



# IP SLAs ICMP Jitter Operation

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The Cisco IOS IP Service Level Agreements (SLAs) Internet Control Message Protocol (ICMP) Jitter Operation feature provides the capability to generate a stream of ICMP packets between a Cisco IOS device (source) and any other IP device (destination) to gather network performance-related statistics. The destination device can be any network device that supports ICMP such as a server or workstation. Available statistical measurements for the IP SLAs ICMP jitter operation include latency, round-trip time, jitter (interpacket delay variance), and packet loss. The IP SLAs ICMP jitter operation does not require configuration of the IP SLAs Responder feature on the destination device.

## Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the [“Feature Information for the IP SLAs ICMP Jitter Operation”](#) section on page 20.

## Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

## Contents

- [Restrictions for the IP SLAs ICMP Jitter Operation, page 2](#)
- [Information About the IP SLAs ICMP Jitter Operation, page 2](#)
- [How to Configure the IP SLAs ICMP Jitter Operation, page 3](#)
- [Configuration Examples for the IP SLAs ICMP Jitter Operation, page 6](#)
- [Where to Go Next, page 6](#)
- [Additional References, page 7](#)



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- [Command Reference, page 8](#)
- [Feature Information for the IP SLAs ICMP Jitter Operation, page 20](#)

## Restrictions for the IP SLAs ICMP Jitter Operation

- When compared to the IP SLAs User Datagram Protocol (UDP) jitter operation, the IP SLAs ICMP jitter operation may provide less accurate measurements because the accuracy of the measurements provided by a non-Cisco destination device cannot be determined.
- Since ICMP packets do not support voice technology, the IP SLAs ICMP jitter operation does not support Mean Opinion Score (MOS), Calculated Planning Impairment Factor (ICPIF), or estimated transmission rating factor (R) reaction configuration capabilities.

## Information About the IP SLAs ICMP Jitter Operation

To configure an IP SLAs ICMP jitter operation, you should understand the following concepts:

- [Benefits of the IP SLAs ICMP Jitter Operation, page 2](#)
- [Statistics Measured by the IP SLAs ICMP Jitter Operation, page 2](#)

## Benefits of the IP SLAs ICMP Jitter Operation

The IP SLAs ICMP Jitter Operation feature provides the following key benefits:

- End-to-end performance measurements between a Cisco device (source) and any other IP device (destination) using ICMP.
- Proactive threshold violation monitoring through Simple Network Management Protocol (SNMP) trap notifications and syslog messages.

## Statistics Measured by the IP SLAs ICMP Jitter Operation

The IP SLAs ICMP jitter operation supports the following statistical measurements:

- Jitter (source-to-destination and destination-to-source)
- Latency (source-to-destination and destination-to-source)
- Round-trip time latency
- Packet loss
- Successive packet loss
- Out-of-sequence packets (source-to-destination, destination-to-source, and round-trip)
- Late packets

Obtaining separate measurements for the source-to-destination and destination-to-source data paths can be useful for identifying problems in your network because the paths may be different (asymmetric),

# How to Configure the IP SLAs ICMP Jitter Operation

This section contains the following task:

- [Configuring an IP SLAs ICMP Jitter Operation, page 3](#)

## Configuring an IP SLAs ICMP Jitter Operation

Perform this task to configure and schedule an IP SLAs ICMP jitter operation.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla operation-number**
4. **icmp-jitter** {*destination-ip-address* | *destination-hostname*} [**interval** *milliseconds*] [**num-packets** *packet-number*] [**source-ip** {*ip-address* | *hostname*}]
5. **frequency** *seconds*
6. **history** *history-parameter*
7. **owner** *owner-id*
8. **tag** *text*
9. **threshold** *milliseconds*
10. **timeout** *milliseconds*
11. **tos** *number*
12. **vrf** *vrf-name*
13. **exit**
14. **ip sla reaction-configuration** *operation-number* **react** *monitored-element* [**action-type** *option*] [**threshold-type** {**average** [*number-of-measurements*] | **consecutive** [*occurrences*] | **immediate** | **never** | **xofy** [*x-value* *y-value*]}] [**threshold-value** *upper-threshold* *lower-threshold*]
15. **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**]
16. **exit**
17. **show ip sla configuration** [*operation-number*]

