IP SLAs for Metro-Ethernet

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The IP Service Level Agreements (SLAs) for Metro-Ethernet feature provides the capability to gather Ethernet layer network performance metrics. This feature integrates Cisco IOS IP SLAs with the Ethernet Connectivity Fault Management (CFM) feature. Ethernet CFM is an end-to-end per-service-instance Ethernet layer operation, administration, and management (OAM) protocol. Available statistical measurements for the IP SLAs Ethernet operation include round-trip time, jitter (interpacket delay variance), and packet loss.

The IP SLAs for Metro-Ethernet feature also allows you to perform multioperation scheduling of IP SLAs operations and supports proactive threshold violation monitoring through Simple Network Management Protocol (SNMP) trap notifications and syslog messages.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for the IP SLAs Ethernet Operation" section on page 36.

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

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

Contents

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Prerequisites for the IP SLAs Ethernet Operation

It is recommended that the IEEE 802.1ag standard is supported on the destination devices in order to obtain complete error reporting and diagnostics information.

Note The destination devices do not require the IP SLAs Responder to be enabled.

Restrictions for the IP SLAs Ethernet Operation

Memory and performance may be impacted for a given Ethernet CFM maintenance domain and VLAN that has a large number of maintenance endpoints (MEPs).

Information About the IP SLAs Ethernet Operation

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

Benefits of the IP SLAs Ethernet Operation

- End-to-end connectivity measurements for determining network availability or testing network connectivity in service provider Ethernet networks
- Proactive threshold violation monitoring through SNMP trap notifications and syslog messages
- Reduced network troubleshooting time for service provider Ethernet networks
- Creation of IP SLAs Ethernet ping and Ethernet jitter operations based on network topology
- Discovery of existing maintenance endpoints (MEPs) in a given Ethernet CFM maintenance domain and VLAN based on the Ethernet CFM database
- Multioperation scheduling of IP SLAs operations

Ethernet CFM

Ethernet CFM is an end-to-end per-service-instance Ethernet layer operation, administration, and management (OAM) protocol. For more information about this feature, see the documentation for the Ethernet CFM feature. (See the "Related Documents" section on page 11 for the location of this document.)

IP SLAs Ethernet Operation Basics

The IP SLAs for Metro-Ethernet feature integrates the IP SLAs software subsystem with the Ethernet CFM software subsystem to provide the capability to gather Ethernet layer statistical measurements by sending and receiving Ethernet data frames between Ethernet CFM maintenance endpoints (MEPs). The performance metrics for IP SLAs Ethernet operations are measured between a source MEP and a destination MEP. Unlike existing IP SLAs operations that provide performance metrics for the IP layer, the IP SLAs Ethernet operation provides performance metrics for Layer 2.

IP SLAs Ethernet operations may be configured using CLI or Simple Network Management Protocol (SNMP). You can manually configure individual Ethernet ping or Ethernet jitter operations by specifying the destination MEP identification number, name of the maintenance domain, and VLAN identification number. You also have the option to configure an IP SLAs auto Ethernet operation that will query the Ethernet CFM database for all maintenance endpoints in a given maintenance domain and VLAN and automatically create individual Ethernet ping or Ethernet jitter operations based on the MEPs that were discovered. A notification mechanism exists between the IP SLAs and Ethernet CFM subsystems to facilitate the automatic creation of Ethernet ping or Ethernet jitter operations for applicable MEPs that are added to a given maintenance domain and VLAN while an auto Ethernet operation is running.

The IP SLAs for Metro-Ethernet feature also allows you to perform multioperation scheduling of IP SLAs operations and supports proactive threshold violation monitoring through SNMP trap notifications and syslog messages. For more information on these topics, see the "Related Documents" section on page 11.

Statistics Measured by the IP SLAs Ethernet Operation

The network performance metrics supported by the IP SLAs Ethernet operation is similar to the metrics supported by existing IP SLAs operations. The statistical measurements supported by the IP SLAs Ethernet jitter operation include the following:

- Jitter (source-to-destination and destination-to-source)
- Round-trip time latency
- Unprocessed packets
- Packet loss (source-to-destination and destination-to-source)
- Out-of-sequence, tail-dropped, and late packets

How to Configure the IP SLAs Ethernet Operation

This section contains the following tasks:

Configuring an IP SLAs Ethernet Operation with Endpoint Discovery

Perform this task to configure and schedule an IP SLAs auto Ethernet operation.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla ethernet-monitor** *operation-number*
4. **type echo domain** *domain-name* **vlan** *vlan-id* [**exclude-mpids** *mp-ids*]
   or
   type jitter domain *domain-name* **vlan** *vlan-id* [**exclude-mpids** *mp-ids*] [**interval** *interframe-interval*] [**num-frames** *frames-number*]
5. **cos** *cos-value*
6. **owner** *owner-id*
7. **request-data-size** *bytes*
8. **tag** *text*
9. **threshold** *milliseconds*
10. **timeout** *milliseconds*
11. **exit**
12. **ip sla ethernet-monitor reaction-configuration** *operation-number* **react** *monitored-element* [**action-type** {**none** | **trapOnly**}] [**threshold-type** {**average** [*number-of-measurements*] | **consecutive** [*occurrences*] | **immediate** | **never** | **xofy** [*x-value y-value*]}] [**threshold-value** *upper-threshold lower-threshold*]
13. **ip sla ethernet-monitor schedule** *operation-number* **schedule-period** *seconds* [**frequency** [*seconds*]] [**start-time** {**after** *hh*:*mm*:*ss* | *hh*:*mm*[:*ss*] [*month day* | *day month*] | **now** | **pending**}]
14. **exit**
15. **show ip sla ethernet-monitor configuration** [*operation-number*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ip sla ethernet-monitor** *operation-number* **Example:** `Router(config)# ip sla ethernet-monitor 1`	Begins configuration for an IP SLAs auto Ethernet operation and enters IP SLA Ethernet monitor configuration mode.

