



Ethernet OAM Commands

This module provides command line interface (CLI) commands for configuring Ethernet Operations, Administration, and Maintenance (EOAM) on the Cisco CRS Router.

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

- [action capabilities-conflict, on page 4](#)
- [action critical-event, on page 6](#)
- [action discovery-timeout, on page 8](#)
- [action dying-gasp, on page 10](#)
- [action high-threshold, on page 12](#)
- [action remote-loopback, on page 14](#)
- [action session-down, on page 16](#)
- [action session-up, on page 18](#)
- [action uni-directional link-fault, on page 20](#)
- [action wiring-conflict, on page 22](#)
- [aggregate, on page 24](#)
- [ais transmission, on page 26](#)
- [ais transmission up, on page 28](#)
- [buckets archive, on page 30](#)
- [buckets size, on page 31](#)
- [clear error-disable, on page 33](#)
- [clear ethernet cfm ccm-learning-database location, on page 34](#)
- [clear ethernet cfm interface statistics, on page 35](#)
- [clear ethernet cfm local meps, on page 36](#)
- [clear ethernet cfm offload, on page 38](#)
- [clear ethernet cfm peer meps, on page 39](#)
- [clear ethernet cfm traceroute-cache, on page 40](#)
- [clear ethernet oam statistics, on page 41](#)
- [clear ethernet sla statistics all, on page 42](#)
- [clear ethernet sla statistics on-demand, on page 43](#)
- [clear ethernet sla statistics profile, on page 45](#)
- [connection timeout, on page 47](#)
- [continuity-check archive hold-time, on page 49](#)

- continuity-check interval, on page 50
- continuity-check loss auto-traceroute, on page 52
- cos (CFM), on page 53
- debug ethernet cfm packets, on page 54
- debug ethernet cfm protocol-state, on page 57
- domain, on page 59
- efd, on page 61
- error-disable recovery cause , on page 63
- ethernet cfm (global), on page 65
- ethernet cfm (interface), on page 66
- ethernet oam, on page 68
- ethernet oam loopback, on page 69
- ethernet oam profile, on page 71
- ethernet sla, on page 72
- ethernet sla on-demand operation type cfm-delay-measurement probe, on page 73
- ethernet sla on-demand operation type cfm-loopback probe, on page 88
- ethernet sla on-demand operation type cfm-synthetic-loss-measurement probe, on page 95
- frame-period threshold, on page 100
- frame-period window, on page 102
- frame-seconds threshold, on page 103
- frame-seconds window, on page 104
- frame threshold, on page 105
- frame window, on page 107
- link-monitor, on page 108
- log ais, on page 109
- log continuity-check errors, on page 110
- log continuity-check mep changes, on page 111
- log crosscheck errors, on page 112
- log efd, on page 113
- maximum-meps, on page 114
- mep crosscheck, on page 116
- mep-id, on page 117
- mep domain, on page 118
- mib-retrieval, on page 119
- mip auto-create, on page 120
- mode (Ethernet OAM), on page 122
- monitoring, on page 124
- packet size, on page 125
- ping ethernet cfm, on page 127
- priority (SLA), on page 130
- probe, on page 131
- profile (EOAM), on page 132
- profile (SLA), on page 133
- require-remote, on page 135
- schedule (SLA), on page 137
- send (SLA), on page 140

- service, on page 143
- show error-disable, on page 146
- show efd database, on page 147
- show efd interface, on page 148
- show ethernet cfm ccm-learning-database, on page 149
- show ethernet cfm configuration-errors, on page 151
- show ethernet cfm interfaces ais, on page 153
- show ethernet cfm interfaces statistics, on page 155
- show ethernet cfm local maintenance-points, on page 157
- show ethernet cfm local meps, on page 159
- show ethernet cfm peer meps, on page 165
- show ethernet cfm summary, on page 171
- show ethernet cfm traceroute-cache, on page 173
- show ethernet oam configuration, on page 179
- show ethernet oam discovery, on page 182
- show ethernet oam event-log, on page 184
- show ethernet oam interfaces, on page 186
- show ethernet oam statistics, on page 188
- show ethernet oam summary, on page 190
- show ethernet sla configuration-errors, on page 192
- show ethernet sla operations, on page 194
- show ethernet sla statistics, on page 197
- sla operation, on page 203
- snmp-server traps ethernet cfm, on page 205
- snmp-server traps ethernet oam events, on page 206
- statistics measure, on page 207
- symbol-period threshold, on page 209
- symbol-period window, on page 210
- synthetic loss calculation packets, on page 211
- traceroute cache, on page 212
- traceroute ethernet cfm, on page 213

action capabilities-conflict

To configure what action is taken on an interface when a capabilities-conflict event occurs, use the **action capabilities-conflict** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action capabilities-conflict **disable** | **efd** | **error-disable-interface** | **log**

Syntax Description	Parameter	Description
	disable	Performs no action on the interface when a capabilities-conflict event occurs.
	efd	Puts the line protocol into the down state for an interface when a capabilities-conflict event occurs. The state is removed when the first packet is received without a conflict.
	error-disable-interface	Puts the interface into the error-disable state when a capabilities-conflict event occurs.
	log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a capabilities-conflict event occurs. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 4.0.0	The efd keyword was added.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when a capabilities-conflict event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam)# action capabilities-conflict disable
```

The following example shows how to configure putting the interface into the line-protocol-down state when a capabilities-conflict event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action capabilities-conflict efd
```

The following example shows how to configure that the interface is put into the error-disable state when a capabilities-conflict event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action capabilities-conflict error-disable-interface
```

The following example shows how to configure that a syslog entry is created when a capabilities-conflict event occurs. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action capabilities-conflict log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action critical-event

To configure what action is taken on an interface when a critical-event notification is received from the remote Ethernet OAM peer, use the **action critical-event** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action critical-event **disable** | **error-disable-interface** | **log**

Syntax Description	disable	error-disable-interface	log
	Performs no action on the interface when a critical-event notification is received.		
		Puts the interface into the error-disable state when a critical-event notification is received.	
			(Interface Ethernet OAM configuration only) Creates a syslog entry when a critical-event notification is received. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when a critical-event notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action critical-event disable
```

The following example shows how to configure that the interface is put into the error-disable state when a critical-event notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
```

```
RP/0/RP0/CPU0:router(config-eoam)# action critical-event error-disable-interface
```

The following example shows how to configure that a syslog entry is created when a critical-event notification is received. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action critical-event log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action discovery-timeout

To configure what action is taken on an interface when a connection timeout occurs, use the **action discovery-timeout** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action discovery-timeout **disable** | **efd** | **error-disable-interface** | **log**

Syntax Description	Parameter	Description
	disable	Performs no action on the interface when a connection timeout occurs.
	efd	Puts the line protocol into the down state for an interface when a connection timeout occurs. The state is removed when the session is re-established.
	error-disable-interface	Puts the interface into the error-disable state when a connection timeout occurs.
	log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a connection timeout occurs. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 4.0.0	The efd keyword was added.
	Release 6.1.2	Removed restriction disallowing default value (log) in Ethernet OAM configuration mode.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples The following example shows how to configure that no action is performed on the interface when a connection timeout occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam)# action discovery-timeout disable
```

The following example shows how to configure putting the interface into the line-protocol-down state when a connection timeout occurs.


```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action discovery-timeout efd
```

The following example shows how to configure that the interface is put into the error-disable state when a connection timeout occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action discovery-timeout error-disable-interface
```

The following example shows how to configure that a syslog entry is created when a connection timeout occurs. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action discovery-timeout log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action dying-gasp

To configure what action is taken on an interface when a dying-gasp notification is received from the remote Ethernet OAM peer, use the **action dying-gasp** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action dying-gasp disable | error-disable-interface | log

Syntax Description	disable	Performs no action on the interface when a dying-gasp notification is received.
	error-disable-interface	Puts the interface into the error-disable state when a dying-gasp notification is received.
	log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a dying-gasp notification is received. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 6.1.2	Removed restriction disallowing default value (log) in Ethernet OAM configuration mode.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when a dying-gasp notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action dying-gasp disable
```

The following example shows how to configure that the interface is put into the error-disable state when a dying-gasp notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
```

```
RP/0/RP0/CPU0:router(config-eoam)# action dying-gasp error-disable-interface
```

The following example shows how to configure that a syslog entry is created when a dying-gasp notification is received. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action dying-gasp log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action high-threshold

To configure what action is taken on an interface when a high threshold is exceeded, use the **action high-threshold** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action high-threshold **disable** | **error-disable-interface** | **log**

Syntax Description	disable	(Interface Ethernet OAM configuration only) Performs no action on the interface when a high threshold is exceeded.
	error-disable-interface	Puts the interface into the error-disable state when a high threshold is exceeded.
	log	Creates a syslog entry when a high threshold is exceeded. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default is that no action is taken when a high threshold is exceeded.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 6.1.2	Removed restriction disallowing default value (disable) in Ethernet OAM configuration mode.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that a syslog entry is created on the interface when a high threshold is exceeded.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action high-threshold log
```

The following example shows how to configure that the interface is put into the error-disable state when a high threshold is exceeded.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
```

```
RP/0/RP0/CPU0:router(config-eoam)# action high-threshold error-disable-interface
```

The following example shows how to configure that no action is taken when a high threshold is exceeded. This configuration overrides the Ethernet OAM profile configuration.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action high-threshold disable
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action remote-loopback

To configure what action is taken on an interface when a remote-loopback event occurs, use the **action remote-loopback** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action remote-loopback disable | log

Syntax Description	
disable	Performs no action on the interface when a remote-loopback event occurs.
log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a remote-loopback event occurs. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when a remote-loopback event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action remote-loopback disable
```

The following example shows how to configure that a syslog entry is created when a remote-loopback event occurs. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action remote-loopback log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action session-down

To configure what action is taken on an interface when an Ethernet OAM session goes down, use the **action session-down** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action session-down **disable** | **efd** | **error-disable-interface** | **log**

Syntax Description	Parameter	Description
	disable	Performs no action on the interface when a capabilities-conflict event occurs.
	efd	Puts the line protocol into the down state for an interface when a capabilities-conflict event occurs. The state is removed when the first packet is received without a conflict.
	error-disable-interface	Puts the interface into the error-disable state when a capabilities-conflict event occurs.
	log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a capabilities-conflict event occurs. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 4.0.0	The efd keyword was added.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when an Ethernet OAM session goes down.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam)# action session-down disable
```

The following example shows how to configure putting the interface into the line-protocol-down state when an Ethernet OAM session goes down.


```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action session-down efd
```

The following example shows how to configure that the interface is put into the error-disable state when an Ethernet OAM session goes down.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action session-down error-disable-interface
```

The following example shows how to configure that a syslog entry is created when an Ethernet OAM session goes down. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action session-down log
```

Related Commands

Command	Description
ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action session-up

To configure what action is taken on an interface when an Ethernet OAM session is established, use the **action session-up** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action session-up disable | log

Syntax Description

disable Performs no action on the interface when an Ethernet OAM session is established.

log (Interface Ethernet OAM configuration only) Creates a syslog entry when an Ethernet OAM session is established. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default

The default action is to create a syslog entry.

Command Modes

Ethernet OAM configuration (config-eoam)

Interface Ethernet OAM configuration (config-if-eoam)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when an Ethernet OAM session is established.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action session-up disable
```

The following example shows how to configure that a syslog entry is created when an Ethernet OAM session is established. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action session-up log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action uni-directional link-fault

To configure what action is taken on an interface when a link-fault notification is received from the remote Ethernet OAM peer, use the **action uni-directional link-fault** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action uni-directional link-fault **disable** | **efd** | **error-disable-interface** | **log**

Syntax Description	Command	Description
	disable	Performs no action on the interface when a capabilities-conflict event occurs.
	efd	Puts the line protocol into the down state for an interface when a capabilities-conflict event occurs. The state is removed when the first packet is received without a conflict.
	error-disable-interface	Puts the interface into the error-disable state when a capabilities-conflict event occurs.
	log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a capabilities-conflict event occurs. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to create a syslog entry.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 4.0.0	This command was introduced.
		This command replaces the action link-fault command.

Usage Guidelines This command only determines the action taken when a uni-directional link fault notification is received from the peer; it does not affect the action taken when a fault is detected locally.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples The following example shows how to configure that no action is performed on the interface when a link-fault notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action uni-directional link-fault disable
```

The following example shows how to configure putting the interface into the line-protocol-down state when a link-fault notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action uni-directional link-fault efd
```

The following example shows how to configure that the interface is put into the error-disable state when a link-fault notification is received.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action uni-directional link-fault error-disable-interface
```

The following example shows how to configure that a syslog entry is created when a link-fault notification is received. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# action uni-directional link-fault log
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

action wiring-conflict

To configure what action is taken on an interface when a wiring-conflict event occurs, use the **action wiring-conflict** command in Ethernet OAM configuration mode or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of this command.

action wiring-conflict **disable** | **efd** | **error-disable-interface** | **log**

Syntax Description	Parameter	Description
	disable	Performs no action on the interface when a capabilities-conflict event occurs.
	efd	Puts the line protocol into the down state for an interface when a capabilities-conflict event occurs. The state is removed when the first packet is received without a conflict.
	error-disable-interface	Puts the interface into the error-disable state when a capabilities-conflict event occurs.
	log	(Interface Ethernet OAM configuration only) Creates a syslog entry when a capabilities-conflict event occurs. This action is available only in interface Ethernet OAM configuration mode to override the OAM profile on a specific interface.

Command Default The default action is to put the interface into error-disable state.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 4.0.0	The efd keyword was added.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure that no action is performed on the interface when a wiring-conflict event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam)# action wiring-conflict disable
```

The following example shows how to configure putting the interface into the line-protocol-down state when a wiring-conflict event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action wiring-conflict efd
```

The following example shows how to configure that a syslog entry is created when a wiring-conflict event occurs.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# action wiring-conflict log
```

The following example shows how to configure that the interface is put into the error-disable state when a wiring-conflict event occurs. This configuration overrides the interface Ethernet OAM profile.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
(config-if-eoam)# action wiring-conflict error-disable-interface
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.

aggregate

To configure the size and number of bins into which to aggregate the results of statistics collection, use the **aggregate** command in SLA profile statistics configuration mode. To return to the default, use the **no** form of this command.

aggregate bins count width width | none

Syntax Description

bins count	Number of bins. The range is 2 to 100.
width	For delay and jitter measurements, the size of each bin in milliseconds (range 1-10000).
width width	For loss measurements, the size of each bin in percentage points (range 1-100). In addition, the width must be specified if the number of bins is at least 2, regardless of the type of measurement.
none	No aggregation is performed. All samples are stored individually.

Command Default

For delay measurements, all collected statistics are aggregated into one bin.
For loss measurements, the default is aggregation disabled.

Command Modes

SLA profile statistics configuration (config-sla-prof-stat-cfg)

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.3.0	The measurement statistics for Y.1731 Synthetic Loss Measurement (SLM) was included.

Usage Guidelines

Changing the aggregation for a given metric clears all stored data for that metric.

When aggregation is enabled, a number of bins are created, each of which represents a range of values. Instead of storing each individual result, all that is stored is a counter of the number of results that fall within the range for each bin. This uses much less memory than storing each individual result.

For delay and jitter measurements, the first bin starts at 0, each bin covers a range of values defined by the specified width, except for the last bin which ends at infinity. For example, an aggregate bin count of 4 and a width of 20 for delay measurements yields 4 bins of statistics for these sample ranges:

- Bin 1—Samples with delay ranges 0 to < 20 ms.
- Bin 2—Samples with delay ranges greater than or equal to 20 and < 40 ms.
- Bin 3—Samples with delay ranges greater than or equal to 40 and < 60 ms.
- Bin 4—Samples with delay ranges 60 ms or greater (unbounded).

For synthetic loss measurements, the first bin starts at 0, each bin covers a range of values defined by the specified width, except for the last bin which ends at infinity. For example, an aggregate bin count of 4 and a width of 25 for loss measurements yields 4 bins of statistics for these sample ranges:

- Bin 1—Samples with loss ranges 0 to < 25 percentage points.
- Bin 2—Samples with loss ranges greater than or equal to 25 and < 50 percentage points.

- Bin 3—Samples with loss ranges greater than or equal to 50 and < 75 percentage points.
- Bin 4—Samples with loss ranges greater than or equal to 75 and <100 percentage points.



Note For delay and jitter measurements (round-trip or one-way), the lower bound of the first bin is zero, and the last bin is effectively of infinite width. If aggregation is disabled, each individual delay value is stored. For loss measurements, the lower bound of the first bin is zero, and the upper bound of the last bin is 100. The last bin may be wider than the other bins. If aggregation is disabled, each calculated FLR value is stored.



Note The lower bound of each bin is inclusive, while the upper bound is exclusive. Changing the aggregation for a given metric clears all stored data for that metric.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

This example shows how to configure round-trip-delay statistics measurement in 4 bins each with a range of 20 milliseconds:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# statistics measure round-trip-delay
RP/0/RP0/CPU0:router(config-sla-prof-stat-cfg)# aggregate bins 4 width 20
```

ais transmission

To configure Alarm Indication Signal (AIS) transmission for a Connectivity Fault Management (CFM) domain service, use the **ais transmission** command in CFM domain service configuration mode. To disable AIS transmission in a CFM domain service, use the **no** form of this command.

ais transmission [**interval** **1s** | **1m**] [**cos** *cos*]

Syntax Description

interval (Optional) Interval at which AIS packets are transmitted. Valid values are:

- **1s** – Interval of 1 second
- **1m** – Interval of 1 minute

cos *cos* (Optional) Specifies the Class of Service (CoS) for the AIS packets. Valid values are 0 to 7.

Command Default

AIS transmission is disabled by default.

If **interval** is not specified, the default interval is 1 second.

If **cos** is not specified, each MEP uses its own CoS value, inherited from the interface.

Command Modes

CFM domain service configuration (config-cfm-dmn-svc)

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

This command enables AIS for all MEPs in the service. AIS messages are triggered by the following events:

- Detection of a CCM defect.
- Detection of a missing peer MEP (when cross-check is configured).
- Receipt of AIS or LCK messages.
- Detection of interface down events (for down MEPs only).

AIS messages are transmitted in the opposite direction of CCMs and other CFM messages that are sent by the MEP. Therefore, up MEPs send AIS messages out of the interface, whereas down MEPs send AIS messages toward the bridging function.

In addition, AIS messages are sent at a higher maintenance level than other CFM messages sent by the MEP:

- If there is a higher-level MEP on the interface in the same direction (up MEP or down MEP), then the AIS messages are passed internally to this higher level MEP. In this case, no AIS messages are actually transmitted (unless the higher-level MEP is also in a service with AIS transmission configured).
- If there is a MIP on the interface, then AIS messages are sent at the level of the MIP.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure Alarm Indication Signal (AIS) transmission for a CFM domain service:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# ais transmission interval 1m cos 7
```

Related Commands

Command	Description
log ais, on page 109	Configures AIS logging for a CFM domain service to indicate when AIS or LCK packets are received.
ais transmission up, on page 28	Configures AIS transmission on a CFM interface.
show ethernet cfm interfaces ais, on page 153	Displays the information about interfaces that are currently transmitting AIS.
show ethernet cfm local meps, on page 159	Displays information about local MEPS.

ais transmission up

To configure Alarm Indication Signal (AIS) transmission on a Connectivity Fault Management (CFM) interface, use the **ais transmission up** command in interface CFM configuration mode. To disable AIS transmission on an interface, use the **no** form of this command.

```
ais transmission up [interval 1s | 1m] [cos cos]
```

Syntax Description

interval (Optional) Interval at which AIS packets are transmitted. Valid values are:

- **1s** – Interval of 1 second
- **1m** – Interval of 1 minute

cos cos (Optional) Specifies the Class of Service (CoS) for the AIS packets. Valid values are 0 to 7.

Command Default

AIS transmission is disabled by default.

If **interval** is not specified, the default interval is 1 second.

If **cos** is not specified, each MEP uses its own CoS value, inherited from the interface.

Command Modes

Interface CFM configuration (config-if-cfm)

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

AIS transmission packets for CFM can be configured only on interfaces with no down MEPs. AIS packets are transmitted only if a MIP exists on the interface and the line protocol state is down. AIS messages are transmitted up, toward the bridging function (same direction as an up MEP sends CCMs), and they are transmitted at the level of the MIP.

If AIS transmission is configured on an interface with any down MEPs, the configuration is ignored, and an error is displayed in the **show ethernet cfm configuration-errors** command.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure AIS transmission on a CFM interface.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/2
RP/0/RP0/CPU0:router(config-if)# ethernet cfm
RP/0/RP0/CPU0:router(config-if-cfm)# ais transmission up interval 1m cos 7
```

Related Commands	Command	Description
	ais transmission, on page 26	Configures AIS transmission for a CFM domain service.
	log ais, on page 109	Configures AIS logging for a CFM domain service to indicate when AIS or LCK packets are received.
	show ethernet cfm interfaces ais, on page 153	Displays the information about interfaces that are currently transmitting AIS.
	show ethernet cfm local meps, on page 159	Displays information about local MEPS.

buckets archive

To configure the number of buckets to store in memory, use the **buckets archive** command in SLA profile statistics configuration mode. To return to the default value, use the **no** form of this command.

buckets archive *number*

Syntax Description

number Number of buckets to store. The range is 1 to 100.

Command Default

The default number of buckets stored in memory is 100.

Command Modes

SLA profile statistics configuration (config-sla-prof-stat-cfg)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The results stored in the oldest bucket are discarded when the limit is reached, to make room for new results. If the number of archived buckets for a given metric decreases, the oldest buckets are deleted and the remaining buckets are untouched. If the number archived buckets for a given metric increases, the newest buckets are filled when the data is collected. See the Usage Guidelines in the [buckets size, on page 31](#) command for a description of buckets.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure the number of buckets to store in memory:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# statistics measure round-trip-delay
RP/0/RP0/CPU0:router(config-sla-prof-stat-cfg)# buckets archive 50
```

Related Commands

Command	Description
buckets size, on page 31	Configures the size of the buckets in which statistics are collected.

buckets size

To configure the size of the buckets in which statistics are collected, use the **buckets size** command in SLA profile statistics configuration mode. To return the **buckets size** to the default value, use the **no** form of this command.

buckets size *number*

Syntax Description

number Specifies the size of each bucket. The number of probes that each buckets may contain. The range is 1 to 100.

per-probe Probes span multiple buckets.

probes Buckets span multiple probes.

Command Default

1 probe per bucket is collected.

Command Modes

SLA profile statistics configuration mode (config-sla-prof-stat-cfg)

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.3.0	The per-probe keyword was deprecated.

Usage Guidelines

A bucket represents a time period during which statistics are collected. All the results received during that time period are recorded in the corresponding bucket. If aggregation is enabled, each bucket has its own set of bins and counters, and only results received during the time period represented by the bucket are included in those counters.

By default, there is a separate bucket for each probe. The time period is determined by how long the probe lasts (configured by the [probe](#), on page 131, [send \(SLA\)](#), on page 140, and [schedule \(SLA\)](#), on page 137 commands). This command allows you to modify the size of buckets so that you can have more buckets per probe, or fewer buckets per probe (fewer buckets allows the results from multiple probes to be included in the same bucket).



Note

Changing the size of the buckets for a given metric clears all stored data for that metric. All existing buckets are deleted and new buckets are created.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

This example shows how to configure the size of the buckets in which statistics are collected.

```

RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# statistics measure round-trip-delay
RP/0/RP0/CPU0:router(config-sla-prof-stat-cfg)# buckets size 100 per-probe

```

Related Commands	Command	Description
	buckets archive, on page 30	Configures the number of buckets to store in memory.
	probe, on page 131	Enters SLA profile probe configuration mode.
	schedule (SLA), on page 137	
	send (SLA), on page 140	Configures the number and timing of packets sent by a probe in an operations profile.

clear error-disable

To clear error-disable reason of an interface, use the **clear error-disable** command in the EXEC mode.

```
clear error-disable {interface<interface>| {all |<location > } }
```

Syntax Description

interface The interface for which you want to clear the error-disable reason.

location Clear error-disable for all interfaces on a specific card, or on all cards.

Command Default

An interface, location o

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.7.3	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
interface	exec

Example

The following example shows how to clear error-disable reason for an interface:

```
RP/0/0/CPU0:ios#sh error-disable
Interface          Error-Disable reason          Retry (s)  Time disabled
-----
Gi0/0/0/0         ethernet-oam-link-fault      ---       01:00 01 Jan

RP/0/0/CPU0:ios#
RP/0/0/CPU0:ios#clear error-disable interface G 0/0/0/0
```

clear ethernet cfm ccm-learning-database location

To clear the Continuity Check Message (CCM) learning database, use the **clear ethernet cfm ccm-learning-database location** command in EXEC mode.

clear ethernet cfm ccm-learning-database location *all**node-id*

Syntax Description	all	Clears the CCM learning database for all interfaces.
	<i>node-id</i>	Clears the CCM learning database for the designated node, entered in <i>r ack/slot/module</i> notation.

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	EXEC mode
----------------------	-----------

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--

Task ID	Task ID	Operations
	ethernet-services	execute

Examples The following example shows how to clear all the CFM CCM learning databases on all interfaces:

```
RP/0/RP0/CPU0:router# clear ethernet cfm ccm-learning-database location all
```

Related Commands	Command	Description
	show ethernet cfm ccm-learning-database, on page 149	Displays the CCM learning database.

clear ethernet cfm interface statistics

To clear the counters for an Ethernet CFM interface, use the **clear ethernet cfm interface statistics** command in EXEC mode.

```
clear ethernet cfm interface interface-path-id statistics [location all | location]
clear ethernet cfm interface statistics location allnode-id
```

Syntax Description

interface-path-id (Optional) Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

location (Optional only when used with a specified interface) Clears MAC accounting statistics for a designated interface or for all interfaces.

all Clears CFM counters for all interfaces.

node-id Clears CFM counters for a specified interface, using *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to clear all the CFM counters from all interfaces:

```
RP/0/RP0/CPU0:router# clear ethernet cfm interface statistics location all
```

Related Commands

Command	Description
show ethernet cfm interfaces statistics, on page 155	Displays the per-interface counters for CFM.

clear ethernet cfm local meps

To clear the counters for all MEPs or a specified MEP, use the **clear ethernet cfm local meps** command in EXEC mode.

clear ethernet cfm local meps **all** | **domain** *domain-name* **all** | **service** *service-name* **all** | **mep-id** *id* | **interface** *interface-name* **all** | **domain** *domain-name*

Syntax Description

all	Clears counters for all local MEPs.
domain <i>domain-name</i>	String of a maximum of 80 characters that identifies the domain in which the maintenance points reside. Note For more information about the syntax, use the question mark (?) online help function.
service <i>service-name</i>	String of a maximum of 80 characters that identifies the maintenance association to which the maintenance points belong.
mep-id <i>id</i>	Maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191.
interface <i>interface-name</i>	String of a maximum of 80 characters that identifies the Ethernet interface.

Command Default

No default behavior or values

Command Modes

EXEC (#)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

The following counters are cleared:

- Number of continuity-check messages (CCMs) sent
- Number of CCMs received
- Number of CCMs received out of sequence
- Number of CCMs received, but discarded due to the **maximum-meps** limit
- Number of loopback messages (LBMs), used for CFM ping
- Number of loopback replies (LBRs), used for CFM ping, sent and received
- Number of LBRs received out of sequence
- Number of LBRs received with bad data (such as LBRs containing padding which does not match the padding sent in the corresponding LBM)
- Number of alarm indication signal (AIS) messages sent and received
- Number of lock (LCK) messages received

Task ID	Task ID	Operations
	ethernet-services	execute

Examples

The following example shows how to clear counters for all MEPs:

```
RP/0/RP0/CPU0:router# clear ethernet cfm local meps all
```

Related Commands	Command	Description
	show ethernet cfm local meps, on page 159	Displays information about local MEPs.

clear ethernet cfm offload

To trigger the re-application of Maintenance End Points (MEPs) that have been disabled due to exceeding offload resource limits, use the **clear ethernet cfm offload** command in the EXEC mode.



Note This command does not clear any counters or stored statistics for the MEPs.

clear ethernet cfm offload*location**node-id*

Syntax Description **location** *node-id* (Optional) Specifies the location for which the re-application of MEPs needs to be triggered.

Command Default The default action is to clear the CFM offload information for all nodes.

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.3.1	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	ethernet-services	execute

Example

This example shows how to execute the **clear ethernet cfm offload** command:

```
RP/0/RP0/CPU0:router# clear ethernet cfm offload
```

clear ethernet cfm peer meps

To clear all peer MEPs or peer MEPs for a specified local MEP, use the **clear ethernet cfm peer meps** command in EXEC mode.

clear ethernet cfm peer meps **all** | **domain** *domain-name* **all** | **service** *service-name* **all** | **local mep-id** *id* | **interface** *interface-name* **all** | **domain** *domain-name*

all	Clears counters for all peer MEPs.
domain <i>domain-name</i>	String of a maximum of 80 characters that identifies the domain in which the maintenance points reside. Note For more information about the syntax, use the question mark (?) online help function.
service <i>service-name</i>	String of a maximum of 80 characters that identifies the maintenance association to which the maintenance end points belong.
local mep-id <i>id</i>	Local maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191.
interface <i>interface-name</i>	String of a maximum of 80 characters that identifies the Ethernet interface.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines This command removes all received CCMs and corresponding peer MEPs from the database (other than those configured with cross-check). The peer MEPs will be added again when the next CCM is received.

