tag (IP SLA)

To create a user-specified identifier for a Cisco IOS IP Service Level Agreements (SLAs) operation, use the **tag** (IP SLA) command in the appropriate submode of IP SLA configuration, auto IP SLA MPLS configuration, or IP SLA monitor configuration mode. To remove a tag from an operation, use the **no** form of this command.

tag *text*

no tag

Syntax Description

text	Name of a group to which the operation belongs from 0 to 16 ASCII characters.

Defaults

No tag identifier is specified.

Command Modes

IP SLA Configuration

DHCP configuration (config-ip-sla-dhcp)
DLSw configuration (config-ip-sla-dlsw)
DNS configuration (config-ip-sla-dns)
Ethernet echo (config-ip-sla-ethernet-echo)
Ethernet jitter (config-ip-sla-ethernet-jitter)
FTP configuration (config-ip-sla-ftp)
HTTP configuration (config-ip-sla-http)
ICMP echo configuration (config-ip-sla-echo)
ICMP jitter configuration (config-ip-sla-icmpjitter)
ICMP path echo configuration (config-ip-sla-pathEcho)
ICMP path jitter configuration (config-ip-sla-pathJitter)
TCP connect configuration (config-ip-sla-tcp)
UDP echo configuration (config-ip-sla-udp)
UDP jitter configuration (config-ip-sla-jitter)
VoIP configuration (config-ip-sla-voip)

Auto IP SLA MPLS Configuration

MPLS parameters configuration (config-auto-ip-sla-mpls-params)

IP SLA Auto Ethernet Configuration

Ethernet parameters configuration (config-ip-sla-ethernet-params)

IP SLA Monitor Configuration

DHCP configuration (config-sla-monitor-dhcp)
DLSw configuration (config-sla-monitor-dlsw)
DNS configuration (config-sla-monitor-dns)
FTP configuration (config-sla-monitor-ftp)
HTTP configuration (config-sla-monitor-http)
ICMP echo configuration (config-sla-monitor-echo)
ICMP path echo configuration (config-sla-monitor-pathEcho)

ICMP path jitter configuration (config-sla-monitor-pathJitter)
TCP connect configuration (config-sla-monitor-tcp)
UDP echo configuration (config-sla-monitor-udp)
UDP jitter configuration (config-sla-monitor-jitter)
VoIP configuration (config-sla-monitor-voip)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The Ethernet echo, Ethernet jitter, and Ethernet parameters configuration modes were added.

Usage Guidelines

An operation tag is normally used to logically link operations in a group.

Tags can be used to support automation (for example, by using the same tag for two different operations on two different routers echoing the same target).

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 27). Note that if you are configuring an IP SLAs LSP Health Monitor operation, see Table 28 for information on Cisco IOS release dependencies. 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.

The configuration mode for the **tag** command varies depending on the Cisco IOS release you are running and the operation type configured. For example, if you are running Cisco IOS Release 12.4 and the ICMP echo operation type is configured, you would enter the **tag** command in ICMP echo configuration mode (config-sla-monitor-echo) within IP SLA monitor configuration mode.

Table 27 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Table 28 Command Used to Begin Configuration of an IP SLAs LSP Health Monitor Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(6)T, 12.0(32)SY, 12.2(31)SB2, 12.2(33)SRB, 12.2(33)SXH, or later releases	**auto ip sla mpls-lsp-monitor**	Auto IP SLA MPLS configuration

Examples

In the following examples, IP SLAs ICMP echo operation 1 is tagged with the label testoperation. Note that the Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 27).

IP SLA Configuration

```
ip sla 1
 icmp-echo 172.16.1.176
 tag testoperation
!
ip sla schedule 1 life forever start-time now
```

IP SLA Monitor Configuration

```
ip sla monitor 1
 type echo protocol ipIcmpEcho 172.16.1.176
 tag testoperation
!
ip sla monitor schedule 1 life forever start-time now
```

Related Commands

Command	Description
auto ip sla mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters auto IP SLA MPLS configuration mode.
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

threshold (IP SLA)

To set the upper threshold value for calculating network monitoring statistics created by a Cisco IOS IP Service Level Agreements (SLAs) operation, use the **threshold** (IP SLA) command in the appropriate submode of IP SLA configuration, auto IP SLA MPLS configuration, or IP SLA monitor configuration mode. To return to the default value, use the **no** form of this command.

threshold *milliseconds*

no threshold

Syntax Description

milliseconds	Number of milliseconds required for a rising threshold to be declared. The default is 5000.

Defaults

5000 ms

Command Modes

IP SLA Configuration

DHCP configuration (config-ip-sla-dhcp)
DLSw configuration (config-ip-sla-dlsw)
DNS configuration (config-ip-sla-dns)
Ethernet echo (config-ip-sla-ethernet-echo)
Ethernet jitter (config-ip-sla-ethernet-jitter)
FTP configuration (config-ip-sla-ftp)
HTTP configuration (config-ip-sla-http)
ICMP echo configuration (config-ip-sla-echo)
ICMP jitter configuration (config-ip-sla-icmpjitter)
ICMP path echo configuration (config-ip-sla-pathEcho)
ICMP path jitter configuration (config-ip-sla-pathJitter)
TCP connect configuration (config-ip-sla-tcp)
UDP echo configuration (config-ip-sla-udp)
UDP jitter configuration (config-ip-sla-jitter)
VoIP configuration (config-ip-sla-voip)

Auto IP SLA MPLS Configuration

MPLS parameters configuration (config-auto-ip-sla-mpls-params)

IP SLA Auto Ethernet Configuration

Ethernet parameters configuration (config-ip-sla-ethernet-params)

IP SLA Monitor Configuration

DHCP configuration (config-sla-monitor-dhcp)
DLSw configuration (config-sla-monitor-dlsw)
DNS configuration (config-sla-monitor-dns)
FTP configuration (config-sla-monitor-ftp)
HTTP configuration (config-sla-monitor-http)
ICMP echo configuration (config-sla-monitor-echo)
ICMP path echo configuration (config-sla-monitor-pathEcho)

ICMP path jitter configuration (config-sla-monitor-pathJitter)
TCP connect configuration (config-sla-monitor-tcp)
UDP echo configuration (config-sla-monitor-udp)
UDP jitter configuration (config-sla-monitor-jitter)
VoIP configuration (config-sla-monitor-voip)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The Ethernet echo, Ethernet jitter, and Ethernet parameters configuration modes were added.

Usage Guidelines

The value specified for the **threshold** command must not exceed the value specified for the **timeout** command.

The threshold value configured by the **threshold** command is used only to calculate network monitoring statistics created by a Cisco IOS IP SLAs operation. This value is not used for generating Simple Network Management Protocol (SNMP) trap notifications. Use the **ip sla reaction-configuration** command in global configuration mode to configure the thresholds for generating IP SLAs SNMP trap notifications.

For the IP SLAs UDP jitter operation, the **threshold** command sets the upper threshold value for the average jitter calculation. For all other IP SLAs operations, the **threshold** command sets the upper threshold value for the round-trip time (RTT) measurement. IP SLAs will calculate the number of times the average jitter or RTT measurement exceeds the specified threshold value.

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 27). Note that if you are configuring an IP SLAs LSP Health Monitor operation, see Table 28 for information on Cisco IOS release dependencies. 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.

The configuration mode for the **threshold** command varies depending on the Cisco IOS release you are running and the operation type configured. For example, if you are running Cisco IOS Release 12.4 and the ICMP echo operation type is configured, you would enter the **threshold** command in ICMP echo configuration mode (config-sla-monitor-echo) within IP SLA monitor configuration mode.

Table 29 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Table 30 Command Used to Begin Configuration of an IP SLAs LSP Health Monitor Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(6)T, 12.0(32)SY, 12.2(31)SB2, 12.2(33)SRB, 12.2(33)SXH, or later releases	**auto ip sla mpls-lsp-monitor**	Auto IP SLA MPLS configuration

Examples

In the following examples, the threshold of IP SLAs ICMP echo operation 1 is set to 2500 ms. Note that the Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 27).