	Command or Action	Purpose

Step 4	**type echo domain** *domain-name* **vlan** *vlan-id* [**exclude-mpids** *mp-ids*]
	or
	type jitter domain *domain-name* **vlan** *vlan-id* [**exclude-mpids** *mp-ids*] [**interval** *interframe-interval*] [**num-frames** *frames-number*]
	
	Example:
	`Router(config-ip-sla-ethernet-monitor)# type echo domain testdomain vlan 34`
	or
	
	Example:
	`Router(config-ip-sla-ethernet-monitor)# type jitter domain testdomain vlan 34 interval 20 num-frames 30`
		Configures an auto Ethernet operation to create Ethernet ping operations.
		or
		Configures an auto Ethernet operation to create Ethernet jitter operations.

Step 5	**cos** *cos-value* **Example:** `Router(config-ip-sla-ethernet-params)# cos 2`	(Optional) Sets the class of service for an IP SLAs Ethernet operation.
Step 6	**owner** *owner-id* **Example:** `Router(config-ip-sla-ethernet-params)# owner admin`	(Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.
Step 7	**request-data-size** *bytes* **Example:** `Router(config-ip-sla-ethernet-params)# request-data-size 64`	(Optional) Sets the padding size for the data frame of an IP SLAs Ethernet operation. The default value for IP SLAs Ethernet ping operations is 66 bytes. The default value for IP SLAs Ethernet jitter operations is 51 bytes.
Step 8	**tag** *text* **Example:** `Router(config-ip-sla-ethernet-params)# tag TelnetPollSever1`	(Optional) Creates a user-specified identifier for an IP SLAs operation.
Step 9	**threshold** *milliseconds* **Example:** `Router(config-ip-sla-ethernet-params)# threshold 10000`	(Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.
Step 10	**timeout** *milliseconds* **Example:** `Router(config-ip-sla-ethernet-params)# timeout 10000`	(Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet.

	Command or Action	Purpose
Step 11	**exit** **Example:** `Router(config-ip-sla-ethernet-params)# exit`	Exits IP SLAs auto Ethernet parameters configuration submode and returns to global configuration mode.
Step 12	**ip sla ethernet-monitor reaction-configuration** *operation-number* **react** *monitored-element* [**action-type** {**none** | **trapOnly**}] [**threshold-type** {**average** [*number-of-measurements*] | **consecutive** [*occurrences*] | **immediate** | **never** | **xofy** [*x-value y-value*]}] [**threshold-value** *upper-threshold lower-threshold*] **Example:** `Router(config)# ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type consecutive 3 action-type trapOnly`	Configures proactive threshold monitoring parameters for an IP SLAs auto Ethernet operation.
Step 13	**ip sla ethernet-monitor schedule** *operation-number* **schedule-period** *seconds* [**frequency** [*seconds*]] [**start-time** {**after** *hh*:*mm*:*ss* | *hh*:*mm*[:*ss*] [*month day* | *day month*] | **now** | **pending**}] **Example:** `Router(config)# ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now`	Configures scheduling parameters for an IP SLAs auto Ethernet operation.
Step 14	**exit** **Example:** `Router(config)# exit`	(Optional) Exits global configuration mode and returns to privileged EXEC mode.
Step 15	**show ip sla ethernet-monitor configuration** [*operation-number*] **Example:** `Router# show ip sla ethernet-monitor configuration 1`	(Optional) Displays configuration settings for all IP SLAs auto Ethernet operations or a specified auto Ethernet operation.

Troubleshooting Tips

Use the **debug ip sla trace** and **debug ip sla error** commands to help troubleshoot issues with an individual IP SLAs Ethernet ping or Ethernet jitter operation. Use the **debug ip sla ethernet-monitor** command to help troubleshoot issues with an IP SLAs auto Ethernet operation.

What to Do Next

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

Manually Configuring an Individual IP SLAs Ethernet Operation

Perform this task to manually configure and schedule an individual IP SLAs Ethernet ping or Ethernet jitter operation.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip sla** *operation-number*
4. **ethernet echo mpid** *mp-id* **domain** *domain-name* **vlan** *vlan-id*
   or
   ethernet jitter mpid *mp-id* **domain** *domain-name* **vlan** *vlan-id* [**interval** *interframe-interval*] [**num-frames** *frames-number*]
5. **cos** *cos-value*
6. **frequency** *seconds*
7. **history** *history-parameter*
8. **owner** *owner-id*
9. **request-data-size** *bytes*
10. **tag** *text*
11. **threshold** *milliseconds*
12. **timeout** *milliseconds*
13. **exit**
14. **ip sla reaction-configuration** *operation-number* **react** *monitored-element* [**action-type** *option*] [**threshold-type** {**average** [*number-of-measurements*] | **consecutive** [*occurrences*] | **immediate** | **never** | **xofy** [*x-value y-value*]}] [**threshold-value** *upper-threshold lower-threshold*]
15. **ip sla schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*] [**ageout** *seconds*] [**recurring**]
16. **exit**
17. **show ip sla configuration** [*operation-number*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**ip sla** *operation-number* **Example:** `Router(config)# ip sla 1`	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.

