show ip sla application through show rtr totals-statistics

show ip sla application

To display global information about Cisco IOS IP Service Level Agreements (SLAs), use the **show ip sla application** command in user EXEC or privileged EXEC mode.

show ip sla application

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **show ip sla monitor application** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **show rtr application** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **show ip sla monitor application**command.
12.2(33)SRD	The command output was modified to include information on IP SLAs Ethernet operation EVC support.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **show ip sla monitor application**command.
12.4(22)T	This command was modified. The command output was modified to include information on IP SLAs Event Publisher.
12.2(33)SRE	This command was modified. The command output was modified to include information on IP SLAs Ethernet operation port level support and IP SLAs Event Publisher.
12.2(58)SE	This command was modified. The command output was modified to include information about IP SLAs video operation support.
15.2(4)M	This command was modified. The command output was modified to include information about IP SLAs multicast (mcast) operation support.
15.3(1)S	This command was integrated into Cisco IOS Release 15.3(1)S.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.
15.1(2)SG	This command was integrated into Cisco IOS Release 15.1(2)SG.
Cisco IOS XE Release 3.4SG	This command was integrated into Cisco IOS XE Release 3.4SG.

Usage Guidelines

Use the **show ip sla application**command to display information such as supported operation types and supported protocols.

Examples

The following is sample output from the **show ip sla application** command:

```
Router# show ip sla application

IP Service Level Agreement Technologies
Version: Round Trip Time MIB 2.2.0, Infrastructure Engine-III
Supported Operation Types:
        icmpEcho, path-echo, path-jitter, udpEcho, tcpConnect, http
        dns, udpJitter, dhcp, ftp, VoIP, rtp, lsp Group, icmpJitter
        lspPing, lspTrace, 802.1agEcho VLAN, Port
        802.1agJitter VLAN, Port, pseudowirePing, udpApp, wspApp
        mcast, generic

Supported Features:
IPSLAs Event Publisher
IP SLAs low memory water mark: 0
Estimated system max number of entries: 63840
Estimated number of configurable operations: 63840
Number of Entries configured  : 0
Number of active Entries      : 0
Number of pending Entries     : 0
Number of inactive Entries    : 0
Last time the operation configuration changed: *07:22:13.183 UTC Fri Feb 13 2009
```

The table below describes the significant fields shown in the display.

Table 1: show ip sla application Field Descriptions

Field	Description
Version	The version of the IP SLAs infrastructure supported on the router.
Supported Operation Types	The types of operations supported by the command.
Supported Features	The features supported by the command.

Related Commands

Command	Description
show ip sla configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla authentication

To display Cisco IOS IP Service Level Agreements (SLAs) authentication information, use the **show ip sla authentication** command in user EXEC or privileged EXEC mode.

show ip sla authentication

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **show ip sla monitor authentication** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **show rtr authentication** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **show ip sla monitor authentication**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **show ip sla monitor authentication**command.

Usage Guidelines

Use the **show ip sla authentication**command to display information such as supported operation types and supported protocols.

Examples

The following is sample output from the **show ip sla authentication**command:

```
Router# show ip sla authentication

IP SLA Monitor control message uses MD5 authentication, key chain name is: ipsla
```

Related Commands

Command	Description
show ip sla configuration	Displays configuration values for IP SLAs operations.

show ip sla auto discovery

To display the status of IP Service Level Agreements (SLAs) auto discovery and the configuration of auto IP SLAs endpoint lists configured to use auto discovery, use the **showipslaautodiscovery** command in user EXEC or privileged EXEC mode.

show ip sla auto discovery

Syntax Description

This command has no arguments or keywords.

Command Default

Displays the configuration of IP SLAs auto discovery.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
15.1(1)T	This command was introduced.

Examples

The following is sample output from the **showipslaautodiscovery** command before, and after, auto discovery was enabled. Note that no IP SLAs endpoint lists are configured yet.

```
Router>show ip sla auto discovery
IP SLAs auto-discovery status: Disabled
The following Endpoint-list are configured to auto-discovery:
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip sla auto discovery

Router(config)#exit
Router#
Router# show ip sla auto discovery
IP SLAs auto-discovery status: Enabled
The following Endpoint-list are configured to auto-discovery:
```

The table below describes the significant fields shown in the display.

Table 2: show ip sla auto discovery Field Descriptions

Field	Description
IP SLAs auto-discovery status	Configuration of the **ipslaautodiscovery** command.

Related Commands

Command	Description
ip sla auto discovery	Enables IP SLAs auto discovery in Cisco IP SLAs Engine 3.0.

show ip sla auto endpoint-list

Note Effective with Cisco IOS Release 15.2(3)T, the **show ip sla auto endpoint-list** command is replaced with the **show ip sla endpoint-list** command. See the **show ip sla endpoint-list** command for more information.

To display the configuration including default values of all auto IP Service Level Agreements (SLAs) endpoint lists, all auto IP SLAs endpoint lists for a specified operation type, or a specified auto IP SLAs endpoint list, use the **showipslaautoendpoint-list** command in user EXEC or privileged EXEC mode.

show ip sla auto endpoint-list [**type ip** [*template-name*]]

Syntax Description

type ip	(Optional) Specifies that the operation type is Internet Protocol.
template-name	(Optional) Unique identifier of the endpoint list. String of 1 to 64 alphanumeric characters.

Command Default

Default display includes configuration for all auto IP SLAs endpoint lists.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
15.1(1)T	This command was introduced.
15.2(3)T	This command was replaced by the **show ip sla endpoint-list** command.

Examples

The following is sample output from the **showipslaautoendpoint-list** command for all configured endpoint lists. Because all of the destinations are for IP operations, the **typeip** keyword is not configured.

```
Router# show ip sla auto endpoint-list
Endpoint-list Name: man1
    Description: testing manual build
    ip-address 10.1.1.1-7 port 23
    ip-address 10.1.1.9,10.1.1.15,10.1.1.23 port 23
Endpoint-list Name: autolist
    Description:
    Auto Discover Parameters
        Destination Port: 5000
        Access-list: 3
        Ageout: 3600    Measurement-retry: 3
    0 endpoints are discovered for autolist
```

The table below describes the significant fields shown in the display.

Table 3: ***show ip sla auto endpoint-list*** *Field Descriptions*

Field	Description
Destination Port	Port number of target device or Cisco IP SLAs Responder.
Access-list	Name of list of discovered endpoints.
Ageout	Length of time that operation is kept in memory, in seconds (sec).
Measurement-retry	Number of times the endpoints belonging to an auto IP SLAs destination templates are retested when an operation fails.

Related Commands

Command	Description
access-list (epl-disc)	Adds list of discovered endpoints to an auto IP SLAs endpoint list.
ageout	Adds ageout timer to auto IP SLAs scheduler or endpoint list.
ip sla auto endpoint-list	Enters IP SLA endpoint-list configuration mode and begins creating an auto IP SLAs endpoint list.
measurement-retry	Specifies the number of times an operation associated with an auto IP SLAs endpoint list is retried when a failure is detected.

show ip sla auto group

To display configuration values including all defaults for all Cisco IOS IP Service Level Agreements (SLAs) auto-measure groups or a specified group, use the **showipslaautogroup** command in user EXEC or privileged EXEC mode.

show ip sla auto group [**type ip** [*group-name*]]

Syntax Description

type ip	(Optional) Specifies that the operation type is Internet Protocol.
group-name	(Optional) Unique identifier of auto-measure group. String of 1 to 64 alphanumeric characters.

Command Default

Displays configuration for all IP SLAs endpoint lists.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
15.1(1)T	This command was introduced.

Usage Guidelines

This command displays the configuration of an IP SLAs auto-measure group including all default values and information about operations created for each destination in the specified endpoint-list for this group.

Examples

The following is sample output from the **showipslaautogroup** command for an IP SLAs auto-measure group (test) and the created operations within the group:

```
Router# show ip sla auto grou
p test
Group Name: test
    Description:
    Activation Trigger: Immediate
    Destination: testeplist
    Schedule: testsched
    Measure Template: testtplt(icmp-jitter)
IP SLAs auto-generated operations of group test
  sno     oper-id         type             dest-ip-addr/port
    1   299389922      icmp-jitter           20.1.1.32/NA
```

The table below describes the significant fields shown in the display.

*Table 4: **show ip sla auto group** Field Descriptions*

Field	Description
Activation Trigger	Start time of operation.
Destination	Name of auto IP SLAs endpoint list referenced by the auto-measure group.
Schedule	Name of auto IP SLAs scheduler referenced by the auto-measure group.

Field	Description
Measure Template	Name of auto IP SLAs template referenced by the auto-measure group.
sno	Serial number of IP SLAs operation created for specified endpoint.
oper-id	Entry number of IP SLAs operation created for specified endpoint.
type	Type of IP SLAs operation created for specified endpoint.
dest-ip-addr/port	IP address and port of destination for operation in current display.

Related Commands

Command	Description
ip sla auto group	Begins configuration for an IP SLAs auto-measure group and enters IP SLA auto-measure group configuration mode.

show ip sla auto schedule

To display configuration values including all defaults for all auto IP Service Level Agreements (SLAs) schedulers or a specified scheduler, use the **showipslaautotemplate** command in user EXEC or privileged EXEC mode.

show ip sla auto schedule [*schedule-id*]

Syntax Description

schedule-id	(Optional) Unique identifier for IP SLAs schedule. String of 1 to 64 alphanumeric characters.

Command Default

The default output includes the configuration for all auto IP SLAs schedulers.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
15.1(1)T	This command was introduced.

Examples

The following is sample output from the **showipslaautoschedule**command when you specify an auto IP SLAs scheduler by name (basic-default):

```
Router# show ip sla auto schedule basic-default
Group sched-id: basic-default
    Probe Interval (ms): 1000
    Group operation frequency (sec): 60
    Status of entry (SNMP RowStatus): Active
    Next Scheduled Start Time: Pending trigger
    Life (sec): 3600
    Entry Ageout (sec): never
```

The table below describes the significant fields shown in the display.

Table 5: show ip sla auto schedule Field Descriptions

Field	Description
Probe Interval (ms)	Length of time, in milliseconds (ms), between operations that share the same auto IP SLAs scheduler.
Group operation frequency (sec)	Frequency at which each operation repeats, in seconds (sec).
Next Scheduled Start Time	Start time of operation. “Pending trigger” indicates that neither a specific start time nor a reaction trigger is configured.
Life (sec)	Length of time that the operation runs, in seconds (sec).
Entry Ageout (sec)	Length of time that operation is kept in memory, in seconds (sec).

Related Commands

Command	Description
ageout (IP SLA)	Adds ageout timer to auto IP SLAs scheduler or endpoint list.
frequency	Specifies how often an operation in an IP SLAs auto-measure group will repeat once it is started.
ip sla auto schedule	Enters IP SLA auto-measure schedule configuration mode and begins creating an auto IP SLAs scheduler.
life	Specifies lifetime characteristic in an auto IP SLAs scheduler.
probe-interval	Specifies interval between operations for staggering operations that share the same auto IP SLAs scheduler.
react	Configures reaction and proactive threshold monitoring parameters in an auto IP SLAs operation template.
start-time	Specifies start time for an IP SLAs auto-measure group.

show ip sla auto summary-statistics

To display the current operational status and statistics for a Cisco IOS IP Service Level Agreements (SLAs) auto-measure group or for a specified destination of a group, use the **show ip sla auto summary-statistics** command in user EXEC or privileged EXEC mode.

show ip sla auto summary-statistics group type ip *group-name* [**ip-address** *ip-address* [**port** *port*]]

Syntax Description

group-name	Unique identifier for IP SLAs auto-measure group. String of 1 to 64 alphanumeric characters.
ip-address *ip-address*	(Optional) Specifies IPv4 address of destination routing device or destination Cisco IP SLAs Responder.
port *port*	(Optional) Specifies port number of destination routing device or destination Cisco IP SLAs Responder. Range is from 1 to 65535.

Command Default

The default output includes statistics for all endpoints of the operation in an IP SLA auto-measure group.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
15.1(1)T	This command was introduced.

Examples

The following is sample output from the **s how ip sla auto summary-statistics** for an IP SLAs auto-measure group (test) that started immediately upon configuration. The partial output from the **show running-config** and **show ip sla group** command are included to illustrate the relationship between the group, operation, and scheduler. Notice that the command to start the operations was configured after the auto IP SLAs scheduler (testsched) was added to the group configuration.

```
Router# show running-config
.
.
.
ip sla auto template type ip icmp-jitter test
ip sla auto endpoint-list type ip test
  ip-address 10.1.1.32 port 2222
ip sla auto group type ip test
schedule testsched
template icmp-jitter testtplt
destination testeplist
ip sla auto schedule testsched <<=====
  start-time now
.
.
.
Router# show ip sla auto summary-statistics group type ip icmp-jitter test
IP SLAs Auto Group Summary Statistics
Legend -
  sno: Serial Number in current display
```

```
  oper-id: Entry Number of IPSLAs operation
  type: Type of IPSLAs operation
  n-rtts: Number of successful round trips in current hour
          of operation
  rtt (min/av/max): The min, max and avg values of latency in
                    current hour of operation
  avg-jitter(DS/SD): average jitter value in destination to
                     source and source to destination direction
  pak-loss: accumulated sum of source to destination and
            destination to source packet loss in current hour
Summary Statistics:
Auto Group Name: test
Template: testtplt
Number of Operations: 1
  sno    oper-id    type      n-rtts    rtt        avg-jitter    packet
         (min/avg/max)      (DS/SD)       loss
   1    299389922  icmp-jitter  10     8/16/24 ms         9/0 ms        0

Router# show ip sla auto grou
p
Group Name: test
    Description:
    Activation Trigger: Immediate
    Destination: testeplist
    Schedule: testsched
    Measure Template: testtplt(icmp-jitter)
IP SLAs auto-generated operations of group test
  sno     oper-id         type             dest-ip-addr/port
    1   299389922      icmp-jitter           10.1.1.32/NA
```

Related Commands

Command	Description
ip sla auto group	Begins configuration for an IP SLAs auto-measure group and enters IP SLA auto-measure group configuration mode.
ip sla auto endpoint-list	Begins configuration for an auto IP SLAs endpoint-list and enters IP SLA endpoint-list configuration mode.
ip sla auto schedule	Begins configuration for an auto IP SLAs scheduler and enters IP SLA auto-measure schedule configuration mode.
ip sla auto template	Begins configuration for an auto IP SLAs operation template and enters IP SLA template configuration mode.

show ip sla auto template

To display configuration values including all defaults for all Cisco IOS IP Service Level Agreements (SLAs) operation templates, all operation templates for a specified type of operation, or a specified operation template, use the **showipslaautotemplate** command in user EXEC or privileged EXEC mode.

show ip sla auto template [**type ip** [*operation* [*template-name*]]]

Syntax Description

type ip	Specifies that the operation type is Internet Protocol (IP).
operation	Type of IP operation. Use one of the following keywords: • **icmp-echo** --Internet Control Message Protocol (ICMP) echo operation • **icmp-jitter**-- Internet Control Message Protocol (ICMP) jitter operation • **tcp-connect**-- Transmission Control Protocol (TCP) connection operation • **udp-echo**-- User Datagram Protocol (UDP) echo operation • **udp-jitter**-- User Datagram Protocol (UDP) jitter operation
template-name	Unique identifier of an IP SLAs operation template. String of 1 to 64 alphanumeric characters.

Command Default

Default output includes configuration for all auto IP SLAs operation templates.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
15.1(1)T	This command was introduced.

Examples

The following is sample shows output for the **showipslaautotemplate**command when you specify a template by name (basic_icmp_jtr):

```
Router# show ip sla auto template type ip icmp-jitter basic_icmp_jtr
IP SLAs Auto Template: basic_icmp_jtr
    Measure Type: icmp-jitter
    Description: default oper temp for icmp jitter
    IP options:
        Source IP: 0.0.0.0
        VRF:    TOS: 0x0
    Operation Parameters:
        Number of Packets: 10   Inter packet interval: 20
        Timeout: 5000           Threshold: 5000
    Statistics Aggregation option:
        Hours of statistics kept: 2
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
```

The following is sample output for the **showipslaautotemplate**command when you use the **typeip***operation* keyword and argument combination to specifiy a certain type of operation:

```
Router# show ip sla auto template type ip udp-jitter
IP SLAs Auto Template: basic_udp_jitter
    Measure Type: udp-jitter (control enabled)
    Description: default oper temp for udp jitter
    IP options:
        Source IP: 0.0.0.0 Source Port: 0
        VRF:    TOS: 0x0
    Operation Parameters:
        Request Data Size: 32   Verify Data: false
        Number of Packets: 10   Inter packet interval: 20
        Timeout: 5000           Threshold: 5000
        Granularity: msec       Operation packet priority: normal
    Statistics Aggregation option:
        Hours of statistics kept: 2
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
IP SLAs Auto Template: voip_g711alaw
    Measure Type: udp-jitter (control enabled)
    Description: oper template for voip udp
    IP options:
        Source IP: 0.0.0.0      Source Port: 0
        VRF:    TOS: 0x0
    Operation Parameters:
        Verify Data: false
        Timeout: 5000           Threshold: 5000
        Codec: g711alaw Number of packets: 1000
        Interval: 20    Payload size: 16        Advantage factor: 0
        Granularity: msec       Operation packet priority: normal
    Statistics Aggregation option:
        Hours of statistics kept: 2
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
```

The following is sample output for the **showipslaautotemplate**command for all configured IP SLAs operation templates. Because all of the templates are for IP operations, the **typeip** keyword is not configured.

```
Router# show ip sla auto template
IP SLAs Auto Template: basic_icmp_echo
    Measure Type: icmp-echo
    Description:
    IP options:
        Source IP: 0.0.0.0
        VRF:    TOS: 0x0
    Operation Parameters:
        Request Data Size: 28   Verify Data: false
        Timeout: 5000           Threshold: 5000
    Statistics Aggregation option:
        Hours of statistics kept: 2
    History options:
        History filter: none
        Max number of history records kept: 15
```

```
        Lives of history kept: 0
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
IP SLAs Auto Template: basic_icmp_jtr
    Measure Type: icmp-jitter
    Description: default oper temp for icmp jitter
    IP options:
        Source IP: 0.0.0.0
        VRF:    TOS: 0x0
    Operation Parameters:
        Number of Packets: 10   Inter packet interval: 20
        Timeout: 5000           Threshold: 5000
    Statistics Aggregation option:
        Hours of statistics kept: 2
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
IP SLAs Auto Template: basic_udp_jitter
    Measure Type: udp-jitter (control enabled)
    Description: default oper temp for udp jitter
    IP options:
        Source IP: 0.0.0.0 Source Port: 0
        VRF:    TOS: 0x0
    Operation Parameters:
        Request Data Size: 32   Verify Data: false
        Number of Packets: 10   Inter packet interval: 20
        Timeout: 5000           Threshold: 5000
        Granularity: msec       Operation packet priority: normal
    Statistics Aggregation option:
        Hours of statistics kept: 2
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
IP SLAs Auto Template: voip_g711alaw
    Measure Type: udp-jitter (control enabled)
    Description: oper template for voip udp
    IP options:
        Source IP: 0.0.0.0 Source Port: 0
        VRF:    TOS: 0x0
    Operation Parameters:
        Verify Data: false
        Timeout: 5000           Threshold: 5000
        Codec: g711alaw Number of packets: 1000
        Interval: 20    Payload size: 16        Advantage factor: 0
        Granularity: msec       Operation packet priority: normal
    Statistics Aggregation option:
        Hours of statistics kept: 2
    Statistics Distributions options:
        Distributions characteristics: RTT
        Distributions bucket size: 20
        Max number of distributions buckets: 1
    Reaction Configuration: None
IP SLAs Auto Template: basic_tcp_conn
    Measure Type: tcp-connect (control enabled)
    Description:
    IP options:
        Source IP: 0.0.0.0 Source Port: 0
```

```
    VRF:    TOS: 0x0
Operation Parameters:
    Timeout: 5000           Threshold: 5000
Statistics Aggregation option:
    Hours of statistics kept: 2
History options:
    History filter: none
    Max number of history records kept: 15
    Lives of history kept: 0
Statistics Distributions options:
    Distributions characteristics: RTT
    Distributions bucket size: 20
    Max number of distributions buckets: 1
Reaction Configuration: None
```

The table below describes the significant fields shown in the display.

*Table 6: **show ip sla auto template** Field Descriptions*

Field	Description
IP SLAs Auto Template	Name of auto IP SLAs operation template in current display.
Measure Type	Type of IP operation defined for auto IP SLAs operation template in current display, including status of protocol control.

Related Commands

Command	Description
ip sla auto template	Begins configuring an auto IP SLAs operation template and enters IP SLA template configuration mode.

show ip sla configuration

To display configuration values including all default values for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **show ip sla configuration** command in user EXEC or privileged EXEC mode.

show ip sla configuration
operation

Syntax Description

operation	(Optional) Number of IP SLAs operations for which the details are displayed.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **show ip sla monitor configuration** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **show rtr configuration** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **show ip sla monitor configuration** command.
12.2(33)SRD	This command was modified. The command output has been modified to include information on IP SLAs Ethernet operation EVC support.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **show ip sla monitor configuration** command.
12.2(33)SRE	This command was modified. The command output has been modified to include information on IP SLAs Ethernet operation port level support.
12.2(58)SE	This command was modified. The command output has been modified to include information about IP SLAs video operations.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
15.2(3)T	This command was modified. The command output was modified to display IPv4 and IPv6 addresses for Domain Name System (DNS), FTP, HTTP, Path Echo, and Path Jitter IP SLAs operations.
Cisco IOS XE 3.7S	This command was integrated into Cisco IOS XE Release 3.7S.

Release	Modification
15.2(4)M	This command was modified. The command output was modified to display multicast UDP jitter operations.
15.3(1)S	This command was integrated into Cisco IOS Release 15.3(1)S.
15.3(2)T	This command was modified. The output was modified to display the percentile configuration.
15.3(2)S	This command was modified. The output was modified to display the configuration for a service performance operation. This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.
15.3(3)M	This command was modified. The output was modified to display the response data size for UDP jitter operations in IPv4 and IPv6 networks.

Usage Guidelines

The IPv4 and IPv6 support for different IP SLAs operations are described below:

- IP SLAs Internet Control Message Protocol (ICMP) echo operations support both IPv4 and IPv6 addresses.
- IP SLAs UDP echo operations support both IPv4 and IPv6 addresses.
- IP SLAs TCP connect operations support both IPv4 and IPv6 addresses.
- IP SLAs UDP jitter connect operations support both IPv4 and IPv6 addresses.
- IP SLAs video operations support only IPv4 addresses.

Examples

This section shows sample output from the **show ip sla configuration** command for different IP SLAs operations in IPv4 and IPv6 networks.

The following sample output from the **show ip sla configuration** command displays that the specified operation is an ICMP echo operation in an IPv4 network:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: echo
Target address/Source address: 192.0.2.10/192.0.2.9
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
```

```
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
Enhanced History:
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is an ICMP echo operation in an IPv6 network:

```
Device# show ip sla configuration 1

IP SLAs, Infrastructure Engine-II.
Entry number: 1
Owner:
Tag:
Type of operation to perform: echo
Target address/Source address: 2001:DB8:100::1/2001:DB8:200::FFFE
Traffic-Class parameter: 0x80
Flow-Label parameter: 0x1B669
Request size (ARR data portion): 28
Operation timeout (milliseconds): 5000
Verify data: No
Vrf Name:
Schedule:
    Operation frequency (seconds): 60
    Next Scheduled Start Time: Pending trigger
    Group Scheduled : FALSE
    Randomly Scheduled : FALSE
    Life (seconds): 3600
    Entry Ageout (seconds): never
    Recurring (Starting Everyday): FALSE
    Status of entry (SNMP RowStatus): notInService
Threshold (milliseconds): 5000
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is an HTTP operation:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: http
Target address/Source address: 192.0.2.100/192.0.2.98
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
HTTP Operation: get
HTTP Server Version: 1.0
URL: http://www.cisco.com
Proxy:
Raw String(s):
Cache Control: enable
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
```

```
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is an ICMP path jitter operation:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: pathJitter
Target address/Source address: 192.0.2.50/192.0.2.34
Packet Interval/Number of Packets: 20 ms/10
Target Only: Disabled
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Loose Source Routing: Disabled
LSR Path:
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is an ICMP path echo operation:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: pathEcho
Target address/Source address: 192.0.2.20/192.0.2.11
Packet Interval/Number of Packets: 20 ms/10
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Loose Source Routing: Disabled
Vrf Name:
LSR Path:
Request size (ARR data portion): 28
Verify data: No
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic paths kept: 5
   Number of statistic hops kept: 16
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
```

```
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a Domain Name System (DNS) operation:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: dns
Target Address/Source address: 192.0.2.3/192.0.2.2
Target Port/Source Port: 1111/0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a UDP echo operation in an IPv4 network:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: udpEcho
Target address/Source address: 192.0.2.5/192.0.2.4
Target Port/Source Port: 1111/0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Data Pattern:
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Control Packets: enabled
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
```

```
History Filter Type: None
Enhanced History:
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a UDP echo operation in an IPv6 network:

```
Device# show ip sla configuration 1

IP SLAs, Infrastructure Engine-II.
Entry number: 1
Owner:
Tag:
Type of operation to perform: udp-echo
Target address/Source address: 2001:DB8:100::1/2001:0DB8:200::FFFE
Target port/Source port: 3/7
Traffic-Class parameter: 0x80
Flow-Label parameter: 0x1B669
Request size (ARR data portion): 16
Operation timeout (milliseconds): 5000
Verify data: No
Data pattern:
Vrf Name:
Control Packets: enabled
Schedule:
    Operation frequency (seconds): 60
    Next Scheduled Start Time: Pending trigger
    Group Scheduled : FALSE
    Randomly Scheduled : FALSE
    Life (seconds): 3600
    Entry Ageout (seconds): never
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a TCP connect operation in an IPv4 network:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: tcpConnect
Target Address/Source address: 192.0.2.10/192.0.2.9
Target Port/Source Port: 1111/0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Control Packets: enabled
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
Enhanced History:
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a TCP connect operation in an IPv6 network:

```
Device# show ip sla configuration 1

IP SLAs, Infrastructure Engine-II.
Entry number: 1
Owner:
Tag:
Type of operation to perform: tcp-connect
Target address/Source address: 2001:DB8:100::1/2001:0DB8:200::FFFE
Target port/Source port: 3/7
Traffic-Class parameter: 0x80
Flow-Label parameter: 0x1B669
Operation timeout (milliseconds): 60000
Control Packets: enabled
Schedule:
    Operation frequency (seconds): 60
    Next Scheduled Start Time: Pending trigger
    Group Scheduled : FALSE
    Randomly Scheduled : FALSE
    Life (seconds): 3600
    Entry Ageout (seconds): never
    Recurring (Starting Everyday): FALSE
    Status of entry (SNMP RowStatus): notInService
Threshold (milliseconds): 5000
Distribution Statistics:
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a Dynamic Host Configuration Protocol (DHCP) operation:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: dhcp
Target Address/Source address: 192.0.2.18/192.0.2.12
Operation timeout (milliseconds): 5000
Dhcp option:
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is an FTP operation:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: ftp
Source address: 0.0.0.0
FTP URL: ftp://ipsla:ipsla@192.0.2.109/test.txt
Operation timeout (milliseconds): 5000
```

```
Type Of Service parameters: 0x0
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a UDP jitter operation in an IPv4 network:

```
Device# show ip sla configuration 3

Entry number: 3
Owner:
Tag:
Type of operation: jitter
Target Address/Source address: 192.0.2.33/192.0.2.20
Target Port/Source Port: 1111/0
Packet Interval/Number of Packets: 20 ms/10
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Vrf Name:
Request size (ARR data portion): 28
Response size (ARR data portion): 100
Verify data: No
Control Packets: enabled
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Enhanced History:
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a UDP jitter operation in an IPv6 network:

```
Device# show ip sla configuration 1

IP SLAs, Infrastructure Engine-II.
Entry number: 1
Owner:
Tag:
Type of operation to perform: udp-jitter
Target address/Source address: 2001:DB8:100::1/2001:0DB8:200::FFFE
Target port/Source port: 3/7
Traffic-Class parameter: 0x0
Flow-Label parameter: 0x0
Request size (ARR data portion): 32
```

```
Response size (ARR data portion): 100
Operation timeout (milliseconds): 5000
Packet Interval (milliseconds)/Number of packets: 30/15
Verify data: No
Vrf Name:
Control Packets: enabled
Schedule:
    Operation frequency (seconds): 60
    Next Scheduled Start Time: Pending trigger
    Group Scheduled : FALSE
    Randomly Scheduled : FALSE
    Life (seconds): 3600
    Entry Ageout (seconds): never
```

The following sample output from the **show ip sla configuration** command displays that the specified operation is a multicast UDP jitter operation. The output includes the list of responders associated with the multicast UDP jitter operation, extracted from the endpoint list for this operation. Each multicast responder has a corresponding operation ID (oper-id) generated for the responder by the multicast operation.

```
Device# show ip sla config 10

IP SLAs Infrastructure Engine-III
Entry number: 10
Owner:
Tag:
Operation timeout (milliseconds): 5000
Type of operation to perform: udp-jitter
Target address/Source address: 192.0.2.2/3000 !<---multicast address
Target port/Source port: 2460/0
Type Of Service parameter: 0x0
Request size (ARR data portion): 32
Packet Interval (milliseconds)/Number of packets: 20/10
Verify data: No
Vrf Name:
Control Packets: enabled
Schedule:
   Operation frequency (seconds): 60  (not considered if randomly scheduled)
   Next Scheduled Start Time: Pending trigger
   Group Scheduled : FALSE
   Randomly Scheduled : FALSE
   Life (seconds): 3600
   Entry Ageout (seconds): never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): notInService
Threshold (milliseconds): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 1
   Statistic distribution interval (milliseconds): 20
Enhanced History:

  sno     oper-id              dest-ip-addr    !<---responders in endpoint list
    1   728338               192.0.2.4
    2   728339               192.0.2.5
    3  2138021658            198.51.100.3
```

The table below describes the significant fields shown in the display.

Table 7: show ip sla configuration Field Descriptions

Field	Description
sno	Serial Number
oper-id	Operation ID
dest-ip-addr	IP address of the destination

The following sample output from the **show ip sla configuration** command displays that the specified operation is a video operation:

```
Device# show ip sla configuration 600

IP SLAs Infrastructure Engine-III
Entry number: 600
Owner:
Tag:
Operation timeout (milliseconds): 5000
Type of operation to perform: video
Video profile name: TELEPRESENCE
Target address/Source address: 192.0.2.9/192.0.2.5
Target port/Source port: 1/1
Vrf Name:
Control Packets: enabled
Schedule:
   Operation frequency (seconds): 60  (not considered if randomly scheduled)
   Next Scheduled Start Time: Pending trigger
   Group Scheduled : FALSE
   Randomly Scheduled : FALSE
   Life (seconds): 3600
   Entry Ageout (seconds): never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): notInService
Threshold (milliseconds): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 1
   Statistic distribution interval (milliseconds): 20
Enhanced History:

IP SLAs Infrastructure Engine-III
Entry number: 1
Service Performance Operation
Type: ethernet
Destination
MAC Address: 4055.398d.8bd2
VLAN:
Interface: GigabitEthernet0/4
Service Instance: 10
EVC Name:
Duration Time: 20
Interval Buckets: 5

Signature:
05060708

Description: this is with all operation modes

Measurement Type:
```

```
throughput, loss
Direction: internal

Profile Traffic:
Direction: internal
CIR: 0
EIR: 0
CBS: 0
EBS: 0
Burst Size: 3
Burst Interval: 20
Rate Step (kbps): 1000 2000

Profile Packet:
Inner COS: 6
Outer COS: 6
Inner VLAN: 100
Outer VLAN: 100
Source MAC Address: 4055.398d.8d4c
Packet Size: 512
Schedule:
   Operation frequency (seconds): 64  (not considered if randomly scheduled)
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled : FALSE
   Randomly Scheduled : FALSE
   Life (seconds): Forever
   Entry Ageout (seconds): never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
```

Related Commands

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

show ip sla endpoint-list

To display the configuration including default values of all IP Service Level Agreements (SLAs) endpoint lists, all P SLAs endpoint lists for a specified operation type, or a specified IP SLAs endpoint list, use the **showipslaendpoint-list** command in user EXEC or privileged EXEC mode.

show ip endpoint-list [**type ip** | **ipv6** [*template-name*]]

Syntax Description

type ip	(Optional) Specifies that the operation type is IPv4.
type ipv6	(Optional) Specifies that the operation type is IPv6.
template-name	(Optional) Unique identifier of the endpoint list. String of 1 to 64 alphanumeric characters.

Command Default

Default display includes configuration for all IP SLAs endpoint lists.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
15.2(3)T	This command was introduced. This command replaced the **show ip sla auto endpoint-list** command.
15.2(4)M	This command was modified. The command output has been modified to display multicast UDP jitter operations.
15.3(1)S	This command was integrated into Cisco IOS Release 15.3(1)S.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.
15.1(2)SG	This command was integrated into Cisco IOS Release 15.1(2)SG.
Cisco IOS XE Release 3.4SG	This command was integrated into Cisco IOS XE Release 3.4SG.

Examples

The following is sample output from the **showipslaendpoint-list** command for all configured endpoint lists. Because all of the destinations are for IP operations, the **typeip** keyword is not configured.

```
Router# show ip sla endpoint-list

Endpoint-list Name: man1
    Description: testing manual build
    ip-address 10.1.1.1-7 port 23
    ip-address 10.1.1.9,10.1.1.15,10.1.1.23 port 23
Endpoint-list Name: autolist
    Description:
    Auto Discover Parameters
        Destination Port: 5000
        Access-list: 3
        Ageout: 3600    Measurement-retry: 3
```

```
    0 endpoints are discovered for autolist
```

The following sample output displays a list of unicast IP addresses that are part of an endpoint list for a multicast UDP jitter operation. Because this endpoint list is for a multicast UDP jitter operation, the port configuration is ignored by the operation.

```
Router# show ip sla auto endpoint-list multicast

Endpoint-list Name: multicast
    Description:
    ip-address 1.1.1.1 port 1111
    ip-address 2.2.2.2 port 2222
    ip-address 3.3.3.3 port 3333
```

The table below describes the significant fields shown in the display.

*Table 8: **show ip sla endpoint-list** Field Descriptions*

Field	Description
Destination Port	Port number of target device or Cisco IP SLAs Responder.
Access-list	Name of list of discovered endpoints.
Ageout	Length of time that operation is kept in memory, in seconds (sec).
Measurement-retry	Number of times the endpoints belonging to an auto IP SLAs destination templates are retested when an operation fails.

