



Configuring the CFM over EFP Interface with Cross Connect Feature

Ethernet Connectivity Fault Management (CFM) is an end-to-end per-service-instance Ethernet layer OAM protocol that includes proactive connectivity monitoring, fault verification, and fault isolation. Currently, Ethernet CFM supports Up facing and Down facing Maintenance Endpoints (MEPs). For information on Ethernet Connectivity Fault Management, see http://www.cisco.com/en/US/docs/ios/12_2sr/12_2sra/feature/guide/srethcfm.html

The CFM over EFP Interface with xconnect feature allows you to:

- Forward continuity check messages (CCM) towards the core over cross connect pseudowires.
- Receive CFM messages from the core.
- Forward CFM messages to the access side (after Continuity Check Database [CCDB] based on maintenance point [MP] filtering rules).

Restrictions and Usage Guidelines

When configuring CFM over EFP Interface with cross connect, follow these restrictions and usage guidelines:

- Only a single down-facing MEP is allowed on the L2VFI.
- As the number of PEs in a VPLS instance scale up, the number of CFM CC messages processed increases. Accordingly, the configuration of the down-facing MEP on L2VFI for large fully meshed PW topologies should be considered for only premium valued networks.
- In the design of CFM domains, the maintenance level of an Down-facing MEP on the L2VFI interface must be lower than the level from the AC.
- Up MEP, Down MEP, and MIPs are supported.
- Offloaded CFM Up MEP sessions are not supported when using E type interface in an EFP using **encapsulation** command.

Configuring CFM over EFP with xconnect for the Cisco ASR 903 Series Router

The following sections describe how to configure CFM on EFP interfaces on the Cisco ASR 903 Series Router:

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Configuring CFM over EFP Interface with Cross Connect—Basic Configuration

This section describes how to configure CFM over EFP Interface with cross connect.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **pseudowire-class** [*pw-class-name*]
4. **encapsulation mpls**
5. **exit**
6. **interface gigabitethernet** *slot/port* **or** **interface tengigabitethernet** *slot/port*
7. **service instance** *id* {**Ethernet** [*service-name*]}
8. **encapsulation dot1q** *vlan_id*
9. **xconnect** *peer-ip-address* *vc-id* {**encapsulation** {**l2tpv3** [**manual**] | **mpls** [**manual**]} | *pw-class* *pw-class-name* } [*pw-class* *pw-class-name*] [**sequencing** {**transmit** | **receive** | **both**}]
10. **cfm mep domain** *domain-name* [**up** | **down**] **mpid** *mpid-value* [**cos** *cos-value*]
11. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	pseudowire-class [<i>pw-class-name</i>] Example: Router(config)# pseudowire-class vlan-xconnect	Specifies the name of a Layer 2 pseudowire class and enter pseudowire class configuration mode.

	Command	Purpose
Step 4	encapsulation mpls Example: Router(config-if)# encapsulation mpls	Specifies that Multiprotocol Label Switching (MPLS) is used as the data encapsulation method for tunneling Layer 2 traffic over the pseudowire.
Step 5	exit Example: Router(config-if-srv)# exit	Exits the pseudowire class configuration mode.
Step 6	interface gigabitethernet slot/port or interface tengigabitethernet slot/port Example: Router(config-if-srv)# interface Gi2/0/2	Specifies the Gigabit Ethernet or the Ten Gigabit Ethernet interface to configure.
Step 7	service instance id ethernet [ser- vice-name] Example: Router(config-if-srv)# service in- stance 101 ethernet	Creates a service instance (an instantiation of an EVC) on an interface and sets the device into the config-if-srv submode.
Step 8	encapsulation dot1q {any vlan-id[vlan-id[-vlan-id]]} sec- ond-dot1q {any vlan-id[vlan-id[-vlan-id]]} Example: Router(config-if-srv)# encapsulation dot1q 100 second dot1q 200	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.
Step 9	xconnect peer-ip-address vc-id {encap- sulation {l2tpv3 [manual] mpls [manu- al]} pw-class pw-class-name }[pw-class pw-class-name] [sequencing {transmit receive both}] Example: Router(config-if-srv)# xconnect 10.0.3.201 123 pw-class vlan-xconnect	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.

	Command	Purpose
Step 10	cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value] Example: Router(config-if-srv)# cfm mep down mpid 100 domain Core	Configures a maintenance endpoint (MEP) for a domain.
Step 11	exit Example: Router(config-if-srv)# exit	Exits the interface configuration mode.