Step 4	**ethernet echo mpid** *mp-id* **domain** *domain-name* **vlan** *vlan-id*
	or
	ethernet jitter mpid *mp-id* **domain** *domain-name* **vlan** *vlan-id* [**interval** *interframe-interval*] [**num-frames** *frames-number*]
	
	Example:
	`Router(config-ip-sla)# ethernet echo mpid 23 domain testdomain vlan 34`
	or
	
	Example:
	`Router(config-ip-sla)# ethernet jitter mpid 23 domain testdomain vlan 34 interval 20 num-frames 30`
		Configures the IP SLAs operation as an Ethernet ping operation and enters Ethernet echo configuration mode.
		or
		Configures the IP SLAs operation as an Ethernet jitter operation and enters Ethernet jitter configuration mode.

Step 5	**cos** *cos-value* **Example:** `Router(config-ip-sla-ethernet-echo)# cos 2`	(Optional) Sets the class of service for an IP SLAs Ethernet operation.
Step 6	**frequency** *seconds* **Example:** `Router(config-ip-sla-ethernet-echo)# frequency 30`	(Optional) Sets the rate at which a specified IP SLAs operation repeats.
Step 7	**history** *history-parameter* **Example:** `Router(config-ip-sla-ethernet-echo)# history hours-of-statistics-kept 3`	(Optional) Specifies the parameters used for gathering statistical history information for an IP SLAs operation.
Step 8	**owner** *owner-id* **Example:** `Router(config-ip-sla-ethernet-echo)# owner admin`	(Optional) Configures the Simple Network Management Protocol (SNMP) owner of an IP SLAs operation.
Step 9	**request-data-size** *bytes* **Example:** `Router(config-ip-sla-ethernet-echo)# request-data-size 64`	(Optional) Sets the padding size for the data frame of an IP SLAs Ethernet operation. The default value for IP SLAs Ethernet ping operations is 66 bytes. The default value for IP SLAs Ethernet jitter operations is 51 bytes.

	Command or Action	Purpose
Step 10	**tag** *text* **Example:** `Router(config-ip-sla-ethernet-echo)# tag TelnetPollSever1`	(Optional) Creates a user-specified identifier for an IP SLAs operation.
Step 11	**threshold** *milliseconds* **Example:** `Router(config-ip-sla-ethernet-echo)# threshold 10000`	(Optional) Sets the upper threshold value for calculating network monitoring statistics created by an IP SLAs operation.
Step 12	**timeout** *milliseconds* **Example:** `Router(config-ip-sla-ethernet-echo)# timeout 10000`	(Optional) Sets the amount of time an IP SLAs operation waits for a response from its request packet.
Step 13	**exit** **Example:** `Router(config-ip-sla-ethernet-echo)# exit`	Exits IP SLAs Ethernet monitor configuration submode and returns to global configuration mode.
Step 14	**ip sla reaction-configuration** *operation-number* **react** *monitored-element* [**action-type** *option*] [**threshold-type** {**average** [*number-of-measurements*] | **consecutive** [*occurrences*] | **immediate** | **never** | **xofy** [*x-value y-value*]}] [**threshold-value** *upper-threshold lower-threshold*] **Example:** `Router(config)# ip sla reaction-configuration 1 react jitterAvg threshold-value 5 2 action-type trap threshold-type immediate`	Configures proactive threshold monitoring parameters for an IP SLAs operation.
Step 15	**ip sla schedule** *operation-number* [**life** {**forever** | *seconds*}] [**start-time** {*hh*:*mm*[:*ss*] [*month day* | *day month*] | **pending** | **now** | **after** *hh*:*mm*:*ss*] [**ageout** *seconds*] [**recurring**] **Example:** `Router(config)# ip sla schedule 1 start-time now life forever`	Configures the scheduling parameters for an individual IP SLAs operation.
Step 16	**exit** **Example:** `Router(config)# exit`	(Optional) Exits global configuration mode and returns to privileged EXEC mode.
Step 17	**show ip sla configuration** [*operation-number*] **Example:** `Router# show ip sla configuration 1`	(Optional) Displays configuration values including all defaults for all IP SLAs operations or a specified operation.

Troubleshooting Tips

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

What to Do Next

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

Configuration Examples for the IP SLAs Ethernet Operation

This section provides the following configuration examples:

- Configuring an IP SLAs Ethernet Operation with Endpoint Discovery: Example, page 10
- Manually Configuring an Individual IP SLAs Ethernet Operation: Example, page 10

Configuring an IP SLAs Ethernet Operation with Endpoint Discovery: Example

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 10 is configured to automatically create IP SLAs Ethernet ping operations for all the discovered maintenance endpoints in the domain named testdomain and VLAN identification number 34. As specified by the proactive threshold monitoring configuration, when three consecutive connection loss events occur, an SNMP trap notification should be sent. The schedule period for operation 10 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 10
 type echo domain testdomain vlan 34
!
ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now
```

Manually Configuring an Individual IP SLAs Ethernet Operation: Example

The following example shows how to configure an IP SLAs Ethernet ping operation. In this example, the maintenance endpoint identification number is 23, the maintenance domain name is testdomain, and the VLAN identification number is 34. As specified by the proactive threshold monitoring configuration, when three consecutive connection loss events occur, an SNMP trap notification should be sent. Operation 1 is scheduled to start immediately.

