



Ethernet OAM, CFM, and Y.1731 Command Reference

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aggregate interval

To configure an aggregate interval for an SLA Y.1731 operation, use the **aggregate interval** command in the IP SLA Y.1731 delay or IP SLA Y.1731 loss configuration mode. To return to the default, use the no form of this command.

aggregate {interval} *seconds*

no aggregate {interval} *seconds*

Syntax Description

interval	Specifies the duration for which individual delay measurements are aggregated in cumulative statistics. The aggregation period ranges from 1 to 65535 seconds.
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Command Default

The default is 900.

Command Modes

IP SLA Y.1731 delay configuration (config-sla-y1731-delay) SLA Y.1731 loss configuration (config-sla-y1731-loss)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

An aggregate interval is the length of time during which the performance measurements are conducted and the results are stored. Use this command to change the number of intervals for a delay, delay variation, or frame loss operation from the default (900 seconds) to the specified value.

The aggregate interval value must be less than the life value of the IP SLAs schedule. The default life value for an IP SLAs schedule or IP SLAs multioperation group scheduler configuration is 3600 seconds

Examples

The following example shows how to configure a two-way delay measurement with an aggregate interval of 1500 seconds.

```
Router(config)# ip sla 10
Router(config-ip-sla)# ethernet y1731 delay dmm domain xxx evc yyy mpid 101 cos 3 source
mpid 100
Router(config-sla-y1731-delay)# aggregate interval 1500
```

Related Commands

Command	Description
distribution	Configures statistics distributions for an IP SLA-Y.1731 operation.

Command	Description
history interval	Sets the number of statistics distributions kept during the lifetime of an IP SLA Y.1731 operation.
ip sla schedule	Configures the scheduling parameters for a single IP SLAs operation.
sho ip sla statistics	Displays the current operational status and statistics of all IP SLAs operations or a specified operation.

ais

To enable the Alarm Indication Signal (AIS) function for a specific maintenance association, use the **ais** command in the Ethernet CFM service configuration mode. To disable AIS configuration, use the no form of this command.



Note

ais is enabled by default when CFM is enabled. When you configure ais, you must configure CFM before ais is operational.

ais [**expiry-threshold** *threshold* | **level** *level-id* **period** *seconds* | **suppress-alarms**]

no ais [**expiry-threshold** *threshold* | **level** *period* *seconds* | **suppress-alarms**]

Syntax Description

expiry-threshold	(Optional) Configures the expiry threshold.
<i>threshold</i>	(Optional) Integer from 2 to 255 that is a count. If no MEPs are received within an interval of the threshold multiplied by the transmission period, the MEP clears the AIS defect condition. The default is 3.5.
level	(Optional) Indicates a maintenance level where AIS frames for maintenance endpoints (MEPs) belonging to the service will be sent.
<i>level-id</i>	(Optional) Integer from 0 to 7 that identifies the maintenance level.
period	(Optional) Configures the AIS transmission period for all MEPs in the maintenance association.
<i>seconds</i>	(Optional) Integer value 1 or 60 that indicates the AIS transmission period in seconds. The default is 60.
suppress-alarms	(Optional) Configures alarm suppression.

Command Default

The AIS function is enabled on specific maintenance associations.

Command Modes

Ethernet CFM service configuration (config-ecfm-srv)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

Alarms are suppressed when an MEP goes into an RX AIS (receipt of an AIS frame) defect condition.

When you specify the level keyword with the **ais** command, you can transmit AIS messages to a higher maintenance association without configuring a maintenance intermediate point (MIP) for that maintenance association. Output of the show running all command shows “ais expiry-threshold 3.5” when the default expiry threshold is configured, “ais period 60” when the default transmission period is configured, and “no ais suppress-alarms” when the default value for the suppress-alarms option is configured.

Examples

The following example shows how to enable the AIS function at level 5 with a transmission period of one second.

```
Router(config)# ethernet cfm domain operatorA level 5
Router(config-ecfm)# service vlan-id 10 port
Router(config-ecfm-srv)# ais period 1
Router(config-ecfm-srv)# ais level 5
```

Related Commands

Command	Description
show running all	Displays the running configuration with default values.

cfm encapsulation

To configure Connectivity Fault Management (CFM) Ethernet frame encapsulation, use the **cfm encapsulation** command in service instance configuration mode. To remove the encapsulation, use the **no** form of this command.

cfm encapsulation {**dot1ad** *vlan-id* | **dot1q** *vlan-id*} [**dot1q** *vlan-id* | **second-dot1q** *vlan-id*]

no cfm encapsulation {**dot1ad** *vlan-id* | **dot1q** *vlan-id*} [**dot1q** *vlan-id* | **second-dot1q** *vlan-id*]

Syntax Description

dot1ad	Indicates the IEEE 802.1ad encapsulation type.
<i>vlan-id</i>	VLAN on which the CFM frames are sent out. The valid values range from 1 to 4094.
dot1q	Supports the IEEE 802.1q standard for encapsulation of traffic, and specifies the outer dot1q encapsulation tag.
second-dot1q	(Optional) Specifies the inner dot1q encapsulation tag. This option is valid only when the outer dot1q encapsulation tag is selected. When the dot1ad encapsulation type is selected first, dot1q is a valid option.

Command Default

CFM Ethernet frame encapsulation is not configured.

Command Modes

Service instance configuration (config-if-srv)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

To use the **cfm encapsulation** command, you must first configure a bridge-domain in the Ethernet service configuration mode using the **bridge-domain** command. The **cfm encapsulation** command does not support untagged service instances.

Examples

The following example shows how to configure the **cfm encapsulation** command:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# service instance 101 ethernet
Router(config-if-srv)# encapsulation dot1q 100-110 second dot1q 200
Router(config-if-srv)# bridge-domain 12
Router(config-if-srv)# cfm encapsulation dot1q 105 second dot1q 200
Router(config-if-srv)# exit
Router(config-if)# exit
```

Related Commands

Command	Description
bridge-domain	Binds the service instance to a bridge domain instance.
service instance ethernet	Configures an Ethernet service instance on an interface and enters service instance configuration mode.

cfm mep domain

To create an MEP for a Ethernet Flow Point (EFP), use the **cfm mep domain** command in service instance configuration mode. To remove the MEP, use the **no** form of this command.

cfm mep domain *domain-name* **mpid** *mpid-value*

no cfm mep domain *domain-name* **mpid** *mpid-value*

Syntax Description

<i>domain-name</i>	Domain name. The name can be up to 154 characters.
mpid	Indicates the maintenance point ID (MPID).
<i>mpid-value</i>	Maintenance point identifier value. The valid values range from 1 to 8191.

Command Default

MEPs are not created if this command is not issued.

Command Modes

Service instance configuration (config-if-srv)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

To use the **cfm mep domain** command, you must first configure a bridge domain in the service instance configuration mode by issuing the **bridge-domain** command.

Examples

The following example shows how to create an MEP for an EFP:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# service instance 101 ethernet
Router(config-if-srv)# encapsulation dot1q 100
Router(config-if-srv)# bridge-domain 12
Router(config-if-srv)# cfm mep domain CustomerB mpid 5
Router(config-if-srv)# exit
```

Related Commands

Command	Description
bridge-domain	Binds the service instance to a bridge domain instance.

Command	Description
service instance ethernet	Configures an Ethernet service instance on an interface and enters service instance configuration mode.

clear ethernet cfm ais

To clear an MEP or SMEP out of the AIS defect condition, use the **clear ethernet cfm ais** command in the privileged EXEC mode.

clear ethernet cfm ais {**domain** *domain-name* **mpid** *mpid-id* **evc** *evc name* | **link-status** **interface** *interface name*}

Syntax Description

domain	Indicates that a maintenance domain is specified.
<i>domain-name</i>	String of a maximum of 154 characters that identifies the domain.
mpid	Indicates that a maintenance point ID (MPID) is specified.
<i>mpid-id</i>	An integer in the range of 1 to 8191 that identifies the MPID.
evc	Indicates that an Ethernet virtual circuit (EVC) is specified.
<i>evc name</i>	String identifying the EVC name.
link-status	Indicates either a SMEP or a link up/link down condition.
<i>interface name</i>	Indicates that an interface is specified.

Command Default

This command has no defaults.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

If an MEP does not exit the AIS state when all the errors are resolved, use the **clear ethernet cfm ais** command with the domain and mpid keywords to clear the AIS defect condition. If an SMEP does not exit the AIS state when all errors are resolved, use the **clear ethernet cfm ais** command with the link-status and interface keywords to clear the AIS defect condition.

Examples

The following example shows how to clear an SMEP of an AIS defect condition.

```
Router# clear ethernet cfm ais link-status interface TenGigabitEthernet 2/3
```

Examples

The following examples show how to clear an MEP of an AIS defect condition.

```
Router# clear ethernet cfm ais domain xxx mpid 100 vlan 11
Router# clear ethernet cfm ais domain xxx mpid 100 evc test
```

Related Commands

Command	Description
ethernet cfm ais	Enables AIS generation from an SMEP.

clear ethernet cfm error

To clear continuity check error conditions logged on a device, use the **clear ethernet cfm errors** command in the privileged EXEC mode.

clear ethernet cfm errors *domain-name* | **level** *level-id*

Syntax Description

domain	(Optional) Clears errors for a maintenance domain.
<i>domain-name</i>	(Optional) String of a maximum of 154 characters.
level	(Optional) Clears errors for a maintenance level.
<i>level-id</i>	(Optional) Integer in the range of 0 to 7 that identifies the maintenance level.

Command Default

The error database is unchanged; existing entries remain in the database.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

Use the clear ethernet cfm errors command to purge error database entries that are not needed and when you want to work with a cleared database. Also, use this command with a specified domain if you want to clear errors for that domain.

In CFM IEEE, if a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in continuity check messages if “id <fmt> <MDID>” is not configured.

Examples

The following example shows a clear ethernet cfm errors command for errors at maintenance level 3. No output is generated when this command is issued.

```
Router# clear ethernet cfm errors level 3
```

Examples

The following example shows how to clear errors for a DNS on VLAN 17. No output is generated when this command is issued.

```
Router# clear ethernet cfm errors domain-id dns Service10 service vlan-id 17
```

Related Commands

Command	Description
show ethernet cfm errors	Displays CFM continuity check error conditions logged on a device since it was last reset or since the log was last cleared.

continuity-check

To enable the transmission of continuity check messages (CCMs), use the **continuity-check** command in CFM service configuration mode. To disable CCM transmission, use the **no** form of this command.

continuity-check [*interval time* | **loss-threshold** *threshold* | **static rmep**]

no continuity-check [*interval* | **loss-threshold** | **static rmep**]

Syntax Description

interval <i>time</i>	(Optional) Configures the time period between message transmissions. The valid values are as follows: • 100 milliseconds • 1 second • 10 seconds • 1 minute • 10 minutes The default value is 10 seconds.
loss-threshold <i>threshold</i>	(Optional) Sets the number of CCMs that must be missed before declaring that a remote maintenance end point (MEP) is down. The valid values range from 2 to 255. The default value is 3.
static	(Optional) Verifies that the MEP received in the CCM is valid.
rmep	(Optional) Defines a static MEP.

Command Default

By default, CCMs are not transmitted.

Command Modes

CFM service configuration (config-ecfm-srv)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The static MEP list configured using the **mep mpid** command is used to verify whether an MEP received in a CCM is valid.

Examples

The following example shows how to configure a loss threshold of 50 CCMs:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain operator level 5
Router(config-ecfm)# service operatorA port
Router(config-ecfm-srv)# continuity-check loss-threshold 50
Router(config-ecfm-srv)# exit
Router(config-ecfm)# exit
```

Related Commands

Command	Description
mep mpid	Statically defines MEPs within a maintenance association.

cos (CFM)

To set the class of service (CoS) for a maintenance end point (MEP) that is sent in IEEE Connectivity Fault Management (CFM) messages, use the **cos** command in CFM interface configuration mode. To set the CoS to the highest priority allowed on the interface, use the **no** form of this command.

cos *cos-value*

no cos

Syntax Description

<i>cos-value</i>	CoS value. The valid values range from 0 to 7. The default value is 7.
------------------	--

Command Default

If this command is not configured, the default CoS value is used. The default value is 7. If **no cos** command is used, the default value is 0.

Command Modes

CFM interface configuration (config-if-ecfm-mep)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The **cos** command is used to set the priority of messages.

Examples

The following example shows how to set the CoS to 5:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# ethernet cfm mep domain test mpid 701 port
Router(config-if-ecfm-mep)# cos 5
Router(config-if-ecfm-mep)# exit
Router(config-if)# exit
```

distribution

To configure statistics distributions for an IP SLA-Y.1731 operation, use the **distribution** command in the IP SLA Y.1731 delay or IP SLA Y.1731 loss configuration mode. To return to the default, use the no form of this command.

distribution {delay | delay-variation} two-way number-of-bins comma separated values

Syntax Description

delay	Specifies that the performance measurement type is delay.
delay-variation	Specifies that the performance measurement type is delay variation. This is the default value, along with delay.
two-way	Specifies two-way measurement values. This is the default for a single-ended operation.
number-of-bins	Number of bins kept during an aggregate interval.
comma separated values	Comma separated list of upper boundaries of bins (in microseconds).

Command Default

This command has no defaults.