Examples

This example shows how to configure CFM over EVC using cross connect.

```

PE3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
PE3(config)#ethernet cfm domain L6 level 6
PE3(config-ecfm)# service s256 evc 256
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end

PE3(config)#int ten 2/0/0
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
PE3#
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int ten 2/0/0
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
PE3#

```

Configuring CFM over EFP Interface with Cross Connect—Single Tag VLAN Cross Connect

This section describes how to configure CFM over EFP Interface with Single Tag VLAN cross connect.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type slot/subslot/port or interface tengigabitethernet slot/port**

4. **service instance** *id* {Ethernet [*service-name*]}
5. **encapsulation dot1q** {any | *vlan-id*[*vlan-id*]*vlan-id*]} **second-dot1q** {any |*vlan-id*[*vlan-id*]*vlan-id*}}
6. **rewrite ingress tag** {push {dot1q *vlan-id* | dot1q *vlan-id* second-dot1q *vlan-id* | dot1ad *vlan-id* dot1q *vlan-id* | pop {1 | 2} | translate {1-to-1 {dot1q *vlan-id* | dot1ad *vlan-id*} | 2-to-1 dot1q *vlan-id* | dot1ad *vlan-id*} | 1-to-2 {dot1q *vlan-id* second-dot1q *vlan-id* | dot1ad *vlan-id* dot1q *vlan-id*} | 2-to-2 {dot1q *vlan-id* second-dot1q *vlan-id* | dot1ad *vlan-id* dot1q *vlan-id*}} [symmetric]
7. **xconnect peer-ip-address** *vc-id* {encapsulation {l2tpv3 [manual] | mpls [manual]} | pw-class *pw-class-name* }[*pw-class pw-class-name*] [sequencing {transmit | receive | both}]
8. **cfm mep domain** *domain-name* [up | down] **mpid** *mpid-value* [cos *cos-value*]

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters the global configuration mode.
Step 3	interface gigabitethernet <i>slot/sub-slot/port</i> Example: Router(config)# interface Gi2/0/2	Specifies the Gigabit Ethernet interface to configure, where: <i>slot/subslot/port</i> —Specifies the location of the interface.
Step 4	service instance <i>id</i> Ethernet [<i>service-name</i>] Example: Router(config-if)# service instance 101 ethernet	Creates a service instance (an instantiation of an EVC) on an interface and sets the device into the config-if-srv submode.
Step 5	encapsulation dot1q {any <i>vlan-id</i> [<i>vlan-id</i> [- <i>vlan-id</i>]]} second-dot1q {any <i>vlan-id</i> [<i>vlan-id</i> [- <i>vlan-id</i>]]} Example: Router(config-if-srv)# encapsulation dot1q 100 second dot1q 100	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.

	Command	Purpose
Step 6	<pre>rewrite ingress tag {push {dot1q vlan-id dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} pop {1 2} translate {1-to-1 {dot1q vlan-id dot1ad vlan-id} 2-to-1 dot1q vlan-id dot1ad vlan-id} 1-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} 2-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id}} [symmetric]</pre> <p>Example: Router(config-if-srv)# rewrite dot1q single symmetric</p>	Specifies the tag manipulation that is to be performed on the frame ingress to the service instance.
Step 7	<pre>xconnect peer-ip-address vc-id {encap- sulation {l2tpv3 [manual] mpls [manu- al]} pw-class pw-class-name }[pw-class pw-class-name] [sequencing {transmit receive both}]</pre> <p>Example: Router(config)# xconnect 10.0.3.201 123 pw-class vlan-xconnect</p>	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.
Step 8	<pre>cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value]</pre> <p>Example: Router# cfm mep up mpid 100 domain Core</p>	Configures a maintenance endpoint (MEP) for a domain.

Examples

This example shows how to configure CFM over EFP Interface with Single Tag VLAN cross connect:

```
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int ten 2/0/0
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
PE3#
```

Configuring CFM over EFP Interface with Cross Connect—Double Tag VLAN Cross Connect