Task ID	Task ID	Operations
	ethernet-services	execute

Examples The following example shows how to clear all peer MEPs:

```
RP/0/RP0/CPU0:router# clear ethernet cfm peer meps all
```

Related Commands	Command	Description
	show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.

clear ethernet cfm traceroute-cache

To remove the contents of the traceroute cache, use the **clear ethernet cfm traceroute-cache** command in EXEC mode.

clear ethernet cfm traceroute-cache **all** | **domain** *domain-name* **all** | **service** *service-name* **all** | **mep-id** *id* | **interface** *interface-name* **all** | **domain** *domain-name*

Syntax Description

domain <i>domain-name</i>	String of a maximum of 80 characters that identifies the domain in which the maintenance points reside.
Note	For more information about the syntax, use the question mark (?) online help function.
service <i>service-name</i>	String of a maximum of 80 characters that identifies the maintenance association to which the maintenance end points belong.
mep-id <i>id</i>	Maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191.
interface <i>interface-name</i>	String of a maximum of 80 characters that identifies the Ethernet interface.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to clear all ethernet cfm traceroute-cache:

```
RP/0/RP0/CPU0:router# clear ethernet cfm traceroute-cache all
```

Related Commands

Command	Description
traceroute cache, on page 212	Sets the maximum limit of traceroute cache entries or the maximum time limit to hold the traceroute cache entries.
show ethernet cfm traceroute-cache, on page 173	Displays the contents of the traceroute cache.

clear ethernet oam statistics

To clear the packet counters on Ethernet OAM interfaces, use the **clear ethernet oam statistics** command in EXEC mode.

clear ethernet oam statistics [**interface** *type interface-path-id* | **location** *node-id* **all**]

Syntax Description	
interface <i>type interface-path-id</i>	(Optional) Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location	Clears the statistics for a specific node. For more information about the syntax for the router, use the question mark (?) online help function.
<i>node-id</i>	Path ID of the node.
all	Clears the statistics for all nodes on the router.

Command Default No parameters clears the packet counters on all Ethernet OAM interfaces.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	execute

Examples The following example shows how to clear the packet counters on a specific interface:

```
RP/0/RP0/CPU0:router# clear ethernet oam statistics interface gigabitethernet 0/1/5/1
```

Related Commands	Command	Description
	show ethernet oam statistics, on page 188	Displays the local and remote Ethernet OAM statistics for interfaces.
	show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

clear ethernet sla statistics all

To delete the contents of buckets containing SLA statistics collected by all operations probes, including on-demand operations, use the **clear ethernet sla statistics all** command in EXEC mode.

clear ethernet sla statistics [**current** | **history**] **all**

Syntax Description

current (Optional) Clears statistics for buckets currently being filled for all operations.

history (Optional) Clears statistics for full buckets for all operations.

all Clears statistics for all operations.

Command Default

When **current** or **history** are not used, all buckets (current, old, new, half empty, and full) for all operations (including on-demand operations) are cleared. This is equivalent to restarting the operation.

Command Modes

EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

When you clear a bucket for a currently running probe, the remaining statistics are still collected and stored in that bucket.

See the Usage Guidelines in the [buckets size, on page 31](#) command for a description of buckets.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to delete the contents of all buckets containing SLA metrics collected by all probes:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics all
```

The following example shows how to delete the contents of all current buckets containing SLA metrics collected by all probes:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics current all
```

The following example shows how to delete the contents of all full buckets containing SLA metrics collected by all probes:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics history all
```

clear ethernet sla statistics on-demand

To delete the contents of buckets containing SLA statistics collected by on-demand probes, use the **clear ethernet sla statistics on-demand** command in EXEC mode.

```
clear ethernet sla statistics [current | history] on-demand allid [interface type interface-path-id
domain all | interface type interface-path-id domain domain-name target all | mac-address H.H.H
| mep-id id | interface all domain domain-name]
```

Syntax Description					
current	(Optional) Clears statistics for all buckets currently being filled.				
history	(Optional) Clears statistics for all full buckets.				
all	Clears statistics for all on-demand operations.				
<i>id</i>	Clears statistics for the on-demand operation of the specified number.				
interface type	(Optional) Clears statistics for the specified interface type. For more information, use the question mark (?) online help function.				
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.				
domain all	Clears statistics for on-demand operations for all domains.				
domain domain-name	Clears statistics for on-demand operations for the specified domain.				
target all	Clears statistics for on-demand operations targeted to all MEPs for the specified interface domain.				
target mac-address H.H.H	Clears statistics for on-demand operations targeted to the specified MAC address.				
target mep-id id	Clears statistics for on-demand operations targeted to the specified MEP ID.				
interface all	(Optional) Clears statistics for on-demand operations on all interfaces.				
Command Default	When current or history are not used, all buckets for on-demand operations (current, old, new, half empty, and full) are cleared. This is equivalent to restarting the operation.				
Command Modes	EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				

Usage Guidelines

When you clear a bucket for a currently running probe, the remaining statistics are still collected and stored in that bucket.

See the Usage Guidelines in the [buckets size, on page 31](#) command for a description of buckets.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to delete the contents of all buckets currently being filled for the on-demand operation with ID 1:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics current on-demand 1
```

The following example shows how to delete the contents of all buckets for all on-demand operations:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics on-demand all
```

The following example shows how to delete the contents of all buckets for all on-demand operations on a specified interface and domain that is targeted to a specific MEP:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics on-demand all interface TenGigE 0/6/1/0
domain D1 target mep-id 3
```

Related Commands

Command	Description
clear ethernet sla statistics all, on page 42	Deletes the contents of buckets containing SLA statistics collected by all operations probes.
ethernet sla on-demand operation type cfm-delay-measurement probe, on page 73	Executes an on-demand Ethernet SLA operation probe for CFM delay measurement.
ethernet sla on-demand operation type cfm-synthetic-loss-measurement probe, on page 95	Executes an on-demand Ethernet SLA operation probe for CFM synthetic loss measurement.
show ethernet sla operations, on page 194	Displays information about configured Ethernet SLA operations.
show ethernet sla statistics, on page 197	Displays the contents of buckets containing Ethernet SLA metrics collected by probes.

clear ethernet sla statistics profile

To delete the contents of buckets containing SLA statistics collected by probes for a profile, use the **clear ethernet sla statistics profile** command in EXEC mode.

```
clear ethernet sla statistics [current | history] profile all profile-name [interface type interface-path-id
domain all | interface type interface-path-id domain domain-name target all | mac-address H.H.H
| mep-id id | interface all domain domain-name]
```

Syntax Description					
current	(Optional) Clears statistics for all buckets currently being filled.				
history	(Optional) Clears statistics for all full buckets.				
<i>profile-name</i>	Clears statistics for the specified profile name.				
all	Clears statistics for all profiles.				
interface <i>type</i>	(Optional) Clears statistics for the specified interface type. For more information, use the question mark (?) online help function.				
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.				
domain all	Clears statistics for on-demand operations for all domains.				
domain <i>domain-name</i>	Clears statistics for on-demand operations for the specified domain.				
target all	Clears statistics for on-demand operations targeted to all MEPs for the specified interface domain.				
target mac-address <i>H.H.H</i>	Clears statistics for on-demand operations targeted to the specified MAC address.				
target mep-id <i>id</i>	Clears statistics for on-demand operations targeted to the specified MEP ID.				
interface all	(Optional) Clears statistics for on-demand operations on all interfaces.				
Command Default	When current or history are not used, all buckets in the profile (current, old, new, half empty, and full) are cleared. This is equivalent to restarting the operation.				
Command Modes	EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				

Usage Guidelines

When you clear a bucket for a currently running probe, the remaining statistics are still collected and stored in that bucket.

See the Usage Guidelines in the [buckets size, on page 31](#) command for a description of buckets.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to delete the contents of all buckets currently being filled for a specified profile:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics current profile P1
```

The following example shows how to delete the contents of all full buckets for a specified profile:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics history profile P2
```

The following example shows how to delete the contents of all buckets for a specified profile:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics profile P3
```

The following example shows how to delete the contents of all buckets for all profiles:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics profile all
```

The following example shows how to delete the contents of all buckets for all profiles on a specified interface and domain that is targeted to a specific MEP:

```
RP/0/RP0/CPU0:router# clear ethernet sla statistics profile all interface TenGigE 0/6/1/0
domain D1 target mep-id 3
```

Related Commands

Command	Description
buckets size, on page 31	Configures the size of the buckets in which statistics are collected.

connection timeout

To configure the timeout value for an Ethernet OAM session, use the **connection timeout** command in Ethernet OAM configuration mode.

connection timeout *seconds*

Syntax Description	<i>seconds</i> Connection timeout period in number of lost periodic information OAMPDUs. The range is 2 to 30.	
Command Default	The default value is 5.	
Command Modes	Ethernet OAM configuration (config-eoam) Interface Ethernet OAM configuration (config-if-eoam)	
Command History	Release	Modification
	Release 3.9.0	This command was introduced.
Usage Guidelines	If no packets are received from the OAM peer in the specified connection timeout period which is measured in number of lost periodic Information OAMPDUs, then the OAM session is brought down, and the negotiation phase starts again.	
Task ID	Task ID	Operations
	ethernet-services	read, write
Examples	This example shows how to configure the connection timeout value of an Ethernet OAM session: <pre>RP/0/RP0/CPU0:router# configure RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1 RP/0/RP0/CPU0:router(config-eoam)# connection timeout 20</pre>	
Related Commands	Command	Description
	action discovery-timeout, on page 8	Configures what action is taken on an interface when a connection timeout occurs.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.

Command	Description
show ethernet oam discovery, on page 182	Displays the current status of Ethernet OAM sessions.
show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

continuity-check archive hold-time

To configure the time limit for how long peer maintenance-end-points (MEPs) are held in the continuity-check database after they have timed out (no more CCMs are received), use the **continuity-check archive hold-time** command in CFM domain service configuration mode. To return to the default value, use the **no** form of this command.

continuity-check archive hold-time *minutes*

Syntax Description	<i>minutes</i> Time limit (in minutes) that peer MEPs are held in the continuity-check database before they are cleared. Range is 1 to 65535.				
Command Default	The default is 100.				
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				
Usage Guidelines	Peer MEPs appear in show ethernet cfm peer meps command display output after they timeout (no more continuity check messages (CCMs) are received).				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				
Examples	<p>The following example shows how to configure the time limit for how long continuity-check messages are held in the continuity-check archive:</p> <pre>RP/0/RP0/CPU0:router# configure RP/0/RP0/CPU0:router(config)# ethernet cfm RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1 RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1 RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# continuity-check archive hold-time 100</pre>				
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show ethernet cfm peer meps, on page 165</td> <td>Displays information about maintenance end points (MEPs) for peer MEPs.</td> </tr> </tbody> </table>	Command	Description	show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.
Command	Description				
show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.				

continuity-check interval

To enable continuity check and configure the time interval at which continuity-check messages are transmitted or to set the threshold limit for when a MEP is declared down, use the **continuity-check interval** command in CFM domain service configuration mode. To disable continuity check, use the **no** form of this command.

continuity-check interval *time* [**loss-threshold** *threshold*]

Syntax Description	<i>time</i>	Interval at which continuity-check messages are transmitted. Valid values are: <ul style="list-style-type: none"> • 3.3ms: 3.3 milliseconds • 10ms: 10 milliseconds • 100ms: 100 milliseconds • 1s: 1 second • 10s: 10 seconds • 1m: 1 minute • 10m: 10 minutes
	loss-threshold <i>threshold</i>	(Optional) Specifies the number of continuity-check messages that are lost before CFM declares that a MEP is down (unreachable). Range is 2 to 255. Used in conjunction with interval .

Command Default Continuity check is off by default.
If **loss-threshold** is not specified, the default is 3.

Command Modes CFM domain service configuration (config-cfm-dmn-svc)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 4.3.1	The continuity-check interval command was updated to allow CCM time interval of 10ms.
	Release 7.1.15	The command was updated to allow CCM time interval of 3.3ms.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples This example shows how to configure the time interval at which continuity-check messages are transmitted and set the threshold limit for when a MEP is declared down.

```
RP/0/RP0/CPU0:router# configure  
RP/0/RP0/CPU0:router(config)# ethernet cfm  
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1  
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1  
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# continuity-check interval 100ms loss-threshold  
10
```

continuity-check loss auto-traceroute

To configure automatic triggering of a traceroute when a MEP is declared down, use the **continuity-check loss auto-traceroute** command in CFM domain service configuration mode. To disable automatic triggering of a traceroute, use the **no** form of this command.

continuity-check loss auto-traceroute

This command has no keywords or arguments.

Command Default	Auto-trigger is off.
------------------------	----------------------

Command Modes	CFM domain service configuration (config-cfm-dmn-svc)
----------------------	---

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines	The results of the traceroute can be seen using the show ethernet cfm traceroute-cache command.
-------------------------	--

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to configure automatic triggering of a traceroute when a MEP is declared down:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# continuity-check loss auto-traceroute
```

Related Commands	Command	Description
	show ethernet cfm traceroute-cache, on page 173	Displays the contents of the traceroute cache.

cos (CFM)

To configure the class of service (CoS) for all CFM packets generated by the maintenance end point (MEP) on an interface, use the **cos** command in interface CFM MEP configuration mode. To return to the default CoS, use the **no** form of this command.

cos *cos*

Syntax Description

cos Class of Service for this MEP. The range is 0 to 7.

Command Default

When not configured, the default CoS value is inherited from the Ethernet interface.

Command Modes

Interface CFM MEP configuration (config-if-cfm-mep)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Configuring the class of service (CoS) on maintenance end points (MEPs) is supported on all Ethernet interfaces.

The specified CoS value is used for all CFM messages transmitted by the MEP, except for the following:

- Loopback and Linktrace replies—These are transmitted using the CoS value received in the corresponding loopback or linktrace message.
- AIS messages—If a different CoS value is specified in the AIS configuration.
- Ethernet SLA probe messages.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure the class of service (CoS) for a maintenance end point (MEP) on an interface.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/1
RP/0/RP0/CPU0:router(config-if)# ethernet cfm mep domain Dm1 service Sv1 mep-id 1
RP/0/RP0/CPU0:router(config-if-cfm-mep)# cos 7
```

Related Commands

Command	Description
ethernet cfm (interface), on page 66	Enters interface CFM configuration mode.

debug ethernet cfm packets

To log debug messages about CFM packets that are sent or received by the Ethernet connectivity fault management (CFM) process, use the **debug ethernet cfm packets** command in EXEC mode.

```
debug ethernet cfm packets [domain domain-name [service service-name [mep-id mep-id]]]
[interface type interface-path-id [domain domain-name]] [packet-type ccm | linktrace | loopback]
[remote mac-address mac-address] [remote mep-id mep-id] [sent | received] [brief | full | hexdump]
debug ethernet cfm packets [domain domain-name [service service-name [mep-id mep-id]]]
[interface type interface-path-id [domain domain-name]] [packet-type ais | ccm | delay-measurement
| linktrace | loopback] [remote mac-address mac-address] [remote mep-id mep-id] [sent | received]
[brief | full | hexdump]
```

Syntax Description		
domain <i>domain-name</i>	(Optional) Filters packets for display by the specified CFM maintenance domain, where <i>domain-name</i> is a string of up to 80 characters.	
service <i>service-name</i>	(Optional) Filters packets for display by the specified service name, where <i>service-name</i> is a string of up to 80 characters.	
mep-id <i>mep-id</i>	(Optional) Filters packets for display by the specified maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191.	
interface <i>type</i> <i>interface-path-id</i>	(Optional) Filters packets for display by the specified physical interface or virtual interface.	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<i>packet-type</i>	(Optional) Filters packets for display by the specified packet type. The following packet types are valid:	<ul style="list-style-type: none"> • ais • ccm • delay-measurement • linktrace • loopback
remote mac-address <i>mac-address</i>	(Optional) Filters packets for display by the specified MAC address.	
remote mep-id <i>mep-id</i>	(Optional) Filters packets for display by the remote MEP properties.	
sent	(Optional) Displays only sent packets.	
received	(Optional) Displays only received packets.	
brief	(Optional) Displays brief information about each packet.	
full	(Optional) Displays a full decode of each packet.	

hexdump (Optional) Displays a full decode and hexadecimal output of each packet.

Command Default If no parameters are specified, all CFM packets are debugged and logged.

Command Modes EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines



Caution Enabling packet debugging without filters can have an adverse effect on the performance of the router. To avoid this, filters should always be specified to restrict the output to the domain, service, local MEP, interface, direction and packet type of interest.

Packets can be filtered for debugging by specifying any of the optional parameters.

Task ID	Task ID	Operations
	ethernet-services	read

Examples

The following example shows a sample output of the **debug ethernet cfm packets** command with a full decode and hexadecimal output for sent and received CCM packets:

```
RP/0/RP0/CPU0:router# debug ethernet cfm packets hexdump

RP/0/RP0/CPU0:May 29 14:15:39.621 : cfmd[150]: PKT-RX: GigabitEthernet0/1/0/0 ingress: CCM
packet rcvd at level 2 for domain foo, service foo: length 91, src MAC 0001.0203.0402, dst
MAC 0180.c200.0032: Packet processed successfully
RP/0/RP0/CPU0:May 29 14:15:39.621 : cfmd[150]: PKT-RX: CCM: Level 2, opcode CCM, version
0, RDI bit unset, interval 10s, seq. num 1, remote MEP ID 16, flags 0x05, first TLV offset
70, 0 unknown TLVs
RP/0/RP0/CPU0:May 29 14:15:39.621 : cfmd[150]: PKT-RX: CCM: MAID: MDID String 'dom4',
SMAN String 'ser4'
RP/0/RP0/CPU0:May 29 14:15:39.621 : cfmd[150]: PKT-RX: CCM: Sender ID: Chassis ID Local
'hpr', Mgmt Addr <none>
RP/0/RP0/CPU0:May 29 14:15:39.621 : cfmd[150]: PKT-RX: CCM: Port status: Up, interface
status Up
RP/0/RP0/CPU0:May 29 14:15:39.622 : cfmd[150]: PKT-RX: Raw Frame:
RP/0/RP0/CPU0:May 29 14:15:39.622 : cfmd[150]: PKT-RX: 0x40010546 00000001 00100404
646F6D34 02047365 72340000 00000000 00000000
RP/0/RP0/CPU0:May 29 14:15:39.622 : cfmd[150]: PKT-RX: 0x00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000
RP/0/RP0/CPU0:May 29 14:15:39.622 : cfmd[150]: PKT-RX: 0x00000000 00000000 00000200
01020400 01010100 05030768 707200
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: GigabitEthernet0/1/0/0 egress: CCM
packet sent at level 2 for domain foo, service foo: length 91, src MAC 0001.0203.0400, dst
MAC 0180.c200.0032
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: CCM: Level 2, opcode CCM, version
0, RDI bit set, interval 10s, seq. num 16, remote MEP ID 1, flags 0x85, first TLV offset
70, 0 unknown TLVs
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: CCM: MAID: MDID String 'foo', SMAN
```

debug ethernet cfm packets

```

String 'foo'
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: CCM: Sender ID: Chassis ID Local
'ios', Mgmt Addr <none>
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: CCM: Port status: Up, interface
status Up
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: Raw Frame:
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: 0x40018546 00000010 00010403
666F6F02 03666F6F 00000000 00000000 00000000
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: 0x00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000
RP/0/RP0/CPU0:May 29 14:15:43.625 : cfmd[150]: PKT-TX: 0x00000000 00000000 00000200
01020400 01010100 05030769 6F7300

```

Related Commands

Command	Description
debug ethernet cfm protocol-state, on page 57	Logs debug messages about CFM state machines and protocol events.

debug ethernet cfm protocol-state

To log debug messages about CFM state machines and protocol events, use the **debug ethernet cfm protocol-state** command in EXEC mode.

```
debug ethernet cfm protocol-state [domain domain-name [service service-name [mep-id mep-id]]]
[interface type interface-path-id [domain domain-name]]
```

Syntax Description	Parameter	Description
	domain <i>domain-name</i>	(Optional) Filters information for display by the specified CFM maintenance domain, where <i>domain-name</i> is a string of up to 80 characters.
	service <i>service-name</i>	(Optional) Filters information for display by the specified service name, where <i>service-name</i> is a string of up to 80 characters.
	mep-id <i>mep-id</i>	(Optional) Filters information for display by the specified maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191.
	interface <i>type interface-path-id</i>	(Optional) Filters information for display by the specified physical interface or virtual interface.
	Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

Command Default If no parameters are specified, all CFM state machines and protocol events are debugged and logged.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines Debug messages can be filtered by specifying any of the optional parameters.

Task ID	Task ID	Operations
	ethernet-services	read

Examples

The following example shows a sample output of the **debug ethernet cfm protocol-state** command.

```
RP/0/RP0/CPU0:router# debug ethernet cfm protocol-state
```

```
RP/0/RP0/CPU0:May 29 14:41:49.966 : cfmd[150]: CFM: Created 1 local MEPs in PM and Engine
RP/0/RP0/CPU0:May 29 14:41:49.967 : cfmd[150]: CFM: State changes notification for 1 EFPs
RP/0/RP0/CPU0:May 29 14:42:14.143 : cfmd[150]: CFM: New remote MEP detected in domain foo,
service foo for local MEP ID 1 on interface GigabitEthernet0/1/0/0; remote MEP ID 16, MAC
0001.0203.0402, errors: set: mismatched MAID; current: mismatched MAID;
```

debug ethernet cfm protocol-state

```

RP/0/RP0/CPU0:May 29 14:42:16.644 : cfmd[150]: CFM: Fault alarm notification for local MEP
- domain: foo, service: foo, MEP ID: 1, interface: GigabitEthernet0/1/0/0, defect:
cross-connect CCM
RP/0/RP0/CPU0:May 29 14:43:32.247 : cfmd[150]: CFM: Initiated exploratory linktrace to
ffff.ffff.ffff from MEP in domain foo, service foo, MEP ID 1, interface GigabitEthernet0/1/0/0
with ttl 64 and transaction ID 65537, reply-filtering Default and directed MAC None
May 29 14:43:49.155 : cfmd[150]: CFM: Remote MEP timed out in domain foo, service foo for
local MEP ID 1 on interface GigabitEthernet0/1/0/0; remote MEP ID 16, MAC 0001.0203.0402,
errors: cleared: mismatched MAID; current: none

```

Related Commands

Command	Description
debug ethernet cfm packets, on page 54	Logs debug messages about CFM packets that are sent or received by the Ethernet CFM process.

domain

To create and name a container for all domain configurations and enter the CFM domain configuration mode, use the **domain** command in CFM configuration mode. To remove the domain, use the **no** form of this command.

```
domain domain-name level level-value [id null [dns dns-name][mac H.H.H][string string]]
```

Syntax Description

domain-name	Administrative name unique to this container, case sensitive ASCII string, up to 80 characters.
level <i>level-value</i>	The CFM protocol level of this domain. Range is 0 to 7.
id	(Optional) Maintenance domain identifier (MDID) used in conjunction with one of the following keywords to specify the MDID type and value: <ul style="list-style-type: none"> • null • dns <i>DNS-name</i> • mac <i>H.H.H</i> • string <i>string</i>
null	(Optional) Null value ID, used with the id keyword.
dns <i>DNS-name</i>	(Optional) DNS name, up to 43 characters in length, used with the id keyword.
mac <i>H.H.H</i>	(Optional) Hexadecimal MAC address, used with the id keyword.
string <i>string</i>	(Optional) Maintenance domain identifier (MDID) value, up to 43 characters in length, used with the id keyword.
Note	The domain name may be the used here as the maintenance domain identifier (MDID) if desired.

Command Default

If **id** is not specified, the domain name is used as the MDID.

Command Modes

CFM configuration (config-cfm)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

The level must be specified.

The maintenance domain identifier (MDID) is used as the first part of the maintenance association identifier (MAID) in CFM frames. If the MDID is not specified, the domain name is used as the MDID by default.

Multiple domains may be specified at the same level. If the MDID is specified as NULL, the MAID is constructed as a short maintenance association name.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to create a domain and give it a domain name, level, and maintenance domain identifier (MDID):


```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)#
```

Related Commands	Command	Description
	ethernet cfm (global), on page 65	Enters CFM configuration mode.
	ethernet cfm (interface), on page 66	Enters interface CFM configuration mode.
	mep domain, on page 118	Creates a MEP on an interface.
	service, on page 143	
	show ethernet cfm configuration-errors, on page 151	Displays information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred.
	show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.
	show ethernet cfm local meps, on page 159	Displays information about local MEPs.

efd

To enable Ethernet Fault Detection (EFD) on all down Maintenance End Points (MEPs) in a down MEPs service, use the **efd** command in CFM domain service configuration mode. To disable EFD, use the **no** form of this command.

efdprotection-switching
no efd

Syntax Description	<p>protection-switching Enables protection switching, which causes high-priority notifications to be sent when peer MEPs specified for cross-check time out, or when CCMs are received with the RDI bit set.</p> <p>Note The high-priority notifications only apply to MEPs that are offloaded. In the case of non-offloaded MEPs, enabling protection switching has no effect, and the command only enables EFD.</p>						
Command Default	EFD is disabled.						
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.3.1</td> <td>The protection-switching keyword was included.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.1	This command was introduced.	Release 4.3.1	The protection-switching keyword was included.
Release	Modification						
Release 3.9.1	This command was introduced.						
Release 4.3.1	The protection-switching keyword was included.						
Usage Guidelines	<p>EFD can only be enabled for down MEPs within a down MEPs service.</p> <p>If the efd command is issued when any MEP in the service has any of the following error conditions, the MEP will shut down the interface:</p> <ul style="list-style-type: none"> • The MEP appears cross-connected to another MAID. • The MEP is receiving invalid CCMs, such as receiving its own MAC or MEP-ID. • All peer MEPs are reporting a state other than UP via the Port Status TLV. • A peer MEP is reporting a state other than UP in Interface Status TLV. • When cross-check is configured, and a session with an expected MEP times out, EFD is triggered on the local MEP. • No CCMs are received from a peer MEP appearing in the configured cross-check list. • An RDI is being received from a peer MEP. • The MEP is receiving an AIS/LCK. <p>The MEP will bring the interface back up when the error condition is no longer detected.</p>						
 Note	When an interface is shut down by a MEP using EFD, the MEP will continue to send and receive CCMs and other CFM messages.						

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

This example shows how to enable EFD:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain D1 level 1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service S1 down-meps
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# efd
```

Related Commands	Command	Description
	show efd interface, on page 148	Displays all interfaces that are shut down because of EFD.
	show ethernet cfm local meps, on page 159	Displays information about local MEPs.

error-disable recovery cause

To configure error-disable to automatically attempt recovery, use the **error-disable recovery cause** command.

error-disable recovery cause { **ethernet-oam-critical-event** | **ethernet-oam-link-fault** | . . . } [**interval**<30 – 1,000,000 >]

Syntax Description	link-oam-critical-event	Used when a critical event is detected by Ethernet Link OAM.
	<i>cause</i>	One of the defined error-disable causes, for example: ethernet-oam-link-fault.
	<i>interval</i>	Specifies the interval, in seconds, at which retries are attempted. The range is 30 to 1,000,000.
	link-oam-link-fault	Used when a unidirectional link is detected by Ethernet Link OAM.

Command Default Default interval period is 300 seconds.

Command Modes Global Configuration mode

Command History	Release	Modification
	Release 3.7.3	This command was introduced.

Usage Guidelines When error disable recovery is enabled, the interface automatically recovers from the error-disabled state, and the device retries bringing the interface up.

Task ID	Task ID	Operation
	interface	write

Example

The following example shows the full list of error-disable recovery causes:

```
RP/0/0/CPU0:ios(config)#error-disable recovery cause ?
cluster-udld           Used when UDLD is enabled on a Cluster port and UDLD is in
  aggressive mode and UDLD goes uni directional
link-oam-capabilities-conflict  Used when Ethernet Link OAM configuration conflicts with
the peer
link-oam-critical-event  Used when a critical event is detected by Ethernet Link OAM
link-oam-discovery-timeout  Used when an Ethernet Link OAM session fails to come up in
  time
link-oam-dying-gasp      Used when a dying gasp is detected by Ethernet Link OAM
link-oam-link-fault      Used when a unidirectional link is detected by Ethernet
Link OAM
link-oam-miswired        Used when a mis-wiring is detected with Ethernet Link OAM
link-oam-session-down    Used when an Ethernet Link OAM session goes down
link-oam-threshold-breached  Used when a configured error threshold has been breached
pvrst-pvid-mismatch      Used when a PVRST BPDU packet is tagged with a VLAN ID which
  is different from the VLAN ID on which it was sent.
stp-bpdu-guard           Used when an STP BPDU is received on a port on which BPDU
```

Guard is configured	
stp-legacy-bpdu and RSTP BPDUs are supported	Used when a legacy BPDU is received on a port. Only MSTP
udld-loopback its Tx is directly connected to its Rx)	Used when UDLD detects that the port is in loopback mode (i.e.
udld-neighbor-mismatch	Used when mismatched neighbors are detected by UDLD
udld-timeout	Used when all UDLD neighbors on the link have timed out
udld-unidirectional	Used when a link is detected to be unidirectional

ethernet cfm (global)

To enter Connectivity Fault Management (CFM) configuration mode, use the **ethernet cfm (global)** command in Global Configuration mode.

ethernet cfm

Syntax Description This command has no keywords or arguments.

Command Default No default behavior or values

Command Modes Global Configuration mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to enter the CFM configuration mode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)#
```

Related Commands	Command	Description
	domain, on page 59	
	ethernet cfm (interface), on page 66	Enters interface CFM configuration mode.
	show ethernet cfm configuration-errors, on page 151	Displays information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred.
	show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.
	show ethernet cfm local meps, on page 159	Displays information about local MEPs.

ethernet cfm (interface)

To enter interface CFM configuration mode, use the **ethernet cfm (interface)** command in interface configuration mode.

ethernet cfm

Syntax Description This command has no keywords or arguments.