Command Modes

IP SLA Y.1731 delay configuration (config-sla-y1731-delay)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

Configure this command on the MEP that performs the performance measurement calculation. For dual-ended operations, calculations are performed at the receiver MEP on the responder. Statistics distributions are defined by number of bins per interval. A bin is a counter that counts the number of measurements initiated and completed during a specified length of time for each operation. The results of performance measurements falling within a specified range are stored in each bin. When the number of distributions reaches the number and range specified, no further distribution-based information is stored.

Examples

The following example shows how to configure statistics distributions for an IP SLA-Y.1731 operation.

```
Router(config)# ip sla 10
Router(config-ip-sla)# ethernet y1731 delay dmm domain xxx evc yyy mpid 101 cos 3 source
mpid 100
Router(config-sla-y1731-delay)# distribution delay one-way 5 10,30,500,700,1000
```

Related Commands

Command	Description
aggregate interval	Configures the aggregate interval.
history interval	Sets the number of statistics distributions kept during the lifetime of an IP SLAs Metro Ethernet 3.0 (ITU-T Y.1731) operation.

ethernet cfm ais link-status

To enable AIS generation from a server maintenance endpoint (SMEP), use the **ethernet cfm ais link-status** command in the interface configuration mode. To disable AIS generation, use the no form of this command.

ethernet cfm ais link-status [**level** *level-id* | **period** *seconds*]

no ethernet cfm ais link-status [**level** | **period**]

Syntax Description

level	(Optional) Indicates a maintenance domain level where the AIS will be sent.
<i>level-id</i>	(Optional) Integer from 0 to 7 that identifies the maintenance level.
period	(Optional) Configures the AIS transmission period generated by the SMEP on the interface.
<i>seconds</i>	(Optional) Integer value 1 or 60 that indicates the AIS transmission period in seconds. The default is 60.

Command Default

AIS frames are not generated.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

This command has precedence over the **ethernet cfm ais link-status global** command issued in global configuration mode.

Examples

The following example shows how to configure AIS generation with a transmission period of 60 seconds.

```
Router(config-if)# ethernet cfm ais link-status period 60
```

Related Commands

Command	Description
ethernet cfm ais link-status global	Globally enables AIS generation and places the CLI in CFM SMEP AIS configuration mode.

ethernet cfm ais link-status global

To globally enable AIS generation and place the command-line interface (CLI) in the CFM SMEP AIS configuration mode (config-ais-link-cfm) to configure AIS commands for an SMEP, use the **ethernet cfm ais link-status global** command in the global configuration mode. To remove the global AIS configuration, use the no form of this command.

ethernet cfm ais link-status global {*level level-id* | *period seconds*}

no ethernet cfm ais link-status global {*level level-id* | *period seconds*}

Syntax Description

level	Indicates a maintenance level where AIS frames for MEPs belonging to the service will be sent.
<i>level-id</i>	Integer from 0 to 7 that identifies the maintenance level.
period	Configures the AIS transmission period for all MEPs in the maintenance association.
<i>value</i>	Integer value 1 or 60 that indicates the AIS transmission period in seconds. The default is 60.

Command Default

AIS generation is enabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

The **ethernet cfm ais link-status global** command changes configuration modes to allow you to configure AIS commands for an SMEP.

Examples

The following example shows how to configure AIS commands for an SMEP.

```
Router(config)# ethernet cfm ais link-status global
Router(config-ais-link-cfm)# level 3
Router(config-ais-link-cfm)# period 1
```

ethernet cfm domain level

To create a IEEE Connectivity Fault Management (CFM) maintenance domain at a specific maintenance level and enter CFM configuration mode, use the **ethernet cfm domain level** command in global configuration mode. To remove the CFM domain at the specified maintenance level, use the **no** form of this command.

ethernet cfm domain *domain-name* **level** *level-id*

no ethernet cfm domain *domain-name* **level** *level-id*

Syntax Description

<i>domain-name</i>	Domain name. The name can be up to 154 characters.
level <i>level-id</i>	Maintenance level ID. The valid values range from 0 to 7.

Command Default

Maintenance domains are not assigned to maintenance levels.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When a router is in CFM configuration mode, parameters specific to a maintenance domain can be set. Several domains with different names can be configured at the same maintenance level; however, a single domain cannot be associated with multiple maintenance levels.

In CFM IEEE, if a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in the continuity check messages.

Examples

The following example shows how to create a maintenance domain named domain1 at maintenance level 6 and enter CFM configuration mode:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain domain1 level 6
Router(config-ecfm)#
```

Related Commands

Command	Description
show ethernet cfm domain	Displays information about the CFM maintenance domain.

Command	Description
show ethernet cfm maintenance-points local	Displays information about CFM maintenance points configured on a device.

ethernet cfm global

To enable IEEE Connectivity Fault Management (CFM) globally on a device, use the **ethernet cfm global** command in global configuration mode. To disable IEEE CFM globally on a device, use the **no** form of this command.

ethernet cfm global

no ethernet cfm global

Syntax Description

This command has no arguments or keywords.

Command Default

IEEE CFM is disabled on a device.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

IEEE CFM is disabled by default and must be enabled explicitly. This command is supported only in the Ethernet CFM IEEE 802.1ag standard implementation.

Examples

The following example shows how to enable CFM globally on a device:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm global
```

Related Commands

Command	Description
ethernet cfm interface	Enables IEEE CFM on an interface.

ethernet cfm interface

To enable IEEE Connectivity Fault Management (CFM) on an interface, use the **ethernet cfm interface** command in interface configuration mode. To disable CFM on an interface, use the **no** form of this command.

ethernet cfm interface

no ethernet cfm interface

Syntax Description

This command has no arguments or keywords.

Command Default

IEEE CFM is enabled on an interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

IEEE CFM is enabled by default on an interface and must be explicitly disabled. An interface must be enabled before any MEPs or MIPs can be configured. Similarly, maintenance points must be unconfigured before an interface configured with MIPs or MEPs can be disabled.

When IEEE CFM processing is disabled on an interface, all the CFM frames that arrive on that interface are dropped and are not processed by the CPU.

Examples

The following example shows how to configure an interface for IEEE CFM processing:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# ethernet cfm interface
```

Related Commands

Command	Description
ethernet cfm global	Enables IEEE CFM globally on a device.

ethernet cfm lck link-status

To enable LCK generation from an SMEP, use the **ethernet cfm lck link-status** command in the interface configuration mode. To disable LCK generation, use the no form of this command.

ethernet cfm lck link-status [*level level-id* | *period seconds*]

no ethernet cfm lck link-status [*level* | *period*]

Syntax Description

level	(Optional) Indicates a maintenance domain level where the LCK will be sent.
<i>level-id</i>	(Optional) Integer from 0 to 7 that identifies the maintenance level.
period	(Optional) Configures the LCK transmission period generated by the SMEP on the interface.
<i>seconds</i>	(Optional) Integer value 1 or 60 that indicates the LCK transmission period in seconds. The default is 60.

Command Default

LCK frames are not generated.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

This command has precedence over the **ethernet cfm lck link-status global** command issued in global configuration mode.

Examples

The following example shows how to configure LCK generation with a transmission period of 60 seconds.

```
Router(config-if)# ethernet cfm lck link-status period 60
```

Related Commands

Command	Description
ethernet cfm lck link-status global	Globally enables LCK generation and places the CLI in CFM SMEP LCK configuration mode.

ethernet cfm lck link-status global

To globally enable LCK generation and place the CLI in the CFM SMEP LCK configuration mode (config-lck-link-cfm) to configure LCK commands for an SMEP, use the **ethernet cfm lck link-status global** command in the global configuration mode. To remove the global LCK configuration, use the no form of this command.

ethernet cfm lck link-status global {*level level-id* | *period seconds*}

no ethernet cfm lck link-status global {*level level-id* | *period seconds*}

Syntax Description

level	Indicates the maintenance level for sending LCK frames transmitted by the SMEP.
<i>level-id</i>	Integer from 0 to 7 that identifies the maintenance level.
period	Configures the LCK frame transmission period interval.
<i>seconds</i>	Integer value 1 or 60 that indicates the frame transmission period in seconds.

Command Default

LCK generation is enabled.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

The **ethernet cfm lck link-status global** command changes configuration modes to allow you to configure LCK commands for an SMEP.

Examples

The following example shows how to configure LCK commands for an SMEP.

```
Router(config)# ethernet cfm lck link-status global
```

ethernet cfm lck start interface

To put an interface in the ETH-LCK condition, enter the **ethernet cfm lck start interface** command in the privileged EXEC mode.

ethernet cfm lck start interface *type number* **direction** {**up** | **down**} [**dropl2-bpdu**]

Syntax Description

interface <i>type number</i>	Specify the interface to be put in LCK condition.
direction up	The LCK is in the direction toward the relay; that is, within the switch.
direction down	The LCK is in the direction of the wire.
dropl2-bpdu	(Optional) Specifies that all Layer 2 BPDUs except CFM frames, all data frames, and all Layer 3 control traffic are dropped for that MEP. If not entered, only data frames and Layer 3 control frames are dropped.

Command Default

This command has no defaults.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Examples

The following example shows how to put an interface in the ETH-LCK condition.

```
Router# ethernet cfm lck start interface TenGigabitEthernet 4/1 direction down
```

Related Commands

Command	Description
ethernet cfm lck stop interface	Places an interface out of the ETH-LCK condition.
ethernet cfm lck start mpid	Places an MEP in the ETH-LCK condition.
show ethernet cfm smep	Displays CFM information for the source MEP.

ethernet cfm lck start mpid

Places an MEP in ETH-LCK condition. To put an MEP out of the ETH-LCK condition, enter the **ethernet cfm lck stop mpid** command in the privileged EXEC command.

ethernet cfm lck start mpid *local-mpid domain domain-name evc evc name* [**drop12-bpdu**]

Syntax Description

mpid <i>local-mpid domain domain-name evc evc name</i>	Identifies the MEP.
drop12-bpdu	Specifies that the switch should drop all data frames, all Layer 3 control traffic, and all Layer 2 BPDUs except CFM frames for that MEP. If not entered, the switch drops only data frames and Layer 3 control frames.

Command Default

This command has no defaults.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Examples

The following example shows how to place an MEP in ETH-LCK condition.

```
Router# ethernet cfm lck start mpid 2 domain customer evc evc1
```

Related Commands

Command	Description
ethernet cfm lck start interface	Places an interface in ETH-LCK condition.
ethernet cfm lck stop mpid	To put a MEP out of ETH-LCK condition.
show ethernet cfm smep	Displays CFM information for the source MEP.

ethernet cfm mep crosscheck

To enable cross-checking between the list of configured remote IEEE CFM maintenance end points (MEPs) of a domain and MEPs learned through continuity check messages (CCMs), use the **ethernet cfm mep crosscheck** command in privileged EXEC mode. To disable cross-checking, use the **ethernet cfm mep crosscheck disable** command.

ethernet cfm mep crosscheck {**enable** | **disable**} **domain** *domain-name* {**port** | **evc** *evc-name*}

Syntax Description

enable	Enables cross-checking.
disable	Disables cross-checking.
domain	Domain name. The name can be up to 154 characters.
<i>domain-name</i>	String of a maximum of 154 characters that identifies the maintenance domain.
port	Specifies that the MEP is a port MEP.
evc	Specifies an MEP for an EVC.
<i>evc-name</i>	Identifier of the EVC.

Command Default

Cross-checking is not enabled.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

To enable cross-checking after a device has booted up, you must issue the **ethernet cfm mep crosscheck enable** command. A **no** form of this command does not exist. Cross-checking is disabled when you issue the command with the **disable** keyword.

If a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in the continuity check messages.

To view the results of a cross-check operation, use the **show ethernet cfm maintenance-points remote crosscheck** command. To view errors in the cross-check operation, use the **show ethernet cfm errors** command. Both commands are used in privileged EXEC mode.

Examples

The following example shows how to enable IEEE CFM MEP cross-check on a port MEP:

```
Router> enable
Router# ethernet cfm mep crosscheck enable domain customerA port
```

Related Commands

Command	Description
ethernet cfm mep crosscheck start-delay	Configures the maximum amount of time that a device waits for remote IEEE CFM MEPs to come up before the cross-check operation is started.
show ethernet cfm errors	Displays IEEE CFM continuity check error conditions logged on a device since it was last reset or since the log was last cleared.
show ethernet cfm maintenance-points remote crosscheck	Displays detailed information about remote IEEE CFM MEPs in the cross-check list that were statically configured.

ethernet cfm mep crosscheck start-delay

To configure the maximum amount of time that a device waits for the remote IEEE CFM maintenance endpoints (MEPs) to come up before the cross-check operation is started, use the **ethernet cfm mep crosscheck start-delay** command in global configuration mode. To restore the default number of seconds a device waits, use the **no** form of this command.

ethernet cfm mep crosscheck start-delay *delay*

no ethernet cfm mep crosscheck start-delay *delay*

Syntax Description

<i>delay</i>	Number of seconds a device waits for the remote IEEE CFM MEPs to come up before the cross-check is started. The valid values range from 1 to 65535. The default value is 30.
--------------	--

Command Default

The start delay interval is enabled with a default of 30 seconds.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

If the continuity check intervals in your network are greater than 30 seconds (the delay default), you must configure the start-delay to match the greatest interval to avoid unnecessary traps.

Examples

The following example shows how to set the maximum number of seconds that a device waits for the remote IEEE CFM MEPs to come up before the cross-check operation is started:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm mep crosscheck start-delay 700
```

Related Commands

Command	Description
ethernet cfm mep crosscheck	Enables cross-checking between the list of configured remote IEEE CFM MEPs of a domain and MEPs learned through continuity check messages.

ethernet cfm mep domain mpid

To set a port as internal to a maintenance domain and create a port maintenance end point (MEP), use the **ethernet cfm mep domain mpid** command in interface configuration mode. To restore the default configuration of the port, use the **no** form of this command.

ethernet cfm mep domain *domain-name* **mpid** *mpid* **{port}**

no ethernet cfm mep domain *domain-name* **mpid** *mpid* **{port}**

Syntax Description

<i>domain-name</i>	Domain name. The name can be up to 154 characters.
mpid <i>mp-id</i>	MP ID. The valid values range from 1 to 8191.
port	Specifies that the MEP is a port MEP.