## DETAILED STEPS

|        | Command or Action                                                                                                                                                                                                                                                                    | Purpose                                                                                                                                    |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | <b>enable</b><br><br><b>Example:</b><br>Router> enable                                                                                                                                                                                                                               | Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>                           |
| Step 2 | <b>configure terminal</b><br><br><b>Example:</b><br>Router# configure terminal                                                                                                                                                                                                       | Enters global configuration mode.                                                                                                          |
| Step 3 | <b>ip sla operation-number</b><br><br><b>Example:</b><br>Router(config)# ip sla 10                                                                                                                                                                                                   | Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.                                                        |
| Step 4 | <b>icmp-jitter</b> {destination-ip-address   destination-hostname} [interval milliseconds] [num-packets packet-number] [source-ip {ip-address   hostname}]<br><br><b>Example:</b><br>Router(config-ip-sla)# icmp-jitter 172.18.1.129 interval 40 num-packets 100 source-ip 10.1.2.34 | Configures the IP SLAs operation as an ICMP jitter operation and enters IP SLAs ICMP jitter configuration mode.                            |
| Step 5 | <b>frequency seconds</b><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# frequency 30                                                                                                                                                                                    | (Optional) Sets the rate at which a specified IP SLAs operation repeats.                                                                   |
| Step 6 | <b>history history-parameter</b><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# history hours-of-statistics-kept 3                                                                                                                                                      | (Optional) Specifies the parameters used for gathering statistical history information for an IP SLAs operation.                           |
| Step 7 | <b>owner owner-id</b><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# owner admin                                                                                                                                                                                        | (Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.                                         |
| Step 8 | <b>tag text</b><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# tag TelnetPollServer1                                                                                                                                                                                    | (Optional) Creates a user-specified identifier for an IP SLAs operation.                                                                   |
| Step 9 | <b>threshold milliseconds</b><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# threshold 10000                                                                                                                                                                            | (Optional) Sets the rising threshold (hysteresis) that generates a reaction event and stores history information for an IP SLAs operation. |

|         | Command or Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Purpose                                                                                                                            |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Step 10 | <b>timeout</b> <i>milliseconds</i><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# timeout 10000                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet.                              |
| Step 11 | <b>tos</b> <i>number</i><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# tos 160                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (Optional) Defines a type of service (ToS) byte in the IP header of an IP SLAs operation.                                          |
| Step 12 | <b>vrf</b> <i>vrf-name</i><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# vrf vpn-A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (Optional) Allows monitoring within Multiprotocol Label Switching (MPLS) Virtual Private Networks (VPNs) using IP SLAs operations. |
| Step 13 | <b>exit</b><br><br><b>Example:</b><br>Router(config-ip-sla-icmpjitter)# exit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Exits IP SLAs ICMP jitter configuration submode and returns to global configuration mode.                                          |
| Step 14 | <b>ip sla reaction-configuration</b> <i>operation-number</i><br><b>react</b> <i>monitored-element</i> [ <b>action-type</b> <i>option</i> ]<br>[ <b>threshold-type</b> { <b>average</b><br><i>number-of-measurements</i>   <b>consecutive</b><br><i>occurrences</i>   <b>immediate</b>   <b>never</b>   <b>xofy</b><br><i>x-value y-value</i> }] [ <b>threshold-value</b><br><i>upper-threshold lower-threshold</i> ]<br><br><b>Example:</b><br>Router(config)# ip sla reaction-configuration 1<br>react jitterAvg threshold-value 5 2 action-type<br>trap threshold-type immediate | (Optional) Configures certain actions to occur based on events under the control of Cisco IOS IP SLAs.                             |
| Step 15 | <b>ip sla schedule</b> <i>operation-number</i> [ <b>life</b><br>{ <b>forever</b>   <i>seconds</i> }] [ <b>start-time</b> { <i>hh:mm:ss</i><br><i>month day</i>   <i>day month</i> }   <b>pending</b>   <b>now</b>  <br><b>after</b> <i>hh:mm:ss</i> ] [ <b>ageout</b> <i>seconds</i> ] [ <b>recurring</b> ]<br><br><b>Example:</b><br>Router(config)# ip sla schedule 10 start-time<br>now life forever                                                                                                                                                                            | Configures the scheduling parameters for an individual IP SLAs operation.                                                          |
| Step 16 | <b>exit</b><br><br><b>Example:</b><br>Router(config)# exit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (Optional) Exits global configuration mode and returns to privileged EXEC mode.                                                    |
| Step 17 | <b>show ip sla configuration</b> [ <i>operation-number</i> ]<br><br><b>Example:</b><br>Router# show ip sla configuration 10                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (Optional) Displays configuration values including all defaults for all IP SLAs operations or a specified operation.               |

