# Ethernet Technology Overview

Ethernet is defined by the IEEE 802.3 international standard. It enables the connection of up to 1024

# Flow Control on Ethernet Interfaces

### Encapsulation Modifications

EFP supports these L2 header encapsulation modifications on both ingress and egress:

- Push 1 or 2 VLAN tags
- Pop 1 or 2 VLAN tags

**Step 3** **ipv4 address** *ip-address mask*

**Example:**

## What to Do Next

- To configure an 802.1Q VLAN subinterface on the Ethernet interface, see the

**Step 6** `l2vpn` Enters L2VPN configuration mode.

**Example:**
```
RP/0/RSP0/CPU0:router(config-subif)#l2vpn
```

**Step 7** **`bridge group`** *`bridge-group-name`*

**Example:**
```
RP/0/RSP0/CPU0:router(config-l2vpn)#bridge
```

# Ethernet Features

R2:

```
!
interface GigabitEthernet0/5/0/1
 negotiation auto
!
interface GigabitEthernet0/5/0/1.1 l2transport
 encapsulation default
!
interface GigabitEthernet0/5/0/2
 negotiation auto
!
interface GigabitEthernet0/5/0/2.1 l2transport
 encapsulation default
 l2protocol cpsv tunnel
!
l2vpn
 xconnect group examples
  p2p r2-connect
   interface GigabitEthernet0/5/0/1.1
   interface GigabitEthernet0/5/0/2.1
  !
 !
!
```

The purpose of this topology is that router R1 and R2 must receive customer protocol traffic from multiple customer interfaces, and multiplex the traffic across a single service provider interface and link.

## Configuring Source Bypass Filter

Perform this task to add a source bypass filter.

### SUMMARY STEPS

1.
2.

## Link Failover

When one member link in a bundle fails, traffic is

**Step 19** **interface** {**GigabitEthernet** | **TenGigE**} *instance* Enters the interface configuration mode for the

**Example:**

```
RP/0/RSP0/CPU0:router(config)# interface
GigabitEthernet 1/0/0/0
```

# Additional References

## Information About Impl

# Configuring L2VPN Quality of Service

**Step 3** **xconnect group** *group-name*

**Example:**

```
RP/0/RSP0/CPU0:router(config-l2vpn)# xconnect
group MS-PW1
```

## Provisioning a Global Multisegment Pseudowire Description

## Provisioning Switching Point TLV Security

# Point-to-Point Cross-connect Configuration: Examples

This section includes configuration examples for both static and dynamic p2p cross-connects.

### Static Configuration

This example shows how to configure a static point-to-point cross-connect:

```
configure
  l2vpn
  xconnect group vlan_grp_1
  p2p vlan1
  interface GigabitEthernet0/0/0/0.1
  neighbor 10.2.1.1 pw-id 1
  mpls static label local 699 remote 890
commit
```

### Dynamic Configuration

This example shows how to configure a dynamic point-to-point cross-connect:

```
configure
  l2vpn
  xconnect group vlan_grp_1
  p2p vlan1
  interface GigabitEthernet0/0/0/0.1
  neighbor 10.2.1.1 pw-id 1
commit
```

# Inter-AS: Example

This example shows how to set up an AC to AC cross-connect from AC1 to AC2:

```
router-id Loopback0

interface Loopback0
 ipv4 address 10.0.0.5 255.255.255.255
!
interface GigabitEthernet0/1/0/0.1 l2transport
encapsulation dot1q 1
!
!
interface GigabitEthernet0/0/0/3
 ipv4 address 10.45.0.5 255.255.255.0
 keepalive disable
!
interface GigabitEthernet0/0/0/4
 ipv4 address 10.5.0.5 255.255.255.0
 keepalive disable
!
router ospf 100
 log adjacency changes detail
 area 0
  interface Loopback0
  !
  interface GigabitEthernet0/0/0/3
  !
  interface GigabitEthernet0/0/0/4
  !
 !
```

# MPLS Transport Profile: Example

This section provides examples for:

:50.4981 0 0 7.98 247.32 41.41f541.58 r-.00315

After you have set the maximum number of secure MAC addresses on a port, you can configure port security to include the secure addresses in the address table in one of these ways:

- Statically configure all secure MAC addresses by using the [illegible] command.
- Allow the port to dynamically configure secure MAC addresses with the MAC addresses of connected devices.
- Statically configure a number of addresses and allow the rest to be dynamically configured.

## Dynamic Host Configuration Protocol Snooping

- RPL neighbor node—The RPL neighbor node is an Ethernet ring node adjacent to the RPL. It is responsible for blocking its end of the RPL under normal conditions. This node type is optional and prevents RPL usage when protected.
- RPL next-neighbor node—The RPL next-neighbor node is an Ethernet ring node adjacent to RPL owner node or RPL neighbor node. It is mainly used for FDB flush optimization on the ring. This node is also optional.