Command Default

This command is disabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

A single port may belong to multiple domains, meaning that you can issue multiple instances of the **ethernet cfm mep domain mpid** command for different domains. A port MEP can be created only on a physical port or on a port of a channel group.

Examples

The following example shows how to set a port as internal to a maintenance domain and create a port MEP:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# ethernet cfm mep domain CustomerB mpid 5 port
```

ethernet cfm mip

To dynamically create a IEEE maintenance intermediate point (MIP) and provision it globally at a specified maintenance level and to enable level filtering, use the **ethernet cfm mip** command in global configuration mode. To remove a IEEE MIP, use the **no** form of this command.

ethernet cfm mip {**auto-create level** *level-id* [**lower-mep-only**] [**sender-id chassis**] | **filter**}

no ethernet cfm mip {**auto-create level** *level-id* [**lower-mep-only**] [**sender-id chassis**] | **filter**}

Syntax Description

auto-create	Dynamically creates an IEEE CFM MIP.
level	Specifies a maintenance domain level.
<i>level-id</i>	Maintenance level ID. The valid values range from 0 to 7.
lower-mep-only	(Optional) Creates an MIP only if a maintenance end point (MEP) is configured at the next lower maintenance domain level on the port.
sender-id	(Optional) Configures the Sender ID option to send VLAN IDs that are not associated with maintenance associations. If the sender-id option is not configured, the Sender ID TLV is not included in the messages.
chassis	(Optional) Sends the chassis ID.
filter	Configures IEEE CFM MIP filter that drops all CFM frames at a lower level independent of whether they come from the wire or relay function side. The level filtering is disabled by default.

Command Default

IEEE CFM MIPs are not provisioned.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

IEEE CFM MIPs will be provisioned only if all the policies have been met.

The **ethernet cfm mip** command has lower precedence than the manual MIP **ethernet cfm mip level** (interface configuration mode) configuration command. For example, if you manually configure an MIP for a particular MA, that configuration overrides the MIP created by the global **ethernet cfm mip** command for that MA.

Examples

The following example shows how to dynamically create a IEEE CFM MIP at maintenance level 6:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm mip auto-create level 6
```

Related Commands

Command	Description
ethernet cfm mip level	Creates an MIP manually at a specified maintenance level on an interface.

ethernet cfm mip level

To provision a IEEE Connectivity Fault Management (CFM) maintenance intermediate point (MIP) manually at a specified maintenance level on an EFP service, use the **ethernet cfm mip level** command in interface configuration mode. To restore the default configuration, use the **no** form of this command.

ethernet cfm mip level *level-id*

no ethernet cfm mip level *level-id*

Syntax Description

<i>level-id</i>	Maintenance level ID. The valid values range from 0 to 7.
-----------------	---

Command Default

IEEE CFM MIPs are not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

You cannot configure a IEEE CFM MIP at a level lower than the level of already configured MEPS on an EFP service.

Configuring a IEEE CFM MIP using this command is known as a manual MIP and has precedence over the **ethernet cfm mip** command.

Examples

The following example shows how to provision a IEEE CFM MIP manually at maintenance level 5:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# ethernet cfm mip level 5
Router(config-if)# exit
```

Related Commands

Command	Description
ethernet cfm domain	Defines a IEEE CFM domain.
ethernet cfm mip	Enables the automatic creation of a IEEE CFM MIP at a maintenance domain level.
show ethernet cfm maintenance-points local	Displays information about maintenance points configured on a device.

ethernet cfm traceroute cache

To enable caching of IEEE CFM data learned through traceroute messages, use the **ethernet cfm traceroute cache** command in global configuration mode. To disable caching, use the **no** form of this command.

ethernet cfm traceroute cache

no ethernet cfm traceroute cache

Syntax Description

This command has no arguments or keywords.

Command Default

Caching is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Setting a traceroute cache allows you to store the results of traceroute operations initiated on the device.

Examples

The following example shows how to enable IEEE CFM traceroute cache:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm traceroute cache
```

Related Commands

Command	Description
ethernet cfm traceroute cache hold-time	Sets the maximum time that IEEE CFM traceroute cache entries are retained.
ethernet cfm traceroute cache size	Sets the maximum number for entries in IEEE CFM traceroute cache table.

ethernet cfm traceroute cache hold-time

To set the time when IEEE Connectivity Fault Management (CFM) traceroute cache entries are retained, use the **ethernet cfm traceroute cache hold-time** command in global configuration mode. To remove the configured time, use the **no** form of this command.

ethernet cfm traceroute cache hold-time *minutes*

no ethernet cfm traceroute cache hold-time

Syntax Description	<i>minutes</i>	Number of minutes that cache entries are retained. The valid values range from 1 to 65535. The default is 100.
--------------------	----------------	--

Command Default	Traceroute cache entries are retained.
-----------------	--

Command Modes	Global configuration (config)
---------------	-------------------------------

Command History	Release	Modification
	9.5.0	This command was introduced.

Usage Guidelines	Before you can issue this command, you must have enabled traceroute caching using the ethernet cfm traceroute cache command. If the traceroute cache is enabled and not empty and you change the hold time to less than the currently configured time, the change is rejected. You are prompted to clean up the table before the new hold time can be accepted. For example:
------------------	---

```
Router(config)# ethernet cfm traceroute cache hold-time 5
```

```
Please clean up the cache before setting smaller hold-time
current hold time = 100 Command Aborted.
```

Examples	The following example shows how to set the retention time for entries in the IEEE CFM traceroute cache table to 5 minutes:
----------	--

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm traceroute cache hold-time 5
```

Related Commands

Command	Description
ethernet cfm traceroute cache	Enables caching of IEEE CFM data learned from traceroute messages.
ethernet cfm traceroute cache size	Sets a maximum number for entries in IEEE CFM traceroute cache table.

ethernet cfm traceroute cache size

To set a maximum size of the IEEE Connectivity Fault Management (CFM) traceroute cache table, use the **ethernet cfm traceroute cache size** command in global configuration mode. To remove the configured size, use the **no** form of this command.

ethernet cfm traceroute cache size *entries*

no ethernet cfm traceroute cache size

Syntax Description

<i>entries</i>	Number of entries in the traceroute cache table. The valid values range from 1 to 4095. The default is 100.
----------------	---

Command Default

The traceroute cache is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

If traceroute cache is enabled, traceroute replies are cached up to a maximum of 100 entries. If traceroute cache is disabled, traceroute replies are not cached; the default size is 0.

Before you can issue this command, you must have enabled traceroute caching using the **ethernet cfm traceroute cache** command.

In the CFM IEEE 802.1ag standard, when the maximum cache size is reached, the oldest traceroute operation is removed to make room for a new traceroute operation.

Setting the number of traceroute cache entries lower than the number of entries currently cached causes this command to be rejected, and you are prompted to clear the traceroute cache.

Examples

The following example shows how to set the maximum number of entries in the IEEE CFM traceroute cache table to 2500:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm traceroute cache size 2500
```

Related Commands

Command	Description
ethernet cfm traceroute cache	Enables caching of IEEE CFM data learned from traceroute messages.

Command	Description
ethernet cfm traceroute cache hold-time	Sets the maximum time that IEEE CFM traceroute cache entries are retained.

ethernet oam

To enable Ethernet link Operations, Administration, and Maintenance (OAM) on an interface, use the **ethernet oam** command in interface configuration mode. To disable Ethernet OAM on an interface, use the **no** form of this command.

ethernet oam [**max-rate** *oampdus* | **min-rate** *num-seconds* | **mode** {**active** | **passive**} | **timeout** *seconds*]

no ethernet oam [**max-rate** *oampdus* | **min-rate** *num-seconds* | **mode** {**active** | **passive**} | **timeout** *seconds*]

Syntax Description

max-rate <i>oampdus</i>	(Optional) Sets the maximum rate at which OAM protocol data units (PDUs) can be transmitted per second. The valid values range from 1 to 10. The default is 10.
min-rate <i>num-seconds</i>	(Optional) Sets the minimum rate at which OAM PDUs are transmitted, in seconds. The valid values range from 1 to 10.
mode	(Optional) Sets the OAM client mode.
active	Sets the OAM client mode to active after the interface was previously placed in passive mode. Active is the default.
passive	Sets the OAM client mode to passive. In passive mode, a device cannot initiate discovery, inquire about variables, or set the loopback mode.
timeout <i>seconds</i>	(Optional) Specifies the amount of time, in seconds, after which a device declares its OAM peer to be nonoperational and resets its state machine. The valid values range from 2 to 30. The default is 5.

Command Default

Ethernet link OAM is disabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When the Ethernet link OAM is configured on an interface, the default mode of the OAM client is active. When Ethernet link OAM mode is enabled on two interfaces passing traffic, both the interfaces cannot be in passive mode. Both interfaces can be in active mode, and one can be in active mode and the other in passive mode. Toggling between the Ethernet link OAM modes does not disable OAM.

The **min-rate** *num-seconds* keyword and argument pair controls the minimum rate at which OAM PDUs can be sent on an interface, in seconds. A value of *n*, where 1 is less than or equal to *n* and *n* is less than or equal to 10, indicates that an OAM PDU must be sent at least once per *n* seconds. If no other OAM PDU is to be sent within an *n*-second window, an information OAM PDU must be sent.

Examples

The following example shows how to activate an Ethernet link OAM interface that was previously configured to be in passive mode:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam mode active
```

The following example shows how to set the maximum transmission rate of OAM PDUs on the TenGigabitEthernet4/1 interface to 5 transmissions per second:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam max-rate 5
```

The following example shows how to set the timeout period to 25 seconds on the TenGigabitEthernet4/1 interface:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam timeout 25
```

ethernet oam link-monitor frame

To configure an error link-monitor frame threshold or window on an Ethernet OAM interface, use the **ethernet oam link-monitor frame** command in interface configuration mode. To remove the error link-monitor threshold or window, use the **no** form of this command.

ethernet oam link-monitor frame {**threshold** {**high** {**none** | *high-frames*} | **low** *low-frames*} | **window** *milliseconds*}

no ethernet oam link-monitor frame {**threshold** {**high** {**none** | *high-frames*} | **low** *low-frames*} | **window** *milliseconds*}

Syntax Description

threshold high none <i>high-frames</i>	Sets a number of error frames at, above, or below which an action is triggered. The high keyword sets a high error frame threshold, in number of frames. The none keyword disables a high error frame threshold. The valid values of <i>high-frames</i> range from 1 to 65535.
low <i>low-frames</i>	Sets a low error frame threshold, in number of frames. The valid values range from 0 to 65535. The default value is 1.
window <i>milliseconds</i>	Sets the period of time during which error frames are counted. Number of milliseconds in multiples of 100. The valid values range from 10 to 600. The default value is 100.

Command Default

The error link-monitor frame threshold or window command is not configured on the Ethernet OAM interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The **ethernet oam link-monitor frame** command configures a number of error frames that trigger an action or a period of time during which error frames are counted.

Examples

The following example shows how to configure an error frame threshold or window on an Ethernet OAM interface of 3000 milliseconds:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor frame window 300
```

Related Commands

Command	Description
ethernet oam link-monitor frame-period	Configures an error frame period on an Ethernet OAM interface.
ethernet oam link-monitor frame-seconds	Configures the frame-seconds period on an Ethernet OAM interface.
ethernet oam link-monitor high-threshold action	Configures a specific action to trigger when the high threshold error exceeds on an Ethernet OAM interface.
ethernet oam link-monitor receive-crc	Configures an Ethernet OAM interface to monitor frames received with cyclic redundancy code (CRC) errors for a period of time.
ethernet oam link-monitor symbol-period	Configures an error symbol period on an Ethernet OAM interface.
ethernet oam link-monitor transmit-crc	Configures an Ethernet OAM interface to monitor frames transmitted with CRC errors for a period of time.

ethernet oam link-monitor frame-period

To configure an error frame period on an Ethernet OAM interface, use the **ethernet oam link-monitor frame-period** command in interface configuration mode. To remove the error frame period, use the **no** form of this command.

ethernet oam link-monitor frame-period {threshold {high {none | *high-frames*} | low *low-frames*} | window *frames*}

no ethernet oam link-monitor frame-period {threshold {high | low} | window}

Syntax Description

threshold	Sets a number of error frames at, above, or below which an action is triggered.
high none <i>high-frames</i>	Sets a high threshold for the error frame period, in number of frames. The valid values range from 1 to 65535. There is no default. The high threshold must be configured. The none keyword disables the high threshold for the error frame period.
low <i>low-frames</i>	Sets a low threshold for the error frame period, in number of frames. The valid values range from 0 to 65535. The default is 1.
window <i>frames</i>	Sets a polling window and window size of the error frame period in number of frames. The valid values range from 1 to 65535. Each value is a multiple of 10000. The default value is 1000.