This section describes how to configure CFM over EFP Interface with Double Tag VLAN cross connect.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type** *slot/subslot/port*
4. **service instance** *id* {Ethernet [*service-name*]}
5. **encapsulation dot1q** {any | *vlan-id*[*vlan-id*[*vlan-id*]]} **second-dot1q** {any |
vlan-id[*vlan-id*[*vlan-id*]]}
6. **rewrite ingress tag** {push {dot1q *vlan-id* | dot1q *vlan-id* second-dot1q *vlan-id* | dot1ad *vlan-id* dot1q *vlan-id*} | pop {1 | 2} | translate {1-to-1 {dot1q *vlan-id* | dot1ad *vlan-id*} | 2-to-1 dot1q *vlan-id* | dot1ad *vlan-id*} | 1-to-2 {dot1q *vlan-id* second-dot1q *vlan-id* | dot1ad *vlan-id* dot1q *vlan-id*} | 2-to-2 {dot1q *vlan-id* second-dot1q *vlan-id* | dot1ad *vlan-id* dot1q *vlan-id*} } [symmetric]
7. **xconnect** *peer-ip-address* *vc-id* {encapsulation {l2tpv3 [manual] | mpls [manual]} | *pw-class* *pw-class-name* } [*pw-class* *pw-class-name*] [sequencing {transmit | receive | both}]
8. **cfm mep domain** *domain-name* [up | down] **mpid** *mpid-value* [cos *cos-value*]
9. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface gigabitethernet <i>slot/subslot/port</i> Example: Router(config)# interface Gi2/0/2	Specifies the Gigabit Ethernet interface to configure, where: <i>slot/subslot/port</i> —Specifies the location of the interface.
Step 4	service instance <i>id</i> Ethernet [<i>service-name</i>] Example: Router(config-if)# service instance 100 ethernet	Creates a service instance (an instance of an EVC) on an interface and sets the device into the config-if-srv submode.

	Command	Purpose
Step 5	<pre>encapsulation dot1q {any vlan-id[vlan-id[-vlan-id]]} sec- ond-dot1q {any vlan-id[vlan-id[-vlan-id]]} Example: Router(config-if-srv)# encapsulation dot1q 100 second-dot1q 200</pre>	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.
Step 6	<pre>rewrite ingress tag {push {dot1q vlan-id dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} pop {1 2} translate {1-to-1 {dot1q vlan-id dot1ad vlan-id} 2-to-1 dot1q vlan-id dot1ad vlan-id} 1-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} 2-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id}} [symmetric] Example: Router(config-if-srv)# rewrite dot1q double symmetric</pre>	Specifies the tag manipulation that is to be performed on the frame ingress to the service instance.
Step 7	<pre>xconnect peer-ip-address vc-id {encap- sulation {l2tpv3 [manual] mpls [manu- al]} pw-class pw-class-name }[pw-class pw-class-name] [sequencing {transmit receive both}] Example: Router(config)# xconnect 1.1.1.1 100 pw-class vlan-xconnect</pre>	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.
Step 8	<pre>cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value] Example: Router# cfm mep down mpid 100 domain Core</pre>	Configures a maintenance endpoint (MEP) for a domain.

Examples

This example shows how to configure CFM over EFP Interface with Double Tag VLAN cross connect:

```
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv) # continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int ten 2/0/0
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256 second-dot1q 257
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
```


PE3#

Configuring CFM over EFP Interface with Cross Connect—Selective QinQ Cross Connect

This section describes how to configure CFM over EFP Interface with Selective QinQ cross connect.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type slot/subslot/port**
4. **exit**
5. **service instance id {Ethernet [service-name]}**
6. **encapsulation dot1q {any | vlan-id[vlan-id[vlan-id]] second-dot1q {any |vlan-id[vlan-id[vlan-id]]}**
7. **xconnect peer-ip-address vc-id {encapsulation {l2tpv3 [manual] | mpls [manual]} | pw-class pw-class-name }[pw-class pw-class-name] [sequencing {transmit | receive | both}]**
8. **cfm mep domain domain-name [up | down] mpid mpid-value [cos cos-value]**
9. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface gigabitethernet slot/subslot/port Example: Router(config)# interface Gi2/0/2	Specifies the Gigabit Ethernet interface to configure, where: <i>slot/subslot/port</i> —Specifies the location of the interface.
Step 4	service instance id Ethernet [service-name] Example: Router(config-if)# service instance 101 ethernet	Creates a service instance (an instance of an EVC) on an interface and sets the device into the config-if-srv submode.

	Command	Purpose
Step 5	<pre>encapsulation dot1q {any vlan-id[vlan-id[-vlan-id]]} sec- ond-dot1q {any vlan-id[vlan-id[-vlan-id]]} Example: Router(config-if-srv)# encapsulation default</pre>	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.
Step 6	<pre>xconnect peer-ip-address vc-id {encap- sulation {l2tpv3 [manual] mpls [manu- al]} pw-class pw-class-name }[pw-class pw-class-name] [sequencing {transmit receive both}] Example: Router(config)# xconnect 10.0.3.201 123 pw-class vlan-xconnect</pre>	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.
Step 7	<pre>cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value] Example: Router# cfm mep down mpid 100 domain Core</pre>	Configures a maintenance endpoint (MEP) for a domain.