Related Commands

Command	Description
access-list (epl-disc)	Adds list of discovered endpoints to an auto IP SLAs endpoint list.
ageout	Adds ageout timer to auto IP SLAs scheduler or endpoint list.
ip sla endpoint-list	Enters IP SLA endpoint-list configuration mode and begins creating an IP SLAs endpoint list.
measurement-retry	Specifies the number of times an operation associated with an auto IP SLAs endpoint list is retried when a failure is detected.

show ip sla enhanced-history collection-statistics

To display enhanced history statistics for all collected history buckets for the specified Cisco IOS IP Service Level Agreements (SLAs) operation, use the **showipslaenhanced-historycollection-statistics** command in user EXEC or privileged EXEC mode.

show ip sla enhanced-history collection-statistics [*operation-number*] [**interval** *seconds*]

Syntax Description

operation-number	(Optional) Number of the operation for which enhanced history statistics is displayed.
interval *seconds*	(Optional) Displays enhanced history distribution statistics for only the specified aggregation interval.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **showipslamonitorenhanced-historycollection-statistics** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrenhanced-historycollection-statistics**command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitorenhanced-historycollection-statistics**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **showipslamonitorenhanced-historycollection-statistics**command.

Usage Guidelines

This command displays data for each bucket of enhanced history data. Data is shown individually (one after the other).

The number of buckets and the collection interval is set using the**historyenhanced** command.

You can also use the following commands to display additional statistics or history information, or to view the status of the operation:

- **show ip sla enhanced-history distribution-statistics**
- **show ip sla statistics**
- **show ip sla statistics aggregated**

Tip If the letter n appears in your output, or not all fields are displayed, you should increase the screen width for your command line interface display (for example, using the **width** line configuration command or the **terminalwidth** EXEC mode command).

Examples

The following example shows sample output for the **showipslaenhanced-historycollection-statistics** command. The output of this command will vary depending on the type of IP SLAs operation.

```
Router# show ip sla enhanced-history collection-statistics 1
Entry number: 1
Aggregation Interval: 900
Bucket Index: 1
Aggregation start time 00:15:00.003 UTC Thur May 1 2003
Target Address:
Number of failed operations due to a Disconnect: 0
Number of failed operations due to a Timeout: 0
Number of failed operations due to a Busy: 0
Number of failed operations due to a No Connection: 0
Number of failed operations due to an Internal Error: 0
Number of failed operations due to a Sequence Error: 0
Number of failed operations due to a Verify Error: 0
 .
 .
 .
```

The table below describes the significant fields shown in the display.

Table 9: show ip sla enhanced-history collection-statistics Field Descriptions

Field	Description
Aggregation Interval	The number of seconds the operation runs for each enhanced history bucket. For example, a value of 900 indicates that statistics were gathered for 15 minutes before the next bucket was created.
Bucket Index	The number identifying the collection bucket. The number of buckets is set using the **historyenhanced**IP SLA configuration command.

Related Commands

Command	Description
ip sla	Allows configuration of IP SLA operations by entering IP SLA configuration mode for the specified operation number.
show ip sla enhanced-history distribution-statistics	Displays enhanced history distribution statistics for IP SLAs operations in tabular format.
show ip sla statistics	Displays the current operational status and statistics of all IP SLAs operations or a specified operation.
show ip sla statistics aggregated	Displays the aggregated statistical errors and distribution information for all IP SLAs operations or a specified operation.

show ip sla enhanced-history distribution-statistics

To display enhanced history distribution statistics for Cisco IOS IP Service Level Agreements (SLAs) operations in tabular format, use the **showipslaenhanced-historydistribution-statistics** command in user EXEC or privileged EXEC mode.

show ip sla enhanced-history distribution-statistics [*operation-number* [**interval** *seconds*]]

Syntax Description

operation-number	(Optional) Number of the operation for which enhanced history statistics is displayed.
interval *seconds*	(Optional) Displays enhanced history distribution statistics for only the specified aggregation interval for only the specified operation.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **showipslamonitorenhanced-historydistribution-statistics** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrenhanced-historydistribution-statistics**command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitorenhanced-historydistribution-statistics**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **showipslamonitorenhanced-historydistribution-statistics**command.

Usage Guidelines

The distribution statistics consist of the following:

- The sum of completion times (used to calculate the mean)
- The sum of the completion times squared (used to calculate standard deviation)
- The maximum and minimum completion times
- The number of completed attempts

You can also use the following commands to display additional statistics or history information, or to view the status of the operation:

- **show ip sla enhanced-history collection-statistics**
- **show ip sla statistics**
- **show ip sla statistics aggregated**

Tip If the letter n appears in your output, or not all fields are displayed, you should increase the screen width for your command line interface display (for example, using the **width** line configuration command or the **terminalwidth** EXEC mode command).

Examples

The following is sample output from the **showipslaenhanced-historydistribution-statistics** command. The fields are defined at the beginning of the output for the command. RTT means round-trip time.

```
Router# show ip sla enhanced-history distribution-statistics 3
 Point by point Enhanced History
Entry    = Entry Number
Int      = Aggregation Interval (seconds)
BucI     = Bucket Index
StartT   = Aggregation Start Time
Pth      = Path index
Hop      = Hop in path index
Comps    = Operations completed
OvrTh    = Operations completed over thresholds
SumCmp   = Sum of RTT (milliseconds)
SumCmp2L = Sum of RTT squared low 32 bits (milliseconds)
SumCmp2H = Sum of RTT squared high 32 bits (milliseconds)
TMax     = RTT maximum (milliseconds)
TMin     = RTT minimum (milliseconds)
Entry Int BucI StartT    Pth Hop Comps OvrTh SumCmp   SumCmp2L  SumCmp2H   TMax     TMin
3     900 1    257850000 1   1   3     0     43       617       0          15       14
3     900 2    258750002 1   1   3     0     45       677       0          16       14
3     900 3    259650000 1   1   3     0     44       646       0          15       14
3     900 4    260550002 1   1   3     0     42       594       0          15       12
3     900 5    261450003 1   1   3     0     42       590       0          15       13
3     900 6    262350001 1   1   3     0     46       706       0          16       15
3     900 7    263250003 1   1   3     0     46       708       0          16       14
 .
 .
 .
```

The time elapsed between BucketIndex 1 (started at 257,850,000) and BucketIndex 2 (started at 258,750,002) in this example is 900,002 milliseconds, or 900 seconds.

The table below describes the significant fields shown in the display.

Table 10: show ip sla enhanced-history distribution-statistics Field Descriptions

Field	Description
Entry	The operation ID number you specified for the IP SLAs operation.
Int	Aggregation interval--The configured statistical distribution buckets interval, in seconds. For example, a value of 900 for Int means that statistics are gathered for 900 seconds per bucket.

Field	Description
BucI	Bucket index number--A number uniquely identifying the statistical distribution (aggregation) bucket. The number of history buckets to be kept is configured using the **historybuckets-kept** command. A bucket will gather statistics for the specified interval of time (aggregation interval), after which a new statistics bucket is created. If a number-of-buckets-kept value is configured, the interval for the last bucket is infinity (until the end of the operation). Buckets are not applicable to HTTP and UDP jitter monitoring operations. This field is equivalent to the rttMonStatsCaptureDistIndex object in the Cisco RTTMON MIB.
StartT	Aggregation start time--Start time for the aggregation interval (per Bucket Index). Shows the start time as the number of milliseconds since the router started; in other words, the time stamp is the number of milliseconds since the last system bootup.
Pth	Path index number--An identifier for a set of different paths to the target destination that have been discovered. For example, if the first operation iteration finds the path h1, h2, h3, h4, then this path is labeled as 1. If, on a later iteration, a new path is discovered, (such as h1, h2, h5, h6, h4) then this new path will be identified as 2, and so on. Data collection per path is available only for ICMP path echo operations ("pathEcho probes"). For all other operations, a value of 1 will always appear. Data collection per path is configured using the **paths-of-statistics-kept***number* command when configuring the operation.
Hop	Hop Index Number--Statistics data per hop. A hop is data transmission between two points in a path (for example, from device h2 to device h3). Data collection per hop is available only for ICMP path echo operations ("pathEcho probes"). For all other operations, a value of "1" will always appear. Data collection per hop is configured using the **hops-of-statistics-kept***number* command when configuring the operation. This field is equivalent to the rrttMonStatsCaptureHopIndex object in the Cisco RTTMON MIB.
Comps	Completions--The number of round-trip time operations that have completed without an error and without timing out, per bucket index. This object has the special behavior as defined by the ROLLOVER NOTE in the DESCRIPTION of the Cisco Rttmon MIB object.
SumCmp	Sum of completed operation times (1)--The total of all round-trip time values for all successful operations in the row, in milliseconds.

Field	Description
SumCmp2L	Sum of the squares of completed operation times (2), Low-Order--The sum of the square roots of round-trip times for operations that were successfully measured, in milliseconds; displays the low-order 32 bits of the value only. • 32 low-order bits and 32 high-order bits are ordered in unsigned 64-bit integers (Int64) as follows: --- | High-order 32 bits | Low-order 32 bits | --- • The "SumCmp2" values are split into "high-order" and "low-order" numbers because of limitations of Simple Network Management Protocol (SNMP). The maximum value allowed for an SNMP object is 4,294,967,295 (the Gauge32 limit). If the sum of the square roots for your operation exceeds this value, then the "high-order" value will be utilized. (For example, the number 4,294,967,296 would have all low-order bits as 0, and the right-most high-order bit would be 1). • The low-order value (SumCmp2L) appears first in the output because in most cases, the value will be less than 4,294,967,295, which means that the value of SumCmp2H will appear as zero.
SumCmp2H	Sum of the squares of completed operation times (2), High-Order--The high-order 32 bits of the accumulated squares of completion times (in milliseconds) of operations that completed successfully.
TMax	Round-trip time, maximum--The highest recorded round-trip time, in milliseconds, per aggregation interval.
TMin	Round-trip time, minimum--The lowest recorded round-trip time, in milliseconds, per aggregation interval.

Related Commands

Command	Description
ip sla	Allows configuration of IP SLA operations by entering IP SLA configuration mode for the specified operation number.
show ip sla enhanced-history collection-statistics	Displays enhanced history statistics for all collected history buckets for the specified IP SLAs operation.
show ip sla statistics	Displays the current operational status and statistics of all IP SLAs operations or a specified operation.
show ip sla statistics aggregated	Displays the aggregated statistical errors and distribution information for all IP SLAs operations or a specified operation.

show ip sla ethernet-monitor configuration

To display configuration settings for IP Service Level Agreements (SLAs) auto Ethernet operations, use the **showipslaethernet-monitorconfiguration** command in user EXEC or privileged EXEC mode.

show ip sla ethernet-monitor configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the auto Ethernet operation for which the details will be displayed.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRB	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

If the identification number of an auto Ethernet operation is not specified, configuration values for all the configured auto Ethernet operations will be displayed.

Examples

The following is sample output from the **showipslaethernet-monitorconfiguration** command:

```
Router# show ip sla ethernet-monitor configuration 1
Entry Number : 1
Modification time   : *00:47:46.703 GMT Thu Jan 11 2007
Operation Type      : echo
Domain Name         : a
VLAN ID             : 11
Excluded MPIDs      :
Owner               :
Tag                 :
Timeout(ms)         : 5000
Threshold(ms)       : 5000
Frequency(sec)      : 60
Operations List     : Empty
Schedule Period(sec): 0
Request size        : 0
CoS                 : 0
Start Time          : Pending trigger
SNMP RowStatus      : notInService
Reaction Configs    :
 Reaction Index     : 1
 Reaction           : RTT
 Threshold Type     : Never
 Threshold Rising   : 300
 Threshold Falling  : 200
 Threshold CountX   : 5
 Threshold CountY   : 5
 Action Type        : None
```

The table below describes the significant fields shown in the display.

Table 11: show ip sla ethernet-monitor configuration Field Descriptions

Field	Description
Entry Number	Identification number for the auto Ethernet operation.
Operation Type	Type of IP SLAs operation configured by the auto Ethernet operation.
Domain Name	Name of the Ethernet Connectivity Fault Management (CFM) maintenance domain.
VLAN ID	VLAN identification number
Excluded MPIDs	List of maintenance endpoint identification numbers to be excluded from the auto Ethernet operation.
Owner	Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.
Tag	User-specified identifier for an IP SLAs operation.
Timeout(ms)	Amount of time the IP SLAs operation waits for a response from its request packet.
Threshold(ms)	Upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.
Frequency(sec)	Time after which an individual IP SLAs operation is restarted.
Operations List	Identification numbers of the individual operations created by the auto Ethernet operation.
Schedule Period(sec)	Time period (in seconds) in which the start times of the individual Ethernet operations are distributed.
Request size	Padding size for the data frame of the individual operations created by the auto Ethernet operation.
CoS	Class of Service of the individual operations created by the auto Ethernet operation.
Start Time	Status of the start time for the auto Ethernet operation.
SNMP RowStatus	Indicates whether SNMP RowStatus is active or inactive.
Reaction Configs	Reaction configuration of the IP SLAs operation.
Reaction Index	Identification number used to identify different reaction configurations for an IP SLAs operation.
Reaction	Reaction condition being monitored.
Threshold Type	Specifies when an action should be performed as a result of a reaction event.

Field	Description
Threshold Rising	The upper threshold value of the reaction condition being monitored. Corresponds to the *upper-threshold*argument of the **threshold-value***upper-thresholdlower-threshold*syntax in the **ipslaethernet-monitorreaction-configuration** command.
Threshold Falling	The lower threshold value of the reaction condition being monitored. Corresponds to the *lower-threshold*argument of the **threshold-value***upper-thresholdlower-threshold* syntax in the **ipslaethernet-monitorreaction-configuration** command.
Threshold CountX	Corresponds to the *x-value* argument of the **threshold-typexofy***x-valuey-value*syntax in the **ipslaethernet-monitorreaction-configuration** command.
Threshold CountY	Corresponds to the *y-value* argument of the **threshold-typexofy***x-valuey-value*syntax in the **ipslaethernet-monitorreaction-configuration** command.
Action Type	Type of action that should be performed as a result of a reaction event.

Related Commands

Command	Description
ip sla ethernet-monitor	Begins configuration for an IP SLAs auto Ethernet operation and enters Ethernet monitor configuration mode.
ip sla ethernet-monitor reaction-configuration	Configures the proactive threshold monitoring parameters for an IP SLAs auto Ethernet operation.
ip sla ethernet-monitor schedule	Configures the scheduling parameters for an IP SLAs LSP Health Monitor operation.

show ip sla event-publisher

To display the list of client applications that are registered to receive IP Service Level Agreements (SLAs) notifications, use the **showipslaevent-publisher** command in user EXEC or privileged EXEC mode.

show ip sla event-publisher

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
12.4(22)T	This command was introduced.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.

Examples

The following is sample output from the **showipslaevent-publisher** command:

```
Router# show ip sla event-publisher
client-id  process-id  event-type
------------------------------------
appl1     1111        react-alert
appl1     1221        react-alert
appl1     1331        react-alert
```

Router#

The table below describes the fields shown in the display.

Table 12: show ip sla event-publisher Field Descriptions

Field	Description
client-id	The identity of the client registered to receive IP SLAs notifications.
process-id	The process identity associated with the client.
event-type	The type of notification (event) that the client has registered to receive.

Related Commands

Command	Description
ip sla enable reaction-alerts	Enables IP SLA notifications to be sent to all registered applications.
show ip sla application	Displays global information about Cisco IOS IP SLAs.

show ip sla group schedule

To display the group schedule details for Cisco IOS IP Service Level Agreements (SLAs) operations, use the **showipslagroupschedule**command in user EXEC or privileged EXEC mode.

show ip sla group schedule [*group-operation-number*]

Syntax Description

group-operation-number	(Optional) Number of the IP SLAs group operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **showipslamonitorgroupschedule** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrgroupschedule**command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitorgroupschedule**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **showipslamonitorgroupschedule**command.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.

Examples

The following is sample output from the **showipslagroupschedule** command that shows information about group (multiple) scheduling. The last line in the example indicates that the IP SLAs operations are multiple scheduled (TRUE):

```
Router# show ip sla group schedule
Multi-Scheduling Configuration:
Group Entry Number: 1
Probes to be scheduled: 2,3,4,9-30,89
Schedule period :60
Group operation frequency: 30
Multi-scheduled: TRUE
```

The following is sample output from the **showipslagroupschedule** command that shows information about group (multiple) scheduling, with the frequency value the same as the schedule period value, the life value as 3600 seconds, and the ageout value as never:

```
Router# show ip sla group schedule
Group Entry Number: 1
Probes to be scheduled: 3,4,6-10
Total number of probes: 7
```

```
Schedule period: 20
Group operation frequency: Equals schedule period
Status of entry (SNMP RowStatus): Active
Next Scheduled Start Time: Start Time already passed
Life (seconds): 3600
Entry Ageout (seconds): never
```

The table below describes the significant fields shown in the displays.

Table 13: show ip sla group schedule Field Descriptions

Field	Description
Group Entry Number	The operation group number specified for IP SLAs multiple operations scheduling.
Probes to be scheduled	The operations numbers specified in the operation group 1.
Scheduled period	The time (in seconds) for which the IP SLAs group is scheduled.
Group operation frequency	The frequency at which each operation is started.
Multi-scheduled	The value TRUE shows that group scheduling is active.

Related Commands

Command	Description
show ip sla configuration	Displays the configuration details for IP SLAs operations.

show ip sla history

To display history collected for all Cisco IOS IP Service Level Agreements (SLAs) operations or for a specified operation, use the **showipslahistory**command in user EXEC or privileged EXEC mode.

show ip sla history [*operation-number*] [**tabular** | **full** | **interval-statistics**]

Syntax Description

operation-number	(Optional) Number of the operation for which history details is displayed.
tabular	(Optional) Displays information in a column format, reducing the number of screens required to display the information. This is the default.
full	(Optional) Displays all information, using identifiers next to each displayed value.
interval-statistics	(Optional) Displays interval statistics.

Command Default

Tabular format history for all operations is displayed.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **showipslamonitorhistory** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrhistory**command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitorhistory**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **showipslamonitorhistory**command.
Cisco IOS XE Release 3.3S	This command was integrated into Cisco IOS XE Release 3.3S. This command was modified. The **interval-statistics** keyword was added.
15.2(2)S	This command was modified. The Available and Unavailable counters that cause the state change are counted towards the new state.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.
15.3(2)S	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

The table below lists the Response Return values used in the output of the **showipslahistory** command.

If the default (tabular) format is used, the Response Return description is displayed as a code in the Sense column. If the full format is used, the Response Return is displayed as indicated in the Description column.

Table 14: Response Return (Sense Column) Codes

Code	Description
1	Okay.
2	Disconnected.
3	Over threshold.
4	Timeout.
5	Busy.
6	Not connected.
7	Dropped.
8	Sequence error.
9	Verify error.
10	Application specific.

Before Cisco IOS Release 15.2(2)S, the counters were incremented only after state change. In Cisco IOS Release 15.2(2)S and later releases, the Available and Unavailable counters that cause the state change are also counted towards the new state.

This command with the **interval-statistics** keyword displays the Available and Unavailable indicators for an IP SLAs Ethernet Frame Loss (FRL) operation.

Prior to Cisco IOS Release 12.4(24)T, the value for SampleT was displayed in centiseconds. In Cisco IOS Release 12.4(24)T and later releases, the value for SampleT is displayed in milliseconds. SampleT is the system uptime value at the start of the operation iteration.

Examples

The following is sample output from the **showipslahistory**command in tabular format.

```
Device# show ip sla history
        Point by point History
          Multiple Lines per Entry
Line 1
 Entry    = Entry Number
 LifeI    = Life Index
 BucketI  = Bucket Index
 SampleI  = Sample Index
 SampleT  = Sample Start Time (milliseconds)
 CompT    = Completion Time (milliseconds)
 Sense    = Response Return Code
Line 2 has the Target Address
Entry LifeI      BucketI    SampleI    SampleT    CompT      Sense
2     1          1          1          174365480   16          1
  AB 45 A0 16
2     1          2          1          174365510   4           1
  AC 12 7  29
```

```
2     1          2          2          174365510   1          1
  AC 12 5  22
2     1          2          3          174365520   4          1
  AB 45 A7 22
2     1          2          4          174365520   4          1
  AB 45 A0 16
```

The following sample output from the **show ip sla history** command with the **interval-statistics** keyword includes the Available and Unavailable indicators for an IP SLAs Ethernet Frame Loss (FRL) operation.

Note Before Cisco IOS Release 15.2(2)S, the counters were incremented only after state change. In Cisco IOS Release 15.2(2)S and later releases, the Available and Unavailable counters that cause the state change are also counted towards the new state.

```
Device# show ip sla history 10 interval-statistics

Loss Statistics for Y1731 Operation 10
Type of operation: Y1731 Loss Measurement
Latest operation start time: *23:04:24.450 UTC Wed Feb 15 2012
Latest operation return code: OK
Distribution Statistics:

Interval 1
 Start time:  *23:04:24.450 UTC Wed Feb 15 2012
 End time:  *23:09:24.446 UTC Wed Feb 15 2012
 Number of measurements initiated: 300
 Number of measurements completed: 300
 Flag: OK

Forward
  Number of Observations 30
  Available indicators: 21
  Unavailable indicators: 9
  Tx frame count: 300
  Rx frame count: 300
    Min/Avg/Max - (FLR % ): 0:9/000.00%/0:9
  Cumulative - (FLR % ): 000.0000%
  Timestamps forward:
    Min - *23:09:24.070 UTC Wed Feb 15 2012
    Max - *23:09:24.070 UTC Wed Feb 15 2012
Backward
  Number of Observations 30
  Available indicators: 21
  Unavailable indicators: 9
  Tx frame count: 300
  Rx frame count: 300
    Min/Avg/Max - (FLR % ): 0:9/000.00%/0:9
  Cumulative - (FLR % ): 000.0000%
  Timestamps backward:
    Min - *23:09:24.070 UTC Wed Feb 15 2012
    Max - *23:09:24.070 UTC Wed Feb 15 2012
```

Related Commands

Command	Description
show ip sla configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla history interval

To display the latest history collected for all IP Service Level Agreements (SLAs) Metro Ethernet 3.0 (ITU-T Y.1731) operations or for a specified operation, use the **show ip sla history interval** command in user EXEC or privileged EXEC mode.

show ip sla history interval [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the operation for which history details are to be displayed.

Command Default

Latest history for all operations is displayed.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
15.1(2)S	This command was introduced.

Usage Guidelines

This command displays the current state of IP SLAs operations, including the monitoring data returned for the last (most recently completed) operation. One of the following Operation Return values is displayed for the latest operation. The values are self-explanatory.

- OK
- Over Threshold
- Timeout
- Unknown
- Internal Error

The output of this command is the same as the output displayed for the **show ip sla statistics** command with the **detail**.

Examples

The following is sample output from the **show ip sla history interval** command for an Ethernet delay operation (3).

```
Router# show ip sla history interval 3

IPSLA operation id: 3
Delay Statistics for Y1731 Operation 3
Type of operation: Y1731 Delay Measurement
Latest operation start time: *02:12:49.772 PST Thu Jul 1 2010
Latest operation return code: OK
Distribution Statistics:
Interval
 Start time:  *02:12:49.772 PST Thu Jul 1 2010
 End time:  *00:00:00.000 PST Mon Jan 1 1900
 Number of measurements initiated: 31
 Number of measurements completed: 31
```

```
 Flag: OK


Delay:
 Max/Avg/Min TwoWay: 2014/637/0
 Time of occurrence TwoWay: Max - *02:13:11.210 PST Thu Jul 1 2010/Min - *02:17:51.339 PST
 Thu Jul 1 2010

 Bucket TwoWay:
  Bucket Range: 0 - < 5000 microseconds
   Total observations: 22
  Bucket Range: 5000 - < 10000 microseconds
   Total observations: 0
  Bucket Range: 10000 - < 15000 microseconds
   Total observations: 0
  Bucket Range: 15000 - < 20000 microseconds
   Total observations: 0
  Bucket Range: 20000 - < 25000 microseconds
   Total observations: 0
  Bucket Range: 25000 - < 30000 microseconds
   Total observations: 0
  Bucket Range: 30000 - < 35000 microseconds
   Total observations: 0
  Bucket Range: 35000 - < 40000 microseconds
   Total observations: 0
  Bucket Range: 40000 - < 45000 microseconds
   Total observations: 0
  Bucket Range: 45000 - < 4294967295 microseconds
   Total observations: 0

Delay Variance:
 Max/Avg TwoWay positive: 0/0
 Time of occurrence TwoWay positive: Max - *00:00:00.000 PST Mon Jan 1 1900
 Max/Avg TwoWay negative: 0/0
 Time of occurrence TwoWay negative: Max - *00:00:00.000 PST Mon Jan 1 1900

 Bucket TwoWay positive:
  Bucket Range: 0 - < 5000 microseconds
   Total observations: 0
  Bucket Range: 5000 - < 10000 microseconds
   Total observations: 0
  Bucket Range: 10000 - < 15000 microseconds
   Total observations: 0
  Bucket Range: 15000 - < 20000 microseconds
   Total observations: 0
  Bucket Range: 20000 - < 25000 microseconds
   Total observations: 0
  Bucket Range: 25000 - < 30000 microseconds
   Total observations: 0
  Bucket Range: 30000 - < 35000 microseconds
   Total observations: 0
  Bucket Range: 35000 - < 40000 microseconds
   Total observations: 0
  Bucket Range: 40000 - < 45000 microseconds
   Total observations: 0
  Bucket Range: 45000 - < 4294967295 microseconds
   Total observations: 0

 Bucket TwoWay negative:
  Bucket Range: 0 - < 5000 microseconds
   Total observations: 0
  Bucket Range: 5000 - < 10000 microseconds
   Total observations: 0
  Bucket Range: 10000 - < 15000 microseconds
```

```
  Total observations: 0
 Bucket Range: 15000 - < 20000 microseconds
  Total observations: 0
 Bucket Range: 20000 - < 25000 microseconds
  Total observations: 0
 Bucket Range: 25000 - < 30000 microseconds
  Total observations: 0
 Bucket Range: 30000 - < 35000 microseconds
  Total observations: 0
 Bucket Range: 35000 - < 40000 microseconds
  Total observations: 0
 Bucket Range: 40000 - < 45000 microseconds
  Total observations: 0
 Bucket Range: 45000 - < 4294967295 microseconds
  Total observations: 0

Bucket TwoWay negative:
```

Related Commands

Command	Description
show ip sla statistics	Displays the current operational status and statistics of all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation.

show ip sla monitor application

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **show ip sla monitor application**command is replaced by the **show ip sla application**command. See the **show ip sla application**command for more information.

To display global information about Cisco IOS IP Service Level Agreements (SLAs), use the **show ip sla monitor application** command in user EXEC or privileged EXEC mode.

show ip sla monitor application [**tabular** | **full**]

Syntax Description

tabular	(Optional) Displays information in a column format, reducing the number of screens required to display the information.
full	(Optional) Displays all information, using identifiers next to each displayed value. This is the default.

Command Default

Full format

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **show ip sla application**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **show rtr application** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **show ip sla application**command.
12.2(33)SXI	This command was replaced by the **show ip sla application**command.

Usage Guidelines

Use the **show ip sla monitor application**command to display information such as supported operation types and supported protocols.

Examples

The following is sample output from the **show ip sla monitor application** command in full format:

```
Router# show ip sla monitor application

        IP Service Level Agreement Monitor
Version: 2.2.0 Round Trip Time MIB
Time of last change in whole IP SLA Monitor: *17:21:30.819 UTC Tue Mar 19 2002
Estimated system max number of entries: 4699
```

```
Number of Entries configured:5
    Number of active Entries:5
   Number of pending Entries:0
  Number of inactive Entries:0
         Supported Operation Types
Type of Operation to Perform:  echo
Type of Operation to Perform:  pathEcho
Type of Operation to Perform:  udpEcho
Type of Operation to Perform:  tcpConnect
Type of Operation to Perform:  http
Type of Operation to Perform:  dns
Type of Operation to Perform:  jitter
Type of Operation to Perform:  dlsw
Type of Operation to Perform:  dhcp
Type of Operation to Perform:  ftp
        Supported Protocols
Protocol Type: ipIcmpEcho
Protocol Type: ipUdpEchoAppl
Protocol Type: snaRUEcho
Protocol Type: snaLU0EchoAppl
Protocol Type: snaLU2EchoAppl
Protocol Type: ipTcpConn
Protocol Type: httpAppl
Protocol Type: dnsAppl
Protocol Type: jitterAppl
Protocol Type: dlsw
Protocol Type: dhcp
Protocol Type: ftpAppl

Number of configurable probe is 490
```

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla monitor authentication

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **show ip sla monitor authentication**command is replaced by the **show ip sla authentication**command. See the **show ip sla authentication**command for more information.

To display Cisco IOS IP Service Level Agreements (SLAs) authentication information, use the **show ip sla monitor authentication** command in user EXEC or privileged EXEC mode.

show ip sla monitor authentication

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **show ip sla authentication**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **show rtr authentication** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **show ip sla authentication**command.
12.2(33)SXI	This command was replaced by the **show ip sla authentication**command.

Usage Guidelines

Use the **show ip sla monitor authentication**command to display information such as supported operation types and supported protocols.

Examples

The following is sample output from the **show ip sla monitor authentication**command:

```
Router# show ip sla monitor authentication

IP SLA Monitor control message uses MD5 authentication, key chain name is: ipsla
```

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values for IP SLAs operations.

show ip sla monitor collection-statistics

Note Effective with Cisco IOS Release 12.4(2)T, the **showipslamonitorcollection-statistics** command is replaced by the **showipslamonitorstatisticsaggregated** command. See the **showipslamonitorstatisticsaggregated** command for more information.

To display statistical errors for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **showipslamonitorcollection-statistics**command in user EXEC or privileged EXEC mode.

show ip sla monitor collection-statistics [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(2)T	This command was replaced by the **showipslamonitorstatisticsaggregated** command.

Usage Guidelines

Use the **showipslamonitorcollection-statistics** command to display information such as the number of failed operations and the failure reason. You can also use the **showipslamonitordistribution-statistics** and **showipslamonitortotals-statistics** commands to display additional statistical information.

This command shows information collected over the past two hours, unless you specify a different amount of time using the **hours-of-statistics-kept** command.

For one-way delay jitter operations, the clocks on each device must be synchronized using Network Time Protocol (NTP) or global positioning systems. If the clocks are not synchronized, one-way measurements are discarded. (If the sum of the source to destination (SD) and the destination to source (DS) values is not within 10 percent of the round-trip time, the one-way measurement values are assumed to be faulty, and are discarded.)

Note This command does not support the IP SLAs ICMP path jitter operation.

Examples

The following is sample output from the **showipslamonitorcollection-statistics** command:

```
Router# show ip sla monitor collection-statistics 1
        Collected Statistics
Entry Number: 1
Start Time Index: *17:15:41.000 UTC Thu May 16 1996
Path Index: 1
Hop in Path Index: 1
Number of Failed Operations due to a Disconnect: 0
Number of Failed Operations due to a Timeout: 0
Number of Failed Operations due to a Busy: 0
```

```
Number of Failed Operations due to a No Connection: 0
Number of Failed Operations due to an Internal Error: 0
Number of Failed Operations due to a Sequence Error: 0
Number of Failed Operations due to a Verify Error: 0
Target Address: 172.16.1.176
```

Output for HTTP Operations

The following is output from the **showipslamonitorcollection-statistics** command when the specified operation is an HTTP operation:

```
Router# show ip sla monitor collection-statistics 2       Collected Statistics

Entry Number:2
HTTP URL:
http://172.20.150.200
Start Time:*00:01:16.000 UTC Mon Nov 1 2003

             Comps:1              RTTMin:343
             OvrTh:0              RTTMax:343
        DNSTimeOut:0              RTTSum:343
        TCPTimeOut:0             RTTSum2:117649
        TraTimeOut:0              DNSRTT:0
          DNSError:0           TCPConRTT:13
         HTTPError:0            TransRTT:330
          IntError:0            MesgSize:1771
            Busies:0
```

Output for UDP Jitter Operations

The following is sample output from the **showipslamonitorcollection-statistics** command, where operation 2 is a jitter operation that includes one-way statistics. The table below describes the significant fields shown in the display.

```
Router# show ip sla monitor collection-statistics
Collected Statistics
Entry Number: 2
Target Address: 5.0.0.1, Port Number:99
Start Time: 11:12:03.000 UTC Thu Jul 1 1999
RTT Values:
NumOfRTT: 600  RTTSum: 3789  RTTSum2: 138665
Packet Loss Values:
PacketLossSD: 0  PacketLossDS: 0
PacketOutOfSequence: 0  PacketMIA: 0  PacketLateArrival: 0
InternalError: 0  Busies: 0
Jitter Values:
MinOfPositivesSD: 1   MaxOfPositivesSD: 2
NumOfPositivesSD: 26  SumOfPositivesSD: 31   Sum2PositivesSD: 41
MinOfNegativesSD: 1   MaxOfNegativesSD: 4
NumOfNegativesSD: 56  SumOfNegativesSD: 73   Sum2NegativesSD: 133
MinOfPositivesDS: 1   MaxOfPositivesDS: 338
NumOfPositivesDS: 58  SumOfPositivesDS: 409  Sum2PositivesDS: 114347
MinOfNegativesDS: 1   MaxOfNegativesDS: 338
NumOfNegativesDS: 48  SumOfNegativesDS: 396  Sum2NegativesDS: 114332
One Way Values:
NumOfOW: 440
OWMinSD: 2  OWMaxSD: 6    OWSumSD: 1273  OWSum2SD: 4021
OWMinDS: 2  OWMaxDS: 341  OWSumDS: 1643  OWSum2DS: 120295
```

Output for UDP Jitter (codec) Operations

The following is sample output from the **showipslamonitorcollection-statistics** command, where operation 10 is a UDP jitter (codec) operation. The table above describes the significant fields shown in the display.

```
Router# show ip sla monitor collection-statistics 10
Entry Number: 10
Start Time Index: 12:57:45.931 UTC Wed Mar 12 2003
Number of successful operations: 60
Number of operations over threshold: 0
Number of failed operations due to a Disconnect: 0
Number of failed operations due to a Timeout: 0
Number of failed operations due to a Busy: 0
Number of failed operations due to a No Connection: 0
Number of failed operations due to an Internal Error: 0
Number of failed operations due to a Sequence Error: 0
Number of failed operations due to a Verify Error: 0
Voice Scores:
 MinOfICPIF: 2   MaxOfICPIF:  20   MinOfMos: 3.20   MaxOfMos: 4.80
RTT Values:
 NumOfRTT: 600  RTTSum: 3789  RTTSum2: 138665
 Packet Loss Values:
 PacketLossSD: 0  PacketLossDS: 0
 PacketOutOfSequence: 0  PacketMIA: 0  PacketLateArrival: 0
 InternalError: 0  Busies: 0
Jitter Values:
 NumOfJitterSamples: 540
 MinOfPositivesSD: 1   MaxOfPositivesSD: 2
 NumOfPositivesSD: 26  SumOfPositivesSD: 31   Sum2PositivesSD: 41
 MinOfNegativesSD: 1   MaxOfNegativesSD: 4
 NumOfNegativesSD: 56  SumOfNegativesSD: 73   Sum2NegativesSD: 133
 MinOfPositivesDS: 1   MaxOfPositivesDS: 338
 NumOfPositivesDS: 58  SumOfPositivesDS: 409  Sum2PositivesDS: 114347
 MinOfNegativesDS: 1   MaxOfNegativesDS: 338
 NumOfNegativesDS: 48  SumOfNegativesDS: 396  Sum2NegativesDS: 114332
 Interarrival jitterout: 0       Interarrival jitterin: 0
One Way Values:
 NumOfOW: 440
 OWMinSD: 2  OWMaxSD: 6    OWSumSD: 1273  OWSum2SD: 4021
 OWMinDS: 2  OWMaxDS: 341  OWSumDS: 1643  OWSum2DS: 120295
```

Table 15: show ip sla monitor collection-statistics Field Descriptions

Field	Description
Voice Scores	Indicates that Voice over IP statistics appear on the following lines. Voice score data is computed when the operation type is configured as **typejitter** (codec).