Command Default

The error frame period is not configured on an Ethernet frame interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The **ethernet oam link-monitor frame-period** command configures an error frame period in number of frames. When a high threshold is configured, it must be at least as great as the low threshold for frame errors.

Examples

The following example shows how to configure an Ethernet OAM link-monitor frame-period window of 20000 frames:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor frame-period window 2
```

The following example shows how to configure an Ethernet OAM link-monitor frame-period low threshold of 500 frames:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor frame-period threshold low 500
```

Related Commands

Command	Description
ethernet oam link-monitor frame	Configures an error frame threshold or window on an Ethernet OAM interface.
ethernet oam link-monitor frame-seconds	Configures the frame-seconds period on an Ethernet OAM interface.
ethernet oam link-monitor high-threshold action	Configures a specific action to trigger when the high threshold error exceeds on an Ethernet OAM interface.
ethernet oam link-monitor receive-crc	Configures an Ethernet OAM interface to monitor frames received with cyclic redundancy code (CRC) errors for a period of time.
ethernet oam link-monitor symbol-period	Configures an error symbol period on an Ethernet OAM interface.
ethernet oam link-monitor transmit-crc	Configures an Ethernet OAM interface to monitor frames transmitted with CRC errors for a period of time.

ethernet oam link-monitor frame-seconds

To configure the error frame-seconds period on an Ethernet OAM interface, use the **ethernet oam link-monitor frame-seconds** command in interface configuration mode. To remove the error frame-seconds period, use the **no** form of this command.

ethernet oam link-monitor frame-seconds {**threshold** {**high** {**none** | *high-frames*} | **low** *low-frames*} | **window** *milliseconds*}

no ethernet oam link-monitor frame-seconds {**threshold** {**high** | **low**} | **window**}

Syntax Description

threshold	Sets the frame-seconds period at, above, or below which an action is triggered.
high none <i>high-frames</i>	Sets a high error frame-seconds period in number of seconds. The valid values range from 1 to 900. There is no default. The high threshold must be configured. The none keyword disables the high threshold for the frame-seconds.
low <i>low-frames</i>	Sets a low error frame-seconds threshold, in number of seconds. The valid values range from 1 to 900. The default is 1.
window <i>milliseconds</i>	Sets the polling window during which error frame-seconds are counted. The valid values range from 100 to 9000 milliseconds. The default value is 1000.

Command Default

The **ethernet oam link-monitor frame-seconds** command is not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The **ethernet oam link-monitor frame-seconds** command configures the error frame-seconds period of time in which error frames are counted.

Examples

The following example shows how to configure an Ethernet OAM link-monitor frame-seconds window of 30000 milliseconds (30 seconds):

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor frame-seconds window 300
```

Related Commands

Command	Description
ethernet oam link-monitor frame	Configures an error frame period on an Ethernet OAM interface.
ethernet oam link-monitor frame-period	Configures an error frame threshold or window on an Ethernet OAM interface.
ethernet oam link-monitor high-threshold action	Configures a specific action to trigger when a high threshold for an error exceeds on an Ethernet OAM interface.
ethernet oam link-monitor receive-crc	Configures an Ethernet OAM interface to monitor frames received with cyclic redundancy code (CRC) errors for a period of time.
ethernet oam link-monitor symbol-period	Configures an error symbol period on an Ethernet OAM interface.
ethernet oam link-monitor transmit-crc	Configures an Ethernet OAM interface to monitor frames transmitted with CRC errors for a period of time.

ethernet oam link-monitor high-threshold action

To trigger a specific action when a high threshold for an error is exceeded on an Ethernet OAM interface, use the **ethernet oam link-monitor high-threshold action** command in interface configuration mode. To remove the high-threshold action, use the **no** form of this command.

ethernet oam link-monitor high-threshold action {**error-disable-interface** | **failover**}

no ethernet oam link-monitor high-threshold action

Syntax Description

error-disable-interface	Performs an error-disable function on the interface.
failover	Performs a failover to another port in the same channel group.

Command Default

A high-threshold action is not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

This command causes the ports to move to the error-disable state when the error high threshold is exceeded within the specified interval.

The failover action is applicable only to the ports of the channel group. It provides an automatic failover of traffic from one port in a channel group to another port in the same channel group when one of the ports in the channel exceeds the high threshold for an error within the specified interval. The port failover occurs only if at least one operational port is in the channel group. The failed port moved to the error-disable state. If the failed port is the last port in the channel group, the port will not move to the error-disable state and will continue to pass traffic regardless of the types of errors received.

Examples

The following example shows how to trigger an error-disable-interface action when the high threshold for an error is exceeded:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor high-threshold action error-disable-interface
```

Related Commands

Command	Description
ethernet oam link-monitor frame	Configures an error frame threshold or window on an Ethernet OAM interface.
ethernet oam link-monitor frame-period	Configures an error frame period on an Ethernet OAM interface.
ethernet oam link-monitor frame-seconds	Configures the frame-seconds period on an Ethernet OAM interface.
ethernet oam link-monitor receive-crc	Configures an Ethernet OAM interface to monitor frames received with cyclic redundancy code (CRC) errors for a period of time.
ethernet oam link-monitor symbol-period	Configures an error symbol period on an Ethernet OAM interface.
ethernet oam link-monitor transmit-crc	Configures an Ethernet OAM interface to monitor frames transmitted with CRC errors for a period of time.

ethernet oam link-monitor on

To enable link monitoring on an Ethernet OAM interface, use the **ethernet oam link-monitor on** command in interface configuration mode. To disable link monitoring, use the **no** form of this command.

ethernet oam link-monitor on

no ethernet oam link-monitor on

Syntax Description

This command has no arguments or keywords.

Command Default

Link monitoring is turned on when Ethernet OAM is enabled on an interface.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When link monitoring is enabled, the interface sends event OAM protocol data units (PDUs) when errors occur and interprets event OAM PDUs from the remote peer. Link monitoring can be effective only if both the local client and remote peer agree to support it.

The **ethernet oam link-monitor on** command is enabled by default when Ethernet OAM is enabled on an interface. When link monitoring is enabled by default, you must explicitly disable it by issuing the **no** form of this command.

Examples

The following example shows how to disable link monitoring on the TenGigabitEthernet4/1 interface:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# no ethernet oam link-monitor on
```

Related Commands

Command	Description
ethernet oam link-monitor supported	Enables support for link monitoring on an Ethernet OAM interface.

ethernet oam link-monitor receive-crc

To configure an Ethernet OAM interface to monitor ingress frames received with cyclic redundancy code (CRC) errors for a period of time, use the **ethernet oam link-monitor receive-crc** command in interface configuration mode. To disable monitoring, use the **no** form of this command.

ethernet oam link-monitor receive-crc {**threshold** {**high** {*high-frames* | **none** } | **low** *low-frames*} | **window** *milliseconds*}

no ethernet oam link-monitor receive-crc {**threshold** {**high** | **low**} | **window**}

Syntax Description

threshold	Sets the number of frames with CRC errors received at, above, or below which an action is triggered.
high none <i>high-frames</i>	The high keyword sets a high threshold for ingress frames received with CRC errors. The none keyword disables a high threshold for ingress frames received with CRC errors. The valid values for <i>high-frames</i> range from 1 to 65535.
low <i>low-frames</i>	Sets a low threshold for ingress frames received with CRC errors. The valid values range from 0 to 65535. The default value is 10.
window <i>milliseconds</i>	Sets a period of time, in milliseconds, during which frames with receive CRC errors are counted. The valid values range from 10 to 1800. The default value is 1000.

Command Default

The monitoring of ingress frames received with CRC errors is not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Ethernet OAM must be operational on the interface before using the **ethernet oam link-monitor receive-crc** command.

Examples

The following example shows how to configure a receive-crc period with a low threshold of 3000:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor receive-crc threshold low 3000
```

Related Commands

Command	Description
ethernet oam link-monitor frame	Configures an error frame threshold or window on an Ethernet OAM interface.
ethernet oam link-monitor frame-period	Configures an error frame period on an Ethernet OAM interface.
ethernet oam link-monitor frame-seconds	Configures the frame-seconds period on an Ethernet OAM interface.
ethernet oam link-monitor high-threshold action	Configures a specific action to occur when a high threshold for an error exceeds on an Ethernet OAM interface.
ethernet oam link-monitor symbol-period	Configures an error symbol period on an Ethernet OAM interface.
ethernet oam link-monitor transmit-crc	Configures an Ethernet OAM interface to monitor frames transmitted with CRC errors for a period of time.

ethernet oam link-monitor supported

To enable support for link monitoring on an Ethernet OAM interface, use the **ethernet oam link-monitor supported** command in interface configuration mode. To disable link monitoring support, use the **no** form of this command.

ethernet oam link-monitor supported

no ethernet oam link-monitor supported

Syntax Description

This command has no arguments or keywords.

Command Default

Link monitoring is supported only when Ethernet OAM is enabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use this command to help establish an OAM session for performing OAM functions, such as remote loopback. For example, if a device is connected to a third-party device that does not support link monitoring, link monitoring support must be disabled on this device to establish an OAM session with the third-party device.

When the **ethernet oam link-monitor supported** command is used, remote loopback will not function even when the interface has been configured to support it.

When support for link monitoring is enabled by default, you must explicitly disable it by issuing the **no** form of this command.

Examples

The following example shows how to disable support for link monitoring on the TenGigabitEthernet4/1 OAM interface:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# no ethernet oam link-monitor supported
```

The following example shows how to reenable support for link monitoring on the TenGigabitEthernet4/1 OAM interface after support has been disabled:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam link-monitor supported
```

Related Commands

Command	Description
ethernet oam link-monitor on	Enables link monitoring on an Ethernet OAM interface.

ethernet oam link-monitor symbol-period

To configure an error symbol-period on an Ethernet OAM interface, use the **ethernet oam link-monitor symbol-period** command in interface configuration mode. To remove the symbol-period, use the **no** form of this command.

ethernet oam link-monitor symbol-period {threshold {high {none | *high-symbols*} | low *low-symbols*} | window *symbols*}

no ethernet oam link-monitor symbol-period {threshold {high | low} | window}

Syntax Description

threshold	Sets the number of error symbols at, above, or below which an action is triggered.
high <i>high-symbols</i>	Sets a high threshold for the error symbol-period in number of error symbols. The valid values range from 1 to 65535. There is no default. The high threshold must be configured.
none	Disables the high threshold for the error symbol-period.
low <i>low-symbols</i>	Sets a low threshold for the error symbol-period in number of error symbols. The valid values range from 0 to 65535.
window <i>symbols</i>	Sets a window and window size in number of symbols. The valid values range from 1 to 65535. Each value represents one million.

Command Default

The error symbol-period is not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The **ethernet oam link-monitor symbol-period** command configures an error symbol-period in number of symbols. When a high threshold is configured, it must be at least as great as the low threshold for symbol errors.

Examples

The following example shows how to configure an error symbol-period window of 500 million error symbols:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor symbol-period window 500
```

The following example shows how to configure an error symbol-period low threshold of 500 error symbols:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor symbol-period threshold low 500
```

Related Commands

Command	Description
ethernet oam link-monitor frame	Configures an error frame threshold or window on an Ethernet OAM interface.
ethernet oam link-monitor frame-period	Configures an error frame period on an Ethernet OAM interface.
ethernet oam link-monitor frame-seconds	Configures the frame-seconds period on an Ethernet OAM interface.
ethernet oam link-monitor high-threshold action	Configures a specific action to occur when a high threshold for an error exceeds on an Ethernet OAM interface.
ethernet oam link-monitor receive-crc	Configures an Ethernet OAM interface to monitor frames received with cyclic redundancy code (CRC) errors for a period of time.
ethernet oam link-monitor transmit-crc	Configures an Ethernet OAM interface to monitor frames transmitted with CRC errors for a period of time.

ethernet oam link-monitor transmit-crc

To configure an Ethernet OAM interface to monitor egress frames transmitted with cyclic redundancy code (CRC) errors for a period of time, use the **ethernet oam link-monitor transmit-crc** command in interface configuration mode. To disable monitoring, use the **no** form of this command.

ethernet oam link-monitor transmit-crc {**threshold** {**high** {*high-frames* | **none**} | **low** *low-frames*} | **window** *milliseconds*}

no ethernet oam link-monitor transmit-crc {**threshold** {**high** | **low**} | **window**}

Syntax Description

threshold	Sets the number of frames with CRC errors transmitted at, above, or below which an action is triggered.
high none <i>high-frames</i>	The high keyword sets a high threshold for egress frames transmitted with CRC errors. The none keyword disables a high threshold for egress frames transmitted with CRC errors. The valid values for <i>high-frames</i> range from 1 to 65535.
low <i>low-frames</i>	Sets a low threshold for ingress frames transmitted with CRC errors. The valid values range from 0 to 65535. The default value is 10.
window <i>milliseconds</i>	Sets a period of time, in milliseconds, during which frames with transmit CRC errors are counted. The valid values range from 10 to 1800. The default value is 100.