```
ip sla 1
 ethernet echo mpid 23 domain testdomain vlan 34
!
ip sla reaction-configuration 1 react connectionLoss threshold-type consecutive 3
action-type trapOnly
!
ip sla schedule 1 start-time now
```

Where to Go Next

If you want to configure other types of IP SLAs operations, see the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4T.

Additional References

The following sections provide references related to the IP SLAs for Metro-Ethernet feature.

Related Documents

Related Topic	Document Title
Ethernet CFM	*Ethernet Connectivity Fault Management* feature module, Cisco IOS Release 12.2(33)SRB
Multioperation scheduling for Cisco IOS IP SLAs	"IP SLAs—Multiple Operation Scheduling" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4T
Proactive threshold monitoring for Cisco IOS IP SLAs	"IP SLAs—Proactive Threshold Monitoring" chapter of the *Cisco IOS IP SLAs Configuration Guide*, Release 12.4T
Cisco IOS IP SLAs command line interface enhancements	*Cisco IOS IP Service Level Agreements Command Line Interface*, Cisco white paper
Cisco IOS IP SLAs configuration tasks	*Cisco IOS IP SLAs Configuration Guide*, Release 12.4T
Cisco IOS IP SLAs commands	*Cisco IOS IP SLAs Command Reference*, Release 12.2SR

Standards

Standard	Title
IEEE 802.1ag	*Connectivity Fault Management*

MIBs

MIB	MIBs Link
• CISCO-RTTMON-MIB • CISCO-IPSLA-ETHERNET-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register on Cisco.com.	http://www.cisco.com/techsupport

Command Reference

This section documents new commands only.

- **cos**
- **debug ip sla ethernet-monitor**
- **ethernet echo mpid**
- **ethernet jitter mpid**
- **ip sla ethernet-monitor**
- **ip sla ethernet-monitor reaction-configuration**
- **ip sla ethernet-monitor schedule**
- **request-data-size (Ethernet)**
- **show ip sla ethernet-monitor configuration**
- **type echo domain**
- **type jitter domain**

cos

To set the class of service (CoS) for a Cisco IOS IP Service Level Agreements (SLAs) Ethernet operation, use the **cos** command in the appropriate submode of IP SLA configuration or IP SLA Ethernet monitor configuration mode. To return to the default value, use the **no** form of this command.

cos *cos-value*

no cos

Syntax Description

cos-value	Class of service value. Range is 0 to 7. The default value is 0.

Command Default

The class of service value for the IP SLAs Ethernet operation is set to 0.

Command Modes

IP SLA configuration

Ethernet echo configuration (config-ip-sla-ethernet-echo)
Ethernet jitter configuration (config-ip-sla-ethernet-jitter)

IP SLA Ethernet monitor configuration

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

Note The configuration mode varies depending on the operation type configured. See the "Usage Guidelines" section for more information.

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

You must configure the type of IP SLAs operation (such as Ethernet ping) before you can configure any of the other parameters of the operation.

The configuration mode for the **cos** command varies depending on the operation type configured. For example, if you are running Cisco IOS Release 12.2(33)SRB and the Ethernet ping operation type is configured using the **ethernet echo mpid** command in IP SLA configuration mode, you would enter the **cos** command in Ethernet echo configuration mode (config-ip-sla-ethernet-echo).

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 10 is configured to automatically create IP SLAs Ethernet ping operations for all the discovered maintenance endpoints in the domain named testdomain and VLAN identification number 34. The class of service for each Ethernet ping operation is set to 3. As specified by the proactive threshold monitoring

configuration, when three consecutive connection loss events occur, a Simple Network Management Protocol (SNMP) trap notification should be sent. The schedule period for operation 10 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 10
 type echo domain testdomain vlan 34
 cos 3
!
ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now
```

Related Commands

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

debug ip sla ethernet-monitor

To enable debugging output for a Cisco IOS IP Service Level Agreements (SLAs) Ethernet operation, use the **debug ip sla ethernet-monitor** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug ip sla ethernet-monitor [*operation-number*]

no debug ip sla ethernet-monitor [*operation-number*]

Syntax Description

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

Command Default

Debug is not enabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Examples

The following is sample output from the **debug ip sla ethernet-monitor** command:

```
Router# debug ip sla ethernet-monitor

00:00:15: IP SLAs Auto Ethernet(0):vlan = 2, domain = DOMAIN_OPERATOR_L3_1, mpid = 6322
                                 from CFM
00:00:15: IP SLAs Auto Ethernet(0):saaHandleEventFromCFM::Received Event from CFM
00:00:15: IP SLAs Auto Ethernet(0):Event::ECFM_SAA_EV_MEP_ADD
00:00:15: IP SLAs Auto Ethernet(0):1 auto-probes found for domain = DOMAIN_OPERATOR_L3_1
and vlan = 2
00:00:15: IP SLAs Auto Ethernet(0):autoProbe probe_id = 1
00:00:15: IP SLAs Auto Ethernet(0):0 Probes already running in auto-probe = 1
00:00:15: IP SLAs Auto Ethernet(1):starting probe with freq = 20 sec
00:00:15: IP SLAs Auto Ethernet(1):starting probe 100001
```

Related Commands

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

ethernet echo mpid

To manually configure an individual Cisco IOS IP Service Level Agreements (SLAs) Ethernet ping operation, use the **ethernet echo mpid** command in IP SLA configuration mode.

ethernet echo mpid *mp-id* **domain** *domain-name* **vlan** *vlan-id*

Syntax Description

mp-id	Maintenance endpoint identification number.
domain *domain-name*	Specifies the name of the Ethernet Connectivity Fault Management (CFM) maintenance domain.
vlan *vlan-id*	Specifies the VLAN identification number.

Command Default

No IP SLAs Ethernet ping operation is configured.