Command Default No MEPs are configured on the interface.

Command Modes Interface configuration (config-if)
Subinterface configuration (config-subif)

Command History	Release	Modification
	Release 3.9.1	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples The following example shows how to enter interface CFM configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/1
RP/0/RP0/CPU0:router(config-if)# ethernet cfm
RP/0/RP0/CPU0:router(config-if-cfm)#
```

Related Commands	Command	Description
	cos (CFM), on page 53	Configures the CoS for all CFM packets generated by the MEP on an interface.
	ethernet cfm (global), on page 65	Enters CFM configuration mode.
	mep domain, on page 118	Creates a MEP on an interface.
	show ethernet cfm configuration-errors, on page 151	Displays information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred.
	show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.

Command	Description
show ethernet cfm local meps, on page 159	Displays information about local MEPs.

ethernet oam

To enable Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode, use the **ethernet oam** command in interface configuration mode. To disable Ethernet Link OAM, use the **no** form of this command.

ethernet oam

Syntax Description	This command has no keywords or arguments.	
Command Default	When enabled on an interface, the Ethernet Link OAM default values apply.	
Command Modes	Interface configuration (config-if)	
Command History	Release	Modification
	Release 3.9.0	This command was introduced.
Usage Guidelines	When you enable Ethernet Link OAM on an interface, the default Ethernet Link OAM values are applied to the interface. For the default Ethernet Link OAM values, see the related Ethernet Link OAM commands.	
Task ID	Task ID	Operations
	ethernet-services	read, write
Examples	The following example shows how to enable Ethernet Link OAM and enter interface Ethernet OAM configuration mode.	

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/5/6
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)#
```

ethernet oam loopback

To start or stop a loopback at the remote end of an Ethernet OAM interface, use the **ethernet oam loopback** command in EXEC mode.

ethernet oam loopback enable | disable *type interface-path-id*

Syntax Description	enable	Starts a loopback at the remote end.
	disable	Stops the loopback at the remote end.
	type	Interface type. For more information, use the question mark (?) online help function.
	interface-path-id	Physical interface or virtual interface.
	Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

Command Default Loopback is not enabled.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines This command puts the remote peer device into loopback mode. This means that all traffic sent to the peer is looped back, which means that it is sent back from the peer and received by the router. All traffic received from the peer device is discarded.

This command returns when the OAM client receives confirmation from the remote end that the remote loopback has been enabled or disabled. If no response or a failure response is received, an error is returned.

Task ID	Task ID	Operations
	ethernet-services	execute

Examples The following example shows how to start a loopback at the far end of an Ethernet OAM interface.

```
RP/0/RP0/CPU0:router# ethernet oam loopback enable tengigabitethernet 0/6/1/0
```

Related Commands	Command	Description
	action remote-loopback, on page 14	Configures what action is taken on an interface when a remote-loopback event occurs.
	snmp-server traps ethernet oam events, on page 206	
	show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.

ethernet oam profile

To create an Ethernet Operations, Administration and Maintenance (EOAM) profile and enter EOAM configuration mode, use the **ethernet oam profile** command in global configuration mode. To delete an EOAM profile, use the **no** form of this command.

ethernet oam profile *profile-name*

Syntax Description

profile-name Text string name of the OAM profile. The maximum length is 32 bytes.

Command Default

No default behavior or values

Command Modes

Global configuration (config)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Before you can delete an EOAM profile, you must remove the profile from all interfaces to which it is attached.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

This example shows how to create an Ethernet OAM profile and enter Ethernet OAM configuration mode:

```
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)#
```

ethernet sla

To enter the Ethernet Service Level Agreement (SLA) configuration mode, use the **ethernet sla** command in Global Configuration mode.

ethernet sla

Syntax Description This command has no keywords or arguments.

Command Default No default behavior or values

Command Modes Global Configuration mode

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to enter the Ethernet SLA configuration mode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)#
```


ethernet sla on-demand operation type cfm-delay-measurement probe

To execute an on-demand Ethernet SLA operation probe for CFM delay measurement, use the **ethernet sla on-demand operation type cfm-delay-measurement probe** command in EXEC mode.

```
<groupcomp >
<kwd >ethernet</kwd>
<sep> </sep>
<kwd >sla</kwd>
<sep> </sep>
<kwd >on-demand</kwd>
<sep> </sep>
<kwd >operation</kwd>
<sep> </sep>
<kwd >type</kwd>
<sep> </sep>
<groupchoice >
<kwd >cfm-delay-measurement</kwd>
<kwd >cfm-delay-measurement-v0</kwd>
</groupchoice>
<sep> </sep>
<kwd >probe</kwd>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >priority</kwd>
<sep> </sep>
<kwd >number</kwd>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >send</kwd>
<sep> </sep>
<groupchoice >
<groupcomp >
```

```
<kwd >packet</kwd>
<sep> </sep>
<groupchoice >
<kwd >once</kwd>
<groupcomp >
<kwd >every</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<groupchoice >
<kwd >milliseconds</kwd>
<kwd >seconds</kwd>
<kwd >minutes</kwd>
<kwd >hours</kwd>
</groupchoice>
</groupcomp>
</groupchoice>
</groupcomp>
<groupcomp >
<kwd >burst</kwd>
<sep> </sep>
<groupchoice >
<kwd >once</kwd>
<groupcomp >
<kwd >every</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<groupchoice >
<kwd >seconds</kwd>
<kwd >minutes</kwd>
<kwd >hours</kwd>
</groupchoice>
</groupcomp>
```

```
</groupchoice>
</groupcomp>
</groupchoice>
<sep> </sep>
<kwd >packet</kwd>
<sep> </sep>
<kwd >count</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<kwd >interval</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<groupchoice >
<kwd >milliseconds</kwd>
<kwd >seconds</kwd>
</groupchoice>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >packet</kwd>
<sep> </sep>
<kwd >size</kwd>
<sep> </sep>
<kwd >bytes</kwd>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >test</kwd>
<sep> </sep>
<kwd >pattern</kwd>
<sep> </sep>
<groupchoice >
<groupcomp >
```

```

<kwd >hex</kwd>
<sep> </sep>
<kwd >0x</kwd>
<sep> </sep>
<kwd >HHHHHHHH</kwd>
</groupcomp>
<kwd >pseudo-random</kwd>
</groupchoice>
</groupcomp>
</groupcomp>
<sep> </sep>
<kwd >domain</kwd>
<sep> </sep>
<kwd >domain_name</kwd>
<sep> </sep>
<kwd >source</kwd>
<sep> </sep>
<kwd >interface</kwd>
<sep> </sep>
<kwd >type</kwd>
<sep> </sep>
<kwd >interface-path-id</kwd>
<sep> </sep>
<kwd >target</kwd>
<sep> </sep>
<groupchoice >
<groupcomp >
<kwd >mac-address</kwd>
<sep> </sep>
<kwd >H</kwd>
<sep> </sep>
<groupcomp >
<delim>.</delim>
<kwd >H</kwd>

```

```
</groupcomp>
<sep> </sep>
<groupcomp >
<delim>.</delim>
<kwd >H</kwd>
</groupcomp>
<sep> </sep>
<groupcomp >
<delim>.</delim>
<kwd >H</kwd>
</groupcomp>
</groupcomp>
<groupcomp >
<kwd >mep-id</kwd>
<sep> </sep>
<kwd >id_number</kwd>
</groupcomp>
</groupchoice>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >statistics</kwd>
<sep> </sep>
<kwd >measure</kwd>
<sep> </sep>
<groupchoice >
<kwd >one-way-delay-ds</kwd>
<kwd >one-way-delay-sd</kwd>
<kwd >one-way-jitter-ds</kwd>
<kwd >one-way-jitter-sd</kwd>
<kwd >round-trip-delay</kwd>
<kwd >round-trip-jitter</kwd>
</groupchoice>
<sep> </sep>
<groupcomp importance='optional' >
```

```
<kwd >aggregate</kwd>
<sep> </sep>
<groupchoice >
<kwd >none</kwd>
<groupcomp >
<kwd >bins</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<kwd >width</kwd>
<sep> </sep>
<kwd >milliseconds</kwd>
</groupcomp>
</groupchoice>
</groupcomp>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >buckets</kwd>
<sep> </sep>
<groupchoice >
<groupcomp >
<kwd >archive</kwd>
<sep> </sep>
<kwd >number</kwd>
</groupcomp>
<groupcomp >
<kwd >size</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<groupchoice >
<kwd >per-probe</kwd>
<kwd >probes</kwd>
```

```
</groupchoice>
</groupcomp>
</groupchoice>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >schedule</kwd>
<sep> </sep>
<groupchoice >
<kwd >now</kwd>
<groupcomp >
<kwd >at</kwd>
<sep> </sep>
<kwd >hh</kwd>
<sep> </sep>
<groupcomp >
<delim>:</delim>
<kwd >mm</kwd>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<delim>.</delim>
<kwd >ss</kwd>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >day</kwd>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >month</kwd>
<sep> </sep>
<kwd importance='optional' >year</kwd>
</groupcomp>
</groupcomp>
```

```

</groupcomp>
<groupcomp >
<kwd >in</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<groupchoice >
<kwd >seconds</kwd>
<kwd >minutes</kwd>
<kwd >hours</kwd>
</groupchoice>
</groupcomp>
</groupchoice>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >for</kwd>
<sep> </sep>
<kwd >duration</kwd>
<sep> </sep>
<groupchoice >
<kwd >seconds</kwd>
<kwd >minutes</kwd>
<kwd >hours</kwd>
</groupchoice>
</groupcomp>
<sep> </sep>
<groupcomp importance='optional' >
<kwd >repeat</kwd>
<sep> </sep>
<kwd >every</kwd>
<sep> </sep>
<kwd >number</kwd>
<sep> </sep>
<groupchoice >

```



```

<kwd >seconds</kwd>
<kwd >minutes</kwd>
<kwd >hours</kwd>
</groupchoice>
<sep> </sep>
<kwd >count</kwd>
<sep> </sep>
<kwd >probes</kwd>
</groupcomp>
</groupcomp>
<sep> </sep>
<kwd importance='optional' >asynchronous</kwd>
</groupcomp>

```

Syntax Description

priority <i>number</i>	(Optional) Configures the priority of outgoing SLA probe packets. The range is 0 to 7. The default is to use the COS bits for the egress interface.
send packet once	(Optional) Sends one packet one time.
send packet every <i>number</i> { milliseconds seconds minutes hours }	(Optional) Sends one packet every specified number of milliseconds, seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 168 hours • 100 to 10000 milliseconds (specified in increments of 100)
send burst once	(Optional) Specifies that a burst of packets is sent one time. This is the default.

send burst every <i>number</i> { seconds minutes hours }}	(Optional) Sends a burst of packets every specified number of seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1–3600 seconds • 1–1440 minutes • 1–168 hours The default is to send a burst every 10 seconds.
packet count <i>number</i>	Specifies the number of packets to be sent in a burst, in the range 2 to 600. The default is 10.
interval <i>number</i> { milliseconds seconds }	Specifies the time between sending packets in a burst, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 100 to 30000 milliseconds • 1 to 30 seconds <p>Note The total length of a burst (the packet count multiplied by the interval) must not exceed 1 minute.</p>
packet size <i>bytes</i>	Minimum size of the packet including padding when necessary. The range is 1 to 9000 bytes. This value is the total frame size including the Layer 2 or Layer 3 packet header.
test pattern hex 0x <i>HHHHHHHH</i>	(Optional) Specifies a 4-byte string (8 hexadecimal characters) to repeat as many times as required to fill the outgoing probe packet to the specified minimum packet size. The default is all 0s.
domain <i>domain-name</i>	Specifies the name of the domain for the locally defined CFM MEP.
source interface <i>type</i>	Specifies the source interface type of the locally defined CFM MEP. For more information, use the question mark (?) online help function.

<i>interface-path-id</i>	<p>Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
target mac-address <i>H.H.H</i>	Specifies the MAC address (in dotted hexadecimal format) of the target MEP that is known to the local MEP for the probe.
target mep-id <i>id-number</i>	Specifies the ID (from 1 to 8191) of the target MEP that is known to the local MEP for the probe.
statistics measure	<p>(Optional) Specifies the type of statistics to collect:</p> <ul style="list-style-type: none"> • one-way-delay-ds—One-way delay statistics from destination to source. • one-way-delay-sd—One-way delay statistics from source to destination. • one-way-jitter-ds—One-way delay jitter from destination to source. • one-way-jitter-sd—One-way delay jitter from source to destination. • round-trip-delay—Round-trip delay statistics. • round-trip-jitter—Round-trip jitter statistics. <p>All statistics are collected by default.</p>
aggregate none	<p>(Optional) Specifies that statistics are not aggregated into bins, and each statistic is stored individually.</p> <p>Caution This option can be memory-intensive and should be used with care.</p>

aggregate bins <i>number</i>	(Optional) Specifies the number of bins (from 2 to 100) within each bucket to store sample packets from the probe. The default is to aggregate into one bin.
width <i>milliseconds</i>	Specifies the range of the samples to be collected within each bin in milliseconds, from 1 to 10000. Based on the specified width, bins are established in the following way: <ul style="list-style-type: none"> • Delay measurements (round-trip or one-way)—The lower bound of the bins is zero and the first bin's upper limit is 0 plus the specified width, and the last bin is unbounded. • Jitter measurements (round-trip or one-way)—The bins are evenly distributed around zero, with both the lowest and highest numbered bins being unbounded. See the Usage Guidelines for more information.
buckets archive <i>number</i>	(Optional) Specifies the number of buckets to store in memory from 1 to 100. The default is 100.
buckets size <i>number</i>	(Optional) Specifies the number of buckets to be used for probes from 1 to 100. The default is 1.
per-probe	Specifies that probes span multiple buckets.
probes	Specifies that buckets span multiple probes.
schedule now	(Optional) Specifies that the probe begins as soon as you enter the command. This is the default.
schedule at <i>hh:mm</i>	(Optional) Specifies a specific time at which to start the probe in 24-hour notation.
<i>ss</i>	(Optional) Number of seconds into the next minute at which to start the probe.

day	(Optional) Number in the range 1 to 31 of the day of the month on which to start the probe.
month	(Optional) Name of the month (full word in English) in which to start the probe.
year	(Optional) Year (fully specified as 4 digits) in which to start the probe.
schedule in <i>number</i> { seconds minutes hours }	(Optional) Specifies a relative time, as a number of seconds, minutes or hours from the current time, at which to start the probe, where <i>number</i> is in the following ranges: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours
for <i>duration</i> { seconds minutes hours }	(Optional) Specifies the length of the probe as a number of seconds, minutes, or hours, where <i>number</i> is in the following ranges: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours <p>Note The duration should not exceed the interval specified by the repeat every option.</p>
repeat every <i>number</i> { seconds minutes hours }	(Optional) Specifies the interval at which to restart the probe as a number of seconds, minutes, or hours, where <i>number</i> is in the following ranges: <ul style="list-style-type: none"> • 1 to 90 seconds • 1 to 90 minutes • 1 to 24 hours <p>The default is that probes are not repeated, and there is no default interval.</p>
count <i>probes</i>	Specifies the number of probes to run in the range 1–100. There is no default.

asynchronous	(Optional) Specifies that the command displays the on-demand operation ID and exits immediately, with the operation continuing in the background. The default is synchronous and the operation displays the on-demand operation ID and all results on the console when it completes.
---------------------	---

Command Default No on-demand operations are configured or executed.

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.0.0	This command was introduced.
	Release 4.3.0	The cfm-delay-measurement-v0 option was included.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	execute

Examples

This example shows how to enter the most basic SLA on-demand operation to measure CFM delay statistics. This example implements these defaults:

- Send a burst once for a packet count of 10 and interval of 1 second (10-second probe).
- Use default class of service (CoS) for the egress interface.
- Measure all statistics, including both one-way and round-trip delay and jitter statistics.
- Aggregate statistics into one bin.
- Schedule now.
- Display results on the console.

```
RP/0/RP0/CPU0:router# ethernet sla on-demand operation type cfm-delay-measurement
probe domain D1 source interface TenGigE 0/6/1/0 target mep-id 100
```

Related Commands	Command	Description
	clear ethernet sla statistics all, on page 42	Deletes the contents of buckets containing SLA statistics collected by all operations probes.
	clear ethernet sla statistics on-demand, on page 43	Deletes the contents of buckets containing SLA statistics collected by on-demand probes.
	show ethernet sla operations, on page 194	Displays information about configured Ethernet SLA operations.

Command	Description
show ethernet sla statistics, on page 197	Displays the contents of buckets containing Ethernet SLA metrics collected by probes.

ethernet sla on-demand operation type cfm-loopback probe

To execute an on-demand Ethernet SLA operation probe for CFM loopback measurement, use the **ethernet sla on-demand operation type cfm-loopback probe** command in EXEC mode.

```
ethernet sla on-demand operation type cfm-delay-measurement cfm-delay-measurement-v0probe
[priority number]
send packet once | every number milliseconds | seconds | minutes | hours | burst once | every number
seconds | minutes | hours packet count number interval number milliseconds | seconds
[packet size bytes [test pattern hex 0x HHHHHHHH | pseudo-random]]
domain domain_name source interface type interface-path-id target mac-address H.H.H.H |
mep-id id_number
[ statistics measure one-way-delay-ds | one-way-delay-sd | one-way-jitter-ds | one-way-jitter-sd |
round-trip-delay | round-trip-jitter
aggregate none | bins number width milliseconds
buckets archive number | size number per-probe | probes ]
schedule now | at hh:mm:ss [day month year] | in number seconds | minutes | hours
for duration seconds | minutes | hours
repeat every number seconds | minutes | hours count probes
[asynchronous]
```

Syntax Description

priority <i>number</i>	(Optional) Configures the priority of outgoing SLA probe packets. The range is 0 to 7. The default is to use the COS bits for the egress interface.
send packet once	(Optional) Sends one packet one time.
send packet every <i>number</i> { milliseconds seconds minutes hours }	(Optional) Sends one packet every specified number of milliseconds, seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 168 hours • 100 to 10000 milliseconds (specified in increments of 100)
send burst once	(Optional) Specifies that a burst of packets is sent one time. This is the default.

send burst every <i>number</i> { seconds minutes hours }	(Optional) Sends a burst of packets every specified number of seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1–3600 seconds • 1–1440 minutes • 1–168 hours The default is to send a burst every 10 seconds.
packet count <i>number</i>	Specifies the number of packets to be sent in a burst, in the range 2 to 600. The default is 10.
interval <i>number</i> { milliseconds seconds }	Specifies the time between sending packets in a burst, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 100 to 30000 milliseconds • 1 to 30 seconds <p>Note The total length of a burst (the packet count multiplied by the interval) must not exceed 1 minute.</p>
packet size <i>bytes</i>	Minimum size of the packet including padding when necessary. The range is 1 to 9000 bytes. This value is the total frame size including the Layer 2 or Layer 3 packet header.
test pattern hex 0x <i>HHHHHHHH</i>	(Optional) Specifies a 4-byte string (8 hexadecimal characters) to repeat as many times as required to fill the outgoing probe packet to the specified minimum packet size. The default is all 0s.
test pattern pseudo-random	(Optional) Specifies a pseudo-random bit sequence determined by the protocol to fill the outgoing probe packet to the specified minimum packet size.
domain <i>domain-name</i>	Specifies the name of the domain for the locally defined CFM MEP.

source interface <i>type</i>	Specifies the source interface type of the locally defined CFM MEP. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	<p>Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
target mac-address <i>H.H.H.H</i>	Specifies the MAC address (in dotted hexadecimal format) of the target MEP that is known to the local MEP for the probe.
target mep-id <i>id-number</i>	Specifies the ID (from 1 to 8191) of the target MEP that is known to the local MEP for the probe.
statistics measure	<p>(Optional) Specifies the type of statistics to collect:</p> <ul style="list-style-type: none"> • one-way-delay-ds—One-way delay statistics from destination to source. • one-way-delay-sd—One-way delay statistics from source to destination. • one-way-jitter-ds—One-way jitter statistics from destination to source. • one-way-jitter-sd—One-way jitter statistics from source to destination. • round-trip-delay—Round-trip delay statistics. • round-trip-jitter—Round-trip jitter statistics. <p>All statistics are collected by default.</p>

aggregate none	(Optional) Specifies that statistics are not aggregated into bins, and each statistic is stored individually. Caution This option can be memory-intensive and should be used with care.
aggregate bins <i>number</i>	(Optional) Specifies the number of bins (from 2 to 100) within each bucket to store sample packets from the probe. The default is to aggregate into one bin.
width <i>milliseconds</i>	Specifies the range of the samples to be collected within each bin in milliseconds, from 1 to 10000. Based on the specified width, bins are established in the following way: <ul style="list-style-type: none"> • Delay measurements (round-trip or one-way)—The lower bound of the bins is zero and the first bin's upper limit is 0 plus the specified width, and the last bin is unbounded. • Jitter measurements (round-trip or one-way)—The bins are evenly distributed around zero, with both the lowest and highest numbered bins being unbounded. See the Usage Guidelines for more information.
buckets archive <i>number</i>	(Optional) Specifies the number of buckets to store in memory from 1 to 100. The default is 100.
buckets size <i>number</i>	(Optional) Specifies the number of buckets to be used for probes from 1 to 100. The default is 1.
per-probe	Specifies that probes span multiple buckets.
probes	Specifies that buckets span multiple probes.

schedule now	(Optional) Specifies that the probe begins as soon as you enter the command. This is the default.
schedule at <i>hh : mm : ss</i>	(Optional) Specifies a specific time at which to start the probe in 24-hour notation.
<i>day</i>	(Optional) Number in the range 1 to 31 of the day of the month on which to start the probe.
<i>month</i>	(Optional) Name of the month (full word in English) in which to start the probe.
<i>year</i>	(Optional) Year (fully specified as 4 digits) in which to start the probe.
schedule in <i>number</i> { seconds minutes hours }	(Optional) Specifies a relative time, as a number of seconds, minutes or hours from the current time, at which to start the probe, where <i>number</i> is in the following ranges: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours
for <i>duration</i> { seconds minutes hours }	(Optional) Specifies the length of the probe as a number of seconds, minutes, or hours, where <i>number</i> is in the following ranges: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours <p>Note The duration should not exceed the interval specified by the repeat every option.</p>

repeat every <i>number</i> {seconds minutes hours}	(Optional) Specifies the interval at which to restart the probe as a number of seconds, minutes, or hours, where <i>number</i> is in the following ranges: <ul style="list-style-type: none"> • 1 to 90 seconds • 1 to 90 minutes • 1 to 24 hours The default is that probes are not repeated, and there is no default interval.
count <i>probes</i>	Specifies the number of probes to run in the range 1–100. There is no default.
asynchronous	(Optional) Specifies that the command displays the on-demand operation ID and exits immediately, with the operation continuing in the background. <p>The default is synchronous and the operation displays the on-demand operation ID and all results on the console when it completes.</p>

Command Default No on-demand operations are configured or executed.

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.0.0	This command was introduced.
	Release 4.3.0	The cfm-delay-measurement-v0 keyword was included.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	execute

Examples The following example shows how to enter the most basic SLA on-demand operation to measure CFM loopback statistics. This example implements the following defaults:

- Send a burst once for a packet count of 10 and interval of 1 second (10-second probe).
- Use default test pattern of 0's for padding.
- Use default class of service (CoS) for the egress interface.

ethernet sla on-demand operation type cfm-loopback probe

- Measure all statistics.
- Aggregate statistics into one bin.
- Schedule now.
- Display results on the console.

```
RP/0/RP0/CPU0:router# ethernet sla on-demand operation type cfm-loopback
probe packet size 1500 domain D1 source interface TenGigE 0/6/1/0 target mep-id 100
```

Related Commands

Command	Description
clear ethernet sla statistics all, on page 42	Deletes the contents of buckets containing SLA statistics collected by all operations probes.
clear ethernet sla statistics on-demand, on page 43	Deletes the contents of buckets containing SLA statistics collected by on-demand probes.
show ethernet sla operations, on page 194	Displays information about configured Ethernet SLA operations.
show ethernet sla statistics, on page 197	Displays the contents of buckets containing Ethernet SLA metrics collected by probes.

ethernet sla on-demand operation type cfm-synthetic-loss-measurement probe

To execute an on-demand Ethernet SLA operation probe for CFM synthetic loss measurement, use the **ethernet sla on-demand operation type cfm-synthetic-loss-measurement probe** command in EXEC mode.

```
ethernet sla on-demand operation type cfm-synthetic-loss-measurement probe [priority number]
[send packet once|every number milliseconds|seconds|minutes|hours|burst once|every number
seconds|minutes|hours packet count number interval number milliseconds|seconds]synthetic loss
calculation packets number [ packet size bytes [test pattern hex 0x HHHHHHHH] ] domain
domain_name source interface type interface-path-id target mac-address H.H.H.H|mep-id
id_number [ statistics measure one-way-loss-sd|one-way-loss-ds [aggregate none|bins number
width count] [buckets archive number|size number per-probe|probes] ] [schedule now|at
hh:mm [.ss] [day [month [year]]] |in number seconds|minutes|hours [for duration seconds|
minutes|hours] [repeat every number seconds|minutes|hours count probes] [asynchronous]
```

Syntax Description

priority <i>number</i>	(Optional) Configures the priority of outgoing SLA probe packets. The range is 0 to 7. The default is to use the COS bits for the egress interface.
send packet once	(Optional) Sends one packet one time.
send packet every <i>number</i> { milliseconds seconds minutes hours }	(Optional) Sends one packet every specified number of milliseconds, seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 168 hours • 100 to 10000 milliseconds (specified in increments of 100)
send burst once	(Optional) Specifies that a burst of packets is sent one time. This is the default.
send burst every <i>number</i> { seconds minutes hours }	(Optional) Sends a burst of packets every specified number of seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1–3600 seconds • 1–1440 minutes • 1–168 hours <p>The default is to send a burst every 10 seconds.</p>
packet count <i>number</i>	Specifies the number of packets to be sent in a burst, in the range 2 to 600. The default is 10.

interval <i>number</i> { milliseconds seconds }	<p>Specifies the time between sending packets in a burst, where <i>number</i> is in the following range:</p> <ul style="list-style-type: none"> • 100 to 30000 milliseconds • 1 to 30 seconds <p>Note The total length of a burst (the packet count multiplied by the interval) must not exceed 1 minute.</p>
packet size <i>bytes</i>	<p>Minimum size of the packet including padding when necessary. The range is 1 to 9000 bytes. This value is the total frame size including the Layer 2 or Layer 3 packet header.</p>
test pattern hex 0x <i>HHHHHHHH</i>	<p>(Optional) Specifies a 4-byte string (8 hexadecimal characters) to repeat as many times as required to fill the outgoing probe packet to the specified minimum packet size. The default is all 0s.</p>
synthetic loss calculation packets <i>number</i>	<p>Defines the number of packets that must be used to make each FLR calculation for synthetic loss measurements. It ranges from 10 to 12096000.</p>
domain <i>domain-name</i>	<p>Specifies the name of the domain for the locally defined CFM MEP.</p>
source interface <i>type</i>	<p>Specifies the source interface type of the locally defined CFM MEP. For more information, use the question mark (?) online help function.</p>
<i>interface-path-id</i>	<p>Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
target mac-address <i>H.H.H</i>	<p>Specifies the MAC address (in dotted hexadecimal format) of the target MEP that is known to the local MEP for the probe.</p>
target mep-id <i>id-number</i>	<p>Specifies the ID (from 1 to 8191) of the target MEP that is known to the local MEP for the probe.</p>
statistics measure	<p>(Optional) Specifies the type of statistics to collect:</p> <ul style="list-style-type: none"> • one-way-loss-ds—One-way loss statistics from destination to source. • one-way-loss-sd—One-way loss statistics from source to destination.

aggregate none	(Optional) Specifies that statistics are not aggregated into bins, and each statistic is stored individually. Caution This option can be memory-intensive and should be used with care.
aggregate bins <i>number</i>	(Optional) Specifies the number of bins (from 2 to 100) within each bucket to store sample packets from the probe. The default is to aggregate into one bin.
width <i>count</i>	Specifies the range of the samples to be collected within each bin in percentage points, from 1 to 100.
buckets archive <i>number</i>	(Optional) Specifies the number of buckets to store in memory from 1 to 100. The default is 100.
buckets size <i>number</i>	(Optional) Specifies the number of buckets to be used for probes from 1 to 100. The default is 1.
per-probe	Specifies that probes span multiple buckets.
probes	Specifies that buckets span multiple probes.
schedule now	(Optional) Specifies that the probe begins as soon as you enter the command. This is the default.
schedule at <i>hh:mm</i>	(Optional) Specifies a specific time at which to start the probe in 24-hour notation.
ss	(Optional) Number of seconds into the next minute at which to start the probe.
day	(Optional) Number in the range 1 to 31 of the day of the month on which to start the probe.
month	(Optional) Name of the month (full word in English) in which to start the probe.
year	(Optional) Year (fully specified as 4 digits) in which to start the probe.
schedule in <i>number</i> { seconds minutes hours }	(Optional) Specifies a relative time, as a number of seconds, minutes or hours from the current time, at which to start the probe, where <i>number</i> is in these ranges: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours

for duration {seconds minutes hours}	(Optional) Specifies the length of the probe as a number of seconds, minutes, or hours, where <i>number</i> is in these ranges: <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours <p>Note The duration should not exceed the interval specified by the repeat every option.</p>
repeat every <i>number</i> {seconds minutes hours}	(Optional) Specifies the interval at which to restart the probe as a number of seconds, minutes, or hours, where <i>number</i> is in these ranges: <ul style="list-style-type: none"> • 1 to 90 seconds • 1 to 90 minutes • 1 to 24 hours <p>The default is that probes are not repeated, and there is no default interval.</p>
count <i>probes</i>	Specifies the number of probes to run in the range 1–100. There is no default.
asynchronous	(Optional) Specifies that the command displays the on-demand operation ID and exits immediately, with the operation continuing in the background. <p>The default is synchronous and the operation displays the on-demand operation ID and all results on the console when it completes.</p>

Command Default No on-demand operations are configured or executed.

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.3.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	ethernet-services	execute

Example

This example shows a minimum configuration, that specifies the local domain and source interface and target MEP, using these defaults:

- Send a burst once for a packet count of 100 and interval of 100 milliseconds .
- The number of packets to be used for FLR calculation is 100.
- Measure the one way loss statistics in both the directions .
- Aggregate statistics into one bin.
- Schedule now.
- Display results on the console.

