Configuring Ethernet Dataplane Loopback

Ethernet data plane loopback provides a means for remotely testing the throughput of an Ethernet port.

Information on Ethernet Data Plane Loopback

The Ethernet data plane loopback feature provides a means for remotely testing the throughput of an Ethernet port. You can verify the maximum rate of frame transmission with no frame loss. This feature allows for bidirectional or unidirectional throughput measurement, and on-demand/out-of-service (intrusive) operation during service turn-up. This feature supports two types of Ethernet loopback. RSP3 supports the following types of loopback from Cisco IOS XE Everest 16.5.1 release.

- Facility loopback (external)—Traffic loopback occurs at the Ingress interface. Traffic does not flow into the router for loopback.

- Terminal loopback (internal)—Traffic loopback occurs at the Egress interface. Traffic loopback occurs after the traffic flows into the router to the other interface.

QoS Support for Ethernet Data Plane Loopback

- Ingress QoS is bypassed in external loopback on service instances.

- Internal loopback sequence is as follows:

    - Ingress QoS

    - Egress QoS (egress port) (both, shaper and policer are supported).

    - Ingress QoS on ingress port and egress QoS on egress port (both, shaper and policer are supported) on the RSP3 module.

    - Ingress QoS on egress port and egress QoS on ingress port on the RSP3 module.

- All port-level and EFP-level QoS is applicable for internal Ethernet data plane loopback.

- For external Ethernet data plane loopback:

    - All port-level and EFP-level QoS is bypassed except for shaper.

    - Port-level shaper cannot be bypassed.

Restrictions for Ethernet Data Plane Loopback

- Data plane loopback on routed port infrastructure is *not* supported.

- Etype, src-mac, and llc-oui based loopback traffic filtering is *not* supported.

- Port-level QoS is *not* bypassed.

- Port shaper cannot be bypassed in facility loopback.

- Facility and terminal Ethernet data plane loopback (ELB) are *not* supported on dot1ad nni interface.

- Internal loopback sessions configured must be within the 1 GB reserved bandwidth for Cisco ASR 900 Series RSP2 Module.

- A maximum number of 20 facility loopback sessions can be created per system, provided 16 sessions are with Dot1Q and 4 sessions are with Dot1Q and destination MAC address. This scale reduces if SPAN or RSPAN is configured. This scale is supported on the Cisco ASR 900 Series RSP2 module.

- A maximum number of 12 terminal loopback sessions can be created per system, provided 8 sessions are with Dot1Q and 4 sessions are with Dot1Q and destination MAC address. This scale reduces if RSPAN or SADT is configured. This scale is supported on the Cisco ASR 900 Series RSP2 module.

- Only one Ethernet loopback (terminal or facility) session can be active on an EFP at any instance.

- Local SPAN and ELB cannot be enabled on a physical interface at the same time.

- Loopback sessions cannot be initiated on a port configured with SPAN or RSPAN.

- Ethernet loopback is not supported on a range of dot1q tags.

- Ethernet Data Plane Loopback is affected on STP enabled interface.

- Dynamic addition of rewrite ingress tags with default EFP is not supported.

- Dynamic changes at EFP and interface level are not supported when Ethernet Data Plane Loopback is active.

- Egress EFP is not updated for external Ethernet data plane loopback statistics.

- For internal Ethernet data plane loopback ingress and egress interface statistics are not updated on interface, where internal ELB is enabled.

- If traffic is more than 650Mbps and if the packet size is less than a frame size of 64, then BFD and OSPF flaps are expected.

RSP3 Module

- Etype, VLAN, COS, src-mac, and llc-oui based loopback traffic filtering is *not* supported.

- Port-based ELB is *not* supported. Ethernet loopback sessions are supported only on EFPs and Trunk EFPs on the RSP3 module.

- Internal ELB is *not* supported when the physical interface port state is down.

- Data filtering of loopback is *not* enforced for the traffic coming in the opposite direction.

- Filtering based on specific VLAN is *not* supported. ELB is applicable to all the VLANs configured in EFP on the RSP3 module.

- Random unknown IP packets may be looped back with MAC address swap, but RSP3 module does *not* support IP address swap. If the packet has a destination MAC address and a destination IP address similar to the BDI MAC and IP address, then the packet is punted and is *not* looped back. The L3 packets that must be routed is also *not* looped back. Hence, dscp/prec marking with ELB is *not* supported.

- Traffic to TEFP, which is not part of BDI or CFM, is looped back based on filters. But traffic to TEFP with VLAN which is part of BDI or CFM, is *not* looped back on the RSP3 module. This is applicable for both types of Ethernet data plane loopback.

- All packets with broadcast or multicast destination MAC is *not* qualified for ELB, hence such packets will *not* be looped back on the RSP3 module.

- Three-level HQOS shaper/policer *not* supported with ELB.

- Dot1Q filter is *not* supported.

- Internal loopback sessions configured must be within the 100 GB reserved recycle bandwidth.

- MAC-ACL *cannot* be bypassed in with facility loopback.

- A maximum number of 20 facility loopback and 12 terminal loopback sessions are supported.