Command Modes

IP SLA configuration (config-ip-sla)

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

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

Examples

The following example shows how to configure an IP SLAs Ethernet ping operation. In this example, the maintenance endpoint identification number is 23, the maintenance domain name is testdomain, and the VLAN identification number is 34. Operation 1 is scheduled to start immediately.

```
ip sla 1
 ethernet echo mpid 23 domain testdomain vlan 34
!
ip sla schedule 1 start-time now
```

Related Commands

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

ethernet jitter mpid

To manually configure an individual Cisco IOS IP Service Level Agreements (SLAs) Ethernet jitter operation, use the **ethernet jitter mpid** command in IP SLA configuration mode.

ethernet jitter mpid *mp-id* **domain** *domain-name* **vlan** *vlan-id* [**interval** *interframe-interval*] [**num-frames** *frames-number*]

Syntax Description

mp-id	Maintenance endpoint identification number.
domain *domain-name*	Specifies the name of the Ethernet Connectivity Fault Management (CFM) maintenance domain.
vlan *vlan-id*	Specifies the VLAN identification number.
interval *interframe-interval*	(Optional) Specifies the interframe interval (in milliseconds). The default value is 20 ms.
num-frames *frames-number*	(Optional) Specifies the number of frames to be sent. The default value is 10 frames.

Command Default

No IP SLAs Ethernet jitter operation is configured.

Command Modes

IP SLA configuration (config-ip-sla)

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

You must configure the type of IP SLAs operation (such as Ethernet jitter) before you can configure any of the other parameters of the operation. To change the operation type of an existing IP SLAs operation, you must first delete the IP SLAs operation (using the **no ip sla** global configuration command) and then reconfigure the operation with the new operation type.

Examples

The following example shows how to configure an IP SLAs Ethernet jitter operation. In this example, the maintenance endpoint identification number is 23, the maintenance domain name is testdomain, the VLAN identification number is 34, the interframe interval is 20 ms, and the number of frames to be sent is 30. Operation 2 is scheduled to start immediately.

```
ip sla 2
 ethernet jitter mpid 23 domain testdomain vlan 34 interval 20 num-frames 30
!
ip sla schedule 2 start-time now
```

Related Commands

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

ip sla ethernet-monitor

To begin configuring an Cisco IOS IP Service Level Agreements (SLAs) auto Ethernet operation and enter IP SLA Ethernet monitor configuration mode, use the **ip sla ethernet-monitor** command in global configuration mode. To remove all configuration information for an auto Ethernet operation, including the schedule of the operation, reaction configuration, and reaction triggers, use the **no** form of this command.

ip sla ethernet-monitor *operation-number*

no ip sla ethernet-monitor *operation-number*

Syntax Description

operation-number	Operation number used for the identification of the IP SLAs operation you want to configure.

Command Default

No IP SLAs operation is configured.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

The **ip sla ethernet-monitor** command is used to begin configuration for an IP SLAs auto Ethernet operation. Use this command to specify an identification number for the operation you are about to configure. After you enter this command, the router will enter IP SLA Ethernet monitor configuration mode.

After you configure an auto Ethernet operation, you must schedule the operation. To schedule an auto Ethernet operation, use the **ip sla ethernet-monitor schedule** command in global configuration mode. You can also optionally set reaction configuration for the operation (see the **ip sla ethernet-monitor reaction-configuration** command).

To display the current configuration settings of an auto Ethernet operation, use the **show ip sla ethernet-monitor configuration** command in user EXEC or privileged EXEC mode.

To change the operation type of an existing auto Ethernet operation, you must first delete the operation (using the **no ip sla ethernet-monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 10 is configured to automatically create IP SLAs Ethernet ping operations for all the discovered maintenance endpoints in the domain named testdomain and VLAN identification number 34. As specified by the