```
RP/0/RP0/CPU0:router#ethernet sla on-demand operation type cfm-synthetic-loss-measurement
probe
domain D1 source interface TenGigE 0/6/1/0 target mac-address 2.3.4
```

Related Commands

Command	Description
clear ethernet sla statistics all, on page 42	Deletes the contents of buckets containing SLA statistics collected by all operations probes.
clear ethernet sla statistics on-demand, on page 43	Deletes the contents of buckets containing SLA statistics collected by on-demand probes.
show ethernet sla operations, on page 194	Displays information about configured Ethernet SLA operations.
show ethernet sla statistics, on page 197	Displays the contents of buckets containing Ethernet SLA metrics collected by probes.

frame-period threshold

To configure the thresholds that trigger an Ethernet OAM frame-period error event, use the **frame-period threshold** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the threshold to the default value, use the **no** form of this command.

```
frame-period threshold {frames [low threshold [thousand | million | billion ]][high threshold
[thousand | million | billion ]]|ppm [low threshold ][high threshold ]}
```

Syntax Description	<p>low threshold Low threshold, in frames, that triggers a frame-period error event. The range is 0 to 1000000.</p> <p>high threshold (Optional) High threshold, in frames, that triggers a frame-period error event. The range is 0 to 1000000. The high threshold value can be configured only in conjunction with the low threshold value.</p>				
Command Default	The default low threshold is 1 ppm.				
Command Modes	Ethernet OAM link monitor configuration (config-eoam-lm) Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.1.32</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.1.32	This command was introduced.
Release	Modification				
Release 6.1.32	This command was introduced.				
Usage Guidelines	<p>The frame period window is defined in the IEEE specification as a number of received frames, in our implementation it is x milliseconds.</p> <p>To obtain the number of frames, the configured time interval is converted to a window size in frames using the interface speed. For example, for a 1Gbps interface, the IEEE defines minimum frame size as 512 bits. So, we get a maximum of approximately 1.5 million frames per second. If the window size is configured to be 8 seconds (8000ms) then this would give us a Window of 12 million frames in the specification's definition of Errored Frame Window.</p> <p>The thresholds for frame-period are measured in errors per million frames. Hence, if you configure a window of 8000ms (that is a window of 12 million frames) and a high threshold of 100, then the threshold would be crossed if there are 1200 errored frames in that period (that is, 100 per million for 12 million).</p> <p>When the low threshold is passed, a frame-period error event notification is generated and transmitted to the OAM peer. Additionally, any registered higher level OAM protocols, such as Connectivity Fault Management (CFM), are also notified. When the high threshold is passed, the configured high threshold action is performed in addition to the low threshold actions.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

The following example shows how to configure the low and high thresholds that trigger a frame-period error event.

```
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1  
RP/0/RP0/CPU0:router(config-eoam)# link-monitor  
RP/0/RP0/CPU0:router(config-eoam-lm)# frame-period threshold ppm low 100 high 600000
```

frame-period window

To configure the window size for an Ethernet OAM frame-period error event, use the **frame-period window** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the window size to the default value, use the **no** form of this command.

frame-period window milliseconds *window* | **frames** *window*[**thousand** | **million** | **billion**]

Syntax Description

window Size of the window for a frame-period error in milliseconds. The range is 100 to 60000.

Command Default

The default value is 1000 milliseconds.

Command Modes

Ethernet OAM link monitor configuration (config-eoam-lm)

Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)

Command History

Release

Release 6.1.32

Modification

This command was introduced.

Usage Guidelines

The IEEE 802.3 standard defines the window size as number of frames rather than a time duration. These two formats can be converted either way by using a knowledge of the interface speed. Note that the conversion assumes that all frames are of the minimum size.

Task ID

Task ID

Operations

ethernet-services read,
write

Examples

The following example shows how to configure the window size for a frame-period error.

```
RP/0/RP0/CPU0:router (config) # ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam) # link-monitor
RP/0/RP0/CPU0:router (config-eoam-lm) # frame-period window milliseconds 60000
```

frame-seconds threshold

To configure the thresholds that trigger a frame-seconds error event, use the **frame-seconds threshold** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the threshold to the default value, use the **no** form of this command.

frame-seconds threshold low *threshold* [**high** *threshold*]

Syntax Description	<p>low <i>threshold</i> Low threshold, in seconds, that triggers a frame-seconds error event. The range is 0 to 900.</p> <p>high <i>threshold</i> (Optional) High threshold, in seconds, that triggers a frame-seconds error event. The range is 1 to 900. The high threshold value can be configured only in conjunction with the low threshold value.</p>						
Command Default	The default value is 1.						
Command Modes	Ethernet OAM link monitor configuration (config-eoam-lm) Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.		
Release	Modification						
Release 3.9.0	This command was introduced.						
Usage Guidelines	When the low threshold is passed, a frame-seconds error event notification is generated and transmitted to the OAM peer. Additionally, any registered higher level OAM protocols, such as Connectivity Fault Management (CFM), are also notified. When the high threshold is passed, the configured high threshold action is performed in addition to the low threshold actions. The high threshold is optional and is configurable only in conjunction with the low threshold.						
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write		
Task ID	Operations						
ethernet-services	read, write						
Examples	<p>The following example shows how to configure the low and high thresholds that trigger a frame-seconds error event:</p> <pre>RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1 RP/0/RP0/CPU0:router(config-eoam)# link-monitor (config-eoam)# link-monitor RP/0/RP0/CPU0:router(config-eoam-lm)# frame-seconds threshold low 10 high 900</pre>						
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ethernet oam profile, on page 71</td> <td>Creates an EOAM profile and enters EOAM configuration mode.</td> </tr> <tr> <td>link-monitor, on page 108</td> <td>Enters Ethernet OAM link monitor configuration mode.</td> </tr> </tbody> </table>	Command	Description	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.	link-monitor, on page 108	Enters Ethernet OAM link monitor configuration mode.
Command	Description						
ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.						
link-monitor, on page 108	Enters Ethernet OAM link monitor configuration mode.						

frame-seconds window

To configure the window size for the OAM frame-seconds error event, use the **frame-seconds window** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the window size to the default value, use the **no** form of this command.

frame-seconds window *window*

Syntax Description

window Size of the window for a frame-seconds error in milliseconds. The range is 10000 to 900000.

Note The only accepted values are multiples of the line card-specific polling interval, that is, 1000 milliseconds for most line cards.

Command Default

The default value is 60000.

Command Modes

Ethernet OAM link monitor configuration (config-eoam-lm)

Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure the window size for a frame-seconds error.

```
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# link-monitor
RP/0/RP0/CPU0:router(config-eoam-lm)#
```

Related Commands

Command	Description
ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
link-monitor, on page 108	Enters Ethernet OAM link monitor configuration mode.

frame threshold

To configure the thresholds that triggers an Ethernet OAM frame error event, use the **frame threshold** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the threshold to the default value, use the **no** form of this command.

frame threshold low *threshold* [**high** *threshold*]

Syntax Description

low threshold	Low threshold, in symbols, that triggers a frame error event. The range is 0 to 12000000.
high threshold	(Optional) High threshold, in symbols, that triggers a frame error event. The range is 0 range is 0 to 12000000. The high threshold value can be configured only in conjunction with the low threshold value. (Optional, at least one of high and low must be specified) High threshold, in symbols, that causes a frame error event to trigger an action. The range is 1 to 12000000.

Command Default

The default low threshold is 1.

Command Modes

Ethernet OAM link monitor configuration (config-eoam-lm)
Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

When the low threshold is passed, a frame error event notification is generated and transmitted to the OAM peer. Additionally, any registered higher level OAM protocols, such as Connectivity Fault Management (CFM), are also notified. When the high threshold is passed, the configured high threshold action is performed in addition to the low threshold actions. The high threshold is optional and is configurable only in conjunction with the low threshold.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure the low and high thresholds that trigger a frame error event:

```
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# link-monitor
RP/0/RP0/CPU0:router(config-eoam-lm)# frame threshold low 100 high 60000
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	link-monitor, on page 108	Enters Ethernet OAM link monitor configuration mode.

frame window

To configure the frame window size of an OAM frame error event, use the **frame window** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the window size to the default value, use the **no** form of this command.

frame window *window*

Syntax Description	<i>window</i> Size of the window for a frame error in milliseconds. The range is 1000 to 60000.
---------------------------	---

Command Default	The default value is 1000.
------------------------	----------------------------

Command Modes	Ethernet OAM link monitor configuration (config-eoam-lm) Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)
----------------------	---

Command History	Release Modification
	Release 3.9.0 This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--

Task ID	Task ID Operations
	ethernet-services read, write

Examples The following example shows how to configure the window size for a frame error.

```
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# link-monitor
RP/0/RP0/CPU0:router(config-eoam-lm)# frame window 60
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	link-monitor, on page 108	Enters Ethernet OAM link monitor configuration mode.

link-monitor

To enter Ethernet OAM link monitor configuration mode, use the **link-monitor** command in Ethernet OAM configuration mode. To enter interface Ethernet OAM link monitor configuration mode, use the **link-monitor** command in interface Ethernet OAM configuration mode.

link-monitor

Syntax Description	This command has no keywords or arguments.				
Command Default	No default behavior or values				
Command Modes	Ethernet OAM configuration (config-eoam) Interface Ethernet OAM configuration (config-if-eoam)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

This example shows how to enter the Ethernet OAM link monitor configuration mode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam)# link-monitor
RP/0/RP0/CPU0:router (config-eoam-lm)#
```

The following example shows how to enter the link monitor configuration mode from interface Ethernet OAM configuration mode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# interface gigabitethernet 0/1/5/6
RP/0/RP0/CPU0:router (config-if)# ethernet oam
RP/0/RP0/CPU0:router (config-if-eoam)# link-monitor
```

log ais

To configure AIS logging for a Connectivity Fault Management (CFM) domain service to indicate when AIS or LCK packets are received, use the **log ais** command in CFM domain service configuration mode. To disable AIS logging, use the no form of this command.

log ais

Command Default	Logging is disabled.				
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.1	This command was introduced.
Release	Modification				
Release 3.9.1	This command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

The following example shows how to configure AIS logging for a Connectivity Fault Management (CFM) domain service to indicate when AIS or LCK packets are received:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# log ais
```

Related Commands	Command	Description
	ais transmission, on page 26	Configures AIS transmission for a CFM domain service.
	ais transmission up, on page 28	Configures AIS transmission on a CFM interface.
	show ethernet cfm interfaces ais, on page 153	Displays the information about interfaces that are currently transmitting AIS.
	show ethernet cfm local meps, on page 159	Displays information about local MEPS.

log continuity-check errors

To enable logging of continuity-check errors, use the **log continuity-check errors** command in CFM domain service configuration mode. To disable logging of continuity-check errors, use the no form of this command.

log continuity-check errors

Syntax Description	This command has no keywords or arguments.
Command Default	Logging is disabled.
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines The following types of continuity-check errors are logged:

- Incorrect level (cross-connect)
- Incorrect interval
- Incorrect MA-ID (cross-connect)
- Local MAC address received (loop)
- Local MEP-ID received (mis-config)
- Invalid source MAC received
- RDI received

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# log continuity-check errors
```

log continuity-check mep changes

To enable logging of peer maintenance-end-point (MEP) state changes, use the **log continuity-check mep changes** command in CFM domain service configuration mode. To disable logging of peer MEP state changes, use the no form of this command.

log continuity-check mep changes

Syntax Description	This command has no keywords or arguments.				
Command Default	Logging is disabled				
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				

Usage Guidelines This command enables logging of state changes that occur in MEPs for a particular service, such as:

- New peer MEP detected.
- Peer MEP time out (loss of continuity) detected.



Note If a Local MEP is receiving Wrong Level CCMs, then a transient timeout might occur when correct Level CCMs are received again.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# log continuity-check mep changes
```

log crosscheck errors

To enable logging of crosscheck error events, use the **log crosscheck errors** command in CFM domain service configuration mode. To disable logging of crosscheck error events, use the no form of this command.

log crosscheck errors

Syntax Description	This command has no keywords or arguments.
Command Default	Logging is disabled.
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines This command enables logging of crosscheck errors, such as:

- MEPs missing
- Additional peer MEPs detected



Note Crosscheck errors are only detected and logged when crosscheck is configured using the **mep crosscheck** and **mep-id** commands.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# log crosscheck errors
```

Related Commands	Command	Description
	mep crosscheck, on page 116	Enters CFM MEP crosscheck configuration mode.
	mep-id, on page 117	Enables crosscheck on a MEP.

log efd

To enable logging of Ethernet Fault Detection (EFD) state changes to an interface (such as when an interface is shut down or brought up via EFD), use the **log efd** command in CFM domain service configuration mode. To disable EFD logging, use the no form of this command.

log efd

Syntax Description

This command has no keywords or arguments.

Command Default

EFD logging is disabled.

Command Modes

CFM domain service configuration (config-cfm-dmn-svc)

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

When EFD logging is enabled, a syslog is generated whenever the EFD state of an interface changes.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to enable EFD logging:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain D1 level 1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service S1 down-meps
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# log efd
```

Related Commands

Command	Description
efd, on page 61	Enables EFD on all down MEPs in a down MEPs service.
show efd interface, on page 148	Displays all interfaces that are shut down because of EFD.

maximum-meps

To configure the maximum number of maintenance end points (MEPs) for a service, use the **maximum-meps** command in CFM domain service configuration mode. To return to the default value, use the no form of this command.

maximum-meps *number*

Syntax Description

number Maximum number of MEPs allowed for this service. The range is 2 to 8190.

Command Default

The default is 100.

Command Modes

CFM domain service configuration (config-cfm-dmn-svc)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

This command configures the maximum number of peer maintenance end points (MEPs). It does not limit the number of local MEPs. The configured **maximum-meps** *number* must be at least as great as the number of configured crosscheck MEPs.

The **maximum-meps** *number* limits the number of peer MEPs, for which local MEPs store continuity-check messages (CCMs). When the limit is reached, CCMs from any new peer MEPs are ignored, but CCMs from existing peer MEPs continue to be processed normally.

The **maximum-meps** *number* also limits the size of the CCM learning database.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# maximum-meps 4000
```

Related Commands

Command	Description
domain , on page 59	
ethernet cfm (global) , on page 65	Enters CFM configuration mode.
ethernet cfm (interface) , on page 66	Enters interface CFM configuration mode.
service , on page 143	

Command	Description
show ethernet cfm configuration-errors, on page 151	Displays information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred.
show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.
show ethernet cfm local meps, on page 159	Displays information about local MEPs.
show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.

mep crosscheck

To enter CFM MEP crosscheck configuration mode, use the **mep crosscheck** command in CFM domain service configuration mode.

mep crosscheck

Syntax Description	This command has no keywords or arguments.				
Command Default	Not configured, in which case no crosscheck is performed on the MEP.				
Command Modes	CFM domain service configuration (config-cfm-dmn-svc)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# mep crosscheck
RP/0/RP0/CPU0:router(config-cfm-xcheck)#
```

mep-id

To enable crosscheck on a maintenance end point (MEP), use the **mep-id** command in CFM MEP crosscheck configuration mode. To disable crosscheck on a MEP, use the **no** form of this command.

mep-id *mep-id-number* [**mac-address** *mac-address*]

Syntax Description	mac <i>mac-address</i>	(Optional) MAC address of the interface upon which the MEP resides, in standard hexadecimal format, hh:hh:hh:hh:hh:hh.
Command Default	Not configured, in which case no crosscheck is performed on the MEP.	
Command Modes	CFM MEP crosscheck configuration (config-cfm-xcheck)	
Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines This command enables Crosscheck on the maintenance end point (MEP) specified by the MEP ID number (*mep-id-number*). The range for MEP ID numbers is 1 to 8191. Crosscheck is enabled when the first crosscheck MEP is entered.

Repeat this command for every MEP that you want to include in the expected set of MEPs for crosscheck.

Crosscheck detects the following two additional defects for continuity-check messages (CCMs) on peer MEPs:

- Peer MEP missing—A crosscheck MEP is configured, but has no corresponding peer MEP from which to receive CCMs.
- Peer MEP unexpected—A peer MEP is sending CCMs, but no crosscheck MEP is configured for it.



Note If more than one local MEP is configured for a service, all the local MEPs must be included in the list of configured crosscheck MEPs.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)# mep crosscheck
RP/0/RP0/CPU0:router(config-cfm-xcheck)# mep-id 10
```

mep domain

To create a maintenance end point (MEP) on an interface, use the **mep domain** command in interface CFM configuration mode. To remove the MEP from the interface, use the **no** form of this command.

mep domain *domain-name* **service** *service-name* **mep-id** *id-number*

Syntax Description

domain *domain-name* Domain in which to create the maintenance end point (MEP).

service *service-name* Operation service in which to create the maintenance end point (MEP).

mep-id *id-number* Maintenance end points (MEP) identifier to assign to this MEP. The range is 1 to 8191.

Command Default

No MEPs are configured on the interface.

Command Modes

Interface CFM configuration (config-if-cfm)

Command History

Release	Modification
Release 3.9.1	This command was introduced. This command replaces the ethernet cfm mep command.

Usage Guidelines

CFM Maintenance end points (MEPs) are supported on all Ethernet interfaces and VLAN subinterfaces.

This command creates MEPs in the UP MEP state, unless the specified **service** is configured with MEPs in the DOWN MEP state. See the [service, on page 143](#) command.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to create a MEP using an ID of 1 on the CFM domain named DM1 and service named Sv1:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/1
RP/0/RP0/CPU0:router(config-if)# ethernet cfm
RP/0/RP0/CPU0:router(config-if-cfm)# mep domain Dm1 service Sv1 mep-id 1
```

Related Commands

Command	Description
ethernet cfm (interface), on page 66	Enters interface CFM configuration mode.
show ethernet cfm configuration-errors, on page 151	Displays information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred.

mib-retrieval

mib-retrieval [**disable**]

Syntax Description **disable** Disables MIB retrieval on the Ethernet OAM interface.

Command Default MIB retrieval is disabled by default.

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines When MIB retrieval is enabled on an Ethernet OAM interface, the OAM client advertises support for MIB retrieval to the peer.

When MIB retrieval is disabled (the default), only the enable form of the **mib-retrieval** command is available in interface Ethernet OAM configuration mode. The **disable** keyword is provided to override the profile when needed.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples The following example shows how to enable MIB retrieval on a Gigabit Ethernet interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/5/6
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# mib-retrieval
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.
	show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
	show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

mip auto-create

To enable the automatic creation of Maintenance Intermediate Points (MIPs) in a cross-connect, use the **mip auto-create** command in CFM domain service configuration mode. To disable automatic creation of MIPs, use the **no** form of this command.

mip auto-create all | lower-mep-only ccm-learning

Syntax Description	all	Enables automatic creation of MIPs on all interfaces.
	lower-mep-only	[Optional] Enables automatic creation of MIPs only on interfaces with a MEP at a lower level.
	ccm-learning	[Optional] Enables CCM learning for MIPs created in this service. This must be used only in services with a relatively long CCM interval of at least 100 ms. CCM learning at MIPs is disabled by default.

Command Default None

Command Modes CFM domain service configuration (config-cfm-dmn-svc) mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.
	Release 4.3.1	The ccm-learning keyword was introduced.

Usage Guidelines The MIP auto-creation feature is configured only for services associated with cross-connects.

Unlike MEPs, MIPs are not explicitly configured on each interface. MIPs are created automatically according to the algorithm specified in the CFM 802.1ag standard. For each interface, the algorithm, in brief, operates in this manner:

- The cross-connect for the interface is found, and all services associated with that cross-connect are considered for MIP auto-creation.
- The level of the highest-level MEP on the interface is found. From among the services considered above, the service in the domain with the lowest level that is higher than the highest MEP level is selected. If there are no MEPs on the interface, the service in the domain with the lowest level is selected.
- The MIP auto-creation configuration for the selected service is examined to determine whether a MIP should be created.



Note Configuring a MIP auto-creation policy for a service does not guarantee that a MIP will automatically be created for that service. The policy is only considered if that service is first selected by the algorithm.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

Related Commands	Command	Description
	domain, on page 59	
	ethernet cfm (global), on page 65	Enters CFM configuration mode.
	service, on page 143	
	show ethernet cfm configuration-errors, on page 151	Displays information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred.
	show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.
	show ethernet cfm local meps, on page 159	Displays information about local MEPs.
	show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.

mode (Ethernet OAM)

To configure the Ethernet OAM mode on an interface, use the **mode** command in Ethernet OAM or interface Ethernet OAM configuration mode. To return to the default, use the **no** form of the command.

mode active | passive

Syntax Description	<p>passive Specifies that the interface operates in passive mode, where it cannot initiate the discovery process, generate a retrieval PDU, or request loopback.</p> <p>active (Interface Ethernet OAM configuration only) Specifies that the interface operates in active mode to initiate processes and make requests.</p>
---------------------------	--

Command Default	The default is active.
------------------------	------------------------

Command Modes	Ethernet OAM configuration (config-eoam) Interface Ethernet OAM configuration (config-if-eoam)
----------------------	---

Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				

Usage Guidelines	If a profile exists on the interface, setting the mode with this command overrides the mode setting in the profile on an interface.
-------------------------	---

Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

The following example shows how to enable Ethernet OAM passive mode on a Gigabit Ethernet interface:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/5/6
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# profile Profile_1
RP/0/RP0/CPU0:router(config-if-eoam)# mode passive
```

Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>ethernet oam profile, on page 71</td> <td>Creates an EOAM profile and enters EOAM configuration mode.</td> </tr> <tr> <td>ethernet oam, on page 68</td> <td>Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.</td> </tr> <tr> <td>profile (EOAM), on page 132</td> <td>Attaches an Ethernet OAM profile to an interface.</td> </tr> </tbody> </table>	Command	Description	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.	profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.
Command	Description								
ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.								
ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.								
profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.								

Command	Description
show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

monitoring

To enable Ethernet OAM link monitoring, use the **monitoring** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return link monitoring to its default state of enabled, use the **no** form of this command.

monitoring [**disable**]

Syntax Description

disable (Optional) Disables Ethernet OAM link monitoring.

Note When configuring on a profile, only the **monitoring disable** form of the command is supported.

Command Default

Link monitoring is enabled by default.

Command Modes

Ethernet OAM link monitor configuration (config-eoam-lm)

Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)

Command History

Release

Release 6.1.32

Modification

This command was introduced.

Usage Guidelines

Monitoring is enabled by default. To disable it either on a profile or an interface, use the **monitoring disable** form of the command.

If monitoring is disabled on a profile, but you want to override the configuration and enable it for an interface, use the **monitoring** command in interface Ethernet OAM link monitor configuration mode.

You cannot configure the **monitoring** command without the **disable** keyword on a profile.

Task ID

Task ID

Operations

ethernet-services read,
write

Examples

The following example shows how to disable link-monitoring on an Ethernet OAM interface:

```
RP/0/RP0/CPU0:router (config) # ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam) # link-monitor
RP/0/RP0/CPU0:router (config-eoam-lm) # monitoring disable
```

packet size

To configure the minimum size (in bytes) for outgoing probe packets, including padding when necessary, use the **packet size** command in SLA profile probe configuration mode. To remove this configuration, use the no form of this command.

packet size *bytes* [**test pattern hex 0x** *HHHHHHHH* | **pseudo-random**]

Syntax Description

<i>bytes</i>	(Optional) Minimum size of the packet including padding when necessary. The range is 1 to 9000 bytes. This value refers to the total frame size including the Layer 2 or Layer 3 packet header. Optional TLVs, such as the End TLV, are only included when the requested packet size allows.
test pattern hex 0x <i>HHHHHHHH</i>	(Optional) Specifies a 4-byte string (8 hexadecimal characters) to repeat as many times as required to fill the outgoing probe packet to the specified minimum packet size. The default is all 0s.
test pattern pseudo-random	(Optional) Specifies a pseudo-random bit sequence determined by the protocol to fill the outgoing probe packet to the specified minimum packet size.

Command Default

The minimum packet size is not configured. When a minimum packet size is configured and padding is required, the default padding is all 0s.

Command Modes

SLA profile probe configuration (config-sla-prof-pb)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

For supported packet types, this configuration determines the minimum size of all outgoing SLA probe packets, including the size to which they are padded. The amount of padding that is added to a packet depends on the type of frame that is sent and the amount of data in the frame.

When the packet size is not configured, packets are sent at the minimum size required to fit all the required information. Even when the packet size is configured, the packets may be larger than the configured size if the required information exceeds the configured value.



Note If a probe packet is too large, it may get dropped somewhere in the network.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to configure the minimum size of outgoing probe packets using default padding of all 0s as needed:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# probe
RP/0/RP0/CPU0:router(config-sla-prof-pb)# packet size 9000
RP/0/RP0/CPU0:router(config-sla-prof-pb)# commit
```

The following example shows how to configure a hexadecimal test pattern to pad packets with to reach the minimum packet size:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# probe
RP/0/RP0/CPU0:router(config-sla-prof-pb)# packet size 9000 test pattern hex 0xabcdabcd
RP/0/RP0/CPU0:router(config-sla-prof-pb)# commit
```

ping ethernet cfm

To send Ethernet connectivity fault management (CFM) loopback messages to a maintenance end point (MEP) or MAC address destination from the specified source MEP, and display a summary of the responses, use the **ping ethernet cfm** command in EXEC mode.