Examples

This example shows how to configure CFM over EFP Interface with Selective QinQ cross connect:

```
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int ten 2/0/0
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256 second-dot1q 257 cos 7
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
PE3#
```

Configuring CFM over EFP Interface with Cross Connect—Port-Based Cross Connect Tunnel

This section describes how to configure CFM over EFP Interface with Port-Based cross connect Tunnel.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type slot/subslot/port**
4. **service instance id {Ethernet [service-name]}**

5. **encapsulation dot1q** {any | vlan-id[vlan-id[vlan-id]]} **second-dot1q** {any |vlan-id[vlan-id[vlan-id]]}
6. **xconnect** peer-ip-address vc-id {encapsulation {12tpv3 [manual] | mpls [manual]} | pw-class pw-class-name } [pw-class pw-class-name] [sequencing {transmit | receive | both}]
7. **cfm mep domain** domain-name [up | down] mpid mpid-value [cos cos-value]
8. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface gigabitethernet slot/sub-slot/port Example: Router(config)# interface Gi2/0/2	Specifies the Gigabit Ethernet interface to configure, where: <i>slot/subslot/port</i> —Specifies the location of the interface.
Step 4	service instance id Ethernet [service-name] Example: Router(config-if)# service instance 100 ethernet	Creates a service instance (an instance of an EVC) on an interface and sets the device into the config-if-srv submode.
Step 5	encapsulation dot1q {any vlan-id[vlan-id[-vlan-id]]} second-dot1q {any vlan-id[vlan-id[-vlan-id]]} Example: Router(config-if-srv)# encapsulation dot1q 10-20, 30, 50-60	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.

	Command	Purpose
Step 6	<pre>xconnect peer-ip-address vc-id {encapsulation {l2tpv3 [manual] mpls [manual]} pw-class pw-class-name} [pw-class pw-class-name] [sequencing {transmit receive both}]</pre> <p>Example: Router(config)# xconnect 1.1.1.1 100 pw-class vlan-xconnect</p>	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.
Step 7	<pre>cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value]</pre> <p>Example: Router# cfm mep up mpid 100 domain Core</p>	Configures a maintenance endpoint (MEP) for a domain.

Examples

This example shows how to configure CFM over EFP Interface with Port-Based cross connect Tunnel:

```
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int ten 2/0/0
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
PE3#
```

Configuring CFM over EFP Interface with Cross Connect—Port Channel-Based Cross Connect Tunnel

This section describes how to configure CFM over EFP Interface with Port Channel-Based cross connect Tunnel.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type** *slot/subslot/port*
4. **service instance** *id* {Ethernet [*service-name*]}
5. **encapsulation dot1q** {any | *vlan-id*[*vlan-id*]} **second-dot1q** {any | *vlan-id*[*vlan-id*]}

6. **rewrite ingress tag** {push {dot1q vlan-id | dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} | pop {1 | 2} | translate {1-to-1 {dot1q vlan-id | dot1ad vlan-id} | 2-to-1 dot1q vlan-id | dot1ad vlan-id} | 1-to-2 {dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} | 2-to-2 {dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id}} [symmetric]
7. **xconnect** peer-ip-address vc-id {encapsulation {l2tpv3 [manual] | mpls [manual]} | pw-class pw-class-name } [pw-class pw-class-name] [sequencing {transmit | receive | both}]
8. **cfm mep domain** domain-name [up | down] mpid mpid-value [cos cos-value]
9. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface gigabitethernet slot/sub-slot/port Example: Router(config)# interface Port-channel 1	Specifies the Gigabit Ethernet interface to configure, where: <i>slot/subslot/port</i> —Specifies the location of the interface.
Step 4	service instance id Ethernet [service-name] Example: Router(config-if)# service instance 101 ethernet	Creates a service instance (an instance of an EVC) on an interface and sets the device into the config-if-srv submode.
Step 5	encapsulation dot1q {any vlan-id[vlan-id[-vlan-id]]} second-dot1q {any vlan-id[vlan-id[-vlan-id]]} Example: Router(config-if-srv)# encapsulation dot1q 20 second-dot1q 30	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.