proactive threshold monitoring configuration, when three consecutive connection loss events occur, a Simple Network Management Protocol (SNMP) trap notification should be sent. The schedule period for operation 10 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 10
 type echo domain testdomain vlan 34
!
ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now
```

Related Commands

Command	Description
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 ethernet-monitor configuration	Displays configuration settings for IP SLAs auto Ethernet operations.

ip sla ethernet-monitor reaction-configuration

To configure proactive threshold monitoring parameters for a Cisco IOS IP Service Level Agreements (SLAs) auto Ethernet operation, use the **ip sla ethernet-monitor reaction-configuration** command in global configuration mode. To clear all threshold monitoring configuration for a specified auto Ethernet operation, use the **no** form of this command.

ip sla ethernet-monitor reaction-configuration *operation-number* **react** *monitored-element* [**action-type** {**none** | **trapOnly**}] [**threshold-type** {**average** [*number-of-measurements*] | **consecutive** [*occurrences*] | **immediate** | **never** | **xofy** [*x-value y-value*]}] [**threshold-value** *upper-threshold lower-threshold*]

no ip sla ethernet-monitor reaction-configuration *operation-number*

Syntax Description

operation-number	Number of the IP SLAs operation for which reactions are to be configured.
react *monitored-element*	Specifies the element to be monitored for threshold violations. Keyword options for the monitored-element argument are as follows: • **connectionLoss**—Specifies that a reaction should occur if there is a one-way connection loss for the monitored operation. • **jitterAvg**—Specifies that a reaction should occur if the average round-trip jitter value violates the upper threshold or lower threshold. • **jitterDSAvg**—Specifies that a reaction should occur if the average one-way destination-to-source jitter value violates the upper threshold or lower threshold. • **jitterSDAvg**—Specifies that a reaction should occur if the average one-way source-to-destination jitter value violates the upper threshold or lower threshold. • **maxOfNegativeDS**—Specifies that a reaction should occur if the one-way maximum negative jitter destination-to-source threshold is violated. • **maxOfNegativeSD**—Specifies that a reaction should occur if the one-way maximum negative jitter source-to-destination threshold is violated. • **maxOfPositiveDS**—Specifies that a reaction should occur if the one-way maximum positive jitter destination-to-source threshold is violated. • **maxOfPositiveSD**—Specifies that a reaction should occur if the one-way maximum positive jitter source-to-destination threshold is violated.

react *monitored-element* (continued)	• **packetLateArrival**—Specifies that a reaction should occur if the one-way number of late packets violates the upper threshold or lower threshold. • **packetLossDS**—Specifies that a reaction should occur if the one-way destination-to-source packet loss value violates the upper threshold or lower threshold. • **packetLossSD**—Specifies that a reaction should occur if the one-way source-to-destination packet loss value violates the upper threshold or lower threshold. • **packetMIA**—Specifies that a reaction should occur if the one-way number of missing packets violates the upper threshold or lower threshold. • **packetOutOfSequence**—Specifies that a reaction should occur if the one-way number of packets out of sequence violates the upper threshold or lower threshold. • **rtt**—Specifies that a reaction should occur if the round-trip time violates the upper threshold or lower threshold. • **timeout**—Specifies that a reaction should occur if there is a one-way timeout for the monitored operation.
action-type none	(Optional) Specifies that no action is taken when threshold events occur. The **none** keyword is the default value. **Note** If the **threshold-type never** keywords are configured, the **action-type** keyword is disabled.
action-type trapOnly	(Optional) Specifies that a Simple Network Management Protocol (SNMP) trap notification should be sent when threshold violation events occur. **Note** If the **threshold-type never** keywords are configured, the **action-type** keyword is disabled.
threshold-type average [*number-of-measurements*]	(Optional) Specifies that when the average of a specified number of measurements for the monitored element exceeds the upper threshold or when the average of a specified number of measurements for the monitored element drops below the lower threshold, the action defined by the **action-type** keyword should be performed. For example, if the upper threshold for **react rtt threshold-type average 3** is configured as 5000 ms and the last three results of the operation are 6000, 6000, and 5000 ms, the average would be 6000 + 6000 + 5000 = 17000/3 = 5667. In this case, the average exceeds the upper threshold. The default number of 5 averaged measurements can be changed using the *number-of-measurements* argument. The valid range is from 1 to 16. This syntax is not available if the **connectionLoss** or **timeout** keyword is specified as the monitored element, because upper and lower thresholds do not apply to these options.
threshold-type consecutive [*occurrences*]	(Optional) Specifies that when a threshold violation for the monitored element is met consecutively for a specified number of times, the action defined by the **action-type** keyword should be performed. The default number of 5 consecutive occurrences can be changed using the *occurrences* argument. The valid range is from 1 to 16.

threshold-type immediate	(Optional) Specifies that when a threshold violation for the monitored element is met, the action defined by the **action-type** keyword should be performed immediately.
threshold-type never	(Optional) Specifies that threshold violations should not be monitored. This is the default threshold type.
threshold-type xofy [*x-value y-value*]	(Optional) Specifies that when a threshold violation for the monitored element is met x number of times within the last y number of measurements ("x of y"), action defined by the **action-type** keyword should be performed. The default is 5 for both the x and y values (**xofy 5 5**). The valid range for each value is from 1 to 16.
threshold-value [*upper-threshold lower-threshold*]	(Optional) Specifies the upper-threshold and lower-threshold values of the applicable monitored elements. See Table 1 in the "Usage Guidelines" section for a list of the default values.

Command Default

IP SLAs proactive threshold monitoring is disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

You can configure the **ip sla ethernet-monitor reaction-configuration** command multiple times to enable proactive threshold monitoring for multiple elements (for example, configuring thresholds for round-trip time and destination-to-source packet loss) for the same operation. However, disabling of individual monitored elements is not supported. In other words, the **no ip sla ethernet-monitor reaction-configuration** command will disable all proactive threshold monitoring configuration for the specified IP SLAs operation.

SNMP traps for IP SLAs are supported by the CISCO-RTTMON-MIB and CISCO-SYSLOG-MIB. Use the **ip sla logging traps** command to enable the generation of SNMP system logging messages specific to IP SLAs trap notifications. Use the **snmp-server enable traps rtr** command to enable the sending of IP SLAs SNMP trap notifications.

To display the current threshold monitoring configuration settings for an auto Ethernet operation, use the **show ip sla ethernet-monitor configuration** command.

Table 1 lists the default upper and lower thresholds for specific monitored elements.

Table 1 Default Threshold Values for Monitored Elements

Monitored Element Keyword	Upper Threshold	Lower Threshold
jitterAvg	100 ms	100 ms
jitterDSAvg	100 ms	100 ms
jitterSDAvg	100 ms	100 ms

Table 1 Default Threshold Values for Monitored Elements (continued)

Monitored Element Keyword	Upper Threshold	Lower Threshold
maxOfNegativeDS	10000 ms	10000 ms
maxOfNegativeSD	10000 ms	10000 ms
maxOfPositiveDS	10000 ms	10000 ms
maxOfPositiveSD	10000 ms	10000 ms
packetLateArrival	10000 packets	10000 packets
packetLossDS	10000 packets	10000 packets
packetLossSD	10000 packets	10000 packets
packetMIA	10000 packets	10000 packets
packetOutOfSequence	10000 packets	10000 packets
rtt	5000 ms	3000 ms

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 10 is configured to automatically create IP SLAs Ethernet ping operations for all the discovered maintenance endpoints in the domain named testdomain and VLAN identification number 34. As specified by the proactive threshold monitoring configuration, when three consecutive connection loss events occur, an SNMP trap notification should be sent. The schedule period for operation 10 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 10
 type echo domain testdomain vlan 34
!
ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now
```