```
ping ethernet cfm domain domain-name service service-name mac-address mac [mep-id id source
[mep-id source-id] interface interface-path-id [cos cos-val] [count n] [frame-size size] [data-pattern
hex] [interval seconds] [timeout time]
```

Syntax Description

domain <i>domain-name</i>	String of a maximum of 80 characters that identifies the domain in which the maintenance points reside. Note For more information about the syntax, use the question mark (?) online help function.
service <i>service-name</i>	String of a maximum of 80 characters that identifies the maintenance association to which the maintenance points belong.
mac-address <i>mac</i>	6-byte ID number of the MAC address of the destination MEP.
mep-id <i>id</i>	Maintenance end point (MEP) ID number of the destination MEP. The range for MEP ID numbers is 1 to 8191.
source	Source information.
mep-id <i>source-id</i>	(Optional) Maintenance end point (MEP) ID number of the source MEP. The range for MEP ID numbers is 1 to 8191.
interface <i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
cos <i>cos-val</i>	(Optional) Class of Service (CoS) value that identifies the class of traffic of the source MEP. The valid values are from 0 to 7.
count <i>n</i>	(Optional) Number of pings as an integer value. The default is 5.
frame-size <i>size</i>	(Optional) Size, as an integer, of the ping frames. Frames are padded to read the specified size. The default is 0 (no padding).
data-pattern <i>hex</i>	(Optional) Hexadecimal value to be used as the data pattern for padding within a ping frame, when padding is required due to the frame-size configuration. The default is 0.
interval <i>seconds</i>	(Optional) Specifies, in seconds, the time between pings. The <i>n</i> argument is entered in seconds. The default is 1 second.

timeout *time* (Optional) Timeout, in seconds, for the ping packet. The default is 2.

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

Usage Guidelines Before you can use this command, a local MEP must be configured for the domain and the interface.

The command displays the following information:

- Number of loopback message being sent
- Timeout period
- Domain name
- Domain level
- Service name
- Source MEP ID
- Interface
- Target MAC address
- MEP ID – If no MEP ID is specified, “No MEP ID specified” is displayed.
- Running time for the current ping operation to complete



Note The remaining information is not displayed until the current ping operation is complete. If the user interrupts the operation during this time (by pressing control-C), the prompt is returned and no further information is displayed. However, all loopback messages continue to be sent.

- Success rate of responses received – displayed as a percentage followed by the actual number of responses
- The round trip time minimum/maximum/average in milliseconds
- Out-of-sequence responses – displayed as a percentage followed by the actual number of out-of-sequence responses when at least one response is received. An out-of-sequence response occurs if the first response does not correspond with the first message sent, or a subsequent response is not the expected next response after a previously received response.
- Bad data responses – displayed as a percentage followed by the actual number of bad data responses when at least one response is received. A bad data response occurs if the padding data in the response does not match the padding data that in the sent message. This can only happen if the sent message is padded using the **frame-size** option.
- Received packet rate – displayed in packets per second when at least two responses are received. This approximate rate of response is the time between the first response received and the last response received, divided by the total number of responses received.

Task ID	Task ID	Operations
	basic-services	execute

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to send an Ethernet CFM loopback message:

```
RP/0/RP0/CPU0:router# ping ethernet cfm domain D1 service S1 mep-id 16 source
interface GigabitEthernet 0/0/0/0
```

```
Type escape sequence to abort.
Sending 5 CFM Loopbacks, timeout is 2 seconds -
Domain foo (level 2), Service foo
Source: MEP ID 1, interface GigabitEthernet0/0/0/0
Target: 0001.0002.0003 (MEP ID 16):
  Running (5s) ...
Success rate is 60.0 percent (3/5), round-trip min/avg/max = 1251/1349/1402 ms
Out-of-sequence: 0.0 percent (0/3)
Bad data: 0.0 percent (0/3)
Received packet rate: 1.4 pps
```

priority (SLA)

To configure the priority of outgoing SLA probe packets, use the **priority** command in SLA profile probe configuration mode. To return the priority to the default value, use the no form of this command.

priority *priority*

Syntax Description	<i>priority</i> Priority level. The range is 0 to 7.				
Command Default	When the priority is not configured by SLA, the default is the Class of Service (CoS) priority for the egress interface.				
Command Modes	SLA profile probe configuration (config-sla-prof-pb)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				
Usage Guidelines	The default priority for all CFM operation types is the Class of Service (CoS) priority for the egress interface. SLA operations that are configured on Maintenance End Points (MEPs) do not use the Class of Service (CoS) settings that are configured independently on Maintenance End Points (MEPs). Use this command to change the priority level of SLA probe packets.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				
Examples	<p>The following example shows how to configure the priority of outgoing SLA probe packets.</p> <pre>RP/0/RP0/CPU0:router# configure RP/0/RP0/CPU0:router(config)# ethernet sla RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback RP/0/RP0/CPU0:router(config-sla-prof)# probe RP/0/RP0/CPU0:router(config-sla-prof-pb)# priority 7</pre>				

probe

To enter SLA profile probe configuration mode, use the **probe** command in SLA profile configuration mode. To exit to the previous mode, use the no form of this command.

probe

Syntax Description	This command has no keywords or arguments.				
Command Default	If no items are configured in the probe mode, all items in the probe mode use their default values.				
Command Modes	SLA profile configuration (config-sla-prof)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				
Usage Guidelines	Each profile may optionally have 1 probe submode.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

The following example shows how to enter the SLA profile probe configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# probe
RP/0/RP0/CPU0:router(config-sla-prof-pb)#
```

profile (EOAM)

To attach an Ethernet OAM profile to an interface, use the **profile** command in interface Ethernet OAM configuration mode. To remove the profile from the interface, use the no form of this command.

profile *name*

Syntax Description	<i>name</i> Text name of the Ethernet OAM profile to attach to the interface.
---------------------------	---

Command Default	No profile is attached.
------------------------	-------------------------

Command Modes	Interface Ethernet OAM configuration (config-if-eoam)
----------------------	---

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines	When an Ethernet OAM profile is attached to an interface using this command, all of the parameters configured for the profile are applied to the interface.
-------------------------	---

Individual parameters that are set by the profile configuration can be overridden by configuring them directly on the interface.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to attach an Ethernet OAM profile to a Gigabit Ethernet interface.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/5/6
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# profile Profile_1
```

Related Commands	Command	Description
	ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
	ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
	show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
	show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

profile (SLA)

To create an SLA operation profile and enter the SLA profile configuration mode, use the **profile** command in SLA configuration mode. To remove the profile, use the **no** form of this command.

profile *profile-name* **type** **cfm-delay-measurement** | **cfm-delay-measurement-v0** | **cfm-loopback** | **cfm-synthetic-loss-measurement**

Syntax Description

profile-name Profile name, case-sensitive string up to 31 characters in length. The name “all” cannot be used.

type Specifies the type of packets sent by operations in this profile. Valid types are:

- **cfm-delay-measurement**: CFM delay measurement packets
- **cfm-delay-measurement-v0**: CFM delay measurement version 0 packets
- **cfm-loopback**: CFM loopback packets
- **cfm-synthetic-loss-measurement**: CFM synthetic loss measurement packets

Command Default

No default behavior or values

Command Modes

Ethernet SLA configuration (config-sla)

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.3.0	The cfm-delay-measurement-v0 and cfm-synthetic-loss-measurement keyword was introduced.

Usage Guidelines



Note Each profile is uniquely identified by its name. Changing the packet **type** for the profile removes all stored data from the profile and is equivalent to deleting the profile and creating a new profile.



Note You can configure the Ethernet SLA profile to use Y.1731 DMM frames. The restriction of 150 configured Ethernet SLA operations for each CFM MEP is removed not only for profiles using DMM frames, but also for profiles using the other supported Y.1731 frame types, such as loopback measurement and synthetic loss measurement. For interoperability purposes, it is still possible to configure profiles to use DMM v0 frames. This is done by specifying a type of **cfm-delay-measurement-v0** on the **profile(SLA)** command. The limit of 150 configured operations for each CFM MEP still applies in this case.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

This example shows how to configure an SLA operation profile and enter the SLA profile configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)#
```

require-remote

To require that certain features are enabled before an OAM session can become active, or to disable a requirement that is part of an active OAM profile, use the **require-remote** command in Ethernet OAM configuration or interface Ethernet OAM configuration mode. To remove the configuration and return to the default, use the **no** form of this command.

require-remote mode active | passive | mib-retrieval | remote-loopback | link-monitoring [disabled]

Syntax Description	
mode { active passive }	Requires that active or passive mode is configured on the peer device before the OAM profile can become active.
mib-retrieval	Requires that MIB-retrieval is configured on the peer device before the OAM profile can become active.
remote-loopback	Requires that remote-loopback is configured on the peer device before the OAM profile can become active.
link-monitoring	Requires that link-monitoring feature is configured on the peer device before the OAM profile can become active.
disabled	(Optional—Interface Ethernet OAM configuration only) Overrides the Ethernet OAM profile configuration for this option and disables the feature at the specified interface.

Command Default No default behaviour or values

Command Modes Ethernet OAM configuration (config-eoam)
Interface Ethernet OAM configuration (config-if-eoam)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines The **disabled** keyword is available only when you are configuring Ethernet OAM on an interface, and is used to override the configuration that is part of an active OAM profile.

The **disabled** keyword does not remove the configuration of the command. Use the **no** form of this command to do that.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to require that specific features are enabled before an OAM session can become active

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet oam profile Profile_1
RP/0/RP0/CPU0:router(config-eoam)# require-remote mode active
RP/0/RP0/CPU0:router(config-eoam)# require-remote mib-retrieval
RP/0/RP0/CPU0:router(config-eoam)# require-remote link-monitoring
```

The following example shows how to disable requirements on a particular interface that is part of an active OAM profile:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/6/5/0
RP/0/RP0/CPU0:router(config-if)# ethernet oam
RP/0/RP0/CPU0:router(config-if-eoam)# require-remote mode active disabled
RP/0/RP0/CPU0:router(config-if-eoam)# require-remote mib-retrieval disabled
RP/0/RP0/CPU0:router(config-if-eoam)# require-remote link-monitoring disabled
```

Related Commands

Command	Description
ethernet oam profile, on page 71	Creates an EOAM profile and enters EOAM configuration mode.
ethernet oam, on page 68	Enables Ethernet Link OAM, with default values, on an interface and enter interface Ethernet OAM configuration mode.
profile (EOAM), on page 132	Attaches an Ethernet OAM profile to an interface.
action capabilities-conflict, on page 4	Configures what action is taken on an interface when a capabilities-conflict event occurs.
show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
show ethernet oam discovery, on page 182	Displays the current status of Ethernet OAM sessions.
show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

schedule (SLA)

To schedule an operation probe in a profile, use the **schedule** command in SLA profile configuration mode. To disable a schedule, use the **no** form of this command.

Hourly Scheduling

schedule every *number* **hours** | **minutes** [**first at** **hh:mm** [:**ss**]] [**for** **duration** **seconds** | **minutes** | **hours**]

Daily Scheduling

schedule every day [**at** **hh:mm**] [**for** **duration** **seconds** | **minutes** | **hours** | **days**]

Weekly Scheduling

schedule every week on day [**at** **hh:mm**] [**for** **duration** **seconds** | **minutes** | **hours** | **days** | **week**]

Syntax Description		
every week on <i>day</i> [at <i>hh:mm</i>][f or <i>duration</i> { seconds minutes hours days week }	Schedules a probe one day per week, on the specified <i>day</i> , at the specified time (<i>hh:mm</i>), for the specified <i>duration</i> .	
every day [at <i>hh:mm</i>][f or <i>duration</i> { seconds minutes hours days }	Schedules a probe every day, at the specified time (<i>hh:mm</i>), for the specified <i>duration</i> .	
every <i>number</i> { hours minutes } first at <i>hh:mm</i> [<i>.ss</i>]	Schedules a probe every specified <i>number</i> of hours or minutes , starting at the specified time after midnight (<i>hh:mm</i> [<i>.ss</i>]).	
every <i>number</i> { hours minutes } [f or <i>duration</i> { seconds minutes hours }]	Schedules a probe every specified <i>number</i> of hours or minutes , for the specified <i>duration</i> .	
<i>day</i>	Day of the week. Valid values are:	<ul style="list-style-type: none"> • Monday • Tuesday • Wednesday • Thursday • Friday • Saturday • Sunday

<i>hh:mm hh:mm[:s s]</i>	Time of day in 24 hour time: <ul style="list-style-type: none"> • <i>hh:mm</i> = hour:minutesexample: 22:30 • <i>hh:mm:ss</i> = hour:minutes:seconds example: 12:30:10(seconds are optional)
<i>duration</i>	Duration of probe. The ranges are : <ul style="list-style-type: none"> • 1 to 3600 seconds • 1 to 1440 minutes • 1 to 24 hours • 1 day • 1 week
<i>number</i>	Number of hours or minutes . <ul style="list-style-type: none"> • Valid values for hours are the factors of 24: 1, 2, 3, 4, 6, 8, 12 • Valid values for minutes are the factors of 1440 (up to 90): 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 30, 32, 36, 40, 45, 48, 60, 80, 90

Command Default

The default is every hour. If the **at** keyword is not specified, the start time of each operation is distributed uniformly within the duration of the probe. If the **for** keyword is not specified, only one single burst is sent.

Command Modes

SLA profile configuration (config-sla-prof)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

Schedules are optional, but a profile may contain only one schedule.

**Note**

Any change to a schedule causes all stored data for that operation to be deleted.

Changing a schedule is equivalent to deleting an operation and creating a new operation.

The **for duration** option must be specified if (and only if) the probe is configured to send multiple packets (or bursts of packets), using the **send packet every** or **send burst every** configuration of the **send (SLA)** command. If the **send (SLA)** command is not configured for the probe, or if **send burst once** is configured, the **for duration** option must not be used. If it is used in those cases, an error is returned.

The **for duration** option must not exceed the **schedule every {week | day | number}** option.

When the “**first at hh:hh[:ss]**” option is used, the configured time is used to calculate an offset after midnight when the first probe should be sent each day. The offset is calculated by taking the configured time plus the interval. Thus, probes may be sent before the configured time.

For example, if you configure “**schedule every 6 hours first at 11:15**,” then the offset after midnight will be 5:15 (11:15 plus 6:00) and probes will be sent each day at 05:15, 11:15, 17:15 and 23:15.



Note The schedule start time starts after the configuration is committed and not at the time when the operation is configured.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following examples show how to schedule operation probes in a profile:

Example 1: Weekly Scheduling on a Specified Day at a Specified Time and Duration

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# schedule every week on Monday at 23:30 for 1 hour
```

Example 2: Daily Scheduling at a Specified Time and Duration

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# schedule every day at 11:30 for 5 minutes
```

Example 3: Hourly Scheduling Beginning at a Specified Time

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# schedule every 2 hours first at 13:45:01
```

Example 4: Hourly Scheduling for a Specified Duration

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# schedule every 6 hours for 2 hours
```

Related Commands	Command	Description
	send (SLA), on page 140	Configures the number and timing of packets sent by a probe in an operations profile.

send (SLA)

To configure the number and timing of packets sent by a probe in an operations profile, use the **send** command in SLA profile probe configuration mode. To return to the default, use the **no** form of the command.

```
send burst every number seconds | minutes | hours | once packet count packets interval number
seconds | milliseconds
send packet every number milliseconds | seconds | minutes | hours | once
```

Syntax Description	
burst every <i>number</i> {seconds minutes hours}	Sends a burst of packets every specified number of seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1–3600 seconds • 1–1440 minutes • 1–168 hours
burst once	Sends a single burst one time.
packet count <i>packets</i>	Specifies the number of <i>packets</i> in each burst. The range is 2 to 600.
interval <i>number</i> {seconds milliseconds}	Specifies the time interval (in seconds or milliseconds) between each packet in a burst, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1–30 seconds • 50–30000 milliseconds
packet every <i>number</i> {milliseconds seconds minutes hours}	Sends one packet every specified number of milliseconds, seconds, minutes, or hours, where <i>number</i> is in the following range: <ul style="list-style-type: none"> • 1–3600 seconds • 1–1440 minutes • 1–168 hours • 50–10000 milliseconds
packet once	Sends a single packet one time.

Command Default	
	If the operation is configured to measure jitter or data packet loss, the default is to send a single burst of 2 packets with a second interval between the packets.
	If the operation is configured to measure synthetic packet loss, the default is to send a single burst of 10 packets with a 100 millisecond interval between the packets.
	If the operation does not calculate jitter, data, or synthetic packet loss, the default is to send a single packet one time.

Command Modes	
	SLA profile probe configuration (config-sla-prof-pb)

Command History	Release	Modification
	Release 4.0.0	This command was introduced.
	Release 4.3.0	The statistics measurement for Y.1731 Synthetic Loss Measurement was included.

Usage Guidelines



Note The total length of a burst is the packet count multiplied by the interval and must not exceed 1 minute.

The minimum **interval** supported is platform and packet-type dependent, so certain a configuration may cause an error even if it falls within the specified limits. In the case of Ethernet SLA, the shortest interval for packet types not used for synthetic loss measurement is 100ms.

When **burst once** is sent, a single burst is sent at the start of the probe. If the schedule defines a duration for the probe, a configuration warning is flagged. The same is true if the default is in effect.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

These examples show how to configure the types of packets sent by a probe in an operations profile:

Example 1: Sending a Burst of a Number of Packets With a Specified Interval Every Specified Number of Seconds

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# probe
RP/0/RP0/CPU0:router(config-sla-prof-pb)# send burst every 60 seconds packet count 30
interval 1 second
RP/0/RP0/CPU0:router(config-sla-prof-pb)#
```

Example 2: Sending a Burst of a Number of Packets With a Specified Interval One Time

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# probe
RP/0/RP0/CPU0:router(config-sla-prof-pb)# send burst once packet count 2 interval 1 second

RP/0/RP0/CPU0:router(config-sla-prof-pb)#
```

Example 3: Sending a Single Packet Every Specified Number of Seconds

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# probe
```

```
RP/0/RP0/CPU0:router(config-sla-prof-pb)# send packet every 1 second
```

service

To associate a service with a domain and enter CFM domain service configuration mode, use the **service** command in CFM domain configuration mode. To remove a service from a domain, use the **no** form of this command.

```
service service-name down-meps | xconnect group xconnect-group-name p2p xconnect-name [id |
[string text] | [number number] | [vlan-id id-number] | [vpn-id oui-vpnid]]
```

Syntax Description	
<i>service-name</i>	Administrative name for the service. Case sensitive ASCII string up to 80 characters. Used in conjunction with one of the following service types: <ul style="list-style-type: none"> • down-meps • xconnect
down-meps	Specifies that all MEPs are down and no MIPs are permitted.
xconnect	Specifies the use of a cross connect. Used in conjunction with group and p2p or mp2mp . Note When xconnect is specified, all MEPs are up and MIPs are permitted.
group <i>xconnect-group-name</i>	Specifies the name of the cross connect group.
p2p <i>xconnect-name</i>	Specifies the name of the point-to-point cross connect and enters the Ethernet CFM domain service mode.
mp2mp <i>xconnect-name</i>	Specifies the name of the multipoint-to-multipoint cross connect and enters the Ethernet CFM domain service mode.
ce-id <i>ce-id-value</i>	Specifies the local Customer Edge (CE) identifier.
remote-ce-id <i>remote-ce-id-value</i>	Specifies the remote Customer Edge (CE) identifier.
id	(Optional) Service identifier. Valid service identifiers are: <ul style="list-style-type: none"> • number <i>number</i>—Number from 0 to 65535. • string <i>text</i>—String length no longer than 46 minus MDID length. • vlan-id <i>id-number</i>—Number from 1 to 4094. • vpn-id <i>oui-vpnid</i>—VPN ID in RFC 2685 format (HHH:HHHH)

Command Default If **id** is not specified, the service name is used as the Short MA name.

Command Modes CFM domain configuration (config-cfm-dmn)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines The Short MA Name is the second part of the Maintenance Association Identifier (MAID) in CFM frames. If the Short MA Name (service id) is not specified, the service administrative name is used by default.

When configuring the **service** command, consider the following restrictions:

- The **bridge group** and **bridge-domain** keyword options appear in the software, but they are unsupported.
- The **service xconnect group p2p** form of the command is not supported for L2TPv3 cross-connect types. The following example shows a sample L2TPv3 configuration that is not supported when used with the **service xconnect group** command:

In this example, a corresponding CFM configuration of the **service xconnect group 1 p2p 1** command will not work.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to specify that all MEPs are down and no MIPs are permitted, and enter CFM domain service configuration mode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Serv_1 down-meps
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)#
```

The following example shows how to associate a p2p cross connect service to a domain and enter CFM domain service configuration mode.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_1 xconnect group XG1 p2p X1
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)#
```

The following example shows how to enable CFM on a multipoint-to-multipoint cross connect.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# domain Domain_One level 1 id string D1
RP/0/RP0/CPU0:router(config-cfm-dmn)# service Cross_Connect_2 xconnect group XG2 mp2mp X2
ce-id 201 remote-ce-id 202
RP/0/RP0/CPU0:router(config-cfm-dmn-svc)#
```


Related Commands	Command	Description
	domain , on page 59	Creates and names a container for all domain configurations and enter the CFM domain configuration mode.
	ethernet cfm (global) , on page 65	Enters Ethernet CFM configuration mode.
	p2p	Enters p2p configuration mode to configure point-to-point cross-connects.
	show ethernet cfm configuration-errors , on page 151	Displays information about errors that are preventing configured cfm operations from becoming active, as well as any warnings that have occurred.
	show ethernet cfm local maintenance-points , on page 157	Displays all the maintenance points that have been created.
	show ethernet cfm local meps , on page 159	Displays information about local MEPs.
	show ethernet cfm peer meps , on page 165	Displays other MEPs detected by a local MEP.
	xconnect group	Configures a cross-connect group.

show error-disable

To display the error-disabled state of interfaces, use the **show error-disable** command in the EXEC mode.

```
show error-disable [recovery] [interface <interface> ]
```

Syntax Description	
recovery	Enables error disabled recovery on an interface.
interface	Displays error-disable state for a single interface.

Command Default This command includes all the error-disabled interfaces.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.7.3	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	interface	read

Example

The following example shows how to display the error disable information.

```
show error-disable
 [ recovery ]
 [ interface <interface> ]
```

```
Interface                Error-Disable reason          Retry (s)  Time disabled
-----                -
                Gi0/1/0/3  ethernet-oam-link-fault      1020000   17:12:23 04/31
                Gi0/2/0/1  ethernet-oam-critical-event   ---       20:04 04/31/06
                Gi0/11/0/12.1234 ethernet-oam-high-threshold   245      20:02:42
show error-disable trace
 [ essential | non-essential ]
```

Related Commands

Command	Description
error-disable recovery cause , on page 63	Enables error disabled recovery on an interface.
clear error-disable, on page 33	Clears all error disabled conditions on an interface.

show efd database

To display complete information about all interfaces brought down due to **EFD**, use the `show efd database` command in EXEC mode.

show efd database [**server** | **client**] [**interface**]

Syntax Description

<i>client</i>	Displays all interfaces brought down by EFD filtered by a specific client protocol.
<i>server</i>	Displays all interfaces brought down by EFD filtered by interface owner.
<i>interface</i>	Displays a specific EFD state for the EFD state, if applicable.

Command Default

This command display all interfaces brought down by EFD.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ethernet-services	read

Example

The following example shows how to display the error disable information.

```
# show efd database
Client CFM
=====
Interface          Since                Success  Msg Req  Del
-----
GigE0/0/0/0.0     07/08/09 14:53     Yes      No      No

Server VLAN MA
=====
Interface          Clients
-----
GigE0/0/0/0.0     CFM
```

show efd interface

To display all interfaces that are shut down because of Ethernet Fault Detection (EFD), or to display whether a specific interface is shut down because of EFD, use the **show efd interface** command in EXEC mode

show efd interface [*type interface-path-id*]

Syntax Description	<p><i>type</i> (Optional) Interface type. For more information, use the question mark (?) online help function.</p> <hr/> <p><i>interface-path-id</i> Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
---------------------------	--

Command Default If no parameters are specified, all interfaces that are shut down because of EFD are displayed.

Command Modes EXEC mode

Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.1	This command was introduced.
Release	Modification				
Release 3.9.1	This command was introduced.				

Usage Guidelines If this command is issued when no EFD errors are detected, the system displays the following message:

```
< date time >
No matching interfaces with EFD-shutdown triggered
```

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to display all interfaces that are shut down because of Ethernet Fault Detection (EFD):

```
RP/0/RP0/CPU0:router# show efd interfaces
```

```
Server VLAN MA
=====
Interface          Clients
-----
GigE0/0/0/0.0     CFM
```

show ethernet cfm ccm-learning-database

To display the Continuity Check Message (CCM) learning database, use the **show ethernet cfm ccm-learning-database** command in EXEC mode.

```
show ethernet cfm ccm-learning-database [location node-id]
```

Syntax Description	location node-id (Optional) Displays the CFM CCM learning database for the designated node. The <i>node-id</i> argument is entered in the <i>rack/slot/module</i> notation.																				
Command Default	All CFM ccm-learning-databases on all interfaces are displayed.																				
Command Modes	EXEC mode																				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.																
Release	Modification																				
Release 3.9.0	This command was introduced.																				
Usage Guidelines	The CCM Learning Database is populated by MEPs and MIPs that have received continuity-check messages (CCMs). The information in the CCM Learning Database is used to reply to traceroutes when no applicable entries are found in the main MAC learning table.																				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read																
Task ID	Operations																				
ethernet-services	read																				
Examples	<p>The following example shows how to display all the CFM CCM learning databases on all interfaces:</p> <pre>RP/0/RP0/CPU0:router# show ethernet cfm ccm-learning-database</pre> <pre>Location 0/0/CPU0:</pre> <table border="1"> <thead> <tr> <th>Domain/Level</th> <th>Service</th> <th>Source MAC</th> <th>Interface</th> </tr> </thead> <tbody> <tr> <td>foo/2</td> <td>foo</td> <td>0001.0203.0401</td> <td>Gi0/0/0/0</td> </tr> <tr> <td>foo/2</td> <td>foo</td> <td>0001.0203.0402</td> <td>PW</td> </tr> </tbody> </table> <pre>Location 0/1/CPU0:</pre> <table border="1"> <thead> <tr> <th>Domain/Level</th> <th>Service</th> <th>Source MAC</th> <th>Interface</th> </tr> </thead> <tbody> <tr> <td>foo/2</td> <td>foo</td> <td>0001.0203.0401</td> <td>XC ID: 0xff000002</td> </tr> </tbody> </table>	Domain/Level	Service	Source MAC	Interface	foo/2	foo	0001.0203.0401	Gi0/0/0/0	foo/2	foo	0001.0203.0402	PW	Domain/Level	Service	Source MAC	Interface	foo/2	foo	0001.0203.0401	XC ID: 0xff000002
Domain/Level	Service	Source MAC	Interface																		
foo/2	foo	0001.0203.0401	Gi0/0/0/0																		
foo/2	foo	0001.0203.0402	PW																		
Domain/Level	Service	Source MAC	Interface																		
foo/2	foo	0001.0203.0401	XC ID: 0xff000002																		

Table 1: show ethernet cfm ccm-learning-database Field Descriptions

Domain/Level	The domain name and the level of the domain for the maintenance point that received the CCM that caused this entry to be created. This entry will be used to respond to traceroute messages received by maintenance points in this domain.
--------------	--

Service	The name of the service for the maintenance point that received the CCM that caused this entry to be created. This entry will be used to respond to traceroute messages received by maintenance points in this domain.
Source MAC	Source MAC address in the CCM that caused this entry to be created. This entry will be used to respond to traceroute messages targeted at this MAC address.
Interface	The interface through which the CCM entered the router. This will be one of the following: <ul style="list-style-type: none">• An interface or sub-interface name• A pseudowire identification (neighbor address and PW ID)• PW – Indicates the CCM was received through the PW in a cross-connect• XC ID – the internal cross-connect ID value, indicating that the CCM was received through an interface that no longer exists, or is no longer in L2 mode.

show ethernet cfm configuration-errors

To display information about errors that are preventing configured CFM operations from becoming active, as well as any warnings that have occurred, use the **show ethernet cfm configuration-errors** command in EXEC mode.

```
show ethernet cfm configuration-errors [domain domain-name] [interface type interface-path-id]
```

Syntax Description

domain *domain-name* (Optional) Displays information about the specified CFM domain name.

interface *type* (Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

All CFM configuration errors on all domains are displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	read

Examples

The following example shows how to display all the CFM configuration errors on all domains:

```
RP/0/RP0/CPU0:router# show ethernet cfm configuration-errors
```

```
Domain fig (level 5), Service bay
 * MIP creation configured using bridge-domain blort, but bridge-domain blort does not exist.
 * An Up MEP is configured for this domain on interface GigabitEthernet0/1/2/3.234 and an Up MEP is also configured for domain blort, which is at the same level (5).
 * A MEP is configured on interface GigabitEthernet0/3/2/1.1 for this domain/service, which has CC interval 100ms, but the lowest interval supported on that interface is 1s.
```

Related Commands	Command	Description
	ethernet cfm (global), on page 65	Enters CFM configuration mode.
	ethernet cfm (interface), on page 66	Enters interface CFM configuration mode.
	traceroute ethernet cfm, on page 213	Sends Ethernet CFM traceroute messages to generate a basic.

show ethernet cfm interfaces ais

To display the information about interfaces that are currently transmitting Alarm Indication Signal (AIS), use the **show ethernet cfm interfaces ais** command in EXEC mode.

```
show ethernet cfm interfaces [type interface-path-id] ais [location node-id]
```

Syntax Description

type (Optional) Interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

location *node-id* (Optional) Displays information about the node location specified as *rack / slot / module*. Location cannot be specified if you configure an interface type.

Command Default

If no parameters are specified, information for all AIS interfaces is displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.1	This command was introduced.

Usage Guidelines

The **location** keyword cannot be specified if an interface has been specified.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

The following example shows how to display the information published in the Interface AIS table:

```
RP/0/RP0/CPU0:router# show ethernet cfm interfaces ais
```

Defects (from at least one peer MEP):

A - AIS received	I - Wrong interval
R - Remote Defect received	V - Wrong Level
L - Loop (our MAC received)	T - Timed out (archived)
C - Config (our ID received)	M - Missing (cross-check)
X - Cross-connect (wrong MAID)	U - Unexpected (cross-check)
P - Peer port down	D - Local port down

	Trigger	Via	Transmission
AIS	-----	Via	-----

show ethernet cfm interfaces ais

```

Interface (State)      Dir  L Defects  Levels  L Int Last started  Packets
-----
Gi0/1/0/0.234 (Up)    Dn   5 RPC      6       7 1s 01:32:56 ago  5576
Gi0/1/0/0.567 (Up)    Up   0 M        2,3     5 1s 00:16:23 ago  983
Gi0/1/0/1.1 (Dn)     Up   D          1!      7 60s 01:02:44 ago 3764
Gi0/1/0/2 (Up)       Dn   0 RX      1!

```

Table 2: show ethernet cfm interfaces ais Field Descriptions

Interface (State)	The name and state of the interface.
AIS dir	The direction that the AIS packets are transmitted, up or down.
Trigger L	The level of the lowest MEP that is transmitting AIS. The field is blank if there are no down MEPs on the interface, and AIS is being transmitted due to configuration on the interface itself.
Trigger Defects	Defects detected by the lowest MEP transmitting AIS.
Via Levels	The levels of any MEPs on the interface that are receiving AIS from a lower MEP, and potentially re-transmitting the signal. If the highest MEP is not re-transmitting the signal, the list of levels is ended using an exclamation point.
Transmission L	The level at which AIS is being transmitted outside of the interface, via a MIP. The field is blank if this is not occurring.
Transmission Int	The interval at which AIS is being transmitted outside of the interface via a MIP. The field is blank if this is not occurring.
Transmission last started	If AIS is being transmitted outside of the interface, the time that the signal started. The field is blank if this is not occurring.
Transmission packets	If AIS is being transmitted outside of the interface, the number of packets sent by the transmitting MEP since it was created or since its counters were last cleared. The field is blank if this is not occurring.

Related Commands

Command	Description
ais transmission, on page 26	Configures AIS transmission for a CFM domain service.
log ais, on page 109	Configures AIS logging for a CFM domain service to indicate when AIS or LCK packets are received.
ais transmission up, on page 28	Configures AIS transmission on a CFM interface.
show ethernet cfm local meps, on page 159	Displays information about local MEPs.

show ethernet cfm interfaces statistics

To display the per-interface counters for Ethernet Connectivity Fault Management (CFM), use the **show ethernet cfm interfaces statistics** command in EXEC mode.

show ethernet cfm interfaces [*type interface-path-id*] **statistics** [**location** *node-id*]

Syntax Description

type (Optional) Interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

location *node-id* (Optional) Displays information about the node location specified as *rack / slot / module*. Location cannot be specified if you configure an interface type.

