REP Access Gateway

Resilient Ethernet Protocol (REP) is a ring protection protocol designed to provide fast failure detection and recovery. A REP Edge No-Neighbor (RENN) port is a port at the edge of a REP segment, connected to a peer device that does not support REP. This feature allows CFM to notify REP when an error is detected, such that CFM can be used to monitor the status of the Edge link, and REP can take actions.

This feature allows communication for REP to enable Ethernet Fault Detection (EFD) notifications between the routers configured with REP Access Gateway (REP-AG).

Prerequisites for REP Access Gateway

- The interface connected to non-REP device port should be configured as a REP edgeNN port.

- CCM notification is processed only on a REP edgeNN port.

- Port MEP is only supported in REP AG. Port MEPs are configured to protect a single hop and used to monitor link state through CFM. See Configuring Ethernet Connectivity Fault Management in a Service Provider Network.

- EFD is supported on down MEPs. A down MEP sends and receives CFM frames through the wire connected to the port on which the MEP is configured. See Configuring Ethernet Connectivity Fault Management in a Service Provider Network.

Restrictions for REP Access Gateway

- REP AG is supported for only for Port MEPs.

- When a link down is observed between the REP and Non-REP device, the convergence time is greater with a Copper connection.

- EFD is supported on Port MEPs and EFP MEPs.

- CCM interval for MAs on which EFD is supported is limited.

- EFD is *not* supported on Trunk EFPs.

- EFD notifications are only supported for a single client per MA. EFD notifications are *not* supported for both G-8032 and REP simultaneously.

- Only a single MEP can be configured on a the interface or EFP for EFD.

- REP Edge No-Neighbour (ENN) configured ports receiving Link Status Layer (LSL) frames from the peer node will automatically be converted to REP ports.

  You will see the log message **%REP-6-AUTOCONFIG: Interface GigabitEthernet< >** automatically configured to the REP device.

- REP is supported on port-channel interface, without **efd notify rep** (CCM).

- The convergence time is between 100miliseconds to 200miliseconds.

Information About REP Access Gateway

In a network when a link failure occurs, a Non-REP device network (access gateway) directly connected to REP network sends failure notification, so that REP network can reroute the traffic to alternate route. But, access devices supporting REP Edge No-Neighbor (REP ENN) only support one interface configured as a REP Edge No-Neighbor port resulting in an unsupported architecture with the REP Access Gateway (REP AG) device.

Fast failure detection can be established by enabling communication between Connectivity Fault Manager (CFM) and REP. CFM on the edge ports can notify REP if any failures are detected on the monitored links, allowing the appropriate re-convergence actions to be taken.

The mechanism for the communication is for REP to register as an Ethernet Fault Detection (EFD) client, so that any CFM defects above a configurable threshold triggers a notification to REP.

Note To trigger EFD notifications on the router, CFM must be configured.

REP Access Gateway Enhancements

In a network where a REP and non-REP devices are connected and when a link failure occurs, a Non-REP device network (access gateway) directly connected to REP network sends failure notification, so that REP network can reroute the traffic to an alternate route. But, access devices supporting REP Edge No-Neighbor (REP ENN) only support one interface configured as a REP Edge No-Neighbor port, resulting in an unsupported architecture with the REP Access Gateway (REP AG) device.

Fast failure detection in a REP-AG configured device can be achieved by enabling communication between Connectivity Fault Manager (CFM) and REP. CFM on the edge ports can notify REP if any failure is detected on the monitored links, allowing the appropriate re-convergence actions to be taken.

The mechanism for the communication is for REP to register as an Ethernet Fault Detection (EFD) client, so that any CFM defects above a configurable threshold triggers a notification to REP.

How to Configure REP Access Gateway

Enabling EFD Notifications

Before you begin

CFM IEEE must be enabled before enabling EFD notifications. For information, see Configuring Ethernet Connectivity Fault Management in a Service Provider Network.

For information on CFM configuration, see the Carrier Ethernet Configuration Guide, Cisco IOS XE Release (Cisco NCS 520).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ethernet cfm domain** *domain-name* **level** *level-id*
4. **service** {*short-ma-name* | **number** *MA-number* | **vlan-id** *primary-vlan-id* | **vpn-id** *vpn-id*} {**vlan** *vlan-id* | **port** | **evc** *evc-name*} **direction** {**up** | **down**}
5. **continuity-check** [**interval** *time* | **loss-threshold** *threshold* | **static rmep**]
6. **continuity-check** [**interval** *cc-interval*]
7. **efd notify** {**g8032** | **rep**}
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> **enable**	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# **configure terminal**	Enters global configuration mode.
Step 3	**ethernet cfm domain** *domain-name* **level** *level-id* **Example:** Router(config)# ethernet cfm domain Customer level 7	Defines a CFM maintenance domain at a specified maintenance level and places the CLI in Ethernet CFM configuration mode.