IP SLA Configuration

```
ip sla 1
 icmp-echo 172.16.1.176
 threshold 2500
!
ip sla schedule 1 start-time now
```

IP SLA Monitor Configuration

```
ip sla monitor 1
 type echo protocol ipIcmpEcho 172.16.1.176
 threshold 2500
!
ip sla monitor schedule 1 start-time now
```

Related Commands

Command	Description
auto ip sla mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters auto IP SLA MPLS configuration mode.
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.
ip sla monitor reaction-configuration	Configures proactive threshold monitoring parameters for an IP SLAs operation.

Command	Description
ip sla reaction-configuration	Configures proactive threshold monitoring parameters for an IP SLAs operation.
timeout	Sets the amount of time the IP SLAs operation waits for a response from its request packet.

timeout (IP SLA)

To set the amount of time a Cisco IOS IP Service Level Agreements (SLAs) operation waits for a response from its request packet, use the **timeout** (IP SLA) command in the appropriate submode of IP SLA configuration, auto IP SLA MPLS configuration, or IP SLA monitor configuration mode. To return to the default value, use the **no** form of this command.

timeout *milliseconds*

no timeout

Syntax Description

milliseconds	Number of milliseconds (ms) the operation waits to receive a response from its request packet. We recommend that the value of the *milliseconds* argument be based on the sum of both the maximum round-trip time (RTT) value for the packets and the processing time of the IP SLAs operation.

Defaults

The default timeout value will vary depending on the type of IP SLAs operation you are configuring.

Command Modes

IP SLA Configuration

DHCP configuration (config-ip-sla-dhcp)
DLSw configuration (config-ip-sla-dlsw)
DNS configuration (config-ip-sla-dns)
Ethernet echo (config-ip-sla-ethernet-echo)
Ethernet jitter (config-ip-sla-ethernet-jitter)
FTP configuration (config-ip-sla-ftp)
HTTP configuration (config-ip-sla-http)
ICMP echo configuration (config-ip-sla-echo)
ICMP jitter configuration (config-ip-sla-icmpjitter)
ICMP path echo configuration (config-ip-sla-pathEcho)
ICMP path jitter configuration (config-ip-sla-pathJitter)
TCP connect configuration (config-ip-sla-tcp)
UDP echo configuration (config-ip-sla-udp)
UDP jitter configuration (config-ip-sla-jitter)
VoIP configuration (config-ip-sla-voip)

Auto IP SLA MPLS Configuration

MPLS parameters configuration (config-auto-ip-sla-mpls-params)

IP SLA Auto Ethernet Configuration

Ethernet parameters configuration (config-ip-sla-ethernet-params)

IP SLA Monitor Configuration

DHCP configuration (config-sla-monitor-dhcp)
DLSw configuration (config-sla-monitor-dlsw)
DNS configuration (config-sla-monitor-dns)
FTP configuration (config-sla-monitor-ftp)
HTTP configuration (config-sla-monitor-http)

ICMP echo configuration (config-sla-monitor-echo)
ICMP path echo configuration (config-sla-monitor-pathEcho)
ICMP path jitter configuration (config-sla-monitor-pathJitter)
TCP connect configuration (config-sla-monitor-tcp)
UDP echo configuration (config-sla-monitor-udp)
UDP jitter configuration (config-sla-monitor-jitter)
VoIP configuration (config-sla-monitor-voip)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The Ethernet echo, Ethernet jitter, and Ethernet parameters configuration modes were added.

Usage Guidelines

We recommend that the value of the *milliseconds* argument for the **timeout** command be based on the sum of both the maximum round-trip time (RTT) value for the packets and the processing time of the IP SLAs operation.

Use the **timeout** command to set how long the operation waits to receive a response from its request packet, and use the **frequency** command to set the rate at which the IP SLAs operation restarts. The value specified for the **timeout** command cannot be greater than the value specified for the **frequency** command.

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 27). Note that if you are configuring an IP SLAs LSP Health Monitor operation, see Table 28 for information on Cisco IOS release dependencies. 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.

The configuration mode for the **timeout** command varies depending on the Cisco IOS release you are running and the operation type configured. For example, if you are running Cisco IOS Release 12.4 and the ICMP echo operation type is configured, you would enter the **timeout** command in ICMP echo configuration mode (config-sla-monitor-echo) within IP SLA monitor configuration mode.

Table 31 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Table 32 Command Used to Begin Configuration of an IP SLAs LSP Health Monitor Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(6)T, 12.0(32)SY, 12.2(31)SB2, 12.2(33)SRB, 12.2(33)SXH, or later releases	**auto ip sla mpls-lsp-monitor**	Auto IP SLA MPLS configuration

Examples

In the following examples, the timeout value for IP SLAs ICMP echo operation 1 is set for 2500 ms. Note that the Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 27).

IP SLA Configuration

```
ip sla 1
 icmp-echo 172.16.1.176
 timeout 2500
!
ip sla schedule 1 start-time now
```

IP SLA Monitor Configuration

```
ip sla monitor 1
 type echo protocol ipIcmpEcho 172.16.1.176
 timeout 2500
!
ip sla monitor schedule 1 start-time now
```

Related Commands

Command	Description
auto ip sla mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters auto IP SLA MPLS configuration mode.
frequency	Sets the rate at which the IP SLAs operation restarts.
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

tos (IP SLA)

To define a type of service (ToS) byte in the IP header of a Cisco IOS IP Service Level Agreements (SLAs) operation, use the **tos** (IP SLA) command in the appropriate submode of IP SLA configuration or IP SLA monitor configuration mode. To return to the default value, use the **no** form of this command.

tos *number*

no tos

Syntax Description

number	Service type byte in the IP header. The range is from 0 to 255. The default is 0.

Defaults

The default type-of-service value is 0.

Command Modes

IP SLA Configuration

HTTP configuration (config-ip-sla-http)
ICMP echo configuration (config-ip-sla-echo)
ICMP jitter configuration (config-ip-sla-icmpjitter)
ICMP path echo configuration (config-ip-sla-pathEcho)
ICMP path jitter configuration (config-ip-sla-pathJitter)
TCP connect configuration (config-ip-sla-tcp)
UDP echo configuration (config-ip-sla-udp)
UDP jitter configuration (config-ip-sla-jitter)

IP SLA Monitor Configuration

HTTP configuration (config-sla-monitor-http)
ICMP echo configuration (config-sla-monitor-echo)
ICMP path echo configuration (config-sla-monitor-pathEcho)
ICMP path jitter configuration (config-sla-monitor-pathJitter)
TCP connect configuration (config-sla-monitor-tcp)
UDP echo configuration (config-sla-monitor-udp)
UDP jitter configuration (config-sla-monitor-jitter)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The ToS value is an 8-bit field in IP headers. This field contains information such as precedence and ToS. This information is useful for policy routing and for features like Committed Access Rate (CAR), where routers examine ToS values.

When the type of service is defined for an operation, the IP SLAs Responder will reflect the ToS value it receives.

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 33). 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.

The configuration mode for the **tos** command varies depending on the Cisco IOS release you are running (see Table 33) and the operation type configured. For example, if you are running Cisco IOS Release 12.4 and the ICMP echo operation type is configured, you would enter the **tos** command in ICMP echo configuration mode (config-sla-monitor-echo) within IP SLA monitor configuration mode.

Table 33 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Examples

In the following examples, IP SLAs operation 1 is configured as an ICMP echo operation with destination IP address 172.16.1.176. The ToS value is set to 0x80. Note that the Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 33).

IP SLA Configuration

```
ip sla 1
 icmp-echo 172.16.1.176
 tos 0x80
!
ip sla schedule 1 start-time now
```

IP SLA Monitor Configuration

```
ip sla monitor 1
 type echo protocol ipIcmpEcho 172.16.1.176
 tos 0x80
!
ip sla monitor schedule 1 start-time now
```

Related Commands

Command	Description
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

track rtr

To track the state of a Cisco IOS IP Service Level Agreements (SLAs) operation and to enter tracking configuration mode, use the **track rtr** command in global configuration mode. To remove the tracking, use the **no** form of this command.

track *object-number* **rtr** *operation-number* {**state** | **reachability**}

no track *object-number* **rtr** *operation-number* {**state** | **reachability**}

Syntax Description

object-number	Object number representing the object to be tracked. The range is from 1 to 500.
operation-number	Number used for the identification of the IP SLAs operation you are tracking.
state	Tracks the operation return code.
reachability	Tracks whether the route is reachable.