Field	Description
ICPIF	The Calculated Planning Impairment Factor (ICPIF) value for the operation. The ICPIF value is computed by IP SLAs using the formula *Icpif=Io+Iq+Idte+Idd+Ie-A*, where • The values for *Io* , *Iq* , and *Idte* are set to zero. • The value *Idd* is computed based on the measured one-way delay. • The value *Ie* is computed based on the measured packet loss. • The value of A is specified by the user. ICPIF values are expressed in a typical range of 5 (very low impairment) to 55 (very high impairment). ICPIF values numerically lower than 20 are generally considered "adequate." **Note** This value is intended only for relative comparisons, and may not match ICPIF values generated using alternate methods.
MinOfICPIF	The lowest (minimum) ICPIF value computed for the collected statistics.
MaxOfICPIF	The highest (maximum) ICPIF value computed for the collected statistics.
Mos	The estimated Mean Opinion Score (Conversational Quality, Estimated) for the latest iteration of the operation. The MOS-CQE is computed by IP SLAs as a function of the ICPIF. MOS values are expressed as a number from 1 (1.00) to 5 (5.00), with 5 being the highest level of quality, and 1 being the lowest level of quality. A MOS value of 0 (zero) indicates that MOS data could not be generated for the operation.
MinOfMos	The lowest (minimum) MOS value computed for the collected statistics.
MaxOfMos	The highest (maximum) ICPIF value computed for the collected statistics.
RTT Values	Indicates that round-trip-time statistics appear on the following lines.
NumOfRTT	The number of successful round-trips.
RTTSum	The sum of all successful round-trip values (in milliseconds).
RTTSum2	The sum of squares of those round-trip values (in milliseconds).
PacketLossSD	The number of packets lost from source to destination.
PacketLossDS	The number of packets lost from destination to source.
PacketOutOfSequence	The number of packets returned out of order.
PacketMIA	The number of packets lost where the direction (SD/DS) cannot be determined.
PacketLateArrival	The number of packets that arrived after the timeout.

Field	Description
InternalError	The number of times an operation could not be started due to other internal failures.
Busies	The number of times this operation could not be started because the previously scheduled run was not finished.
Jitter Values:	Indicates that jitter statistics appear on the following lines. Jitter is interpacket delay variance.
NumOfJitterSamples	The number of jitter samples collected. This is the number of samples that are used to calculate the following jitter statistics.
MinOfPositivesSD MaxOfPositivesSD	The minimum and maximum positive jitter values from source to destination, in milliseconds.
NumOfPositivesSD	The number of jitter values from source to destination that are positive (that is, network latency increases for two consecutive test packets).
SumOfPositivesSD	The sum of those positive values (in milliseconds).
Sum2PositivesSD	The sum of squares of those positive values.
MinOfNegativesSD MaxOfNegativesSD	The minimum and maximum negative jitter values from source to destination. The absolute value is given.
NumOfNegativesSD	The number of jitter values from source to destination that are negative (that is, network latency decreases for two consecutive test packets).
SumOfNegativesSD	The sum of those values.
Sum2NegativesSD	The sum of the squares of those values.
Interarrival jitterout	The source-to-destination (SD) jitter value calculation, as defined in RFC 1889.
Interarrival jitterin	The destination-to-source (DS) jitter value calculation, as defined in RFC 1889.
One Way Values	Indicates that one-way measurement statistics appear on the following lines. One Way (OW) values are the amount of time required for the packet to travel from the source router to the target router (SD) or from the target router to the source router (DS).
NumOfOW	Number of successful one-way time measurements.
OWMinSD	Minimum time (in milliseconds) from the source to the destination.
OWMaxSD	Maximum time (in milliseconds) from the source to the destination.
OWSumSD	Sum of the OWMinSD and OWMaxSD values.
OWSum2SD	Sum of the squares of the OWMinSD and OWMaxSD values.

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.
show ip sla monitor distributions-statistics	Displays statistics distribution information (captured response times) for all IP SLAs operations or the specified operation.
show ip sla monitor totals-statistics	Displays the total statistical values (accumulation of error counts and completions) for all IP SLAs operations or the specified operation.
show ntp status	Displays the status of the NTP configuration on your system.

show ip sla monitor configuration

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **show ip sla monitor configuration**command is replaced by the **show ip sla configuration**command. See the **show ip sla configuration**command for more information.

To display configuration values including all defaults for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **show ip sla monitor configuration** command in user EXEC or privileged EXEC mode.

show ip sla monitor configuration [*operation*]

Syntax Description

operation	(Optional) Number of the IP SLAs operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(2)T	The displayed information was reorganized.
12.4(4)T	This command was replaced by the **show ip sla configuration**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **show rtr configuration** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **show ip sla configuration**command.
12.2(33)SXI	This command was replaced by the **show ip sla configuration**command.

Examples

The following sections show sample output from the **show ip sla monitor configuration** command for different IP SLAs operations.

Output for ICMP Echo Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is an Internet Control Message Protocol (ICMP) echo operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: echo
Target address/Source address: 1.1.1.1/0.0.0.0
```

```
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
Enhanced History:
```

Output for HTTP Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a Hypertext Transfer Protocol (HTTP) operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: http
Target address/Source address: 1.1.1.1/0.0.0.0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
HTTP Operation: get
HTTP Server Version: 1.0
URL: http://www.cisco.com
Proxy:
Raw String(s):
Cache Control: enable
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

Output for ICMP Path Jitter Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is an ICMP path jitter operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: pathJitter
Target address/Source address: 1.1.1.1/0.0.0.0
Packet Interval/Number of Packets: 20 ms/10
Target Only: Disabled
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Loose Source Routing: Disabled
LSR Path:
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
```

Output for ICMP Path Echo Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is an ICMP path echo operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: pathEcho
Target address/Source address: 1.1.1.1/0.0.0.0
Packet Interval/Number of Packets: 20 ms/10
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Loose Source Routing: Disabled
Vrf Name:
LSR Path:
Request size (ARR data portion): 28
Verify data: No
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic paths kept: 5
```

```
   Number of statistic hops kept: 16
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

Output for DNS Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a Domain Name System (DNS) operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: dns
Target Address/Source address: 1.1.1.1/0.0.0.0
Target Port/Source Port: 1111/0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

Output for UDP Echo Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a UDP echo operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: udpEcho
Target address/Source address: 1.1.1.1/0.0.0.0
Target Port/Source Port: 1111/0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Data Pattern:
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Control Packets: enabled
Schedule:
   Next Scheduled Start Time: Start Time already passed
```

```
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
Enhanced History:
```

Output for TCP Connect Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a Transmission Control Protocol (TCP) connect operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: tcpConnect
Target Address/Source address: 1.1.1.1/0.0.0.0
Target Port/Source Port: 1111/0
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Control Packets: enabled
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
Enhanced History:
```

Output for DHCP Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a Dynamic Host Configuration Protocol (DHCP) operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: dhcp
Target Address/Source address: 1.1.1.1/0.0.0.0
```

```
Operation timeout (milliseconds): 5000
Dhcp option:
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

Output for FTP Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a File Transfer Protocol (FTP) operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: ftp
Source address: 0.0.0.0
FTP URL: ftp://ipsla:ipsla@172.19.192.109/test.txt
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Number of history Lives kept: 0
Number of history Buckets kept: 15
History Filter Type: None
```

Output for UDP Jitter Operations

The following example shows output from the **show ip sla monitor configuration** command when the specified operation is a User Datagram Protocol (UDP) jitter operation:

```
Router# show ip sla monitor configuration 3
Entry number: 3
Owner:
Tag:
Type of operation: jitter
```

```
Target Address/Source address: 1.1.1.1/0.0.0.0
Target Port/Source Port: 1111/0
Packet Interval/Number of Packets: 20 ms/10
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Vrf Name:
Request size (ARR data portion): 28
Verify data: No
Control Packets: enabled
Schedule:
   Next Scheduled Start Time: Start Time already passed
   Group Scheduled: False
   Operation frequency (seconds): 60
   Life/Entry Ageout (seconds): Forever/never
   Recurring (Starting Everyday): FALSE
   Status of entry (SNMP RowStatus): Active
Threshold (ms): 5000
Distribution Statistics:
   Number of statistic hours kept: 2
   Number of statistic distribution buckets kept: 5
   Statistic distribution interval (milliseconds): 10
Enhanced History:
```

Related Commands

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

show ip sla monitor distributions-statistics

Note Effective with Cisco IOS Release 12.4(2)T, the **show ip sla monitor distributions-statistics** command is replaced by the **show ip sla monitor statistics aggregated details**command. See the **show ip sla monitor statistics aggregated** command for more information.

To display distribution statistics (captured response times) for all Cisco IOS IP Service Level Agreements (SLAs) operations or the specified operation, use the **show ip sla monitor distributions-statistics** command in user EXEC or privileged EXEC mode.

show ip sla monitor distributions-statistics [*operation*] [**tabular** | **full**]

Syntax Description

operation	(Optional) Number of the IP SLAs operation to display.
tabular	(Optional) Displays information in a column format, reducing the number of screens required to display the information. This is the default.
full	(Optional) Displays all information, using identifiers next to each displayed value.

Command Default

Statistics are displayed for the past two hours.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(2)T	This command was replaced by the **show ip sla monitor statistics aggregated details**command.

Usage Guidelines

The distribution statistics consist of the following:

- The sum of completion times (used to calculate the mean)
- The sum of the completion times squared (used to calculate standard deviation)
- The maximum and minimum completion time
- The number of completed attempts

Note This command does not support the IP SLAs ICMP path jitter operation.

This command shows information collected over the past two hours, unless you specify a different amount of time using the **hours-of-statistics-kept** command.

You can also use the **show ip sla monitor collection-statistics** and **show ip sla monitor totals-statistics** commands to display additional statistical information.

Examples

The following is sample output from the **show ip sla monitor distributions-statistics** command:

```
Router# show ip sla monitor distributions-statistics
        Captured Statistics
        Multiple Lines per Entry
Line 1
Entry    = Entry Number
StartT   = Start Time of Entry (hundredths of seconds)
Pth      = Path Index
Hop      = Hop in Path Index
Dst      = Time Distribution Index
Comps    = Operations Completed
OvrTh    = Operations Completed Over Thresholds
SumCmp   = Sum of Completion Times (milliseconds)
Line 2
SumCmp2L = Sum of Completion Times Squared Low 32 Bits (milliseconds)
SumCmp2H = Sum of Completion Times Squared High 32 Bits (milliseconds)
TMax     = Completion Time Maximum (milliseconds)
TMin     = Completion Time Minimum (milliseconds)
Entry StartT   Pth Hop Dst Comps  OvrTh   SumCmp    SumCmp2L   SumCmp2H  TMax     TMin
1     17417068 1   1   1   2      0       128       8192       0         64       64
```

The fields shown in the display are self-explanatory.

Related Commands

Command	Description
show ip sla monitor collection-statistics	Displays statistical errors for all IP SLAs operations or the specified operation.
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.
show ip sla monitor totals-statistics	Displays the total statistical values (accumulation of error counts and completions) for all IP SLAs operations or the specified operation.

show ip sla monitor enhanced-history collection-statistics

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **showipslamonitorenhanced-historycollection-statistics**command is replaced by the **showipslaenhanced-historycollection-statistics**command. See the **showipslaenhanced-historycollection-statistics**command for more information.

To display enhanced history statistics for all collected history buckets for the specified Cisco IOS IP Service Level Agreements (SLAs) operation, use the **showipslamonitorenhanced-historycollection-statistics** command in user EXEC or privileged EXEC mode.

show ip sla monitor enhanced-history collection-statistics [*operation-number*] [**interval** *seconds*]

Syntax Description

operation-number	(Optional) Number of the operation for which enhanced history statistics is displayed.
interval *seconds*	(Optional) Displays enhanced history distribution statistics for only the specified aggregation interval.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **showipslaenhanced-historycollection-statistics**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **showrtrenhanced-historycollection-statistics** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslaenhanced-historycollection-statistics**command.
12.2(33)SXI	This command was replaced by the **showipslaenhanced-historycollection-statistics**command.

Usage Guidelines

This command displays data for each bucket of enhanced history data. Data is shown individually (one after the other).

The number of buckets and the collection interval is set using the**enhanced-history** command.

You can also use the following commands to display additional statistics or history information, or to view the status of the operation:

- **show ip sla monitor enhanced-history distribution-statistics**
- **show ip sla monitor statistics**
- **show ip sla monitor statistics aggregated**

Tip If the letter n appears in your output, or not all fields are displayed, you should increase the screen width for your command line interface display (for example, using the **width** line configuration command or the **terminalwidth** EXEC mode command).

Examples

The following example shows sample output for the **showipslamonitorenhanced-historycollection-statistics** command. The output of this command will vary depending on the type of IP SLAs operation.

```
Router# show ip sla monitor enhanced-history collection-statistics 1
Entry number: 1
Aggregation Interval: 900
Bucket Index: 1
Aggregation start time 00:15:00.003 UTC Thur May 1 2003
Target Address:
Number of failed operations due to a Disconnect: 0
Number of failed operations due to a Timeout: 0
Number of failed operations due to a Busy: 0
Number of failed operations due to a No Connection: 0
Number of failed operations due to an Internal Error: 0
Number of failed operations due to a Sequence Error: 0
Number of failed operations due to a Verify Error: 0
 .
 .
 .
```

The table below describes the significant fields shown in the display.

Table 16: show ip sla monitor enhanced-history collection-statistics Field Descriptions

Field	Description
Aggregation Interval	The number of seconds the operation runs for each enhanced history bucket. For example, a value of 900 indicates that statistics were gathered for 15 minutes before the next bucket was created.
Bucket Index	The number identifying the collection bucket. The number of buckets is set using the **enhanced-history** IP SLA monitor configuration command.

Related Commands

Command	Description
ip sla monitor	Allows configuration of IP SLA operations by entering IP SLA monitor configuration mode for the specified operation number.
show ip sla monitor enhanced-history distribution-statistics	Displays enhanced history distribution statistics for IP SLAs operations in tabular format.
show ip sla monitor statistics	Displays the current operational status and statistics of all IP SLAs operations or a specified operation.
show ip sla monitor statistics aggregated	Displays the aggregated statistical errors and distribution information for all IP SLAs operations or a specified operation.

show ip sla monitor enhanced-history distribution-statistics

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **showipslamonitorenhanced-historydistribution-statistics**command is replaced by the **showipslaenhanced-historydistribution-statistics**command. See the **showipslaenhanced-historydistribution-statistics**command for more information.

To display enhanced history distribution statistics for Cisco IOS IP Service Level Agreements (SLAs) operations in tabular format, use the **showipslamonitorenhanced-historydistribution-statistics** command in user EXEC or privileged EXEC mode.

show ip sla monitor enhanced-history distribution-statistics [*operation-number* [**interval** *seconds*]]

Syntax Description

operation-number	(Optional) Number of the operation for which enhanced history statistics is displayed.
interval *seconds*	(Optional) Displays enhanced history distribution statistics for only the specified aggregation interval for only the specified operation.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **showipslaenhanced-historydistribution-statistics**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **showrtrenhanced-historydistribution-statistics** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslaenhanced-historydistribution-statistics**command.
12.2(33)SXI	This command was replaced by the **showipslaenhanced-historydistribution-statistics**command.

Usage Guidelines

The distribution statistics consist of the following:

- The sum of completion times (used to calculate the mean)
- The sum of the completion times squared (used to calculate standard deviation)
- The maximum and minimum completion times
- The number of completed attempts

You can also use the following commands to display additional statistics or history information, or to view the status of the operation:

- **show ip sla monitor enhanced-history collection-statistics**
- **show ip sla monitor statistics**
- **show ip sla monitor statistics aggregated**

Tip If the letter n appears in your output, or not all fields are displayed, you should increase the screen width for your command line interface display (for example, using the **width** line configuration command or the **terminalwidth** EXEC mode command).

Examples

The following is sample output from the **showipslamonitorenhanced-historydistribution-statistics** command. The fields are defined at the beginning of the output for the command. RTT means round-trip time.

```
Router# show ip sla monitor enhanced-history distribution-statistics 3
 Point by point Enhanced History
Entry    = Entry Number
Int      = Aggregation Interval (seconds)
BucI     = Bucket Index
StartT   = Aggregation Start Time
Pth      = Path index
Hop      = Hop in path index
Comps    = Operations completed
OvrTh    = Operations completed over thresholds
SumCmp   = Sum of RTT (milliseconds)
SumCmp2L = Sum of RTT squared low 32 bits (milliseconds)
SumCmp2H = Sum of RTT squared high 32 bits (milliseconds)
TMax     = RTT maximum (milliseconds)
TMin     = RTT minimum (milliseconds)
Entry Int BucI StartT    Pth Hop Comps OvrTh SumCmp   SumCmp2L  SumCmp2H   TMax    TMin
3     900 1    257850000 1   1   3     0     43       617       0          15      14
3     900 2    258750002 1   1   3     0     45       677       0          16      14
3     900 3    259650000 1   1   3     0     44       646       0          15      14
3     900 4    260550002 1   1   3     0     42       594       0          15      12
3     900 5    261450003 1   1   3     0     42       590       0          15      13
3     900 6    262350001 1   1   3     0     46       706       0          16      15
3     900 7    263250003 1   1   3     0     46       708       0          16      14
 .
 .
 .
```

The time elapsed between BucketIndex 1 (started at 257,850,000) and BucketIndex 2 (started at 258,750,002) in this example is 900,002 milliseconds, or 900 seconds.

The table below describes the significant fields shown in the display.

Table 17: show ip sla monitor enhanced-history distribution-statistics Field Descriptions

Field	Description
Entry	The operation ID number you specified for the IP SLAs operation.

Field	Description
Int	Aggregation interval--The configured statistical distribution buckets interval, in seconds. For example, a value of 900 for Int means that statistics are gathered for 900 seconds per bucket.
BucI	Bucket index number--A number uniquely identifying the statistical distribution (aggregation) bucket. The number of history buckets to be kept is configured using the **buckets-of-history-kept** command. A bucket will gather statistics for the specified interval of time (aggregation interval), after which a new statistics bucket is created. If a number-of-buckets-kept value is configured, the interval for the last bucket is infinity (until the end of the operation). Buckets are not applicable to HTTP and UDP jitter monitoring operations. This field is equivalent to the rttMonStatsCaptureDistIndex object in the Cisco RTTMON MIB.
StartT	Aggregation start time--Start time for the aggregation interval (per Bucket Index). Shows the start time as the number of milliseconds since the router started; in other words, the time stamp is the number of milliseconds since the last system bootup.
Pth	Path index number--An identifier for a set of different paths to the target destination that have been discovered. For example, if the first operation iteration finds the path h1, h2, h3, h4, then this path is labeled as 1. If, on a later iteration, a new path is discovered, (such as h1, h2, h5, h6, h4) then this new path will be identified as 2, and so on. Data collection per path is available only for ICMP path echo operations ("pathEcho probes"). For all other operations, a value of 1 will always appear. Data collection per path is configured using the **paths-of-statistics-kept***number* command when configuring the operation.
Hop	Hop Index Number--Statistics data per hop. A hop is data transmission between two points in a path (for example, from device h2 to device h3). Data collection per hop is available only for ICMP path echo operations ("pathEcho probes"). For all other operations, a value of "1" will always appear. Data collection per hop is configured using the **hops-of-statistics-kept***number* command when configuring the operation. This field is equivalent to the rrttMonStatsCaptureHopIndex object in the Cisco RTTMON MIB.
Comps	Completions--The number of round-trip time operations that have completed without an error and without timing out, per bucket index. This object has the special behavior as defined by the ROLLOVER NOTE in the DESCRIPTION of the Cisco Rttmon MIB object.
SumCmp	Sum of completed operation times (1)--The total of all round-trip time values for all successful operations in the row, in milliseconds.

Field	Description
SumCmp2L	Sum of the squares of completed operation times (2), Low-Order--The sum of the square roots of round-trip times for operations that were successfully measured, in milliseconds; displays the low-order 32 bits of the value only. • 32 low-order bits and 32 high-order bits are ordered in unsigned 64-bit integers (Int64) as follows: --- | High-order 32 bits | Low-order 32 bits | --- • The "SumCmp2" values are split into "high-order" and "low-order" numbers because of limitations of Simple Network Management Protocol (SNMP). The maximum value allowed for an SNMP object is 4,294,967,295 (the Gauge32 limit). If the sum of the square roots for your operation exceeds this value, then the "high-order" value will be utilized. (For example, the number 4,294,967,296 would have all low-order bits as 0, and the right-most high-order bit would be 1). • The low-order value (SumCmp2L) appears first in the output because in most cases, the value will be less than 4,294,967,295, which means that the value of SumCmp2H will appear as zero.
SumCmp2H	Sum of the squares of completed operation times (2), High-Order--The high-order 32 bits of the accumulated squares of completion times (in milliseconds) of operations that completed successfully.
TMax	Round-trip time, maximum--The highest recorded round-trip time, in milliseconds, per aggregation interval.
TMin	Round-trip time, minimum--The lowest recorded round-trip time, in milliseconds, per aggregation interval.

Related Commands

Command	Description
ip sla monitor	Allows configuration of IP SLA operations by entering IP SLA monitor configuration mode for the specified operation number.
show ip sla monitor enhanced-history collection-statistics	Displays enhanced history statistics for all collected history buckets for the specified IP SLAs operation.
show ip sla monitor statistics	Displays the current operational status and statistics of all IP SLAs operations or a specified operation.
show ip sla monitor statistics aggregated	Displays the aggregated statistical errors and distribution information for all IP SLAs operations or a specified operation.

show ip sla monitor group schedule

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **showipslamonitorgroupschedule**command is replaced by the **showipslagroupschedule**command. See the **showipslagroupschedule**command for more information.

To display the group schedule details for Cisco IOS IP Service Level Agreements (SLAs) operations, use the **showipslamonitorgroupschedule**command in user EXEC or privileged EXEC mode.

show ip sla monitor group schedule [*group-operation-number*]

Syntax Description

group-operation-number	(Optional) Number of the IP SLAs group operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **showipslagroupschedule**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **showrtrgroupschedule** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslagroupschedule**command.
12.2(33)SXI	This command was replaced by the **showipslagroupschedule**command.

Examples

The following is sample output from the **showipslamonitorgroupschedule** command that shows information about group (multiple) scheduling. The last line in the example indicates that the IP SLAs operations are multiple scheduled (TRUE):

```
Router# show ip sla monitor group schedule
Multi-Scheduling Configuration:
Group Entry Number: 1
Probes to be scheduled: 2,3,4,9-30,89
Schedule period :60
Group operation frequency: 30
Multi-scheduled: TRUE
```

The following is sample output from the **showipslamonitorgroupschedule** command that shows information about group (multiple) scheduling, with the frequency value the same as the schedule period value, the life value as 3600 seconds, and the ageout value as never:

```
Router# show ip sla monitor group schedule
Group Entry Number: 1
```

```
Probes to be scheduled: 3,4,6-10
Total number of probes: 7
Schedule period: 20
Group operation frequency: Equals schedule period
Status of entry (SNMP RowStatus): Active
Next Scheduled Start Time: Start Time already passed
Life (seconds): 3600
Entry Ageout (seconds): never
```

The table below describes the significant fields shown in the displays.

Table 18: show ip sla monitor group schedule Field Descriptions

Field	Description
Group Entry Number	The operation group number specified for IP SLAs multiple operations scheduling.
Probes to be scheduled	The operations numbers specified in the operation group 1.
Scheduled period	The time (in seconds) for which the IP SLAs group is scheduled.
Group operation frequency	The frequency at which each operation is started.
Multi-scheduled	The value TRUE shows that group scheduling is active.

Related Commands

Command	Description
show ip sla monitor configuration	Displays the configuration details for IP SLAs operations.

show ip sla monitor history

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **showipslamonitorhistory**command is replaced by the **showipslahistory**command. See the **showipslahistory**command for more information.

To display history collected for all Cisco IOS IP Service Level Agreements (SLAs) operations or for a specified operation, use the **showipslamonitorhistory**command in user EXEC or privileged EXEC mode.

show ip sla monitor history [*operation-number*] [**tabular** | **full**]

Syntax Description

operation-number	(Optional) Number of the operation for which history details is displayed.
tabular	(Optional) Displays information in a column format, reducing the number of screens required to display the information. This is the default.
full	(Optional) Displays all information, using identifiers next to each displayed value.

Command Default

Tabular format history for all operations is displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **showipslahistory**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **showrtrhistory** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslahistory**command.
12.2(33)SXI	This command was replaced by the **showipslahistory**command.

Usage Guidelines

The table below lists the Response Return values used in the output of the **showipslamonitorhistory** command. If the default (**tabular**) format is used, the Response Return description is displayed as a code in the Sense column. If the full format is used, the Response Return is displayed as indicated in the Description column.

Table 19: Response Return (Sense Column) Codes

Code	Description
1	Okay.
2	Disconnected.

Code	Description
3	Over threshold.
4	Timeout.
5	Busy.
6	Not connected.
7	Dropped.
8	Sequence error.
9	Verify error.
10	Application specific.

Examples

The following is sample output from the **showipslamonitorhistory**command in tabular format:

```
Router# show ip sla monitor history
        Point by point History
          Multiple Lines per Entry
Line 1
 Entry    = Entry Number
 LifeI    = Life Index
 BucketI  = Bucket Index
 SampleI  = Sample Index
 SampleT  = Sample Start Time
 CompT    = Completion Time (milliseconds)
 Sense    = Response Return Code
Line 2 has the Target Address
Entry LifeI      BucketI    SampleI    SampleT    CompT      Sense
2     1          1          1          17436548   16          1
  AB 45 A0 16
2     1          2          1          17436551   4           1
  AC 12 7  29
2     1          2          2          17436551   1           1
  AC 12 5  22
2     1          2          3          17436552   4           1
  AB 45 A7 22
2     1          2          4          17436552   4           1
  AB 45 A0 16
```

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla monitor mpls-lsp-monitor collection-statistics

Note Effective with Cisco IOS Release 12.2(33)SB, the **showipslamonitormpls-lsp-monitorcollection-statistics**command is replaced by the **showipslampls-lsp-monitorcollection-statistics**command. See the **showipslampls-lsp-monitorcollection-statistics**command for more information.

To display the statistics for Cisco IOS IP Service Level Agreements (SLAs) operations belonging to a label switched path (LSP) discovery group of an LSP Health Monitor operation, use the **showipslamonitormpls-lsp-monitorcollection-statistics**command in user EXEC or privileged EXEC mode.

show ip sla monitor mpls-lsp-monitor collection-statistics [*group-id*]

Syntax Description

group-id	(Optional) Identification number of the LSP discovery group for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced.
12.2(33)SB	This command was replaced by the **showipslampls-lsp-monitorcollection-statistics**command.

Usage Guidelines

Use the **showipslamonitormpls-lsp-monitorcollection-statistics**command if the LSP discovery option is enabled for an LSP Health Monitor operation. This command is not applicable if the LSP discovery option is disabled.

When the LSP discovery option is enabled, an individual IP SLAs operation is created by the LSP Health Monitor for each equal-cost multipath belonging to an LSP discovery group of a particular LSP Health Monitor operation. The network connectivity statistics collected by each individual IP SLAs operation are aggregated and stored in one-hour increments (data can be collected for a maximum of two hours). Results are stored as group averages representative of all the equal-cost multipaths within the group for a given one-hour increment.

Examples

The following is sample output from the **showipslamonitormpls-lsp-monitorcollection-statistics** command:

```
Router# show ip sla monitor mpls-lsp-monitor collection-statistics 100001
Entry number: 100001
Start Time Index: *19:32:37.995 EST Mon Feb 28 2005
Path Discovery Start Time: *20:23:43.919 EST Mon Feb 28 2005
Target destination IP address: 10.131.161.251
Path Discovery Status: OK
Path Discovery Completion Time: 1772
Path Discovery Minimum Paths: 12
Path Discovery Maximum Paths: 12
LSP Group Index: 100001
LSP Group Status: up
```

```
Total Pass: 1225
Total Timeout: 0 Total Fail: 0
Latest probe status: 'up,up,up,up,up,up,up,up,up,up,up,up'
Latest Path Identifier:
'127.0.0.13 s:3 0:3, 127.0.0.6 s:3 0:3, 127.0.0.1 s:3 0:3, 127.0.0.2 s:3 0:3, 127.0.0.4 s:3 0:3, 127.0.0.5 s:3 0:3, 127.0.0.13 s:4 0:3, 127.0.0.6 s:4 0:3, 127.0.0.1 s:4 0:3, 127.0.0.2 s:4 0:3, 127.0.0.4 s:4 0:3, 127.0.0.5 s:4 0:3'
Minimum RTT: 24 Maximum RTT: 100 Average RTT: 42
```

The table below describes the significant fields shown in the display.

Table 20: show ip sla monitor mpls-lsp-monitor collection-statistics Field Descriptions

Field	Description
Entry number	Identification number of the LSP discovery group.
Start Time Index	Start time of the LSP Health Monitor operation.
Path Discovery Start Time	Time in which the most recent iteration of LSP discovery started.
Target destination IP address	IP address of the Border Gateway Protocol (BGP) next hop neighbor.
Path Discovery Status	Return code of the most recent iteration of LSP discovery.
Path Discovery Completion Time	Amount of time (in milliseconds) it took to complete the most recent iteration of the LSP discovery process.
Path Discovery Minimum Paths	Minimum number of equal-cost multipaths discovered by the LSP discovery process.
Path Discovery Maximum Paths	Maximum number of equal-cost multipaths discovered by the LSP discovery process.
LSP Group Index	Identification number of the LSP discovery group.
LSP Group Status	Operation status of the LSP discovery group.
Total Pass	Total number of LSP discovery process iterations.
Total Timeout	Total number of LSPs in which a timeout violation was reported.
Total Fail	Total number of LSPs in which an operation failure was reported.
Latest probe status	Current operation status for each IP SLAs operation belonging to the specified LSP discovery group.
Latest Path Identifier	Current identification information (IP address used to select the LSP, outgoing interface, and label stack) for each IP SLAs operation belonging to the specified LSP discovery group.
Minimum RTT	Minimum round-trip time (in milliseconds) measured by the IP SLAs operations associated with the specified LSP discovery group.
Maximum RTT	Maximum round-trip time (in milliseconds) measured by the IP SLAs operations associated with the specified LSP discovery group.
Average RTT	Average round-trip time (in milliseconds) for all the IP SLAs operations associated with the specified LSP discovery group.

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.

show ip sla monitor mpls-lsp-monitor configuration

Note Effective with Cisco IOS Release 12.2(33)SB, the **showipslamonitormpls-lsp-monitorconfiguration**command is replaced by the **showipslampls-lsp-monitorconfiguration**command. See the **showipslampls-lsp-monitorconfiguration**command for more information.

To display configuration settings for IP Service Level Agreements (SLAs) label switched path (LSP) Health Monitor operations, use the **showipslamonitormpls-lsp-monitorconfiguration** command in user EXEC or privileged EXEC mode.

show ip sla monitor mpls-lsp-monitor configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the LSP Health Monitor operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced. This command replaces the **showrtrmpls-lsp-monitorconfiguration** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslampls-lsp-monitorconfiguration**command.

Usage Guidelines

If the identification number of an LSP Health Monitor operation is not specified, configuration values for all the configured LSP Health Monitor operations will be displayed.

Examples

The following is sample output from the **showipslamonitormpls-lsp-monitorconfiguration** command:

```
Router# show ip sla monitor mpls-lsp-monitor configuration 1
Entry Number : 1
Modification time   : *12:18:21.830 PDT Fri Aug 19 2005
Operation Type      : echo
Vrf Name            : ipsla-vrf-all
Tag                 :
EXP Value           : 0
Timeout(ms)         : 1000
Threshold(ms)       : 5000
Frequency(sec)      : Equals schedule period
LSP Selector        : 127.0.0.1
ScanInterval(min)   : 1
Delete Scan Factor  : 1
Operations List     : 100001-100003
Schedule Period(sec): 60
Request size        : 100
Start Time          : Start Time already passed
```

```
SNMP RowStatus      : Active
TTL value           : 255
Reply Mode          : ipv4
Reply Dscp Bits     :
Secondary Frequency : Enabled on Timeout
         Value(sec) : 10
Reaction Configs    :
    Reaction        : connectionLoss
    Threshold Type  : Consecutive
    Threshold Count : 3
    Action Type     : Trap Only
    Reaction        : timeout
    Threshold Type  : Consecutive
    Threshold Count : 3
    Action Type     : Trap Only
```

The following is sample output from the **showipslamonitormpls-lsp-monitorconfiguration** command when the LSP discovery option is configured:

```
Router# show ip sla monitor mpls-lsp-monitor configuration 100
Entry Number : 100
Modification time   : *21:50:16.411 GMT Tue Jun 20 2006
Operation Type      : echo
Vrf Name            : saa-vrf-all
Tag                 :
EXP Value           : 0
Timeout(ms)         : 5000
Threshold(ms)       : 50
Frequency(sec)      : Equals schedule period
ScanInterval(min)   : 1
Delete Scan Factor  : 1
Operations List     : 100002
Schedule Period(sec): 30
Request size        : 100
Start Time          : Start Time already passed
SNMP RowStatus      : Active
TTL value           : 255
Reply Mode          : ipv4
Reply Dscp Bits     :
Path Discover       : Enable
    Maximum sessions          : 1
    Session Timeout(seconds)  : 120
    Base LSP Selector         : 127.0.0.1
    Echo Timeout(seconds)     : 5
    Send Interval(msec)       : 0
    Label Shimming Mode       : force-explicit-null
    Number of Stats Hours     : 2
    Scan Period(minutes)      : 3
Secondary Frequency : Enabled on Connection Loss and Timeout
         Value(sec) : 5
Reaction Configs    :
    Reaction        : Lpd Group
    Retry Number    : 3
    Action Type     : Trap Only
```

The table below describes the significant fields shown in the displays.

Table 21: show ip sla monitor mpls-lsp-monitor configuration Field Descriptions

Field	Description
Entry Number	Identification number for the LSP Health Monitor operation.

Field	Description
Operation Type	Type of IP SLAs operation configured by the LSP Health Monitor operation.
Vrf Name	If a specific name is displayed in this field, then the LSP Health Monitor is configured to discover only those Border Gateway Protocol (BGP) next hop neighbors in use by the VPN routing or forwarding instance (VRF) specified. If saa-vrf-all is displayed in this field, then the LSP Health Monitor is configured to discover all BGP next hop neighbors in use by all VRFs associated with the source Provider Edge (PE) router.
Tag	User-specified identifier for the LSP Health Monitor operation.
EXP Value	Experimental field value in the header for an echo request packet of the IP SLAs operation.
Timeout(ms)	Amount of time the IP SLAs operation waits for a response from its request packet.
Threshold(ms)	Threshold value of the IP SLAs operation for which a reaction event is generated if violated.
Frequency(sec)	Time after which the IP SLAs operation is restarted.
LSP Selector	Local host IP address used to select the LSP for the IP SLAs operation.
ScanInterval(min)	Time interval at which the LSP Health Monitor checks the scan queue for BGP next hop neighbor updates.
Delete Scan Factor	Specifies the number of times the LSP Health Monitor should check the scan queue before automatically deleting IP SLAs operations for BGP next hop neighbors that are no longer valid.
Operations List	Identification numbers IP SLAs operations created by the LSP Health Monitor operation.
Schedule Period(sec)	Amount of time for which the LSP Health Monitor operation is scheduled.
Request size	Protocol data size for the request packet of the IP SLAs operation.
Start Time	Status of the start time for the LSP Health Monitor operation.
SNMP RowStatus	Indicates whether SNMP RowStatus is active or inactive.
TTL value	The maximum hop count for an echo request packet of the IP SLAs operation.
Reply Mode	Reply mode for an echo request packet of the IP SLAs operation.
Reply Dscp Bits	Differentiated services codepoint (DSCP) value of an echo reply packet of the IP SLAs operation.
Path Discover	Indicates whether the LSP discovery option is enabled.
Maximum sessions	Maximum number of BGP next hop neighbors that can be concurrently undergoing LSP discovery for a single LSP Health Monitor operation.

Field	Description
Session Timeout (seconds)	The amount of time the LSP discovery process waits for a response to its LSP discovery request for a particular BGP next hop neighbor.
Base LSP Selector	The base IP address used to select the LSPs of the LSP discovery groups.
Echo Timeout (seconds)	The amount of time the LSP discovery process waits for a response to its echo request packets.
Send Interval (msec)	The time interval (in milliseconds) between MPLS echo requests that are sent as part of the LSP discovery process.
Label Shimming Mode	Indicates whether the MPLS explicit null label option is enabled for the echo request packets.
Number of Stats Hours	The number of hours for which LSP discovery group statistics are maintained.
Scan Period (minutes)	The amount of time after which the LSP discovery process can restart.
Secondary Frequency	Reaction condition that will enable the secondary frequency option.
Value(sec)	Secondary frequency value.
Reaction Configs	The configured proactive threshold monitoring settings for the IP SLAs operation.
Reaction	Reaction condition being monitored.
Retry Number	Indicates the number of times the equal-cost multipaths belonging to an LSP discovery group are retested when a reaction condition is detected.
Threshold Type	Specifies when an action should be performed as a result of a reaction event.
Threshold Count	The number of times a reaction condition can occur before an action should be performed.
Action Type	Type of action that should be performed as a result of a reaction event.

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.
auto ip sla mpls-lsp-monitor reaction-configuration	Configures proactive threshold monitoring parameters for an IP SLAs LSP Health Monitor operation.
auto ip sla mpls-lsp-monitor schedule	Configures the scheduling parameters for an IP SLAs LSP Health Monitor operation.

show ip sla monitor mpls-lsp-monitor lpd operational-state

Note Effective with Cisco IOS Release 12.2(33)SB, the **showipslamonitormpls-lsp-monitorlpdoperational-state**command is replaced by the **showipslampls-lsp-monitorlpdoperational-state**command. See the **showipslampls-lsp-monitorlpdoperational-state**command for more information.

To display the operational status of the label switched path (LSP) discovery groups belonging to an IP Service Level Agreements (SLAs) LSP Health Monitor operation, use the **showipslamonitormpls-lsp-monitorlpdoperational-state**command in user EXEC or privileged EXEC mode.

show ip sla monitor mpls-lsp-monitor lpd operational-state [*group-id*]

Syntax Description

group-id	(Optional) Identification number of the LSP discovery group for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced.
12.2(33)SB	This command was replaced by the **showipslampls-lsp-monitorlpdoperational-state**command.

Usage Guidelines

Use the **showipslamonitormpls-lsp-monitorlpdoperational-state**command if the LSP discovery option is enabled for an LSP Health Monitor operation. This command is not applicable if the LSP discovery option is disabled.

Examples

The following is sample output from the **showipslamonitormpls-lsp-monitorlpdoperational-state** command:

```
Router# show ip sla monitor mpls-lsp-monitor lpd operational-state 100001
Entry number: 100001
MPLSLM Entry Number: 1
Target FEC Type: LDP IPv4 prefix
Target Address: 192.168.1.11
Number of Statistic Hours Kept: 2
Last time LPD Stats were reset: *21:21:18.239 GMT Tue Jun 20 2006
Traps Type: 3
Latest Path Discovery Mode: rediscovery complete
Latest Path Discovery Start Time: *21:59:04.475 GMT Tue Jun 20 2006
Latest Path Discovery Return Code: OK
Latest Path Discovery Completion Time(ms): 3092
Number of Paths Discovered: 3
Path Information :
Path   Outgoing   Lsp       Link  Conn  Adj   Downstream
Index  Interface  Selector  Type  Id    Addr  Label Stack  Status
1 Et0/0 127.0.0.8 90 0 10.10.18.30 21 OK
```

```
2 Et0/0 127.0.0.2 90 0 10.10.18.30 21 OK
3 Et0/0 127.0.0.1 90 0 10.10.18.30 21 OK
```

The table below describes the significant fields shown in the display.

Table 22: show ip sla monitor mpls-lsp-monitor lpd operational-state Field Descriptions

Field	Description
Entry number	Identification number of the LSP discovery group.
MPLSLM Entry number	Identification number of the LSP Health Monitor operation.
Target FEC Type	The Forward Equivalence Class (FEC) type of the BGP next hop neighbor.
Target Address	IP address of the Border Gateway Protocol (BGP) next hop neighbor.
Number of Statistic Hours Kept	The amount of time (in hours) in which LSP discovery group statistics will be maintained. Use the **hours-of-statistics-kept** command to configure this value.
Traps Type	Trap type values indicate the type of threshold monitoring that has been enabled using the **autoipslampls-lsp-monitorreaction-configuration** command. Trap type values are defined as follows: • 1--timeout • 2--connection loss • 3--LSP discovery group status changes • 4--LSP discovery failure
Latest Path Discovery Mode	Current mode of the LSP discovery process. Modes include initial discovery, initial complete, rediscovery running, and rediscovery complete.
Latest Path Discovery Start Time	Time in which the most recent iteration of LSP discovery started.
Latest Path Discovery Return Code	Return code for the most recent iteration of LSP discovery.
Latest Path Discovery Completion Time	Amount of time (in milliseconds) it took to complete the most recent iteration of the LSP discovery process.
Number of Paths Discovered	Number of equal-cost multipaths discovered during the most recent iteration of the LSP discovery process.
Path Index	Identification number for the equal-cost multipath.
Outgoing Interface	Outgoing interface of the echo request packet.
Lsp Selector	IP address used to select the LSP.
Adj Addr	IP address of the next hop physical interface.
Downstream Label Stack	Downstream MPLS label stack number.

Field	Description
Status	Return code for the most recent IP SLAs LSP ping operation of the specified equal-cost multipath.

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.

show ip sla monitor mpls-lsp-monitor neighbors

Note Effective with Cisco IOS Release 12.2(33)SB, the **showipslamonitormpls-lsp-monitorneighbors**command is replaced by the **showipslampls-lsp-monitorneighbors**command. See the **showipslampls-lsp-monitorneighbors**command for more information.

To display routing and connectivity information about Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) Border Gateway Protocol (BGP) next hop neighbors discovered by the IP Service Level Agreements (SLAs) label switched path (LSP) Health Monitor, use the **showipslamonitormpls-lsp-monitorneighbors** command in user EXEC or privileged EXEC mode.

show ip sla monitor mpls-lsp-monitor neighbors

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced. This command replaces the **showrtrmpls-lsp-monitorneighbors** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslampls-lsp-monitorneighbors**command.

Examples

The following is sample output from the **showipslamonitormpls-lsp-monitorneighbors**command:

```
Router# show ip sla monitor mpls-lsp-monitor neighbors
IP SLA MPLS LSP Monitor Database : 1
BGP Next hop 10.10.10.5 (Prefix: 10.10.10.5/32)  OK
  ProbeID: 100001 (red, blue, green)
BGP Next hop 10.10.10.7 (Prefix: 10.10.10.7/32)  OK
  ProbeID: 100002 (red, blue, green)
BGP Next hop 10.10.10.8 (Prefix: 10.10.10.8/32)  OK
  ProbeID: 100003 (red, blue, green)
```

The table below describes the significant fields shown in the display.

Table 23: show ip sla monitor mpls-lsp-monitor neighbors Field Descriptions

Field	Description
BGP Next hop	Identifier for the BGP next hop neighbor.
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.

Field	Description
ProbeID	The identification number of the IP SLAs operation. The names of the VPN routing or forwarding instances (VRFs) that contain routing entries for the specified BGP next hop neighbor are listed in parentheses.
OK	LSP ping or LSP traceroute connectivity status between the source Provider Edge (PE) router and specified BGP next hop neighbor. Connectivity status can be the following: • OK--Successful reply. • ConnectionLoss--Reply is from a device that is not egress for the Forward Equivalence Class (FEC). • Timeout--Echo request timeout. • Unknown--State of LSP is not known.

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.

show ip sla monitor mpls-lsp-monitor scan-queue

Note Effective with Cisco IOS Release 12.2(33)SB, the **showipslamonitormpls-lsp-monitorscan-queue**command is replaced by the **showipslampls-lsp-monitorscan-queue**command. See the **showipslampls-lsp-monitorscan-queue**command for more information.

To display information about adding or deleting Border Gateway Protocol (BGP) next hop neighbors from a particular Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) of an IP Service Level Agreements (SLAs) LSP Health Monitor operation, use the **showipslamonitormpls-lsp-monitorscan-queue** command in user EXEC or privileged EXEC mode.

show ip sla monitor mpls-lsp-monitor scan-queue *operation-number*

Syntax Description

operation-number	Number of the LSP Health Monitor operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced. This command replaces the **showrtrmpls-lsp-monitorscan-queue** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslampls-lsp-monitorscan-queue**command.

Examples

The following is sample output from the **showipslamonitormpls-lsp-monitorscan-queue** command:

```
Router# show ip sla monitor mpls-lsp-monitor scan-queue 1
Next scan Time after: 23 Secs
Next Delete scan Time after: 83 Secs
BGP Next hop    Prefix            vrf                              Add/Delete?
10.10.10.8      10.10.10.8/32     red                              Add
10.10.10.8      10.10.10.8/32     blue                             Add
10.10.10.8      10.10.10.8/32     green                            Add
```

The table below describes the significant fields shown in the display.

Table 24: show ip sla monitor mpls-lsp-monitor scan-queue Field Descriptions

Field	Description
Next scan Time after	Amount of time left before the LSP Health Monitor checks the scan queue for information about adding BGP next hop neighbors to a particular VPN. At the start of each scan time, IP SLAs operations are created for all newly discovered neighbors.

Field	Description
Next Delete scan Time after	Amount of time left before the LSP Health Monitor checks the scan queue for information about deleting BGP next hop neighbors from a particular VPN. At the start of each delete scan time, IP SLAs operations are deleted for neighbors that are no longer valid.
BGP Next hop	Identifier for the BGP next hop neighbor.
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.
vrf	Name of the VPN routing or forwarding instance (VRF) that contains a routing entry for the specified BGP next hop neighbor.
Add/Delete	Indicates that the specified BGP next hop neighbor will be added to or removed from the specified VPN.

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.
delete-scan-factor	Specifies the number of times the LSP Health Monitor should check the scan queue before automatically deleting IP SLAs operations for BGP next hop neighbors that are no longer valid.
mpls discovery vpn interval	Specifies the time interval at which routing entries that are no longer valid are removed from the BGP next hop neighbor discovery database of an MPLS VPN.
scan-interval	Specifies the time interval (in minutes) at which the LSP Health Monitor checks the scan queue for BGP next hop neighbor updates.

show ip sla monitor mpls-lsp-monitor summary

Note Effective with Cisco IOS Release 12.2(33)SB, the **showipslamonitormpls-lsp-monitorsummary**command is replaced by the **showipslampls-lsp-monitorsummary**command. See the **showipslampls-lsp-monitorsummary**command for more information.

To display Border Gateway Protocol (BGP) next hop neighbor and label switched path (LSP) discovery group information for IP Service Level Agreements (SLAs) LSP Health Monitor operations, use the **showipslamonitormpls-lsp-monitorsummary**command in user EXEC or privileged EXEC mode.

show ip sla monitor mpls-lsp-monitor summary [*operation-number* [**group** [*group-id*]]]

Syntax Description

operation-number	(Optional) Number of the LSP Health Monitor operation for which the details will be displayed.
group *group-id*	(Optional) Specifies the identification number of the LSP discovery group for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced.
12.2(33)SB	This command was replaced by the **showipslampls-lsp-monitorsummary**command.

Usage Guidelines

Use the **showipslamonitormpls-lsp-monitorsummary**command if the LSP discovery option is enabled for an LSP Health Monitor operation. This command is not applicable if the LSP discovery option is disabled.

Examples

The following is sample output from the **showipslamonitormpls-lsp-monitorsummary***operation-number* command:

```
Router# show ip sla monitor mpls-lsp-monitor summary 1
Index - MPLS LSP Monitor probe index.
Destination - Target IP address of the BGP Next Hop.
Status - LPD Group Status.
LPD Group ID - Unique index to identify the LPD Group.
Last Operation Time - Last time an operation was attempted by a particular probe in the LPD
 group.
Index Destination Status LPD Group ID Last Operation Time
1 100.1.1.1 up 100001 19:33:37.915 EST Mon Feb 28 2005
2 100.1.1.2 down 100002 19:33:47.915 EST Mon Feb 28 2005
3 100.1.1.3 retry 100003 19:33:57.915 EST Mon Feb 28 2005
4 100.1.1.4 partial 100004 19:34:07.915 EST Mon Feb 28 2005
```

The following is sample output from the **showipslamonitormpls-lsp-monitorsummary***operation-number***group***group-id* command:

```
Router# show ip sla monitor mpls-lsp-monitor summary 1 group 100001
Group ID - Unique number to identify a LPD group
Lsp-selector - Unique 127/8 address used to identify an LPD.
Latest operation status - Latest probe status.
Last Operation time - Time when the last operation was attempted.
Group ID Lsp-Selector Status Failures Successes RTT Last Operation Time
100001 127.0.0.13 up 0 78 32 *20:11:37.895 EST Mon Feb 28 2005
100001 127.0.0.15 up 0 78 32 *20:11:37.995 EST Mon Feb 28 2005
100001 127.0.0.16 up 0 78 32 *20:11:38.067 EST Mon Feb 28 2005
100001 127.0.0.26 up 0 78 32 *20:11:38.175 EST Mon Feb 28 2005
```

The table below describes the significant fields shown in the display.

Table 25: show ip sla monitor mpls-lsp-monitor summary Field Descriptions

Field	Description
Failures	Number of times the IP SLAs operation for the specified LSP failed to report an RTT value.
Successes	Number of times the IP SLAs operation for the specified LSP successfully reported an RTT value.
RTT	Average round-trip time (in milliseconds) for the specified LSP.

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.

show ip sla monitor reaction-configuration

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **showipslamonitorreaction-configuration**command is replaced by the **showipslareaction-configuration**command. See the **showipslareaction-configuration**command for more information.

To display the configured proactive threshold monitoring settings for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **showipslamonitorreaction-configuration** command in user EXEC or privileged EXEC mode.

show ip sla monitor reaction-configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the operation for which the reaction configuration characteristics is displayed.

Command Default

Displays configured proactive threshold monitoring settings for all IP SLAs operations.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **showipslareaction-configuration**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **showrtrreaction-configuration** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslareaction-configuration**command.
12.2(33)SXI	This command was replaced by the **showipslareaction-configuration**command.

Usage Guidelines

Use the **ipslamonitorreaction-configuration** command in global configuration mode to configure the proactive threshold monitoring parameters for an IP SLAs operations.

Examples

In the following example, multiple monitored elements (indicated by the Reaction values) are configured for a single IP SLAs operation:

```
Router# show ip sla monitor reaction-configuration

Entry Number: 1
Reaction: RTT
Threshold type: Never
Rising (milliseconds): 5000
```

```
Falling (milliseconds): 3000
Threshold Count: 5
Threshold Count2: 5
Action Type: None
Reaction: jitterDSAvg
Threshold type: average
Rising (milliseconds): 5
Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: triggerOnly
Reaction: jitterDSAvg
Threshold type:  immediate
Rising (milliseconds): 5
Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: trapOnly
Reaction: PacketLossSD
Threshold type:  immediate
Rising (milliseconds): 5
Threshold Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: trapOnly
```

The table below describes the significant fields shown in the display.

Table 26: show ip sla monitor reaction-configuration Field Descriptions

Field	Description
Reaction	The monitored element configured for the specified IP SLAs operation. Corresponds to the **react**{**connectionLoss** | **jitterAvg** | **jitterDSAvg** | **jitterSDAvg** | **mos** | **PacketLossDS** | **PacketLossSD** | **rtt** | **timeout** | **verifyError**} syntax in the **ipslamonitorreaction-configuration** command.
Threshold type	The configured threshold type. Corresponds to the **threshold-type** {**never** | **immediate** | **consecutive** | **xofy** | **average**} syntax in the **ipslamonitorreaction-configuration** command.
Rising (milliseconds)	The *upper-threshold* value. Corresponds to the **threshold-value***upper-thresholdlower-threshold* syntax in the **ipslamonitorreaction-configuration** command.
Falling (milliseconds)	The *lower-threshold* value. Corresponds to the **threshold-value***upper-thresholdlower-threshold* syntax in the **ipslamonitorreaction-configuration** command.
Threshold Count	The *x-value* in the **xofy** threshold type, or the *number-of-measurements* value for the **average** threshold type.
Threshold Count2	The *y-value* in the **xofy** threshold type.

Field	Description
Action Type	The reaction to be performed when the violation conditions are met. Corresponds to the **action-type** {**none** | **trapOnly** | **triggerOnly** | **trapAndTrigger**} syntax in the **ipslamonitorreaction-configuration** command.

Related Commands

Command	Description
ip sla monitor reaction-configuration	Configures proactive threshold monitoring parameters for an IP SLAs operation.

show ip sla monitor reaction-trigger

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **show ip sla monitor reaction-trigger**command is replaced by the **show ip sla reaction-trigger**command. See the **show ip sla reaction-trigger**command for more information.

To display the reaction trigger information for all Cisco IOS IP Service Level Agreements (SLAs) operations or the specified operation, use the **show ip sla monitor reaction-trigger** command in user EXEC or privileged EXEC mode.

show ip sla monitor reaction-trigger [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **show ip sla reaction-trigger**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **show rtr reaction-trigger** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **show ip sla reaction-trigger**command.
12.2(33)SXI	This command was replaced by the **show ip sla reaction-trigger**command.

Usage Guidelines

Use the **show ip sla monitor reaction-trigger** command to display the configuration status and operational state of target operations that will be triggered as defined with the **ip sla monitor reaction-configuration** global configuration command.

Examples

The following is sample output from the **show ip sla monitor reaction-trigger** command:

```
Router# show ip sla monitor reaction-trigger 1
        Reaction Table
Entry Number: 1
Target Entry Number: 2
Status of Entry (SNMP RowStatus): active
Operational State: pending
```

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla monitor responder

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **show ip sla monitor responder**command is replaced by the **show ip sla responder**command. See the **show ip sla responder**command for more information.

To display information about the Cisco IOS IP Service Level Agreements (SLAs) Responder, use the **show ip sla monitor responder** command in user EXEC or privileged EXEC mode.

show ip sla monitor responder

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **show ip sla responder**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **show rtr responder** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **show ip sla responder**command.
12.2(33)SXI	This command was replaced by the **show ip sla responder**command.

Usage Guidelines

Use the **show ip sla monitor responder**command to display information about recent sources of IP SLAs control messages, such as who has sent recent control messages and who has sent invalid control messages.

Examples

The following is sample output from the **show ip sla monitor responder** command:

```
Router# show ip sla monitor responder

IP SLA Monitor Responder is: Enabled
Number of control message received: 19 Number of errors: 1
Recent sources:
10.0.0.1 [19:11:49.035 UTC Sat Dec 2 1995]
10.0.0.1 [19:10:49.023 UTC Sat Dec 2 1995]
10.0.0.1 [19:09:48.707 UTC Sat Dec 2 1995]
10.0.0.1 [19:08:48.687 UTC Sat Dec 2 1995]
10.0.0.1 [19:07:48.671 UTC Sat Dec 2 1995]
Recent error sources:
10.0.0.1 [19:10:49.023 UTC Sat Dec 2 1995] RTT_AUTH_FAIL
```

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values for IP SLAs operations.

show ip sla monitor statistics

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **showipslamonitorstatistics**command is replaced by the **showipslastatistics**command. See the **showipslastatistics**command for more information.

To display the current operational status and statistics of all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **showipslamonitorstatistics** command in user EXEC or privileged EXEC mode.

show ip sla monitor statistics [*operation-number*] [**details**]

Syntax Description

operation-number	(Optional) Number of the operation for which operational status and statistics are displayed.
details	(Optional) Operational status and statistics are displayed in greater detail.

Command Default

Displays output for all running IP SLAs operations.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(4)T	This command was replaced by the **showipslastatistics**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **showrtroperational-state**command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **showipslastatistics**command.
12.2(33)SXI	This command was replaced by the **showipslastatistics**command.

Usage Guidelines

Use the **showipslamonitorstatistics** command to display the current state of IP SLAs operations, including how much life the operation has left, whether the operation is active, and the completion time. The output will also include the monitoring data returned for the last (most recently completed) operation.

Examples

The following is sample output from the **showipslamonitorstatistics** command:

```
Router# show ip sla monitor statistics       Current Operational State
Entry Number: 3
Modification Time: *22:15:43.000 UTC Sun Feb 11 2001
Diagnostics Text:
Last Time this Entry was Reset: Never
```

```
Number of Octets in use by this Entry: 1332
Number of Operations Attempted: 2
Current Seconds Left in Life: 3511
Operational State of Entry: active
Latest Completion Time (milliseconds): 544
Latest Operation Start Time: *22:16:43.000 UTC Sun Feb 11 2001
Latest Oper Sense: ok
Latest Sense Description: 200  OK
Total RTT: 544
DNS RTT: 12
TCP Connection RTT: 28
HTTP Transaction RTT: 504
HTTP Message Size: 9707
```

The following is sample output from the **showipslamonitorstatistics** command when the specified operation is a UDP jitter (codec) operation. The values shown indicate the values for the last IP SLAs operation.

```
Router# show ip sla monitor statistics       Current Operational State
Entry number: 10
Modification time: 12:57:45.690 UTC Sun Oct 26 2003
Number of operations attempted: 3
Number of operations skipped: 0
Current seconds left in Life: 3570
Operational state of entry: Active
Last time this entry was reset: Never
Connection loss occurred: FALSE
Timeout occurred: FALSE
Over thresholds occurred: FALSE
Latest RTT (milliseconds): 19
Latest operation start time: 12:57:45.723 Sun Oct 26 2003
Latest operation return code: OK
Voice Scores:
 ICPIF:  20          MOS Score:  3.20
RTT Values:
 NumOfRTT: 10     RTTAvg: 19      RTTMin: 19     RTTMax: 20
 RTTSum:  191    RTTSum2: 3649
Packet Loss Values:
 PacketLossSD: 0 PacketLossDS: 0
 PacketOutOfSequence: 0  PacketMIA: 0    PacketLateArrival: 0
 InternalError: 0        Busies: 0
Jitter Values:
 NumOfJitterSamples: 9
 MinOfPositivesSD: 0     MaxOfPositivesSD: 0
 NumOfPositivesSD: 0     SumOfPositivesSD: 0     Sum2PositivesSD: 0
 MinOfNegativesSD: 0     MaxOfNegativesSD: 0
 NumOfNegativesSD: 0     SumOfNegativesSD: 0     Sum2NegativesSD: 0
 MinOfPositivesDS: 1     MaxOfPositivesDS: 1
 NumOfPositivesDS: 1     SumOfPositivesDS: 1     Sum2PositivesDS: 1
 MinOfNegativesDS: 1     MaxOfNegativesDS: 1
 NumOfNegativesDS: 1     SumOfNegativesDS: 1     Sum2NegativesDS: 1
 Interarrival jitterout: 0       Interarrival jitterin: 0
One Way Values:
 NumOfOW: 0
 OWMinSD: 0      OWMaxSD: 0      OWSumSD: 0      OWSum2SD: 0
 OWMinDS: 0      OWMaxDS: 0      OWSumDS: 0      OWSum2DS: 0
```

The table below describes the significant fields shown in the display.

Table 27: show ip sla monitor statistics Field Descriptions

Field	Description
Voice Scores	Indicates that Voice over IP statistics appear on the following lines. Voice score data is computed when the operation type is configured as **typejitter** (codec).
ICPIF	The Calculated Planning Impairment Factor (ICPIF) value for the operation. The ICPIF value is computed by IP SLAs using the formula *Icpif=Io+Iq+Idte+Idd+Ie-A*, where • The values for *Io* , *Iq* , and *Idte* are set to zero. • The value *Idd* is computed based on the measured one-way delay. • The value *Ie* is computed based on the measured packet loss. • The value of A is specified by the user. ICPIF values are expressed in a typical range of 5 (very low impairment) to 55 (very high impairment). ICPIF values numerically lower than 20 are generally considered “adequate.” **Note** This value is intended only for relative comparisons, and may not match ICPIF values generated using alternate methods.
MOS Score	The estimated Mean Opinion Score (Conversational Quality, Estimated) for the latest iteration of the operation. The MOS-CQE is computed by IP SLAs as a function of the ICPIF. MOS values are expressed as a number from 1 (1.00) to 5 (5.00), with 5 being the highest level of quality, and 1 being the lowest level of quality. A MOS value of 0 (zero) indicates that MOS data could not be generated for the operation.
RTT Values	Indicates that round-trip-time statistics appear on the following lines.
NumOfRTT	The number of successful round-trips.
RTTSum	The sum of all successful round-trip values (in milliseconds).
RTTSum2	The sum of squares of those round-trip values (in milliseconds).
PacketLossSD	The number of packets lost from source to destination.
PacketLossDS	The number of packets lost from destination to source.
PacketOutOfSequence	The number of packets returned out of order.
PacketMIA	The number of packets lost where the direction (SD/DS) cannot be determined.
PacketLateArrival	The number of packets that arrived after the timeout.

Field	Description
InternalError	The number of times an operation could not be started due to other internal failures.
Busies	The number of times this operation could not be started because the previously scheduled run was not finished.
Jitter Values:	Indicates that jitter statistics appear on the following lines. Jitter is interpacket delay variance.
NumOfJitterSamples	The number of jitter samples collected. This is the number of samples that are used to calculate the following jitter statistics.
MinOfPositivesSD MaxOfPositivesSD	The minimum and maximum positive jitter values from source to destination, in milliseconds.
NumOfPositivesSD	The number of jitter values from source to destination that are positive (that is, network latency increases for two consecutive test packets).
SumOfPositivesSD	The sum of those positive values (in milliseconds).
Sum2PositivesSD	The sum of squares of those positive values.
MinOfNegativesSD MaxOfNegativesSD	The minimum and maximum negative jitter values from source to destination. The absolute value is given.
NumOfNegativesSD	The number of jitter values from source to destination that are negative (that is, network latency decreases for two consecutive test packets).
SumOfNegativesSD	The sum of those values.
Sum2NegativesSD	The sum of the squares of those values.
Interarrival jitterout	The source-to-destination (SD) jitter value calculation, as defined in RFC 1889.
Interarrival jitterin	The destination-to-source (DS) jitter value calculation, as defined in RFC 1889.
One Way Values	Indicates that one-way measurement statistics appear on the following lines. One Way (OW) values are the amount of time required for the packet to travel from the source router to the target router (SD) or from the target router to the source router (DS).
NumOfOW	Number of successful one-way time measurements.
OWMinSD	Minimum time (in milliseconds) from the source to the destination.
OWMaxSD	Maximum time (in milliseconds) from the source to the destination.
OWSumSD	Sum of the OWMinSD and OWMaxSD values.
OWSum2SD	Sum of the squares of the OWMinSD and OWMaxSD values.

Related Commands

Command	Description
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla monitor statistics aggregated

Note Effective with Cisco IOS Release 12.4(4)T, 12.2(33)SB, and 12.2(33)SXI, the **show ip sla monitor statistics aggregated**command is replaced by the **show ip sla statistics aggregated**command. See the **show ip sla statistics aggregated**command for more information.

To display the aggregated statistical errors and distribution information for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **show ip sla monitor statistics aggregated**command in user EXEC or privileged EXEC mode.

show ip sla monitor statistics aggregated [*operation-number*] [**details**]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.
details	(Optional) Aggregated statistical information is displayed in greater detail. Distribution information is included when this keyword is specified.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(2)T	This command was introduced.
12.4(4)T	This command was replaced by the **show ip sla statistics aggregated**command.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command replaces the **show rtr collection-statistics** command.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was replaced by the **show ip sla statistics aggregated**command.
12.2(33)SXI	This command was replaced by the **show ip sla statistics aggregated**command.

Usage Guidelines

Use this command to display information such as the number of failed operations and the failure reason. The distributions statistics consist of the following:

- The sum of completion times (used to calculate the mean)
- The sum of the completion times squared (used to calculate standard deviation)
- The maximum and minimum completion time
- The number of completed attempts

This command shows information collected over the past two hours, unless you specify a different amount of time using the **hours-of-statistics-kept** command.

Note This command does not support the IP SLAs ICMP path jitter operation.

Examples

The following sections show sample output from the **show ip sla monitor statistics aggregated** and **show ip sla monitor statistics aggregated details**commands for different IP SLAs operations.

Output for HTTP Operations

The following example shows output from the **show ip sla monitor statistics aggregated** and **show ip sla monitor statistics aggregated details**commands when the specified operation is a Hypertext Transfer Protocol (HTTP) operation:

```
Router# show ip sla monitor statistics aggregated 1
Round trip time (RTT) Index 3
DNS RTT: 3004 ms
TCP Connection RTT: 16 ms
HTTP Transaction RTT: 84 ms
Number of successes: 0
Number of failures: 1
Router# show ip sla monitor statistics aggregated 1 details
Round trip time (RTT) Index 3
DNS RTT: 3004
TCP Connection RTT: 0
HTTP Transaction RTT: 0
HTTP time to first byte: 0
DNS TimeOut: 0
TCP TimeOut: 0
Transaction TimeOut: 0
DNS Error: 0
TCP Error: 0
Number of successes: 0
Number of failures: 1
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/0/0/0
Failed Operations due to Internal/Sequence/Verify Error: 1/0/0
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for UDP Jitter Operations

The following is sample output from the **show ip sla monitor statistics aggregated** and **show ip sla monitor statistics aggregated details**commands when the specified operation is a User Datagram Protocol (UDP) jitter operation:

```
Router# show ip sla monitor statistics aggregated 2
Round trip time (RTT) Index 7
RTT Values
        Number Of RTT: 10
        RTT Min/Avg/Max: 1/1/2 ms
Latency one-way time milliseconds
        Number of Latency one-way Samples: 0
        Source to Destination Latency one way Latency Min/Avg/Max: 0/0/0 ms
        Destination to source Latency one way Min/Avg/Max: 0/0/0 ms
Jitter time milliseconds
        Number of Jitter Samples: 9
        Source to Destination Jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source Jitter Min/Avg/Max: 1/1/1 ms
Packet Loss Values
        Loss Source to Destination: 0           Loss Destination to Source: 0
        Out Of Sequence: 0      Tail Drop: 0    Packet Late Arrival: 0
Number of successes: 1
Number of failures: 1
Router# show ip sla monitor statistics aggregated 2 details
Round trip time (RTT) Index 7
RTT Values
        Number Of RTT: 10
        RTT Min/Avg/Max: 1/1/1 ms
Latency one-way time milliseconds
        Number of Latency one-way Samples: 0
        Source to Destination Latency one way Min/Avg/Max: 0/0/0 ms
        Destination to Source Latency one way Min/Avg/Max: 0/0/0 ms
        Source to Destination Latency one way Sum/Sum2: 0/0
        Destination to Source Latency one way Sum/Sum2: 0/0
Jitter time milliseconds
        Number of Jitter Samples: 9
        Source to Destination Jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source Jitter Min/Avg/Max: 1/1/1 ms
        Source to destination positive jitter Min/Avg/Max: 1/1/1 ms
        Source to destination positive jitter Number/Sum/Sum2:  1/1/1
        Source to destination negative jitter Min/Avg/Max: 1/1/1 ms
        Source to destination negative jitter Number/Sum/Sum2: 1/1/1
        Destination to Source positive jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source positive jitter Number/Sum/Sum2:  2/2/2
        Destination to Source negative jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source negative jitter Number/Sum/Sum2: 2/2/2
        Interarrival jitterout: 0       Interarrival jitterin: 0
Packet Loss Values
        Loss Source to Destination: 0           Loss Destination to Source: 0
        Out Of Sequence: 0      Tail Drop: 0    Packet Late Arrival: 0
Number of successes: 3
Number of failures: 1
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/23/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
```

```
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for ICMP Echo Operations

The following is sample output from the **show ip sla monitor statistics aggregated** and **show ip sla monitor statistics aggregated details**commands when the specified operation is an Internet Control Message Protocol (ICMP) echo operation:

```
Router# show ip sla monitor statistics aggregated 3
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
RTT Values
        Number Of RTT: 0
        RTT Min/Avg/Max: 0/0/0 ms
Number of successes: 0
Number of failures: 21
Router# show ip sla monitor statistics aggregated 3 details
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
RTT Values
        Number Of RTT: 0
        RTT Min/Avg/Max: 0/0/0 ms
Number of successes: 0
Number of failures: 23
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/23/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for TCP Connect, DNS, FTP, DHCP, and UDP Echo Operations

The following is sample output from the **show ip sla monitor statistics aggregated** and **show ip sla monitor statistics aggregated details**commands when the specified operation is a Transmission

