold</i>   <i>failures</i> }  <b>Example:</b> Router(config-ip-sla-voip)# history filter failures	(Optional) Defines the type of information kept in the history table for an IP SLAs operation.
Step 9	<b>frequency</b> <i>seconds</i>  <b>Example:</b> Router(config-ip-sla-voip)# frequency 30	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 10	<b>history hours-of-statistics-kept</b> <i>hours</i>  <b>Example:</b> Router(config-ip-sla-voip)# history hours-of-statistics-kept 4	(Optional) Sets the number of hours for which statistics are maintained for an IP SLAs operation.
Step 11	<b>history lives-kept</b> <i>lives</i>  <b>Example:</b> Router(config-ip-sla-voip)# history lives-kept 5	(Optional) Sets the number of lives maintained in the history table for an IP SLAs operation.
Step 12	<b>owner</b> <i>owner-id</i>  <b>Example:</b> Router(config-ip-sla-voip)# owner admin	(Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.
Step 13	<b>history statistics-distribution-interval</b> <i>milliseconds</i>	(Optional) Sets the time interval for each statistics distribution kept for an IP SLAs operation.

	Command or Action	Purpose
	<p><b>Example:</b></p> <pre>Router(config-ip-sla-voip)# history statistics- distribution-interval 10</pre>	
<b>Step 14</b>	<p><b>tag</b> <i>text</i></p> <p><b>Example:</b></p> <pre>Router(config-ip-sla-voip)# tag TelnetPollServer1</pre>	(Optional) Creates a user-specified identifier for an IP SLAs operation.
<b>Step 15</b>	<p><b>threshold</b> <i>milliseconds</i></p> <p><b>Example:</b></p> <pre>Router(config-ip-sla-voip)# threshold 10000</pre>	(Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.
<b>Step 16</b>	<p><b>timeout</b> <i>milliseconds</i></p> <p><b>Example:</b></p> <pre>Router(config-ip-sla-voip)# timeout 10000</pre>	(Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet.
<b>Step 17</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Router(config-ip-sla-voip)# exit</pre>	Exits to privileged EXEC mode.

## Scheduling IP SLAs Operations



### Note

- All IP SLAs operations to be scheduled must be already configured.
- The frequency of all operations scheduled in a multioperation group must be the same.
- List of one or more operation ID numbers to be added to a multioperation group is limited to a maximum of 125 characters, including commas (,).

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. Do one of the following:
  - **ip sla schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh : mm[: ss]* [*month day* | *day month*]} | **pending** | **now** | **after** *hh : mm : ss*}] [**ageout** *seconds*] [**recurring**]
  - **ip sla group schedule** *group-operation-number* *operation-id-numbers* **schedule-period** *schedule-period-range* [**ageout** *seconds*] [**frequency** *group-operation-frequency*] [**life**{**forever** | *seconds*}] [**start-time**{*hh:mm[:ss]* [*month day* | *day month*]} | **pending** | **now** | **after** *hh:mm:ss*}]
4. **exit**
5. **show ip sla group schedule**
6. **show ip sla configuration**

**DETAILED STEPS**

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	Do one of the following: <ul style="list-style-type: none"> <li>• <b>ip sla schedule</b> <i>operation-number</i> [<b>life</b> {<b>forever</b>   <i>seconds</i>}] [<b>start-time</b> {<i>hh : mm[: ss]</i> [<i>month day</i>   <i>day month</i>]}   <b>pending</b>   <b>now</b>   <b>after</b> <i>hh : mm : ss</i>}] [<b>ageout</b> <i>seconds</i>] [<b>recurring</b>]</li> <li>• <b>ip sla group schedule</b> <i>group-operation-number</i> <i>operation-id-numbers</i> <b>schedule-period</b> <i>schedule-period-range</i> [<b>ageout</b> <i>seconds</i>] [<b>frequency</b> <i>group-operation-frequency</i>] [<b>life</b>{<b>forever</b>   <i>seconds</i>}] [<b>start-time</b>{<i>hh:mm[:ss]</i> [<i>month day</i>   <i>day month</i>]}   <b>pending</b>   <b>now</b>   <b>after</b> <i>hh:mm:ss</i>}]</li> </ul> <b>Example:</b> Router(config)# ip sla schedule 10 start-time now life forever  <b>Example:</b> Router(config)# ip sla group schedule 1 3,4,6-9	For individual IP SLAs operations only: Configures the scheduling parameters for an individual IP SLAs operation. or For multioperation scheduler only: Specifies an IP SLAs operation group number and the range of operation numbers to be scheduled in global configuration mode.
<b>Step 4</b>	<b>exit</b>	Exits to privileged EXEC mode.