	Command	Purpose
Step 6	<pre>rewrite ingress tag {push {dot1q vlan-id dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} pop {1 2} translate {1-to-1 {dot1q vlan-id dot1ad vlan-id} 2-to-1 dot1q vlan-id dot1ad vlan-id} 1-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} 2-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id}} [symmetric]</pre> <p>Example: Router(config-if-srv)# rewrite ingress tag pop 2 symmetric</p>	Specifies the tag manipulation that is to be performed on the frame ingress to the service instance.
Step 7	<pre>xconnect peer-ip-address vc-id {encapsulation {l2tpv3 [manual] mpls [manual]} pw-class pw-class-name} [pw-class pw-class-name] [sequencing {transmit receive both}]</pre> <p>Example: Router(config)# xconnect 1.1.1.1 100 pw-class vlan-xconnect</p>	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.
Step 8	<pre>cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value]</pre> <p>Example: Router# cfm mep up mpid 100 domain Core</p>	Configures a maintenance endpoint (MEP) for a domain.

Examples

This example shows how to configure CFM over EFP Interface with Port Channel-Based cross connect Tunnel:

```
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int port-20
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
```

Verification

Use the following commands to verify a configuration:

- Use the **show ethernet cfm ma remote** commands to verify the CFM over EVC configuration. This command shows the basic configuration information for CFM.

```
Router-30-PE1#show ethernet cfm ma local
```

Local MEPS:

MPID	Domain Name	Lvl	MacAddress	Type	CC
	Domain Id	Dir	Port	Id	
	MA Name		SrvcInst		
	EVC name				
1	L6	6	000a.f393.56d0	XCON	Y
	L6	Down	Te2/0/0		N/A
	bbb		1		
	bbb				
3	L5	5	0007.8478.4410	XCON	Y
	L5	Up	Te2/0/0		N/A
	bbb		1		
	bbb				

Total Local MEPS: 2

Local MIPs:

* = MIP Manually Configured

Level	Port	MacAddress	SrvcInst	Type	Id
7	Te2/0/0	0007.8478.4410	1	XCON	N/A

Total Local MIPs: 1

- Use the **show ethernet cfm ma remote** to verify the MEP configuration:

Router-30-PE1#show ethernet cfm ma remote

MPID	Domain Name	MacAddress	IfSt	PtSt
	Lvl Domain ID	Ingress		
	RDI MA Name	Type Id	SrvcInst	
	EVC Name		Age	
4	L5	000a.f393.56d0	Up	Up
5	L5	Te2/0/0:(2.2.2.2, 1)		
-	bbb	XCON N/A	1	
	bbb		9s	
2	L6	000a.f393.56d0	Up	Up
6	L6	Te2/0/0:(2.2.2.2, 1)		
-	bbb	XCON N/A	1	
	bbb		1s	

Total Remote MEPS: 2

- Use the **show ethernet cfm mpdb** command to verify the catalogue of CC with MIP in intermediate routers.

PE2#show ethernet cfm mpdb

* = Can Ping/Traceroute to MEP

MPID	Domain Name	MacAddress	Version
	Lvl Domain ID	Ingress	
	Expd MA Name	Type Id	SrvcInst
	EVC Name		Age
600	* L6	0021.d8ca.d7d0	IEEE-CFM
6	L6	Te2/1:(2.2.2.2, 1)	
-	s1	XCON N/A	1
	1		2s
700	L7	001f.cab7.fd01	IEEE-CFM

```

7      L7      Te2/1: (2.2.2.2, 1)
-      s1      XCON N/A      1
      1      3s

```

Total Remote MEPS: 2

- Use the **show mpls l2 transport vc 1 detail** command to show detailed configuration information:

```

PE1#sh mpls l2 vc 1 deta
Local interface: Te8/0/1 up, line protocol up, Eth VLAN 200 up
Interworking type is Ethernet
Destination address: 3.3.3.3, VC ID: 1, VC status: up
Output interface: Te8/0/0, imposed label stack {21}
Preferred path: not configured
Default path: active
Next hop: 20.1.1.2
Create time: 21:13:27, last status change time: 02:55:33
Signaling protocol: LDP, peer 3.3.3.3:0 up
Targeted Hello: 2.2.2.2(LDP Id) -> 3.3.3.3, LDP is UP
Status TLV support (local/remote) : enabled/supported
LDP route watch : enabled
Label/status state machine : established, LruRru
Last local dataplane status rcvd: No fault
Last local SSS circuit status rcvd: No fault
Last local SSS circuit status sent: No fault
Last local LDP TLV status sent: No fault
Last remote LDP TLV status rcvd: No fault
Last remote LDP ADJ status rcvd: No fault
MPLS VC labels: local 21, remote 21
Group ID: local 0, remote 0
MTU: local 1500, remote 1500
Remote interface description:
Sequencing: receive disabled, send disabled
Control Word: On (configured: autosense)
VC statistics:
transit packet totals: receive 37, send 1067452272
transit byte totals: receive 4181, send 72586757556
transit packet drops: receive 0, seq error 0, send 0