Control Protocol (TCP) connect, Domain Name System (DNS), File Transfer Protocol (FTP), Dynamic Host Configuration Protocol (DHCP), or UDP echo operation:

```
Router# show ip sla monitor statistics aggregated 3
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Number of successes: 0
Number of failures: 21
Router# show ip sla monitor statistics aggregated 3 details
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Number of successes: 0
Number of failures: 23
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/23/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for ICMP Path Echo Operations

The following is sample output from the **show ip sla monitor statistics aggregated** and **show ip sla monitor statistics aggregated details**commands when the specified operation is an ICMP path echo operation:

```
Router# show ip sla monitor statistics aggregated 3
Round trip time (RTT) Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 1
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 2
Number of successes: 0
Number of failures: 21
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
```

```
Path Index: 2
Hop in Path Index: 3
Number of successes: 0
Number of failures: 21
.
.
.
Router# show ip sla monitor statistics aggregated 3 details
Round trip time (RTT) Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 1
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 2
```

```
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 3
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0-9 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10-19 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >20 ms:
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
.
.
.
```

Related Commands

Command	Description
hours-of-statistics-kept	Sets the number of hours for which statistics are maintained for the IP SLAs operation.
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla monitor totals-statistics

Note Effective with Cisco IOS Release 12.4(2)T, the **show ip sla monitor totals-statistics**command is replaced by the **show ip sla monitor statistics aggregated**command. See the **show ip sla statistics aggregated**command for more information.

To display the total statistical values (accumulation of error counts and completions) for all Cisco IOS IP Service Level Agreements (SLAs) operations or the specified operation, use the **show ip sla monitor totals-statistics** command in user EXEC or privileged EXEC mode.

show ip sla monitor totals-statistics [*number*] [**tabular** | **full**]

Syntax Description

number	(Optional) Number of the IP SLAs operation to display.
tabular	(Optional) Display information in a column format, reducing the number of screens required to display the information.
full	(Optional) Display all information, using identifiers next to each displayed value. This is the default.

Command Default

Full format for all operations

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(2)T	This command was replaced by the **show ip sla monitor statistics aggregated** command.

Usage Guidelines

The total statistics consist of the following items:

- The operation number
- The start time of the current hour of statistics
- The age of the current hour of statistics
- The number of attempted operations

You can also use the **show ip sla monitor distributions-statistics** and **show ip sla monitor collection-statistics** commands to display additional statistical information.

Examples

The following is sample output from the **show ip sla monitor totals-statistics** command in full format:

```
Router# show ip sla monitor totals-statistics
        Statistic Totals
```

```
Entry Number: 1
Start Time Index: *17:15:41.000 UTC Thu May 16 1996
Age of Statistics Entry (hundredths of seconds): 48252
Number of Initiations: 10
```

Related Commands

Command	Description
show ip sla monitor collection-statistics	Displays statistical errors for all IP SLAs operations or the specified operation.
show ip sla monitor configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.
show ip sla monitor distributions-statistics	Displays statistics distribution information (captured response times) for all IP SLAs operations or the specified operation.

show ip sla mpls-lsp-monitor collection-statistics

To display the statistics for Cisco IOS IP Service Level Agreements (SLAs) operations belonging to a label switched path (LSP) discovery group of an LSP Health Monitor operation, use the **showipslampls-lsp-monitorcollection-statistics**command in user EXEC or privileged EXEC mode.

show ip sla mpls-lsp-monitor collection-statistics [*group-id*]

Syntax Description

group-id	(Optional) Identification number of the LSP discovery group for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(33)SRB	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitormpls-lsp-monitorcollection-statistics** command.

Usage Guidelines

Use the **showipslampls-lsp-monitorcollection-statistics**command if the LSP discovery option is enabled for an LSP Health Monitor operation. This command is not applicable if the LSP discovery option is disabled.

When the LSP discovery option is enabled, an individual IP SLAs operation is created by the LSP Health Monitor for each equal-cost multipath belonging to an LSP discovery group of a particular LSP Health Monitor operation. The network connectivity statistics collected by each individual IP SLAs operation are aggregated and stored in one-hour increments (data can be collected for a maximum of two hours). Results are stored as group averages representative of all the equal-cost multipaths within the group for a given one-hour increment.

Examples

The following is sample output from the **showipslampls-lsp-monitorcollection-statistics** command:

```
Router# show ip sla mpls-lsp-monitor collection-statistics 100001
Entry number: 100001
Start Time Index: *19:32:37.995 EST Mon Feb 28 2005
Path Discovery Start Time: *20:23:43.919 EST Mon Feb 28 2005
Target destination IP address: 10.131.161.251
Path Discovery Status: OK
Path Discovery Completion Time: 1772
Path Discovery Minimum Paths: 12
Path Discovery Maximum Paths: 12
LSP Group Index: 100001
LSP Group Status: up
Total Pass: 1225
Total Timeout: 0 Total Fail: 0
Latest probe status: 'up,up,up,up,up,up,up,up,up,up,up,up'
Latest Path Identifier:
'127.0.0.1:8:3:3,127.0.0.6:8:3:3,127.0.0.1:8:2:3,127.0.0.2:8:2:3,127.0.0.4:8:2:3,127.0.0.5:8:2:3,127.0.0.1:8:4:3,127.0.0.6:8:4:3,127.0.0.1:8:4:3,127.0.0.2:8:4:3,127.0.0.4:8:4:3,127.0.0.5:8:4:3'
Minimum RTT: 24 Maximum RTT: 100 Average RTT: 42
```

The table below describes the significant fields shown in the display.

Table 28: show ip sla mpls-lsp-monitor collection-statistics Field Descriptions

Field	Description
Entry number	Identification number of the LSP discovery group.
Start Time Index	Start time of the LSP Health Monitor operation.
Path Discovery Start Time	Time in which the most recent iteration of LSP discovery started.
Target destination IP address	IP address of the Border Gateway Protocol (BGP) next hop neighbor.
Path Discovery Status	Return code of the most recent iteration of LSP discovery.
Path Discovery Completion Time	Amount of time (in milliseconds) it took to complete the most recent iteration of the LSP discovery process.
Path Discovery Minimum Paths	Minimum number of equal-cost multipaths discovered by the LSP discovery process.
Path Discovery Maximum Paths	Maximum number of equal-cost multipaths discovered by the LSP discovery process.
LSP Group Index	Identification number of the LSP discovery group.
LSP Group Status	Operation status of the LSP discovery group.
Total Pass	Total number of LSP discovery process iterations.
Total Timeout	Total number of LSPs in which a timeout violation was reported.
Total Fail	Total number of LSPs in which an operation failure was reported.
Latest probe status	Current operation status for each IP SLAs operation belonging to the specified LSP discovery group.
Latest Path Identifier	Current identification information (IP address used to select the LSP, outgoing interface, and label stack) for each IP SLAs operation belonging to the specified LSP discovery group.
Minimum RTT	Minimum round-trip time (in milliseconds) measured by the IP SLAs operations associated with the specified LSP discovery group.
Maximum RTT	Maximum round-trip time (in milliseconds) measured by the IP SLAs operations associated with the specified LSP discovery group.
Average RTT	Average round-trip time (in milliseconds) for all the IP SLAs operations associated with the specified LSP discovery group.

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.

show ip sla mpls-lsp-monitor configuration

To display configuration settings for IP Service Level Agreements (SLAs) label switched path (LSP) Health Monitor operations, use the **showipslampls-lsp-monitorconfiguration** command in user EXEC or privileged EXEC mode.

show ip sla mpls-lsp-monitor configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the LSP Health Monitor operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(6)T	This command was introduced.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrmpls-lsp-monitorconfiguration** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitormpls-lsp-monitorconfiguration** command.

Usage Guidelines

If the identification number of an LSP Health Monitor operation is not specified, configuration values for all the configured LSP Health Monitor operations will be displayed.

Examples

The following is sample output from the **showipslampls-lsp-monitorconfiguration** command:

```
Router# show ip sla mpls-lsp-monitor configuration 1
Entry Number : 1
Modification time   : *12:18:21.830 PDT Fri Aug 19 2005
Operation Type      : echo
Vrf Name            : ipsla-vrf-all
Tag                 :
EXP Value           : 0
Timeout(ms)         : 1000
Threshold(ms)       : 5000
Frequency(sec)      : Equals schedule period
LSP Selector        : 127.0.0.1
ScanInterval(min)   : 1
Delete Scan Factor  : 1
Operations List     : 100001-100003
Schedule Period(sec): 60
Request size        : 100
Start Time          : Start Time already passed
SNMP RowStatus      : Active
TTL value           : 255
Reply Mode          : ipv4
Reply Dscp Bits     :
Secondary Frequency : Enabled on Timeout
         Value(sec) : 10
```

```
Reaction Configs    :
    Reaction        : connectionLoss
    Threshold Type  : Consecutive
    Threshold Count : 3
    Action Type     : Trap Only
    Reaction        : timeout
    Threshold Type  : Consecutive
    Threshold Count : 3
    Action Type     : Trap Only
```

The table below describes the significant fields shown in the display.

Table 29: show ip sla mpls-lsp-monitor configuration Field Descriptions

Field	Description
Entry Number	Identification number for the LSP Health Monitor operation.
Operation Type	Type of IP SLAs operation configured by the LSP Health Monitor operation.
Vrf Name	If a specific name is displayed in this field, then the LSP Health Monitor is configured to discover only those BGP next hop neighbors in use by the VRF specified. If ipsla-vrf-all is displayed in this field, then the LSP Health Monitor is configured to discover all BGP next hop neighbors in use by all VRFs associated with the source Provider Edge (PE) router.
Tag	User-specified identifier for an IP SLAs operation.
EXP Value	Experimental field value in the header for an echo request packet of the IP SLAs operation.
Timeout(ms)	Amount of time the IP SLAs operation waits for a response from its request packet.
Threshold(ms)	Upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.
Frequency(sec)	Time after which the IP SLAs operation is restarted.
LSP Selector	Local host IP address used to select the LSP for the IP SLAs operation.
ScanInterval(min)	Time interval at which the LSP Health Monitor checks the scan queue for BGP next hop neighbor updates.
Delete Scan Factor	Specifies the number of times the LSP Health Monitor should check the scan queue before automatically deleting IP SLAs operations for BGP next hop neighbors that are no longer valid.
Operations List	Identification numbers of the IP SLAs operations created by the LSP Health Monitor operation.
Schedule Period(sec)	Time period (in seconds) in which the start times of the individual IP SLAs operations are distributed.
Request size	Protocol data size for the request packet of the IP SLAs operation.
Start Time	Status of the start time for the LSP Health Monitor operation.

Field	Description
SNMP RowStatus	Indicates whether SNMP RowStatus is active or inactive.
TTL value	The maximum hop count for an echo request packet of the IP SLAs operation.
Reply Mode	Reply mode for an echo request packet of the IP SLAs operation.
Reply Dscp Bits	Differentiated services codepoint (DSCP) value of an echo reply packet of the IP SLAs operation.
Secondary Frequency	Reaction condition that will enable the secondary frequency option.
Value(sec)	Secondary frequency value.
Reaction Configs	Reaction configuration of the IP SLAs operation.
Reaction	Reaction condition being monitored.
Threshold Type	Specifies when an action should be performed as a result of a reaction event.
Threshold Count	The number of times a reaction event can occur before an action should be performed.
Action Type	Type of action that should be performed as a result of a reaction event.

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.
auto ip sla mpls-lsp-monitor schedule	Configures the scheduling parameters for an IP SLAs LSP Health Monitor operation.

show ip sla mpls-lsp-monitor lpd operational-state

To display the operational status of the label switched path (LSP) discovery groups belonging to an IP Service Level Agreements (SLAs) LSP Health Monitor operation, use the **showipslampls-lsp-monitorlpdoperational-state**command in user EXEC or privileged EXEC mode.

show ip sla mpls-lsp-monitor lpd operational-state [*group-id*]

Syntax Description

group-id	(Optional) Identification number of the LSP discovery group for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(33)SRB	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitormpls-lsp-monitorlpdoperational-state**command.

Usage Guidelines

Use the **showipslampls-lsp-monitorlpdoperational-state**command if the LSP discovery option is enabled for an LSP Health Monitor operation. This command is not applicable if the LSP discovery option is disabled.

Examples

The following is sample output from the **showipslampls-lsp-monitorlpdoperational-state** command:

```
Router# show ip sla mpls-lsp-monitor lpd operational-state 100001
Entry number: 100001
MPLSLM Entry Number: 1
Target FEC Type: LDP IPv4 prefix
Target Address: 192.168.1.11
Number of Statistic Hours Kept: 2
Last time LPD Stats were reset: *21:21:18.239 GMT Tue Jun 20 2006
Traps Type: 3
Latest Path Discovery Mode: rediscovery complete
Latest Path Discovery Start Time: *21:59:04.475 GMT Tue Jun 20 2006
Latest Path Discovery Return Code: OK
Latest Path Discovery Completion Time(ms): 3092
Number of Paths Discovered: 3
Path Information :
Path   Outgoing   Lsp       Link  Conn  Adj   Downstream
Index  Interface  Selector  Type  Id    Addr  Label Stack  Status
1 Et0/0 127.0.0.8 90 0 10.10.18.30 21 OK
2 Et0/0 127.0.0.2 90 0 10.10.18.30 21 OK
3 Et0/0 127.0.0.1 90 0 10.10.18.30 21 OK
```

The table below describes the significant fields shown in the display.

Table 30: show ip sla mpls-lsp-monitor lpd operational-state Field Descriptions

Field	Description
Entry number	Identification number of the LSP discovery group.

Field	Description
MPLSLM Entry number	Identification number of the LSP Health Monitor operation.
Target FEC Type	The Forward Equivalence Class (FEC) type of the BGP next hop neighbor.
Target Address	IP address of the Border Gateway Protocol (BGP) next hop neighbor.
Number of Statistic Hours Kept	The amount of time (in hours) in which LSP discovery group statistics will be maintained. Use the **hours-of-statistics-kept** command to configure this value.
Traps Type	Trap type values indicate the type of threshold monitoring that has been enabled using the **autoipslampls-lsp-monitorreaction-configuration** command. Trap type values are defined as follows: • 1--timeout • 2--connection loss • 3--LSP discovery group status changes • 4--LSP discovery failure
Latest Path Discovery Mode	Current mode of the LSP discovery process. Modes include initial discovery, initial complete, rediscovery running, and rediscovery complete.
Latest Path Discovery Start Time	Time in which the most recent iteration of LSP discovery started.
Latest Path Discovery Return Code	Return code for the most recent iteration of LSP discovery.
Latest Path Discovery Completion Time	Amount of time (in milliseconds) it took to complete the most recent iteration of the LSP discovery process.
Number of Paths Discovered	Number of equal-cost multipaths discovered during the most recent iteration of the LSP discovery process.
Path Index	Identification number for the equal-cost multipath.
Outgoing Interface	Outgoing interface of the echo request packet.
Lsp Selector	IP address used to select the LSP.
Adj Addr	IP address of the next hop physical interface.
Downstream Label Stack	Downstream MPLS label stack number.
Status	Return code for the most recent IP SLAs LSP ping operation of the specified equal-cost multipath.

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.

show ip sla mpls-lsp-monitor neighbors

To display routing and connectivity information about Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) Border Gateway Protocol (BGP) next hop neighbors discovered by the IP Service Level Agreements (SLAs) label switched path (LSP) Health Monitor, use the **showipslampls-lsp-monitorneighbors** command in user EXEC or privileged EXEC mode.

show ip sla mpls-lsp-monitor neighbors

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(6)T	This command was introduced.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrmpls-lsp-monitorneighbors** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitormpls-lsp-monitorneighbors** command.

Examples

The following is sample output from the **showipslampls-lsp-monitorneighbors**command:

```
Router# show ip sla mpls-lsp-monitor neighbors
IP SLA MPLS LSP Monitor Database : 1
BGP Next hop 10.10.10.5 (Prefix: 10.10.10.5/32)  OK
  ProbeID: 100001 (red, blue, green)
BGP Next hop 10.10.10.7 (Prefix: 10.10.10.7/32)  OK
  ProbeID: 100002 (red, blue, green)
BGP Next hop 10.10.10.8 (Prefix: 10.10.10.8/32)  OK
  ProbeID: 100003 (red, blue, green)
```

The table below describes the significant fields shown in the display.

Table 31: show ip sla mpls-lsp-monitor neighbors Field Descriptions

Field	Description
BGP Next hop	Identifier for the BGP next hop neighbor.
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.
ProbeID	The identification number of the IP SLAs operation. The names of the VRFs that contain routing entries for the specified BGP next hop neighbor are listed in parentheses.

Field	Description
OK	LSP ping or LSP traceroute connectivity status between the source PE router and specified BGP next hop neighbor. Connectivity status can be the following: • OK--Successful reply. • ConnectionLoss--Reply is from a device that is not egress for the Forward Equivalence Class (FEC). • Timeout--Echo request timeout. • Unknown--State of LSP is not known.

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.

show ip sla mpls-lsp-monitor scan-queue

To display information about adding or deleting Border Gateway Protocol (BGP) next hop neighbors from a particular Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) of an IP Service Level Agreements (SLAs) LSP Health Monitor operation, use the **showipslampls-lsp-monitorscan-queue** command in user EXEC or privileged EXEC mode.

show ip sla mpls-lsp-monitor scan-queue *operation-number*

Syntax Description

operation-number	Number of the LSP Health Monitor operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(6)T	This command was introduced.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrmpls-lsp-monitorscan-queue** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitormpls-lsp-monitorscan-queue** command.

Examples

The following is sample output from the **showipslampls-lsp-monitorscan-queue** command:

```
Router# show ip sla mpls-lsp-monitor scan-queue 1
Next scan Time after: 23 Secs
Next Delete scan Time after: 83 Secs
BGP Next hop    Prefix            vrf                              Add/Delete?
10.10.10.8      10.10.10.8/32     red                              Add
10.10.10.8      10.10.10.8/32     blue                             Add
10.10.10.8      10.10.10.8/32     green                            Add
```

The table below describes the significant fields shown in the display.

Table 32: show ip sla mpls-lsp-monitor scan-queue Field Descriptions

Field	Description
Next scan Time after	Amount of time left before the LSP Health Monitor checks the scan queue for information about adding BGP next hop neighbors to a particular VPN. At the start of each scan time, IP SLAs operations are created for all newly discovered neighbors.
Next Delete scan Time after	Amount of time left before the LSP Health Monitor checks the scan queue for information about deleting BGP next hop neighbors from a particular VPN. At the start of each delete scan time, IP SLAs operations are deleted for neighbors that are no longer valid.

Field	Description
BGP Next hop	Identifier for the BGP next hop neighbor.
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.
vrf	Name of the VRF that contains a routing entry for the specified BGP next hop neighbor.
Add/Delete	Indicates that the specified BGP next hop neighbor will be added to or removed from the specified VPN.

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.
delete-scan-factor	Specifies the number of times the LSP Health Monitor should check the scan queue before automatically deleting IP SLAs operations for BGP next hop neighbors that are no longer valid.
mpls discovery vpn interval	Specifies the time interval at which routing entries that are no longer valid are removed from the BGP next hop neighbor discovery database of an MPLS VPN.
scan-interval	Specifies the time interval (in minutes) at which the LSP Health Monitor checks the scan queue for BGP next hop neighbor updates.

show ip sla mpls-lsp-monitor summary

To display Border Gateway Protocol (BGP) next hop neighbor and label switched path (LSP) discovery group information for IP Service Level Agreements (SLAs) LSP Health Monitor operations, use the **showipslampls-lsp-monitorsummary**command in user EXEC or privileged EXEC mode.

show ip sla mpls-lsp-monitor summary [*operation-number* [**group** [*group-id*]]]

Syntax Description

operation-number	(Optional) Number of the LSP Health Monitor operation for which the details will be displayed.
group *group-id*	(Optional) Specifies the identification number of the LSP discovery group for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(33)SRB	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitormpls-lsp-monitorsummary** command.

Usage Guidelines

Use the **showipslampls-lsp-monitorsummary**command if the LSP discovery option is enabled for an LSP Health Monitor operation. This command is not applicable if the LSP discovery option is disabled.

Examples

The following is sample output from the **showipslampls-lsp-monitorsummary***operation-number* command:

```
Router# show ip sla mpls-lsp-monitor summary 1
Index - MPLS LSP Monitor probe index.
Destination - Target IP address of the BGP Next Hop.
Status - LPD Group Status.
LPD Group ID - Unique index to identify the LPD Group.
Last Operation Time - Last time an operation was attempted by a particular probe in the LPD
 group.
Index Destination Status LPD Group ID Last Operation Time
1 100.1.1.1 up 100001 19:33:37.915 EST Mon Feb 28 2005
2 100.1.1.2 down 100002 19:33:47.915 EST Mon Feb 28 2005
3 100.1.1.3 retry 100003 19:33:57.915 EST Mon Feb 28 2005
4 100.1.1.4 partial 100004 19:34:07.915 EST Mon Feb 28 2005
```

The following is sample output from the **showipslampls-lsp-monitorsummary***operation-number***group***group-id* command:

```
Router# show ip sla mpls-lsp-monitor summary 1 group 100001
Group ID - Unique number to identify a LPD group
Lsp-selector - Unique 127/8 address used to identify an LPD.
Latest operation status - Latest probe status.
Last Operation time - Time when the last operation was attempted.
Group ID Lsp-Selector Status Failures Successes RTT Last Operation Time
100001 127.0.0.13 up 0 78 32 *20:11:37.895 EST Mon Feb 28 2005
```

```
100001 127.0.0.15 up 0 78 32 *20:11:37.995 EST Mon Feb 28 2005
100001 127.0.0.16 up 0 78 32 *20:11:38.067 EST Mon Feb 28 2005
100001 127.0.0.26 up 0 78 32 *20:11:38.175 EST Mon Feb 28 2005
```

The table below describes the significant fields shown in the display.

Table 33: show ip sla mpls-lsp-monitor summary Field Descriptions

Field	Description
Failures	Number of times the IP SLAs operation for the specified LSP failed to report an RTT value.
Successes	Number of times the IP SLAs operation for the specified LSP successfully reported an RTT value.
RTT	Average round-trip time (in milliseconds) for the specified LSP.

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.

show ip sla periodic hostname summary

To display the hostnames associated with IP Service Level Agreements (SLAs) operations, use the **show ip sla periodic hostname summary** command in privileged EXEC mode.

show ip sla periodic hostname summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged Exec (#)

Command History

Release	Modification
Cisco IOS XE Fuji 16.8.1	This command was introduced.

Usage Guidelines

This command displays the summary of the resolved hostnames, such as, SLA operation id, hostname configured under IP SLA operation, IPv4 or IPv6 address and the last run.

Examples

```
Device# show ip sla periodic hostname summary

IP SLAs Hostname Summary
Latest Periodic Hostname Resolution start time: 17:52:17 IST Mon Jan 30 2017
Resolution Codes: * Success, ^ Failure
ID              Hostname                IP/IPv6                 Last
                                        Address                 Resolved
------------------------------------------------------------------------------
*1              hostone.cisco.com       103.1.1.2               2 minutes, 25
                                                                 seconds ago


*2              hosttwo.cisco.com       104.1.1.2               2 minutes, 22
                                                                 seconds ago

*3              hostthree.cisco.com     105.1.1.2               2 minutes, 22
                                                                 seconds ago
```

The following table describes the significant fields shown in the command output.

Field	Description
Resolution Codes:	Resolution status (success or failure) • * indicates success • ^ indicates failure
ID	IP SLAs Operation Identifier.
Hostname	Hostname of the destination device for the listed operation.
IP/IPv6 Address	Resolved IPv4 or IPv6 address of the destination device for the listed operation.
Last Resolved	Last resolved time from the current time.

Related Commands

Command	Description
ip sla periodic hostname resolution	Enables IP SLA operation to use the recently resolved IPv4 or IPv6 destination address for probes specified with hostnames as destination.

show ip sla profile video

To display a list of standard predefined and user-defined video traffic profiles available for IP Service Level Agreements (SLAs) video operations or to display configuration values including all defaults for a specified profile, use the **show ip sla profile video** command in user EXEC or privileged EXEC mode.

show ip sla profile video [*profile-name*]

Syntax Description

profile-name	(Optional) name of synethetic video traffic profile to be displayed. Valid options are as follows: • **cp9900**: The predefined Cisco Unified 9900 Series IP Phone System profile. • **cts**: The predefined Cisco Telepresence System 1000/3000 profile. • **custom**: A customized video endpoint type. • *name*: Unique identifier for the user-defined endpoint.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
15.2(2)T	This command was introduced.

Examples

```
Router# show ip sla profile video
CTS-1080P-Best
CTS-1080P-Better
CTS-1080P-Good
CTS-720P-Best
CTS-720P-Better
CTS-720P-Good
CTS-720P-Lite
CP-9900-VGA-30fps-1000kbps
CP-9900-VGA-15fps-1000kbps
CP-9900-CIF-30fps-1000kbps
CP-9900-CIF-15fps-384kbps
CP-9900-QCIF-30fps-249kbps
CP-9900-QCIF-15fps-99kbps
CP-9900-QCIF-10fps-79kbps
My-TP
My-RT
custom


Router# show ip sla profile video cp9900
IP SLA synthetic video traffic profile parameter details:
  Name: cp9900
  ID: 17
  Administrative status: not in service
  Operational status: none
  Description: (not set)
  Endpoint type: CP-9900
```

```
Codec type: H.264 Profile: baseline
Content: single-person
Resolution: CIF (352x288)
Frame rate: 15fps
Bit rate maximum: 333kbps
Bit rate maximum: 3500kbps
```

The table below describes the significant fields that can be shown in the display.

Field	Description
Name:	One of the following: • CP9900 • CTS • Custom • A text string that is a unique identifier for the user-defined endpoint.
ID:	IP SLA identifier index.
Administrative status:	One of the following: • not ready—If any one or more of the three mandatory parameters are not configured, the profile remains in the not-ready state. • not in service—When each of the three mandatory parameters are configured, the profile is in the not-in-service state. • active—When the profile is in the "not in service" state, entering the **no shutdown** command changes the status of the the profile to the active state. Compared to the normal interface administrative mode, the not-ready or not-in-service states are analogous to the interface down state.
Operational status:	One of the following: • none—When a profile is not in the administrative active state, Cisco IOS software displays the operational status as none. • idle—When a profile is in the administrative active state but the profile is not being used by any IP SLA VO operation, the operational status is idle. • in use—When a profile is in the administrative active state and the profile is being used by an IP SLA VO operation, the operational status is in use.

Field	Description
Description:	Description (text string) of the video profile.
Endpoint type:	Ehe endpoint type is one the following: TS, CP-9900, or custom.
Codec type:	Codec profile type.
Content:	Video content type is conference-room, single-person, news-broadcast, sports, or street-view.
Resolution:	Video resolution is one of the following: QCIF, CIF, SIF, QVGA, VGA, 4CIF, 4SIF, 720p, or 1080p.
Frame rate:	Frame rate of 30, 24, 15, 10, 7.5, or 5 frames per second (fps).
Bitrate maximum:	Maximum bit rate in kilobits per second (kb/s).
Bitrate window size:	Bit-rate window size in milliseconds.
Frame intra size maximum:	Maximum intra-frame size in kilobytes (KB/s).
Frame intra refresh interval:	Intra-frame refresh interval in milliseconds
RTP packet size average:	Average RTP packet size in bytes.
RTP buffer output:	Buffer output as either bursty or shaped.

show ip sla reaction-configuration

To display the configured proactive threshold monitoring settings for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **showipslareaction-configuration** command in user EXEC or privileged EXEC mode.

show ip sla reaction-configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the operation for which the reaction configuration characteristics is displayed.

Command Default

Displays configured proactive threshold monitoring settings for all IP SLAs operations.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **showipslamonitorreaction-configuration** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtrreaction-configuration**command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitorreaction-configuration**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **showipslamonitorreaction-configuration**command.

Usage Guidelines

Use the **ipslareaction-configuration** command in global configuration mode to configure the proactive threshold monitoring parameters for an IP SLAs operations.

Examples

In the following example, multiple monitored elements (indicated by the Reaction values) are configured for a single IP SLAs operation:

```
Router# show ip sla reaction-configuration

Entry Number: 1
Reaction: RTT
Threshold type: Never
Rising (milliseconds): 5000
Falling (milliseconds): 3000
Threshold Count: 5
Threshold Count2: 5
Action Type: None
Reaction: jitterDSAvg
Threshold type: average
Rising (milliseconds): 5
Falling (milliseconds): 3
```

```
Threshold Count: 5
Threshold Count2: 5
Action Type: triggerOnly
Reaction: jitterDSAvg
Threshold type:  immediate
Rising (milliseconds): 5
Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: trapOnly
Reaction: PacketLossSD
Threshold type:  immediate
Rising (milliseconds): 5
Threshold Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: trapOnly
```

The table below describes the significant fields shown in the display.

Table 34: show ip sla reaction-configuration Field Descriptions

Field	Description
Reaction	The monitored element configured for the specified IP SLAs operation. Corresponds to the **react**{**connectionLoss** | **jitterAvg** | **jitterDSAvg** | **jitterSDAvg** | **mos** | **PacketLossDS** | **PacketLossSD** | **rtt** | **timeout** | **verifyError**} syntax in the **ipslareaction-configuration** command.
Threshold type	The configured threshold type. Corresponds to the **threshold-type** {**never** | **immediate** | **consecutive** | **xofy** | **average**} syntax in the **ipslareaction-configuration** command.
Rising (milliseconds)	The *upper-threshold* value. Corresponds to the **threshold-value***upper-thresholdlower-threshold* syntax in the **ipslareaction-configuration** command.
Falling (milliseconds)	The *lower-threshold* value. Corresponds to the **threshold-value***upper-thresholdlower-threshold* syntax in the **ipslareaction-configuration** command.
Threshold Count	The *x-value* in the **xofy** threshold type, or the *number-of-measurements* value for the **average** threshold type.
Threshold Count2	The *y-value* in the **xofy** threshold type.
Action Type	The reaction to be performed when the violation conditions are met. Corresponds to the **action-type** {**none** | **trapOnly** | **triggerOnly** | **trapAndTrigger**} syntax in the **ipslareaction-configuration** command.

Related Commands

Command	Description
ip sla reaction-configuration	Configures proactive threshold monitoring parameters for an IP SLAs operation.

show ip sla reaction-trigger

To display the reaction trigger information for all Cisco IOS IP Service Level Agreements (SLAs) operations or the specified operation, use the **show ip sla reaction-trigger** command in user EXEC or privileged EXEC mode.

show ip sla reaction-trigger [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **show ip sla monitor reaction-trigger** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **show rtr reaction-trigger** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **show ip sla monitor reaction-trigger**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **show ip sla monitor reaction-trigger**command.

Usage Guidelines

Use the **show ip sla reaction-trigger** command to display the configuration status and operational state of target operations that will be triggered as defined with the **ip sla reaction-configuration** global configuration command.

Examples

The following is sample output from the **show ip sla reaction-trigger** command:

```
Router# show ip sla reaction-trigger 1
        Reaction Table
Entry Number: 1
Target Entry Number: 2
Status of Entry (SNMP RowStatus): active
Operational State: pending
```

Related Commands

Command	Description
show ip sla configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla responder

To display information about the Cisco IOS IP Service Level Agreements (SLAs) Responder, use the **show ip sla responder** command in user EXEC or privileged EXEC mode.

show ip sla responder

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **show ip sla monitor responder** command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **show rtr responder** command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **show ip sla monitor responder**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **show ip sla monitor responder**command.

Usage Guidelines

Use the **show ip sla responder**command to display information about recent sources of IP SLAs control messages, such as who has sent recent control messages and who has sent invalid control messages.

Examples

The following sections show sample output from the **show ip sla responder** command for IP SLAs Responders in IPv4 and IPv6 networks.

Output in an IPv4 Network

The following is sample output from the **show ip sla responder** command in an IPv4 network:

```
Router# show ip sla responder

IP SLA Monitor Responder is: Enabled
Number of control message received: 19 Number of errors: 1
Recent sources:
10.0.0.1 [19:11:49.035 UTC Sat Dec 2 2005]
10.0.0.1 [19:10:49.023 UTC Sat Dec 2 2005]
10.0.0.1 [19:09:48.707 UTC Sat Dec 2 2005]
10.0.0.1 [19:08:48.687 UTC Sat Dec 2 2005]
10.0.0.1 [19:07:48.671 UTC Sat Dec 2 2005]
Recent error sources:
10.0.0.1 [19:10:49.023 UTC Sat Dec 2 2005] RTT_AUTH_FAIL
```

Output in an IPv6 Network

The following is sample output from the **show ip sla responder** command in an IPv6 network:

```
Router# show ip sla responder

IP SLA Responder is: Enabled
Number of control message received: 19 Number of errors: 1
Recent sources:
2001:DB8:100::1 [19:11:49.035 IST Thu Jul 13 2006]
2001:DB8:100::1 [19:10:49.023 IST Thu Jul 13 2006]
2001:DB8:100::1 [19:09:48.707 IST Thu Jul 13 2006]
2001:DB8:100::1 [19:08:48.687 IST Thu Jul 13 2006]
2001:DB8:100::1 [19:07:48.671 IST Thu Jul 13 2006]
Recent error sources:
2001:DB8:100::1 [19:10:49.023 IST Thu Jul 13 2006] RTT_AUTH_FAIL
```

Related Commands

Command	Description
show ip sla configuration	Displays configuration values for IP SLAs operations.

show ip sla statistics

To display the current operational status and statistics of all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **showipslastatistics** command in user EXEC or privileged EXEC mode.

show ip sla statistics [*operation-number*] [**details**]

Syntax Description

operation-number	(Optional) Number of the operation for which operational status and statistics are displayed. **Note** For Multicast UDP jitter operations: Valid operation numbers include the operation IDs (oper-id) for each responder in the endpoint list for the operation.
details	(Optional) Operational status and statistics are displayed in greater detail.

Command Default

Displays output for all running IP SLAs operations.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **showipslamonitorstatistics**command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **showrtroperational-state**command.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **showipslamonitorstatistics**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **showipslamonitorstatistics**command.
12.2(58)SE	This command was modified. The command output has been modified to include information about IP SLAs video operations.
15.2(2)T	This command was integrated into Cisco IOS Release 15.2(2)T.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
15.2(4)M	This command was modified. The command output has been modified to include information about multicast UDP jitter operations.

Release	Modification
15.3(1)S	This command was integrated into Cisco IOS Release 15.3(1)S.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.
15.1(2)SG	This command was integrated into Cisco IOS Release 15.1(2)SG.
Cisco IOS XE Release 3.4SG	This command was integrated into Cisco IOS XE Release 3.4SG.
15.3(2)T	This command was modified. The command output has been modified to include information about percentile operations.
15.3(2)S	This command was modified. the command output has been modified to include information about service performance operations.

Usage Guidelines

Use the **showipslastatistics** command to display the current state of IP SLAs operations, including how much life the operation has left, whether the operation is active, and the completion time. The output will also include the monitoring data returned for the last (most recently completed) operation.

For multicast UDP jitter operations with an endpoint-list: Operation IDs (oper-id) are generated for each destination responder that is associated with the multicast UDP jitter operation. This generated operation ID is displayed when you use the **show ip sla configuration** command for the base multicast operation, and as part of the summery statistics for the entire operation.

Accessing Cisco IOS IP SLAs UDP-jitter Data using SNMP:

The results of Cisco IOS IP SLAs UDP-jiiter operation are stored in different tables. Here is a list of table that the data is stored for each Cisco IOS IP SLA UDP-jitter Operation.