## Troubleshooting Tips

Use the **debug ip sla trace** and **debug ip sla error** commands to help troubleshoot issues with an IP SLAs operation.

## What to Do Next

To view and interpret the results of an IP SLAs operation use the **show ip sla statistics** and **show ip sla statistics aggregated** commands. 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 the IP SLAs ICMP Jitter Operation

This section provides the following configuration example:

- [Configuring an IP SLAs ICMP Jitter Operation: Example, page 6](#)

## Configuring an IP SLAs ICMP Jitter Operation: Example

The following example shows how to configure an IP SLAs ICMP jitter operation:

```
ip sla 1
 icmp-jitter 172.18.1.129 interval 40 num-packets 100 source-ip 10.1.2.34
 frequency 50
!
ip sla reaction-configuration 1 react jitterAvg threshold-value 5 2 action-type trap
 threshold-type immediate
!
ip sla schedule 1 start-time now life forever
```

## Where to Go Next

- If you want to configure multiple Cisco IOS IP SLAs operations at once, see the “[IP SLAs—Multiple Operation Scheduling](#)” chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.
- If you want to configure threshold parameters for an IP SLAs operation, see the “[IP SLAs—Proactive Threshold Monitoring](#)” chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.
- If you want to configure other types of IP SLAs operations, see the “Where to Go Next” section of the “[Cisco IOS IP SLAs Overview](#)” chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4.

# Additional References

The following sections provide references related to the IP SLAs ICMP Jitter Operation feature.

## Related Documents

| Related Topic                                                                               | Document Title                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP SLAs UDP jitter operation                                                                | <a href="#">“IP SLAs—Analyzing IP Service Levels Using the UDP Jitter Operation”</a> chapter of the <i>Cisco IOS IP SLAs Configuration Guide</i> , Release 12.4                                                                                                                               |
| Cisco IOS IP SLAs command line interface enhancements for Cisco IOS Releases 12.4 and 12.4T | <a href="#">Cisco IOS IP Service Level Agreements Command Line Interface</a> , Cisco white paper<br><a href="http://www.cisco.com/en/US/products/ps6602/products_white_paper0900aecd8022c2cc.shtml">http://www.cisco.com/en/US/products/ps6602/products_white_paper0900aecd8022c2cc.shtml</a> |
| Cisco IOS IP SLAs configuration tasks                                                       | <a href="#">Cisco IOS IP SLAs Configuration Guide</a> , Release 12.4                                                                                                                                                                                                                          |
| Cisco IOS IP SLAs commands                                                                  | <a href="#">Cisco IOS IP SLAs Command Reference</a> , Release 12.4T                                                                                                                                                                                                                           |

## 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                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>CISCO-RTTMON-MIB</li><li>CISCO-RTTMON-ICMP-MIB</li></ul> | To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:<br><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 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. | <a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a> |

## Command Reference

This section documents new and modified commands only.