Defaults

IP SLAs tracking is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

Every IP SLAs operation maintains an operation return-code value. This return code is interpreted by the tracking process. The return code may return OK, OverThreshold, and several other return codes. Different operations may have different return-code values, so only values common to all operation types are used.

Two aspects of an IP SLAs operation can be tracked: state and reachability. The difference between these aspects relates to the acceptance of the OverThreshold return code. Table 34 shows the state and reachability aspects of IP SLAs operations that can be tracked.

Table 34 Comparison of State and Reachability Operations

Tracking	Return Code	Track State
State	OK	Up
	(all other return codes)	Down
Reachability	OK or over threshold	Up
	(all other return codes)	Down

Examples

The following example shows how to configure the tracking process to track the state of IP SLAs operation 2:

```
track 1 rtr 2 state
```

The following example shows how to configure the tracking process to track the reachability of IP SLAs operation 3:

```
track 2 rtr 3 reachability
```

ttl (IP SLA)

To specify the maximum hop count for an echo request packet of a Cisco IOS IP Service Level Agreements (SLAs) operation, use the **ttl** command in the appropriate submode of auto IP SLA MPLS configuration or IP SLA configuration mode. To return to the default value, use the **no** form of this command.

ttl *time-to-live*

no ttl

Syntax Description

time-to-live	Specifies the maximum hop count for an echo request packet. For IP SLAs LSP ping operations, valid values are from 1 to 255 and the default is 255. For IP SLAs LSP traceroute operations, the range is from 1 to 30. The default is 30.

Command Default

For IP SLAs LSP ping operations, the default time-to-live value is 255.
For IP SLAs LSP traceroute operations, the default time-to-live value is 30.

Command Modes

Auto IP SLA MPLS Configuration

MPLS parameters configuration (config-auto-ip-sla-mpls-params)

IP SLA Configuration and IP SLA Monitor Configuration

LSP ping configuration (config-sla-monitor-lspPing)
LSP trace configuration (config-sla-monitor-lspTrace)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
12.2(27)SBC	This command was introduced.
12.4(6)T	This command was integrated into Cisco IOS Release 12.4(6)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 35). Note that if you are configuring an IP SLAs LSP Health Monitor operation, see Table 36 for information on Cisco IOS release dependencies. You must configure the type of IP SLAs operation (such as LSP ping) before you can configure any of the other parameters of the operation.

The configuration mode for the **ttl** command varies depending on the Cisco IOS release you are running and the operation type configured. For example, if you are running Cisco IOS Release 12.4(6)T and the LSP ping operation type is configured (without using the LSP Health Monitor), you would enter the **ttl** command in LSP ping configuration mode (config-sla-monitor-lspPing) within IP SLA configuration mode.

Table 35 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Table 36 Command Used to Begin Configuration of an IP SLAs LSP Health Monitor Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(6)T, 12.0(32)SY, 12.2(31)SB2, 12.2(33)SRB, 12.2(33)SXH, or later releases	**auto ip sla mpls-lsp-monitor**	Auto IP SLA MPLS configuration

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using the LSP Health Monitor. In this example, LSP Health Monitor operation 1 is configured to automatically create IP SLAs LSP ping operations for all Border Gateway Protocol (BGP) next hop neighbors in use by all VPN routing and forwarding (VRF) instances associated with the source Provider Edge (PE) router. The maximum hop count for echo request packets of IP SLAs operations created by LSP Health Monitor operation 1 is set to 200 hops.

```
mpls discovery vpn interval 60
mpls discovery vpn next-hop
!
auto ip sla mpls-lsp-monitor 1
 type echo ipsla-vrf-all
 timeout 1000
 scan-interval 1
 secondary-frequency connection-loss 10
 secondary-frequency timeout 10
 delete-scan-factor 2
 ttl 200
!
auto ip sla mpls-lsp-monitor reaction-configuration 1 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
```

```
auto ip sla mpls-lsp-monitor reaction-configuration 1 react timeout threshold-type
consecutive 3 action-type trapOnly
ip sla logging traps
!
auto ip sla mpls-lsp-monitor schedule 1 schedule-period 60 start-time now
```

Related Commands

Command	Description
auto ip sla mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters auto IP SLA MPLS configuration mode.
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.

type dhcp

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type dhcp** command is replaced by the **dhcp** (IP SLA) command. See the **dhcp** (IP SLA) command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) Dynamic Host Configuration Protocol (DHCP) operation, use the **type dhcp** command in IP SLA monitor configuration mode.

type dhcp [**source-ipaddr** {*ip-address* | *hostname*}] [**dest-ipaddr** {*ip-address* | *hostname*}] [**option 82** [**circuit-id** *circuit-id*] [**remote-id** *remote-id*] [**subnet-mask** *subnet-mask*]]

Syntax Description

source-ipaddr {*ip-address* | *hostname*}	(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.
dest-ipaddr {*ip-address* | *hostname*}	(Optional) Specifies the destination IP address or hostname.
option 82	(Optional) Specifies DHCP option 82 for the destination DHCP server.
circuit-id *circuit-id*	(Optional) Specifies the circuit ID in hexadecimal.
remote-id *remote-id*	(Optional) Specifies the remote ID in hexadecimal.
subnet-mask *subnet-mask*	(Optional) Specifies the subnet mask IP address. The default subnet mask is 255.255.255.0.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.1(1)T	The following keywords were added: • **source-ipaddr** • **dest-ipaddr** • **option 82**
12.4(4)T	This command was replaced by the **dhcp** (IP SLA) command.
12.2(33)SRB	This command was replaced by the **dhcp** (IP SLA) command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If the source IP address is configured, then packets will be sent with that source address.

You may configure the **ip dhcp-server** global configuration command to identify the DHCP server that the DHCP operation will measure. If the target IP address is configured, then only that device will be measured. If the **ip dhcp-server** command is not configured and the target IP address is not configured, then DHCP discover packets will be sent on every available IP interface.

Option 82 is called the Relay Agent Information option and is inserted by the DHCP relay agent when client-originated DHCP packets are forwarded to a DHCP server. Servers recognizing the Relay Agent Information option may use the information to implement IP address or other parameter assignment policies. The DHCP server echoes the option back verbatim to the relay agent in server-to-client replies, and the relay agent strips the option before forwarding the reply to the client.

The Relay Agent Information option is organized as a single DHCP option that contains one or more suboptions that convey information known by the relay agent. The initial suboptions are defined for a relay agent that is colocated in a public circuit access unit. These suboptions are as follows: a circuit ID for the incoming circuit, a remote ID that provides a trusted identifier for the remote high-speed modem, and a subnet mask designation for the logical IP subnet from which the relay agent received the client DHCP packet.

Note If an odd number of characters are specified for the circuit ID, a zero will be added to the end of the string.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation number 4 is configured as a DHCP operation enabled for DHCP server 172.16.20.3.

```
ip sla monitor 4
 type dhcp option 82 circuit-id 10005A6F1234
ip dhcp-server 172.16.20.3
!
ip sla monitor schedule 4 start-time now
```

Related Commands

Command	Description
ip dhcp-server	Specifies which DHCP servers to use on a network, and specifies the IP address of one or more DHCP servers available on the network.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type dlsw peer-ipaddr

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type dlsw peer-ipaddr** command is replaced by the **dlsw peer-ipaddr** command. See the **dlsw peer-ipaddr** command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) Data Link Switching Plus (DLSw+) operation, use the **type dlsw peer-ipaddr** command in IP SLA monitor configuration mode.

type dlsw peer-ipaddr *ip-address*

Syntax Description

ip-address	IP address of the peer destination.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.4(4)T	This command was replaced by the **dlsw peer-ipaddr** command.
12.2(33)SRB	This command was replaced by the **dlsw peer-ipaddr** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

To configure an IP SLAs DLSw+ operation, the DLSw feature must be configured on the local and target routers.

