Configuring 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 chapter consists of these sections:

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Limitations and Configuration Guidelines

The following limitations and configuration guidelines apply when configuring Ethernet Data Plane Loopback on the Cisco ME 3600X and ME 3800X:

- The switch does not support data plane loopback on routed port infrastructure.
- The switch does not support Etype, src-mac, or llc-oui based loopback traffic filtering.
- In external loopback on service instances, the ingress qos on the service instance will be bypassed but not the port level qos. Similarly, the egress port shaper cannot be bypassed.
- In internal loopback, the expected sequence is ingress qos, egress qos (egress port), but the ingress port shaper will also take effect.
- The switch cannot bypass the port shaper on the ingress port in both external and internal loopback.
- The switch supports one active session per EFP, per port.
- Internal session on the switchport is not supported.
- Internal session is supported only of EFPs (service instances, Ethernet flow points, EVCs).
- While configuring internal sessions on EFPs, dot1q tags are mandatory. Therefore, internal loopback is not supported on a range of dot1q tags. However, loopback sessions can be configured using dot1q/QinQ, even if the underlying EFP has the dot1q/QinQ range configured.
- Multiple external loopback sessions can be configured on the same EFP or switchport (VLAN).
- Enabling Ethernet loopback command in an untagged service instance is accepted at the service instance level but you cannot start the Ethernet loopback globally since dot1q filter is mandatory.
Enabling or running Ethernet loopback in encapsulation default service instance is supported for tagged frames only when you give a specific dot1q filter value in the Ethernet loopback start command. The restriction is only for untagged traffic but you cannot start Ethernet Data Plane Loopback for untagged traffic as the dot1q filter is mandatory.

Enabling Ethernet loopback command at interface level for both internal and external does not prompt any message for unsupported configurations.

At one time, only one terminal loopback session can be active on an EFP.

Egress span on the port and internal loopback on an EFP on the same port cannot be configured at the same time.

The switch has only 1 Gigabit of bandwidth reserved for internal loopback. All internal sessions traffic has to be within this limit. There is an additional 18 bytes of overhead per packet in the internal loopback path.

## Configuring Ethernet Data Plane Loopback

To enable and start Ethernet Data Plane Loopback on an interface, perform the following steps:

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enter your password if prompted.</td>
</tr>
<tr>
<td>2</td>
<td>configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>3</td>
<td>interface ethernet 0/1</td>
<td>Specifies an interface and enters interface configuration mode.</td>
</tr>
<tr>
<td>4</td>
<td>ethernet loopback permit external [vlan {vlan-list</td>
<td>untagged}]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vlan vlan-list—Configures VLAN loopback for non-disruptive loopback testing. The vlan vlan-list keyword and argument is only supported on a switchport.</td>
</tr>
<tr>
<td>5</td>
<td>ethernet loopback permit internal [vlan {vlan-list</td>
<td>untagged}]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vlan vlan-list—Configures VLAN loopback for non-disruptive loopback testing. The vlan vlan-list keyword and argument is only supported on a switchport.</td>
</tr>
<tr>
<td>6</td>
<td>end</td>
<td>Return to privileged EXEC mode.</td>
</tr>
</tbody>
</table>
Note

By default the Session would be running for 300 seconds unless explicitly specified by the user and automatically stopped after the session time expiry.

To stop an active session on an interface or to stop all sessions use the `ethernet loopback stop` command.

```
Switch# ethernet loopback stop local interface gigabitethernet 0/1 id 1
```

### Displaying Ethernet Dataplane Loopback Information

To verify the configuration on the switch use the `show ethernet loopback` command.
## Sample Configurations

The example below enables and starts loopback, vlan 100 on the switchport trunk interface gigabitethernet 0/1 for external loopback.

```
Switch(config)#interface GigabitEthernet0/1
Switch(config-if)switchport trunk allowed vlan none
Switch(config-if)switchport mode trunk
Switch(config-if)media-type rj45
Switch(config-if)ethernet loopback permit external vlan 100
Switch(config-if)end
Switch#ethernet loopback start local interface gigabitethernet 0/1 external dot1q 100 cos 3
```

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

```
*Mar 25 11:14:04.863: %E_DLB-6-DATAPLANE_LOOPBACK_START: Ethernet Dataplane Loopback Start on interface GigabitEthernet0/1 with session id 1
```

### Note
By default the Session would be running for 300 seconds unless explicitly specified by the user and automatically stopped after the session time expiry.