	Command or Action	Purpose
Step 4	**service** {*short-ma-name* | **number** *MA-number* | **vlan-id** *primary-vlan-id* | **vpn-id** *vpn-id*} {**vlan** *vlan-id* | **port** | **evc** *evc-name*} **direction** {**up** | **down**} **Example:** Device(config-ecfm)# service s1 port	Configures a maintenance association within a maintenance domain and enters Ethernet connectivity fault management (CFM) service configuration mode.
Step 5	**continuity-check** [**interval** *time* | **loss-threshold** *threshold* | **static rmep**] **Example:** Router(config-ecfm-srv)# continuity-check	Enables the transmission of CCMs.
Step 6	**continuity-check** [**interval** *cc-interval*] **Example:** Device(config-ecfm-srv)# continuity-check interval 10s	Configures the per-service parameters and sets the interval at which CCMs are transmitted.
Step 7	**efd notify** {**g8032** | **rep**} **Example:** Router(config)# **efd notify rep**	• **g8032**—Enables G.8032 notifications on the MA. • **rep**—Enables REP notifications on the MA. . **Note** Either g8032 or rep notifications can be configured for an MA at an instance. For example, if REP notifications are enabled while G.8032 notifications are enabled for an MA, the G.8032 notifications are disabled.
Step 8	**end** **Example:** Router# **end**	Returns to privileged EXEC mode.

Configuration Examples

Example: Configuring REP AG EFD

The example shows EFD notify enabled on the router.

```
ethernet cfm ieee
ethernet cfm global
ethernet cfm traceroute cache
ethernet cfm traceroute cache hold-time 60
ethernet cfm domain d1 level 6
 service s1 port
  continuity-check
  continuity-check interval 100ms
```

```
  efd notify rep
end
..
1


interface GigabitEthernet0/1/2
ethernet cfm mep domain d1 mpid 3 service s1
 service instance trunk 1 ethernet
  encapsulation dot1q 209-212
  rewrite ingress tag pop 1 symmetric
  bridge-domain from-encapsulation
end
..
!


interface GigabitEthernet0/1/3
ethernet cfm mep domain d1 mpid 4 service s1
 service instance trunk 1 ethernet
  encapsulation dot1q 209-212
  rewrite ingress tag pop 1 symmetric
  bridge-domain from-encapsulation
end
..
!
```

Verifying REP Access Gateway

Example: Verifying REP AG EFD Notifications

Use the **show interface** command to view the status EFD.

- This example shows EFD status on the interface .

```
Router# show interface gigabitethernet 0/1/7 rep detail

 Interface Gi0/1/7
---
GigabitEthernet1/7   REP enabled

Segment-id: 1 (Primary Edge No-Neighbor)
PortID: 000DE8BA70DD3000
Preferred flag: No
Operational Link Status: NO_NEIGHBOR
Current Key: 001878DA6ED817002FF3
Port Role: Open
Blocked VLAN: empty
Admin-vlan: 2
Preempt Delay Timer: disabled
LSL Ageout Timer: 5000 ms
LSL Ageout Retries: 5
Configured Load-balancing Block Port: none
Configured Load-balancing Block VLAN: none
STCN Propagate to: STP
EFD State : Enabled
EFD Status : Clear
LSL PDU rx: 0, tx: 0
HFL PDU rx: 32, tx: 1
BPA TLV rx: 0, tx: 0
```

```
BPA (STCN, LSL) TLV rx: 0, tx: 0
BPA (STCN, HFL) TLV rx: 0, tx: 0
EPA-ELECTION TLV rx: 0, tx: 18
EPA-COMMAND TLV rx: 0, tx: 0
EPA-INFO TLV rx: 0, tx: 0
```

- This example shows REP topology.

```
Router# show rep topolgy

REP Segment 911
BridgeName       PortName   Edge Role
---------------- ---------- ---- ----
node3            Te0/0/12   Pri* Alt
node3            Gi0/0/11        Open
node4            Gi0/0/11        Open
node4            Gi0/0/0         Open
node2            Gi0/0/0         Open
node2            Gi0/0/7    Sec* Open
```

- This example shows the CFM EFD MEP information.

> ✎ **Note** Configure service internal in configuration mode before executing the **show ethernet cfm efd mep** command.

```
Router# show ethernet cfm efd mep

Domain d1, Service s1: notify REP, EFD not triggered
    ID Interface  SrvcInst Defect        Threshold     Triggered?
    ---- ---------- -------- ------------- ------------- ----------
     4 Te0/0/12   N/A      None          DefMACstatus  No
```

This example shows the CFM EFD MEP information when a fault is detected.

```
Router# show ethernet cfm efd meps | sec ring1
Domain dom1_ring1, Service ser1_ring1: notify REP, EFD not triggered
ID      Interface  SrvcInst  Defect     Threshold  Triggered?
----    ---------  --------  -------    ---------  ----------
3       Te0/0/12   NA        None       DefMACstatus  No
```