For DLSw+ operations, the default request packet data size is 0 bytes (use the **request-data-size** command to modify this value) and the default amount of time the operation waits for a response from the request packet is 30 seconds (use the **timeout** command to modify this value).

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation number 10 is configured as a DLSw+ operation enabled for remote peer IP address 172.21.27.11. The data size is 15 bytes.

```
ip sla monitor 10
 type dlsw peer-ipaddr 172.21.27.11
 request-data-size 15
```

```
!
ip sla monitor schedule 10 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.
request-data-size	Sets the protocol data size in the payload of the IP SLAs operation's request packet.
show dlsw peers	Displays DLSw peer information.

type dns target-addr

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type dns target-addr** command is replaced by the **dns** (IP SLA) command. See the **dns** (IP SLA) command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) Domain Name System (DNS) operation, use the **type dns target-addr** command in IP SLA monitor configuration mode.

type dns target-addr {*target-hostname* | *target-ip-address*} **name-server** *ip-address*
[**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*]

Syntax Description

target-hostname | *target-ip-address*	Target (destination) IP address or hostname.
name-server *ip-address*	Specifies the IP address of the DNS server.
source-ipaddr {*ip-address* | *hostname*}	(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.
source-port *port-number*	(Optional) Specifies the source port number. When a port number is not specified, IP SLAs chooses an available port.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.4(4)T	This command was replaced by the **dns** (IP SLA) command.
12.2(33)SRB	This command was replaced by the **dns** (IP SLA) command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation 7 is configured as a DNS operation using the target IP address 172.20.2.132.

```
ip sla monitor 7
 type dns target-addr host1 name-server 172.20.2.132
!
ip sla monitor schedule 7 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type echo (MPLS)

To configure Cisco IOS IP Service Level Agreements (SLAs) label switched path (LSP) ping operations using the LSP Health Monitor, use the **type echo** command in auto IP SLA MPLS configuration mode.

type echo [**ipsla-vrf-all** | **vrf** *vpn-name*]

Syntax Description

ipsla-vrf-all	(Optional) Specifies that LSP ping operations should be automatically created for all Border Gateway Protocol (BGP) next hop neighbors in use by a VPN routing or forwarding instance (VRF) corresponding to all the Virtual Private Networks (VPNs) in which the originating Provider Edge (PE) router belongs. This option is the default.
vrf *vpn-name*	(Optional) Specifies that LSP ping operations should be automatically created for only those BGP next hop neighbors associated with the specified VPN name.

Command Default

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

Command Modes

Auto IP SLA MPLS configuration (config-auto-ip-sla-mpls)

Command History

Release	Modification
12.2(27)SBC	This command was introduced.
12.4(6)T	This command was integrated into Cisco IOS Release 12.4(6)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

You must configure the type of LSP Health Monitor operation (such as LSP ping) before you can configure any of the other parameters of the operation.

Note When an IP SLAs LSP ping operation is created by the LSP Health Monitor, an operation number (identification number) is automatically assigned to the operation. The operation numbering starts at 100001.

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using the LSP Health Monitor. In this example, LSP Health Monitor operation 1 is configured to automatically create IP SLAs LSP ping operations for all Border Gateway Protocol (BGP) next hop neighbors in use by all VPN routing and forwarding (VRF) instances associated with the source PE router.

```
mpls discovery vpn interval 60
mpls discovery vpn next-hop
!
auto ip sla mpls-lsp-monitor 1
 type echo ipsla-vrf-all
 timeout 1000
 scan-interval 1
 secondary-frequency connection-loss 10
 secondary-frequency timeout 10
 delete-scan-factor 2
!
auto ip sla mpls-lsp-monitor reaction-configuration 1 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
auto ip sla mpls-lsp-monitor reaction-configuration 1 react timeout threshold-type
consecutive 3 action-type trapOnly
ip sla logging traps
!
auto ip sla mpls-lsp-monitor schedule 1 schedule-period 60 start-time now
```

Related Commands

Command	Description
auto ip sla mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters auto IP SLA MPLS configuration mode.

type echo protocol ipIcmpEcho

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type echo protocol ipIcmpEcho** command is replaced by the **icmp-echo** command. See the **icmp-echo** command for more information.

To configure an IP Service Level Agreements (SLAs) Internet Control Message Protocol (ICMP) echo operation, use the **type echo protocol ipIcmpEcho** command in IP SLA monitor configuration mode.

type echo protocol ipIcmpEcho {*destination-ip-address* | *destination-hostname*} [**source-ipaddr** {*ip-address* | *hostname*} | **source-interface** *interface-name*]

Syntax Description

destination-ip-address | *destination-hostname*	Destination IP address or hostname for the operation.
source-ipaddr {*ip-address* | *hostname*}	(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.
source-interface *interface-name*	(Optional) Specifies the source interface for the operation.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
11.2	This command was introduced.
12.0(5)T	The following keyword and arguments were added: • **source-ipaddr** {*ip-address* | *hostname*}
12.3(7)XR	The **source-interface** keyword and *interface-name* argument were added.
12.3(11)T	The **source-interface** keyword and *interface-name* argument were added.
12.4(4)T	This command was replaced by the **icmp-echo** command.
12.2(33)SRB	This command was replaced by the **icmp-echo** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The default request packet data size for an ICMP echo operation is 28 bytes. Use the **request-data-size** command to modify this value. This data size is the payload portion of the ICMP packet, which makes a 64-byte IP packet.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation 10 is created and configured as an echo operation using the IP/ICMP protocol and the destination IP address 172.16.1.175.

```
ip sla monitor 10
 type echo protocol ipIcmpEcho 172.16.1.175
!
ip sla monitor schedule 10 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type ftp operation get url

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type ftp operation get url** command is replaced by the **ftp get** command. See the **ftp get** command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) File Transfer Protocol (FTP) GET operation, use the **type ftp operation get url** command in IP SLA monitor configuration mode.

type ftp operation get url *url* [**source-ipaddr** {*ip-address* | *hostname*}] [**mode** {**passive** | **active**}

Syntax Description

url	URL location information for the file to be retrieved.
source-ipaddr {*ip-address* | *hostname*}	(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.
mode {**passive** | **active**}	(Optional) Specifies the FTP transfer mode as either passive or active. The default is passive transfer mode.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.1(1)T	This command was introduced.
12.4(4)T	This command was replaced by the **ftp get** command.
12.2(33)SRB	This command was replaced by the **ftp get** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The *url* argument must be in one of the following formats:

- ftp://username:password@host/filename
- ftp://host/filename

If the username and password are not specified, the defaults are anonymous and test, respectively.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, an FTP operation is configured. User1 is the username and password1 is the password; host1 is the host and file1 is the filename.

```
ip sla monitor 3
 type ftp operation get url ftp://user1:password1@host1/file1
!
ip sla monitor schedule 3 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type http operation

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type http operation** command is replaced by the **http** (IP SLA) command. See the **http** (IP SLA) command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) HTTP operation, use the **type http operation** command in IP SLA monitor configuration mode.

type http operation {**get** | **raw**} **url** *url* [**name-server** *ip-address*] [**version** *version-number*] [**source-ipaddr** {*ip-address* | *hostname*}] [**source-port** *port-number*] [**cache** {**enable** | **disable**}] [**proxy** *proxy-url*]