Figure 15 illustrates the G.8032 Ethernet ring.

***Figure 15 G.8032 Ethernet Ring***

Nodes on the ring use control messages called RAPS to coordinate the activities of switching on or off the RPL link. Any failure along the ring triggers a RAPS signal fail (RAPS SF) message Tw one boh

**Step 3**

# Configuring a Layer 2 Virtual Forwarding Instance

# Configuring an Attachment Circuit to the AC Split Horizon Group

These steps show how to add an interface to the split horizon group for attachment circuits (ACs) under a bridge domain.

**SUMMARY STEPS**

# Adding an Access Pseudowire to the AC Split Horizon Group

These steps show how to add an access pseudowire as a member to the split horizon group for attachment circuits (ACs) under a bridge domain.

## SUMMARY STEPS

1.
2.
3.
4.
5.
6.
7.
8.
9.

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| Step 1 | configure | Enter global configuration mode. |

**Example:**

```
RP/0/RSP0/CPU0:router# configure
```

# Configuring VPLS with BGP Autodiscovery and LDP Signaling

Perform this task to configure BGP-based Autodiscovery and signaling:

**SUMMARY STEPS**

1.
2.
3.

| | | |
|---|---|---|
| **Step 6** | **interface** *type port1-interface-path-id.subinterface*<br><br>**Example:**<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd)# interface GigabitEthernet 0/0/0/1.1`<br>`RP/0/RSP0/CPU0:router(config-l2vpn-bg-bd-ac)#` | Enters interface configuration mode and adds an interface to a bridge domain that allows packets to be forwarded and received from other interfaces |

# Enabling Load Balancing with ECMP and FAT PW for VPWS

**14.**

or

## DETAILED STEPS

| Command or Action | Purpose |
|---|---|
| **Step 1** | |

# Split Horizon Group: Example

This example configures interfaces for Layer 2 transport, adds them to a bridge domain, and assigns them to split horizon groups.

**Step 19**

**Common Configuration between PE1 and PE2:**

```
ASN - 120
VPN ID - 100
VPLS ID - 120:100
Route Target - 12:12
```

**Configuration at PE2:**

```
LDP Router ID - 2.2.2.2
BGP Router ID - 2.2.2.200
Peer Address - 2.2.2.20
L2VPN Router ID - 20.20.20.20
Route Distinguisher - 2:200
```

**Discovery Attributes**

**NLRI sent at PE1:**

```
Source Address - 1.1.1.10
Destination Address - 2.2.2.20
Length - 14
Route Distinguisher - 1:100
L2VPN Router ID - 10.10.10.10
VPLS ID - 120:100
Route Target - 12:12
```

**NLRI sent at PE2:**

```
Source Address - 2.2.2.20
Destination Address - 1.1.1.10
Length - 14
Route Distinguisher - 2:200
L2VPN Router ID - 20.20.20.20
VPLS ID - 120:100
Route Target - 12:12
```

# Configuring Dynamic ARP Inspection: Example

This example shows how to configure basic dynamic ARP inspection under a bridge dop5-.009 - 2o5(snuetTar)'

# Configuring Static MAC addresses under PBB Edge Bridge Domain

Perform this task to configure the static MAC addr5(f)1mer Phe sBB Eere Dbri5.4(ige D)4.5(r)-1.5( ain).

## STP Protocol Operation

All variants of STP operate in a similar fashion: STP frames (known as bridge protocol data units (BPDUs)) are exchanged at regular intervals over Layer 2 LAN segments, between network devices participating in STP. Such network devices do not forward these frames, but use the information to

## Configuring MSTAG Topology Change Propagation

MSTAG Topology Change Propagation is configured simply by configuring connectivity between the MSTAG-enabled interfaces on the two gateway devices:

1.

**Step 9**

```
            Ext Cost    0

Root ID     Priority    4096
            Address     6262.6262.6262
            This bridge is the root
            Int Cost    0
```

This example shows the output of [illegible], which produces details on the BPDUs being output and received on a given local interface:

```
RP/0/RSP0/CPU0:router#show spanning-tree mstag foo bpdu interface GigabitEthernet 0/0/0/0
Transmitted:/0/0/0
ProtocolIdentifier: 0
ProtocolVersionIdentifier: 3/0/0/0
CISTFlags: Top Change Ack  0
           Agreement       1/0/0/0
```

## Ethernet Services Access List Process and Rules

Use this process and rules when configuring an Ethernet services access list:

- The software tests the source or destination address of each packet being filtered against the