Command Default

The monitoring of egress frames transmitted with CRC errors is not configured.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Ethernet OAM must be operational on the interface before using the **ethernet oam link-monitor transmit-crc** command

Examples

The following example shows how to configure a transmit CRC window of 2500 milliseconds:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/1
Router(config-if)# ethernet oam
Router(config-if)# ethernet oam link-monitor transmit-crc window 25
```

Related Commands

Command	Description
ethernet oam link-monitor frame	Configures an error frame threshold or window on an Ethernet OAM interface.
ethernet oam link-monitor frame-period	Configures an error frame period on an Ethernet OAM interface.
ethernet oam link-monitor frame-seconds	Configures the frame-seconds period on an Ethernet OAM interface.
ethernet oam link-monitor high-threshold action	Configures a specific action to occur when a high threshold for an error exceeds on an Ethernet OAM interface.
ethernet oam link-monitor receive-crc	Configures an Ethernet OAM interface to monitor ingress frames received with CRC errors.
ethernet oam link-monitor symbol-period	Configures an error symbol period on an Ethernet OAM interface.

ethernet oam remote-failure action

To enable Ethernet OAM remote-failure actions, use the **ethernet oam remote-failure action** command in interface configuration mode. To turn off remote failure actions, use the **no** form of this command.

ethernet oam remote-failure {critical-event | dying-gasp | link-fault} action {error-block-interface | error-disable-interface}

no ethernet oam remote-failure {critical-event | dying-gasp | link-fault} action

Syntax Description

critical-event	Acts on remote critical event failures.
dying-gasp	Acts on remote dying-gasp failures.
link-fault	Acts on remote link-fault failures.
error-block-interface	Sets the interface to the blocking state when an error occurs.
error-disable-interface	Disables the interface when an error occurs.

Command Default

Actions in response to Ethernet OAM remote failures do not occur.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use this command to configure an interface to take specific actions when Ethernet OAM remote-failure events occur.

Examples

The following example shows how to configure the action to be taken when a critical event occurs on the TenGigabitEthernet4/11 interface:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet4/11
Router(config-if)# ethernet oam remote-failure critical-event action error-disable-interface
```

ethernet oam remote-loopback

To enable or disable Ethernet OAM remote loopback functionality on an interface, use the **ethernet oam remote-loopback** command in privileged EXEC mode.

ethernet oam remote-loopback {start | stop} {interface *type number*}

Syntax Description

start	Starts the remote loopback operation.
stop	Stops the remote loopback operation.
interface <i>type number</i>	Specifies an interface, interface type, and number.

Command Default

Remote loopback functionality is disabled.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When the Ethernet OAM remote loopback functionality is enabled on an interface, traffic sent out on this interface is discarded or sent back (and dropped locally) by the remote interface.

When the **no ethernet oam link-monitor supported** command is used, remote loopback will not function even when the interface has been configured to support it.

Examples

The following example shows how to start a remote loopback session on the TenGigabitEthernet4/1 interface:

```
Router> enable
Router# ethernet oam remote-loopback start interface TenGigabitEthernet4/1
```

Related Commands

Command	Description
ethernet oam remote-loopback (interface)	Enables the support of the Ethernet OAM remote loopback operation on an interface or sets a remote loopback timeout period.

ethernet oam remote-loopback (interface)

To enable the support of Ethernet OAM remote loopback operations on an interface or set a remote loopback timeout period, use the **ethernet oam remote-loopback (interface)** command in interface configuration mode. To disable support of the remote loopback operations or remove the timeout setting, use the **no** form of this command.

ethernet oam remote-loopback {**supported** | **timeout** *seconds*}

no ethernet oam remote-loopback {**supported** | **timeout**}

Syntax Description

supported	Enables the remote loopback functionality.
timeout <i>seconds</i>	Sets a master loopback timeout setting. The valid values of the timeout period range from 1 to 10.

Command Default

Ethernet OAM remote loopback is not enabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

This command enables the support of OAM remote loopback on an interface. Only after this functionality is enabled, the local OAM client can initiate the OAM remote loopback operations to exchange configuration information with its remote peer.

Examples

The following example shows how to enable remote loopback support on the TenGigabitEthernet4/1 interface:

```
Router> enable
Router# configure terminal
Router(config)# interface TenGigabitEthernet 4/1
Router(config-if)# ethernet oam remote-loopback supported
```

Related Commands

Command	Description
ethernet oam remote-loopback	Enables or disables the remote loopback functionality.

ethernet y1731 delay dmm domain

To configure a sender MEP for an IP SLA-Y.1731 delay or delay variation operation, use the **ethernet y1731 delay** command in the IP SLA configuration mode.

ethernet y1731 delay DMM domain **domain** **{{vlan | evc} value}{mpid | mac-address} value cos value source {mpid | mac-address} value**

Syntax Description

evc	Specifies the ethernet virtual circuit identifier.
vlan	Specifies the VLAN.
cos	Specifies the class of service. The values ranges between 0 and 7.
mpid	Specifies the destination MP ID. The values ranges between 1 and 8191.
mac-address	Specifies the destination mac-address.
source	Specifies the source MP ID or mac-address.

Command Default

A sender MEP is not configured for the IP SLA Y.1731 operation.

Command Modes

IP SLA configuration (config-ip-sla)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

This command begins configuring a two-way delay measurement and enters IP SLA Y.1731 delay configuration mode.

Delay Measurement Message (DMM) frames are sent during single-ended operations. A receiver MEP on the responder device is required for dual-ended operations. To change the operation type of an existing IP SLAs operation, you must first use the **no ip sla** command to delete the IP SLAs operation and then reconfigure the operation with the new operation type.

Examples

The following example shows how to sender MEP for an IP SLA-Y.1731 delay or delay variation operation.

```
Router(config-term)# ip sla 500
Router(config-ip-sla)# ethernet y1731 delay DMM domain xxx evc yyy mpid 101 cos 3 source
mpid 100
```

Related Commands

Command	Description
ethernet y1731 delay receive	Configures a receiver MEP on the responder for a dual-ended IP SLAs Y.1731 delay or delay variation operation.
no ip sla	Deletes an existing configuration for a Cisco IP SLAs operation

frame

Use this command to configure the following:

- Rate at which an IP SLA Y.1731 operation sends synthetic frames in the IP SLA Y.1731 delay or IP SLA Y.1731 loss configuration mode
- Frame offset to be used to calculate statistics for an IP SLA Y.1731 delay variation operation in IP SLA Y.1731 delay configuration mode
- Padding for synthetic frames for an IP SLA Y.1731 delay or delay variation operation in IP SLA Y.1731 delay configuration mode

To return to default, use the no form of this command.

frame {*interval* | *offset* | *size*} *bytes*

no frame {*interval* | *offset* | *size*} *bytes*

Syntax Description

<i>interval</i>	Specifies the retransmission period. The default for the frame interval is 1000 milliseconds for DMM. The allowed values are 100 milliseconds or 1 second.
<i>offset</i>	Specifies the frame offset to be used for calculations. The values range from 1 to 10.
<i>size</i>	Specifies the frame size. The values range from 64 to 384. The default for the frame size is 64 bytes.

Command Default

This command has no defaults.

Command Modes

IP SLA Y.1731 delay configuration (config-sla-y1731-delay) for frame interval, frame offset, and frame size
IP SLA Y.1731 loss configuration (config-sla-y1731-loss) only for frame interval

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

Use the **frame offset** command to change the value of frame offset from the default (1) to the specified value. Configure this command on the MEP that performs the performance measurement calculation. For dual-ended operations, calculations are performed at the receiver MEP on the responder. Use the **distribution** command to set the performance measurement type to delay variation.

Use the **frame interval** command to change the gap between successive synthetic frames sent in an Ethernet delay, delay variation, or frame loss operation from the default (1000 ms) to the specified value. Frames will be sent at a given frequency for the lifetime of the operation. For example, a delay operation with a frame interval of 1000 ms sends a frame once every second, for the lifetime of the operation. Configure this command on the sender MEP.

Use the **frame size** command to change the padding size of synthetic frames sent during an Ethernet delay or delay variation operation from the default (64 bytes) to the specified value. Configure this command on the sender MEP.

Examples

The following example shows how to set frame interval and frame size.

```
Router(config)# ip sla 10
Router(config-ip-sla)# ethernet y7131 delay dmm domain xxx evc yyy mpid 101 cos 3 source
mpid 100
Router(config-sla-y1731-delay)# frame interval 100
Router(config-sla-y1731-delay)# frame size 32
```

Related Commands

Command	Description
frame size	Configures the padding for synthetic frames in an Ethernet delay or delay variation operation.
distribution	Configures statistics distributions for an IP SLA Y.1731 operation.
frame interval	Configures statistics distributions for an IP SLAs M Y.1731 operation.

history interval

To set the number of statistics distributions kept during the lifetime of an SLA Y.1731 operation, use the **history interval** command in the IP SLA Y.1731 delay configuration mode or the IP SLA Y.1731 loss configuration mode. To return to the default value, use the no form of this command.

history interval *intervals-stored*

no history interval *intervals-stored*

Syntax Description

interval	Specifies the number of historical aggregated interval statistics to be retained. The number of interval ranges from 1 to 10.
-----------------	---

Command Default

The default history interval is 2 distributions.

Command Modes

IP SLA Y.1731 delay configuration (config-sla-y1731-delay)
SLA Y.1731 loss configuration (config-sla-y1731-loss)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

Use this command to change the number of distribution statistics kept from the default (2) to the specified number.

Use the **distribution** command to configure the number and range of distribution bins to calculate delay and delay-variation performance measurements per interval.

Use the **aggregate interval** command to configure the length of time during which the performance measurements are conducted and the results stored for an Ethernet operation

Examples

The following example shows how to set the number of statistics distributions kept during the lifetime of an SLA Y.1731 operation.

```
Router(config-term)# ip sla 10
Router(config-ip-sla)# ethernet y1731 delay dmm domain xxx evc yyy mpid 101 cos 3 source
mpid 100
Router(config-sla-y1731-delay)# history interval 1
```

Related Commands

Command	Description
aggregate intreval	Configures the aggregate interval.
distribution	Specifies measurement type and configures bins for statistics distributions kept for an Ethernet delay or delay variation operation.

id (CFM)

To configure a maintenance domain identifier (MDID) for the maintenance domain, use the **id** command in CFM configuration mode. To remove an MDID, use the **no** form of this command.

id {*mac-address domain-number* | **dns** *dns-name* | **null**}

no id

Syntax Description

<i>mac-address</i>	MAC address of the maintenance domain.
<i>domain-number</i>	Domain number. The valid values range from 0 to 65535.
dns <i>dns-name</i>	Specifies a domain name service (DNS) name. A maximum string value of 43 characters is supported.
null	Indicates that there is no domain name.

Command Default

A MDID is not configured for the maintenance domain.

Command Modes

CFM configuration (config-ecfm)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

If the MDID is not specified, the domain name in string format is used as the default. If a DNS name exceeds 43 characters, the MDID is only the first 43 characters of that DNS name.

If the MDID is explicitly null, the maintenance association ID (MAID) is constructed from the short maintenance association name. The short maintenance association name needs to be unique globally if the MDID is null.

Examples

The following example shows how to configure a MDID with a MAC address and a domain number:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain customerA level 5
Router(config-ecfm)# id aaaa.bbbb.cccc 1017
```

ip sla

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

ip sla *operation number*

no ip sla *operation number*

Syntax Description

<i>operation-number</i>	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 (config)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

The **ip sla** command is used to begin configuration for an IP SLAs 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 configuration mode.

The **ip sla** command is supported in IPv4 networks. This command can also be used when configuring an IP SLAs operation that supports IPv6 addresses.

IP SLAs allows a maximum of 2000 operations. Debugging is supported only on the first 32 operation numbers.

After you configure an operation, you must schedule the operation. For information on scheduling an operation, refer to the **ip sla schedule** and **ip sla group schedule global configuration** commands. You can also optionally set reaction triggers for the operation. For information on reaction triggers, refer to the **ip sla reaction-configuration** and **ip sla reaction-trigger global configuration** commands. To change the operation type of an existing IP SLAs operation, you must first delete the IP SLAs operation (using the **no ip sla**) and then reconfigure the operation with the new operation type.

**Note**

After you schedule an operation, you cannot modify the configuration of the operation. To modify the configuration of the operation after it is scheduled, you must first delete the IP SLAs operation (using the `no ip sla` command) and then reconfigure the operation with the new operation parameters. To display the current configuration settings of the operation, use the `show ip sla configuration` command in user EXEC or privileged EXEC mode.

Examples

The following example shows how to configure the IP SLA operation 99.

```
Router (config) # ip sla 99
```

**Note**

If operation 99 already exists and has not been scheduled, the command line interface will enter IP SLA configuration mode for operation 99. If the operation already exists and has been scheduled, this command will fail.

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	Displays the current operational status and statistics of all IP SLAs operations or a specified operation.
ip sla schedule	Configures the scheduling parameters for a single IP SLAs operation.

ip sla reset

To perform a shutdown and restart of the Cisco IOS IP SLAs engine, use the **ip sla reset** command in the global configuration mode.

ip sla reset

Command Default

This command has no defaults.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

The **ip sla reset** command stops all IP SLAs operations, clears IP SLAs configuration information, and returns the IP SLAs feature to the startup condition. This command does not reread the IP SLAs configuration stored in the startup configuration in NVRAM. You must retype the configuration or load a previously saved configuration file.



Note

The **ip sla reset** command does not remove IP SLAs label switched path (LSP) Health Monitor configurations from the running configuration. Use the **auto ip sla mpls-lsp-monitor reset** command to remove LSP Health Monitor configurations from the running configuration.



Note

Use the **ip sla reset** command only in extreme situations such as the incorrect configuration of a number of operations.

Examples

The following example shows how to reset the Cisco IOS IP SLAs engine, clearing all stored IP SLAs information and configuration.