Syntax Description

get	Specifies an HTTP GET operation.
raw	Specifies an HTTP RAW operation.
url *url*	Specifies the URL of destination HTTP server.
name-server *ip-address*	(Optional) Specifies the destination IP address of a Domain Name System (DNS) Server.
version *version-number*	(Optional) Specifies the version number.
source-ipaddr {*ip-address*| *hostname*}	(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.
source-port *port-number*	(Optional) Specifies the source port number. When a port number is not specified, IP SLAs chooses an available port.
cache {**enable** | **disable**}	(Optional) Enables or disables download of a cached HTTP page.
proxy *proxy-url*	(Optional) Specifies proxy information or URL.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.4(4)T	This command was replaced by the **http** (IP SLA) command.
12.2(33)SRB	This command was replaced by the **http** (IP SLA) command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs HTTP operation 6 is configured as an HTTP RAW operation. The destination URL is http://www.cisco.com.

```
ip sla monitor 6
 type http operation raw url http://www.cisco.com
 http-raw-request
 GET /index.html HTTP/1.0\r\n
 \r\n
!
ip sla monitor schedule 6 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type jitter dest-ipaddr

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type jitter dest-ipaddr** command is replaced by the **udp-jitter** command. See the **udp-jitter** command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) User Datagram Protocol (UDP) jitter operation, use the **type jitter dest-ipaddr** command in IP SLA monitor configuration mode.

type jitter dest-ipaddr {*destination-ip-address* | *destination-hostname*} **dest-port** *port-number* [**source-ipaddr** {*ip-address* | *hostname*}] [**source-port** *port-number*] [**control** {**enable** | **disable**}] [**num-packets** *number-of-packets*] [**interval** *interpacket-interval*]

Syntax Description

destination-ip-address | *destination-hostname*	Destination IP address or hostname.
dest-port *port-number*	Specifies the destination port number.
source-ipaddr {*ip-address*| *hostname*}	(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.
source-port *port-number*	(Optional) Specifies the source port number. When a port number is not specified, IP SLAs chooses an available port.
control {**enable** | **disable**}	(Optional) Enables or disables the sending of IP SLAs control messages to the IP SLAs Responder. By default, IP SLAs control messages are sent to the destination device to establish a connection with the IP SLAs Responder.
num-packets *number-of-packets*	(Optional) Number of packets, as specified by the number argument. The default value is 10.
interval *interpacket-interval*	(Optional) Interpacket interval in milliseconds. The default value is 20 ms.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.4(4)T	This command was replaced by the **udp-jitter** command.
12.2(33)SRB	This command was replaced by the **udp-jitter** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **type jitter dest-ipaddr** command configures an IP SLAs UDP Plus operation. The UDP Plus operation is a superset of the UDP echo operation. In addition to measuring UDP round-trip time, the UDP Plus operation measures per-direction packet loss and jitter. Jitter is interpacket delay variance. Jitter statistics are useful for analyzing traffic in a Voice over IP (VoIP) network.

You must enable the IP SLAs Responder on the target router before you can configure a UDP jitter operation. Prior to sending an operation packet to the target router, IP SLAs sends a control message to the IP SLAs Responder to enable the destination port.

The default request packet data size for an IP SLAs UDP jitter operation is 32 bytes. Use the **request-data-size** command to modify this value.

Note 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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

IP SLAs VoIP UDP Jitter (codec) Operation

When you specify the codec in the command syntax of the **type jitter dest-ipaddr** command, the standard configuration options are replaced with codec-specific keywords and arguments. The codec-specific command syntax is documented separately from the command syntax for the standard implementation of the **type jitter dest-ipaddr** command. For information about the codec-specific command syntax, see the documentation for the **type jitter dest-ipaddr** (codec) command.

Examples

In the following example, operation 6 is configured as a UDP jitter operation with the destination IP address 172.30.125.15, the destination port number 2000, 20 packets, and an interpacket interval of 20 ms.

```
ip sla monitor 6
 type jitter dest-ipaddr 172.30.125.15 dest-port 2000 num-packets 20 interval 20
!
ip sla monitor schedule 6 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.
request-data-size	Sets the payload size for IP SLAs operation request packets.
type jitter dest-ipaddr (codec)	Configures an IP SLAs UDP jitter operation that returns VoIP scores.

type jitter dest-ipaddr (codec)

Note Effective with Cisco IOS Release 12.4(4)T and 12.2(33)SRB, the **type jitter dest-ipaddr** (codec) command is replaced by the **udp-jitter** (codec) command. See the **udp-jitter** (codec) command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) User Datagram Protocol (UDP) jitter operation that returns Voice over IP (VoIP) scores, use the **type jitter dest-ipaddr** command in IP SLA monitor configuration mode.

type jitter dest-ipaddr {*destination-ip-address* | *destination-hostname*} **dest-port** *port-number* **codec** *codec-type* [**codec-numpackets** *number-of-packets*] [**codec-size** *number-of-bytes*] [**codec-interval** *milliseconds*] [**advantage-factor** *value*] [**source-ipaddr** {*ip-address* | *hostname*}] [**source-port** *port-number*] [**control** {**enable** | **disable**}]

Syntax Description

destination-ip-address | *destination-hostname*	Specifies the destination IP address or hostname.
dest-port *port-number*	Specifies the destination port number. For UDP jitter (codec) operations, the port number should be an even number in the range of 16384 to 32766 or 49152 to 65534.
codec *codec-type*	Enables the generation of estimated voice-quality scores in the form of Calculated Planning Impairment Factor (ICPIF) and Mean Opinion Score (MOS) values. The codec type should match the encoding algorithm you are using for VoIP transmissions. The following codec-type keywords are available: • **g711alaw**—The G.711 a-law codec (64 kbps transmission) • **g711ulaw**—The G.711 muHmm-law codec (64 kbps transmission) • **g729a**—The G.729A codec (8 kbps transmission) Configuring the codec type sets default values for the variables **codec-numpackets**, **codec-size**, and **codec-interval** in this command. See Table 37 for details.
codec-numpackets *number-of-packets*	(Optional) Specifies the number of packets to be transmitted per operation. The valid range is from 1 to 60000 packets. The default is 1000 packets.
codec-size *number-of-bytes*	(Optional) Specifies the number of bytes in each packet transmitted. (Also called the payload size or request size.) The valid range is from 16 to 1500 packets. The default varies by codec (see Table 37).
codec-interval *milliseconds*	Specifies the interval (delay) between packets that should be used for the operation, in milliseconds (ms). The valid range is from 1 to 60000 ms. By default, packets are sent 20 ms apart.
advantage-factor *value*	Specifies the expectation factor to be used for ICPIF calculations. This value is subtracted from the measured impairments to yield the final ICPIF value (and corresponding MOS value). See the "Usage Guidelines" section for recommended values. The valid range is from 0 to 20. The default is 0.

source-ipaddr {*ip-address* | *hostname*}	(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.
source-port *port-number*	(Optional) Specifies the source port number. When a port number is not specified, IP SLAs chooses an available port.
control {**enable** | **disable**}	(Optional) Enables or disables the sending of IP SLAs control messages to the IP SLAs Responder. By default, IP SLAs control messages are sent to the destination device to establish a connection with the IP SLAs Responder. **Note** Control messages are enabled by default. Disabling the IP SLAs control messages for UDP jitter operations is not recommended. If you disable IP SLAs control messages, packet loss statistics and IP telephony scores will not be generated accurately.

Defaults

No IP SLAs operation type is associated with the operation number being configured.

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(5)T	The **type jitter dest-ipaddr** command was introduced.
12.3(4)T	The codec-specific keywords and arguments were added to the **type jitter dest-ipaddr** command to support the IP SLAs VoIP UDP jitter operation.
12.4(4)T	This command was replaced by the **udp-jitter** (codec) command.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was replaced by the **udp-jitter** (codec) command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

When you specify the codec in the command syntax of the **type jitter dest-ipaddr** command, the standard configuration options are replaced with codec-specific keywords and arguments. The codec-specific command syntax is documented separately from the command syntax for the standard implementation of the **type jitter dest-ipaddr** command. For information about the command syntax for the standard implementation, see the documentation for the **type jitter dest-ipaddr** command.

You must enable the IP SLAs Responder on the target router before you can configure a UDP jitter (codec) operation. Prior to sending an operation packet to the target router, IP SLAs sends a control message to the IP SLAs Responder to enable the destination port.

Note 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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

IP SLAs VoIP UDP Jitter (codec) Statistics

The IP SLAs UDP jitter operation computes statistics by sending *n* UDP packets, each of size *s*, sent *t* milliseconds apart, from a given source router to a given target router, at a given frequency *f*.