```
- rttMonLatestJitterOperTable: store the latest sample;
- rttMonJitterStatsTable: store statistical information

OIDs to calculate the total packets Sent:
rttMonJitterStatsPacketMIA 1.3.6.1.4.1.9.9.42.1.3.5.1.37
rttMonJitterStatsPacketLateArrival 1.3.6.1.4.1.9.9.42.1.3.5.1.38
rttMonJitterStatsPacketLossDS 1.3.6.1.4.1.9.9.42.1.3.5.1.35
rttMonJitterStatsPacketLossSD 1.3.6.1.4.1.9.9.42.1.3.5.1.34
rttMonJitterStatsNumOfRTT 1.3.6.1.4.1.9.9.42.1.3.5.1.4

OIDs to calculate the Average Round trip time:
RttMonJitterStatsRTTSum 1.3.6.1.4.1.9.9.42.1.3.5.1.5
rttMonJitterStatsNumOfRTT 1.3.6.1.4.1.9.9.42.1.3.5.1.4
Equation: RttMonJitterStatsRTTSum / rttMonJitterStatsNumOfRTT = Ave RTT

OIDs to calculate the one-way measurements:
rttMonJitterStatsNumOfOW 1.3.6.1.4.1.9.9.42.1.3.5.1.51
rttMonJitterStatsOWSumDS 1.3.6.1.4.1.9.9.42.1.3.5.1.41
rttMonJitterStatsOWSumSD 1.3.6.1.4.1.9.9.42.1.3.5.1.41
```

Doing a show on the specific operation ID will allow details for that one responder to be displayed.

Examples

The following is sample output from the **showipslastatistics** command:

```
Router# show ip sla statistics       Current Operational State
Entry Number: 3
Modification Time: *22:15:43.000 UTC Sun Feb 11 2001
Diagnostics Text:
Last Time this Entry was Reset: Never
```

```
Number of Octets in use by this Entry: 1332
Number of Operations Attempted: 2
Current Seconds Left in Life: 3511
Operational State of Entry: active
Latest Completion Time (milliseconds): 544
Latest Operation Start Time: *22:16:43.000 UTC Sun Feb 11 2001
Latest Oper Sense: ok
Latest Sense Description: 200  OK
Total RTT: 544
DNS RTT: 12
TCP Connection RTT: 28
HTTP Transaction RTT: 504
HTTP Message Size: 9707
```

The following is sample output from the **showipslastatistics** command when the specified operation is a UDP jitter (codec) operation. The values shown indicate the values for the last IP SLAs operation.

```
Router# show ip sla statistics 2 details        Current Operational State

IPSLAs Latest Operation Statistics

IPSLA operation id: 2
Type of operation: udp-jitter
        Latest RTT: 1 milliseconds
Latest operation start time: 07:45:28 GMT Thu Aug 28 2014
Latest operation return code: OK
Over thresholds occurred: FALSE
RTT Values:
        Number Of RTT: 10               RTT Min/Avg/Max: 1/1/1 milliseconds
Latency one-way time:
        Number of Latency one-way Samples: 6
        Source to Destination Latency one way Min/Avg/Max: 1/1/1 milliseconds
        Destination to Source Latency one way Min/Avg/Max: 0/0/0 milliseconds
        Source to Destination Latency one way Sum/Sum2: 6/6
        Destination to Source Latency one way Sum/Sum2: 0/0
Jitter Time:
        Number of SD Jitter Samples: 9
        Number of DS Jitter Samples: 9
        Source to Destination Jitter Min/Avg/Max: 0/1/1 milliseconds
        Destination to Source Jitter Min/Avg/Max: 0/0/0 milliseconds
        Source to destination positive jitter Min/Avg/Max: 1/1/1 milliseconds
        Source to destination positive jitter Number/Sum/Sum2: 3/3/3
        Source to destination negative jitter Min/Avg/Max: 1/1/1 milliseconds
        Source to destination negative jitter Number/Sum/Sum2: 3/3/3
        Destination to Source positive jitter Min/Avg/Max: 0/0/0 milliseconds
        Destination to Source positive jitter Number/Sum/Sum2: 0/0/0
        Destination to Source negative jitter Min/Avg/Max: 0/0/0 milliseconds
        Destination to Source negative jitter Number/Sum/Sum2: 0/0/0
        Interarrival jitterout: 0       Interarrival jitterin: 0
        Jitter AVG: 1
Over Threshold:
        Number Of RTT Over Threshold: 0 (0%)
Packet Loss Values:
        Loss Source to Destination: 0
        Source to Destination Loss Periods Number: 0
        Source to Destination Loss Period Length Min/Max: 0/0
        Source to Destination Inter Loss Period Length Min/Max: 0/0
        Loss Destination to Source: 0
        Destination to Source Loss Periods Number: 0
        Destination to Source Loss Period Length Min/Max: 0/0
        Destination to Source Inter Loss Period Length Min/Max: 0/0
        Out Of Sequence: 0      Tail Drop: 0    Packet Late Arrival: 0
Packet Skipped: 0
Voice Score Values:
```

```
        Calculated Planning Impairment Factor (ICPIF): 0
        Mean Opinion Score (MOS): 0
Number of successes: 2
Number of failures: 0
Operation time to live: Forever
Operational state of entry: Active
Last time this entry was reset: Never
```

The following is sample output from the **showipslastatistics detail** command when the specified operation is an IP SLAs Metro-Ethernet 3.0 (ITU-T Y.1731) delay operation (3). The values shown indicate the values for the last operation.

```
Router# show ip sla statistics 3 details

IPSLA operation id: 3
Delay Statistics for Y1731 Operation 3
Type of operation: Y1731 Delay Measurement
Latest operation start time: *02:12:49.772 PST Thu Jul 1 2010
Latest operation return code: OK
Distribution Statistics:
Interval
 Start time:  *02:12:49.772 PST Thu Jul 1 2010
 End time:  *00:00:00.000 PST Mon Jan 1 1900
 Number of measurements initiated: 31
 Number of measurements completed: 31
 Flag: OK


Delay:
 Max/Avg/Min TwoWay: 2014/637/0
 Time of occurrence TwoWay: Max - *02:13:11.210 PST Thu Jul 1 2010/Min - *02:17:51.339 PST
 Thu Jul 1 2010

 Bucket TwoWay:
  Bucket Range: 0 - < 5000 microseconds
   Total observations: 22
  Bucket Range: 5000 - < 10000 microseconds
   Total observations: 0
  Bucket Range: 10000 - < 15000 microseconds
   Total observations: 0
  Bucket Range: 15000 - < 20000 microseconds
   Total observations: 0
  Bucket Range: 20000 - < 25000 microseconds
   Total observations: 0
  Bucket Range: 25000 - < 30000 microseconds
   Total observations: 0
  Bucket Range: 30000 - < 35000 microseconds
   Total observations: 0
  Bucket Range: 35000 - < 40000 microseconds
   Total observations: 0
  Bucket Range: 40000 - < 45000 microseconds
   Total observations: 0
  Bucket Range: 45000 - < 4294967295 microseconds
   Total observations: 0

Delay Variance:
 Max/Avg TwoWay positive: 0/0
 Time of occurrence TwoWay positive: Max - *00:00:00.000 PST Mon Jan 1 1900
 Max/Avg TwoWay negative: 0/0
 Time of occurrence TwoWay negative: Max - *00:00:00.000 PST Mon Jan 1 1900

 Bucket TwoWay positive:
  Bucket Range: 0 - < 5000 microseconds
   Total observations: 0
```

```
 Bucket Range: 5000 - < 10000 microseconds
  Total observations: 0
 Bucket Range: 10000 - < 15000 microseconds
  Total observations: 0
 Bucket Range: 15000 - < 20000 microseconds
  Total observations: 0
 Bucket Range: 20000 - < 25000 microseconds
  Total observations: 0
 Bucket Range: 25000 - < 30000 microseconds
  Total observations: 0
 Bucket Range: 30000 - < 35000 microseconds
  Total observations: 0
 Bucket Range: 35000 - < 40000 microseconds
  Total observations: 0
 Bucket Range: 40000 - < 45000 microseconds
  Total observations: 0
 Bucket Range: 45000 - < 4294967295 microseconds
  Total observations: 0

Bucket TwoWay negative:
 Bucket Range: 0 - < 5000 microseconds
  Total observations: 0
 Bucket Range: 5000 - < 10000 microseconds
  Total observations: 0
 Bucket Range: 10000 - < 15000 microseconds
  Total observations: 0
 Bucket Range: 15000 - < 20000 microseconds
  Total observations: 0
 Bucket Range: 20000 - < 25000 microseconds
  Total observations: 0
 Bucket Range: 25000 - < 30000 microseconds
  Total observations: 0
 Bucket Range: 30000 - < 35000 microseconds
  Total observations: 0
 Bucket Range: 35000 - < 40000 microseconds
  Total observations: 0
 Bucket Range: 40000 - < 45000 microseconds
  Total observations: 0
 Bucket Range: 45000 - < 4294967295 microseconds
  Total observations: 0

Bucket TwoWay negative:
```

The following is sample output from the **showipslastatistics** command when the specified operation is a multicast UDP jitter operation and includes statistics for each multicast responder in the endpoint list associated with the multicast UDP jitter operation:

```
Router# show ip sla statistics 100

Operation id: 22
mcast-ip-address/port: 239.1.1.1/3000
Latest operation start time: 18:32:36 PST Thu Aug 4 2011
Number of successes: 11
Number of failures: 0
Operation time to live: 2965 sec

status DSCP delay jitter loss
OK 000 1/2/5 1/2/3 0/0/0

Multicast responder statistics:

Seq#  oper-id   responder-ip   status               delay   jitter   loss
1        728338     1.2.3.4         OK                  1/2/5    1/2/3 0
2        728339     1.2.3.5         NO_RESPONSE  1/2/5   1/2/3 0
```

```
3        728340     1.2.3.6         OK                    1/2/5   1/2/3 0
4        728343     1.2.3.7        ERROR                1/2/5   1/2/3 0
```

The following is sample output from the **showipslastatistics** command when the specified operation is configured for the percentile option:

```
Device# show ip sla statistics 123
IPSLAs Latest Operation Statistics

IPSLA operation id: 123
Type of operation: udp-jitter
        Latest RTT: 1 milliseconds
Latest operation start time: 00:24:08 PST Sat Feb 25 2012
Latest operation return code: OK
RTT Values:
       Number Of RTT: 10               RTT Min/Avg/Max: 2/2/3 milliseconds
    Percentile RTT: 95%
        Number Of RTT: 9               RTT Min/Avg/Max: 2/2/2 milliseconds
Latency one-way time:
        Number of Latency one-way Samples: 9
        Source to Destination Latency one way Min/Avg/Max: 1/1/2 milliseconds
        Destination to Source Latency one way Min/Avg/Max: 1/1/2 milliseconds
    Percentile SD OW: 95%
    Percentile DS OW: 95%
        Number of Latency one-way Samples: 8
        Source to Destination Latency one way Min/Avg/Max: 1/1/1 milliseconds
        Destination to Source Latency one way Min/Avg/Max: 1/1/1 milliseconds
Jitter Time:
        Number of SD Jitter Samples: 9
        Source to Destination Jitter Min/Avg/Max: 4/6/12  milliseconds
        Number of DS Jitter Samples: 9
        Destination to Source Jitter Min/Avg/Max: 0/2/5 milliseconds
    Percentile SD OW: 95%
    Percentile DS OW: 95%
        Number of SD Jitter Samples: 8
        Source to Destination Jitter Min/Avg/Max: 4/6/11 milliseconds
        Number of DS Jitter Samples: 8
        Destination to Source Jitter Min/Avg/Max: 0/2/4 milliseconds
```

The table below describes the significant fields shown in the display.

Table 35: show ip sla statistics Field Descriptions

Field	Description
RTT Values	Indicates that round-trip-time statistics appear on the following lines.
Number Of RTT	The number of successful round-trips.
RTT Min/Avg/Max	The minimum, average, and maximum round-trip values (in milliseconds).
Latest RTT	The latest round-trip-time of the operation. The latest RTT value is equal to the average RTT value.
Latency one-way time	Indicates that one-way measurement statistics appear on the following lines. One Way (OW) values are the amount of time required for the packet to travel from the source router to the target router (SD) or from the target router to the source router (DS).

Field	Description
Number of Latency one-way Samples	Number of successful one-way time measurements.
Source to Destination Latency one way Min/Avg/Max	The minimum, average, and maximum time (in milliseconds) from the source to the destination.
Destination to Source Latency one way Min/Avg/Max	The minimum, average, and maximum time (in milliseconds) from the destination to the source.
Source to Destination Latency one way Sum/Sum2	The sum and sum of the squares of the minimum Source to Destination Latency one-way and maximum Source to Destination Latency one-way values
Destination to Source Latency one way Sum/Sum2	The sum and sum of the squares of the minimum Destination to Source Latency one-way and maximum Destination to Source Latency one-way values
Jitter Time	Indicates that jitter statistics appear on the following lines. Jitter is interpacket delay variance.
Number of SD Jitter Samples: 9	The number of jitter samples collected from the source to the destination.
Number of DS Jitter Samples: 9	The number of jitter samples collected from the destination to the source.
Source to Destination Jitter Min/Avg/Max	The minimum, average, and maximum jitter values from the source to the destination, in milliseconds.
Destination to Source Jitter Min/Avg/Max	The minimum, average, and maximum jitter values from the destination to the source, in milliseconds.
Source to destination positive jitter Min/Avg/Max	The minimum, average, and maximum jitter values from the source to the destination that are positive (that is, network latency increases for two consecutive test packets).
Source to destination positive jitter Number/Sum/Sum2	The number, sum, and sum of the squares of the positive jitter values from the source to the destination (in milliseconds).
Source to destination negative jitter Min/Avg/Max	The minimum, average, and maximum jitter values from the source to the destination that are negative (that is, network latency decreases for two consecutive test packets).
Source to destination negative jitter Number/Sum/Sum2	The number, sum, and sum of the squares of the negative jitter values from the source to the destination (in milliseconds).
Destination to Source positive jitter Min/Avg/Max	The minimum, average, and maximum jitter values from the destination to the source that are positive (that is, network latency increases for two consecutive test packets).
Destination to Source positive jitter Number/Sum/Sum2	The number, sum, and sum of the squares of the positive jitter values from the destination to the source (in milliseconds).

Field	Description
Destination to Source negative jitter Min/Avg/Max	The minimum, average, and maximum jitter values from the destination to the source that are negative (that is, network latency decreases for two consecutive test packets).
Destination to Source negative jitter Number/Sum/Sum2	The number, sum, and sum of the squares of the negative jitter values from the destination to the source (in milliseconds).
Interarrival jitterout	The source-to-destination (SD) jitter value calculation, as defined in RFC 1889.
Interarrival jitterin	The destination-to-source (DS) jitter value calculation, as defined in RFC 1889.
Loss Source to Destination	The number of packets lost from source to destination.
Source to Destination Loss Periods Number	The number of unsuccessful attempts made to send a packet from the source to the destination
Source to Destination Loss Period Length Min/Max	The minimum and maximum time, in milliseconds, after which the failed packet is resent from the source to the destination.
Source to Destination Inter Loss Period Length Min/Max	The time, in milliseconds, between unsuccessful attempts made to resend the failed packet from the source to the destination.
Loss Destination to Source	The number of packets lost from the destination to the source.
Destination to Source Loss Periods Number	The number of unsuccessful attempts made to send a packet from the destination to the source
Destination to Source Loss Period Length Min/Max	The minimum and maximum time, in milliseconds, after which the failed packet is resent from the destination to the source.
Destination to Source Inter Loss Period Length Min/Max	The time, in milliseconds, between unsuccessful attempts made to resend the failed packet from the destination to the source.
Out Of Sequence	The number of packets returned out of order.
Tail Drop	The number of packets lost where the direction (SD/DS) cannot be determined.
Packet Late Arrival	The number of packets that arrived after the timeout.
Packet Skipped	The number of packets skipped.
Voice Scores	Indicates that Voice over IP statistics appear on the following lines. Voice score data is computed when the operation type is configured as **udp-jitter** (codec).

Field	Description
ICPIF	The Calculated Planning Impairment Factor (ICPIF) value for the operation. The ICPIF value is computed by IP SLAs using the formula *Icpif=Io+Iq+Idte+Idd+Ie-A*, where • The values for *Io* , *Iq* , and *Idte* are set to zero. • The value *Idd* is computed based on the measured one-way delay. • The value *Ie* is computed based on the measured packet loss. • The value of A is specified by the user. ICPIF values are expressed in a typical range of 5 (very low impairment) to 55 (very high impairment). ICPIF values numerically lower than 20 are generally considered "adequate." **Note** This value is intended only for relative comparisons, and may not match ICPIF values generated using alternate methods.
MOS Score	The estimated Mean Opinion Score (Conversational Quality, Estimated) for the latest iteration of the operation. The MOS-CQE is computed by IP SLAs as a function of the ICPIF. MOS values are expressed as a number from 1 (1.00) to 5 (5.00), with 5 being the highest level of quality, and 1 being the lowest level of quality. A MOS value of 0 (zero) indicates that MOS data could not be generated for the operation.

The following is an example of the output from this command for an Ethernet service performance operation:

```
IPSLAs Latest Operation Statistics
IPSLA operation id: 10
Type of operation: Ethernet Service Performance
Test mode: Two-way Measurement
Steps Tested (kbps): 1000
Test duration: 30 seconds
Latest measurement: 03:48:57.912 IST Fri Feb 15 2013
Latest return code: OK
Overall Throughput: 1000 kbps
Step 1 (1000 kbps):
Stats:
IR(kbps) FL FLR Avail
1000 0 0.00% 100.00%
Tx Packets: 7563 Tx Bytes: 3872256
Rx Packets: 7563 Rx Bytes: 3872256
Step Duration: 30 seconds
```

The table below describes the significant fields shown in the display for service performance operations.

Field	Description
Type of operation	Type of service performance operation.

Field	Description
Test Mode	Mode of testing such as two-way measurement or traffic generation mode.
Latest return code	Current status of the IP SLAs session.
Stats	Specifies the network performance such as throughput, frame loss, frame loss ratio, and availability of a session.
Tx	Packets or bytes transmitted.
Rx	Packets or bytes received.

Related Commands

Command	Description
show ip sla configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla statistics aggregated

To display the aggregated statistical errors and distribution information for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **show ip sla statistics aggregated**command in user EXEC or privileged EXEC mode.

show ip sla statistics aggregated [*operation-number*] [**details**]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.
details	(Optional) Aggregated statistical information is displayed in greater detail. Distribution information is included when this keyword is specified.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
12.4(4)T	This command was introduced. This command replaces the **show ip sla monitor statistics aggregated**command.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB. This command replaces the **show rtr collection-statistics**, **show rtr distributions-statistics**, and **show rtr totals-statistics** commands.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB. This command replaces the **show ip sla monitor statistics aggregated**command.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI. This command replaces the **show ip sla monitor statistics aggregated**command.
12.2(58)SE	This command was modified. The command output has been modified to include information about IP SLAs video operations.
15.2(4)M	This command was modified. The command output has been modified to include information about multicast UDP jitter operations.
15.3(1)S	This command was integrated into Cisco IOS Release 15.3(1)S.
Cisco IOS XE Release 3.8S	This command was integrated into Cisco IOS XE Release 3.8S.
15.1(2)SG	This command was integrated into Cisco IOS Release 15.1(2)SG.
Cisco IOS XE Release 3.4SG	This command was integrated into Cisco IOS XE Release 3.4SG.

Usage Guidelines

Use this command to display information such as the number of failed operations and the failure reason. The distributions statistics consist of the following:

- The sum of completion times (used to calculate the mean)

- The sum of the completions times squared (used to calculate standard deviation)
- The maximum and minimum completion time
- The number of completed attempts

This command shows information collected over the past two hours, unless you specify a different amount of time using the **history hours-of-statistics-kept** command.

Note This command does not support the IP SLAs ICMP path jitter operation.

Examples

The following sections show sample output from the **show ip sla statistics aggregated** and **show ip sla statistics aggregated details**commands for different IP SLAs operations:

Output for HTTP Operations

The following example shows output from the **show ip sla statistics aggregated** and **show ip sla statistics aggregated details**commands when the specified operation is a Hypertext Transfer Protocol (HTTP) operation:

```
Router# show ip sla statistics aggregated 1
Round trip time (RTT) Index 3
DNS RTT: 3004 ms
TCP Connection RTT: 16 ms
HTTP Transaction RTT: 84 ms
Number of successes: 0
Number of failures: 1
Router# show ip sla statistics aggregated 1 details
Round trip time (RTT) Index 3
DNS RTT: 3004
TCP Connection RTT: 0
HTTP Transaction RTT: 0
HTTP time to first byte: 0
DNS TimeOut: 0
TCP TimeOut: 0
Transaction TimeOut: 0
DNS Error: 0
TCP Error: 0
Number of successes: 0
Number of failures: 1
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/0/0/0
Failed Operations due to Internal/Sequence/Verify Error: 1/0/0
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
```

```
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for UDP Jitter Operations

The following is sample output from the **show ip sla statistics aggregated** and **show ip sla statistics aggregated details**commands when the specified operation is a User Datagram Protocol (UDP) jitter operation:

```
Router# show ip sla statistics aggregated 2
Round trip time (RTT) Index 7
RTT Values
        Number Of RTT: 10
        RTT Min/Avg/Max: 1/1/2 ms
Latency one-way time milliseconds
        Number of Latency one-way Samples: 0
        Source to Destination Latency one way Latency Min/Avg/Max: 0/0/0 ms
        Destination to source Latency one way Min/Avg/Max: 0/0/0 ms
Jitter time milliseconds
        Number of Jitter Samples: 9
        Source to Destination Jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source Jitter Min/Avg/Max: 1/1/1 ms
Packet Loss Values
        Loss Source to Destination: 0           Loss Destination to Source: 0
        Out Of Sequence: 0      Tail Drop: 0    Packet Late Arrival: 0
Number of successes: 1
Number of failures: 1
Router# show ip sla statistics aggregated 2 details
Round trip time (RTT) Index 7
RTT Values
        Number Of RTT: 10
        RTT Min/Avg/Max: 1/1/1 ms
Latency one-way time milliseconds
        Number of Latency one-way Samples: 0
        Source to Destination Latency one way Min/Avg/Max: 0/0/0 ms
        Destination to Source Latency one way Min/Avg/Max: 0/0/0 ms
        Source to Destination Latency one way Sum/Sum2: 0/0
        Destination to Source Latency one way Sum/Sum2: 0/0
Jitter time milliseconds
        Number of Jitter Samples: 9
        Source to Destination Jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source Jitter Min/Avg/Max: 1/1/1 ms
        Source to destination positive jitter Min/Avg/Max: 1/1/1 ms
        Source to destination positive jitter Number/Sum/Sum2:  1/1/1
        Source to destination negative jitter Min/Avg/Max: 1/1/1 ms
        Source to destination negative jitter Number/Sum/Sum2: 1/1/1
        Destination to Source positive jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source positive jitter Number/Sum/Sum2:  2/2/2
        Destination to Source negative jitter Min/Avg/Max: 1/1/1 ms
        Destination to Source negative jitter Number/Sum/Sum2: 2/2/2
        Interarrival jitterout: 0       Interarrival jitterin: 0
Packet Loss Values
        Loss Source to Destination: 0           Loss Destination to Source: 0
        Out Of Sequence: 0      Tail Drop: 0    Packet Late Arrival: 0
Number of successes: 3
Number of failures: 1
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/23/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
```

```
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for ICMP Echo Operations

The following is sample output from the **show ip sla statistics aggregated** and **show ip sla statistics aggregated details**commands when the specified operation is an Internet Control Message Protocol (ICMP) echo operation:

```
Router# show ip sla statistics aggregated 3
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
RTT Values
        Number Of RTT: 0
        RTT Min/Avg/Max: 0/0/0 ms
Number of successes: 0
Number of failures: 21
Router# show ip sla statistics aggregated 3 details
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
RTT Values
        Number Of RTT: 0
        RTT Min/Avg/Max: 0/0/0 ms
Number of successes: 0
Number of failures: 23
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/23/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for TCP Connect, DNS, FTP, DHCP, and UDP Echo Operations

The following is sample output from the **show ip sla statistics aggregated** and **show ip sla statistics aggregated details**commands when the specified operation is a Transmission Control Protocol (TCP) connect, Domain Name System (DNS), File Transfer Protocol (FTP), Dynamic Host Configuration Protocol (DHCP), or UDP echo operation:

```
Router# show ip sla statistics aggregated 3
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Number of successes: 0
Number of failures: 21
Router# show ip sla statistics aggregated 3 details
Round trip time (RTT)Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Number of successes: 0
Number of failures: 23
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/23/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
```

Output for ICMP Path Echo Operations

The following is sample output from the **show ip sla statistics aggregated** and **show ip sla statistics aggregated details**commands when the specified operation is an ICMP path echo operation:

```
Router# show ip sla statistics aggregated 3
Round trip time (RTT) Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 1
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 2
```

```
Hop in Path Index: 2
Number of successes: 0
Number of failures: 21
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.896 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 3
Number of successes: 0
Number of failures: 21
.
.
.
Router# show ip sla statistics aggregated 3 details
Round trip time (RTT) Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 1
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 1
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
```

```
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 2
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Round trip time (RTT)   Index 3
Start Time Index: 05:31:12.897 PST Wed Sep 3 2003
Path Index: 2
Hop in Path Index: 3
Number of successes: 0
Number of failures: 21
Failed Operations due to over threshold: 0
Failed Operations due to Disconnect/TimeOut/Busy/No Connection: 0/21/0/0
Failed Operations due to Internal/Sequence/Verify Error: 0/0/0
Target Address: 10.4.23.44
Distribution Statistics:
Bucket Range: 0 to < 9ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: 10 to < 19ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
Bucket Range: >=20 ms
   Avg. Latency: 0 ms
   Percent of Total Completions for this range: 0%
   Number of Completions/Sum of Latency: 0/0/0
Sum of RTT squared low 32 Bits/ Sum of RTT squared high 32 Bits: 0/0
.
.
.
```

Output for Multicast UDP Jitter Operations

For multicast UDP jitter operations, the following statements apply:

- The fail counter in the per operation Success and Fail (suc/fail) column indicates that the operation failed completely. It does not include operations for which some responders succeeded and others failed.
- The Loss column in the per operation results displays the minimum, average, and maximum (Min/Avg/Max) values of packet loss for all multicast receivers.
- The Fail counter in per responder statistics means the receiver took part in the operation but the operation to this receiver failed for some reason.

```
Device# show ip sla statistics aggregated 100

Operation id: 100
mcast-ip-address/port: 239.1.1.1/3000
Start Time Index: 19:52:25 PST Tue Aug 9 2011

suc/fail DSCP delay jitter loss
38/2      000 1/2/5 1/2/3  0/0/0

Multicast responder statistics:

Seq# oper-id responder-ip suc/fail delay jitter loss

1     728338 1.2.3.4       10/0     1/2/5 1/2/3  0
2     728339 1.2.3.5        8/2     1/2/5 1/2/3  0
3     728340 1.2.3.6       10/0     1/2/5 1/2/3  0
4     728343 1.2.3.7       10/0     1/2/5 1/2/3  0


Start Time Index: 18:52:25 PST Tue Aug 9 2011

suc/fail DSCP delay jitter loss
38/2      000 1/2/5  1/2/3 0/0/0

Multicast responder statistics:

Seq# oper-id responder-ip suc/fail delay jitter loss

1    728338   1.2.3.4       10/0   1/2/5  1/2/3  0
2    728339   1.2.3.5        8/2   1/2/5  1/2/3  0
3    728340   1.2.3.6       10/0   1/2/5  1/2/3  0
4    728343   1.2.3.7       10/0   1/2/5  1/2/3  0


Device# show ip sla statistics aggregated detail 100

Operation id: 100
mcast-ip-address/port: 239.1.1.1/3000
Number of multicast responders configured: 4
Number of multicast responders active: 3

Start Time Index: 19:52:25 PST Tue Aug 9 2011

suc/fail DSCP delay jitter loss
38/2 000 1/2/5 1/2/3 0/0/0

Multicast responder statistics:

Operation id: 728338 responder-ip: 1.2.3.4
suc/fail: 10/0
Latency one-way time:
Samples: 100 Min/Avg/Max: 0/0/0 milliseconds
Jitter Time:
```

```
Samples: 99 Min/Avg/Max: 0/0/0 milliseconds
Positive jitter Min/Avg/Max: 1/3/4 milliseconds
Negative jitter Min/Avg/Max: 1/3/4 milliseconds
Packet Loss Values:
Loss: 0 Out Of Sequence: 0
Voice Score Values:
ICPIF: 0 MOS: 0

# Additional multicast responder stats
```

Related Commands

Command	Description
history hours-of-statistics-kept	Sets the number of hours for which statistics are maintained for the IP SLAs operation.
show ip sla configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show ip sla summary

To display summary statistics for IP Service Level Agreements (SLAs) operations, use the **show ip sla summary** command in privileged EXEC mode.

show ip sla summary [**destination** *ip-addresshostname*]

destination	(Optional) Displays destination-address-based statistics.
destination-ip-address	IP address of the destination device.
destination-hostname	Hostname of the destination device.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.2(3)T	This command was introduced.
Cisco IOS XE Release 3.7S	This command was integrated into Cisco IOS XE Release 3.7S.
15.1(2)SG	This command was integrated into Cisco IOS Release 15.1(2)SG.
Cisco IOS XE Release 3.4SG	This command was integrated into Cisco IOS XE Release 3.4SG.
15.3(2)S	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

This command displays summary statistics for multicast operations and for unicast on which multiple operations are configured on the same destination IP address or hostname.

Note Statistics in microseconds have a token 'u' to indicate that statistics is in microseconds.

Examples

```
Device# show ip sla summary

IPSLAs Latest Operation Summary
Codes: * active, ^ inactive, ~ pending
All Stats are in milliseconds. Stats with u are in microseconds

ID           Type           Destination       Stats               Return        Last
                                                                  Code          Run
---------------------------------------------------------------------------------------
*1           udp-jitter      10.0.0.2          RTT=900u           OK             20 seconds
 ago
*2           icmp-echo       10.0.0.2          RTT=1              OK              3 seconds
 ago

Device# show ip sla summary destination 192.0.2.2
ID       Type      Destination  State   Stats(ms)  ReturnCode  LastRun
---      ----      -----------  -----   -------  ----------  -------
100   icmp-jitter   192.0.2.2    Active   100      OK       22:49:53 PST Tue May 3 2011
```

```
101   udp-jitter    192.0.2.2    Active   100      OK       22:49:53 PST Tue May 3 2011
102   tcp-connect   192.0.2.2    Active    -     NoConnection  22:49:53 PST Tue May 3 2011
103   video         1232:232     Active   100      OK       22:49:53 PST Tue May 3 2011
                      ::222

104   video         1232:232     Active   100      OK       22:49:53 PST Tue May 3 2011
                      ::222
```

The table below describes the significant fields shown in the display.

Table 36: show ip sla summary Field Descriptions

Field	Description
ID	IP SLAs operation identifier.
Destination	IP address or hostname of the destination device for the listed operation.
Stats	Round trip time in milliseconds.

show ip sla twamp connection

To display information for current IP Service Level Agreements (SLAs) Two-Way Active Measurement Protocol (TWAMP) connections, use the **show ip sla twamp connection** command in privileged EXEC mode.

show ip sla twamp connection detail | [**source-ip** *ip-addresshostname*] | **requests**

Syntax Description

detail	Displays greater detail for current connections.
source-ip	(Optional) Dislays information for a specific TWAMP connection.
ip-address	IPv4 address of TWAMP connection.
hostname	Hostname of TWAMP connection.
requests	Displays current connection requests.

Command Default

Displays information for all current TWAMP connections.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.2(2)S	This command was introduced.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.

Examples

```
Device# show ip sla twamp connection detail

Connection Id:          91
Client IP Address:    172.27.111.225
Client Port:          43026
Mode:                 Unauthenticated
Connection State:     Connected
Control State:        None
Number of Test Requests - 0:1


Device# show ip sla twamp connection requests

Connection-Id    Client Address   Client Port
91               172.27.111.225   43026
Total number of current connections: 1
```

The table below describes the significant fields shown in the display.

*Table 37: **show ip sla twamp connection** Field Descriptions*

Field	Description
Connection- Id	TWAMP connection identifier.
Client IP Address	IPv4 address of the TWAMP control device for the listed connection.
Client Port	Port number for the listed connection.

show ip sla twamp session

To display information and results for IP Service Level Agreements (SLAs) Two-Way Active Measurement Protocol (TWAMP) test sessions, use the **show ip sla twamp session** command in privileged EXEC mode.

show ip sla session [**source-ip** *ip-addresshostname* **source-port** *port-number*]

Syntax Description

source-ip	(Optional) Display results from the TWAMP test session for a specific TWAMP connection.
ip-address	IPv4 or IPv6 address of a TWAMP connection.
hostname	Alphanumeric string that identifies a TWAMP connection.
source-port	Display results from the TWAMP test session for a specific port.
port-number	Port number of the source port. The range is from 1 to 65535.

Command Default

Information and results for all TWAMP test sessions is displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.2(2)S	This command was introduced.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.

Examples

```
Device# show ip sla twamp session

IP SLAs Responder TWAMP is: Enabled
Recvr Addr: 172.27.117.116
Recvr Port: 3619
Sender Addr: 172.27.111.225
Sender Port: 32910
Session Id: 172.27.117.116:533112:9C41EC42
Connection Id: 95
```

In the following example, the IP SLAs TWAMP responder is not disabled.

```
Device(config)# no ip sla responder twamp
Device(config)# exit
Device# show ip sla twamp session
IP SLAs Responder TWAMP is: Disabled
```

The table below describes the significant fields shown in the display.

*Table 38: **show ip sla twamp session** Field Descriptions*

Field	Description
Recvr Addr	IP address of the session-reflector on the IP SLAs TWAMP responder.
Recvr Port	Port number of the TWAMP server on the IP SLAs TWAMP responder.
Sender Addr	IP address of the session-sender on the TWAMP control device.
Sender Port	Port number of the session-sender entity on the control device.

Related Commands

Command	Description
ip sla responder twamp	Sets up a TWAMP responder.

show ip sla twamp standards

To display a list of Two-Way Active Measurement Protocol (TWAMP) standards that are implemented on a Cisco device, use the **show ip sla twamp standards** command in privileged EXEC mode.

show ip slatwamp standards

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.2(2)S	This command was introduced.
Cisco IOS XE Release 3.6S	This command was integrated into Cisco IOS XE Release 3.6S.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.

