

Gigabit Ethernet Interfaces Commands

This section describes the commands used to configure Gigabit Ethernet services for Layer 2 VPNs.

Note All commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router that is introduced from Cisco IOS XR Release 6.3.2. References to earlier releases in Command History tables apply to only the Cisco NCS 5500 Series Router.

Note

- Starting with Cisco IOS XR Release 6.6.25, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 560 Series Routers.
- Starting with Cisco IOS XR Release 6.3.2, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router.
- References to releases before Cisco IOS XR Release 6.3.2 apply to only the Cisco NCS 5500 Series Router.
- Cisco IOS XR Software Release 7.0.1 specific updates are not applicable for the following variants of Cisco NCS 540 Series Routers:
  - N540-28Z4C-SYS-A
  - N540-28Z4C-SYS-D
  - N540X-16Z4G8Q2C-A
  - N540X-16Z4G8Q2C-D
  - N540X-16Z8Q2C-D
  - N540-12Z20G-SYS-A
  - N540-12Z20G-SYS-D
  - N540X-12Z16G-SYS-A
  - N540X-12Z16G-SYS-D

For detailed information about concepts and configuration, see the Configure Gigabit Ethernet for Layer 2 VPNs chapter in the *L2VPN and Ethernet Services Configuration Guide for Cisco NCS 5500 Series RoutersL2VPN and Ethernet Services Configuration Guide for Cisco NCS 540 Series RoutersL2VPN and Ethernet Services Configuration Guide for Cisco NCS 560 Series Routers*.

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dot1q tunneling ethertype

To configure the Ethertype, used by peer devices when implementing QinQ VLAN tagging, to be 0x9100, use the **dot1q tunneling ethertype** command in the interface configuration mode for an Ethernet interface. To return to the default Ethertype configuration (0x8100), use the **no** form of this command.

dot1q tunneling ethertype {**0x9100** | **0x9200**}
no dot1q tunneling ethertype

Syntax Description

0x9100	Sets the Ethertype value to 0x9100.
0x9200	Sets the Ethertype value to 0x9200.

Command Default

The Ethertype field used by peer devices when implementing QinQ VLAN tagging is either 0x8100 or 0x8200.

Command Modes

Interface configuration mode

Command History

Release	Modification
Release 6.0.1	This command was introduced.

Usage Guidelines

The **dot1q tunneling ethertype** command can be applied to a main interface. When applied to the main interface, it changes the subinterfaces, that have been configured with an **encapsulation dot1q second-dot1q** command, under that main interface.

This command changes the outer VLAN tag from 802.1q Ethertype 0x8100 to 0x9100 or 0x9200.

Task ID

Task ID	Operations
vlan	read, write

Examples

The following example shows how to configure the Ethertype to 0x9100:

```
Router# configure
Router(config)# interface GigabitEthernet 0/1/5/0
Router(config-if)# dot1q tunneling ethertype 0x9100
```

The following example shows how to configure the Ethertype to 0x9200:

```
Router# configure
```

```
Router(config)# interface GigabitEthernet 0/1/5/1
Router(config-if)# dot1q tunneling ethertype 0x9200
```

Related Commands

Command	Description
encapsulation dot1q	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
encapsulation dot1q second-dot1q	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.
encapsulation dot1ad	Defines the matching criteria to map 802.1ad frames ingress on an interface to the appropriate service instance.
encapsulation dot1ad dot1q	Defines the matching criteria to be used in order to map single-tagged 802.1ad frames ingress on an interface to the appropriate service instance.

l2transport (Ethernet)

To enable Layer 2 transport port mode on an Ethernet interface and enter Layer 2 transport configuration mode, use the **l2transport** command in interface or Subinterface configuration mode for an Ethernet interface. To disable Layer 2 transport port mode on an Ethernet interface, use the **no** form of this command.

l2transport
no l2transport

This command has no keywords or arguments.

Command Default

None

Command Modes

Interface configuration

Sub-interface configuration

Command History

Release	Modification
Release 6.0.1	This command was introduced.