```

- Use **show mpls forwarding-table** command to verify the cross connect VC:

```

PE1#show mpls forwarding-table
Local      Outgoing   Prefix          Bytes Label   Outgoing   Next Hop
Label      Label      or Tunnel Id   Switched      interface
17         Pop Label   3.3.3.3/32     23038746624  Te8/0/0   20.1.1.2
21         No Label   12ckt(1)       4181         Te8/0/1   point2point

```

- Use **show ethernet cfm error** command to view the error report:

```

PE2#show ethernet cfm error
-----
MPID Domain Id          Mac Address      Type  Id  Lvl
      MName          Reason          Age
-----
-   L3              001d.45fe.ca81  BD-V  200 3
      s2              Receive AIS      8s
PE2#

```


Configuring CFM over EFP Interface with xconnect—Port Channel-Based xconnect Tunnel

Use the following commands at the customer facing port:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface type slot/subslot/port**
4. **service instance id {Ethernet [service-name]}**
5. **encapsulation untagged | dot1q {any | vlan-id[vlan-id[vlan-id]]} second-dot1q {any |vlan-id[vlan-id[vlan-id]]}**
6. **rewrite ingress tag {push {dot1q vlan-id | dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} | pop {1 | 2} | translate {1-to-1 {dot1q vlan-id | dot1ad vlan-id} | 2-to-1 dot1q vlan-id | dot1ad vlan-id} | 1-to-2 {dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} | 2-to-2 {dot1q vlan-id second-dot1q vlan-id | dot1ad vlan-id dot1q vlan-id} [symmetric]}**
7. **xconnect peer-ip-address vc-id {encapsulation {l2tpv3 [manual] | mpls [manual]} | pw-class pw-class-name }[[pw-class pw-class-name] [sequencing {transmit | receive | both}]**
8. **cfm mep domain domain-name mpid mpid-value [cos cos-value]**

DETAILED STEPS

	Command	Purpose
Step 1	enable Example: Router# enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	interface gigabitethernet slot/sub-slot/port Example: Router(config)# interface Port-channel 1	Specifies the Gigabit Ethernet interface to configure, where: <i>slot/subslot/port</i> —Specifies the location of the interface.
Step 4	service instance id Ethernet [service-name] Example: Router(config-if)# service instance 101 ethernet	Creates a service instance (an instance of an EVC) on an interface and sets the device into the config-if-srv submode.

	Command	Purpose
Step 5	<pre>encapsulation untagged dot1q {any vlan-id[vlan-id[vlan-id]]} sec- ond-dot1q {any vlan-id[vlan-id[vlan-id]]} Example: Router(config-if-srv)# encapsulation dot1q 20 second-dot1q 30</pre>	Configures the encapsulation. Defines the matching criteria that maps the ingress dot1q, QinQ, or untagged frames on an interface for the appropriate service instance.
Step 6	<pre>rewrite ingress tag {push {dot1q vlan-id dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} pop {1 2} translate {1-to-1 {dot1q vlan-id dot1ad vlan-id} 2-to-1 dot1q vlan-id dot1ad vlan-id} 1-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id} 2-to-2 {dot1q vlan-id second-dot1q vlan-id dot1ad vlan-id dot1q vlan-id}} [symmetric] Example: Router(config-if-srv)# rewrite ingress tag pop 2 symmetric</pre>	Specifies the tag manipulation that is to be performed on the frame ingress to the service instance.
Step 7	<pre>xconnect peer-ip-address vc-id {encap- sulation {l2tpv3 [manual] mpls [manu- al]} pw-class pw-class-name }[pw-class pw-class-name] [sequencing {transmit receive both}] Example: Router(config)# xconnect 1.1.1.1 100 pw-class vlan-xconnect</pre>	Binds an attachment circuit to a pseudowire, and configures an Any Transport over MPLS (AToM) static pseudowire.
Step 8	<pre>cfm mep domain domain-name [up down] mpid mpid-value [cos cos-value] Example: Router# cfm mep up mpid 100 domain Core</pre>	Configures a maintenance endpoint (MEP) for a domain.