Usage Guidelines

The list of supported standards depends on the Cisco software release running on your device.

Examples

The following sample output shows which TWAMP standards are implemented in a Cisco software release that supports IP SLAs TWAMP Responder v1.0:

```
Device# show ip sla twamp standards

Feature                   Organization    Standard
TWAMP Server              IETF            draft-ietf-ippm-twamp-06
TWAMP Reflector           IETF            draft-ietf-ippm-twamp-06
```

show mpls discovery vpn

To display routing information relating to the Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) Border Gateway Protocol (BGP) next hop neighbor discovery process, use the **showmplsdiscoveryvpn**command in user EXEC or privileged EXEC mode.

show mpls discovery vpn

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

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.

Examples

The following is sample output from the **showmplsdiscoveryvpn** command:

```
Router# show mpls discovery vpn
Refresh interval set to 60 seconds.
Next refresh in 46 seconds
Next hop 10.10.10.5 (Prefix: 10.10.10.5/32)
        in use by: red, blue, green
Next hop 10.10.10.7 (Prefix: 10.10.10.7/32)
        in use by: red, blue, green
Next hop 10.10.10.8 (Prefix: 10.10.10.8/32)
        in use by: red, blue, green
```

The table below describes the fields shown in the display.

Table 39: show mpls discovery vpn Field Descriptions

Field	Description
Refresh interval	The time interval at which routing entries that are no longer valid are removed from the BGP next hop neighbor discovery database. The default time interval is 300 seconds.
Next refresh	The amount of time left before the next refresh interval starts.
Next hop	Identifier for the BGP next hop neighbor.
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.

Field	Description
in use by	Names of the VPN routing and forwarding (VRF) instances that contain routing entries for the specified BGP next hop neighbor.

Related Commands

Command	Description
mpls discovery vpn interval	Specifies the time interval at which routing entries that are no longer valid are removed from the BGP next hop neighbor discovery database of an MPLS VPN.
mpls discovery vpn next-hop	Enables the MPLS VPN BGP next hop neighbor discovery process.

show rtr application

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **show rtr application**command is replaced by the **show ip sla monitor application**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr application**command is replaced by the **show ip sla application**command. See the **show ip sla monitor application**and **show ip sla application**commands for more information.

To display global information about Cisco IOS IP Service Level Agreements (IP SLAs), use the **show rtr application** command in user EXEC or privileged EXEC mode.

show rtr application [**tabular** | **full**]

Syntax Description

tabular	(Optional) Displays information in a column format reducing the number of screens required to display the information.
full	(Optional) Displays all information using identifiers next to each displayed value. This is the default.

Command Default

Full format

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.3(14)T	This command was replaced by the **show ip sla monitor application**command.
12.2(31)SB2	This command was replaced by the **show ip sla monitor application**command.
12.2(33)SRB	This command was replaced by the **show ip sla application**command.

Usage Guidelines

Use the **show rtr application**command to display information such as supported operation types and supported protocols.

Examples

The following is sample output from the **show rtr application** command in full format:

```
Router# show rtr application

        SA Agent
Version: 2.2.0 Round Trip Time MIB
Time of last change in whole RTR: *17:21:30.819 UTC Tue Mar 19 2002
Estimated system max number of entries: 4699

Number of Entries configured:5
    Number of active Entries:5
   Number of pending Entries:0
  Number of inactive Entries:0
```

```
         Supported Operation Types
Type of Operation to Perform:  echo
Type of Operation to Perform:  pathEcho
Type of Operation to Perform:  udpEcho
Type of Operation to Perform:  tcpConnect
Type of Operation to Perform:  http
Type of Operation to Perform:  dns
Type of Operation to Perform:  jitter
Type of Operation to Perform:  dlsw
Type of Operation to Perform:  dhcp
Type of Operation to Perform:  ftp
        Supported Protocols
Protocol Type: ipIcmpEcho
Protocol Type: ipUdpEchoAppl
Protocol Type: snaRUEcho
Protocol Type: snaLU0EchoAppl
Protocol Type: snaLU2EchoAppl
Protocol Type: ipTcpConn
Protocol Type: httpAppl
Protocol Type: dnsAppl
Protocol Type: jitterAppl
Protocol Type: dlsw
Protocol Type: dhcp
Protocol Type: ftpAppl

Number of configurable probe is 490
```

Related Commands

Command	Description
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show rtr authentication

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **show rtr authentication**command is replaced by the **show ip sla monitor authentication**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr authentication**command is replaced by the **show ip sla authentication**command. See the **show ip sla monitor authentication**and **show ip sla authentication**commands for more information.

To display Cisco IOS IP Service Level Agreements (IP SLAs) authentication information, use the **show rtr authentication** command in user EXEC or privileged EXEC mode.

show rtr authentication

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.3(14)T	This command was replaced by the **show ip sla monitor authentication**command.
12.2(31)SB2	This command was replaced by the **show ip sla monitor authentication**command.
12.2(33)SRB	This command was replaced by the **show ip sla authentication**command.

Usage Guidelines

Use the **show rtr authentication**command to display information such as supported operation types and supported protocols.

Examples

The following is sample output from the **show rtr authentication**command:

```
Router# show rtr authentication

RTR control message uses MD5 authentication, key chain name is: rtr
```

Related Commands

Command	Description
show rtr configuration	Displays configuration values for IP SLAs operations.

show rtr collection-statistics

Note Effective with Cisco IOS Release 12.3(14)T , the **showrtrcollection-statistics**command is replaced by the **showipslamonitorcollection-statistics**command. Effective with 12.2(31)SB2, the **showrtrcollection-statistics**command is replaced by the **showipslamonitorstatisticsaggregated**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrcollection-statistics**command is replaced by the **showipslastatisticsaggregated**command. See the **showipslamonitorcollection-statistics**, **showipslamonitorstatisticsaggregated**, and **showipslastatisticsaggregated**commands for more information.

To display statistical errors for all Cisco IOS IP Service Level Agreements (IP SLAs) operations or a specified operation, use the **showrtrcollection-statistics**command in user EXEC or privileged EXEC mode.

show rtr collection-statistics [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.

Command Default Shows statistics for the past two hours.

Command Modes User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.0(5)T	The output for this command was expanded to show information for Jitter operations.
12.1	The **tabular** and **full** keywords were removed.
12.1(1)T	The output for this command was expanded to show information for the FTP operation type and for One Way Delay Jitter operations.
12.2(8)T, 12.2(8)S	Output for “NumOfJitterSamples” was added (CSCdv30022).
12.2(11)T	The SAA Engine II was implemented. The maximum number of operations was increased from 500 to 2000.
12.3(4)T	Output (MOS and ICPIF scores) for the Jitter (codec) operation type was added.
12.3(7)T	Decimal granularity for MOS scores was added.
12.3(14)T	This command was replaced by the **showipslamonitorcollection-statistics**command.
12.2(31)SB2	This command was replaced by the **showipslamonitorstatisticsaggregated**command.
12.2(33)SRB	This command was replaced by the **showipslastatisticsaggregated**command.

Usage Guidelines

Use the **showrtrcollection-statistics** command to display information such as the number of failed operations and the failure reason. You can also use the **showrtrdistribution-statistics** and **showrtrtotals-statistics** commands to display additional statistical information.

This command shows information collected over the past two hours, unless you specify a different amount of time using the **hours-of-statistics-kept** command.

For One Way Delay Jitter operations, the clocks on each device must be synchronized using NTP (or GPS systems). If the clocks are not synchronized, one way measurements are discarded. (If the sum of the source to destination (SD) and the destination to source (DS) values is not within 10 percent of the round trip time, the one way measurement values are assumed to be faulty, and are discarded.)

Note This command does not support the IP SLAs ICMP path jitter operation.

Examples

The following shows sample output from the **showrtrcollection-statistics** command in full format.

```
Router# show rtr collection-statistics 1
        Collected Statistics
Entry Number: 1
Start Time Index: *17:15:41.000 UTC Thu May 16 1996
Path Index: 1
Hop in Path Index: 1
Number of Failed Operations due to a Disconnect: 0
Number of Failed Operations due to a Timeout: 0
Number of Failed Operations due to a Busy: 0
Number of Failed Operations due to a No Connection: 0
Number of Failed Operations due to an Internal Error: 0
Number of Failed Operations due to a Sequence Error: 0
Number of Failed Operations due to a Verify Error: 0
Target Address: 172.16.1.176
```

Output for HTTP Operations

The following example shows output from the show rtr collection-statistics command when the specified operation is an HTTP operation:

```
Router# show rtr collection-statistics 2        Collected Statistics

Entry Number:2
HTTP URL:
http://172.20.150.200
Start Time:*00:01:16.000 UTC Mon Nov 1 2003

             Comps:1              RTTMin:343
             OvrTh:0              RTTMax:343
        DNSTimeOut:0              RTTSum:343
        TCPTimeOut:0             RTTSum2:117649
        TraTimeOut:0              DNSRTT:0
          DNSError:0           TCPConRTT:13
         HTTPError:0            TransRTT:330
          IntError:0            MesgSize:1771
            Busies:0
```

Output for Jitter Operations

The following is sample output from the **showrtrcollection-statistics** command, where operation 2 is a Jitter operation that includes One Way statistics:

```
Router# show rtr collection-statistics
Collected Statistics
Entry Number: 2
Target Address: 5.0.0.1, Port Number:99
Start Time: 11:12:03.000 UTC Thu Jul 1 1999
RTT Values:
NumOfRTT: 600  RTTSum: 3789  RTTSum2: 138665
Packet Loss Values:
PacketLossSD: 0  PacketLossDS: 0
PacketOutOfSequence: 0  PacketMIA: 0  PacketLateArrival: 0
InternalError: 0  Busies: 0
Jitter Values:
MinOfPositivesSD: 1   MaxOfPositivesSD: 2
NumOfPositivesSD: 26  SumOfPositivesSD: 31   Sum2PositivesSD: 41
MinOfNegativesSD: 1   MaxOfNegativesSD: 4
NumOfNegativesSD: 56  SumOfNegativesSD: 73   Sum2NegativesSD: 133
MinOfPositivesDS: 1   MaxOfPositivesDS: 338
NumOfPositivesDS: 58  SumOfPositivesDS: 409  Sum2PositivesDS: 114347
MinOfNegativesDS: 1   MaxOfNegativesDS: 338
NumOfNegativesDS: 48  SumOfNegativesDS: 396  Sum2NegativesDS: 114332
One Way Values:
NumOfOW: 440
OWMinSD: 2  OWMaxSD: 6    OWSumSD: 1273  OWSum2SD: 4021
OWMinDS: 2  OWMaxDS: 341  OWSumDS: 1643  OWSum2DS: 120295
```

The values shown indicate the aggregated values for the current hour. RTT stands for Round-Trip-Time. SD stands for Source-to-Destination. DS stands for Destination-to-Source. OW stands for One Way. The table below describes the significant fields shown in this output.

Output for Jitter (codec) Operations

The following is sample output from the **showrtrcollection-statistics** command, where operation 10 is a Jitter (codec) operation:

```
Router# show rtr collection-statistics 10
Entry number: 10
Start Time Index: 13:18:49.904 PST Mon Jun 24 2002
Number of successful operations: 2
Number of operations over threshold: 0
Number of failed operations due to a Disconnect: 0
Number of failed operations due to a Timeout: 0
Number of failed operations due to a Busy: 0
Number of failed operations due to a No Connection: 0
Number of failed operations due to an Internal Error: 0
Number of failed operations due to a Sequence Error: 0
Number of failed operations due to a Verify Error: 0
Voice Scores:
MinOfICPIF: 0   MaxOfICPIF: 0   MinOfMOS: 0     MaxOfMOS: 0
RTT Values:
NumOfRTT: 122   RTTAvg: 2       RTTMin: 2       RTTMax: 3
RTTSum: 247     RTTSum2: 503
Packet Loss Values:
PacketLossSD: 0 PacketLossDS: 0
```

```
PacketOutOfSequence: 0  PacketMIA: 0    PacketLateArrival: 0
InternalError: 0        Busies: 0       PacketSkipped: 78  <<<<<===========
Jitter Values:
MinOfPositivesSD: 1     MaxOfPositivesSD: 1
NumOfPositivesSD: 9     SumOfPositivesSD: 9     Sum2PositivesSD: 9
MinOfNegativesSD: 1     MaxOfNegativesSD: 1
NumOfNegativesSD: 8     SumOfNegativesSD: 8     Sum2NegativesSD: 8
MinOfPositivesDS: 1     MaxOfPositivesDS: 1
NumOfPositivesDS: 6     SumOfPositivesDS: 6     Sum2PositivesDS: 6
MinOfNegativesDS: 1     MaxOfNegativesDS: 1
NumOfNegativesDS: 7     SumOfNegativesDS: 7     Sum2NegativesDS: 7
Interarrival jitterout: 0       Interarrival jitterin: 0
One Way Values:
NumOfOW: 0
OWMinSD: 0      OWMaxSD: 0      OWSumSD: 0      OWSum2SD: 0
OWMinDS: 0      OWMaxDS: 0      OWSumDS: 0      OWSum2DS: 0
```

Table 40: show rtr collection-statistics Field Descriptions

Field	Description
Voice Scores:	Indicates that Voice over IP statistics appear on the following lines. Voice score data is computed when the operation type is configured as **typejitter(codec)**.
ICPIF	The Calculated Planning Impairment Factor (ICPIF) value for the operation. The ICPIF value is computed by IP SLAs using the formula *Icpif=Io+Iq+Idte+Idd+Ie-A*, where • the values for *Io* , *Iq* , and *Idte* are set to zero, • the value *Idd* is computed based on the measured one way delay, • the value *Ie* is computed based on the measured packet loss, • and the value of A is specified by the user. ICPIF values are expressed in a typical range of 5 (very low impairment) to 55 (very high impairment). ICPIF values numerically less than 20 are generally considered “adequate.” **Note** This value is intended only for relative comparisons, and may not match ICPIF values generated using alternate methods.
MinOfICPIF:	The lowest (minimum) ICPIF value computed for the collected statistics.
MaxOfICPIF:	The highest (maximum) ICPIF value computed for the collected statistics.
Mos	The estimated Mean Opinion Score (Conversational Quality, Estimated) for the latest iteration of the operation. The MOS-CQE is computed by IP SLAs as a function of the ICPIF. MOS values are expressed as a number from 1 (1.00) to 5 (5.00), with 5 being the highest level of quality, and 1 being the lowest level of quality. A MOS value of 0 (zero) indicates that MOS data could not be generated for the operation.
MinOfMos:	The lowest (minimum) MOS value computed for the collected statistics.

Field	Description
MaxOfMos:	The highest (maximum) ICPIF value computed for the collected statistics.
RTT Values:	Indicates that Round-Trip-Time statistics appear on the following lines.
NumOfRTT	The number of successful round trips.
RTTSum	The sum of all successful round trip values (in milliseconds).
RTTSum2	The sum of squares of those round trip values (in milliseconds).
PacketLossSD	The number of packets lost from source to destination.
PacketLossDS	The number of packets lost from destination to source.
PacketOutOfSequence	The number of packets returned out of order.
PacketMIA	The number of packets lost where the direction (SD/DS) cannot be determined.
PacketLateArrival	The number of packets that arrived after the timeout.
PacketSkipped	The number of packets that are not sent during the IP SLAs jitter operation.
InternalError	The number of times an operation could not be started due to other internal failures.
Busies	The number of times this operation could not be started because the previously scheduled run was not finished.
Jitter Values:	Indicates that Jitter statistics appear on the following lines. Jitter is inter-packet delay variance.
NumOfJitterSamples:	The number of jitter samples collected. This is the number of samples that are used to calculate the following jitter statistics.
MinOfPositivesSD MaxOfPositivesSD	The minimum and maximum positive jitter values from source to destination, in milliseconds.
NumOfPositivesSD	The number of jitter values from source to destination that are positive (i.e., network latency increases for two consecutive test packets).
SumOfPositivesSD	The sum of those positive values (in milliseconds).
Sum2PositivesSD	The sum of squares of those positive values.
MinOfNegativesSD MaxOfNegativesSD	The minimum and maximum negative jitter values from source to destination. The absolute value is given.
NumOfNegativesSD	The number of jitter values from source to destination that are negative (i.e., network latency decreases for two consecutive test packets).
SumOfNegativesSD	The sum of those values.

Field	Description
Sum2NegativesSD	The sum of the squares of those values.
Interarrival jitterout:	The source to destination (SD) jitter value calculation, as defined in RFC 1889.
Interarrival jitterin:	The destination to source (DS) jitter value calculation, as defined in RFC 1889.
One Way Values	Indicates that one way measurement statistics appear on the following lines. One Way (OW) Values are the amount of time it took the packet to travel from the source router to the target router (SD) or from the target router to the source router (DS).
NumOfOW	Number of successful one way time measurements.
OWMinSD	Minimum time from the source to the destination.
OWMaxSD	Maximum time from the source to the destination.
OWSumSD	Sum of the OWMinSD and OWMaxSD values.
OWSum2SD	Sum of the squares of the OWMinSD and OWMaxSD values.

The DS values show the same information as above for Destination-to-Source Jitter values.

Related Commands

Command	Description
show ntp status	Displays the status of the Network Time Protocol configuration on your system.
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.
show rtr distributions-statistics	Displays statistic distribution information (captured response times) for all IP SLAs operations or the specified operation.
show rtr totals-statistics	Displays the total statistical values (accumulation of error counts and completions) for all IP SLAs operations or the specified operation.

show rtr configuration

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **show rtr configuration**command is replaced by the **show ip sla monitor configuration**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr configuration**command is replaced by the **show ip sla configuration**command. See the **show ip sla monitor configuration**and **show ip sla configuration**commands for more information.

To display configuration values including all defaults for all Cisco IOS IP Service Level Agreements (IP SLAs) operations or the specified operation, use the **show rtr configuration** command in user EXEC or privileged EXEC mode.

show rtr configuration [*operation*]

Syntax Description

operation	(Optional) Number of the IP SLAs operation for, which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.1	The **tabular** and **full** keywords were removed.
12.3(2)T	Output was added to show the VRF assignment name (if configured).
12.3(4)T	Output specific to the jitter (codec) operation type was added.
12.3(7)T	Output pertaining to reaction configuration (threshold values, reaction types) was removed from the output. Reaction configuration is now displayed using the **show rtr reaction-configuration** command.
12.3(8)T	Output was added to show the group schedule and the recurring schedule details for the IP SLAs operations.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S. This integration includes the addition of output to show the group schedule and recurring schedule details for the IP SLAs operations.
12.3(14)T	This command was replaced by the **show ip sla monitor configuration**command.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC. This integration includes the addition of output to show the group schedule and recurring schedule details for the IP SLAs operations.
12.2(31)SB2	This command was replaced by the **show ip sla monitor configuration**command.
12.2(33)SRB	This command was replaced by the **show ip sla configuration**command.

Examples

The following is sample output from the **show rtr configuration** command for an IP SLAs Echo operation:

```
Router# show rtr configuration

        Complete Configuration Table (includes defaults)
Entry Number: 1
Owner: "Sample Owner"
Tag: "Sample Tag Group"
Type of Operation to Perform: echo
Reaction and History Threshold (milliseconds): 5000
Operation Frequency (seconds): 60
Operation Timeout (milliseconds): 5000
Verify Data: FALSE
Status of Entry (SNMP RowStatus): active
Protocol Type: ipIcmpEcho
Target Address: 172.16.1.176
Request Size (ARR data portion): 1
Response Size (ARR data portion): 1
Life (seconds): 3600
Next Start Time: Start Time already passed
Entry Ageout (seconds): 3600
Number of Statistic Hours kept: 2
Number of Statistic Paths kept: 1
Number of Statistic Hops kept: 1
Number of Statistic Distribution Buckets kept: 1
Number of Statistic Distribution Intervals (milliseconds): 20
Number of History Lives kept: 0
Number of History Buckets kept: 50
Number of History Samples kept: 1
History Filter Type: none
```

The following is sample output from the **show rtr configuration** command that verifies the configuration of an IP SLAs HTTP operation:

```
Router# show rtr configuration

        Complete Configuration Table (includes defaults)
Entry Number:3
Owner:Joe
Tag:AppleTree
Type of Operation to Perform:http
Reaction and History Threshold (milliseconds):5000
Operation Frequency (seconds):60
Operation Timeout (milliseconds):5000
Verify Data:FALSE
Status of Entry (SNMP RowStatus):active
Protocol Type:httpAppl
Target Address:
Source Address:0.0.0.0
Target Port:0
Source Port:0
Request Size (ARR data portion):1
Response Size (ARR data portion):1
Control Packets:enabled
Loose Source Routing:disabled
LSR Path:
Type of Service Parameters:0x0
HTTP Operation:get
HTTP Server Version:1.0
URL:http://www.cisco.com
Cache Control:enabled
```

```
Life (seconds):3600
Next Scheduled Start Time:Start Time already passed
Entry Ageout:never
Number of Statistic Hours kept:2
Number of Statistic Paths kept:1
Number of Statistic Hops kept:1
Number of Statistic Distribution Buckets kept:1
Statistic Distribution Interval (milliseconds):20
Number of History Lives kept:0
Number of History Buckets kept:15
Number of History Samples kept:1
History Filter Type:none
```

The following is sample output from the **show rtr configuration** command that shows output for a PathJitter operation associated with the VPN vrf1:

```
Router# show rtr configuration 1

Entry number: 1
Owner:
Tag:
Type of operation to perform: pathJitter
Destination address: 171.69.1.129
Source address: 0.0.0.0
Number of packets: 10
Interval (milliseconds): 20
Target Only: Disabled
Request size (ARR data portion): 1
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Verify data: No
Loose Source Routing: Disabled
Vrf Name: vrf1
LSR Path:
Operation frequency (seconds): 60
Next Scheduled Start Time: Start Time already passed
Life (seconds): 2000
Entry Ageout (seconds): never
Status of entry (SNMP RowStatus): Active
```

The following is sample output from the **show rtr configuration** command that includes output for the **type jitter (codec)** operation for VoIP metric monitoring:

```
Router# show rtr configuration
Entry number: 10
Owner: admin_bofh
Tag:
Type of operation to perform: jitter
Target address: 209.165.200.225
Source address: 0.0.0.0
Target port: 16384
Source port: 0
Operation timeout (milliseconds): 5000
Codec Type: g711alaw
Codec Number Of Packets: 1000
Codec Packet Size: 172
Codec Interval (milliseconds): 20
Advantage Factor: 2
Type Of Service parameters: 0x0
Verify data: No
Vrf Name:
Control Packets: enabled
Operation frequency (seconds): 60
```

```
Next Scheduled Start Time: Start Time already passed
Life (seconds): 3600
Entry Ageout (seconds): never
Status of entry (SNMP RowStatus): Active
Threshold (milliseconds): 5000
Number of statistic hours kept: 2
Number of statistic distribution buckets kept: 1
Statistic distribution interval (milliseconds): 20
Enhanced History:
```

The following is sample output from the **show rtr configuration** command for a recurring IP SLAs operation, with the recurring state as TRUE:

```
Router# show rtr configuration
Entry number: 5
Owner:
Tag:
Type of operation to perform: udpEcho
Target address: 10.2.31.121
Source address: 0.0.0.0
Target port: 989
Source port: 0
Request size (ARR data portion): 16
Operation timeout (milliseconds): 5000
Type Of Service parameters: 0x0
Verify data: No
Data pattern:
Vrf Name:
Control Packets: enabled
Operation frequency (seconds): 60
Next Scheduled Start Time: Start Time already passed
Group Scheduled: FALSE
Group Schedule Entry number :
Life (seconds): 3600
Entry Ageout (seconds): never
Recurring (Starting everyday): TRUE
Status of entry (SNMP RowStatus): Active
Connection loss reaction enabled: No
```

Related Commands

Command	Description
show rtr application	Displays global information about the IP SLAs feature.
show rtr collection-statistics	Displays statistical errors for all IP SLAs operations or the specified operation.
show rtr distributions-statistics	Displays statistic distribution information (captured response times) for all IP SLAs operations or the specified operation.
show rtr group schedule	Displays the group schedule details of the specified IP SLAs operation.
show rtr history	Displays history collected for all IP SLAs operations or the specified operation.
show rtr operational-state	Displays the operational state of all IP SLAs operations or the specified operation.
show rtr reaction-trigger	Displays the reaction trigger information for all IP SLAs operations or the specified operation.

Command	Description
show rtr totals-statistics	Displays the total statistical values (accumulation of error counts and completions) for all IP SLAs operations or the specified operation.

show rtr distributions-statistics

Note Effective with Cisco IOS Release 12.3(14)T , the **show rtr distributions-statistics**command is replaced by the **show ip sla monitor distributions -statistics** command. Effective with Cisco IOS Release 12.2(31)SB2, the **show rtr distributions-statistics**command is replaced by the **show ip sla monitor statistics aggregated**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr distributions-statistics**command is replaced by the **show ip sla statistics aggregated**command. See the **show ip sla monitor distributions-statistics**, **show ip sla monitor statistics aggregated**, and **show ip sla statistics aggregated**commands for more information.

To display statistic distribution information (captured response times) for all Cisco IOS IP Service Level Agreements (IP SLAs) operations or the specified operation, use the **show rtr distributions-statistics** command in user EXEC or privileged EXEC mode.

show rtr distributions-statistics [*operation*] [**tabular** | **full**]

Syntax Description

operation	(Optional) Number of the IP SLAs operation to display.
tabular	(Optional) Displays information in a column format reducing the number of screens required to display the information. This is the default.
full	(Optional) Displays all information using identifiers next to each displayed value.

Command Default

Tabular format for all operations is displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.3(14)T	This command was replaced by the **show ip sla monitor distributions-statistics**command.
12.2(31)SB2	This command was replaced by the **show ip sla monitor statistics aggregated**command.
12.2(33)SRB	This command was replaced by the **show ip sla statistics aggregated**command.

Usage Guidelines

The distributions statistics consist of the following:

- The sum of completion times (used to calculate the mean)
- The sum of the completions times squared (used to calculate standard deviation)
- The maximum and minimum completion time
- The number of completed attempts

Note This command does not support the IP SLAs ICMP path jitter operation.

You can also use the **show rtr collection-statistics** and **show rtr totals-statistics** commands to display additional statistical information.

Examples

The following is sample output from the **show rtr distributions-statistics** command in tabular format when the output is split over multiple lines

```
Router# show rtr distributions-statistics
        Captured Statistics
        Multiple Lines per Entry
Line 1
Entry    = Entry Number
StartT   = Start Time of Entry (hundredths of seconds)
Pth      = Path Index
Hop      = Hop in Path Index
Dst      = Time Distribution Index
Comps    = Operations Completed
OvrTh    = Operations Completed Over Thresholds
SumCmp   = Sum of Completion Times (milliseconds)
Line 2
SumCmp2L = Sum of Completion Times Squared Low 32 Bits (milliseconds)
SumCmp2H = Sum of Completion Times Squared High 32 Bits (milliseconds)
TMax     = Completion Time Maximum (milliseconds)
TMin     = Completion Time Minimum (milliseconds)
Entry StartT     Pth Hop Dst Comps      OvrTh      SumCmp
  SumCmp2L   SumCmp2H   TMax       TMin
1     17417068   1   1   1   2          0           128
   8192      0          64         64
```

The following example shows the output as it appears on a single line:

```
Entry StartT   Pth Hop Dst Comps  OvrTh   SumCmp    SumCmp2L   SumCmp2H  TMax      TMin
10    3581     1   1   1   0      0       0         0          0         0         0
```

Related Commands

Command	Description
show rtr collection-statistics	Displays statistical errors for all IP SLAs operations or the specified operation.
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.
show rtr totals-statistics	Displays the total statistical values (accumulation of error counts and completions) for all IP SLAs operations or the specified operation.

show rtr enhanced-history collection-statistics

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **showrtrenhanced-historycollection-statistics**command is replaced by the **showipslamonitorenhanced-historycollection-statistics**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrenhanced-historycollection-statistics**command is replaced by the **showipslaenhanced-historycollection-statistics**command. See the **showipslamonitorenhanced-historycollection-statistics**and **showipslaenhanced-historycollection-statistics**commands for more information.

To display enhanced history statistics for all collected history buckets for the specified Cisco IOS IP Service Level Agreements (IP SLAs) operation, use the **showrtrenhanced-historycollection-statistics** command in user EXEC or privileged EXEC mode.

show rtr enhanced-history collection-statistics [*operation-number*] [**interval** *seconds*]

Syntax Description

operation-number	(Optional) Displays enhanced history distribution statistics for only the specified operation.
interval *seconds*	(Optional) Displays enhanced history distribution statistics for only the specified aggregation interval.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.3(14)T	This command was replaced by the **showipslamonitorenhanced-historycollection-statistics**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(31)SB2	This command was replaced by the **showipslamonitorenhanced-historycollection-statistics**command.
12.2(33)SRB	This command was replaced by the **showipslaenhanced-historycollection-statistics**command.

Usage Guidelines

This command displays data for each bucket of enhanced history data shown individually (one after the other).

The number of buckets and the collection interval is set using the**enhanced-historyinterval***seconds***buckets***number-of-buckets* RTR configuration command.

Examples

The following example shows sample output for the **showrtrenhanced-historycollection-statistics** command. The output of this command will vary depending on the type of IP SLAs operation.

```
Router# show rtr enhanced-history collection-statistics 1
Entry number: 1
Aggregation Interval: 900
Bucket Index: 1
Aggregation start time 00:15:00.003 UTC Thur May 1 2003
Target Address:
Number of failed operations due to a Disconnect: 0
Number of failed operations due to a Timeout: 0
Number of failed operations due to a Busy: 0
Number of failed operations due to a No Connection: 0
Number of failed operations due to an Internal Error: 0
Number of failed operations due to a Sequence Error: 0
Number of failed operations due to a Verify Error: 0
 .
 .
 .
```

The table below describes the significant fields shown in the display.

Table 41: show rtr enhanced-history collection-statistics Field Descriptions

Field	Description
Aggregation Interval:	The number of seconds the operation runs for each enhanced history bucket. For example, a value of 900 indicates that statistics were gathered for 15 minutes before the next bucket was created.
Bucket Index:	The number identifying the collection bucket. The number of buckets is set using the **enhanced-history** RTR configuration command.

show rtr enhanced-history distribution-statistics

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **showrtrenhanced-historydistribution-statistics**command is replaced by the **showipslamonitorenhanced-historydistribution-statistics**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrenhanced-historydistribution-statistics**command is replaced by the **showipslaenhanced-historydistribution-statistics**command. See the **showipslamonitorenhanced-historydistribution-statistics**and **showipslaenhanced-historydistribution-statistics**commands for more information.

To display enhanced history distribution statistics for Cisco IOS IP Service Level Agreements (IP SLAs) operations in tabular format, use the **showrtrenhanced-historydistribution-statistics** command in user EXEC or privileged EXEC mode.

show rtr enhanced-history distribution-statistics [*operation-number* [**interval** *seconds*]]

Syntax Description

operation-number	(Optional) Displays enhanced history distribution statistics for only the specified operation.
interval *seconds*	(Optional) Displays enhanced history distribution statistics for only the specified aggregation interval for only the specified operation. • The range is from 1 to 3600 (1 hour). The default is 900.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(1)	This command was introduced.
12.3(14)T	This command was replaced by the **showipslamonitorenhanced-historydistribution-statistics**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(31)SB2	This command was replaced by the **showipslamonitorenhanced-historydistribution-statistics**command.
12.2(33)SRB	This command was replaced by the **showipslaenhanced-historydistribution-statistics**command.

Usage Guidelines

The distribution statistics consist of the following:

- The sum of completion times (used to calculate the mean)

- The sum of the completion times squared (used to calculate standard deviation)
- The maximum and minimum completion times
- The number of completed attempts

You can also use the following commands to display additional statistics or history information, or to view the status of the operation:

- **show rtr enhanced-history collection-statistics**
- **show rtr enhanced-history totals-statistics**

Tip If the character 'n' appears in your output, or not all fields are displayed, you should increase the screen width for your CLI display (for example, using the **width** line configuration command or the **terminalwidth** EXEC mode command).

Examples

The following is sample output from the **showrtrenhanced-historydistribution-statistics** command. The fields are defined at the beginning of the output for the command. RTT means round-trip-time.

```
Router# show rtr enhanced-history distribution-statistics 3
 Point by point Enhanced History
Entry    = Entry Number
Int      = Aggregation Interval (seconds)
BucI     = Bucket Index
StartT   = Aggregation Start Time
Pth      = Path index
Hop      = Hop in path index
Comps    = Operations completed
OvrTh    = Operations completed over thresholds
SumCmp   = Sum of RTT (milliseconds)
SumCmp2L = Sum of RTT squared low 32 bits (milliseconds)
SumCmp2H = Sum of RTT squared high 32 bits (milliseconds)
TMax     = RTT maximum (milliseconds)
TMin     = RTT minimum (milliseconds)
Entry Int BucI StartT    Pth Hop Comps OvrTh SumCmp   SumCmp2L  SumCmp2H   TMax     TMin
3     900 1    257850000 1   1   3     0     43       617       0          15       14
3     900 2    258750002 1   1   3     0     45       677       0          16       14
3     900 3    259650000 1   1   3     0     44       646       0          15       14
3     900 4    260550002 1   1   3     0     42       594       0          15       12
3     900 5    261450003 1   1   3     0     42       590       0          15       13
3     900 6    262350001 1   1   3     0     46       706       0          16       15
3     900 7    263250003 1   1   3     0     46       708       0          16       14
 .
 .
 .
```

The time elapsed between BucketIndex 1 (started at 257,850,000) and BucketIndex 2 (started at 258,750,002) in this example is 900,002 milliseconds, or 900 seconds.

The table below describes the significant fields shown in the display.

Table 42: show rtr enhanced-history distribution-statistics Field Descriptions

Field	Description
Entry	The operation ID number you specified for the IP SLAs operation.
Int	Aggregation interval--The configured statistical distribution buckets interval, in seconds. For example, a value of 900 for Int means that statistics are gathered for 900 seconds per bucket.
BucI	Bucket index number--A number uniquely identifying the statistical distribution (aggregation) bucket. The number of history buckets to be kept is configured using the **buckets-of-history-kept** command. A bucket will gather statistics for the specified interval of time (aggregation interval), after which a new statistics bucket is created. If a number-of-buckets-kept value is configured, the interval for the last bucket is infinity (until the end of the operation). Buckets are not applicable to HTTP and UDP jitter monitoring operations. This field is equivalant to the rttMonStatsCaptureDistIndex object in the Cisco RTTMON MIB.
StartT	Aggregation start time--Start time for the aggregation interval (per Bucket Index). Shows the start time as the number of milliseconds since the router started; in other words, the time stamp is the number of milliseconds since the last system bootup.
Pth	Path index number--An identifier for a set of different paths to the target destination that have been discovered. For example, if the first operation iteration finds the path h1, h2, h3, h4, then this path is labeled as 1. If, on a later iteration, a new path is discovered, (such as h1, h2, h5, h6, h4) then this new path will be identified as 2, and so on. Data collection per path is available only for ICMP path echo operations ("pathEcho probes"). For all other operations, a value of 1 will always appear. Data collection per path is configured using the **paths-of-statistics-kept***number* command when configuring the operation.
Hop	Hop Index Number--Statistics data per hop. A hop is data transmission between two points in a path (for example, from device h2 to device h3). Data collection per hop is available only for ICMP path echo operations ("pathEcho probes"). For all other operations, a value of "1" will always appear. Data collection per hop is configured using the **hops-of-statistics-kept***number* command when configuring the operation. This field is equivalent to the rrttMonStatsCaptureHopIndex object in the Cisco RTTMON MIB.
Comps	Completions--The number of round-trip time operations that have completed without an error and without timing out, per bucket index. This object has the special behavior as defined by the ROLLOVER NOTE in the DESCRIPTION of the Cisco Rttmon MIB object.