```
Router (config) # ip sla reset
```

Related Commands

Command	Description
ip sla restart	Restarts a stopped IP SLAs operation.

ip sla restart

To restart a Cisco IOS IP SLAs operation, use the **ip sla restart** command in the global configuration mode.

ip sla restart *operation-number*

Syntax Description

operation-number

Number of the IP SLAs operation to restart. IP SLAs allows a maximum of 2000 operations.

Command Default

This command has no defaults.

Command Modes

Global configuration (config)

Command History

Release

Modification

9.5.1

This command was introduced.

Usage Guidelines

To restart an operation, the operation should be in an active state.

IP SLAs allows a maximum of 2000 operations. This command does not have a no form.

Examples

The following example shows how to restart operation 12.

```
Router (config) # ip sla restart 12
```

Related Commands

Command	Description
ip sla reset	Clears all current IP SLAs statistics and configuration information from the router and resets the IP SLAs engine.

ip sla schedule

To configure the scheduling parameters for a single Cisco IOS IP SLAs operation, use the **ip sla schedule** command in the global configuration mode. To stop the operation and place it in the default state (pending), use the no form of this command.

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**]

no ip sla schedule *operation-number*

Syntax Description

<i>operation-number</i>	Number of the IP SLAs operation to schedule.
life forever	(Optional) Schedules the operation to run indefinitely.
life <i>seconds</i>	(Optional) Number of seconds the operation actively collects information. The default is 3600 seconds (one hour).
start-time	(Optional) Time when the operation starts.
<i>hh:mm[:ss]</i>	Specifies an absolute start time using hour, minute, and (optionally) second. 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.
<i>month</i>	(Optional) Name of the month to start the operation in. If 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.
<i>day</i>	(Optional) Number of the day (in the range 1 to 31) to start the operation on. If a day is not specified, the current day is used. Use of this argument requires that a month be specified.
pending	(Optional) No information is collected. This is the default value.
now	(Optional) Indicates that the operation should start immediately.
after <i>hh:mm:ss</i>	(Optional) Indicates that the operation should start hh hours, mm minutes, and ss seconds after this command was entered.
ageout <i>seconds</i>	(Optional) Number of seconds to keep the operation in memory when it is not actively collecting information. The default is 0 seconds (never ages out).
recurring	(Optional) Indicates that the operation will start automatically at the specified time and for the specified duration every day.

Command Default

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

Command Modes

Global configuration (config)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

After you schedule the operation with the **ip sla schedule** command, you cannot change the configuration of the operation. To change the configuration of the operation, use the no form of the **ip sla global configuration** command and reenter the configuration information.

If the operation is in a pending state, you can define the conditions under which the operation makes the transition from pending to active with the **ip sla reaction-trigger** and **ip sla reaction-configuration** global configuration commands. When the operation is in an active state, it immediately begins collecting information.

The following time line shows the age-out process of the operation:

W-----X-----Y-----Z

where:

- W is the time the operation was configured with the **ip sla global configuration** command.
- X is the start time or start of life of the operation (that is, when the operation became “active”).
- Y is the end of life as configured with the **ip sla schedule global configuration** command (life seconds have counted down to zero).
- Z is the age out of the operation.

Age out starts counting down at W and Y, is suspended between X and Y, and is reset to its configured size at Y.

The operation can age out before it executes (that is, Z can occur before X). To ensure that this does not happen, configure the difference between the operation’s configuration time and start time (X and W) to be less than the age-out seconds.

**Note**

The total RAM required to hold the history and statistics tables is allocated at the time of scheduling the IP SLAs operation. This prevents router memory problems when the router gets heavily loaded and lowers the amount of overhead an IP SLAs operation causes on a router when it is active.

The recurring keyword is supported only for scheduling single IP SLAs operations. You cannot schedule multiple IP SLAs operations using the **ip sla schedule** command. The life value for a recurring IP SLAs operation should be less than one day. The ageout value for a recurring operation must be “never” (which is specified with the value 0), or the sum of the life and ageout values must be more than one day. If the recurring option is not specified, the operations are started in the existing normal scheduling mode.

The **ip sla schedule** command is supported in IPv4 networks. This command can also be used when configuring an IP SLAs operation that supports IPv6 addresses.

Examples

In the following example, operation 25 begins actively collecting data at 3:00 p.m. on April 5. This operation will age out after 12 hours of inactivity, which can be before it starts or after it has finished with its life. When this operation ages out, all configuration information for the operation is removed (that is, the configuration information is no longer in the running configuration in RAM).

```
ip sla schedule 25 life 43200 start-time 15:00 apr 5 ageout 43200
```

In the following example, operation 1 begins collecting data after a 5-minute delay:

```
ip sla schedule 1 start-time after 00:05:00
```

In the following example, operation 3 begins collecting data immediately and is scheduled to run indefinitely:

```
ip sla schedule 3 start-time now life forever
```

In the following example, operation 15 begins automatically collecting data every day at 1:30 a.m.:

```
ip sla schedule 15 start-time 01:30:00 recurring
```

Related Commands

Command	Description
ip sla	Begins configuration for an IP SLAs operation and enters IP SLA configuration mode.
ip sla group schedule	Performs group scheduling for IP SLAs operations.
ip sla reaction-configuration	Configures certain actions to occur based on events under the control of the IP SLA.
ip sla reaction-trigger	Defines a second IP SLAs operation to make the transition from a pending state to an active state when one of the trigger action-type options is defined with the ip sla reaction-configuration global configuration command.
show ip sla configuration	Displays the configuration details of the IP SLAs operation.

lck

To enable the Locked Signal function (LCK) for a specific maintenance association, use the **lck** command in the Ethernet CFM service configuration mode. To disable LCK configuration, use the no form of this command.



Note

lck is enabled by default when CFM is enabled. When you configure lck, you must configure CFM before lck is operational.

lck [*level level-id* | *period seconds* | *expiry threshold value*]

no lck [*level level-id* | *period seconds* | *expiry threshold value*]

Syntax Description

level <i>level-id</i>	Configures the maintenance level for sending ETH-LCK frames transmitted by the MEP. The range is from 0 to 7.
lck period <i>value</i>	Configure the MEP ETH-LCK frame transmission period interval. The allowable values are 1 second or 60 seconds.
lck expiry-threshold <i>value</i>	Sets the expiry threshold for the maintenance association. The range is from 2 to 255. The default value is 3.5.

Command Default

The LCK function is enabled on specific maintenance associations.

Command Modes

Ethernet CFM service configuration (config-ecfm-srv)

Command History

Release	Modification
9.5.1	This command was introduced.

Examples

The following example shows how to enable the LCK function at level 7.

```
Router(config)# ethernet cfm domain operatorA level 7
Router(config-ecfm)# service Customer1 port
Router(config-ecfm-srv)# lck level 3
Router(config-ecfm-srv)# lck period 60
Router(config-ecfm-srv)# lck expiry-threshold 20
```

maximum meps

To specify the number of maintenance end points (MEPs) across the network in a maintenance association, use the **maximum meps** command in IEEE Connectivity Fault Management (CFM) service configuration mode. To restore the default value, use the **no** form of this command.

maximum meps *max-num*

no maximum meps

Syntax Description

<i>max-num</i>	Maximum number of MEPS that can be defined in the network. The valid values range from 1 to 65535. The default is 100.
----------------	--

Command Default

A maximum number of MEPs is not configured.

Command Modes

IEEE CFM service configuration (config-ecfm-srv)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When the configured maximum MEP value is reached, continuity check messages (CCMs) from other remote MEPs are ignored and a warning message is displayed.

Examples

The following example shows how to configure a maximum of 50 MEPs:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain operator level 5
Router(config-ecfm)# service operatorA port
Router(config-ecfm-srv)# maximum meps 50
Router(config-ecfm-srv)# exit
Router(config-ecfm)# exit
```

mep archive-hold-time

To set the amount of time (in minutes), that data from a missing maintenance end point (MEP) is kept in the continuity check database or that entries are held in the error database before they are purged, use the **mep archive-hold-time** command in CFM configuration mode. To restore the default number of minutes, use the **no** form of this command.

mep archive-hold-time *minutes*

no mep archive-hold-time

Syntax Description

<i>minutes</i>	Number of minutes that data from a missing MEP is kept before it is purged. The valid values range from 1 to 65535. The default value is 100.
----------------	---

Command Default

The command is enabled, and the archive-hold-time is set to 100 minutes.

Command Modes

Ethernet CFM configuration (config-ecfm)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When you reset the archive-hold-time, the new hold-time applies only to entries in the database that occur after the reset. Entries made before the hold-time was reset are not affected by the change. Different archive hold-times can be set for MEPs in different domains.

Examples

The following example shows how to set an archive-hold-time of 1000 minutes:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain operator level 5
Router(config-ecfm)# mep archive-hold-time 1000
```

mep mpid

To statically define maintenance end points (MEPs) within a maintenance association, use the **mep mpid** command in CFM service configuration mode. To remove MEP definitions, use the **no** form of this command.

mep mpid *mpid*

no mep mpid

Syntax Description

<i>mpid</i>	MEP ID that identifies the MEP. The valid values range from 1 to 8191.
-------------	--

Command Default

MEPs are not statically defined.

Command Modes

CFM service configuration (config-ecfm-srv)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use this command to manually configure a list of MEPs in a maintenance association. The device logs a warning when a discovered MPID is not on the list of configured MPIDs.

Examples

The following example shows how to configure an MEP with an ID of 25:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain operator level 5
Router(config-ecfm)# service operatorA port
Router(config-ecfm-srv)# mep mpid 25
Router(config-ecfm-srv)# exit
Router(config-ecfm)# exit
```

mip auto-create

To enable the automatic creation of a maintenance intermediate point (MIP) at a maintenance domain level, use the **mip auto-create** command in IEEE CFM configuration mode. To disable the automatic creation of an MIP, use the **no** form of this command.

mip auto-create [**lower-mep-only**]

no mip auto-create [**lower-mep-only**]

Syntax Description

lower-mep-only	(Optional) Creates an MIP only if there is a maintenance end point (MEP) for the service in another domain at the next lower active maintenance domain level.
-----------------------	---

Command Default

MIPs are not created automatically.

Command Modes

Ethernet CFM configuration (config-ecfm)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

This command configures the MIP creation policy for members of a maintenance domain to apply for automatically creating an MIP at the domain maintenance level.

If you manually configure an MIP for the maintenance association using the **ethernet cfm mip level** command, it will override the **mip auto-create** command for the MIP created for that maintenance association. The **mip auto-create** command also has lower precedence than the MIP creation policy at the maintenance association.

Examples

The following example shows how to enable the automatic creation of an MIP in the customerA domain at maintenance level 5:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain customerA level 5
Router(config-ecfm)# mip auto-create
```

Related Commands

Command	Description
ethernet cfm mip level	Provisions an MIP manually at a specified maintenance level on an interface.

mip auto-create (cfm-srv)

To configure the policy for a maintenance association to dynamically create maintenance intermediate points (MIPs) at the maintenance domain level, use the **mip auto-create** command in CFM service configuration mode. To disable the dynamic creation of an MIP, use the **no** form of this command.

mip auto-create [**lower-mep-only** | **none**]

no mip auto-create [**lower-mep-only** | **none**]

Syntax Description

lower-mep-only	(Optional) Creates an MIP only if there is a maintenance end point (MEP) for the service in another domain at the next lower active maintenance domain level.
none	(Optional) Indicates that MIPs should not be dynamically created.

Command Default

The default behavior is the MIP configuration policy of the enclosing maintenance domain.

Command Modes

CFM service configuration (config-ecfm-srv)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

If the **lower-mep-only** or **none** options are not configured, an MIP is created at the maintenance association. This command has lower precedence than the manual configuration of an MIP for a maintenance association. For example, if you manually configure an MIP for a maintenance association using the **ethernet cfm mip level** command, that manual configuration overrides the dynamic configuration from this **mip auto-create** command.

Examples

The following example shows how to configure the policy for a maintenance association to dynamically create MIPs at the enclosing maintenance domain level:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain operator level 5
Router(config-ecfm)# service operatorA port
Router(config-ecfm-srv)# mip auto-create
```

Related Commands

Command	Description
ethernet cfm mip level	Provisions an MIP manually at a specified maintenance level on an interface.

ping ethernet

To send Connectivity Fault Management (CFM) loopback messages through a MAC address or MPID to a destination maintenance end point (MEP) and maintenance intermediate point (MIP), use the **ping ethernet** command in privileged EXEC mode.

ping ethernet {**mpid** *mpid* | *mac-address*} {**domain** *domain-name*} {**port** | **evc** *evc-name*} [**source** *source-mpid*] [**cos** *cos-value*]

Syntax Description

mpid <i>mpid</i>	Specifies a maintenance point identifier. The valid values range from 1 to 8191.
<i>mac-address</i>	MAC address of the destination MEP in the format abcd.abcd.abcd.
domain <i>domain-name</i>	Specifies the domain where the destination MEP resides. The domain name can be up to 154 characters.
port	Specifies a port MEP.
evc <i>evc-name</i>	Specifies an MEP for an Ethernet Virtual Circuit (EVC).
source <i>source-mpid</i>	(Optional) Specifies a source maintenance point identifier. The valid values range from 1 to 8191.
cos <i>cos-value</i>	(Optional) Specifies a class of service (CoS) for an MEP that will be sent in the IEEE CFM messages. The valid values range from 0 to 7.