Examples

This example shows how to configure CFM over EFP Interface with Port Channel-Based xconnect Tunnel:

```
PE3(config)#ethernet cfm domain L2 level 2
PE3(config-ecfm)# service s256 evc 256 direction down
PE3(config-ecfm-srv)# continuity-check
PE3(config-ecfm-srv)#end
PE3#
PE3(config)#int port-20
PE3(config-if)#no ip address
PE3(config-if)# service instance 256 ethernet 256
PE3(config-if-srv)# encapsulation dot1q 256
PE3(config-if-srv)# xconnect 1.1.1.1 1 encapsulation mpls
PE3(cfg-if-ether-vc-xconn)# cfm mep domain L6 mpid 256
PE3(config-if-srv-ecfm-mep)#end
```

Verification

Use the following commands to verify a configuration:

- Use **show ethernet cfm ma remote** commands to verify the CFM over EFP configuration. This command shows the basic configuration information for CFM.

```
Router-30-PE1#show ethernet cfm ma local
Local MEPS:
```

MPID	Domain Name	Lvl	MacAddress	Type	CC
	Domain Id	Dir	Port	Id	
	MA Name		SrvcInst		
	EVC name				
1	L6	6	000a.f393.56d0	XCON	Y
	L6	Down	Te2/0/0	N/A	
	bbb		1		
	bbb				
3	L5	5	0007.8478.4410	XCON	Y
	L5	Up	Te2/0/0	N/A	
	bbb		1		
	bbb				

Total Local MEPS: 2

```
Local MIPs:
* = MIP Manually Configured
```

Level	Port	MacAddress	SrvcInst	Type	Id
7	Te2/0/0	0007.8478.4410	1	XCON	N/A

Total Local MIPs: 1

- Use **show ethernet cfm ma remote** to verify the MEP configuration:

```
Router-30-PE1#show ethernet cfm ma remote
```

MPID	Domain Name	MacAddress	IfSt	PtSt
Lvl	Domain ID	Ingress		
RDI	MA Name	Type Id	SrvcInst	
	EVC Name		Age	
4	L5	000a.f393.56d0	Up	Up
5	L5	Te2/0/0:(2.2.2.2, 1)		
-	bbb	XCON N/A	1	
	bbb		9s	
2	L6	000a.f393.56d0	Up	Up
6	L6	Te2/0/0:(2.2.2.2, 1)		
-	bbb	XCON N/A	1	
	bbb		1s	

Total Remote MEPS: 2

- Use **show ethernet cfm mpdb** command to verify the catalogue of CC with MIP in intermediate routers.

```
PE2#show ethernet cfm mpdb
* = Can Ping/Traceroute to MEP
```

MPID	Domain Name	MacAddress	Version
Lvl	Domain ID	Ingress	

```

Expd  MA Name                               Type Id                               SrvcInst
     EVC Name                               Age
-----
600 * L6                                   0021.d8ca.d7d0                       IEEE-CFM
6     L6                                   Te2/1:(2.2.2.2, 1)
-     s1                                   XCON N/A                               1
     1                                       2s
700 L7                                   001f.cab7.fd01                       IEEE-CFM
7     L7                                   Te2/1:(2.2.2.2, 1)
-     s1                                   XCON N/A                               1
     1                                       3s

Total Remote MEPS: 2

```

- Use **show mpls l2 transport vc 1 detail** command to show detailed configuration information:

```

PE1#sh mpls l2 vc 1 deta
Local interface: Te8/0/1 up, line protocol up, Eth VLAN 200 up
  Interworking type is Ethernet
  Destination address: 3.3.3.3, VC ID: 1, VC status: up
  Output interface: Te8/0/0, imposed label stack {21}
  Preferred path: not configured
  Default path: active
  Next hop: 20.1.1.2
  Create time: 21:13:27, last status change time: 02:55:33
  Signaling protocol: LDP, peer 3.3.3.3:0 up
  Targeted Hello: 2.2.2.2(LDP Id) -> 3.3.3.3, LDP is UP
  Status TLV support (local/remote) : enabled/supported
    LDP route watch                  : enabled
    Label/status state machine       : established, LruRru
    Last local dataplane status rcvd: No fault
    Last local SSS circuit status rcvd: No fault
    Last local SSS circuit status sent: No fault
    Last local LDP TLV status sent: No fault
    Last remote LDP TLV status rcvd: No fault
    Last remote LDP ADJ status rcvd: No fault
  MPLS VC labels: local 21, remote 21
  Group ID: local 0, remote 0
  MTU: local 1500, remote 1500
  Remote interface description:
  Sequencing: receive disabled, send disabled
  Control Word: On (configured: autosense)
  VC statistics:
    transit packet totals: receive 37, send 1067452272
    transit byte totals: receive 4181, send 72586757556
    transit packet drops: receive 0, seq error 0, send 0