Command Default

All CFM counters from all interfaces are displayed.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

The location cannot be specified if a particular interface is specified.

Task ID

Task ID	Operations
ethernet-services	read

Examples

The following example shows all the CFM counters on all interfaces:

```
RP/0/RP0/CPU0:router# show ethernet cfm interfaces statistics
Location 0/1/CPU0:
```

Interface	Malformed	Dropped	Last Malformed	Reason
Gi0/1/0/3.185	0	0		
Gi0/1/0/7.185	0	0		
Gi0/1/0/7.187	0	0		

Table 3: show ethernet cfm statistics Field Descriptions

Interface	Name of the interface.
-----------	------------------------

Malformed	Number of packets that have been received at this interface that have been found to be non-compliant with the packet formats specified in IEEE 802.1ag and ITU-T Y.1731.
Dropped	Number of valid (well-formed) packets that have been received at this interface, that have been dropped in software. Packets may be dropped for the following reasons: <ul style="list-style-type: none"> • Packet has an unknown operation code, and reached a MEP. • Packet dropped at a MEP because it has a lower CFM level than the MEP. • Packet could not be forwarded because the interface is STP blocked. • Packet could not be forwarded because it is destined for this interface.
Last Malformed Reason	Operation code for the last malformed packet received, and the reason that it was found to be malformed. If no malformed packets have been received, this field is blank.

Related Commands

Command	Description
clear ethernet cfm interface statistics, on page 35	Clears the counters for an Ethernet CFM interface.

show ethernet cfm local maintenance-points

To display a list of local maintenance points, use the **show ethernet cfm local maintenance-points** command in EXEC mode.

show ethernet cfm local maintenance-points [**domain** *domain-name* [**service** *service-name*]] **interface** *type interface-path-id* [**mep** | **mip**]

Syntax Description	
domain <i>domain-name</i>	(Optional) Displays information about the specified domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain in which the maintenance points reside.
service <i>service-name</i>	(Optional) Displays information about the specified service, where <i>service-name</i> is a string of a maximum of 80 characters that identifies the maintenance association to which the maintenance points belong.
interface <i>type</i>	(Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
mep	(Optional) Displays information about maintenance end points (MEPs).
mip	(Optional) Displays information about maintenance intermediate points (MIPs).

Command Default All maintenance points from all interfaces are displayed.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read

Examples

This example shows how to display maintenance points:

```
RP/0/RP0/CPU0:router# show ethernet cfm local maintenance-points
```

show ethernet cfm local maintenance-points

Domain/Level	Service	Interface	Type	ID	MAC
bar/0	bar	Gi0/0/0/0	Dn MEP	1	03:04:00
baz/4	baz	Gi0/0/0/1.1	MIP		03:04:01
baz/4	baz	Gi0/0/0/2	MIP		03:04:02
foo/?	foo	Gi0/0/0/3	MEP	1	03:04:03!
qux/2	qux	Gi0/0/0/1.1	Up MEP	10	03:04:01
qux/2	qux	Gi0/0/0/2	Up MEP	11	03:04:02

Table 4: show ethernet cfm local maintenance-points Field Descriptions

Domain/Level	The domain name and the level of the domain. If the domain is not configured globally, a question mark (?) is displayed for the Level.
Service	The name of the service.
Interface	The interface containing the maintenance point.
Type	The type of maintenance point: <ul style="list-style-type: none"> • MIP • Up MEP • Down MEP • MEP–If the MEP belongs to a service that is not configured globally, the type cannot be determined and just MEP is displayed.
ID	The configured MEP ID. Note Since MIPs do not have an ID, this column is blank for MIPs.
MAC	The last 3 octets of the interface MAC address. Note The first three octets are typically the Cisco OUI.
Note	If the MEP has a configuration error, an exclamation point (!) is displayed at the end of the line in the display output.

Related Commands

Command	Description
show ethernet cfm local meps, on page 159	Displays information about local MEPs.
show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.
traceroute cache, on page 212	Sets the maximum limit of traceroute cache entries or the maximum time limit to hold the traceroute cache entries.
traceroute ethernet cfm, on page 213	Sends Ethernet CFM traceroute messages to generate a basic.

show ethernet cfm local meps

To display information about local maintenance end points (MEPs), use the **show ethernet cfm local meps** command in EXEC mode.

show ethernet cfm local meps [**domain** *domain-name* [**service** *service-name* [**mep-id** *id*]]] | **interface** *type interface-path-id* [**domain** *domain-name*]] [**errors** [**detail** | **verbose**] | **detail** | **verbose**]

Syntax Description

domain <i>domain-name</i>	(Optional) Displays information about the specified CFM domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain in which the maintenance points reside.
service <i>service-name</i>	(Optional) Displays information about the specified service, where <i>service-name</i> is a string of a maximum of 80 characters that identifies the maintenance association to which the maintenance points belong.
interface <i>type</i>	(Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
mep-id <i>id</i>	(Optional) Displays information about the specified MEP, where <i>id</i> is a number of a local maintenance end point (MEP). The range is 1 to 8191.
errors	(Optional) Displays information about peer MEPs with errors.
detail	(Optional) Displays detailed information.
verbose	(Optional) Displays detailed information, plus counters for each type of CFM packet.

Command Default

Brief information is displayed for all local MEPs.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 3.9.1	New output fields were added for AIS.

Usage Guidelines

All MEPs are displayed in the **show ethernet cfm local meps** command output, unless they have configuration errors.

Task ID	Task ID	Operations
	ethernet-services	read

Examples

Example 1: show ethernet cfm local meps Command

This example shows sample output of the default statistics for local MEPs without any filtering:

```
RP/0/RP0/CPU0:router# show ethernet cfm local meps

A - AIS received           I - Wrong interval
R - Remote Defect received V - Wrong Level
L - Loop (our MAC received) T - Timed out (archived)
C - Config (our ID received) M - Missing (cross-check)
X - Cross-connect (wrong MAID) U - Unexpected (cross-check)
P - Peer port down

Domain foo (level 6), Service bar
  ID Interface (State)      Dir MEPS/Err RD Defects AIS
-----
  100 Gi1/1/0/1.234 (Up)    Up      0/0   N  A      L7

Domain fred (level 5), Service barney
  ID Interface (State)      Dir MEPS/Err RD Defects AIS
-----
  2 Gi0/1/0/0.234 (Up)     Up      3/2   Y  RPC     L6

RP/0/0/CPU0:router# show ethernet cfm local meps

A - AIS received           I - Wrong interval
R - Remote Defect received V - Wrong Level
L - Loop (our MAC received) T - Timed out (archived)
C - Config (our ID received) M - Missing (cross-check)
X - Cross-connect (wrong MAID) U - Unexpected (cross-check)
P - Peer port down

Domain foo (level 6), Service bar
  ID Interface (State)      Dir MEPS/Err RD Defects AIS
-----
  100 Gi1/1/0/1.234 (Up)    Up      0/0   N  A

Domain fred (level 5), Service barney
  ID Interface (State)      Dir MEPS/Err RD Defects AIS
-----
  2 Gi0/1/0/0.234 (Up)     Up      3/2   Y  RPC
```

Table 5: show ethernet cfm local meps Field Descriptions

ID	Configured MEP ID of the MEP.

Interface (State)	Interface that the MEP is configured under, and the state of the interface. The states are derived from the interface state, the Ethernet Link OAM interworking state, and the Spanning Tree Protocol (STP) state. The following states are reported: <ul style="list-style-type: none"> • Up – Interface Up, Ethernet Link OAM Up, STP Up • Down – Interface Down or Admin Down • Test – Interface Up, Ethernet Link OAM loopback mode • Blkd – Interface Up, Ethernet Link OAM Up, STP Blocked • Otherwise, the interface state.
Dir	Direction of the MEP.
RD	Remote Defect. Y (yes) indicates that a remote defect is detected on at least one peer MEP. In which case, the RDI bit is set in outgoing CCM messages. Otherwise, N (no).
MEPs	Total number of peer MEPs sending CCMs to the local MEP.
Err	Number of peer MEPs for which at least one error has been detected.
Defects	Types of errors detected. Each error is listed as a single character. Multiple errors are listed if they are from the same MEP. Possible errors are listed at the top of the display output of the command.
AIS	Alarm Indication Signal. If AIS is configured for the service, the configured level is displayed when an alarm is signaled. If AIS is not configured for the service, or if no alarm is currently signaled, this field is blank.

Example 2: show ethernet cfm local meps Command Filtered by Domain and Service

```
RP/0/RP0/CPU0:router# show ethernet cfm local meps domain foo service bar
```

```
A - AIS received           I - Wrong interval
R - Remote Defect received V - Wrong Level
L - Loop (our MAC received) T - Timed out (archived)
C - Config (our ID received) M - Missing (cross-check)
X - Cross-connect (wrong MAID) U - Unexpected (cross-check)
P - Peer port down
```

```
Domain foo (level 6), Service bar
```

```
  ID Interface (State)      Dir  MEPs/Err  RD  Defects  AIS
-----
  100 Gi1/1/0/1.234 (Up)    Up    0/0     N  A        L7
```

```
RP/0/0/CPU0:router# show ethernet cfm local meps domain foo service bar
```

```
A - AIS received           I - Wrong interval
R - Remote Defect received V - Wrong Level
L - Loop (our MAC received) T - Timed out (archived)
C - Config (our ID received) M - Missing (cross-check)
X - Cross-connect (wrong MAID) U - Unexpected (cross-check)
P - Peer port down
```

```
Domain foo (level 6), Service bar
```

```

      ID Interface (State)          Dir MEPS/Err RD Defects AIS
-----
100 Gi1/1/0/1.234 (Up)           Up      0/0    N  X

```

Example 3: show ethernet cfm local meps detail Command

This example shows sample output of detailed statistics for local MEPs:



Note The Discarded CCMs field is not displayed when the number is zero (0). It is unusual for the count of discarded CCMs to be anything other than zero, since CCMs are only discarded when the limit on the number of peer MEPs is reached. The Peer MEPs field is always displayed, but the counts are always zero when continuity check is not enabled.

```

RP/0/RP0/CPU0:router# show ethernet cfm local meps detail

Domain foo (level 6), Service bar
Up MEP on GigabitEthernet0/1/0/0.234, MEP-ID 100
=====
Interface state: Up      MAC address: 1122.3344.5566
Peer MEPS: 0 up, 0 with errors, 0 timed out (archived)

CCM generation enabled: No
AIS generation enabled: Yes (level: 7, interval: 1s)
Sending AIS:           Yes (started 01:32:56 ago)
Receiving AIS:         Yes (from lower MEP, started 01:32:56 ago)

Domain fred (level 5), Service barney
Up MEP on GigabitEthernet0/1/0/0.234, MEP-ID 2
=====
Interface state: Up      MAC address: 1122.3344.5566
Peer MEPS: 3 up, 2 with errors, 0 timed out (archived)
Cross-check defects: 0 missing, 0 unexpected

CCM generation enabled: Yes (Remote Defect detected: Yes)
CCM defects detected:   R - Remote Defect received
                       P - Peer port down
                       C - Config (our ID received)
AIS generation enabled: Yes (level: 6, interval: 1s)
Sending AIS:           Yes (to higher MEP, started 01:32:56 ago)
Receiving AIS:         No

RP/0/0/CPU0:router# show ethernet cfm local meps detail

Domain foo (level 5), Service bar
Down MEP on GigabitEthernet0/1/0/0.123, MEP-ID 20
=====
Interface state: Up      MAC address: 1122.3344.5566
Peer MEPS: 1 up, 0 with errors, 0 timed out (archived)
Cross-check errors: 0 missing, 0 unexpected

CCM generation enabled: Yes, 10ms
                       CCM processing offloaded to high-priority software
AIS generation enabled: No
Sending AIS:           No
Receiving AIS:         No

```

Example 4: show ethernet cfm local meps verbose Command

This example shows sample output of detailed statistics for local MEPs:

```
RP/0/RP0/CPU0:router# show ethernet cfm local meps verbose

Domain foo (level 6), Service bar
Up MEP on GigabitEthernet0/1/0/0.234, MEP-ID 100
=====
Interface state: Up      MAC address: 1122.3344.5566
Peer MEPs: 0 up, 0 with errors, 0 timed out (archived)

CCM generation enabled: No
AIS generation enabled: Yes (level: 7, interval: 1s)
Sending AIS:           Yes (started 01:32:56 ago)
Receiving AIS:        Yes (from lower MEP, started 01:32:56 ago)
EFD triggered:        No

Packet      Sent      Received
-----
AIS          5576          0
SLM           0          11
SLR           11          0
DMM           0           6
DMR           5           0

Domain fred (level 5), Service barney
Up MEP on GigabitEthernet0/1/0/0.234, MEP-ID 2
=====
Interface state: Up      MAC address: 1122.3344.5566
Peer MEPs: 3 up, 2 with errors, 0 timed out (archived)
Cross-check errors: 0 missing (0 auto), 0 unexpected

CCM generation enabled: Yes, 1s (Remote Defect detected: Yes)
                        CCM processing offloaded to software
CCM defects detected:  R - Remote Defect received
                        P - Peer port down
                        C - Config (our ID received)
AIS generation enabled: Yes (level: 6, interval: 1s)
Sending AIS:           Yes (to higher MEP, started 01:32:56 ago)
Receiving AIS:        No

Packet      Sent      Received
-----
CCM          12345      67890 (out of seq: 6, discarded: 10)
LBM           5           0
LBR           0           5 (out of seq: 0, with bad data: 0)
AIS           0          46910
LMM           3           4
LMR           5           3

Domain gaz (level 4), Service baz
Up MEP on Standby Bundle-Ether 1, MEP-ID 3
=====
Interface state: Up      MAC address: 6655.4433.2211
Peer MEPs: 1 up, 0 with errors, 0 timed out (archived)

CCM generation enabled: Yes, 1s (Remote Defect detected: No)
                        CCM processing offloaded to software
)
CCM defects detected:  Sending disabled on local standby MEP
                        Defects below ignored on local standby MEP
                        I - Wrong interval
                        V - Wrong level
```

show ethernet cfm local meps

```

AIS generation enabled: No
Sending AIS:           No
Receiving AIS:        No

```

```

Packet      Sent      Received
-----
CCM          0        67890 (out of seq: 6, discarded: 10)
LBM          0          1
LBR          0          2 (out of seq: 0, with bad data: 0)
AIS          0          3
LCK          -          4

```

```

Domain bar (level 3), Service boz
Down MEP on GigabitEthernet102/1/0/0.345, MEP-ID 200

```

```

=====
Interface state: Up      MAC address: 1122.3344.5566
Peer MEPS: 0 up, 0 with errors, 0 timed out (archived)

```

```

CCM generation enabled: No
AIS generation enabled: No
Sending AIS:           No
Receiving AIS:        No

```

```

No packets sent/received

```

Related Commands

Command	Description
show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.
show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPS.
traceroute ethernet cfm, on page 213	Sends Ethernet CFM traceroute messages to generate a basic.

show ethernet cfm peer meps

To display information about maintenance end points (MEPs) for peer MEPs, use the **show ethernet cfm peer meps** command in EXEC mode.

```
show ethernet cfm peer meps [domain domain-name [service service-name [local mep-id id
[peer mep-id id|mac-address H . H . H]]]|interface type interface-path-id [domain domain-name
[peer mep-id id|mac-address H . H . H]]] [cross-check [missing|unexpected]|errors] [detail]
```

Syntax Description	
cross-check	(Optional) Displays information about peer MEPs with cross-check errors.
detail	(Optional) Displays detailed information.
domain <i>domain-name</i>	(Optional) Displays information about a CFM domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain in which the maintenance points reside.
errors	(Optional) Displays information about peer MEPs with errors.
interface <i>type</i>	(Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
local mep-id <i>id</i>	(Optional) Displays information about a local MEP, where <i>id</i> is the number of the MEP.
<i>missing</i>	(Optional) Displays information about peer MEPs that are missing.
peer mep-id <i>id</i>	(Optional) Displays information about a peer MEP, where <i>id</i> is the number of the MEP.
peer mac-address <i>H.H.H</i>	(Optional) Displays information about a peer MEP, where <i>H.H.H</i> is the hexadecimal address of the MEP.
service <i>service-name</i>	(Optional) Displays information about a CFM service, where <i>service-name</i> is a string of a maximum of 154 characters that identifies the maintenance association to which the maintenance points belong.
unexpected	(Optional) Displays information about unexpected peer MEPs.
Command Default	Peer MEPs for all domains are displayed.
Command Modes	EXEC mode

show ethernet cfm peer meps

Command History**Release Modification**

Release 3.9.0 This command was introduced.

Usage Guidelines

If a Local MEP is receiving Wrong Level CCMs, and if the Remote MEP has its CCM processing offloaded, then the last CCM cannot be displayed.

Task ID**Task ID Operations**

ethernet-services read

Examples

The following example shows sample output of MEPs detected by a local MEP:

```
RP/0/RP0/CPU0:router# show ethernet cfm peer meps

Flags:
> - Ok                      I - Wrong interval
R - Remote Defect received  V - Wrong level
L - Loop (our MAC received) T - Timed out
C - Config (our ID received) M - Missing (cross-check)
X - Cross-connect (wrong MAID) U - Unexpected (cross-check)
* - Multiple errors received

Domain dom3 (level 5), Service ser3
Down MEP on GigabitEthernet0/0/0/0 MEP-ID 1
=====
St   ID MAC Address   Port   Up/Downtime   CcmRcvd SeqErr   RDI Error
--   -
V    10 0001.0203.0403 Up     00:01:35           2     0     0     2

Domain dom4 (level 2), Service ser4
Down MEP on GigabitEthernet0/0/0/0 MEP-ID 1
=====
St   ID MAC Address   Port   Up/Downtime   CcmRcvd SeqErr   RDI Error
--   -
>   20 0001.0203.0402 Up     00:00:03           4     1     0     0
>   21 0001.0203.0403 Up     00:00:04           3     0     0     0

Domain dom5 (level 2), Service dom5
```

Table 6: show ethernet cfm peer meps Field Descriptions

St	Status: one or two characters, representing the states listed at the top of the output.
ID	Peer MEP ID
MAC address	Peer MAC Address. If this entry is a configured cross-check MEP, with no MAC address specified, and no CCMs are currently being received from a peer MEP with a matching MEP ID, then this field is blank.
Port	Port state of the peer, based on the Port Status and Interface Status TLVs. If no TLVs or CCMs have been received, this field is blank. Otherwise, the port status is displayed—unless it is Up. If the port status is Up, then the interface status is displayed.

Up/Downtime	Time since the peer MEP last came up or went down. If CCMs are currently being received, it is the time since the peer MEP last came up, which is the time since the first CCM was received. If CCMs are not currently being received, it is the time since the peer MEP last went down, which is the time since the loss threshold was exceeded and a loss of continuity was detected.
CcmRcvd	Total number of CCMs received from this peer MEP.
SeqErr	Number of CCMs received out-of-sequence.
RDI	Number of CCMs received with the RDI bit set.
Error	Number of CCMs received with CCM defects, such as: <ul style="list-style-type: none"> • Invalid level error • Maintenance Association Identifier (MAID) error • Interval error • Received with out MEP ID error • Invalid source MAC error

This example shows sample detailed output of MEPs detected by a local MEP:

```
RP/0/RP0/CPU0:router# show ethernet cfm peer meps detail
```

```
Domain dom3 (level 5), Service ser3
Down MEP on GigabitEthernet0/0/0/0 MEP-ID 1
```

```
=====
Peer MEP-ID 10, MAC 0001.0203.0403
CFM state: Wrong level, for 00:01:34
Port state: Up
CCM defects detected:      V - Wrong Level
CCMs received: 5
  Out-of-sequence:          0
  Remote Defect received:   5
  Wrong Level:              0
  Cross-connect (wrong MAID): 0
  Wrong Interval:          5
  Loop (our MAC received):  0
  Config (our ID received): 0
Last CCM received
  Level: 4, Version: 0, Interval: 1min
  Sequence number: 5, MEP-ID: 10
  MAID: String: dom3, String: ser3
  Port status: Up, Interface status: Up
```

```
Domain dom4 (level 2), Service ser4
Down MEP on GigabitEthernet0/0/0/0 MEP-ID 1
```

```
=====
Peer MEP-ID 20, MAC 0001.0203.0402
CFM state: Ok, for 00:00:04
Received CCM handling offloaded to software
Port state: Up
CCMs received: 7
  Out-of-sequence:          1
```

show ethernet cfm peer meps

```

Remote Defect received:      0
Wrong Level:                0
Cross-connect (wrong MAID): 0
Wrong Interval:             0
Loop (our MAC received):    0
Config (our ID received):   0
Last CCM received
Level: 2, Version: 0, Interval: 10s
Sequence number: 1, MEP-ID: 20
MAID: String: dom4, String: ser4
Chassis ID: Local: ios; Management address: 'Not specified'
Port status: Up, Interface status: Up

Peer MEP-ID 21, MAC 0001.0203.0403
CFM state: Ok, for 00:00:05
Port state: Up
CCMs received: 6
Out-of-sequence:           0
Remote Defect received:    0
Wrong Level:               0
Cross-connect (wrong MAID): 0
Wrong Interval:           0
Loop (our MAC received):   0
Config (our ID received):  0
Last CCM received 00:00:05 ago:
Level: 2, Version: 0, Interval: 10s
Sequence number: 1, MEP-ID: 21
MAID: String: dom4, String: ser4
Port status: Up, Interface status: Up

Domain dom5 (level 2), Service ser5
Up MEP on Standby Bundle-Ether 1 MEP-ID 1
=====
Peer MEP-ID 600, MAC 0001.0203.0401
CFM state: Ok (Standby), for 00:00:08, RDI received
Port state: Down
CCM defects detected:      Defects below ignored on local standby MEP
                          I - Wrong Interval
                          R - Remote Defect received

CCMs received: 5
Out-of-sequence:         0
Remote Defect received:  5
Wrong Level:             0
Cross-connect W(wrong MAID): 0
Wrong Interval:         5
Loop (our MAC received): 0
Config (our ID received): 0
Last CCM received 00:00:08 ago:
Level: 2, Version: 0, Interval: 10s
Sequence number: 1, MEP-ID: 600
MAID: DNS-like: dom5, String: ser5
Chassis ID: Local: ios; Management address: 'Not specified'
Port status: Up, Interface status: Down

Peer MEP-ID 601, MAC 0001.0203.0402
CFM state: Timed Out (Standby), for 00:15:14, RDI received
Port state: Down
CCM defects detected:      Defects below ignored on local standby MEP
                          I - Wrong Interval
                          R - Remote Defect received
                          T - Timed Out
                          P - Peer port down

CCMs received: 2

```



```

Out-of-sequence:          0
Remote Defect received:   2
Wrong Level:              0
Cross-connect (wrong MAID): 0
Wrong Interval:          2
Loop (our MAC received):  0
Config (our ID received): 0
Last CCM received 00:15:49 ago:
Level: 2, Version: 0, Interval: 10s
Sequence number: 1, MEP-ID: 600
MAID: DNS-like: dom5, String: ser5
Chassis ID: Local: ios; Management address: 'Not specified'
Port status: Up, Interface status: Down

```

Table 7: show ethernet cfm peer meps detail Field Descriptions

CFM state	<p>State of the peer MEP, how long it has been up or down, and whether the RDI bit was set in the last received CCM. The following possible states are shown if CCMs are currently being received:</p> <ul style="list-style-type: none"> • Missing • Timed out—No CCMs have been received for the loss time • Ok • Indication of a defect
Port state	<p>Port state of the peer, based on the Port Status and Interface Status TLVs. If no TLVs or CCMs have been received, this field is blank. Otherwise, the port status is displayed—unless it is Up. If the port status is Up, then the interface status is displayed.</p>

CCM defects detected	<p>Types of CCM defects that have been detected.</p> <p>The possible defects are:</p> <ul style="list-style-type: none"> • Remote Defect received—The last CCM received from the peer had the RDI bit set. • Loop (our MAC received)—CCMs were received from a peer with the same MAC address as the local MEP. • Config (our ID received)—CCMs were received from a peer with the same MEP ID as the local MEP. • Cross-connect (wrong MAID)—The last CCM received from the peer contained a domain/service identified that did not match the locally configured domain/service identifier. • Peer port down—The last CCM received from the peer contained an Interface Status indicating that the interface on the peer was not up. • Wrong interval—The last CCM received contained a CCM interval that did not match the locally configured CCM interval. • Wrong level—The last CCM received was for a lower level than the level of the local MEP. • Timed out—No CCMs have been received within the loss time. • Missing (cross-check)—Cross-check is configured and lists this peer MEP, but no CCMs have been received within the loss time. • Unexpected (cross-check)—Cross check is configured for this service and does not list this peer MEP, but CCMs have been received from it within the loss time.
CCMs received	Number of CCMs received in total, by defect type.
Last CCM received	How long ago the last CCM was received, and a full decode of its contents. Any unknown TLVs are displayed in hexadecimal.
Offload status	Offload status of received CCM handling.

Related Commands

Command	Description
show ethernet cfm local maintenance-points, on page 157	Displays a list of local maintenance points.
show ethernet cfm local meps, on page 159	Displays information about local MEPs.
traceroute ethernet cfm, on page 213	Sends Ethernet CFM traceroute messages to generate a basic.

show ethernet cfm summary

To display summary information about CFM, use the **show ethernet cfm summary** command in the EXEC mode.

show ethernet cfm summary *location**node-id*

Syntax Description	location <i>node-id</i> (Optional) Specifies the location for which CFM summary is required. If the location is not specified, an overall summary for all nodes is displayed, followed by information for each node. If the location is specified, only information from that node is displayed.				
Command Default	An overall summary for all nodes is displayed.				
Command Modes	EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.3.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.3.1	This command was introduced.
Release	Modification				
Release 4.3.1	This command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operation	ethernet-services	read
Task ID	Operation				
ethernet-services	read				

Example

This example shows how to display ethernet CFM summary:

```
RP/0/RP0/CPU0:router# show ethernet cfm summary
```

```
CFM System Summary
=====

Domains                               4
Services                               10000
Local MEPS                             10000
  Operational                           9997
  Down MEPS                             9997
  Up MEPS                               0
  Offloaded                             200
    3.3ms                               100
    10ms                                100
  Disabled (misconfiguration)           2
  Disabled (resource limit)             1
  Disabled (operational error)          0
Peer MEPS                              9997
  Operational                           9990
  Defect detected                        5
  No defect detected                    9985
  Timed out                             7
MIPs                                    0
```

show ethernet cfm summary

Interfaces	10000
Bridge domains/Xconnects	10000
Traceroute Cache entries	3
Traceroute Cache replies	11
CCM Learning Database entries	10000

CFM Summary for 0/0/CPU0

=====

Initial resynchronization: complete

Domains	4
Services	10000
Local MEPS	1000
Operational	999
Down MEPS	999
Up MEPS	0
Offloaded	100
3.3ms	100
10ms	0
Disabled (misconfiguration)	1
Disabled (offload resource limit)	0
Disabled (operational error)	0
Peer MEPS	999
Operational	998
Defect detected	2
No defect detected	996
Timed out	1
MIPs	0
Interfaces	1000
Bridge domains/Xconnects	10000
Traceroute Cache entries	1
Traceroute Cache replies	3
CCM Learning Database entries	1000

show ethernet cfm traceroute-cache

To display the contents of the traceroute cache, use the **show ethernet cfm traceroute-cache** command in EXEC mode.

```
show ethernet cfm traceroute-cache [[domain domain-name] [service service-name] [local mep-id id] [transaction-id id]] | interface type interface-path-id [[domain domain-name] [transaction-id id]] [exploratory | targeted] [status complete | incomplete] [detail]
```

Syntax Description	
domain <i>domain-name</i>	(Optional) Displays information about a CFM domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain in which the maintenance points reside.
service <i>service-name</i>	(Optional) Displays information about a CFM service, where <i>service-name</i> is a string of a maximum of 80 characters that identifies the maintenance association to which the maintenance points belong.
local mep-id <i>id</i>	(Optional) Displays information for the specified local maintenance end point (MEP). The range for MEP ID numbers is 1 to 8191.
transaction-id <i>id</i>	(Optional) Displays information for the specified transaction.
interface <i>type</i>	(Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
exploratory	(Optional) Displays information for exploratory traceroutes.
targeted	(Optional) Displays information for traceroutes that are not exploratory, but explicitly mapped.
status	(Optional) Displays status information.
complete	(Optional) Displays status information for traceroutes that have received all replies.
incomplete	(Optional) Displays status information for traceroutes that are still receiving replies.
detail	(Optional) Displays detailed information.

Command Default Shows output for the default traceroute.

Command Modes EXEC mode

show ethernet cfm traceroute-cache

Command History**Release Modification**

 Release 3.9.0 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 end points (MEPs) of a domain as they were discovered. The data is historic. The traceroute cache stores entries from previous traceroute operations.

In the output, the traceroutes sourced from each local MEP are listed. The heading for the local MEP contains the domain name and level, service name, MEP ID and interface name.