Usage Guidelines

The l2transport command and these configuration items are mutually exclusive:

- IPv4 address and L3 feature configuration
- IPv4 enable and L3 feature configuration
- Bundle-enabling configuration
- L3 sub-interfaces
- Layer 3 QoS Policy



Note

- After an interface or connection is set to Layer 2 switched, commands such as **ipv4 address** are not usable. If you configure routing commands on the interface, **l2transport** is rejected.
- The **l2transport** command is mutually exclusive with any Layer 3 interface configuration.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to enable Layer 2 transport port mode on an Ethernet interface and enter Layer 2 transport configuration mode:

```
Router# configure
Router(config)# interface TenGigE 0/2/0/0
```

```
Router(config-if)# l2transport
Router(config-if-l2)#
```

Note Ensure that the **l2transport** command is applied on the same line as the **interface** command for the Ethernet sub-interface.

The following example shows how to use the l2transport command on an Ethernet sub-interface:

```
Router# configure
Router(config)# interface TenGigE 0/1/0/3.10 l2transport
Router(config-subif)# encapsulation dot1q 10
```

Examples

The following example shows how to configure an interface or connection as Layer 2 switched under several different modes:

Ethernet Port Mode:

```
Router# configure
Router(config)# interface TenGigE 0/0/0/10
Router(config-if)# l2transport
```

Ethernet VLAN Mode:

```
Router# configure
Router(config)# interface TenGigE 0/0/0/0.1 l2transport
Router(config-if)# encapsulation dot1q 10
```

Ethernet VLAN Mode (QinQ):

```
Router# configure
Router(config)# interface TenGigE 0/0/0/0.1 l2transport
Router(config-if)# encapsulation dot1q 10 second-dot1q 11
```

Note Ensure that the **l2transport** command is applied on the same line as the **interface** command for the Ethernet subinterface.

Related Commands

Command	Description
encapsulation dot1q	Defines the matching criteria to map 802.1Q frames ingress on an interface to the appropriate service instance.
encapsulation dot1q second-dot1q	Defines the matching criteria to map Q-in-Q ingress frames on an interface to the appropriate service instance.

l2transport propagate

To propagate Layer 2 transport events, use the **l2transport propagate** command in interface configuration mode. To return to the default behavior, use the **no** form of this command.

l2transportpropagateremote-status
no l2transportpropagatepropagateremote-status

Syntax Description

remote-status	Propagates remote link status changes.

Command Default

None

Command Modes

Interface configuration

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines

The **l2transport propagate** command provides a mechanism for the detection and propagation of remote link failure for port mode EoMPLS.

To display the state of l2transport events, use the **show controller internal** command.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to propagate remote link status changes:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# interface GigabitEthernet 0/0/0/0
RP/0/RP0/CPU0:router(config-if)# l2transport propagate remote remote-status
```

Related Commands

Command	Description
show l2vpn forwarding	Displays forwarding information from the layer2_fib manager on the line card.

l2protocol (l2pt)

To configure Layer 2 protocol tunneling and protocol data unit (PDU) filtering on an Ethernet interface, use the **l2protocol** command in Layer 2 transport configuration mode. To disable a Layer 2 protocol tunneling and Layer 2 protocol data units configuration, use the **no** form of this command.

l2protocol cpsv tunnel
no l2protocol

Syntax Description

cpsv Enables L2PT for the interface. L2PT is enabled for the following protocols only:

- CDP
- STP
- VTP

Note
STP includes all Spanning Tree protocol derivatives (RSTP, MSTP, etc.)

tunnel Performs L2PT encapsulation on frames as they enter the interface. Also, performs L2PT de-encapsulation on frames as they exit they interface.

L2PT encapsulation rewrites the destination MAC address with the L2PT destination MAC address. L2PT deencapsulation replaces the L2PT destination MAC address with the original destination MAC address.

Command Default

All Layer 2 protocol data units are forwarded through the network without modification.

Command Modes

Layer 2 transport configuration

Command History

Release	Modification
Release 7.3.1	This command was introduced.

Usage Guidelines

The **l2protocol** command is available only when Layer 2 transport port mode is enabled on the interface with the **l2transport** command.

Task ID

Task ID	Operations
l2vpn	read, write

Examples

The following example shows how to configure an Ethernet interface to tunnel in the ingress direction:

```
Router# configure
Router(config)# interface TenGigE 0/0/0/1
```

```
Router(config-if)# l2transport
Router(config-if-l2)# l2protocol cpsv tunnel
```

ethernet lmi

To enable Ethernet Local Management Interface (E-LMI) operation on an interface and enter interface Ethernet LMI configuration mode, use the **ethernet lmi** command in interface configuration mode. To disable Ethernet LMI and return to the default, use the **no** form of the command.

ethernet lmi
no ethernet lmi

Syntax Description

This command has no keywords or arguments.

Command Default

Ethernet LMI is disabled.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines

Ethernet LMI is supported only on physical Ethernet interfaces.

Task ID

Task ID	Operation
ethernet-services	read, write

The following example shows how to enable Ethernet LMI on a Gigabit Ethernet interface and enter Ethernet LMI configuration mode:

```
Router# interface gigabitethernet 0/1/0/0
Router(config-if)# ethernet lmi
Router config-if-elmi)# commit
```

ethernet loopback

To enable Ethernet data plane loopback on an interface, use the **ethernet loopback** command in interface or sub-interface configuration mode. To disable Ethernet data plane loopback on an interface, use the **no** form of this command.

ethernet loopback permit [**internal** | **external**]
no ethernet loopback permit [**internal** | **external**]

Command Default

None

Command Modes

Interface configuration

Sub-interface configuration

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines

None

Task ID

Task ID	Operations
l2vpn	read, write

The following example shows how you can configure Ethernet Data Plane Loopback:

```
/* Configuring External Loopback */

RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tenGigE 0/0/0/0 l2transport
RP/0/RSP0/CPU0:router(config-subif)#  ethernet loopback permit external

/* Configuring Internal Loopback */

RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# interface tenGigE 0/0/0/1 l2tansport
RP/0/RSP0/CPU0:router(config-subif)# ethernet loopback permit internal
```

flood mode ac-ingress-replication

To add BUM traffic queueing support for attachment circuits in a bridge domain, use the **flood mode ac-ingress-replication** command in the L2VPN bridge group bridge domain configuration mode. To return to the default behavior, use the **no** form of this command.

flood mode ac-ingress-replication

This command has no keywords or arguments.

Command Default

BUM traffic queueing support is not supported for attachment circuits in a bridge domain.

Command Modes

L2VPN bridge group bridge domain configuration

Command History

Release	Modification
Release 7.2.1	This command was introduced.
Release 7.2.2	This command was deprecated.

Usage Guidelines

BUM traffic queueing support for attachment circuits in a bridge domain is not supported on devices that have multiple NPUs or line cards. It is only supported on single NPU devices.

Perform this task to add BUM traffic queueing support for attachment circuits in a bridge domain

```
Router# configure
Router(config)# l2vpn
Router(config-l2vpn)# bridge group 10
Router(config-l2vpn-bg)# bridge-domain 1
Router(config-l2vpn-bg-bd)# flood mode ac-ingress-replication
Router(config-l2vpn-bg-bd)# commit
```

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 *domain-name*	(Optional) Displays information about a CFM domain, where *domain-name* 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 *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.
local mep-id *id*	(Optional) Displays information about a local MEP, where *id* is the number of the MEP.
missing	(Optional) Displays information about peer MEPs that are missing.
peer mep-id *id*	(Optional) Displays information about a peer MEP, where *id* is the number of the MEP.
peer mac-address *H.H.H*	(Optional) Displays information about a peer MEP, where *H.H.H* is the hexadecimal address of the MEP.
service *service-name*	(Optional) Displays information about a CFM service, where *service-name* 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 (#)

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines

Note 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:

```
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 1: 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: • 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:

```
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
     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 2: show ethernet cfm peer meps detail Field Descriptions

CFM state	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: • Missing • Timed out—No CCMs have been received for the loss time • Ok • Indication of a defect
Port state	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.

CCM defects detected	Types of CCM defects that have been detected. The possible defects are: • Remote Defect re ceived—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.

show ethernet lmi interfaces

To display Ethernet Local Management Interface (E-LMI) information for an interface, including protocol status and error and event statistics, use the **show ethernet lmi interfaces** command in EXEC configuration mode.

show ethernet lmi interfaces [*type interface-path-id*][**brief** | **detail**]
show ethernet lmi interfaces [**brief** | **detail**][**location** *location*]

Syntax Description

brief	(Optional) Displays summary information about the E-LMI protocol status, number of EVCs and errors, and CE-VLAN/EVC map type.
detail	(Optional) Displays the configured and operational state of E-LMI on the interface, with counts for reliability and protocol errors and elapsed time since various events have occurred, including details about subinterfaces and EVC status.
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 *location*	(Optional) Displays E-LMI information for the designated node. The *location* argument is entered in the *rack*/*slot*/*module* notation. **Note** The location cannot be specified when you specify an interface type.

Command Default

The output displays the configured and operational state of E-LMI on the interface, with counts for reliability and protocol errors and elapsed time since various events have occurred since the protocol was enabled on the interface or counters were cleared.

Command Modes

EXEC (#)

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Usage Guidelines

If Protocol Errors are seen in the output, then the CE device is sending packets to the PE device, but the PE does not understand those packets. This suggests an incorrect implementation of the E-LMI protocol on the CE side, or corruption of the packets on the path between the CE and PE. E-LMI packets have a strictly defined structure in the MEF 16 standard, and any deviation from that results in a protocol error. The PE will not respond to any packets that are malformed and result in a protocol error.

The Reliability Error counters can indicate that messages are being lost between the PE and CE devices. The timers in the last block of the output should indicate that messages are being sent and received by the PE device. Consider the following actions when these Reliability Errors occur:

- Status Enquiry Timeouts—If this counter is continuously incrementing, it indicates that the Polling Timer on the CE is configured to a greater value than the Polling Verification Timer (PVT) configuration on the PE. Status Enquiry messages will be sent less frequently than the PVT expects them and PVT timeouts occur. Be sure that the value of the PVT (specified by the **polling-verification-timer** command on the PE) is greater than the Polling Timer value on the CE device.
- Invalid Sequence Number—Indicates that messages from the PE are not being received by the CE. Be sure that the correct interface on the CE device is connected to the corresponding E-LMI interface on the PE device, so that communication can take place. Verify that both interfaces are Up.
- Invalid Report Type—This error can occur under the following conditions:
  - If the protocol is in the process of a status update and an "E-LMI Check" type of STATUS ENQUIRY is received by the PE, then the PE ignores the ENQUIRY and records an error.
  - If the protocol is not in the process of a status update and a "Full Status Continued" type of STATUS ENQUIRY is received by the PE, then the PE ignores the ENQUIRY and records an error.



Note If the protocol is in the process of a status update and a "Full Status" type of STATUS ENQUIRY is received by the PE, then the PE restarts the status update but does not record any error.

Task ID

Task ID	Operation
ethernet-services	read

The following example shows sample output for the default form of the command:

```
Router# show ethernet lmi interfaces
Interface: GigabitEthernet0/0/0/0
  Ether LMI Link Status: Up
  UNI Id: PE1-CustA-Slot1-Port0
  Line Protocol State: Up
  MTU: 1500 (2 PDUs reqd. for full report)
  CE-VLAN/EVC Map Type: Bundling (1 EVC)
  Configuration: Status counter 4, Polling Verification Timer 15 seconds
  Last Data Instance Sent: 1732
  Last Sequence Numbers: Sent 128, Received 128

  Reliability Errors:
    Status Enq Timeouts                19 Invalid Sequence Number             0
    Invalid Report Type                 0

  Protocol Errors:
    Malformed PDUs                      0 Invalid Protocol Version            0
```

```
  Invalid Message Type                0 Out of Sequence IE                 0
  Duplicated IE                       0 Mandatory IE Missing               0
  Invalid Mandatory IE                0 Invalid non-Mandatory IE           0
  Unrecognized IE                     0 Unexpected IE                      0