	Command or Action	Purpose
	<b>Example:</b> Router(config)# exit	
<b>Step 5</b>	<b>show ip sla group schedule</b>  <b>Example:</b> Router# show ip sla group schedule	(Optional) Displays the IP SLAs group schedule details.
<b>Step 6</b>	<b>show ip sla configuration</b>  <b>Example:</b> Router# show ip sla configuration	(Optional) Displays the IP SLAs configuration details.

- [Troubleshooting Tips, page 10](#)
- [What to Do Next, page 11](#)

## Enabling the IP SLAs VoIP Responder Application on the Destination Gateway



### Note

The required configuration for setting up the dial peer will vary slightly depending on whether you are using H.323 or SIP.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **dial-peer voice *tag* voip**
4. **incoming called-number *tag***
5. **application *application-name***
6. **session protocol sipv2**
7. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>

	Command or Action	Purpose
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>dial-peer voice tag voip</b>  <b>Example:</b> Router(config)# dial-peer voice 6789 voip	Defines a VoIP dial peer and enters dial-peer configuration mode.
Step 4	<b>incoming called-number tag</b>  <b>Example:</b> Router(config-dial-peer)# incoming called-number 6789	Specifies a digit string to be matched by an incoming call to associate the call with a dial peer.
Step 5	<b>application application-name</b>  <b>Example:</b> Router(config-dial-peer)# application ipsla-responder	Enables the Cisco IOS IP SLAs VoIP Responder application (ipsla-responder) on the dial peer to respond to incoming call setup messages.
Step 6	<b>session protocol sipv2</b>  <b>Example:</b> Router(config-dial-peer)# session protocol sipv2	(Optional) Specifies SIP as the session protocol for the VoIP dial peer.  <b>Note</b> Perform this step only if configuring a SIP call.
Step 7	<b>end</b>  <b>Example:</b> Router(config-dial-peer)# exit	Exits to privileged EXEC mode.

- [Troubleshooting Tips, page 10](#)
- [What to Do Next, page 11](#)

## Troubleshooting Tips

- If the IP SLAs operation is not running and generating statistics, add the **verify-data** command to the configuration of the operation (while configuring in IP SLA configuration mode) to enable data verification. When enabled, each operation response is checked for corruption. Use the **verify-data** command with caution during normal operations because it generates unnecessary overhead.
- Use the **debugipsla trace** and **debug ip sla error** commands to help troubleshoot issues with an IP SLAs operation.

## What to Do Next

To add proactive threshold conditions and reactive triggering for generating traps, or for starting another operation, to an IP SLAs operation, see the "Configuring Proactive Threshold Monitoring" section.

To view and interpret the results of an IP SLAs operation use the **show ip sla statistics** command. Checking the output for fields that correspond to criteria in your service level agreement will help you determine whether the service metrics are acceptable.

## Configuration Examples for VoIP Call Setup Monitoring

- [Example VoIP Call Setup Configuration on the Source Gateway, page 11](#)
- [Example VoIP Responder Application on Destination Gateway, page 11](#)

### Example VoIP Call Setup Configuration on the Source Gateway

The following example shows the configuration on the source (originating) gateway to start the IP SLAs VoIP test-call application, set up the dial peer to route the test call, define the VoIP call setup operation, and schedule the VoIP call setup operation. In this example, test-call messages are generated using the Session Initiation Protocol (SIP).

```
call application session start ipsla-testcall ipsla-testcall
configure terminal
dial-peer voice 6789 voip
 destination-pattern 6789
 session target ipv4:172.29.129.123
 session protocol sipv2
 exit
ip sla 1
 voip delay post-dial detect-point alert-ringing destination 6789
 exit
ip sla schedule 1 start-time now life forever
```

### Example VoIP Responder Application on Destination Gateway

The following example shows the configuration for setting up the dial peer and enabling the IP SLAs VoIP Responder application to respond to the IP SLAs VoIP call setup test call. In this example, test-call messages are generated using the Session Initiation Protocol (SIP).

```
configure terminal
dial-peer voice 6789 voip
 incoming called-number 6789
 application ipsla-responder
 session protocol sipv2
 exit
```

## Additional References

**Related Documents**

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
Cisco IOS IP SLAs commands	<i>Cisco IOS IP SLAs Command Reference</i>
Cisco IOS IP SLAs: general information	Cisco IOS IP SLAs Overview chapter of the <i>Cisco IP SLAs Configuration Guide</i> .

**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: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**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 Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for VoIP Call Setup Monitoring

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

**Table 1: Feature Information for VoIP Call Setup Monitoring**

Feature Name	Releases	Feature Information
IP SLAs VoIP Call Setup (Post Dial Delay) Monitoring	12.3(14)T	The Cisco IOS IP SLAs Voice over IP (VoIP) call setup operation allows you to measure network response time for setting up a VoIP call.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.