Task ID**Task ID Operations**

 ethernet-services read

Examples

The following example shows sample output for the **show ethernet cfm traceroute-cache** command:

```
RP/0/RP0/CPU0:router# show ethernet cfm traceroute-cache
```

```
Traceroutes in domain bar (level 4), service bar
Source: MEP-ID 1, interface GigabitEthernet0/0/0/0
```

```
=====
Traceroute at 2009-05-18 12:09:10 to 0001.0203.0402,
TTL 64, Trans ID 2:
```

Hop	Hostname/Last	Ingress MAC/name	Egress MAC/Name	Relay
1	ios 0000-0001.0203.0400	0001.0203.0400 [Down] Gi0/0/0/0		FDB
2	abc ios		0001.0203.0401 [Ok] Not present	FDB
3	bcd abc	0001.0203.0402 [Ok] GigE0/0		Hit

```
Replies dropped: 0
```

```
Traceroutes in domain foo (level 2), service foo
Source: MEP-ID 1, interface GigabitEthernet0/0/0/0
```

```
=====
Traceroute at 2009-05-18 12:03:31 to 0001.0203.0403,
TTL 64, Trans ID 1:
```

Hop	Hostname/Last	Ingress MAC/name	Egress MAC/Name	Relay
1	abc 0000-0001.0203.0400	0001.0203.0401 [Ok] Not present		FDB
2	bob abc	0001.0203.0402 [Ok] Gi0/1/0/2.3		MPDB
3	cba bob		0001.0203.0403 [Ok] Gi0/2/0/3.45	Hit

```
Replies dropped: 0
```

```
Traceroute at 2009-05-18 12:15:47 to 0001.0203.0409,
TTL 64, Trans ID 3, automatic:
00:00:05 remaining
```

Traceroute at 2009-05-18 12:20:10 explore to ffff.ffff.ffff,
TTL 64, Trans ID 4, Timeout auto, Reply Filter Default:

Hop	Hostname/Last	Ingr/Egr	MAC/name	Relay
1	abc	Ingress	0015.0000.323f [Ok]	FDB
	0000-0001.0203.0400		Gi0/0/0/0.1	
2	abc	Egress	0015.0000.323e [Ok]	FDB
	abc		Te0/1/0/0.1	
3	0002-0016.eeee.1234	Ingress	0016.eeee.1234 [Ok]	FDB
	abc		Te0/4.23	
4	0000-0016.eeee.4321	Egress	0016.eeee.4321 [Ok]	FDB
	0002-0016.eeee.1234		Gi1/2.23	
5	rtr	Ingress	0015.0000.f123 [Ok]	FDB
	0002-00.16.eeee.4321		Gi0/0/0/0	
2	abc	Egress	0015.0000.323d [Ok]	FDB
	abc		Te0/1/0/1.1	
3	pe2	Ingress	0017.0000.cf01 [Ok]	FDB
	abc		Te0/0/2/0/1.450	
4	pe2	Egress	0017.0000.cf01 [Ok]	Drop
	pe2		Gi0/0/0/0.451	
4	pe2	Egress	0017.0000.cf01 [Ok]	FDB
	pe2		Gi0/0/0/1.452	
5	ce2	Ingress	0015.0000.8830 [Ok]	FDB
	pe2		Gi0/1/0/0	

Replies dropped: 0

Table 8: show ethernet cfm traceroute-cache Field Descriptions

Field	Description
Traceroute at	Date and time the traceroute was started.
to	Destination MAC address.
explore to	(Exploratory traceroutes) MAC address of the target for the exploratory traceroute.
TTL	Initial Time To Live used for the traceroute operation.
Trans ID	Transaction ID
Timeout	(Exploratory traceroutes) If no timeout was configured, "Timeout auto" is shown.
Reply Filter	(Exploratory traceroutes) Type of filter.
automatic	Indicates that the traceroute was triggered automatically (for example, as a result of a peer MEP exceeding the loss threshold, or if Continuity-Check Auto-traceroute is configured).
00:00:00 remaining	If the traceroute is in progress, the time remaining until it completes.
No replies received	Traceroute has completed but no replies were received.
Replies dropped	Number of replies dropped.
FDB only	Indicates FDB-only was configured for a standard traceroute.

Field	Description
Hop	Number of hops between the source MEP and the Maintenance Point that sent the reply. (Exploratory traceroutes) The display is indented by an extra character as the hop increases, so that the tree of responses can be seen.
Hostname/Last	On the first line, the hostname of the Maintenance Point that sent the reply. On the second line, the hostname of the previous Maintenance Point in the path. If either of the hostnames is unknown, the corresponding Egress ID is displayed instead.
Ingr/Egr	(Exploratory traceroutes) Indicates whether the reply is for an ingress or egress interface, but never both.
Ingress MAC/Name	If the reply includes information about the ingress interface, then the first line displays the ingress interface MAC address and the ingress action. The ingress interface name, if known, is displayed on the second line.
Egress MAC/Name	If the reply includes information about the egress interface, then the first line displays the egress interface MAC address and the egress action. The egress interface name, if known, is displayed on the second line.
MAC/Name	(Exploratory traceroutes) The MAC address of the interface from which the reply was sent, and the ingress/egress action, are displayed on the first line. If the interface name was present in the reply, it is displayed on the second line.
Relay	Type of relay action performed. For standard traceroutes, the possible values are: <ul style="list-style-type: none"> • Hit—The target MAC address was reached. • FDB—The target MAC address was found in the Filtering Database (the MAC learning table on the switch) and will be forwarded by the interface. • MPDB—The target MAC address was found in the MP Database (the CCM Learning database on the switch). In addition, “MEP” is displayed on the second line if a terminal MEP was reached. For exploratory traceroutes, the possible values are: <ul style="list-style-type: none"> • Hit—The target MAC address was reached. • FDB—The target MAC address was found in the Filtering Database and will be forwarded at this interface. • Flood—The target MAC address was not found in the Filtering database, and will be flooded at this interface. • Drop—The target MAC address will not be forwarded at this interface.

The following example shows sample output for the **show ethernet cfm traceroute-cache detail** command:

RP/0/RP0/CPU0:router# show ethernet cfm traceroute-cache domain bar detail

Traceroutes in domain bar (level 4), service bar
Source: MEP-ID 1, interface GigabitEthernet0/0/0/0

=====

Traceroute at 2009-05-18 12:09:10 to 0001.0203.0402,
TTL 64, Trans ID 2:

Hop	Hostname	Ingress MAC	Egress MAC	Relay
1	ios	0001.0203.0400 [Down]		FDB
	Level: 4, version: 0, Transaction ID: 2 TTL: 63, Relay Action: RlyFDB Forwarded, Terminal MEP not reached Last egress ID: 0000-0001.0203.0400 Next egress ID: 0000-0001.0203.0400 Ingress interface: Action: IngDown, MAC: 0001.0203.0400 ID: Local: Gi0/0/0/0 Hostname: Local: ios, address Not specified			
2	abc		0001.0203.0401 [Ok]	FDB
	Level: 4, version: 0, Transaction ID: 2 TTL: 62, Relay Action: RlyFDB Forwarded, Terminal MEP not reached Last egress ID: 0000-0001.0203.0400 Next egress ID: 0000-0001.0203.0401 Egress interface: Action: EgOk, MAC: 0001.0203.0401 ID: Not present Hostname: Local: abc, address Not specified			
3	bcd	0001.0203.0402 [Ok]		Hit
	Level: 4, version: 0, Transaction ID: 2 TTL: 61, Relay Action: RlyHit Not Forwarded, Terminal MEP not reached Last egress ID: 0000-0001.0203.0401 Next egress ID: Not Forwarded Ingress interface: Action: IngOk, MAC: 0001.0203.0402 ID: Local: GigE0/0 Hostname: Local: bcd, address Not specified			

Replies dropped: 0

Traceroute at 2009-05-18 12:30:10 explore to ffff.ffff.ffff from 0204.0608.0a0c,
TTL 255, Trans ID 5, Timeout auto, Reply Filter Spanning Tree:

Hop	Hostname	Ingr/Egr MAC	Relay
1	0000-0015.0000.ffffe	Ingress 0015.0000.ffffe [Ok]	FDB
	Level: 2, version: 0, Transaction ID: 5 TTL: 254, Relay Action: RlyFDB Forwarded, Terminal MEP not reached Next-Hop Timeout: 5 seconds Delay Model: Logarithmic Last egress ID: 0000-0002.0002.0002 Next egress ID: 0000-0015.0000.ffffe Ingress interface: Action: ELRIngOk, MAC: 0015.0000.ffffe ID: Local: Gi0/0/0/0.1		

show ethernet cfm traceroute-cache

```

2 0001-0030.0000.ffff          Egress  0030.0000.ffff [Ok]   Drop
  Level: 2, version: 0, Transaction ID: 5
  TTL: 253, Relay Action: RlyDrop
  Not Forwarded, Terminal MEP not reached
  Next-Hop Timeout: 5 seconds
  Delay Model: Logarithmic
  Last egress ID: 0000-0015.0000.ffffe
  Next egress ID: 0030-0000.0000.ffffd
  Egress interface:
    Action: ELREgrOk, MAC: 0030.0000.ffffd
    ID: Local: Gi0/1/0/1.2

```

Related Commands

Command	Description
traceroute cache, on page 212	Sets the maximum limit of traceroute cache entries or the maximum time limit to hold the traceroute cache entries.
clear ethernet cfm traceroute-cache, on page 40	Removes the contents of the traceroute cache.
traceroute ethernet cfm, on page 213	Sends Ethernet CFM traceroute messages to generate a basic.

show ethernet oam configuration

To display the current active Ethernet OAM configuration on an interface, use the **show ethernet oam configuration** command in EXEC mode.

show ethernet oam configuration [**interface** *type interface-path-id*]

Syntax Description	<p>interface <i>type</i> (Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.</p> <hr/> <p><i>interface-path-id</i> (Optional) Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
---------------------------	--

Command Default	If no parameters are specified, the configurations for all Ethernet OAM interfaces is displayed.
------------------------	--

Command Modes	EXEC mode
----------------------	-----------

Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 4.0.0</td> <td>The “Uni-directional link-fault detection enabled” output field was added.</td> </tr> <tr> <td></td> <td>The “Uni-directional link-fault detection enabled” field is not supported in this release. Therefore, the field will always display “N.”</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.	Release 4.0.0	The “Uni-directional link-fault detection enabled” output field was added.		The “Uni-directional link-fault detection enabled” field is not supported in this release. Therefore, the field will always display “N.”
Release	Modification								
Release 3.9.0	This command was introduced.								
Release 4.0.0	The “Uni-directional link-fault detection enabled” output field was added.								
	The “Uni-directional link-fault detection enabled” field is not supported in this release. Therefore, the field will always display “N.”								

Usage Guidelines	This command displays the Ethernet OAM configuration information for all interfaces, or a specified interface.
-------------------------	--

Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read
Task ID	Operations				
ethernet-services	read				

Examples

The following example shows how to display Ethernet OAM configuration information for a specific interface:

```
RP/0/RP0/CPU0:router# show ethernet oam configuration interface gigabitethernet 0/4/0/0
Thu Aug  5 21:54:34.050 DST
GigabitEthernet0/4/0/0:
  Hello interval:                               1s
  Link monitoring enabled:                       Y
  Remote loopback enabled:                       N
  Mib retrieval enabled:                         N
  Uni-directional link-fault detection enabled:  N
  Configured mode:                              Active
  Connection timeout:                            5
```

show ethernet oam configuration

```

Symbol period window: 0
Symbol period low threshold: 1
Symbol period high threshold: None
Frame window: 1000
Frame low threshold: 1
Frame high threshold: None
Frame period window: 1000
Frame period low threshold: 1
Frame period high threshold: None
Frame seconds window: 60000
Frame seconds low threshold: 1
Frame seconds high threshold: None
High threshold action: None
Link fault action: Log
Dying gasp action: Log
Critical event action: Log
Discovery timeout action: Log
Capabilities conflict action: Log
Wiring conflict action: Error-Disable
Session up action: Log
Session down action: Log
Remote loopback action: Log
Require remote mode: Ignore
Require remote MIB retrieval: N
Require remote loopback support: N
Require remote link monitoring: N

```

The following example shows how to display the configuration for all EOAM interfaces:

```

RP/0/RP0/CPU0:router# show ethernet oam configuration
Thu Aug 5 22:07:06.870 DST
GigabitEthernet0/4/0/0:
Hello interval: 1s
Link monitoring enabled: Y
Remote loopback enabled: N
Mib retrieval enabled: N
Uni-directional link-fault detection enabled: N
Configured mode: Active
Connection timeout: 5
Symbol period window: 0
Symbol period low threshold: 1
Symbol period high threshold: None
Frame window: 1000
Frame low threshold: 1
Frame high threshold: None
Frame period window: 1000
Frame period low threshold: 1
Frame period high threshold: None
Frame seconds window: 60000
Frame seconds low threshold: 1
Frame seconds high threshold: None
High threshold action: None
Link fault action: Log
Dying gasp action: Log
Critical event action: Log
Discovery timeout action: Log
Capabilities conflict action: Log
Wiring conflict action: Error-Disable
Session up action: Log
Session down action: Log
Remote loopback action: Log
Require remote mode: Ignore
Require remote MIB retrieval: N

```

```
Require remote loopback support:      N
Require remote link monitoring:       N
```

Related Commands	Command	Description
	show ethernet oam discovery, on page 182	Displays the current status of Ethernet OAM sessions.
	show ethernet oam statistics, on page 188	Displays the local and remote Ethernet OAM statistics for interfaces.
	show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

show ethernet oam discovery

To display the currently configured OAM information of Ethernet OAM sessions on interfaces, use the **show ethernet oam discovery** command in EXEC mode.

show ethernet oam discovery [**brief** | **interface** *type interface-path-id* [**remote**]]

Syntax Description	Parameter	Description
	brief	Displays minimal, currently configured OAM information in table form.
	interface <i>type</i>	(Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	Physical interface or virtual interface.
	Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.
	remote	(Optional) Retrieves and displays information from a remote device, as if the command was run on the remote device.

Command Default Displays detailed information for Ethernet OAM sessions on all interfaces.

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read

Examples

The following example shows how to display the minimal, currently configured OAM information for Ethernet OAM sessions on all interfaces:

```
RP/0/RP0/CPU0:router# show ethernet oam discovery brief
```

```
Sat Jul  4 13:52:42.949 PST
Flags:
  L - Link Monitoring support
  M - MIB Retrieval support
  R - Remote Loopback support
  U - Unidirectional detection support
  * - data is unavailable
```

Local Interface	Remote MAC Address	Remote Vendor	Mode	Capability
Gi0/1/5/1	0010.94fd.2bfa	00000A	Active	L
Gi0/1/5/2	0020.95fd.3bfa	00000B	Active	M
Gi0/1/6/1	0030.96fd.6bfa	00000C	Passive	L R
Fa0/1/3/1	0080.09ff.e4a0	00000C	Active	L R

The following example shows how to display detailed, currently configured OAM information for the Ethernet OAM session on a specific interface:

```
RP/0/RP0/CPU0:router# show ethernet oam discovery interface gigabitethernet 0/1/5/1
```

```
Sat Jul 4 13:56:49.967 PST
GigabitEthernet0/1/5/1:
Local client
-----
Administrative configuration:
  PDU revision:                1
  Mode:                        Active
  Unidirectional support:      N
  Link monitor support:        Y
  Remote loopback support:     N
  MIB retrieval support:       N
  Maximum PDU size:            1500
  Mis-wiring detection key:    5E9D

Operational status:
  Port status:                  Active send
  Loopback status:              None
  Interface mis-wired:          N

Remote client
-----
MAC address:                    0030.96fd.6bfa
Vendor (OUI):                   00.00.0C (Cisco)

Administrative configuration:
  PDU revision:                5
  Mode:                        Passive
  Unidirectional support:      N
  Link monitor support:        Y
  Remote loopback support:     Y
  MIB retrieval support:       N
  Maximum PDU size:            1500
```

Related Commands

Command	Description
show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
show ethernet oam statistics, on page 188	Displays the local and remote Ethernet OAM statistics for interfaces.
show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

show ethernet oam event-log

To display the most recent OAM event logs per interface, use the **show ethernet oam event-log** command in EXEC mode.

show ethernet oam event-log [**interface** *interface*] [**detail**]

Syntax Description	interface <i>interface</i> Filters the output to only include events for the specified interface.
	detail Displays additional details like threshold value, breaching value, total running errors and window size of a particular interface.

Command Default This command displays event logs for all interfaces which have OAM configured.

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.3.1	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read

Examples

The following example shows how to display the event logs for all interfaces which have OAM configured:

```
RP/0/RP0/CPU0:router# show ethernet oam event-log
Wed Jan 23 06:16:46.684 PST
Local Action Taken:
  N/A      - No action needed          EFD      - Interface brought down using EFD
  None     - No action taken          Err.D    - Interface error-disabled
  Logged   - System logged

GigabitEthernet0/1/0/0
=====
Time                Type                Loc'n  Action  Threshold  Breaching Value
-----
Wed Jan 23 06:13:25 PST  Symbol period      Local  N/A     1           4
Wed Jan 23 06:13:33 PST  Frame              Local  N/A     1           6
Wed Jan 23 06:13:37 PST  Frame period       Local  None    9           12
Wed Jan 23 06:13:45 PST  Frame seconds      Local  N/A     1           10
Wed Jan 23 06:13:57 PST  Dying gasp        Remote  Logged  N/A         N/A

GigabitEthernet0/1/0/1
=====
Time                Type                Loc'n  Action  Threshold  Breaching Value
-----
Wed Jan 23 06:26:14 PST  Dying gasp        Remote  Logged  N/A         N/A
Wed Jan 23 06:33:25 PST  Symbol period      Local  N/A     1           4
Wed Jan 23 06:43:33 PST  Frame period       Remote  N/A     9           12
```


Wed Jan 23 06:53:37 PST	Critical event	Remote	Logged	N/A	N/A
Wed Jan 23 07:13:45 PST	Link fault	Remote	EFD	N/A	N/A
Wed Jan 23 07:18:23 PST	Dying gasp	Local	Logged	N/A	N/A

Related Commands

Command	Description
show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
show ethernet oam discovery, on page 182	Displays the current status of Ethernet OAM sessions.
show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

show ethernet oam interfaces

To display the current state of Ethernet OAM interfaces, use the **show ethernet oam interfaces** command in EXEC mode.

show ethernet oam interfaces [**interface** *type interface-path-id*]

Syntax Description

interface *type* (Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

No parameters displays the current state for all Ethernet OAM interfaces.

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	read

Examples

The following example shows how to display the current state for all Ethernet OAM interfaces:

```
RP/0/RP0/CPU0:router# show ethernet oam interfaces
GigabitEthernet0/0/0/0
In REMOTE_OK state
Local MWD key: 80081234
Remote MWD key: 8F08ABCC
EFD triggered: Yes (link-fault)
```

Table 9: show ethernet oam interfaces Field Descriptions

Field	Description
In <i>type</i> state	<p>The possible discovery state <i>type</i> values are:</p> <ul style="list-style-type: none"> • ACTIVE_SEND_LOCAL—The interface is configured in active mode (the default), but no Information PDUs have been received from the peer (except possibly link-fault PDUs). Information PDUs are sent. • FAULT—A local unidirectional link fault has been detected. Link-fault PDUs are sent. • INACTIVE—The interface is down. • PASSIVE_WAIT—The interface is configured in passive mode (mode passive command) but no Information PDUs have been received from the peer (except possibly link-fault PDUs). No PDUs are sent. • REMOTE—(Also known as SEND_LOCAL_REMOTE). Information PDUs are being sent and received, but the local device is not satisfied with the remote peer's capabilities (for example, because there is a 'require-remote' configuration and the peer does not have the required capabilities). • REMOTE_OK—(Also known as SEND_LOCAL_REMOTE_OK). Information PDUs are being sent and received, and the local device is satisfied with the peer's capabilities, but the remote peer is not satisfied with the local device capabilities (for example, because there is a 'require-remote' configuration on the peer device). • SEND_ANY—The discovery process has completed, both devices are satisfied with the configuration and the session is up. All types of PDU can be sent and received.
EFD triggered	<p>Indicates if an Ethernet Fault Detection (EFD) event has occurred on the interface and the type of fault that triggered the interface to be moved to the down state for the line protocol. The possible EFD trigger events are:</p> <ul style="list-style-type: none"> • capabilities-conflict • discovery-timeout • • session-down • wiring-conflict

Related Commands

Command	Description
show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
show ethernet oam discovery, on page 182	Displays the current status of Ethernet OAM sessions.
show ethernet oam statistics, on page 188	Displays the local and remote Ethernet OAM statistics for interfaces.

show ethernet oam statistics

To display the local and remote Ethernet OAM statistics for interfaces, use the **show ethernet oam statistics** command in EXEC mode.

show ethernet oam statistics [**interface** *type interface-path-id* [**remote**]]

Syntax Description	<p>interface type (Optional) Displays information about the specified interface type. For more information, use the question mark (?) online help function.</p> <hr/> <p><i>interface-path-id</i> Physical interface or virtual interface.</p> <p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p> <hr/> <p><i>remote</i> (Optional) Retrieves and displays information from a remote device, as if the command was run on the remote device.</p>
---------------------------	---

Command Default No parameters displays statistics for all Ethernet OAM interfaces.

Command Modes EXEC mode

Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 3.9.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.
Release	Modification				
Release 3.9.0	This command was introduced.				

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read
Task ID	Operations				
ethernet-services	read				

Examples The following example shows how to display Ethernet OAM statistics for a specific interface:

```
RP/0/RP0/CPU0:router# show ethernet oam statistics interface gigabitethernet 0/1/5/1

GigabitEthernet0/1/5/1:
Counters
-----
Information OAMPDU Tx          161177
Information OAMPDU Rx          151178
Unique Event Notification OAMPDU Tx      0
Unique Event Notification OAMPDU Rx      0
Duplicate Event Notification OAMPDU Tx    0
Duplicate Event Notification OAMPDU Rx    0
Loopback Control OAMPDU Tx              0
Loopback Control OAMPDU Rx              0
```

```

Variable Request OAMPDU Tx           0
Variable Request OAMPDU Rx           0
Variable Response OAMPDU Tx          0
Variable Response OAMPDU Rx           0
Organization Specific OAMPDU Tx      0
Organization Specific OAMPDU Rx      0
Unsupported OAMPDU Tx                 45
Unsupported OAMPDU Rx                 0
Frames Lost due to OAM                23
Fixed frames Rx                       1

Local event logs
-----
  Errored Symbol Period records       0
  Errored Frame records                0
  Errored Frame Period records        0
  Errored Frame Second records        0

Remote event logs
-----
  Errored Symbol Period records       0
  Errored Frame records                0
  Errored Frame Period records        0
  Errored Frame Second records        0

```

Related Commands

Command	Description
show ethernet oam configuration, on page 179	Displays the current active Ethernet OAM configuration on an interface.
show ethernet oam discovery, on page 182	Displays the current status of Ethernet OAM sessions.
show ethernet oam interfaces, on page 186	Displays the current state of Ethernet OAM interfaces.

show ethernet oam summary

To display the summary of all the active OAM sessions across all the interfaces, use the **show ethernet oam summary** command in EXEC mode.

The summary output hides the fields for which the field count is zero (0).

show ethernet oam summary

Command Default This command displays summary of all the active OAM sessions for all the interfaces.

Command Modes EXEC mode

Command History

Release	Modification
Release 5.2.1	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ethernet-services	read

Examples

The following example shows how to display the summary for all the active OAM sessions across all the interfaces.

```
Router#show ethernet oam summary
Wed Apr 29 09:32:19.874 PDT
Link OAM System Summary
=====
Profiles:                               1
Interfaces:                              4
  Interface states
    Port down:                           4
    Passive wait:                         0
    Active send:                          0
    Operational:                          0
    Loopback mode:                        0
  Miswired connections:                   1
Events:                                   0
  Local:                                  0
    Symbol period:                        0
    Frame:                                 0
    Frame period:                          0
    Frame seconds:                         0
  Remote:                                 0
    Symbol period:                        0
    Frame:                                 0
    Frame period:                          0
    Frame seconds:                         0

Event Logs
=====
Local Action Taken:
  N/A      - No action needed           EFD      - Interface brought down using EFD
```

None - No action taken
Logged - System logged

Err.D - Interface error-disabled

Interface	Time	Type	Loc'n	Action
Gi0/0/0/0	Wed Apr 29 08:56:54 PDT	Dying gasp	Local	Err.D
Gi0/0/0/0	Wed Apr 29 08:56:54 PDT	Link fault	Remote	Err.D
Gi0/0/0/1	Wed Apr 29 08:56:51 PDT	Dying gasp	Local	Err.D
Gi0/0/0/1	Wed Apr 29 08:56:51 PDT	Link fault	Remote	Err.D
Gi0/0/0/2	Wed Apr 29 08:56:50 PDT	Dying gasp	Local	Err.D
Gi0/0/0/2	Wed Apr 29 08:56:50 PDT	Dying gasp	Remote	Err.D
Gi0/0/0/3	Wed Apr 29 08:56:46 PDT	Dying gasp	Local	Err.D
Gi0/0/0/3	Wed Apr 29 08:56:46 PDT	Link fault	Remote	Err.D

show ethernet sla configuration-errors

To display information about errors that are preventing configured Ethernet Service Level Agreement (SLA) operations from becoming active, as well as any warnings that have occurred, use the **show ethernet sla configuration-errors** command in EXEC mode.

show ethernet sla configuration-errors [**domain** *domain-name*] [**interface** *type interface-path-id*] [**profile** *profile-name*]

Syntax Description	
domain <i>domain-name</i>	Displays information for the specified domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain where the SLA operation is configured.
interface <i>type</i>	(Optional) Displays information for the specified interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
profile <i>profile-name</i>	(Optional) Displays information for the specified profile name.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to display information about errors that are preventing configured SLA operations from becoming active:

```
RP/0/RP0/CPU0:router# show ethernet sla configuration-errors

Errors:
-----
  Profile 'gold' is not defined but is used on Gi0/0/0/0.0
```


Profile 'red' defines a test-pattern, which is not supported by the type

show ethernet sla operations

To display information about configured Ethernet Service Level Agreement (SLA) operations, use the **show ethernet sla operations** command in EXEC mode.

show ethernet sla operations [**detail**] [**domain** *domain-name*] [**interface** *type interface-path-id*] [**on-demand** *allid* | **profile** *profile-name* | **all**]

Syntax Description					
detail	(Optional) Displays detailed information.				
domain <i>domain-name</i>	(Optional) Displays information for the specified domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain where the SLA operation is configured.				
interface <i>type</i>	(Optional) Displays information for the specified interface type. For more information, use the question mark (?) online help function.				
<i>interface-path-id</i>	Displays information for the specified interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.				
on-demand all	(Optional) Displays information for all on-demand operations.				
on-demand <i>id</i>	(Optional) Displays information for the specified on-demand operation, where <i>id</i> is the number of the operation.				
profile <i>profile-name</i>	(Optional) Displays information for the specified profile name.				
profile all	(Optional) Displays information for all profiles.				
Command Default	No default behavior or values				
Command Modes	EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.0.0	This command was introduced.
Release	Modification				
Release 4.0.0	This command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write
Task ID	Operations				
ethernet-services	read, write				

Examples

Examples

The following example shows how to display information about configured SLA operations in brief:

```
RP/0/RP0/CPU0:router# show ethernet sla operations
```

```
Profile           Instance
-----
gold              Gi0/0/0/0, dom d,      to MEP-ID 200          !
business-gold    Gi0/0/0/0, dom mydom, to 00ab.cdef.1234
business-gold    Gi0/0/0/0, dom mydom, to MEP-ID 2
```



Note If the SLA operation has a configuration error, an exclamation point (!) is displayed at the end of the line in the command output.