Command Default

A CFM ping operation to the specified MEP and MIP is performed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use the **ping ethernet** command to test connectivity between MEPs and MIPs.

If a domain name has more than 154 characters, a warning message is displayed notifying you that the maintenance domain ID (MDID) will be truncated to 43 characters in the continuity check messages (CCMs).

This command can be issued by specifying keywords and arguments as one command or as an extended command where you specify options line by line.

The CFM ping (loopback) supports up to 1488 bytes.

Examples

The following example shows how to send an Ethernet CFM loopback message to a destination MEP using the extended command format:

Router# **ping**

```
Protocol [ip]: ethernet
Mac Address : 0015.6215.46d0
Maintenance Domain : vik-vfi-ofm
EVC: evc2
Source MPID [555]:
Repeat Count [5]:
Datagram Size [100]: 9000
% A decimal number between 64 and 1488.
Datagram Size [100]:
Timeout in seconds [5]:
Interval in seconds [0]:
Extended commands [n]:
Type escape sequence to abort.
Sending 5 Ethernet CFM loopback messages to 0015.6215.46d0, timeout is 5
seconds:!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/8 ms
```

Related Commands

Command	Description
traceroute ethernet	Sends CFM traceroute messages to a destination MEP through a MAC address or MPID.

service (CFM-srv)

To configure a maintenance association within a maintenance domain for a port maintenance end point (MEP) or MEP for an Ethernet Flow Point (EFP), use the **service** command in CFM configuration mode. To remove the configuration, use the **no** form of this command.

service {*ma-name* | **number** *ma-num*} {**evc** *evc-name* | **port**} [**direction down**]

no service {*ma-name* | **number** *ma-num*} {**evc** *evc-name* | **port**} [**direction down**]

Syntax Description

<i>ma-name</i>	Short maintenance association name.
number <i>ma-num</i>	Specifies a maintenance association by a numerical ID. The valid values range from 0 to 65535.
evc <i>evc-name</i>	Specifies an Ethernet virtual circuit (EVC).
port	Specifies a port MEP.
direction	(Optional) Configures the service direction. The available options are "up" or "down". The default is "up."
down	(Optional) Configures the direction toward the LAN.

Command Default

No maintenance associations are configured.

Command Modes

CFM configuration (config-ecfm)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The maintenance association ID (MAID) is a combination of a maintenance domain ID and the short maintenance association name. The length of the MAID TLV must not exceed 48 characters.

Examples

The following example shows how to create a maintenance association within a maintenance domain for a port MEP:

```
Router> enable
Router# configure terminal
Router(config)# ethernet cfm domain operator level 5
Router(config-ecfm)# service operatorA port
Router(config-ecfm)# exit
```

show ethernet cfm domain

To display information for an IEEE Connectivity Fault Management (CFM) domain, use the **show ethernet cfm domain** command in privileged EXEC mode.

show ethernet cfm domain [*domain-name* | **brief**]

Syntax Description

<i>domain-name</i>	(Optional) Domain name where the name can be up to 154 characters.
brief	(Optional) Displays brief details about the configured maintenance domains.

Command Default

Information about all the configured maintenance domains is displayed when no keyword or argument is used.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

When using this command, if a domain name is not specified, information for all domains is shown.

If a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in the continuity check messages (CCMs).

When the **brief** keyword is used, the command output shows the following summary data:

- Domain name
- Domain index
- Domain level
- Number of maintenance associations in the domain
- Archive-hold-time for the error and continuity check databases for the domain

Examples

The following is sample output from the **show ethernet cfm domain** command:

```
Router# show ethernet cfm domain
```

```
Domain Name: md7
Level: 7
Total Services: 1
Services:
```

```

Type Id  Dir CC    CC-int  Static-rmep  Crosscheck  MaxMEP  Source  MA-Name
BD   100 Up   Y      1m      Disabled    Disabled    100     Static  ms7

```

Domain Name: md6

Level: 6

Total Services: 1

Services:

```

Type Id  Dir CC    CC-int  Static-rmep  Crosscheck  MaxMEP  Source  MA-Name
BD   100 Dwn  Y      1m      Disabled    Disabled    100     Static  ms6

```

Related Commands

Command	Description
show ethernet cfm maintenance-points remote	Displays information about all the remote maintenance points in the continuity check database.
show ethernet cfm maintenance-points remote crosscheck	Displays information about remote maintenance points configured statically in a cross-check list.
show ethernet cfm maintenance-points remote detail	Displays information about a remote maintenance point in the continuity check database.

show ethernet cfm errors

To display IEEE Connectivity Fault Management (CFM) continuity check error conditions logged on a device since it was last reset or since the log was last cleared, use the **show ethernet cfm errors** command in privileged EXEC mode.

show ethernet cfm errors [**configuration** | **domain-id** *domain-name* [**service** {*ma-name* | **number** *ma-num*}]]

Syntax Description

configuration	(Optional) Displays the configuration error list information; for example, port and error condition.
domain-id <i>domain-name</i>	(Optional) Displays the domain ID. The domain name can be up to 154 characters.
service	(Optional) Displays a maintenance association within the domain.
<i>ma-name</i>	(Optional) Short maintenance association name.
number <i>ma-num</i>	(Optional) Specifies a maintenance association by a numerical ID. The valid values range from 0 to 65535.

Command Default

When no maintenance domain is specified, errors for all domains are displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Errors that are logged on a device while using the **show ethernet cfm errors** command include the following:

- MEP–Down—Maintenance end point (MEP) timed out or is advertising a 0 lifetime.
- Configuration Error—A continuity check message (CCM) is received that has an maintenance point ID (MPID) matching the local device, but the source MAC address is different.
- Forwarding Loop—A CCM is received, that has the same MPID and same MAC address as the local device.
- Cross–connected—A CCM is received and the service ID does not match the service ID configured on the device.
- Cross–check Missing MEP—The cross-checking delay timer has expired, and the configured remote MEP did not come up.
- Cross–check Unknown MEP—An unexpected remote MEP came up.

Error conditions are kept in a log for the duration of the archive-hold-time configured on the maintenance domain or until the error condition is cleared, whichever occurs first.

Examples

The following is a sample output from the **show ethernet cfm errors** command:

The value in the Age field displays the age of the alarm condition. After the Stateful switchover (SSO), the value of the Age field for the alarms is not restarted. However, the alarm is cleared if the error condition is not present after the expiry threshold.

```
Router# show ethernet cfm errors
```

MPID	Domain Id	Mac Address	Type Id	
	MA Name	Reason	Lvl	Age
2	md6	c062.6baf.01ad	BD	100
	ms6	Receive RDI	6	21s

show ethernet cfm maintenance-points local

To display information about IEEE Connectivity Fault Management (CFM) maintenance points configured on a device, use the **show ethernet cfm maintenance-points local** command in privileged EXEC mode.

show ethernet cfm maintenance-points local [**detail**] [**mep** | **mip**] [**domain** *domain-name* | **interface** *type number* | **level** *level-id* | **evc** *evc-name*]

Syntax Description

detail	(Optional) Displays a detailed output.
mep	(Optional) Displays a maintenance end point (MEP).
mip	(Optional) Displays a maintenance intermediate point (MIP).
domain <i>domain-name</i>	(Optional) Displays a maintenance domain. The domain name can be up to 154 characters.
interface <i>type number</i>	(Optional) Displays an interface type and number.
level <i>level-id</i>	(Optional) Displays a maintenance level. The valid values range from 0 to 7.
evc <i>evc-name</i>	(Optional) Displays an Ethernet virtual circuit (EVC).

Command Default

When none of the optional keywords and arguments is specified, information about all the maintenance points on the device is shown.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The **show ethernet cfm maintenance-points local** command allows you to filter output. You can display information about maintenance points as follows:

- Independent of domain or interface
- On a particular interface independent of domain
- On a particular interface belonging to a given domain
- Belonging to a given domain independent of interface

The display may also be restricted to either MEPs or MIPs.

If a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in the continuity check messages (CCMs).

Examples

The following is sample output from the **show ethernet cfm maintenance-points local** command when none of the other optional keywords and arguments are specified:

```
Router# show ethernet cfm maintenance-points local
```

Local MEPs:

MPID	Domain Name	Lvl	MacAddress	Type	CC
Ofld	Domain Id	Dir	Port	Id	
	MA Name	SrvInst		Source	
	EVC name				
1	md6	6	0002.05ba.0001	BD	Y
No	md6	Down	Static	3	
	ms6	Te5/1		100	
	evc				

Total Local MEPs: 1
Local MIPs: None

Related Commands

Command	Description
show ethernet cfm maintenance-points remote	Displays detailed information about remote MEPs configured statically in the MEP list.

show ethernet cfm maintenance-points remote

To display detailed information about remote IEEE Connectivity Fault Management (CFM) maintenance end points (MEPs) configured statically in the MEP list and their status in the continuity check database (CCDB), use the **show ethernet cfm maintenance-points remote** command in privileged EXEC mode.

show ethernet cfm maintenance-points remote [**domain** *domain-name* | [[**crosscheck** | **static**] [**domain** *domain-name* | **mpid** *mpid* [**domain** *domain-name*]] [**port**]]]

Syntax Description

domain <i>domain-name</i>	(Optional) Displays a maintenance domain. The domain name can be up to 154 characters.
crosscheck	(Optional) Displays the Mep-Up status from the crosscheck function.
static	(Optional) Displays the Mep-Up status from the continuity-check static rmep function.
mpid <i>mpid</i>	(Optional) Shows a remote maintenance point. The valid values range from 1 to 8191.
port	(Optional) Displays the operational state of the port MEP.

Command Default

When a domain is not specified, all the CCDB MEP entries are displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

If a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in continuity check messages (CCMs) if “id <fmt> <MDID>” is not configured.

When no maintenance domain is specified, all the entries are displayed; otherwise only the entries belonging to the specified domain are displayed.

Examples

The following example is a sample output from the **show ethernet cfm maintenance-points remote** command:

```
Router# show ethernet cfm maintenance-points remote
```

```
-----
MPID  Domain Name  MacAddress      IfSt
```

```
Lvl   Domain ID   Ingress   PtSt
RDI   MA Name     Type      SvcInst
      EVC Name     ID        Age
-----
2      md6         c062.6baf.01ad  Up
6      md6         Te5/1      Up
RDI    ms6         BD         3
      evc         100       2s

Total Remote MEPS: 1
```

Related Commands

Command	Description
show ethernet cfm maintenance-points local	Displays information about maintenance points configured on a device.
show ethernet cfm maintenance-points remote crosscheck	Displays information about remote maintenance points configured statically in a cross-check list.
show ethernet cfm maintenance-points remote detail	Displays information about a remote maintenance point in the continuity check database.

show ethernet cfm maintenance-points remote crosscheck

To display information about remote IEEE Connectivity Fault Management (CFM) maintenance points configured statically in a cross-check list, use the **show ethernet cfm maintenance-points remote crosscheck** command in privileged EXEC mode.

show ethernet cfm maintenance-points remote crosscheck [**domain** *domain-name* | **mpid** *mpid* [**domain** *domain-name*]] [**evc** *evc-name* | **port**]

Syntax Description

domain <i>domain-name</i>	(Optional) Displays a maintenance domain. The domain name can be up to 154 characters.
mpid <i>mpid</i>	(Optional) Displays a remote maintenance point. The valid values range from 1 to 8191.
evc <i>evc-name</i>	(Optional) Displays an Ethernet virtual circuit (EVC).
port	(Optional) Displays the operational state of the port MEP.

Command Default

When no options are specified, maintenance point IDs (MPIDs) and domains for all the maintenance points on the list are displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

If a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in continuity check messages (CCMs) if “id <fmt> <MDID>” is not configured.

Examples

The following example is a sample output from the **show ethernet cfm maintenance-points remote crosscheck** command:

```
Router# show ethernet cfm maintenance-points remote crosscheck level 4
```

```
-----
MPID Domain Name  Lvl Type  Id      Mep-Up  MA Name
-----
    1      md7      7  BD     100     n/a     ms7
```

2	md7	7	BD	100	n/a	ms7
3	md7	7	BD	100	n/a	ms7

Related Commands

Command	Description
show ethernet cfm maintenance-points local	Displays information about maintenance points configured on a device.
show ethernet cfm maintenance-points remote	Displays information about remote maintenance points in the continuity check database.
show ethernet cfm maintenance-points remote detail	Displays information about a remote maintenance point in the continuity check database.

show ethernet cfm maintenance-points remote detail

To display information about a remote IEEE Connectivity Fault Management (CFM) maintenance point in the continuity check database, use the **show ethernet cfm maintenance-points remote detail** command in privileged EXEC mode.

show ethernet cfm maintenance-points remote detail {**mac** *mac-address* | **mpid** *mpid*} [**domain** *domain-name* | **evc** *evc-name* | **port**]

Syntax Description

mac	Displays a remote MAC address.
<i>mac-address</i>	MAC address of the remote maintenance point, in the format abcd.abcd.abcd.
mpid <i>mpid</i>	Displays a remote maintenance point. The valid values range from 1 to 8191.
domain <i>domain-name</i>	(Optional) Displays a specific maintenance domain. The domain name can be up to 154 characters.
evc <i>evc-name</i>	(Optional) Displays an Ethernet virtual circuit (EVC).
port	(Optional) Displays the operational state of the port MEP.