To generate MOS and ICPIF scores, you specify the codec type used for the connection when configuring the UDP jitter operation. Based on the type of codec you configure for the operation, the number of packets (*n*), the size of each payload (*s*), the inter-packet time interval (*t*), and the operational frequency (*f*) will be auto-configured with default values. (See Table 37 for specific information.) However, you are given the option, if needed, to manually configure these parameters in the syntax of the **type jitter dest-ipaddr** (codec) command.

Table 37 shows the default parameters that are configured for the operation by codec.

Table 37 Default UDP Jitter Operation Parameters by Codec

Codec	Default Number of Packets (*n*); [codec-numpackets]	Packet Payload (*s*) [codec-size][1]	Default Interval Between Packets (*t*) [codec-interval]	Frequency of Operations (*f*)
G.711 mu-law (g711ulaw)	1000	160 bytes	20 ms	Once every 60 seconds
G.711 a-law (g711alaw)	1000	160 bytes	20 ms	Once every 60 seconds
G.729A (g729a)	1000	20 bytes	20 ms	Once every 60 seconds

1. The actual data size of each request packet will contain an additional 12 bytes of Real-Time Transport Protocol (RTP) header data in order to simulate the RTP/UDP/IP/Layer 2 protocol stack.

For example, if you configure the UDP jitter operation to use the characteristics for the g711ulaw codec, by default an operation will be sent once a minute (*f*). Each operation would consist of 1000 packets (*n*), with each packet containing 160 bytes (plus 12 header bytes) of synthetic data (*s*), sent 20 ms apart (*t*).

The **advantage-factor** *value* keyword and argument allow you to specify an access Advantage Factor (also called the Expectation Factor). Table 38, adapted from ITU-T Rec. G.113, defines a set of provisional maximum values for Advantage Factors in terms of the service provided.

Table 38 Advantage Factor Recommended Maximum Values

Communication Service	Maximum Value of Advantage/ Expectation Factor (*A*):
Conventional wire line (land line)	0
Mobility (cellular connections) within a building	5

Table 38 Advantage Factor Recommended Maximum Values

Communication Service	Maximum Value of Advantage/ Expectation Factor (*A*):
Mobility within a geographical area or moving within a vehicle	10
Access to hard-to-reach location; (for example, via multihop satellite connections)	20

These values are only suggestions. To be meaningful, the use of the Advantage/Expectation factor (*A*) and its selected value in a specific application should be used consistently in any planning model you adopt. However, the values in Table 38 should be considered as the absolute upper limits for *A*. The default Advantage/Expectation factor for IP SLAs UDP jitter operations is always zero.

Examples

In the following example, IP SLAs operation 10 is configured as a UDP jitter (codec) operation with the destination IP address 209.165.200.225 and the destination port number 3000. The operation is configured to use the characteristics of the G.711 a-law codec, which means the operation will consist of 1000 packets, each of 172 bytes (160 plus 12 header bytes), sent 20 ms apart. The default value for the Advantage Factor and operation frequency is used.

```
ip sla monitor 10
 type jitter dest-ipaddr 209.165.200.225 dest-port 3000 codec g711alaw
!
ip sla monitor schedule 10 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.
type jitter dest-ipaddr	Configures an IP SLAs UDP jitter operation.

type mpls lsp ping ipv4

Note Effective with Cisco IOS Release 12.2(33)SRB, the **type mpls lsp ping ipv4** command is replaced by the **mpls lsp ping ipv4** command. See the **mpls lsp ping ipv4** command for more information.

To manually configure an individual Cisco IOS IP Service Level Agreements (SLAs) label switched path (LSP) ping IPv4 operation, use the **type mpls lsp ping ipv4** command in IP SLA monitor configuration mode.

type mpls lsp ping ipv4 *destination-address destination-mask* [**force-explicit-null**] [**lsp-selector** *ip-address*] [**src-ip-addr** *source-address*] [**reply** {**dscp** *dscp-value* | **mode** {**ipv4** | **router-alert**}}]

Syntax Description

destination-address	Address prefix of the target to be tested.
destination-mask	Number of bits in the network mask of the target address.
force-explicit-null	(Optional) Adds an explicit null label to all echo request packets.
lsp-selector *ip-address*	(Optional) Specifies a local host IP address used to select the LSP. The default address is 127.0.0.1.
src-ip-addr *source-address*	(Optional) Specifies a source IP address for the echo request originator.
reply dscp *dscp-value*	(Optional) Specifies the differentiated services codepoint (DSCP) value of an echo reply packet. The default DSCP value is 0.
reply mode	(Optional) Specifies the reply mode for the echo request packet.
ipv4	(Optional) Replies with an IPv4 UDP packet (default).
router-alert	(Optional) Replies with an IPv4 UDP packet with router alert.

Command Default

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.2(27)SBC	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	The **force-explicit-null** keyword was added.
12.2(33)SRB	This command was replaced by the **mpls lsp ping ipv4** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The **lsp-selector** keyword is used to force an IP SLAs operation to use a specific LSP to obtain its response time measurement. This option is useful if there are multiple equal cost paths between Provider Edge (PE) routers.

You must configure the type of IP SLAs operation (such as LSP ping) 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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Note This command supports only single path connectivity measurements between the source PE router and associated Border Gateway Protocol (BGP) next hop neighbors.

Examples

The following examples show how to manually configure operation parameters, proactive threshold monitoring, and scheduling options for IP SLAs LSP ping operation 1.

```
ip sla monitor 1
type mpls lsp ping ipv4 192.168.1.4 255.255.255.255 lsp-selector 127.1.1.1
frequency 120
secondary-frequency connection-loss 30
secondary-frequency timeout 30
!
ip sla monitor reaction-configuration 1 react connectionLoss threshold-type consecutive 3
action-type trapOnly
ip sla monitor reaction-configuration 1 react timeout threshold-type consecutive 3
action-type trapOnly
ip sla monitor logging traps
!
ip sla monitor schedule 1 start-time now life forever
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type mpls lsp trace ipv4

Note Effective with Cisco IOS Release 12.2(33)SRB, the **type mpls lsp trace ipv4** command is replaced by the **mpls lsp trace ipv4** command. See the **mpls lsp trace ipv4** command for more information.

To manually configure an individual Cisco IOS IP Service Level Agreements (SLAs) label switched path (LSP) traceroute IPv4 operation, use the **type mpls lsp trace ipv4** command in IP SLA monitor configuration mode.

type mpls lsp trace ipv4 *destination-address destination-mask* [**force-explicit-null**] [**lsp-selector** *ip-address*] [**src-ip-addr** *source-address*] [**reply** {**dscp** *dscp-value* | **mode** {**ipv4** | **router-alert**}}]

Syntax Description

destination-address	Address prefix of the target to be tested.
destination-mask	Number of bits in the network mask of the target address.
force-explicit-null	(Optional) Adds an explicit null label to all echo request packets.
lsp-selector *ip-address*	(Optional) Specifies a local host IP address used to select the LSP. The default address is 127.0.0.1.
src-ip-addr *source-address*	(Optional) Specifies a source IP address for the echo request originator.
reply dscp *dscp-value*	(Optional) Specifies the differentiated services codepoint (DSCP) value of an echo reply. The default DSCP value is 0.
reply mode	(Optional) Specifies the reply mode for the echo request packet.
ipv4	(Optional) Replies with an IPv4 UDP packet (default).
router-alert	(Optional) Replies with an IPv4 UDP packet with router alert.

Command Default

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.2(27)SBC	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	The **force-explicit-null** keyword was added.
12.2(33)SRB	This command was replaced by the **mpls lsp trace ipv4** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The **lsp-selector** keyword is used to force an IP SLAs operation to use a specific LSP to obtain its response time measurement. This option is useful if there are multiple equal cost paths between Provider Edge (PE) routers.

You must configure the type of IP SLAs operation (such as LSP ping) 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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Note This command supports only single path connectivity measurements between the source PE router and associated Border Gateway Protocol (BGP) next hop neighbors.