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 logging traps	Enables the generation of SNMP system logging messages specific to IP SLAs trap notifications.
show ip sla ethernet-monitor configuration	Displays configuration settings for IP SLAs auto Ethernet operations.
snmp-server enable traps rtr	Enables the sending of IP SLAs SNMP trap notifications.

ip sla ethernet-monitor schedule

To configure the scheduling parameters for an IP Service Level Agreements (SLAs) auto Ethernet operation, use the **ip sla ethernet-monitor schedule** command in global configuration mode. To stop the operation and place it in the default state (pending), use the **no** form of this command.

ip sla ethernet-monitor schedule *operation-number* **schedule-period** *seconds* [**frequency** [*seconds*]] [**start-time** {**after** *hh*:*mm*:*ss* | *hh*:*mm*[:*ss*] [*month day* | *day month*] | **now** | **pending**}]

no ip sla ethernet-monitor schedule *operation-number*

Syntax Description

operation-number	Number of the IP SLAs operation to be scheduled.
schedule-period *seconds*	Specifies the time period (in seconds) in which the start times of the individual IP SLAs operations are distributed.
frequency *seconds*	(Optional) Specifies the number of seconds after which each IP SLAs operation is restarted. The default frequency is the value specified for the schedule period.
start-time	(Optional) Time when the operation starts collecting information. If the start time is not specified, no information is collected.
after *hh*:*mm*:*ss*	(Optional) Indicates that the operation should start *hh* hours, *mm* minutes, and *ss* seconds after this command was entered.
hh:*mm*[:*ss*]	(Optional) Specifies an absolute start time using hours, minutes, and seconds. Use the 24-hour clock notation. For example, **start-time 01:02** means "start at 1:02 a.m.," and **start-time 13:01:30** means "start at 1:01 p.m. and 30 seconds." The current day is implied unless you specify a month and day.
month	(Optional) Name of the month in which to start the operation. If a month is not specified, the current month is used. Use of this argument requires that a day be specified. You can specify the month by using either the full English name or the first three letters of the month.
day	(Optional) Number of the day (in the range 1 to 31) on which to start the operation. If a day is not specified, the current day is used. Use of this argument requires that a month be specified.
now	(Optional) Indicates that the operation should start immediately.
pending	(Optional) No information is collected. This option is the default value.

Command Default

The IP SLAs auto Ethernet operation is placed in a pending state (that is, the operation is enabled but is not actively collecting information).

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

After you schedule an IP SLAs auto Ethernet operation with the **ip sla ethernet-monitor schedule** command, you should not change the configuration of the operation until the operation has finished collecting information. To change the configuration of the operation, use the **no ip sla ethernet-monitor schedule** *operation-number* command in global configuration mode and then enter the new configuration information.

To display the current configuration settings of an IP SLAs auto Ethernet operation, use the **show ip sla ethernet-monitor configuration** command in user EXEC or privileged EXEC mode.

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 10 is configured to automatically create IP SLAs Ethernet ping operations for all the discovered maintenance endpoints in the domain named testdomain and VLAN identification number 34. As specified by the proactive threshold monitoring configuration, when three consecutive connection loss events occur, a Simple Network Management Protocol (SNMP) trap notification should be sent. The schedule period for operation 10 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 10
 type echo domain testdomain vlan 34
!
ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now
```

Related Commands

Command	Description
ip sla ethernet-monitor	Begins configuration for an IP SLAs auto Ethernet operation and enters Ethernet monitor configuration mode.
show ip sla ethernet-monitor configuration	Displays configuration settings for IP SLAs auto Ethernet operations.

request-data-size (Ethernet)

To set the padding size for the data frame of a Cisco IOS IP Service Level Agreements (SLAs) Ethernet operation, use the **request-data-size** (Ethernet) command in the appropriate submode of IP SLA configuration or auto IP SLA MPLS configuration mode. To return to the default value, use the **no** form of this command.

request-data-size *bytes*

no request-data-size

Syntax Description

bytes	Padding size (in bytes) for the data frame of the operation. Range is 0 to the maximum of the protocol.

Defaults

The default padding size will vary depending on the type of IP SLAs operation you are configuring. See the CISCO-RTTMON-MIB MIB documentation for more details.

Command Modes

IP SLA Configuration

Ethernet echo (config-ip-sla-ethernet-echo)
Ethernet jitter (config-ip-sla-ethernet-jitter)

IP SLA Auto Ethernet Configuration

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

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

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

Examples

The following example shows how to set the padding size to 40 bytes for IP SLAs Ethernet ping operation 3:

```
ip sla 3
 ethernet echo mpid 23 domain testdomain vlan 34
 request-data-size 40
!
ip sla schedule 3 life forever start-time now
```

Related Commands

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

show ip sla ethernet-monitor configuration

To display configuration settings for IP Service Level Agreements (SLAs) auto Ethernet operations, use the **show ip sla ethernet-monitor configuration** 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.

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 **show ip sla ethernet-monitor configuration** 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
```

Table 2 describes the significant fields shown in the display.

Table 2 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.
Threshold Rising	The upper threshold value of the reaction condition being monitored. Corresponds to the *upper-threshold* argument of the **threshold-value** *upper-threshold lower-threshold* syntax in the **ip sla ethernet-monitor reaction-configuration** command.