Full Status Enq Rcvd     00:00:10 ago   Full Status Sent      00:00:10 ago
PDU Rcvd                 00:00:00 ago   PDU Sent              00:00:00 ago
LMI Link Status Changed  10:00:00 ago   Last Protocol Error      never
Counters cleared            never
```

Table 3: show ethernet lmi interfaces Field Descriptions

Field	Description
Interface:	Name of the interface running the E-LMI protocol.
Ether LMI Link Status:	Status of the E-LMI protocol on the interface. Possible values are Up, Down, or Unknown (PVT disabled).
UNI Id:	Name of the UNI as configured by the **ethernet uni id** command. This output field does not appear if the UNI ID is not configured.
Line Protocol State:	Status of the interface line protocol. Possible values are Up, Down, or Admin-Down.
MTU (*x* PDUs reqd for full report)	Maximum Transmission Unit of the interface and the number (*x*) of E-LMI PDUs of that size required to send one full status report.
CE-VLAN/EVC Map Type: *type* (*x* EVCs)	Map type, which describes how CE VLAN IDs are mapped to specific EVCs. Possible values for *type* are Bundling, All to One Bundling, or Service Multiplexing with no bundling. The number *x* of EVCs in the map are displayed in parentheses.
Configuration: Status counter	Value of the MEF N393 Status Counter as configured by the **status-counter** command.
Polling Verification Timer	Value of the MEF T392 Polling Verification Timer (in seconds) as configured by the **polling-verification-timer** command. Displays "disabled" if the PVT is turned off.
Last Data Instance Sent:	Current value of the Data Instance.
Last Sequence Numbers: Sent *x*, Received *y*	Values of the last sent (*x*) and received (*y*) sequence numbers as reported in sent PDUs.

Field	Description
Reliability Errors:	Number of times the specified types of reliability errors have occurred since the protocol was enabled on the interface or counters were cleared: • Status Enq Timeouts—Increments every time the Polling Verification Timer (PVT) expires. • Invalid Report Type—Increments if the Report Type is not appropriate to the protocol's current state. There are four Report Types defined by the E-LMI Standard, and only three of them can appear in Status Enquiry messages that the PE receives. These are: E-LMI Check, Full Status and Full Status Continued. • Invalid Sequence Number—Increments whenever the received sequence number in a Status Enquiry from the CE does not match the last sent sequence number in the PE response. Indicates that messages from the PE are not being received by the CE. The PE continues to respond with the requested Report Type. For more information about possible actions, see the "Usage Guidelines" section.
Protocol Errors: (Malformed PDUs, Invalid Message Type, Duplicated IE, and others)	Number of times the specified types of protocol errors have occurred since the protocol was enabled on the interface or counters were cleared.
Full Status Enq Rcvd, PDU Rcvd, LMI Link Status Changed, Counters cleared, Full Status Sent, PDU Sent, and Last Protocol Error.	Elapsed time (hrs:mins:secs ago) since the specified events last occurred or counters were cleared. Displays "never" if the event has not occurred since the protocol was enabled on the interface or counters were cleared.

The following example shows sample output for the **show ethernet lmi interfaces brief** form of the command:

```
Router# show ethernet lmi interfaces brief
                     ELMI   LineP      #            CE-VLAN/
Interface            State  State      EVCs  Errors EVC Map
------------------------------------------------------------------------------
Gi0/0/0/0            Up     Up            3      19 Multiplexing, no bundling
Gi0/0/0/1            Down   Admin-down    1       0 All to One Bundling
```

Table 4: show ethernet lmi interfaces brief Field Descriptions

Field	Description
Interface	Name of the interface running the E-LMI protocol.

Field	Description
ELMI State	Status of the E-LMI protocol. Possible values are Up, Down, or N/A if the Polling Verification Timer is disabled.
LineP State	Status of the interface line protocol. Possible values are Up, Down, or Admin-Down.
# EVCs	Total number of EVCs in the CE-VLAN/EVC map.
Errors	Total number of reliability and protocol errors encountered since the protocol was enabled on the interface or counters were cleared.
CE-VLAN/EVC Map	Map type, which describes how CE VLAN IDs are mapped to specific EVCs. Possible values are Bundling, All to One Bundling, or Multiplexing, no bundling.

The following example shows sample output for the **show ethernet lmi interfaces detail** form of the command:

```
Router#show ethernet lmi interfaces detail
Interface: GigabitEthernet0/0/0/0
  Ether LMI Link Status: Up
  UNI Id: PE1-CustA-Slot1-Port0
  Line Protocol State: Up
  MTU: 1500 (2 PDUs reqd. for full report)
  CE-VLAN/EVC Map Type: Bundling (1 EVC)
  Configuration: Status counter 4, Polling Verification Timer 15 seconds
  Last Data Instance Sent: 1732
  Last Sequence Numbers: Sent 128, Received 128

  Reliability Errors:
    Status Enq Timeouts                 19 Invalid Sequence Number             0
    Invalid Report Type                  0

  Protocol Errors:
    Malformed PDUs                       0 Invalid Protocol Version            0
    Invalid Message Type                 0 Out of Sequence IE                  0
    Duplicated IE                        0 Mandatory IE Missing                0
    Invalid Mandatory IE                 0 Invalid non-Mandatory IE            0
    Unrecognized IE                      0 Unexpected IE                       0

  Full Status Enq Rcvd     00:00:10 ago   Full Status Sent      00:00:10 ago
  PDU Rcvd                 00:00:00 ago   PDU Sent              00:00:00 ago
  LMI Link Status Changed  10:00:00 ago   Last Protocol Error      never
  Counters cleared            never

  Sub-interface: GigabitEthernet0/0/0/0.1
    VLANs: 1,10,20-30, default, untagged/priority tagged
    EVC Status: New, Partially Active
    EVC Type: Multipoint-to-Multipoint
    OAM Protocol: CFM
      CFM Domain: Global (level 5)
      CFM Service: CustomerA
    Remote UNI Count: Configured = 2, Active = 1