- [icmp-jitter](#)
- [ip sla reaction-configuration](#)

# icmp-jitter

To configure an IP Service Level Agreements (SLAs) Internet Control Message Protocol (ICMP) jitter operation, use the **icmp-jitter** command in IP SLA configuration mode.

**icmp-jitter** {*destination-ip-address* | *destination-hostname*} [**interval** *milliseconds*] [**num-packets** *packet-number*] [**source-ip** {*ip-address* | *hostname*}]

## Syntax Description

|                                                             |                                                                                                                                                                           |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>destination-ip-address</i>   <i>destination-hostname</i> | Destination IP address or hostname.                                                                                                                                       |
| <b>interval</b> <i>milliseconds</i>                         | (Optional) Specifies the time interval between packets (in milliseconds). The default value is 20 ms.                                                                     |
| <b>num-packets</b> <i>packet-number</i>                     | (Optional) Specifies the number of packets to be sent in each operation. The default value is 10 packets per operation.                                                   |
| <b>source-ip</b> { <i>ip-address</i>   <i>hostname</i> }    | (Optional) Specifies the source IP address or hostname. When a source IP address or hostname is not specified, IP SLAs chooses the IP address nearest to the destination. |

## Command Default

No IP SLAs operation type is configured for the operation being configured.

## Command Modes

IP SLA configuration (config-ip-sla)

## Command History

| Release  | Modification                 |
|----------|------------------------------|
| 12.4(6)T | This command was introduced. |

## Usage Guidelines

You must configure the type of IP SLAs operation (such as User Datagram Protocol [UDP] jitter or Internet Control Message Protocol [ICMP] echo) before you can configure any of the other parameters of the operation. To change the operation type of an existing IP SLAs operation, you must first delete the IP SLAs operation (using the **no ip sla** global configuration command) and then reconfigure the operation with the new operation type.

## Examples

The following example shows how to configure an IP SLAs ICMP jitter operation:

```
ip sla 1
 icmp-jitter 172.18.1.129 interval 40 num-packets 100 source-ip 10.1.2.34
 frequency 50
!
ip sla reaction-configuration 1 react jitterAvg threshold-value 5 2 action-type trap
 threshold-type immediate
!
ip sla schedule 1 start-time now life forever
```

**Related Commands**

| Command       | Description                                                                         |
|---------------|-------------------------------------------------------------------------------------|
| <b>ip sla</b> | Begins configuration for an IP SLAs operation and enters IP SLA configuration mode. |

## ip sla reaction-configuration

To configure certain actions to occur based on events under the control of Cisco IOS IP Service Level Agreements (SLAs), use the **ip sla reaction-configuration** command in global configuration mode. To clear all reaction configuration for a specified IP SLAs operation, use the **no** form of this command.

```
ip sla reaction-configuration operation-number react monitored-element [action-type option]
[threshold-type {average [number-of-measurements] | consecutive [occurrences] | immediate
| never | xofy [x-value y-value]]] [threshold-value upper-threshold lower-threshold]
```

```
no ip sla reaction-configuration operation-number
```