Table 2 show ip sla ethernet-monitor configuration Field Descriptions (continued)

Field	Description
Threshold Falling	The lower threshold value of the reaction condition being monitored. Corresponds to the *lower-threshold* argument of the **threshold-value** *upper-threshold lower-threshold* syntax in the **ip sla ethernet-monitor reaction-configuration** command.
Threshold CountX	Corresponds to the *x-value* argument of the **threshold-type xofy** *x-value y-value* syntax in the **ip sla ethernet-monitor reaction-configuration** command.
Threshold CountY	Corresponds to the *y-value* argument of the **threshold-type xofy** *x-value y-value* syntax in the **ip sla ethernet-monitor reaction-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.

type echo domain

To configure a Cisco IOS IP Service Level Agreements (SLAs) auto Ethernet operation to create Ethernet ping operations, use the **type echo domain** command in IP SLA Ethernet monitor configuration mode.

type echo domain *domain-name* **vlan** *vlan-id* [**exclude-mpids** *mp-ids*]

Syntax Description

domain-name	Name of the Ethernet Connectivity Fault Management (CFM) maintenance domain.
vlan *vlan-id*	Specifies the VLAN identification number.
exclude-mpids *mp-ids*	(Optional) Specifies the list of maintenance endpoint identification numbers to be excluded from the operation.

Command Default

Ethernet ping operations are not configured.

Command Modes

IP SLA Ethernet monitor

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

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

You must configure the type of auto Ethernet operation (such as Ethernet ping) before you can configure any of the other parameters of the operation.

To change the operation type of an existing IP SLAs operation, you must first delete the IP SLAs operation (using the **no ip sla ethernet-monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 10 is configured to automatically create IP SLAs Ethernet ping operations for all the discovered maintenance endpoints in the domain named testdomain and VLAN identification number 34. As specified by the proactive threshold monitoring configuration, when three consecutive connection loss events occur, a Simple Network Management Protocol (SNMP) trap notification should be sent. The schedule period for operation 10 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 10
 type echo domain testdomain vlan 34
!
ip sla ethernet-monitor reaction-configuration 10 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 10 schedule-period 60 start-time now
```

Related Commands

Command	Description
ip sla ethernet-monitor	Begins configuration for an IP SLAs auto Ethernet operation and enters Ethernet monitor configuration mode.

type jitter domain

To configure a Cisco IOS IP Service Level Agreements (SLAs) auto Ethernet operation to create Ethernet jitter operations, use the **type jitter domain** command in IP SLA Ethernet monitor configuration mode.

type jitter domain *domain-name* **vlan** *vlan-id* [**exclude-mpids** *mp-ids*] [**interval** *interframe-interval*] [**num-frames** *frames-number*]

Syntax Description

domain-name	Name of the Ethernet Connectivity Fault Management (CFM) maintenance domain.
vlan *vlan-id*	Specifies the VLAN identification number.
exclude-mpids *mp-ids*	(Optional) Specifies the list of maintenance endpoint identification numbers to be excluded from the operation.
interval *interframe-interval*	(Optional) Specifies the interframe interval (in milliseconds). The default value is 20 ms.
num-frames *frames-number*	(Optional) Specifies the number of frames to be sent. The default value is 10 frames.

Command Default

Ethernet jitter operations are not configured.

Command Modes

IP SLA Ethernet monitor

Command History

Release	Modification
12.2(33)SRB	This command was introduced.

Usage Guidelines

Note When an IP SLAs Ethernet jitter operation is created by an auto Ethernet operation, an operation number (identification number) is automatically assigned to the jitter operation. The operation numbering starts at 100001.

You must configure the type of auto Ethernet operation (such as Ethernet jitter) before you can configure any of the other parameters of the operation.

To change the operation type of an existing IP SLAs operation, you must first delete the IP SLAs operation (using the **no ip sla ethernet-monitor** global configuration command) and then reconfigure the operation with the new operation type.

Examples

The following example shows how to configure operation parameters, proactive threshold monitoring, and scheduling options using an IP SLAs auto Ethernet operation. In this example, operation 20 is configured to automatically create IP SLAs Ethernet jitter operations for all the discovered maintenance

endpoints in the domain named testdomain and VLAN identification number 34. For each Ethernet jitter operation, the interframe interval is set to 20 ms and the number of frames to be sent is 30. As specified by the proactive threshold monitoring configuration, when three consecutive connection loss events occur, a Simple Network Management Protocol (SNMP) trap notification should be sent. The schedule period for operation 20 is 60 seconds, and the operation is scheduled to start immediately.

```
ip sla ethernet-monitor 20
 type jitter domain testdomain vlan 34 interval 20 num-frames 30
!
ip sla ethernet-monitor reaction-configuration 20 react connectionLoss threshold-type
consecutive 3 action-type trapOnly
!
ip sla ethernet-monitor schedule 20 schedule-period 60 start-time now
```

Related Commands

Command	Description
ip sla ethernet-monitor	Begins configuration for an IP SLAs auto Ethernet operation and enters Ethernet monitor configuration mode.

Feature Information for the IP SLAs Ethernet Operation

Table 3 lists the release history for this feature.

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

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

Note Table 3 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 3 Feature Information for the IP SLAs Ethernet Operation

Feature Name	Releases	Feature Information
IP SLAs for Metro-Ethernet	12.2(33)SRB	The IP Service Level Agreements (SLAs) for Metro-Ethernet feature provides the capability to gather Ethernet layer network performance metrics. Available statistical measurements for the IP SLAs Ethernet operation include round-trip time, jitter (interpacket delay variance), and packet loss.