Command Default

When no options are specified, all the remote MEPs matching the specified MAC address or maintenance point ID (MPID) are displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use the **show ethernet cfm maintenance-points remote detail** command to obtain information about a specific maintenance point by specifying its MPID or to obtain information about all maintenance points that have a particular MAC address.

Examples

The following example is a sample output from the **show ethernet cfm maintenance-points remote detail** command:

```
Router# show ethernet cfm maintenance-points remote detail mpid 2
```

```
Version: IEEE-CFM
MAC Address: c062.6baf.01ad
Domain Name: md6
MA Name: ms6
Level: 6
EVC: evc
Bridge Domain: 100
MPID: 2
Incoming Port(s): Te5/1 Service Instance 3
CC Lifetime(sec): 210
Age of Last CC Message(sec): 30
CC Packet Statistics: 16753/0 (Received/Error)
MEP interface status: Up
MEP port status: Up
Receive RDI: TRUE
```

Related Commands

Command	Description
show ethernet cfm maintenance-points local	Displays information about maintenance points configured on a device.
show ethernet cfm maintenance-points remote	Displays information about remote maintenance points in the continuity check database.
show ethernet cfm maintenance-points remote crosscheck	Displays information about remote maintenance points configured statically in a cross-check list.

show ethernet cfm mpdb

To display the contents of a maintenance intermediate point (MIP) continuity check database, use the **show ethernet cfm mpdb** command in privileged EXEC mode.

show ethernet cfm mpdb [**domain-id** {*domain-name*} [**service** {*ma-name* | **number** *ma-num*}]]

Syntax Description

domain-id <i>domain-name</i>	(Optional) Displays the domain ID. The domain name can be up to 43 characters.
service	(Optional) Displays a maintenance association within the domain.
<i>ma-name</i>	(Optional) Short maintenance association name.
number <i>ma-num</i>	(Optional) Displays a maintenance association by a numerical ID. The valid values range from 0 to 65535.

Command Default

When no maintenance domain is specified, all the entries are displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use this command to display information received from MEPs.

Examples

The following example is a sample output from the **show ethernet cfm mpdb** command:

```
Router# show ethernet cfm mpdb
```

```
* = Can Ping/Traceroute to MEP
```

```
-----
MPID  Domain Name  MacAddress      Version      SrvcInst
Lvl   Domain ID      Ingress         Type        Age
Expd  MA Name              ID
      EVC Name
-----
2    *  md6             c062.6baf.01ad  IEEE-CFM    3
6    md6             Te5/1          BD          13s
-    ms6             100
```

```
evc
```

```
Total Remote MEPs: 1
```

show ethernet cfm smep

To display CFM SMEP settings on a device, use the **show ethernet cfm smep** command in the privileged EXEC mode.

show ethernet cfm smep [*interface number*]

Syntax Description

interface	(Optional) Displays information about an interface.
number	(Optional) • Integer from 1 to 6 that identifies a Gigabit Ethernet interface. • Integer from 1 to 564 that identifies a port channel.

Command Default

This command has no defaults.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Usage Guidelines

This command allows filtering on a per-interface basis.

AIS messages are sent by default at the configured maintenance intermediate point (MIP) level if an AIS level is not configured.

Examples

The following example shows sample output from the **show ethernet cfm smep** command.

```
Router# show ethernet cfm smep
```

```
Interface: TenGigabitEthernet2/2
LCK-Status: Enabled
LCK Period: 60000 (ms)
Level to transmit LCK: Default
AIS-Status: Enabled
AIS Period: 60000 (ms)
Level to transmit AIS: Default
Defect Condition: No Defect
10.64.107.172#AAA^Z
Translating "AAA"...domain server (255.255.255.255)
```

```
% Bad IP address or host name% Unknown command or computer name, or unable
to fi nd computer address
10.64.107.172#end
Translating "end"...domain server (255.255.255.255)

% Bad IP address or host name% Unknown command or computer name, or unable
to fi nd computer address
10.64.107.172#show ethernet cfm smep
SMEP Settings:
-----

Interface: TenGigabitEthernet2/2
LCK-Status: Enabled
LCK Period: 60000 (ms)
Level to transmit LCK: Default
AIS-Status: Enabled
AIS Period: 60000 (ms)
Level to transmit AIS: Default
Defect Condition: No Defect
```

show ethernet cfm statistics

To display IEEE Connectivity Fault Management (CFM) information, use the **show ethernet cfm statistics** command in privileged EXEC mode.

show ethernet cfm statistics [**domain** *domain-name* [**service** {*ma-name* | *ma-num*}]] | **mpid** *mpid*]

Syntax Description

domain <i>domain-name</i>	(Optional) Displays a maintenance domain.
service	(Optional) Displays a maintenance association within the domain.
<i>ma-name</i>	(Optional) Short maintenance association name.
<i>ma-num</i>	(Optional) Maintenance association number. The valid values range from 0 to 65535.
mpid <i>mpid</i>	(Optional) Displays a maintenance point identifier. The valid values range from 1 to 8191.

Command Default

All domains are displayed when none of the keywords or arguments are selected.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use this command to display an overview of CFM information.

If a domain name has more than 43 characters, a warning message is displayed notifying that the maintenance domain ID (MDID) will be truncated to 43 characters in the continuity check messages (CCMs).

Examples

The following is sample output from the **show ethernet cfm statistics** command:

```
Router# show ethernet cfm statistics
```

```
BRAIN MAC: 0005.9b1b.0000
DomainName: md6
MA Name: ms6
MPID: 1
  Last clearing of counters:  never
  CCMs:
    Transmitted:           16765   Rcvd Seq Errors:           0
```

```
LTRs:
  Unexpected Rcvd:          0
LBRs:
  Transmitted:              0   Rcvd Seq Errors:    0
  Rcvd in order:            0   Rcvd Bad MSDU:    0
```

show ethernet cfm traceroute-cache

To display the contents of IEEE Connectivity Fault Management (CFM) traceroute cache, use the **show ethernet cfm traceroute-cache** command in privileged EXEC mode.

show ethernet cfm traceroute-cache

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

Use the **show ethernet cfm traceroute-cache** command to display the contents of the traceroute cache; for example, to see the maintenance intermediate points (MIPs) and maintenance endpoints (MEPs) of a domain as they were discovered. The data is historic. The traceroute cache stores entries from previous traceroute operations.

Examples

The following example is a sample output from the **show ethernet cfm traceroute-cache** command:

```
Router# show ethernet cfm traceroute-cache
```

```
Current Cache-size: 0 Hops
Max Cache-size: 100 Hops
Hold-time: 100 Minutes
```

Related Commands

Command	Description
traceroute ethernet	Sends CFM traceroute messages to the destination MEP through the MAC address or MPID.
ethernet cfm traceroute cache	Enables caching of CFM data learned through traceroute messages.

show ip sla configuration

To display configuration values including all defaults for all Cisco IOS IP 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

<i>operation</i>	(Optional) Number of the IP SLAs operation for which the details will be displayed.
------------------	---

Command Default

The command has no defaults.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

Examples

The following example shows sample output from the **show ip sla configuration** command.

```
Router# show ip sla configuration
```

```
IP SLAs Infrastructure Engine-III
Entry number: 1
Owner:
Tag:
Operation timeout (milliseconds): 5000
Ethernet Y1731 Delay Operation
Frame Type: DMM
Domain: TESTDOMAINRUP
Evc: CFMRUP
Target Mpid: 1
Source Mpid: 2
CoS: 2
    Max Delay: 5000
    Request size (Padding portion): 64
    Frame Interval: 1000
    Clock: Not In Sync
Threshold (milliseconds): 5000
Schedule:
    Operation frequency (seconds): 90 (not considered if randomly
scheduled)
    Next Scheduled Start Time: Start Time already passed
    Group Scheduled : FALSE
```

show ip sla configuration

```
Randomly Scheduled : FALSE  
Life (seconds): Forever
```

Related Commands

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

show ip sla statistics

To display the current operational status and statistics of all Cisco IOS IP SLAs operations or a specified operation, use the **show ip sla statistics** command in the user EXEC or privileged EXEC mode.

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

Syntax Description

<i>operation-number</i>	(Optional) Number of the operation for which operational status and statistics are displayed.
<i>details</i>	(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
9.5.1	This command was introduced.

Usage Guidelines

Use the **show ip sla statistics** 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 sample output from the **show ip sla statistics** command.

```
Router (config) # show ip sla statistics
```

```
IPSLA operation id: 1
Delay Statistics for Y1731 Operation 1
Type of operation: Y1731 Delay Measurement
Latest operation start time: 20:34:55.944 PDT Tue May 22 2012
Latest operation return code: OK
Distribution Statistics:
```

```
Interval
Start time: 20:34:55.944 PDT Tue May 22 2012
Elapsed time: 31 seconds
Number of measurements initiated: 23
Number of measurements completed: 23
Flag: OK
```

```
IPSLA operation id: 10
```

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 SLAs operations or a specified operation, use the **show ip sla statistics aggregated** command in the user EXEC or privileged EXEC mode.

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

Syntax Description

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

Command Default

This command has no defaults.

Command Modes

User EXEC (>) Privileged EXEC (#)

Command History

Release	Modification
9.5.1	This command was introduced.

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 example shows sample output from the **show ip sla statistics aggregated** command.

```
Router (config) # show ip sla statistics aggregated
```

show ip sla statistics aggregated

```

IPSLA operation id: 1
Delay Statistics for Y1731 Operation 1
Type of operation: Y1731 Delay Measurement
Latest operation start time: 20:51:25.933 PDT Tue May 22 2012
Latest operation return code: OK
Distribution Statistics:

```

Interval

```

Start time: 20:51:25.933 PDT Tue May 22 2012
Elapsed time: 40 seconds
Number of measurements initiated: 33
Number of measurements completed: 33
Flag: OK

```

Delay:

```

Number of TwoWay observations: 28
  Min/Avg/Max TwoWay: 84/91/97 (microsec)
Time of occurrence TwoWay:
  Min - 20:51:40.089 PDT Tue May 22 2012
  Max - 20:51:50.089 PDT Tue May 22 2012

```

Delay Variance:

```

Number of TwoWay positive observations: 13
  Min/Avg/Max TwoWay positive: 0/4/11 (microsec)
Time of occurrence TwoWay positive:
  Min - 20:51:45.089 PDT Tue May 22 2012
  Max - 20:51:40.089 PDT Tue May 22 2012
Number of TwoWay negative observations: 14
  Min/Avg/Max TwoWay negative: 0/3/8 (microsec)
Time of occurrence TwoWay negative:
  Min - 20:51:35.089 PDT Tue May 22 2012
  Max - 20:51:35.089 PDT Tue May 22 2012

```

```

IPSLA operation id: 10

```

Related Commands

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

traceroute ethernet

To send Connectivity Fault Management (CFM) traceroute messages to a destination maintenance end point (MEP) through MAC address or MPID, use the **traceroute ethernet** command in privileged EXEC mode. This command does not have a **no** form.

traceroute ethernet {**mpid** *mpid* | *mac-address*} {**domain** *domain-name*} {**port** | **evc** *evc-name*} [**cos** *cos-value*] [**fdb-only**]

Syntax Description

mpid <i>mpid</i>	Specifies a destination MEP. The valid values range from 1 to 8191.
<i>mac-address</i>	MAC address of the destination MEP in the format abcd.abcd.abcd.
domain <i>domain-name</i>	Specifies the domain where the destination MEP resides. The domain name can be up to 154 characters.
port	Specifies a port MEP.
evc <i>evc-name</i>	Specifies an MEP for an Ethernet Virtual Circuit (EVC).
cos <i>cos-value</i>	(Optional) Specifies a class of service (CoS) for an MEP. The valid values range from 0 to 7.
fdb-only	(Optional) Specifies the forwarding database (FDB) table.

Command Default

An IEEE CFM traceroute operation to the specified MEP and MIP is performed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
9.5.0	This command was introduced.

Usage Guidelines

The IEEE CFM traceroute messages to a destination can be either an MEP or an MIP. If the destination is an MIP, the FDB must have a MAC address entry for that MIP; that is, the FDB has learned the MAC address of the MIP through linktrace responses.

Examples

The following example is a sample output from the **traceroute ethernet** command:

```
Router# traceroute ethernet mpid 401 domain Domain_L5
```

```
Type escape sequence to abort. TTL 64. Linktrace Timeout is 5 seconds
```

```
Tracing the route to aabb.cc03.bb99 on Domain Domain_L5, Level 5
Traceroute sent via TenGigabitEthernet 4/1, path found via MPDB
```

```
B = Intermediary Bridge
! = Target Destination
* = Per hop Timeout
```

```
-----
Hops      Host      MAC              Forwarded      Ingress Egress
-----
! 1              aabb.cc03.bb99   Not Forwarded
-----
Ingr and Egr Action  Relay Action  Previous Hop
-----
                        RlyHit:MEP    aabb.cc03.b999
```

Related Commands

Command	Description
ping ethernet	Sends CFM loopback messages to a destination MEP or MIP through a MAC address or MPID.
ethernet cfm traceroute-cache	Enables caching of Ethernet CFM data learned through traceroute messages.
show ethernet traceroute-cache	Displays the contents of the IEEE CFM traceroute cache.