Field	Description
SumCmp	Sum of completed operation times (1)--The total of all round-trip time values for all succesful operations in the row, in milliseconds.
SumCmp2L	Sum of the squares of completed operation times (2), Low-Order--The sum of the square roots of round-trip times for operations that were successfully measured, in milliseconds; displays the low-order 32 bits of the value only. • 32 low-order bits and 32 high-order bits are ordered in unsigned 64-bit integers (Int64) as follows: --- | High-order 32 bits | Low-order 32 bits | --- • The "SumCmp2" values are split into "high-order" and "low-order" numbers because of limitations of Simple Network Management Protocol (SNMP). The maximum value allowed for an SNMP object is 4,294,967,295 (the Gauge32 limit). If the sum of the square roots for your operation exceeds this value, then the "high-order" value will be utilized. (For example, the number 4,294,967,296 would have all low-order bits as 0, and the right-most high-order bit would be 1). • The low-order value (SumCmp2L) appears first in the output because in most cases, the value will be less than 4,294,967,295, which means that the value of SumCmp2H will appear as zero.
SumCmp2H	Sum of the squares of completed operation times (2), High-Order--The high-order 32 bits of the accumulated squares of completion times (in milliseconds) of operations that completed successfully.
TMax	Round-trip time, maximum--The highest recorded round-trip time, in milliseconds, per aggregation interval.
TMin	Round-trip time, minimum--The lowest recorded round-trip time, in milliseconds, per aggregation interval.

Related Commands

Command	Description
rtr	Begins configuration for an IP SLAs operation and enters RTR configuration mode.
show rtr enhanced-history collection-statistics	Displays data for all collected history buckets for the specified IP SLAs operation, with data for each bucket shown individually.

show rtr group schedule

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **showrtrgroupschedule**command is replaced by the **showipslamonitorgroupschedule**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrgroupschedule**command is replaced by the **showipslagroupschedule**command. See the **showipslamonitorgroupschedule**and **showipslagroupschedule**commands for more information.

To display the group schedule details of Cisco IOS IP Service Level Agreements (IP SLAs) operations, use the **showrtrgroupschedule**command in user EXEC or privileged EXEC mode.

show rtr group schedule [*group-operation-number*]

Syntax Description

group-operation-number	(Optional) Number of the IP SLAs group operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(8)T	This command was introduced.
12.3(14)T	This command was replaced by the **showipslamonitorgroupschedule**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(31)SB2	This command was replaced by the **showipslamonitorgroupschedule**command.
12.2(33)SRB	This command was replaced by the **showipslagroupschedule**command.

Examples

The following is sample output from the **showrtrgroupschedule** command that shows information about group (multiple) scheduling. The last line in the example indicates that the IP SLAs operations are multiple scheduled (TRUE):

```
Router# show rtr group schedule
Multi-Scheduling Configuration:
Group Entry Number: 1
Probes to be scheduled: 2,3,4,9-30,89
Schedule period :60
Group operation frequency: 30
Multi-scheduled: TRUE
```

The following is sample output from the **showrtrgroupschedule** command that shows information about group (multiple) scheduling, with the **frequency** value the same as the **schedule-period**value, the **life** value as 3600 seconds, and the **ageout** value as never:

```
Router# show rtr group schedule
Group Entry Number: 1
Probes to be scheduled: 3,4,6-10
Total number of probes: 7
Schedule period: 20
Group operation frequency: Equals schedule period
Status of entry (SNMP RowStatus): Active
Next Scheduled Start Time: Start Time already passed
Life (seconds): 3600
Entry Ageout (seconds): never
```

The table below describes the significant fields shown in the displays.

Table 43: show rtr group schedule Field Descriptions

Field	Description
Group Entry Number	The operation group number specified for IP SLAs multiple operations scheduling.
Probes to be scheduled	The operations numbers specified in the operation group 1.
Scheduled period	The time in seconds you mentioned while scheduling the operation.
Group operation frequency	The frequency at which each operation is started.
Multi-scheduled	The value TRUE shows that group scheduling is active.

Related Commands

Command	Description
show rtr configuration	Displays the scheduling details.
show running configuration	Displays the configuration details which includes the IP SLAs multiple operations scheduling information.

show rtr history

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **showrtrhistory**command is replaced by the **showipslamonitorhistory**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrhistory**command is replaced by the **showipslahistory**command. See the **showipslamonitorhistory**and **showipslahistory**commands for more information.

To display history collected for all Cisco IOS IP Service Level Agreements (IP SLAs) operations or for a specified operation, use the **showrtrhistory**command in user EXEC or privileged EXEC mode.

show rtr history [*operation-number*] [**tabular** | **full**]

Syntax Description

operation-number	(Optional) Displays history for only the specified operation.
tabular	(Optional) Displays information in a column format reducing the number of screens required to display the information. This is the default.
full	(Optional) Displays all information using identifiers next to each displayed value.

Command Default

Tabular format history for all operations is displayed.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.3(14)T	This command was replaced by the **showipslamonitorhistory**command.
12.2(31)SB2	This command was replaced by the **showipslamonitorhistory**command.
12.2(33)SRB	This command was replaced by the **showipslahistory**command.

Usage Guidelines

The table below lists the Response Return values used in the output of the **showrtrhistory** command. If the default (**tabular**) format is used, the Response Return description is displayed as a code in the Sense column. If the full format is used, the Response Return is displayed as indicated in the Description column.

Table 44: Response Return (Sense Column) Codes

Code	Description
1	Okay.
2	Disconnected.
3	Over threshold.
4	Timeout.

Code	Description
5	Busy.
6	Not connected.
7	Dropped.
8	Sequence error.
9	Verify error.
10	Application specific.

Examples

The following is sample output from the **showrtrhistory**command in tabular format:

```
Router# show rtr history
        Point by point History
          Multiple Lines per Entry
Line 1
 Entry    = Entry Number
 LifeI    = Life Index
 BucketI  = Bucket Index
 SampleI  = Sample Index
 SampleT  = Sample Start Time
 CompT    = Completion Time (milliseconds)
 Sense    = Response Return Code
Line 2 has the Target Address
Entry LifeI      BucketI    SampleI    SampleT    CompT      Sense
2     1          1          1          17436548   16          1
  AB 45 A0 16
2     1          2          1          17436551   4           1
  AC 12 7  29
2     1          2          2          17436551   1           1
  AC 12 5  22
2     1          2          3          17436552   4           1
  AB 45 A7 22
2     1          2          4          17436552   4           1
  AB 45 A0 16
```

Related Commands

Command	Description
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show rtr mpls-lsp-monitor configuration

Note Effective with Cisco IOS Release 12.2(31)SB2, the **showrtrmpls-lsp-monitorconfiguration**command is replaced by the **showipslamonitormpls-lsp-monitorconfiguration**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrmpls-lsp-monitorconfiguration**command is replaced by the **showipslampls-lsp-monitorconfiguration**command. See the **showipslamonitormpls-lsp-monitorconfiguration**and **showipslampls-lsp-monitorconfiguration**commands for more information.

To display configuration settings for IP Service Level Agreements (SLAs) label switched path (LSP) Health Monitor operations, use the **showrtrmpls-lsp-monitorconfiguration** command in user EXEC or privileged EXEC mode.

show rtr mpls-lsp-monitor configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the LSP Health Monitor operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

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	This command was replaced by the **showipslamonitormpls-lsp-monitorconfiguration**command.
12.2(33)SRB	This command was replaced by the **showipslampls-lsp-monitorconfiguration**command.

Usage Guidelines

If the identification number of an LSP Health Monitor operation is not specified, configuration values for all the configured LSP Health Monitor operations will be displayed.

Examples

The following is sample output from the **showrtrmpls-lsp-monitorconfiguration** command:

```
Router# show rtr mpls-lsp-monitor configuration 1
Entry Number : 1
Modification time   : *12:18:21.830 PDT Fri Aug 19 2005
Operation Type      : echo
Vrf Name            : saa-vrf-all
Tag                 :
EXP Value           : 0
Timeout(ms)         : 1000
Threshold(ms)       : 5000
Frequency(sec)      : Equals schedule period
LSP Selector        : 127.0.0.1
ScanInterval(min)   : 1
```

```
Delete Scan Factor  : 1
Operations List     : 100001-100003
Schedule Period(sec): 60
Request size        : 100
Start Time          : Start Time already passed
SNMP RowStatus      : Active
TTL value           : 255
Reply Mode          : ipv4
Reply Dscp Bits     :
Secondary Frequency : Enabled on Timeout
         Value(sec) : 10
Reaction Configs    :
    Reaction        : connectionLoss
    Threshold Type  : Consecutive
    Threshold Count : 3
    Action Type     : Trap Only
    Reaction        : timeout
    Threshold Type  : Consecutive
    Threshold Count : 3
    Action Type     : Trap Only
```

The table below describes the significant fields shown in the display.

Table 45: show rtr mpls-lsp-monitor configuration Field Descriptions

Field	Description
Entry Number	Identification number for the LSP Health Monitor operation.
Operation Type	Type of IP SLAs operation configured by the LSP Health Monitor operation.
Vrf Name	If a specific name is displayed in this field, then the LSP Health Monitor is configured to discover only those BGP next hop neighbors in use by the VRF specified. If saa-vrf-all is displayed in this field, then the LSP Health Monitor is configured to discover all BGP next hop neighbors in use by all VRFs associated with the source Provider Edge (PE) router.
Tag	User-specified identifier for the LSP Health Monitor operation.
EXP Value	Experimental field value in the header for an echo request packet of the IP SLAs operation.
Timeout(ms)	Amount of time the IP SLAs operation waits for a response from its request packet.
Threshold(ms)	Threshold value of the IP SLAs operation for which a reaction event is generated if violated.
Frequency(sec)	Time after which the IP SLAs operation is restarted.
LSP Selector	Local host IP address used to select the LSP for the IP SLAs operation.
ScanInterval(min)	Time interval at which the LSP Health Monitor checks the scan queue for BGP next hop neighbor updates.
Delete Scan Factor	Specifies the number of times the LSP Health Monitor should check the scan queue before automatically deleting IP SLAs operations for BGP next hop neighbors that are no longer valid.

Field	Description
Operations List	Identification numbers IP SLAs operations created by the LSP Health Monitor operation.
Schedule Period(sec)	Amount of time for which the LSP Health Monitor operation is scheduled.
Request size	Protocol data size for the request packet of the IP SLAs operation.
Start Time	Status of the start time for the LSP Health Monitor operation.
SNMP RowStatus	Indicates whether SNMP RowStatus is active or inactive.
TTL value	The maximum hop count for an echo request packet of the IP SLAs operation.
Reply Mode	Reply mode for an echo request packet of the IP SLAs operation.
Reply Dscp Bits	Differentiated services codepoint (DSCP) value of an echo reply packet of the IP SLAs operation.
Secondary Frequency	Reaction condition that will enable the secondary frequency option.
Value(sec)	Secondary frequency value.
Reaction Configs	Reaction configuration of the IP SLAs operation.
Reaction	Reaction condition being monitored.
Threshold Type	Specifies when an action should be performed as a result of a reaction event.
Threshold Count	The number of times a reaction event can occur before an action should be performed.
Action Type	Type of action that should be performed as a result of a reaction event.

Related Commands

Command	Description
rtr mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters SAA MPLS configuration mode.
rtr mpls-lsp-monitor schedule	Configures the scheduling parameters for an IP SLAs LSP Health Monitor operation.

show rtr mpls-lsp-monitor neighbors

Note Effective with Cisco IOS Release 12.2(31)SB2, the **showrtrmpls-lsp-monitorneighbors**command is replaced by the **showipslamonitormpls-lsp-monitorneighbors**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrmpls-lsp-monitorneighbors**command is replaced by the **showipslampls-lsp-monitorneighbors**command. See the **showipslamonitormpls-lsp-monitorneighbors**and **showipslampls-lsp-monitorneighbors**commands for more information.

To display routing and connectivity information about Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) Border Gateway Protocol (BGP) next hop neighbors discovered by the IP Service Level Agreements (SLAs) label switched path (LSP) Health Monitor, use the **showrtrmpls-lsp-monitorneighbors** command in user EXEC or privileged EXEC mode.

show rtr mpls-lsp-monitor neighbors

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

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	This command was replaced by the **showipslamonitormpls-lsp-monitorneighbors**command.
12.2(33)SRB	This command was replaced by the **showipslampls-lsp-monitorneighbors**command.

Examples

The following is sample output from the **showrtrmpls-lsp-monitorneighbors**command:

```
Router# show rtr mpls-lsp-monitor neighbors
SAA MPLS LSP Monitor Database : 1
BGP Next hop 10.10.10.5 (Prefix: 10.10.10.5/32)  OK
  ProbeID: 100001 (red, blue, green)
BGP Next hop 10.10.10.7 (Prefix: 10.10.10.7/32)  OK
  ProbeID: 100002 (red, blue, green)
BGP Next hop 10.10.10.8 (Prefix: 10.10.10.8/32)  OK
  ProbeID: 100003 (red, blue, green)
```

The table below describes the significant fields shown in the display.

Table 46: show rtr mpls-lsp-monitor neighbors Field Descriptions

Field	Description
BGP Next hop	Identifier for the BGP next hop neighbor.

Field	Description
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.
ProbeID	The identification number of the IP SLAs operation. The names of the VRFs that contain routing entries for the specified BGP next hop neighbor are listed in parentheses.
OK	LSP ping or LSP traceroute connectivity status between the source PE router and specified BGP next hop neighbor. Connectivity status can be the following: • OK--Successful reply. • ConnectionLoss--Reply is from a device that is not egress for the Forward Equivalence Class (FEC). • Timeout--Echo request timeout. • Unknown--State of LSP is not known.

Related Commands

Command	Description
rtr mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters SAA MPLS configuration mode.

show rtr mpls-lsp-monitor scan-queue

Note Effective with Cisco IOS Release 12.2(31)SB2, the **showrtrmpls-lsp-monitorscan-queue**command is replaced by the **showipslamonitormpls-lsp-monitorscan-queue**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrmpls-lsp-monitorscan-queue**command is replaced by the **showipslampls-lsp-monitorscan-queue**command. See the **showipslamonitormpls-lsp-monitorscan-queue**and **showipslampls-lsp-monitorscan-queue**commands for more information.

To display information about adding or deleting Border Gateway Protocol (BGP) next hop neighbors from a particular Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) of an IP Service Level Agreements (SLAs) LSP Health Monitor operation, use the **showrtrmpls-lsp-monitorscan-queue** command in user EXEC or privileged EXEC mode.

show rtr mpls-lsp-monitor scan-queue *operation-number*

Syntax Description

operation-number	Number of the LSP Health Monitor operation for which the details will be displayed.

Command Modes

User EXEC Privileged EXEC

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	This command was replaced by the **showipslamonitormpls-lsp-monitorscan-queue**command.
12.2(33)SRB	This command was replaced by the **showipslampls-lsp-monitorscan-queue**command.

Examples

The following is sample output from the **showrtrmpls-lsp-monitorscan-queue** command:

```
Router# show rtr mpls-lsp-monitor scan-queue 1
Next scan Time after: 23 Secs
Next Delete scan Time after: 83 Secs
BGP Next hop    Prefix            vrf                              Add/Delete?
10.10.10.8      10.10.10.8/32     red                              Add
10.10.10.8      10.10.10.8/32     blue                             Add
10.10.10.8      10.10.10.8/32     green                            Add
```

The table below describes the significant fields shown in the display.

Table 47: show rtr mpls-lsp-monitor scan-queue Field Descriptions

Field	Description
Next scan Time after	Amount of time left before the LSP Health Monitor checks the scan queue for information about adding BGP next hop neighbors to a particular VPN. At the start of each scan time, IP SLAs operations are created for all newly discovered neighbors.
Next Delete scan Time after	Amount of time left before the LSP Health Monitor checks the scan queue for information about deleting BGP next hop neighbors from a particular VPN. At the start of each delete scan time, IP SLAs operations are deleted for neighbors that are no longer valid.
BGP Next hop	Identifier for the BGP next hop neighbor.
Prefix	IPv4 Forward Equivalence Class (FEC) of the BGP next hop neighbor to be used by the MPLS LSP ping operation.
vrf	Name of the VRF that contains a routing entry for the specified BGP next hop neighbor.
Add/Delete	Indicates that the specified BGP next hop neighbor will be added to or removed from the specified VPN.

Related Commands

Command	Description
delete-scan-factor	Specifies the number of times the LSP Health Monitor should check the scan queue before automatically deleting IP SLAs operations for BGP next hop neighbors that are no longer valid.
mpls discovery vpn interval	Specifies the time interval at which routing entries that are no longer valid are removed from the BGP next hop neighbor discovery database of an MPLS VPN.
rtr mpls-lsp-monitor	Begins configuration for an IP SLAs LSP Health Monitor operation and enters SAA MPLS configuration mode.
scan-interval	Specifies the time interval (in minutes) at which the LSP Health Monitor checks the scan queue for BGP next hop neighbor updates.

show rtr operational-state

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **showrtroperational-state**command is replaced by the **showipslamonitorstatistics**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtroperational-state**command is replaced by the **showipslastatistics**command. See the **showipslamonitorstatistics**and **showipslastatistics**commands for more information.

To display the operational state of all Cisco IOS IP Service Level Agreements (IP SLAs) operations or a specified operation, use the **showrtroperational-state** command in user EXEC or privileged EXEC mode.

show rtr operational-state [*operation-number*]

Syntax Description

operation-number	(Optional) ID number of the IP SLAs operation to display.

Command Default

Displays output for all running IP SLAs operations.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.0(5)T	Output for the Jitter operation type was added.
12.1	The **tabular** and **full** keywords were removed.
12.2(8)T	Output for “NumOfJitterSamples” was added (CSCdv30022).
12.2(8)S	Output for “NumOfJitterSamples” was added (CSCdv30022).
12.3(4)T	Output (MOS and ICPIF scores) for the Jitter (codec) operation type was added.
12.3(7)T	Decimal granularity for MOS scores was added.
12.3(14)T	This command was replaced by the **showipslamonitorstatistics**command.
12.2(31)SB2	This command was replaced by the **showipslamonitorstatistics**command.
12.2(33)SRB	This command was replaced by the **showipslastatistics**command.

Usage Guidelines

Use the **showrtroperational-state** command to display the current state of IP SLAs operations, including how much life the operation has left, whether the operation is active, and the completion time. The output will also include the monitoring data returned for the last (most recently completed) operation.

Examples

The following example shows basic sample output from the **showrtroperational-state** command:

```
Router# show rtr operational-state          Current Operational State
```

```
Entry Number: 3
Modification Time: *22:15:43.000 UTC Sun Feb 11 2001
Diagnostics Text:
Last Time this Entry was Reset: Never
Number of Octets in use by this Entry: 1332
Number of Operations Attempted: 2
Current Seconds Left in Life: 3511
Operational State of Entry: active
Latest Completion Time (milliseconds): 544
Latest Operation Start Time: *22:16:43.000 UTC Sun Feb 11 2001
Latest Oper Sense: ok
Latest Sense Description: 200  OK
Total RTT: 544
DNS RTT: 12
TCP Connection RTT: 28
HTTP Transaction RTT: 504
HTTP Message Size: 9707
```

The following example shows sample output from the **showrtroperational-state** command when the specified operation is a Jitter (codec) operation:

```
Router# show rtr operational-state 1
Entry number: 1
Modification time: 13:18:38.012 PST Mon Jun 24 2002
Number of Octets Used by this Entry: 10392
Number of operations attempted: 2
Number of operations skipped: 0
Current seconds left in Life: Forever
Operational state of entry: Active
Last time this entry was reset: Never
Connection loss occurred: FALSE
Timeout occurred: FALSE
Over thresholds occurred: FALSE
Latest RTT (milliseconds): 2
Latest operation start time: *13:18:42.896 PST Mon Jun 24 2002
Latest operation return code: OK
Voice Scores:
ICPIF Value: 0  MOS score: 0
RTT Values:
NumOfRTT: 61    RTTAvg: 2       RTTMin: 2       RTTMax: 3
RTTSum: 123     RTTSum2: 249
Packet Loss Values:
PacketLossSD: 0 PacketLossDS: 0
PacketOutOfSequence: 0  PacketMIA: 0    PacketLateArrival: 0
InternalError: 0        Busies: 0       PacketSkipped: 39   <<<<<<==========
Jitter Values:
MinOfPositivesSD: 1     MaxOfPositivesSD: 1
NumOfPositivesSD: 1     SumOfPositivesSD: 1     Sum2PositivesSD: 1
MinOfNegativesSD: 1     MaxOfNegativesSD: 1
NumOfNegativesSD: 1     SumOfNegativesSD: 1     Sum2NegativesSD: 1
MinOfPositivesDS: 0     MaxOfPositivesDS: 0
NumOfPositivesDS: 0     SumOfPositivesDS: 0     Sum2PositivesDS: 0
MinOfNegativesDS: 0     MaxOfNegativesDS: 0
NumOfNegativesDS: 0     SumOfNegativesDS: 0     Sum2NegativesDS: 0
Interarrival jitterout: 0       Interarrival jitterin: 0
One Way Values:
NumOfOW: 0
OWMinSD: 0      OWMaxSD: 0      OWSumSD: 0      OWSum2SD: 0
OWMinDS: 0      OWMaxDS: 0      OWSumDS: 0      OWSum2DS: 0
```

The values shown indicate the values for the last IP SLAs operation. RTT stands for Round-Trip-Time. SD stands for Source-to-Destination. DS stands for Destination-to-Source. OW stands for One Way.

The * symbol in front of the time stamps indicates the time is synchronized using NTP or SNTP.
The table below describes the significant fields shown in this output.

Table 48: show rtr operational-state Field Descriptions

Field	Description
Voice Scores:	Indicates that Voice over IP statistics appear on the following lines. Voice score data is computed when the operation type is configured as **typejitter(codec)**.
ICPIF:	The Calculated Planning Impairment Factor (ICPIF) value for the latest iteration of the operation. The ICPIF value is computed by IP SLAs using the formula *Icpif=Io+Iq+Idte+Idd+Ie-A*, where • the values for *Io* , *Iq* , and *Idte* are set to zero, • the value *Idd* is computed based on the measured one way delay, • the value *Ie* is computed based on the measured packet loss, • and the value of A is specified by the user. ICPIF values are expressed in a typical range of 5 (very low impairment) to 55 (very high impairment). ICPIF values numerically less than 20 are generally considered "adequate." **Note** This value is intended only for relative comparisons, and may not match ICPIF values generated using alternate methods.
MOS:	The estimated Mean Opinion Score (Conversational Quality, Estimated) for the latest iteration of the operation. The MOS-CQE is computed by IP SLAs as a function of the ICPIF. MOS values are expressed as a number from 1 (1.00) to 5 (5.00), with 5 being the highest level of quality, and 1 being the lowest level of quality. A MOS value of 0 (zero) indicates that MOS data could not be generated for the operation.
RTT Values:	Indicates that Round-Trip-Time statistics appear on the following lines.
NumOfRTT	The number of successful round trips.
RTTSum	The sum of those round trip values (in milliseconds).
RTTSum2	The sum of squares of those round trip values (in milliseconds).
Packet Loss Values:	Indicates that Packet Loss statistics appear on the following lines.
PacketLossSD	The number of packets lost from source to destination.
PacketLossDS	The number of packets lost from destination to source.
PacketOutOfSequence	The number of packets returned out of order.

Field	Description
PacketMIA	The number of packets lost where the direction (SD or DS) cannot be determined (MIA: “missing in action”).
PacketLateArrival	The number of packets that arrived after the timeout.
PacketSkipped	The number of packets that are not sent during the IP SLAs jitter operation.
InternalError	The number of times an operation could not be started due to other internal failures.
Busies	The number of times this operation could not be started because the previously scheduled run was not finished.
Jitter Values:	Indicates that jitter operation statistics appear on the following lines. Jitter is inter-packet delay variance.
NumOfJitterSamples:	The number of jitter samples collected. This is the number of samples that are used to calculate the following jitter statistics.
MinOfPositivesSD MaxOfPositivesSD	The minimum and maximum positive jitter values from source to destination, in milliseconds.
NumOfPositivesSD	The number of jitter values from source to destination that are positive (i.e., network latency increases for two consecutive test packets).
SumOfPositivesSD	The sum of those positive values (in milliseconds).
Sum2PositivesSD	The sum of squares of those positive values.
MinOfNegativesSD MaxOfNegativesSD	The minimum and maximum negative jitter values from source to destination. The absolute value is given.
NumOfNegativesSD	The number of jitter values from source to destination that are negative (that is, network latency decreases for two consecutive test packets).
SumOfNegativesSD	The sum of those values.
Sum2NegativesSD	The sum of the squares of those values.
Interarrival jitterout:	The source to destination (SD) jitter value calculation, as defined in RFC 1889.
Interarrival jitterin:	The destination to source (DS) jitter value calculation, as defined in RFC 1889.
One Way Values	Indicates that One Way measurement statistics appear on the following lines. One Way (OW) Values are the amount of time it took the packet to travel from the source router to the target router (SD) or from the target router to the source router (DS).
NumOfOW	Number of successful one way time measurements.

Field	Description
OWMinSD	Minimum time from the source to the destination.
OWMaxSD	Maximum time from the source to the destination.
OWSumSD	Sum of the OWMinSD and OWMaxSD values.
OWSum2SD	Sum of the squares of the OWMinSD and OWMaxSD values.

Related Commands

Command	Description
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show rtr reaction-configuration

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **showrtrreaction-configuration**command is replaced by the **showipslamonitorreaction-configuration**command. Effective with Cisco IOS Release 12.2(33)SRB, the **showrtrreaction-configuration**command is replaced by the **showipslareaction-configuration**command. See the **showipslamonitorreaction-configuration**and **showipslareaction-configuration**commands for more information.

To display the configured proactive threshold monitoring settings for all Cisco IOS IP Service Level Agreements (SLAs) operations or a specified operation, use the **showrtrreaction-configuration** command in user EXEC or privileged EXEC mode.

show rtr reaction-configuration [*operation-number*]

Syntax Description

operation-number	(Optional) Displays the reaction configuration for only the specified IP SLAs operation.

Command Default

Displays configured proactive threshold monitoring settings for all IP SLAs operations.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.3(14)T	This command was replaced by the **showipslamonitorreaction-configuration**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(31)SB2	This command was replaced by the **showipslamonitorreaction-configuration**command.
12.2(33)SRB	This command was replaced by the **showipslareaction-configuration**command.

Usage Guidelines

Use the **rtrreaction-configuration** command in global configuration mode to configure the proactive threshold monitoring parameters for an IP SLAs operations.

Examples

In the following example, multiple monitored elements (indicated by the Reaction values) are configured for a single IP SLAs operation:

```
Router# show rtr reaction-configuration

Entry Number: 1
Reaction: RTT
Threshold type: Never
```

```
Rising (milliseconds): 5000
Falling (milliseconds): 3000
Threshold Count: 5
Threshold Count2: 5
Action Type: None
Reaction: jitterDSAvg
Threshold type: average
Rising (milliseconds): 5
Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: triggerOnly
Reaction: jitterDSAvg
Threshold type:  immediate
Rising (milliseconds): 5
Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: trapOnly
Reaction: PacketLossSD
Threshold type:  immediate
Rising (milliseconds): 5
Threshold Falling (milliseconds): 3
Threshold Count: 5
Threshold Count2: 5
Action Type: trapOnly
```

The table below describes the significant fields shown in this output.

Table 49: show rtr reaction-configuration Field Descriptions

Field	Description
Reaction:	The monitored element configured for the specified IP SLAs operation. Corresponds to the **react**{**connectionLoss** | **jitterAvg** | **jitterDSAvg** | **jitterSDAvg** | **mos** | **PacketLossDS** | **PacketLossSD** | **rtt** | **timeout** | **verifyError**} syntax in the **rtrreaction-configuration** command.
Threshold type:	The configured threshold type. Corresponds to the **threshold-type** {**never** | **immediate** | **consecutive** | **xofy** | **average**} syntax in the **rtrreaction-configuration** command.
Rising (milliseconds):	The *upper-threshold* value, as configured by the **threshold-value***upper-thresholdlower-threshold* syntax in the **rtrreaction-configuration** command.
Threshold Falling (milliseconds):	The *lower-threshold* value, as configured by the **threshold-value***upper-thresholdlower-threshold* syntax in the **rtrreaction-configuration** command.
Threshold Count:	The *x-value* in the **xofy** threshold type, or the *number-of-measurements* value for **average** threshold type.
Threshold Count2:	The *y-value* in the **xofy** threshold-type.
Action Type:	The reaction to be performed when the violation conditions are met, as configured by the **action-type** {**none** | **trapOnly** | **triggerOnly** | **trapAndTrigger**} syntax in the **rtrreaction-configuration** command.

Related Commands

Command	Description
rtr reaction-configuration	Configures proactive threshold monitoring parameters for an IP SLAs operation.

show rtr reaction-trigger

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **show rtr reaction-trigger**command is replaced by the **show ip sla monitor reaction-trigger**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr reaction-trigger**command is replaced by the **show ip sla reaction-trigger**command. See the **show ip sla monitor reaction-trigger**and **show ip sla reaction-trigger**commands for more information.

To display the reaction trigger information for all Cisco IOS IP Service Level Agreements (IP SLAs) operations or the specified operation, use the **show rtr reaction-trigger** command in user EXEC or privileged EXEC mode.

show rtr reaction-trigger [*operation-number*]

Syntax Description

operation-number	(Optional) Number of the IP SLAs operation to display.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.3(14)T	This command was replaced by the **show ip sla monitor reaction-trigger**command.
12.2(31)SB2	This command was replaced by the **show ip sla monitor reaction-trigger**command.
12.2(33)SRB	This command was replaced by the **show ip sla reaction-trigger**command.

Usage Guidelines

Use the **show rtr reaction-trigger** command to display the configuration status and operational state of target operations that will be triggered as defined with the **rtr reaction-configuration** global command.

Examples

The following is sample output from the **show rtr reaction-trigger** command:

```
Router# show rtr reaction-trigger 1
        Reaction Table
Entry Number: 1
Target Entry Number: 2
Status of Entry (SNMP RowStatus): active
Operational State: pending
```

Related Commands

Command	Description
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.

show rtr responder

Note Effective with Cisco IOS Release 12.3(14)T and 12.2(31)SB2, the **show rtr responder**command is replaced by the **show ip sla monitor responder**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr responder**command is replaced by the **show ip sla responder**command. See the **show ip sla monitor responder**and **show ip sla responder**commands for more information.

To display Cisco IOS IP Service Level Agreements (IP SLAs) Responder information, use the **show rtr responder** command in user EXEC or privileged EXEC mode.

show rtr responder

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.3(14)T	This command was replaced by the **show ip sla monitor responder**command.
12.2(31)SB2	This command was replaced by the **show ip sla monitor responder**command.
12.2(33)SRB	This command was replaced by the **show ip sla responder**command.

Usage Guidelines

Use the **show rtr responder**command to display information about recent sources of IP SLAs control messages, such as who has sent recent control messages and who has sent invalid control messages.

Examples

The following is sample output from the **show rtr responder** command:

```
Router# show rtr responder

RTR Responder is: Enabled
Number of control message received: 19 Number of errors: 1
Recent sources:
        4.0.0.1 [19:11:49.035 UTC Sat Dec 2 1995]
        4.0.0.1 [19:10:49.023 UTC Sat Dec 2 1995]
        4.0.0.1 [19:09:48.707 UTC Sat Dec 2 1995]
        4.0.0.1 [19:08:48.687 UTC Sat Dec 2 1995]
        4.0.0.1 [19:07:48.671 UTC Sat Dec 2 1995]
Recent error sources:
        4.0.0.1 [19:10:49.023 UTC Sat Dec 2 1995] RTT_AUTH_FAIL
```

Related Commands

Command	Description
show rtr configuration	Displays configuration values for IP SLAs operations.

show rtr totals-statistics

Note Effective with Cisco IOS Release 12.3(14)T , the **show rtr totals-statistics**command is replaced by the **show ip sla monitor totals -statistics** command. Effective with Cisco IOS Release 12.2(31)SB2, the **show rtr totals-statistics**command is replaced by the **show ip sla monitor statistics aggregated**command. Effective with Cisco IOS Release 12.2(33)SRB, the **show rtr totals-statistics**command is replaced by the **show ip sla statistics aggregated**command. See the **show ip sla monitor totals -statistics**, **show ip sla monitor statistics aggregated**, and **show ip sla statistics aggregated**commands for more information.

To display the total statistical values (accumulation of error counts and completions) for all Cisco IOS IP Service Level Agreements (IP SLAs) operations or the specified operation, use the **show rtr totals-statistics** command in user EXEC or privileged EXEC mode.

show rtr totals-statistics [*number*] [**tabular** | **full**]

Syntax Description

number	(Optional) Number of the IP SLAs operation to display.
tabular	(Optional) Display information in a column format reducing the number of screens required to display the information.
full	(Optional) Display all information using identifiers next to each displayed value. This is the default.

Command Default

Full format for all operations

Command Modes

User EXEC Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.3(14)T	This command was replaced by the **show ip sla monitor total-statistics**command.
12.2(31)SB2	This command was replaced by the **show ip sla monitor statistics aggregated**command.
12.2(33)SRB	This command was replaced by the **show ip sla statistics aggregated**command.

Usage Guidelines

The total statistics consist of the following items:

- The operation number
- The start time of the current hour of statistics
- The age of the current hour of statistics
- The number of attempted operations

You can also use the **show rtr distributions-statistics** and **show rtr collection-statistics** commands to display additional statistical information.

Examples

The following is sample output from the **show rtr totals-statistics** command in full format:

```
Router# show rtr totals-statistics
        Statistic Totals
Entry Number: 1
Start Time Index: *17:15:41.000 UTC Thu May 16 1996
Age of Statistics Entry (hundredths of seconds): 48252
Number of Initiations: 10
```

Related Commands

Command	Description
show rtr collection-statistics	Displays statistical errors for all IP SLAs operations or the specified operation.
show rtr configuration	Displays configuration values including all defaults for all IP SLAs operations or the specified operation.
show rtr distributions-statistics	Displays statistic distribution information (captured response times) for all IP SLAs operations or the specified operation.