



# IP SLAs—Analyzing IP Service Levels Using the 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 ICMP Jitter Operation](#)” section on page 8.*

## **Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images**

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

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## 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>  <b>Example:</b> 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>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>ip sla operation-number</b>  <b>Example:</b> 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}]  <b>Example:</b> 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>  <b>Example:</b> 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>  <b>Example:</b> 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>  <b>Example:</b> 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>  <b>Example:</b> Router(config-ip-sla-icmpjitter)# tag TelnetPollServer1	(Optional) Creates a user-specified identifier for an IP SLAs operation.
Step 9	<b>threshold milliseconds</b>  <b>Example:</b> Router(config-ip-sla-icmpjitter)# threshold 10000	(Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.

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

For information about other types of IP SLAs operations and IP SLAs features, see the [Cisco IOS IP SLAs Features Roadmap](#).

## 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>

Related Topic	Document Title
Cisco IOS IP SLAs command-line interface enhancements	<a href="#">Cisco IOS IP Service Level Agreements Command Line Interface</a> , Cisco white paper
Cisco IOS IP SLAs commands	<a href="#">Cisco IOS IP SLAs Command Reference</a>

## 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: <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 & Documentation 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>

# Feature Information for the ICMP Jitter Operation

Table 1 lists the 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.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



**Note**

Table 1 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 1** Feature Information for the 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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