```

- Use **show mpls forwarding-table** command to verify the xconnect VC:

```

PE1#show mpls forwarding-table
Local   Outgoing Prefix          Bytes Label  Outgoing  Next Hop
Label   Label    or Tunnel Id   Switched    interface
17      Pop Label 3.3.3.3/32     23038746624 Te8/0/0    20.1.1.2
21      No Label  l2ckt(1)      4181        Te8/0/1    point2point

```

- Use **show ethernet cfm error** command to view the error report:

```

PE2#show ethernet cfm error
-----
MPID Domain Id                               Mac Address   Type  Id  Lvl
      MAname                               Reason       Age
-----

```

```

- L3          001d.45fe.ca81 BD-V 200 3
  s2          Receive AIS      8s
PE2#
    
```

Troubleshooting CFM Features

provides troubleshooting solutions for the CFM features.

Table 1 Troubleshooting Scenarios for CFM Features

Problem	Solution
<p>When you configure CFM, the message “Match registers are not available” is displayed.</p>	<p>Use the show platform mrm info command on the SP console to verify the match registers. Based on the derived output, perform these tasks:</p> <ol style="list-style-type: none"> 1. Check if the line card supports the CFM feature. 2. Enable CFM across the system to allow co-existence with other protocols. 3. Ensure that no CFM traffic is present in any supervisor or ports. 4. Configure STP mode to Multiple Spanning Tree (MST) and re-enable CFM or disable CFM completely. <p>For more information on match registers, see <i>Ethernet Connectivity Fault Management</i> at http://www.cisco.com/en/US/docs/ios/12_2sr/12_2sra/feature/guide/srethcfm.html.</p> <p>CFM uses two match registers to identify the control packet type and each VLAN spanning tree also uses a match register to identify its control packet type. For both protocols to work on the same system, each line card should support three match registers, and at least one supporting only a 44 bit MAC match.</p>
<p>CFM configuration errors</p>	<p>CFM configuration error occurs when when a MEP receives a continuity check with an overlapping MPID. To verify the source of the error, use the command show ethernet cfm errors configuration or show ethernet cfm errors.</p>
<p>CFM ping and traceroute result is "not found"</p>	<p>Complete these steps:</p> <ol style="list-style-type: none"> 1. Use show run ethernet cfm to view all CFM global configurations. 2. Use show ethernet cfm location main to view local MEPs and their CCM statistics 3. Use show ethernet cfm peer meps command to View CFM CCM received from Peer MEPs. 4. Use trace ethernet cfm command to start a CFM trace.

Table 1 Troubleshooting Scenarios for CFM Features

Problem	Solution
CFM connectivity is down and issues at the maintenance domain levels	Use the ping ethernet {mac-address mpid id multicast} domain domain-name {vlan vlan-id port evc evc-name} or tracertoe ethernet {mac-address mpid id} domain domain-name {vlan vlan-id port evc evc-name} commands to verify ethernet CFM connectivity. Share the output with TAC for further investigation.
Loop trap error	<p>Use the show ethernet cfm error command to check for Loop Trap errors as shown here:</p> <pre> CE(config-if)#do sh ethernet cfm err ----- ----- Level Vlan MPID Remote MAC Reason Service ID ----- 5 711 550 1001.1001.1001 Loop Trap Error OUT PE#sh ethernet cfm err ----- ----- Level Vlan MPID Remote MAC Reason Service ID ----- ----- 5 711 550 1001.1001.1001 Loop Trap Error OUT </pre>
Module has insufficient match registers	<p>Complete these steps:</p> <ol style="list-style-type: none"> 1. Verify and confirm if a unsupported line card is inserted into the router. 2. If yes, perform an OIR of the unsupported line card.
CFM is deactivated	<p>Complete these steps:</p> <ol style="list-style-type: none"> 1. Check if all the line cards have free match registers. 2. Check if CFM is activated on supervisor cards. CFM is not supported on supervisor cards that has two match registers. In this scenario, CFM is automatically disabled on the SUP ports and enabled on the remaining line cards.
ethernet cfm logging	<p>In a scale scenario, you configure either the console logging rate-limiting using logging rate-limit or using logging buffered instead of using logging console. The suggested rate-limit is around 30 messages per second.</p>