Examples

The following examples show how to manually configure operation parameters, proactive threshold monitoring, and scheduling options for IP SLAs LSP traceroute operation 1.

```
ip sla monitor 1
type mpls lsp trace ipv4 192.168.1.4 255.255.255.255 lsp-selector 127.1.1.1
frequency 120
secondary-frequency connection-loss 30
secondary-frequency timeout 30
!
ip sla monitor reaction-configuration 1 react connectionLoss threshold-type consecutive 3
action-type trapOnly
ip sla monitor reaction-configuration 1 react timeout threshold-type consecutive 3
action-type trapOnly
ip sla monitor logging traps
!
ip sla monitor schedule 1 start-time now life forever
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type pathEcho (MPLS)

To configure Cisco IOS IP Service Level Agreements (SLAs) label switched path (LSP) LSP traceroute operations using the LSP Health Monitor, use the **type pathEcho** command in auto IP SLA MPLS configuration mode.

type pathEcho [**ipsla-vrf-all** | **vrf** *vpn-name*]

Syntax Description

ipsla-vrf-all	(Optional) Specifies that LSP traceroute operations should be automatically created for all Border Gateway Protocol (BGP) next hop neighbors in use by a VPN routing or forwarding instance (VRF) corresponding to all the Virtual Private Networks (VPNs) in which the originating Provider Edge (PE) router belongs. This option is the default.
vrf *vpn-name*	(Optional) Specifies that LSP traceroute operations should be automatically created for only those BGP next hop neighbors associated with the specified VPN name.

Command Default

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

Command Modes

Auto IP SLA MPLS configuration (config-auto-ip-sla-mpls)

Command History

Release	Modification
12.2(27)SBC	This command was introduced.
12.4(6)T	This command was integrated into Cisco IOS Release 12.4(6)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

You must configure the type of LSP Health Monitor operation (such as LSP ping) before you can configure any of the other parameters of the operation.

You must configure the type of IP SLAs operation (such as LSP ping) before you can configure any of the other parameters of the operation. To change the operation type of an existing LSP Health Monitor operation, you must first delete the operation (using the **no auto ip sla mpls-lsp-monitor** global configuration command) and then reconfigure the operation with the new operation type.

Note When an IP SLAs LSP traceroute operation is created by the LSP Health Monitor, an operation number (identification number) is automatically assigned to the operation. The operation numbering starts at 100001.

Note This command supports only single path connectivity measurements between the source PE router and associated BGP next hop neighbors.

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using the LSP Health Monitor. In this example, LSP Health Monitor operation 1 is configured to automatically create IP SLAs LSP traceroute operations for all BGP next hop neighbors in use by all VRFs associated with the source PE router.

```
mpls discovery vpn interval 60
mpls discovery vpn next-hop
!
auto ip sla mpls-lsp-monitor 1
 type pathEcho ipsla-vrf-all
 timeout 1000
 scan-interval 1
 secondary-frequency connection-loss 10
 secondary-frequency timeout 10
!
auto ip sla mpls-lsp-monitor reaction-configuration 1 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
auto ip sla mpls-lsp-monitor reaction-configuration 1 react timeout threshold-type
consecutive 3 action-type trapOnly
ip sla logging traps
!
auto ip sla mpls-lsp-monitor schedule 1 schedule-period 60 start-time now
```

Related Commands

Command	Description
auto ip sla mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters auto IP SLA MPLS configuration mode.

type pathEcho protocol ipIcmpEcho

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type pathEcho protocol ipIcmpEcho** command is replaced by the **path-echo** command. See the **path-echo** command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) Internet Control Message Protocol (ICMP) path echo operation, use the **type pathEcho protocol ipIcmpEcho** command in IP SLA monitor configuration mode.

type pathEcho protocol ipIcmpEcho {*destination-ip-address* | *destination-hostname*} [**source-ipaddr** {*ip-address* | *hostname*}]

Syntax Description

destination-ip-address | *destination-hostname*	Destination IP address or hostname.
source-ipaddr {*ip-address* | *hostname*}	(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.

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
11.2	This command was introduced.
12.4(4)T	This command was replaced by the **path-echo** command.
12.2(33)SRB	This command was replaced by the **path-echo** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation 10 is configured as an ICMP path echo operation using the IP/ICMP protocol and the destination IP address 172.16.1.175.

```
ip sla monitor 10
```

```
 type pathEcho protocol ipIcmpEcho 172.16.1.175
!
ip sla monitor schedule 10 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type pathJitter dest-ipaddr

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type pathJitter dest-ipaddr** command is replaced by the **path-jitter** command. See the **path-jitter** command for more information.

To configure a Cisco IOS IP Service Level Agreements (SLAs) Internet Control Message Protocol (ICMP) path jitter operation, use the **type pathJitter dest-ipaddr** command in IP SLA monitor configuration mode.

type pathJitter dest-ipaddr {*destination-ip-address* | *destination-hostname*} [**source-ipaddr** {*ip-address* | *hostname*}] [**num-packets** *packet-number*] [**interval** *milliseconds*] [**targetOnly**]

Syntax Description

destination-ip-address | *destination-hostname*	Destination IP address or hostname.
source-ipaddr {*ip-address* | *hostname*}	(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.
num-packets *packet-number*	(Optional) Specifies the number of packets to be transmitted in each operation. The default value is 10 packets per operation.
interval *milliseconds*	(Optional) Time interval between packets (in milliseconds). The default value is 20 ms.
targetOnly	(Optional) Sends test packets to the destination only (path is not traced).

Defaults

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

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.4(4)T	This command was replaced by the **path-jitter** command.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(20)S	This command was integrated into Cisco IOS Release 12.2(20)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was replaced by the **path-jitter** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If the **targetOnly** keyword is used, the ICMP path jitter operation will send echoes to the destination only (the path from the source to the destination is not traced).

If the **targetOnly** keyword is not used, the IP SLAs ICMP path jitter operation will trace a "hop-by-hop" IP path from the source to the destination and then send a user-specified number of test packets to each hop along the traced path at user-specified time intervals.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

The following example shows how to enable the ICMP path jitter operation to trace the IP path to the destination 172.69.5.6 and send 50 test packets to each hop with an interval of 30 ms between each test packet.

```
ip sla monitor 2
 type pathJitter dest-ipaddress 172.69.5.6 num-packets 50 interval 30
!
ip sla monitor schedule 2 start-time now
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type tcpConnect dest-ipaddr

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type tcpConnect dest-ipaddr** command is replaced by the **tcp-connect** command. See the **tcp-connect** command for more information.

To define a Cisco IOS IP Service Level Agreements (SLAs) Transmission Control Protocol (TCP) connection operation, use the **type tcpConnect dest-ipaddr** command in IP SLA monitor configuration mode.

type tcpConnect dest-ipaddr {*destination-ip-address* | *destination-hostname*} **dest-port** *port-number* [**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*] [**control** {**enable** | **disable**}]

Syntax Description

destination-ip-address | *destination-hostname*	Destination IP address or hostname.
dest-port *port-number*	Specifies the destination port number.
source-ipaddr {*ip-address* | *hostname*}	(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.
source-port *port-number*	(Optional) Specifies the source port number. When a port number is not specified, IP SLAs chooses an available port.
control {**enable** | **disable**}	(Optional) Enables or disables the IP SLAs control protocol to send a control message to the IP SLAs Responder prior to sending an operation packet. By default, IP SLAs control messages are sent to the destination device to establish a connection with the IP SLAs Responder.

Defaults

No IP SLAs operation type is associated with the operation number being configured.

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.4(4)T	This command was replaced by the **tcp-connect** command.
12.2(33)SRB	This command was replaced by the **tcp-connect** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The TCP connection operation is used to discover the time required to connect to the target device. This operation can be used to test virtual circuit availability or application availability. If the target is a Cisco router, then IP SLAs makes a TCP connection to any port number specified by the user. If the destination is a non-Cisco IP host, then the user must specify a known target port number (for example, 21 for FTP, 23 for Telnet, or 80 for HTTP server). This operation is useful in testing Telnet or HTTP connection times.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation 11 is configured as a TCP connection operation using the destination IP address 172.16.1.175 and the destination port 2400.