    Remote UNI Id                                                    Status
```

```
-------------                                                   ------
PE2-CustA-Slot2-Port2                                           Up
PE2-CustA-Slot3-Port3                                           Unreachable
```

Table 5: show ethernet lmi interfaces detail Field Descriptions

Field	Description
Interface:	Name of the interface running the E-LMI protocol.
Ether LMI Link Status:	Status of the E-LMI protocol on the interface. Possible values are Up, Down, or Unknown (PVT disabled).
UNI Id:	Name of the UNI as configured by the **ethernet uni id** command. This output field does not appear if the UNI ID is not configured.
Line Protocol State:	Status of the interface line protocol. Possible values are Up, Down, or Admin-Down.
MTU (*x* PDUs reqd for full report)	Maximum Transmission Unit of the interface and the number (*x*) of E-LMI PDUs of that size required to send one full status report.
CE-VLAN/EVC Map Type: *type* (*x* EVCs)	Map type, which describes how CE VLAN IDs are mapped to specific EVCs. Possible values for *type* are Bundling, All to One Bundling, or Service Multiplexing with no bundling. The number *x* of EVCs in the map are displayed in parentheses.
Configuration: Status counter	Value of the MEF N393 Status Counter as configured by the **status-counter** command.
Polling Verification Timer	Value of the MEF T392 Polling Verification Timer (in seconds) as configured by the **polling-verification-timer** command. Displays "disabled" if the PVT is turned off.
Last Data Instance Sent:	Current value of the Data Instance.
Last Sequence Numbers: Sent *x*, Received *y*	Values of the last sent (*x*) and received (*y*) sequence numbers as reported in sent PDUs.
Reliability Errors: (Status Enq Timeouts, Invalid Report Type, and Invalid Sequence Number)	Number of times the specified types of reliability errors have occurred since the protocol was enabled on the interface or counters were cleared.
Protocol Errors: (Malformed PDUs, Invalid Message Type, Duplicated IE, and others)	Number of times the specified types of protocol errors have occurred since the protocol was enabled on the interface or counters were cleared.

Field	Description
Full Status Enq Rcvd, PDU Rcvd, LMI Link Status Changed, Counters cleared, Full Status Sent, PDU Sent, and Last Protocol Error.	Elapsed time (hrs:mins:secs ago) since the specified events last occurred or counters were cleared. Displays "never" if the event has not occurred since the protocol was enabled on the interface or counters were cleared.
Subinterface:	Name of the subinterface corresponding to the EVC.
VLANs:	VLAN traffic on the interface that corresponds to the EFPs encapsulation, with the following possible values: • Numbers of the matching VLAN IDs **Note** If Q-in-Q encapsulation is configured, only the outer tag is displayed. • default—Indicates that Default tagging is configured, or the encapsulation specifies to match "any." • none—No matches for the configured encapsulation have occurred on the interface. • untagged/priority—Traffic is either untagged or has priority tagging. **Note** If the message "EVC omitted from Full Status due to encapsulation conflict" is displayed above the VLAN output, a misconfiguration has occurred with two or more EFPs having a conflicting encapsulation.
EVC Status:	State of the EVC, with the following possible values: • Active—E-LMI is operational for this EVC. • Inactive—All of the remote UNIs are unreachable or down. • New—The EVC has not yet been reported to the CE device. • Not yet known—E-LMI is still waiting to receive the status from CFM. This condition should not persist for more than a few seconds. • Partially Active—One or more of the remote UNIs is unreachable or down.
EVC Type:	Type of the EVC, with the following possible values: "Point-to-Point," "Multipoint-to-Multipoint," or "EVC type not yet known."

Field	Description
OAM Protocol:	The OAM protocol from which the EVC status and type are derived. Possible values are either "CFM" or "None."
CFM Domain:	Name of the CFM domain for this EVC.
CFM Service:	Name of the CFM service for this EVC.
Remote UNI Count: Configured = *x*, Active = *y*	Number of configured or expected remote UNIs (*x*) and the number of active remote UNIs (*y*) within the EVC.
Remote UNI Id:	ID of each remote UNI, including both configured and active remote UNIs where these two sets are not identical. If the number of configured and active remote UNIs is zero, no table is displayed. **Note** Where no ID is configured for a remote UNI using the **ethernet uni id** command, then the CFM remote MEP ID is displayed, for example, "<Remote UNI Reference Id: *x*>"
Status	Status of each remote UNI, with the following possible values: "Up," "Down," "Admin Down," "Unreachable (a configured remote UNI is not active or missing)," or "Unknown (a remote UNI is active but not reporting its status)."

show ethernet loopback

To display Ethernet data plane loopback information on an interface, use the **show ethernet loopback** command in EXEC mode.

show ethernet loopback [**active** | **permitted**]

Syntax Description

active	Display the details of the active loopback session.
permitted	Displays information on interfaces permitted to run Ethernet loopback.

Command Default

None

Command Modes

EXEC mode

Command History

Release	Modification
Release 6.3.1	This command was introduced.

Task ID

Task ID	Operations
l2vpn	read, write

The following example displays the loopback capabilities per interface.:

```
RP/0/RSP0/CPU0:router# show ethernet loopback permitted

------------------------------------------------------------------------------
Interface                                Dot1q(s)                      Direction
------------------------------------------------------------------------------
tenGigE 0/0/0/1.1                         100                            Internal
tenGigE 0/0/0/0.1                         100                            External
------------------------------------------------------------------------------


/* This example shows all active sessions on the router */

RP/0/RSP0/CPU0:router# show ethernet loopback active
Thu Jul 20 11:00:57.864 UTC
Local: TenGigE0/0/0/0.1, ID 1
============================================
Direction:                           External
Time out:                               None
Time left:                                 -
Status:                                Active
Filters:
  Dot1Q:                                  Any
  Second-dot1Q:                           Any
```

```
  Source MAC Address:                    Any
  Destination MAC Address:               Any
  Class of Service:                      Any
Local: TenGigE0/0/0/0.1, ID 2
=============================================
Direction:                            External
Time out:                                 None
Time left:                                   -
Status:                                 Active
Filters:
  Dot1Q:                                 Any
  Second-dot1Q:                          Any
  Source MAC Address:          0000.0000.0001
  Destination MAC Address:     0000.0000.0002
  Class of Service:                         5
```