### Syntax Description

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>operation-number</i>               | Number of the IP SLAs operation for which reactions are to be configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>react</b> <i>monitored-element</i> | (Optional) Specifies the element to be monitored for violations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Note</b>                           | The elements available for monitoring will vary depending on the type of IP SLAs operation you are running.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                       | Keyword options for the <i>monitored-element</i> argument are as follows:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                       | <ul style="list-style-type: none"> <li>• <b>connectionLoss</b>—Specifies that a reaction should occur if there is a one-way connection loss for the monitored operation. The <b>threshold-value</b> keyword does not apply to this monitored element.</li> <li>• <b>frameLossDS</b>—Specifies that a reaction should occur if the one-way destination-to-source digital signal processor (DSP) frame loss value violates the upper threshold or lower threshold.</li> <li>• <b>iaJitterDS</b>—Specifies that a reaction should occur if the one-way destination-to-source interarrival jitter value violates the upper threshold or lower threshold.</li> <li>• <b>iaJitterSD</b>—Specifies that a reaction should occur if the one-way source-to-destination interarrival jitter value violates the upper threshold or lower threshold.</li> <li>• <b>icpif</b>—Specifies that a reaction should occur if the one-way Calculated Planning Impairment Factor (ICPIF) value violates the upper threshold or lower threshold.</li> <li>• <b>jitterAvg</b>—Specifies that a reaction should occur if the average round-trip jitter value violates the upper threshold or lower threshold.</li> <li>• <b>jitterDSAvg</b>—Specifies that a reaction should occur if the average one-way destination-to-source jitter value violates the upper threshold or lower threshold.</li> <li>• <b>jitterSDAvg</b>—Specifies that a reaction should occur if the average one-way source-to-destination jitter value violates the upper threshold or lower threshold.</li> </ul> |

**react** *monitored-element*  
(continued)

- **latencyDSAvg**—Specifies that a reaction should occur if the average one-way destination-to-source latency value violates the upper threshold or lower threshold.
- **latencySDAvg**—Specifies that a reaction should occur if the average one-way source-to-destination latency value violates the upper threshold or lower threshold.
- **maxOflatencyDS**—Specifies that a reaction should occur if the one-way maximum latency destination-to-source threshold is violated.
- **maxOflatencySD**—Specifies that a reaction should occur if the one-way maximum latency source-to-destination threshold is violated.
- **maxOfNegativeDS**—Specifies that a reaction should occur if the one-way maximum negative jitter destination-to-source threshold is violated.
- **maxOfNegativeSD**—Specifies that a reaction should occur if the one-way maximum negative jitter source-to-destination threshold is violated.
- **maxOfPositiveDS**—Specifies that a reaction should occur if the one-way maximum positive jitter destination-to-source threshold is violated.
- **maxOfPositiveSD**—Specifies that a reaction should occur if the one-way maximum positive jitter source-to-destination threshold is violated.
- **mos**—Specifies that a reaction should occur if the one-way Mean Opinion Score (MOS) value violates the upper threshold or lower threshold.
- **moscqds**—Specifies that a reaction should occur if the one-way destination-to-source Mean Opinion Score for Conversational Quality (MOS-CQ) value violates the upper threshold or lower threshold.
- **moscqsd**—Specifies that a reaction should occur if the one-way source-to-destination Mean Opinion Score for Conversational Quality (MOS-CQ) value violates the upper threshold or lower threshold.
- **moslqds**—Specifies that a reaction should occur if the one-way destination-to-source Mean Opinion Score for Listening Quality (MOS-LQ) value violates the upper threshold or lower threshold.
- **packetLateArrival**—Specifies that a reaction should occur if the one-way number of late packets violates the upper threshold or lower threshold.

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**react** *monitored-element*  
(continued)

- **packetLoss**—Specifies that a reaction should occur if the packet loss value violates the upper threshold or lower threshold. The path of the packets is unknown.
  - **packetLossDS**—Specifies that a reaction should occur if the one-way destination-to-source packet loss value violates the upper threshold or lower threshold.
  - **packetLossSD**—Specifies that a reaction should occur if the one-way source-to-destination packet loss value violates the upper threshold or lower threshold.
  - **packetMIA**—Specifies that a reaction should occur if the one-way number of missing packets violates the upper threshold or lower threshold.
  - **packetOutOfSequence**—Specifies that a reaction should occur if the one-way number of packets out of sequence violates the upper threshold or lower threshold.
  - **rFactorDS**—Specifies that a reaction should occur if the one-way destination-to-source estimated transmission rating factor R violates the upper threshold or lower threshold.
  - **rFactorSD**—Specifies that a reaction should occur if the one-way source-to-destination estimated transmission rating factor R violates the upper threshold or lower threshold.
  - **rtt**—Specifies that a reaction should occur if the round-trip time violates the upper threshold or lower threshold.
  - **successivePacketLoss**—Specifies that a reaction should occur if the one-way number of successively dropped packets violates the upper threshold or lower threshold.
  - **timeout**—Specifies that a reaction should occur if there is a one-way timeout for the monitored operation. The **threshold-value** keyword does not apply to this monitored element.
  - **verifyError**—Specifies that a reaction should occur if there is a one-way error verification violation. The **threshold-value** keyword does not apply to this monitored element.
-