```
ip sla monitor 11
 type tcpConnect dest-ipaddr 172.16.1.175 dest-port 2400
!
ip sla monitor schedule 11 start-time now life forever
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

type udpEcho dest-ipaddr

Note Effective with Cisco IOS Releases 12.4(4)T and 12.2(33)SRB, the **type udpEcho dest-ipaddr** command is replaced by the **udp-echo** command. See the **udp-echo** command for more information.

To define a Cisco IOS IP Service Level Agreements (SLAs) User Datagram Protocol (UDP) echo operation, use the **type udpEcho dest-ipaddr** command in IP SLA monitor configuration mode.

type udpEcho dest-ipaddr {*ip-address* | *hostname*} **dest-port** *port-number* [**source-ipaddr** {*ip-address* | *hostname*} **source-port** *port-number*] [**control** {**enable** | **disable**}]

Syntax Description

ip-address | *hostname*	Destination IP address or hostname of the operation.
dest-port *port-number*	Specifies the destination port number.
source-ipaddr {*ip-address* | *hostname*}	(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.
source-port *port-number*	(Optional) Specifies the source port number. When a port number is not specified, IP SLAs chooses an available UDP port.
control {**enable** | **disable**}	(Optional) Enables or disables the IP SLAs control protocol to send a control message to the IP SLAs Responder prior to sending an operation packet. By default, IP SLAs control messages are sent to the destination device to establish a connection with the IP SLAs Responder.

Defaults

No IP SLAs operation type is associated with the operation number being configured.

Command Modes

IP SLA monitor configuration (config-sla-monitor)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.4(4)T	This command was replaced by the **udp-echo** command.
12.2(33)SRB	This command was replaced by the **udp-echo** command.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

In the following example, IP SLAs operation 12 is configured as a UDP echo operation using the destination IP address 172.16.1.175 and destination port 2400.

```
ip sla monitor 12
 type udpEcho dest-ipaddr 172.16.1.175 dest-port 2400
!
ip sla monitor schedule 12 start-time now life forever
```

Related Commands

Command	Description
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

verify-data (IP SLA)

To cause a Cisco IOS IP Service Level Agreements (SLAs) operation to check each reply packet for data corruption, use the **verify-data** (IP SLA) command in the appropriate submode of IP SLA configuration or IP SLA monitor configuration mode. To return to the default value, use the **no** form of this command.

verify-data

no verify-data

Syntax Description

This command has no arguments or keywords.

Defaults

Data is not checked for corruption.

Command Modes

IP SLA Configuration

ICMP echo configuration (config-ip-sla-echo)
ICMP path echo configuration (config-ip-sla-pathEcho)
ICMP path jitter configuration (config-ip-sla-pathJitter)
UDP echo configuration (config-ip-sla-udp)
UDP jitter configuration (config-ip-sla-jitter)

IP SLA Monitor Configuration

ICMP echo configuration (config-sla-monitor-echo)
ICMP path echo configuration (config-sla-monitor-pathEcho)
ICMP path jitter configuration (config-sla-monitor-pathJitter)
UDP echo configuration (config-sla-monitor-udp)
UDP jitter configuration (config-sla-monitor-jitter)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **verify-data** (IP SLA) command only when data corruption may be an issue.

Note Do not enable this feature during normal operation because it can cause unnecessary network overhead.

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 39). 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.

The configuration mode for the **verify-data** command varies depending on the Cisco IOS release you are running (see Table 39) and the operation type configured. For example, if you are running Cisco IOS Release 12.4 and the ICMP echo operation type is configured, you would enter the **verify-data** command in ICMP echo configuration mode (config-sla-monitor-echo) within IP SLA monitor configuration mode.

Table 39 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Examples

In the following examples, IP SLAs ICMP echo operation 5 is configured to verify each reply packet for data corruption. Note that the Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 39).

IP SLA Configuration

```
ip sla 5
 icmp-echo 172.16.1.174
 verify-data
!
ip sla schedule 5 start-time now life forever
```

IP SLA Monitor Configuration

```
ip sla monitor 5
 type echo protocol ipIcmpEcho 172.16.1.174
 verify-data
!
ip sla monitor schedule 5 start-time now life forever
```

Related Commands

Command	Description
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.

vrf (IP SLA)

To allow monitoring within Multiprotocol Label Switching (MPLS) Virtual Private Networks (VPNs) using Cisco IOS IP Service Level Agreements (SLAs) operations, use the **vrf** (IP SLA) command in the appropriate submode of IP SLA configuration or IP SLA monitor configuration mode.

vrf *vrf-name*

Syntax Description

vrf-name	Name of the VPN.

Defaults

The MPLS VPN parameter is not configured for the IP SLAs operation.

Command Modes

IP SLA Configuration

ICMP echo configuration (config-ip-sla-echo)
ICMP jitter configuration (config-ip-sla-icmpjitter)
ICMP path echo configuration (config-ip-sla-pathEcho)
ICMP path jitter configuration (config-ip-sla-pathJitter)
UDP echo configuration (config-ip-sla-udp)
UDP jitter configuration (config-ip-sla-jitter)

IP SLA Monitor Configuration

ICMP echo configuration (config-sla-monitor-echo)
ICMP path echo configuration (config-sla-monitor-pathEcho)
ICMP path jitter configuration (config-sla-monitor-pathJitter)
UDP echo configuration (config-sla-monitor-udp)
UDP jitter configuration (config-sla-monitor-jitter)

Note The configuration mode varies depending on the Cisco IOS release you are running and the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.2(11)T	Syntax changed from **vrfName** to **vrf** with SAA Engine II.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S. Support for this command was also added for ICMP path jitter operations.
12.3(2)T	Support for this command was added for ICMP path jitter operations.
12.2(20)S	This command was integrated into Cisco IOS Release 12.2(20)S. Support for this command was also added for path jitter operations.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

A VPN is commonly identified using the VPN routing and forwarding (VRF) name. If the **vrf** *vrf-name* command is configured for an IP SLAs operation, IP SLAs uses the *vrf-name* value to identify the VPN for this operation. This command should be used only if it is necessary to measure the response time over the VPN tunnel.

This command is supported only for the following operation types:

- ICMP echo
- ICMP jitter
- ICMP path echo
- ICMP path jitter
- UDP echo
- UDP jitter

IP SLAs Operation Configuration Dependence on Cisco IOS Release

The Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 40). 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.

The configuration mode for the **vrf** (IP SLA) command varies depending on the Cisco IOS release you are running (see Table 40) and the operation type configured. For example, if you are running Cisco IOS Release 12.4 and the ICMP echo operation type is configured, you would enter the **vrf** (IP SLA) command in ICMP echo configuration mode (config-sla-monitor-echo) within IP SLA monitor configuration mode.

Table 40 Command Used to Begin Configuration of an IP SLAs Operation Based on Cisco IOS Release

Cisco IOS Release	Global Configuration Command	Command Mode Entered
12.4(4)T, 12.0(32)SY, 12.2(33)SRB, or later releases	**ip sla**	IP SLA configuration
12.3(14)T, 12.4, 12.4(2)T, 12.2(31)SB2, or 12.2(33)SXH	**ip sla monitor**	IP SLA monitor configuration

Examples

The following examples illustrate how to configure an IP SLAs ICMP echo operation for an MPLS VPN. These examples show how test traffic can be sent in an already existing VPN tunnel between two endpoints. Note that the Cisco IOS command used to begin configuration for an IP SLAs operation varies depending on the Cisco IOS release you are running (see Table 40).

Note For ICMP path jitter operations, you must specify the source IP address or hostname when using the **vrf** command.

IP SLA Configuration

```
ip sla 1
 icmp-echo 10.1.1.1
 vrf vpn1
!
ip sla schedule 1 start now
```

IP SLA Monitor Configuration

```
ip sla monitor 1
 type echo protocol ipIcmpEcho 10.1.1.1
 vrf vpn1
!
ip sla monitor schedule 1 start now
```

Related Commands

Command	Description
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla monitor	Begins configuration for an IP SLAs operation and enters IP SLA monitor configuration mode.