EVPN E-LAN L2 Gateway Single-Homing

This chapter describes how to configure EVPN E-LAN L2 Gateway Single-Homing.

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Table 1: Feature History Table

Feature Name	Release Information	Feature Description
EVPN E-LAN L2 Gateway Single-Homing	Release 7.11.1	We now offer a cost-effective and simplified solution for seamless communication between various customer sites connected to the same service provider network using Ethernet Virtual Private Network (EVPN) single-homing mode. EVPN LAN (E-LAN) is a service to bridge Ethernet data traffic among different sites across the MPLS network connecting a Layer 2 gateway device to a single access network.
		In the single-homing mode, a device is connected to one router in the MPLS core through physical ports or bundle ports, and in the event of a failure on those links, the traffic over the links is not protected by links to another router on the core.
		This feature is supported only on Q200-based line cards.
		The feature introduces the **evpn** commands.

Deploying EVPN single-homing can simplify network infrastructure management and scaling by requiring only one provider edge router for connectivity, resulting in significant benefits. Additionally, reducing the need for additional infrastructure through implementing EVPN single-homing can lead to substantial cost savings for the initial setup and ongoing maintenance.

The EVPN network provides a solution for linking a network or device to a single physical or bundle link. This approach does not come with built-in redundancy or automatic failover capabilities. Nevertheless, you can use various mechanisms to ensure high availability and minimize downtime through appropriate failover mechanisms like link or route redundancy. Evaluating your specific network requirements is essential when deploying EVPN single-homing. Although this option offers cost savings and simplicity, it may be better suited to smaller or medium-sized enterprises that require only a single connection to the EVPN network.

Topology

Using this topology, let's understand how EVPN E-LAN Layer 2 gateway single-homing transports traffic from one customer site to another.
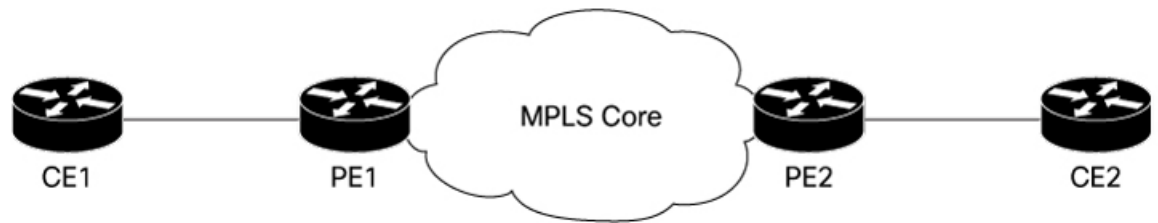
- CE1 is connected to PE1 using a single bundle or physical link. When you send Layer 2 traffic from CE1 to CE2, the traffic is encapsulated in Layer 2 frames.

- PE1 receives the Layer 2 frames on the ingress interface from CE1. PE1 checks the destination MAC address of the frame and determines the appropriate attachment circuit to forward the frame.

- PE1 then uses EVPN control plane protocols to distribute the MAC address information learned from CE1 to PE2.

- PE2 router that has the destination MAC address obtained from the EVPN control plane forwards the Layer 2 frames to the appropriate attachment circuit connected to CE2.

Configure EVPN E-LAN L2 Gateway Single -Homing

In this topology, configure EVPN E-LAN L2 Gateway single-homing on PE1. You must configure Ethernet VPN Identifier (EVI) under the bridge domain and enable PE1 to advertise MAC addresses to distribute the MAC address information learned from CE1 to PE2.

Perform the following tasks to configure EVPN E-LAN L2 gateway single-homing on PE1:

1. Set up BGP for L2VPN and EVPN

2. Configure bridge domain

3. Configure MAC advertisement

Configuration Example

```
/* Set up BGP for L2VPN and EVPN */
Router# configure
Router#(config)# router bgp 200
Router#(config-bgp)# bgp router-id 10.10.10.1
Router#(config-bgp)# address-family l2vpn evpn
Router#(config-bgp)# neighbor 10.10.10.10
Router#(config-bgp-nbr)# remote-as 200
Router#(config-bgp-nbr)# update-source Loopback 0
Router#(config-bgp-nbr)# address-family l2vpn evpn

/* Configure bridge domain */
Router(config)# l2vpn
Router (config-l2vpn)# bridge group BG1
Router (config-l2vpn-bg)# bridge-domain BD1
Router (config-l2vpn-bg-bd)# interface Bundle-Ether1.2001
Router (config-l2vpn-bg-bd-ac)# evi 2001

/* Configure MAC advertisement */
Router(config)# evpn
Router(config-evpn)# interface Bundle-Ether 1
```

```
Router(config-evpn-ac)# exit
Router(config-evpn)# evi 2001
Router(config-evpn-instance)# advertise-mac
Router(config-evpn-instance-mac)# commit
```

Running Configuration

This section shows an EVPN E-LAN L2 gateway single-homing running configuration.

```
router bgp 200
 bgp router-id 10.10.10.1
 address-family l2vpn evpn
 neighbor 10.10.10.10
  remote-as 200 description MPLS-FACING-PEER
  update-source Loopback0
  address-family l2vpn evpn
!

l2vpn
 bridge group BG1
  bridge-domain BD1
   interface BundleEther1.2001
    evi 2001
!

evpn
 interface Bundle-Ether 1
!
evi 2001
 advertise-mac
!
```

Verification

Verify that EVPN E-LAN L2 gateway single-homing is configured.

In this example, the operational mode is SH or single-homing, which indicates that CE1 is connected to PE1 through a single link.

```
Router# show evpn ethernet-segment interface Bundle-Ether 1 detail

Ethernet Segment Id    Interface      Nexthops
-------------------    ----------     ----------
N/A                    Bundle-Ether 1  10.0.0.2
..............
Topology :
Operational : SH
```

EVPN E-LAN L2 Gateway Single-Homing Features

EVPN E-LAN L2 Gateway single-homing supports the following functionalities:

- BUM Ingress Replication for EVPN Single-Homing

- Split-Horizon Groups for EVPN Single-Homing

- VRF Leaking for EVPN Single-Homing

- Core Isolation by Interface Tracking for EVPN Single-Homing
- EVPN Core Isolation through Peer Failure Detection
- MAC Mobility for EVPN Single-Homing
- Detect and Block Duplicate MAC Addresses
- EVPN E-Tree
- Seamless Migration of VPLS Network to EVPN Network