|                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>action-type</b> <i>option</i>                                   | <p>(Optional) Specifies what action or combination of actions the operation performs when threshold events occur. If the <b>threshold-type never</b> keywords are defined, the <b>action-type</b> keyword is disabled. The <i>option</i> argument can be one of the following keywords:</p> <ul style="list-style-type: none"> <li>• <b>none</b>—No action is taken. This option is the default value.</li> <li>• <b>trapAndTrigger</b>—Trigger a Simple Network Management Protocol (SNMP) trap and start another IP SLAs operation when the violation conditions are met, as defined in the <b>trapOnly</b> and <b>triggerOnly</b> options.</li> <li>• <b>trapOnly</b>—Send an SNMP logging trap when the specified violation type occurs for the monitored element. IP SLAs logging traps are enabled using the <b>ip sla logging traps</b> command.</li> <li>• <b>triggerOnly</b>—Have one or more target operation's operational state make the transition from pending to active when the violation conditions are met. The target operations to be triggered are specified using the <b>ip sla reaction-trigger</b> command. A target operation will continue until its life expires, as specified by the target operation's configured lifetime value. A triggered target operation must finish its life before it can be triggered again.</li> </ul> |
| <b>threshold-type average</b><br>[ <i>number-of-measurements</i> ] | <p>(Optional) When the average of a specified number of measurements for the monitored element exceeds the upper threshold or when the average of a specified number of measurements for the monitored element drops below the lower threshold, perform the action defined by the <b>action-type</b> keyword. For example, if the upper threshold for <b>react rtt threshold-type average 3</b> is configured as 5000 ms and the last three results of the operation are 6000, 6000, and 5000 ms, the average would be <math>6000 + 6000 + 5000 = 17000/3 = 5667</math>, thus violating the 5000 ms upper threshold.</p> <p>The default number of 5 averaged measurements can be changed using the <i>number-of-measurements</i> argument. The valid range is from 1 to 16.</p> <p>This syntax is not available if the <b>connectionLoss</b>, <b>timeout</b>, or <b>verifyError</b> keyword is specified as the monitored element, because upper and lower thresholds do not apply to these options.</p>                                                                                                                                                                                                                                                                                                                                                      |
| <b>threshold-type consecutive</b><br>[ <i>occurrences</i> ]        | <p>(Optional) When the reaction conditions (such as threshold violations) for the monitored element are met consecutively for a specified number of times, perform the action defined by the <b>action-type</b> keyword.</p> <p>The default number of 5 consecutive occurrences can be changed using the <i>occurrences</i> argument. The valid range is from 1 to 16.</p> <p>The <i>occurrences</i> value will appear in the output of the <b>show ip sla reaction-configuration</b> command as the "Threshold Count" value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>threshold-type immediate</b>                                    | <p>(Optional) When the reaction conditions (such as threshold violations) for the monitored element are met, immediately perform the action defined by the <b>action-type</b> keyword.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>threshold-type never</b>                                        | <p>(Optional) Do not calculate threshold violations. This is the default threshold type.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>threshold-type xofy</b><br>[ <i>x-value y-value</i> ]                   | <p>(Optional) When the reaction conditions (such as threshold violations) for the monitored element are met x number of times within the last y number of measurements (“x of y”), perform the action defined by the <b>action-type</b> keyword.</p> <p>The default is 5 for both the x and y values (<b>xofy 5 5</b>). The valid range for each value is from 1 to 16.</p> <p>The <i>x-value</i> will appear in the output of the <b>show ip sla reaction-configuration</b> command as the “Threshold Count” value, and the <i>y-value</i> will appear as the “Threshold Count2” value.</p> |
| <b>threshold-value</b><br><i>upper-threshold</i><br><i>lower-threshold</i> | <p>(Optional) Specifies the upper-threshold and lower-threshold values of the applicable monitored elements. See <a href="#">Table 1</a> in the “Usage Guidelines” section for a list of the default values.</p> <p><b>Note</b> For MOS threshold values (<b>react mos</b>), the number is expressed in three digits representing ones, tenths, and hundredths. For example, to express a MOS threshold of 3.20, enter <b>320</b>. The valid range is from 100 (1.00) to 500 (5.00).</p>                                                                                                     |