How to Configure Ethernet Data Plane Loopback

Enabling Ethernet Data Plane Loopback

```
enable
configure terminal
interface gigabitethernet 0/2/1
service instance 1 ethernet
encapsulation dot1q 100
bridge-domain 120
ethernet loopback permit external
end
```

Note ELB is supported using a MAC filter for UP-MEP session. If you are starting ELB without the MAC filter, the UP-MEP session will go DOWN.

Starting an Ethernet Data Plane Loopback Session

Note To start a loopback for untagged and default EFPs, dot1q and second-dot1q are not needed. Dot1q is *not* applicable to start a loopback session on the RSP3 module.

Note By default the session would be running for 300 seconds unless you explicitly specify and automatically stops after the session time expiry.

```
enable
configure terminal
ethernet loopback start local interface gigabitEthernet 0/4/1 service instance 10 external
 dot1q 10 cos 1 destination mac-address 0000.0000.0001 timeout none
end
This is an intrusive loopback and the packets matched with the service will not be able
to pass through.
Continue? (yes/[no]): yes
```

Dot1q and COS-based filtering is not supported on the RSP3 module.

```
enable
configure terminal
ethernet loopback start local interface gigabitEthernet 0/4/1 service instance 10 external
 destination mac-address 0000.0000.0001 timeout none
end
```

Stopping an Active Session

Use the **ethernet loopback stop** command to stop an active session on an interface or to stop all sessions based on the session id.

```
Router# ethernet loopback stop local interface gigabitEthernet 0/4/1 id 1
```

Configuration Examples

Example: Configuring External Loopback

This example shows how to configure external (facility) loopback.

```
Router(config)# interface gigabitEthernet 0/4/1
Router(config-if)# service instance 1 ethernet
Router(config-if-srv)# encapsulation dot1q 120
Router(config-if-srv)# bridge-domain 120
Router(config-if-srv)# ethernet loopback permit external
```

This example shows external (facility) loopback on the Gigabit Ethernet 0/4/1 interface:

```
interface GigabitEthernet0/4/1
 no ip address
```

```
 negotiation auto
 service instance 10 ethernet
  encapsulation dot1q 10
  rewrite ingress tag pop 1 symmetric
  bridge-domain 10
  ethernet loopback permit external ===? For facility loopback
 !
end
```

This example below shows how to start external (facility) loopback on the router. A warning message is displayed. Type **yes** to continue.

```
Router# ethernet loopback start local interface gigabitEthernet 0/4/1 service instance 10
external dot1q 10 cos 1
 destination mac-address 0000.0000.0001 timeout none

This is an intrusive loopback and the packets matched with the service will not  be able
to pass through.
Continue? (yes/[no]): yes
```

Note   Dot1q and COS-based filtering is not supported on the RSP3 module.

Example: Configuring Terminal Loopback

This example shows how to configure internal (terminal) loopback.

```
Router(config)# interface gigabitEthernet 0/0/0
Router(config-if)# service instance 1 ethernet
Router(config-if-srv)# encapsulation dot1q 120
Router(config-if-srv)# bridge-domain 120
Router(config-if-srv)# ethernet loopback permit internal
```

This example shows internal (terminal) loopback on Gigabit Ethernet 0/0/0 interface:

```
interface TenGigabitEthernet0/0/0
 no ip address
service instance 10 ethernet
  encapsulation dot1q 10
  rewrite ingress tag pop 1 symmetric
  bridge-domain 10
  ethernet loopback permit internal
 !
end
```

Verifying Ethernet Data Plane Loopback

Example: Verifying Ethernet Dataplane Loopback

Use the **show ethernet loopback** {**active** | **permitted**} [**interface** *interface numbe*r] command.

- The following example displays the loopback capabilities per interface. The output shows internal (terminal) loopback has been permitted on Ten Gigabit Ethernet 0/0/0 interface and external (facility) loopback has been permitted on Gigabit Ethernet 0/4/1 interface.

```
Router# show ethernet loopback permitted

--------------------------------------------------------------------------------
Interface                               SrvcInst Direction
Dot1q/Dot1ad(s)                         Second-Dot1q(s)
--------------------------------------------------------------------------------
Te0/0/0                                 10                      Internal
10
Gi0/4/1                                 10                      External
10
```

- This example shows all active sessions on the router.

```
Router# show ethernet loopback active

============================================================
Loopback Session ID       : 1
Interface                 : GigabitEthernet0/4/1
Service Instance          :10
Direction                 : External
Time out(sec)             : none
Status                    : on
Start time                : 10:31:09.539 IST Mon Aug 26 2013
Time left                 : N/A
Dot1q/Dot1ad(s)           : 10
Second-dot1q(s)           :
Source Mac Address        : Any
Destination Mac Address   : 0000.0000.0001
Ether Type                : Any
Class of service          : 1
Llc-oui                   : Any


Total Active Session(s)   : 1
Total Internal Session(s) : 0
Total External Session(s) : 1
```

- This example shows how to stop the sessions on the router.

```
Router# ethernet loopback stop local interface GigabitEthernet
0/4/1 id 1
```