Stop a session:

```
Switch#ethernet loopback stop local int gi 0/1 id <session_id>
```

```
*Nov 26 11:24:29.666: %E_DLB-6-DATAPLANE_LOOPBACK_STOP: Ethernet Dataplane Loopback Stop on interface GigabitEthernet0/1 with session id 1
```

This example shows the default behavior of ethernet data plane loopback. The VLAN keyword is not specified, therefore packets with all VLAN tags and untagged packets will be loopbacked:

```
Switch(config)# interface ethernet 1/0
Switch(config-if)# ethernet loopback permit external
```

This example shows data plane loopback on a switch port. In this example, the packets tagged with VLAN 2 coming from the wire on ethernet 1/0 will be loopbacked:

```
Switch(config)#interface ethernet 1/0
Switch(config-if)#switchport
Switch(config-if)#ethernet loopback permit external vlan 2
```
In this example, packets tagged with VLAN 3/4/5 coming from the wire on ethernet1/0 will be loopbacked:

```bash
Switch(config)#interface ethernet 1/0
Switch(config-if)#switchport
Switch(config-if)#ethernet loopback permit external vlan 3-5
```

In this example, packets tagged with VLAN 3/4/5 coming from the relay on ethernet1/0 will be loopbacked:

```bash
Switch(config)#interface ethernet 1/0
Switch(config-if)#switchport
Switch(config-if)#ethernet loopback permit internal vlan 3-5
```

In this example, untagged packets from the wire on ethernet 1/0 will be loopbacked:

```bash
Switch(config)#interface ethernet 1/0
Switch(config-if)#switchport
Switch(config-if)#ethernet loopback permit external vlan untagged
```

In this example, external loopback for VLAN 100 on the switch port trunk GigabitEthernet 0/1 is enabled:

```bash
interface GigabitEthernet 0/1
switchport trunk allowed vlan none
switchport mode trunk
media-type rj45
ethernet loopback permit external vlan 100
end
```

In this example, internal loopback for EFP 100 on GigabitEthernet 0/5 is enabled:

```bash
interface GigabitEthernet 0/5
switchport trunk allowed vlan none
switchport mode trunk
media-type rj45
service instance 101 ethernet
    encapsulation dot1q 101 second-dot1q 200
    rewrite ingress tag pop 2 symmetric
    bridge-domain 200
    ethernet loopback permit internal
end
```

In this example, both internal and external loopback for EFP 100 on GigabitEthernet 0/5 is enabled:

```bash
interface GigabitEthernet 0/5
switchport trunk allowed vlan none
switchport mode trunk
media-type rj45
service instance 101 ethernet
    encapsulation dot1q 101
    rewrite ingress tag pop 1 symmetric
    bridge-domain 101
    ethernet loopback permit internal
    ethernet loopback permit external
end
```

In this example, internal loopback is started on an EFP:

```bash
Ethernet loopback start local int gi 0/5 service instance 100 internal dot1q 100 second-dot1q 200 cos 5
```

In these examples, external loopback is started on an EFP:
Ethernet loopback start local int gi 0/5 service instance 101 external dot1q 101 cos 5
This is an intrusive loopback and the packets matched with the service will not be able to pass through. Continue? (yes/[no]): yes

In this example, external loopback is started on a switchport trunk VLAN:

ethernet loopback start local int gi 0/1 external dot1q 100 cos 3
This is an intrusive loopback and the packets matched with the service will not be able to pass through. Continue? (yes/[no]): yes

In this example, all active sessions on the switch are displayed:

Switch# show ethernet loopback active
==================================================================================================
Loopback Session ID : 1
Interface : GigabitEthernet0/1
Service Instance : N/A
Direction : External
Time out(sec) : 300
Status : on
Start time : *11:19:29.670 UTC Sun Nov 26 2000
Time left : 00:03:16
Dot1q/Dot1ad(s) : 100
Second-dot1q(s) :
Source Mac Address : Any
Destination Mac Address : Any
Ether Type : Any
Class of service : 3
Llc-oui :
Total Active Session(s) : 1
Total Internal Session(s) : 0
Total External Session(s) : 1

The following example displays the loopback capabilities per interface:

Switch# show ethernet loopback permitted interface gigabitethernet 0/1
================================================================================
Interface Dot1q/Dot1ad(s) SrvcInst Direction Second-Dot1q(s)
Gi0/1 100 N/A External

Switch# ethernet loopback start local int gi 0/5 service instance 100 internal dot1q 100 second-dot1q 200 cos 5
This is an intrusive loopback and the packets matched with the service will not be able to pass through. Continue? (yes/[no]): yes
Switch#
*Nov 26 11:58:38.921: %E_DLB-6-DATAPLANE_LOOPBACK_START: Ethernet Dataplane Loopback Start on interface GigabitEthernet0/5 service instance 100 with session id 2

Switch# show ethernet loopback active interface gigabitethernet 0/5
==================================================================================================
Loopback Session ID : 1
Interface : GigabitEthernet0/5
Sample Configurations

Service Instance : 100
Direction : Internal
Time out(sec) : 300
Status : on
Start time : *11:58:38.925 UTC Sun Nov 26 2000
Time left : 00:03:41
Dot1q/Dot1ad(s) : 100
Second-dot1q(s) : 200
Source Mac Address : Any
Destination Mac Address : Any
Ether Type : Any
Class of service : 5
Llc-oui : Any

Total Active Session(s): 1
Total Internal Session(s): 1
Total External Session(s): 0
Sample Configurations