**Defaults**

No IP SLAs reactions are generated.  
Error verification is disabled.  
Connection loss and timeout logging are disabled.

**Note**

See [Table 1](#) in the “Usage Guidelines” section for a list of the default upper and lower thresholds for specific monitored elements.

**Command Modes**

Global configuration

## Command History

| Release  | Modification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.4(4)T | <p>This command was introduced. This command replaces the <b>ip sla monitor reaction-configuration</b> command.</p> <p>The following keywords for the <i>monitored-element</i> argument were added to support the IP SLAs RTP-based VoIP operation:</p> <ul style="list-style-type: none"> <li>• <b>frameLossDS</b></li> <li>• <b>iaJitterDS</b></li> <li>• <b>moscqds</b></li> <li>• <b>moslqds</b></li> <li>• <b>rFactorDS</b></li> </ul>                                                  |
| 12.4(6)T | <p>The following keywords for the <i>monitored-element</i> argument were added to support the IP SLAs ICMP jitter and IP SLAs RTP-based VoIP operations:</p> <ul style="list-style-type: none"> <li>• <b>iaJitterSD</b></li> <li>• <b>latencyDSAvg</b></li> <li>• <b>latencySDAvg</b></li> <li>• <b>maxOflatencyDS</b></li> <li>• <b>maxOflatencySD</b></li> <li>• <b>moscqsd</b></li> <li>• <b>packetLoss</b></li> <li>• <b>rFactorSD</b></li> <li>• <b>successivePacketLoss</b></li> </ul> |

## Usage Guidelines

You can configure the **ip sla reaction-configuration** command multiple times to allow reactions for multiple monitored elements (for example, configuring thresholds for destination-to-source packet loss and MOS) for the same operation. However, entering the **no ip sla reaction-configuration operation-number** command will clear all reaction configuration for the specified operation. In other words, disabling of granular reaction elements (for example, entering the **no ip sla reaction-configuration operation-number react monitored-element** command) is not supported, so as to provide backwards compatibility with the earlier version of this command.

SNMP traps for IP SLAs are supported by the CISCO-RTTMON-MIB and CISCO-SYSLOG-MIB. The **ip sla logging traps** command is used to enable the generation of SNMP traps specific to IP SLAs threshold violations.

You can check the configuration of the IP SLAs reaction configuration using the **show ip sla reaction-configuration** command.



## Note

Keywords are not case sensitive and are shown in mixed case for readability only.

[Table 1](#) lists the default upper and lower thresholds for specific monitored elements.