The following example shows how to display information about configured SLA operations in detail:

```
RP/0/RP0/CPU0:router# show ethernet sla operations detail
```

```
Source: Interface GigabitEthernet0/0/0/0, Domain d
Destination: Target MEP-ID 200
=====
Profile 'gold'
Profile is not configured

Source: Interface GigabitEthernet0/0/0/0, Domain mydom
Destination: Target MAC Address 00ab.cdef.1234
=====
Profile 'business-gold'
Probe type 'cfm-delay-measurement':
  burst sent every 1min, each of 20 packets sent every 100ms
Measures RT Delay: 5 bins; 1 buckets/probe; 75 of 100 archived
Measures RT Jitter (interval 1): no aggregation; 5 probes/bucket; 10 of 10 archived
Scheduled to run every 5min first at 00:02:00 UTC for 2min (2 bursts)
  last run at 07:32:00 PST Tue 19 January 2010

Source: Interface GigabitEthernet0/0/0/0, Domain mydom
Destination: Target MEP-ID 2
=====
Profile 'business-gold'
Probe type 'cfm-delay-measurement':
  burst sent every 1min, each of 20 packets sent every 100ms
Measures RT Delay: 5 bins; 1 buckets/probe; 75 of 100 archived
Measures RT Jitter (interval 1): no aggregation; 5 probes/bucket; 10 of 10 archived
Scheduled to run every 5min first at 00:02:00 UTC for 2min (2 bursts)
  last run at 07:32:00 PST Tue 19 January 2010
```

The following example shows how to display information about on-demand SLA operations in detail:

```
RP/0/RP0/CPU0:router# show ethernet sla operations detail on-demand
```

```
Source: Interface GigabitEthernet0/0/0/0.0, Domain mydom
Destination: Target MAC Address 00ab.cdef.1234
=====
On-demand operation ID #6
```

```

Probe type 'cfm-loopback':
  burst sent every 10s, each of 10 packets sent every 1s
  packets padded to 1024 bytes with pattern 0xabcd56ef
  packets use priority value of 3
Measures RT Delay: no aggregation; 1 buckets/probe; 1 of 100 archived
Started at 12:01:49 GMT Tue 02 March 2010, runs every 1hr for 1hr (360 bursts)
  repeats 10 times, ends at 22:01:49 GMT Tue 02 March 2010

```

The following example shows how to display information about configured and on-demand SLA operations on a specific interface:

```

RP/0/RP0/CPU0:router# show ethernet sla operations interface gigabitethernet 0/0/0/0.0
detail

```

```

Interface GigabitEthernet 0/0/0/0.0
Domain mydom Service myser to 00AB.CDEF.1234
-----
Profile 'business-gold'
Probe type CFM-delay-measurement:
  bursts sent every 1min, each of 20 packets sent every 100ms
  packets padded to 1500 bytes with zeroes
  packets use priority value of 7
Measures RTT: 5 bins 20ms wide; 2 buckets/ probe; 75/100 archived
Measures Jitter (interval 1): 3 bins 40ms wide; 2 buckets/probe; 50 archived
Scheduled to run every Sunday at 4am for 2 hours:
  last run at 04:00 25/05/2008

```

show ethernet sla statistics

To display the contents of buckets containing Ethernet Service Level Agreement (SLA) metrics collected by probes, use the **show ethernet sla statistics** command in EXEC mode.

```
show ethernet sla statistics [current | history] [detail] [domain domain-name] [interface type
interface-path-id] [on-demand allid | profile profile-name | all] [statistic stat-type]
```

Syntax	Description
current	(Optional) Displays the content of buckets currently being filled.
history	(Optional) Displays the content of all full buckets.
detail	(Optional) Displays detailed content of buckets.
domain <i>domain-name</i>	(Optional) Displays the content of buckets for the specified domain, where <i>domain-name</i> is a string of a maximum of 80 characters that identifies the domain where the SLA operation is configured.
interface <i>type</i>	(Optional) Displays the content of buckets for the specified interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Displays the content of buckets for the specified interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
on-demand all	(Optional) Displays the content of buckets for all on-demand operations.
on-demand <i>id</i>	(Optional) Displays the content of buckets for the specified on-demand operation, where <i>id</i> is the number of the operation.
profile <i>profile-name</i>	(Optional) Displays the content of buckets for the specified profile name.
profile all	(Optional) Displays the content of buckets for all profiles.
statistic <i>stat-type</i>	(Optional) Displays only the specified type of statistic. Valid values are: <ul style="list-style-type: none"> • one-way-delay-ds—Displays only one-way (destination-to-source) delay. • one-way-delay-sd—Displays only one-way (source-to-destination) delay. • one-way-jitter-ds—Displays only one-way (destination-to-source) jitter. • one-way-jitter-sd—Displays only one-way (source-to-destination) jitter. • round-trip-delay—Displays only round-trip delay. • round-trip-jitter—Displays only round-trip jitter.
Command Default	No default behavior or values

Command Modes EXEC mode

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines See the Usage Guidelines in the **buckets size** command for a description of buckets.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

This example shows how to display the current contents of buckets containing SLA metrics collected by probes in brief:

```
RP/0/RP0/CPU0:router# show ethernet sla statistics

Source: Interface GigabitEthernet0/0/0/0, Domain mydom
Destination: Target MEP-ID 2
=====
Profile 'business-gold', packet type 'cfm-delay-measurement'
Scheduled to run every 5min first at 00:02:00 UTC for 2min

Round Trip Delay
~~~~~
1 buckets per probe

Bucket started at 07:47:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: 0.24ms; Max: 0.49ms; Mean: 0.34ms; StdDev: 0.05ms

Bucket started at 07:52:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: 0.24ms; Max: 0.69ms; Mean: 0.34ms; StdDev: 0.12ms

Round Trip Jitter
~~~~~
1 buckets per probe

Bucket started at 07:47:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: -0.25ms; Max: 0.13ms; Mean: -0.01ms; StdDev: 0.08ms

Bucket started at 07:52:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: -0.38ms; Max: 0.38ms; Mean: -0.02ms; StdDev: 0.14ms
```

This example shows how to display the current contents of buckets containing SLA metrics collected by probes in detail:



Note In this example, the round-trip-delay measurement is configured with aggregation (and hence bins are displayed), whereas the round-trip-jitter measurement is configured with no aggregation (and hence individual samples are displayed).

```
RP/0/RP0/CPU0:router# show ethernet sla statistics detail
Source: Interface GigabitEthernet0/0/0/0, Domain mydom
Destination: Target MEP-ID 2
=====
Profile 'business-gold', packet type 'cfm-delay-measurement'
Scheduled to run every 5min first at 00:02:00 UTC for 2min

Round Trip Delay
~~~~~
1 buckets per probe

Bucket started at 07:47:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: 0.24ms, occurred at 07:47:29 on Tue 19 Jan 2010 UTC
  Max: 0.49ms, occurred at 07:48:04 on Tue 19 Jan 2010 UTC
  Mean: 0.34ms; StdDev: 0.05ms

  Bins:
  Range      Samples    Cum. Count  Mean
  -----
  0 to 20 ms  20 (100.0%) 20 (100.0%) 0.34ms
  20 to 40 ms  0 (0.0%)   20 (100.0%) -
  40 to 60 ms  0 (0.0%)   20 (100.0%) -
  60 to 80 ms  0 (0.0%)   20 (100.0%) -
  > 80      ms  0 (0.0%)   20 (100.0%) -

Bucket started at 07:52:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: 0.24ms, occurred at 07:53:10 on Tue 19 Jan 2010 UTC
  Max: 0.69ms, occurred at 07:53:42 on Tue 19 Jan 2010 UTC
  Mean: 0.34ms; StdDev: 0.12ms

  Bins:
  Range      Samples    Cum. Count  Mean
  -----
  0 to 20 ms  20 (100.0%) 20 (100.0%) 0.34ms
  20 to 40 ms  0 (0.0%)   20 (100.0%) -
  40 to 60 ms  0 (0.0%)   20 (100.0%) -
  60 to 80 ms  0 (0.0%)   20 (100.0%) -
  > 80      ms  0 (0.0%)   20 (100.0%) -

Round Trip Jitter
~~~~~
1 buckets per probe

Bucket started at 07:47:00 PST Tue 19 January 2010 lasting 2min
  Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
  Min: -0.25ms, occurred at 07:47:53 on Tue 19 Jan 2010 UTC
  Max: 0.13ms, occurred at 07:48:11 on Tue 19 Jan 2010 UTC
  Mean: -0.01ms; StdDev: 0.08ms

  Samples:
  Time sent  Result  Notes
  -----
```

show ethernet sla statistics

```

07:47:00.0    ...
07:47:00.1  -0.12ms
07:47:00.2   0.06ms
07:47:00.3   0.00ms
07:47:00.4  -0.06ms
07:47:00.5   0.00ms
07:47:00.6   0.00ms
07:47:00.7   0.00ms
07:47:00.8   0.06ms
07:47:00.9   0.00ms
07:48:00.0   0.11ms
07:48:00.1  -0.25ms
07:48:00.2   0.13ms
07:48:00.3   0.00ms
07:48:00.4  -0.06ms
07:48:00.5   0.00ms
07:48:00.6   0.06ms
07:48:00.7  -0.06ms
07:48:00.8   0.00ms
07:48:00.9   0.00ms

```

```

Bucket started at 07:52:00 PST Tue 19 January 2010 lasting 2min
Pkts sent: 20; Lost: 0 (0.0%); Corrupt: 0 (0.0%); Misordered: 0 (0.0%)
Min: -0.38ms, occurred at 07:52:13 on Tue 19 Jan 2010 UTC
Max: 0.38ms, occurred at 07:53:26 on Tue 19 Jan 2010 UTC
Mean: -0.02ms; StdDev: 0.14ms

```

```

Samples:
Time sent   Result   Notes
-----
07:52:00.0    ...
07:52:00.1  -0.38ms
07:52:00.2   0.00ms
07:52:00.3  -0.05ms
07:52:00.4   0.00ms
07:52:00.5   0.05ms
07:52:00.6   0.00ms
07:52:00.7   0.00ms
07:52:00.8   0.00ms
07:52:00.9   0.00ms
07:53:00.0   0.38ms
07:53:00.1  -0.32ms
07:53:00.2   0.00ms
07:53:00.3  -0.13ms
07:53:00.4   0.06ms
07:53:00.5   0.00ms
07:53:00.6   0.00ms
07:53:00.7   0.00ms
07:53:00.8   0.06ms
07:53:00.9   0.00ms

```

This example shows how to display the current contents of buckets containing SLA metrics collected by probes on a specific interface:

```
RP/0/RP0/CPU0:router# show ethernet sla statistics current interface GigabitEthernet 0/0/0/0.0
```

```

Interface GigabitEthernet 0/0/0/0.0
Domain mydom Service myser to 00AB.CDEF.1234
=====
Profile 'business-gold', packet type 'cfm-superpacket'
Scheduled to run every Sunday at 4am for 2 hours

```



```

Round Trip Delay
~~~~~
2 buckets per probe

Bucket started at 04:00 Sun 17 Feb 2008 lasting 1 hour:
  Pkts sent: 2342; Lost: 2 (0%); Corrupt: 0 (0%); Misordered: 0 (0%)
  Min: 13ms; Max: 154ms; Mean: 28ms; StdDev: 11ms

Round Trip Jitter
~~~~~
2 buckets per probe

Bucket started at 04:00 Sun 17 Feb 2008 lasting 1 hour:
  Pkts sent: 2342; Lost: 2 (0%); Corrupt: 0 (0%); Misordered: 0 (0%)
  Min: -5ms; Max: 8ms; Mean: 0ms; StdDev: 3.6ms

```

This example shows how to display a history detail of buckets containing SLA metrics collected by probes on a specific interface:

```

RP/0/RP0/CPU0:router# show ethernet sla history detail GigabitEthernet 0/0/0/0.0

Interface GigabitEthernet 0/0/0/0.0
Domain mydom Service myser to 00AB.CDEF.1234
=====
Profile 'business-gold', packet type 'cfm-loopback'
Scheduled to run every Sunday at 4am for 2 hours

Round Trip Delay
~~~~~
2 buckets per probe

Bucket started at 04:00 Sun 17 Feb 2008 lasting 1 hour:
  Pkts sent: 2342; Lost: 2 (0%); Corrupt: 0 (0%); Misordered: 0 (0%)
  Min: 13ms, occurred at 04:43:29 on Sun 22 Aug 2010 UTC
  Max: 154ms, occurred at 05:10:32 on Sun 22 Aug 2010 UTC
  Mean: 28ms; StdDev: 11ms

Results suspect as more than 10 seconds time drift detected
Results suspect as scheduling latency prevented some packets being sent

Samples:
Time sent      Result  Notes
-----
04:00:01.324   23ms
04:00:01.425   36ms
04:00:01.525   - Timed Out
...

Round Trip Jitter
~~~~~
2 buckets per probe

Bucket started at 04:00 Sun 17 Feb 2008, lasting 1 hour:
  Pkts sent: 2342; Lost: 2 (0%); Corrupt: 0 (0%); Misordered: 0 (0%)
  Min: -5ms, occurred at 04:15:03 on Sun 22 Aug 2010 UTC
  Max: 10ms, occurred at 05:29:15 on Sun 22 Aug 2010 UTC
  Mean: 0ms; StdDev: 3.6ms

Samples:
Time sent      Result  Notes
-----

```

show ethernet sla statistics

```

04:00:01.324      -
04:00:01.425      13ms
04:00:01.525      - Timed out
...

```

This example shows how to display statistics for all full buckets for on-demand operations in detail:

```
RP/0/RP0/CPU0:router# show ethernet sla statistics history detail on-demand
```

```

Interface GigabitEthernet0/0/0/0.1
Domain mydom Service myser to 0123.4567.890A
=====
On-demand operation ID #1, packet type 'cfm-delay-measurement'
Started at 15:38 on 06 July 2010 UTC, runs every 1 hour for 1 hour

```

```

Round Trip Delay
~~~~~
1 bucket per probe

```

```

Bucket started at 15:38 on Tue 06 Jul 2010 UTC, lasting 1 hour:
  Pkts sent: 1200; Lost: 4 (0%); Corrupt: 600 (50%); Misordered: 0 (0%)
  Min: 13ms, occurred at 15:43:29 on Tue 06 Jul 2010 UTC
  Max: 154ms, occurred at 16:15:34 on Tue 06 Jul 2010 UTC
  Mean: 28ms; StdDev: 11ms

```

```

Bins:
Range      Samples      Cum. Count      Mean
-----
0 - 20 ms  194 (16%)      194 (16%)       17ms
20 - 40 ms 735 (61%)      929 (77%)       27ms
40 - 60 ms 212 (18%)      1141 (95%)      45ms
> 60 ms    55 (5%)        1196             70ms

```

```

Bucket started at 16:38 on Tue 01 Jul 2008 UTC, lasting 1 hour:
  Pkts sent: 3600; Lost: 12 (0%); Corrupt: 1800 (50%); Misordered: 0 (0%)
  Min: 19ms, occurred at 17:04:08 on Tue 06 Jul 2010 UTC
  Max: 70ms, occurred at 16:38:00 on Tue 06 Jul 2010 UTC
  Mean: 28ms; StdDev: 11ms

```

```

Bins:
Range      Samples      Cum. Count      Mean
-----
0 - 20 ms  194 (16%)      194 (16%)       19ms
20 - 40 ms 735 (61%)      929 (77%)       27ms
40 - 60 ms 212 (18%)      1141 (95%)      45ms
> 60 ms    55 (5%)        1196             64ms

```

Related Commands

Command	Description
buckets size, on page 31	Configures the size of the buckets in which statistics are collected.

sla operation

To create an operation instance from a maintenance end point (MEP) to a specified destination, use the **sla operation** command in interface CFM MEP configuration mode. To remove the operation, use the **no** form of this command.

```
sla operation profile profile-name target mep-id id | mac-address mac-address
```

Syntax Description	Field	Description
	profile <i>profile-name</i>	Name of the profile to assign this operation.
	target mep-id <i>id</i>	Destination MEP ID. The range is 1 to 8191.
	mac-address <i>mac-address</i>	Destination MAC address in standard hexadecimal format, hh:hh:hh:hh:hh:hh.

Command Default No operations are configured

Command Modes Interface CFM MEP configuration (config-if-cfm-mep)

Command History	Release	Modification
	Release 4.0.0	This command was introduced.

Usage Guidelines

The **sla operation** command is supported on all Ethernet interfaces.

Multiple SLA operation instances may be configured under each MEP, and may have different targets, and may be assigned to different profiles.

If an operation is assigned to a nonexistent profile, a warning message is issued, and the offending configuration is shown in the output of the related show commands.

Changing the configuration of an SLA operation is equivalent to deleting the operation and creating a new operation. All stored data for the operation is discarded.

When **target mep-id** is specified, the operation is activated only if that MEP is in the peer MEP database. You can verify that a MEP is in the database, using the **show ethernet cfm peer meps** command.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples

The following example shows how to create an SLA operation instance using a profile named "Profile_1" to a destination MEP with the specified MAC address:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface gigabitethernet 0/1/0/1
RP/0/RP0/CPU0:router(config-if)# ethernet cfm
RP/0/RP0/CPU0:router(config-if-cfm)# mep domain Dm1 service Sv1 mep-id 1
```

```
RP/0/RP0/CPU0:router(config-if-cfm-mep) # sla operation profile Profile_1 target mac-address  
01:23:45:67:89:ab
```

Related Commands	Command	Description
	show ethernet cfm peer meps, on page 165	Displays information about maintenance end points (MEPs) for peer MEPs.

snmp-server traps ethernet cfm

To enable SNMP traps for Ethernet Connectivity Fault Management (CFM), use the **snmp-server traps ethernet cfm** command in Global Configuration mode.

snmp-server traps ethernet cfm

Syntax Description This command has no keywords or arguments.

Command Default Ethernet OAM event traps are not enabled.

Command Modes Global Configuration mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines If a Local MEP is receiving Wrong Level CCMs, then a transient timeout might occur when correct Level CCMs are received again.

Task ID	Task ID	Operations
	snmp	read, write

Examples

The following example shows how to enable SNMP server traps on an Ethernet OAM interface.

```
RP/0/RP0/CPU0:router #configure
RP/0/RP0/CPU0:router(config)# snmp-server traps ethernet cfm
```

snmp-server traps ethernet oam events

To enable SNMP traps for Ethernet OAM events, use the **snmp-server traps ethernet oam events** command in Global Configuration mode.

snmp-server traps ethernet oam events

Syntax Description This command has no keywords or arguments.

Command Default Ethernet OAM event traps are not enabled.

Command Modes Global Configuration mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	snmp	read, write

Examples The following example shows how to enable SNMP server traps on an Ethernet OAM interface.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# snmp-server traps ethernet oam events
```

statistics measure

To enable the collection of Ethernet Service Level Agreement (SLA) statistics, and enter the SLA profile statistics configuration mode, use the **statistics measure** command in SLA profile configuration mode. To disable statistics collection, use the **no** form of this command.

statistics measure one-way-delay-ds | one-way-delay-sd | one-way-jitter-ds | one-way-jitter-sd | round-trip-delay | round-trip-jitter
no statistics measure one-way-delay-ds | one-way-delay-sd | one-way-jitter-ds | one-way-jitter-sd | round-trip-delay | round-trip-jitter

Syntax Description

one-way-delay-ds	(CFM delay measurement profile type only) Enables the collection of statistics that measure delay in one direction, from destination to source.
one-way-delay-sd	(CFM delay measurement profile type only) Enables the collection of statistics that measure delay in one direction, from source to destination.
one-way-jitter-ds	(CFM delay measurement profile type only) Enables the collection of statistics that measure delay variance in one direction, from destination to source.
one-way-jitter-sd	(CFM delay measurement profile type only) Enables the collection of statistics that measure delay variance in one direction, from source to destination.
round-trip-delay	(CFM delay measurement and CFM loopback profile types only) Enables the collection of statistics that measure the delay in the round trip of a packet.
round-trip-jitter	(CFM delay measurement and CFM loopback profile types only) Enables the collection of statistics that measure the amount of delay variance in the round trip of a packet.

Command Default

No statistics are collected

Command Modes

SLA profile configuration (config-sla-prof)

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

For statistics to be collected, at least one statistics entry must be present in each profile. To measure more than one type of statistic, this command may be configured more than once in a single profile.

The one-way delay and jitter statistics are available for CFM delay measurement profile types only (**profile (SLA)** command with the **type cfm-delay-measurement** keywords).

Task ID

Task ID	Operations
ethernet-services	read, write

Examples

This example shows how to enable the collection of round-trip-delay statistics, and enter the SLA profile statistics configuration mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-loopback
RP/0/RP0/CPU0:router(config-sla-prof)# statistics measure round-trip-delay
RP/0/RP0/CPU0:router(config-sla-prof-stat-cfg)#
```

Related Commands

Command	Description
ethernet sla, on page 72	Enters the Ethernet SLA configuration mode.
profile (SLA), on page 133	Creates an SLA operation profile and enter the SLA profile configuration mode.

symbol-period threshold

To configure the thresholds that trigger an Ethernet OAM symbol-period error event, use the **symbol-period threshold** command in Ethernet OAM link monitor configuration mode. To return the threshold to the default value, use the **no** form of this command.

symbol-period threshold low threshold [high threshold]

Syntax Description	<p>low threshold Low threshold value, in symbols, that triggers a symbol-period error event. The range is 0 to 60000000.</p> <p>high threshold (Optional) High threshold value, in symbols, that triggers a symbol-period error event. The range is 0 to 60000000. The high threshold value can be configured only in conjunction with the low threshold value.</p>						
Command Default	The default low threshold is 1 symbol.						
Command Modes	Ethernet OAM link monitor configuration (config-eoam-lm) Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)						
Command History	<table border="1"> <thead> <tr> <th data-bbox="380 949 532 984">Release</th> <th data-bbox="542 949 695 984">Modification</th> </tr> </thead> <tbody> <tr> <td data-bbox="380 1014 532 1041">Release 3.9.0</td> <td data-bbox="542 1014 1036 1041">This command was introduced.</td> </tr> <tr> <td data-bbox="380 1071 532 1098">Release 6.1.2</td> <td data-bbox="542 1071 1036 1152">Allowed high threshold without low threshold. Added choice of units.</td> </tr> </tbody> </table>	Release	Modification	Release 3.9.0	This command was introduced.	Release 6.1.2	Allowed high threshold without low threshold. Added choice of units.
Release	Modification						
Release 3.9.0	This command was introduced.						
Release 6.1.2	Allowed high threshold without low threshold. Added choice of units.						
Usage Guidelines	When the low threshold is passed, a symbol-period error event notification is generated and transmitted to the OAM peer. Additionally, any registered higher level OAM protocols, such as Connectivity Fault Management (CFM), are also notified. When the high threshold is passed, the configured high threshold action is performed in addition to the low threshold actions. The high threshold is optional and is configurable only in conjunction with the low threshold.						
Task ID	<table border="1"> <thead> <tr> <th data-bbox="380 1390 532 1425">Task ID</th> <th data-bbox="542 1390 695 1425">Operations</th> </tr> </thead> <tbody> <tr> <td data-bbox="380 1455 532 1482">ethernet-services</td> <td data-bbox="542 1455 695 1516">read, write</td> </tr> </tbody> </table>	Task ID	Operations	ethernet-services	read, write		
Task ID	Operations						
ethernet-services	read, write						

Examples

The following example shows how to configure the symbol-period low and high thresholds that trigger a symbol-period error event:

```
Router(config)# ethernet oam profile Profile_1
Router(config-eoam)# link-monitor
Router(config-eoam-lm)# symbol-period threshold low 100 high 6000
```

symbol-period window

To configure the window size for an Ethernet OAM symbol-period error event, use the **symbol-period window** command in Ethernet OAM link monitor or interface Ethernet OAM link monitor configuration mode. To return the window size to the default value, use the **no** form of this command.

symbol-period window *window*

Syntax Description

window Size of the window for symbol-period error in milliseconds. The range is 1000 to 60000.

Command Default

The default value is 1000 milliseconds.

Command Modes

Ethernet OAM link monitor configuration (config-eoam-lm)

Interface Ethernet OAM link monitor configuration (config-if-eoam-lm)

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

The IEEE 802.3 standard defines the window size as a number of symbols rather than a time duration. These two formats can be converted either way by using a knowledge of the interface speed and encoding.

Task ID

Task ID	Operations
ethernet-services	read, write

Examples


The following example shows how to configure the window size for a symbol-period error.

```
RP/0/RP0/CPU0:router (config) # ethernet oam profile Profile_1
RP/0/RP0/CPU0:router (config-eoam) # link-monitor
RP/0/RP0/CPU0:router (config-eoam-lm) # symbol-period window 60000
```

synthetic loss calculation packets

To configure the number of packets that must be used to calculate each Frame Loss Ratio (FLR) calculation, use the **synthetic loss calculation packets** command in the Ethernet SLA profile probe configuration mode.

synthetic loss calculation packets *number*

Syntax Description	<p><i>number</i> Specifies the number of packets that must be used to calculate each FLR. The range is 10 – 12096000.</p> <p>Note The value must be a divisor of the number of packets per probe. If bursts are configured, the value must be a multiple of the number of packets per burst.</p>				
Command Default	The default value is the number of packets in the probe, that is each probe results in a single FLR calculation.				
Command Modes	SLA profile probe configuration (config-sla-prof-pb)				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 4.3.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 4.3.0	This command was introduced.
Release	Modification				
Release 4.3.0	This command was introduced.				
Usage Guidelines	The synthetic loss calculation packets command can only be configured for packet types that support synthetic loss measurement.				
 Note	An FLR value is calculated for each discrete block of packets. For instance, if a value of 10 is configured, then the first FLR value is calculated based on packets 0 to 9, the second FLR value is calculated based on packets 10 to 19, and so on.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ethernet-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	ethernet-services	read, write
Task ID	Operation				
ethernet-services	read, write				

Example

This example shows how to configure the number of packets to be used to calculate FLR using the **synthetic loss calculation packets** command:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet sla
RP/0/RP0/CPU0:router(config-sla)# profile Prof1 type cfm-synthetic-loss-measurement
RP/0/RP0/CPU0:router(config-sla-prof)# probe
RP/0/RP0/CPU0:router(config-sla-prof-pb)# synthetic loss calculation packets 1250
```

traceroute cache

To set the maximum limit of traceroute cache entries or the maximum time limit to hold the traceroute cache entries, use the **traceroute cache** command in CFM configuration mode. To return the traceroute cache to its default limits, use the **no** form of this command.

traceroute cache hold-time *minutes* **size** *entries*

Syntax Description	hold-time <i>minutes</i>
	Timeout value in minutes that entries are held in the Ethernet CFM traceroute cache table before being cleared. Range is 1 minute or greater.
	size <i>entries</i>
	Maximum number of entries that are stored in the Ethernet CFM traceroute cache table. An entry is a single traceroute reply. Range is 1 to 5000.

Command Default
hold-time: 100
size: 100

Command Modes CFM configuration (config-cfm)

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines A separate cache is managed for each node that sends a traceroute request. All replies to a single traceroute request are cached at once. The **hold-time** begins when the last reply to a request is received. When the **hold-time** limit is reached, all replies to that request are cleared. The size of each traceroute reply is limited by the MTU of the interface.

When the maximum number of entries (**size entries**) is exceeded, all replies for the oldest request are deleted.

Task ID	Task ID	Operations
	ethernet-services	read, write

Examples The following example shows how to set the **hold-time** and the **size** of a traceroute cache.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# ethernet cfm
RP/0/RP0/CPU0:router(config-cfm)# traceroute cache hold-time 1 size 3000
```

Related Commands	Command	Description
	ethernet cfm (global), on page 65	Enters CFM configuration mode.
	traceroute ethernet cfm, on page 213	Sends Ethernet CFM traceroute messages to generate a basic.

traceroute ethernet cfm

To send Ethernet connectivity fault management (CFM) traceroute messages to generate a basic, targeted, or exploratory traceroute, use the **traceroute ethernet** command in EXEC mode .

```
traceroute ethernet cfm domain domain-name service service-name mac-address target-mac-address
| mep-id target-mep-id | explore [all-ports] [from from-mac-address] source [mep-id source-mep-id]
interface type interface-path-id [asynchronous] [timeout seconds] [filtering-db-only] [cos cos-no]
[tfl tfl] [detail]
```

Syntax Description

domain <i>domain-name</i>	String of a maximum of 80 characters that identifies the domain in which the destination MEP resides. (Basic traceroute)
service <i>service-name</i>	String of a maximum of 80 characters that identifies the maintenance association to which the destination MEP belongs. (Basic traceroute)
mac-address <i>target-mac-address</i>	Identifies the 6-byte MAC address (in hexadecimal H.H.H format) of the destination MEP. (Targeted traceroute)
mep-id <i>target-mepid</i>	Destination maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191. (Targeted traceroute)
explore	(Optional) Specifies that an exploratory traceroute is performed.
all-ports	(Optional) Specifies an exploratory traceroute of all ports.
from <i>from-mac-address</i>	(Optional) Specifies an exploratory traceroute beginning at the specified MAC address (in hexadecimal H.H.H format).
source	Specifies source information for the traceroute.
mep-id <i>source-mep-id</i>	(Optional) Source maintenance end point (MEP) ID number. The range for MEP ID numbers is 1 to 8191.
interface <i>type</i>	Source interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
asynchronous	(Optional) Specifies that the traceroute is performed asynchronously, where control is returned to the command prompt immediately, and no results are displayed. The results can be displayed later using the show ethernet cfm traceroute-cache command.

timeout <i>seconds</i>	(Optional) Timeout value (in seconds) for the specified interface. For a basic traceroute, the timeout is a fixed value that defaults to 5 seconds. For an exploratory traceroute, a logarithmic algorithm is used unless this value is specified.
filtering-db-only	(Optional) Sets whether or not the remote maintenance points should base their responses on the filtering database only. The default is no—use both the filtering and MIP-CCM databases. Note The filtering-db-only option is only available for basic traceroute (when the MAC address or MEP ID is specified). It is not available with the explore option.
cos <i>cos-no</i>	(Optional) Identifies the class of traffic of the source MEP by setting a Class of Service (CoS) value. The valid values are from 0 to 7.
ttl <i>ttl</i>	Specifies the initial time-to-live (TTL) value (from 1 to 255) for the traceroute message. The default is 64.
detail	(Optional) Specifies that details are displayed in the output for the traceroute.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines By default, this command pauses until the traceroute operation is complete, then displays the results. If the **asynchronous** option is used, this command returns immediately and no results are displayed. Results are placed placed the traceroute cache and can be retrieved using the **show ethernet cfm traceroute-cache** command.

An exploratory traceroute, by default uses a **timeout** value that is calculated by a logarithmic delay algorithm. If the **timeout** value is specified, the specified value is used.

The display output of this command is similar to the output of the **show ethernet cfm traceroute-cache** command.

Task ID	Task ID	Operations
	interface	read

Examples

The following example shows how generate a basic traceroute:

```
RP/0/RP0/CPU0:router# tracroute ethernet cfm domain bar service bar mep-id 1 source interface gigabitethernet 0/0/0/0
```

```
Traceroutes in domain bar (level 4), service bar
Source: MEP-ID 1, interface GigabitEthernet0/0/0/0
```

```

=====
Traceroute at 2009-05-18 12:09:10 to 0001.0203.0402,
TTL 64, Trans ID 2:

Hop Hostname/Last          Ingress MAC/name      Egress MAC/Name      Relay
-----
 1 ios                      0001.0203.0400 [Down]
   0000-0001.0203.0400   Gi0/0/0/0
 2 abc                      0001.0203.0401 [Ok]
   ios                      Not present
 3 bcd                      0001.0203.0402 [Ok]
   abc                      GigE0/0
Replies dropped: 0

```

Related Commands

Command	Description
traceroute cache, on page 212	Sets the maximum limit of traceroute cache entries or the maximum time limit to hold the traceroute cache entries.
clear ethernet cfm traceroute-cache, on page 40	Removes the contents of the traceroute cache.
show ethernet cfm traceroute-cache, on page 173	Displays the contents of the traceroute cache.