**Table 1**      **Default Threshold Values for Monitored Elements**

| Monitored Element Keyword   | Upper Threshold | Lower Threshold |
|-----------------------------|-----------------|-----------------|
| <b>frameLossDS</b>          | 1000 frames     | 1000 frames     |
| <b>iaJitterDS</b>           | 20 ms           | 20 ms           |
| <b>iaJitterSD</b>           | 20 ms           | 20 ms           |
| <b>icpif</b>                | 93 (score)      | 93 (score)      |
| <b>jitterAvg</b>            | 100 ms          | 100 ms          |
| <b>jitterDSAvg</b>          | 100 ms          | 100 ms          |
| <b>jitterSDAvg</b>          | 100 ms          | 100 ms          |
| <b>latencyDSAvg</b>         | 5000 ms         | 3000 ms         |
| <b>latencySDAvg</b>         | 5000 ms         | 3000 ms         |
| <b>maxOflatencyDS</b>       | 5000 ms         | 3000 ms         |
| <b>maxOflatencySD</b>       | 5000 ms         | 3000 ms         |
| <b>maxOfNegativeDS</b>      | 10000 ms        | 10000 ms        |
| <b>maxOfNegativeSD</b>      | 10000 ms        | 10000 ms        |
| <b>maxOfPositiveDS</b>      | 10000 ms        | 10000 ms        |
| <b>maxOfPositiveSD</b>      | 10000 ms        | 10000 ms        |
| <b>mos</b>                  | 500 (score)     | 100 (score)     |
| <b>moscqds</b>              | 410 (score)     | 310 (score)     |
| <b>moscqsd</b>              | 410 (score)     | 310 (score)     |
| <b>moslqds</b>              | 410 (score)     | 310 (score)     |
| <b>packetLateArrival</b>    | 10000 packets   | 10000 packets   |
| <b>packetLoss</b>           | 10000 packets   | 10000 packets   |
| <b>packetLossDS</b>         | 10000 packets   | 10000 packets   |
| <b>packetLossSD</b>         | 10000 packets   | 10000 packets   |
| <b>packetMIA</b>            | 10000 packets   | 10000 packets   |
| <b>packetOutOfSequence</b>  | 10000 packets   | 10000 packets   |
| <b>rFactorDS</b>            | 80              | 60              |
| <b>rFactorSD</b>            | 80              | 60              |
| <b>rtt</b>                  | 5000 ms         | 3000 ms         |
| <b>successivePacketLoss</b> | 10000 packets   | 10000 packets   |

**Examples**

In the following example, IP SLAs operation 10 (a UDP jitter operation) is configured to send an SNMP logging trap when the MOS value exceeds 4.9 (best quality) or falls below 2.5 (poor quality):

```
ip sla reaction-configuration 10 react mos threshold-type immediate threshold-value 490
250 action-type trapOnly
```

| Related Commands | Command                                   | Description                                                                                                                                                                                                                           |
|------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | <b>ip sla</b>                             | Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.                                                                                                                                                   |
|                  | <b>ip sla logging traps</b>               | Enables the generation of system logging SNMP notifications (traps) specific to IP SLAs thresholds.                                                                                                                                   |
|                  | <b>ip sla reaction-trigger</b>            | Defines a second IP SLAs operation to make the transition from a pending state to an active state when one of the trigger action-type options are defined with the <b>ip sla reaction-configuration</b> global configuration command. |
|                  | <b>show ip sla reaction-configuration</b> | Displays the current configuration for IP SLAs reactions.                                                                                                                                                                             |
|                  | <b>show ip sla reaction-trigger</b>       | Displays the configured state of triggered IP SLAs operations.                                                                                                                                                                        |
|                  | <b>timeout</b>                            | Sets the amount of time the IP SLAs operation waits for a response from its request packet.                                                                                                                                           |



# Feature Information for the IP SLAs ICMP Jitter Operation

Table 2 lists the feature release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Cisco IOS software images are specific to a Cisco IOS software release, a feature set, and a platform. Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.



## Note

Table 2 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

**Table 2** Feature Information for the IP SLAs ICMP Jitter Operation

| Feature Name                  | Releases | Feature Information                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP SLAs ICMP Jitter Operation | 12.4(6)T | The Cisco IOS IP Service Level Agreements (SLAs) Internet Control Message Protocol (ICMP) jitter operation provides the capability to generate a stream of ICMP packets between a Cisco IOS device (source) and any other IP device (destination) to gather network performance-related statistics. Available statistical measurements for the IP SLAs ICMP jitter operation include latency, round-trip time, jitter (interpacket delay variance), and packet loss. |

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