Configuring IPv6 Across a VXLAN EVPN Fabric

This chapter contains the following sections:

Overview of IPv6 Across a VXLAN EVPN Fabric

This section provides an example configuration that enables IPv6 in the overlay of a VXLAN EVPN fabric.

Cisco Nexus 3500 Series switches do not support IPv6 Across VXLAN EVPN on Cisco NX-OS Release 7.0(3)I7(2) and the previous releases.

The VXLAN encapsulation mechanism encapsulates the IPv6 packets in the overlay as IPv4 UDP packets and uses IPv4 routing to transport the VXLAN encapsulated traffic.

To enable IPv6 across a VXLAN EVPN fabric, the IPv6 address family is included in VRF, BGP, and EVPN. IPv6 routes are initiated in the tenant VRF IPv6 unicast address-family on a VTEP and are advertised in the VXLAN fabric through the L2VPN EVPN address family as EVPN route-type 2 or 5.

Note These routes are advertised as EVPN routes on the spine.

Configuring IPv6 Across a VXLAN EVPN Fabric Example

Topology for the example:
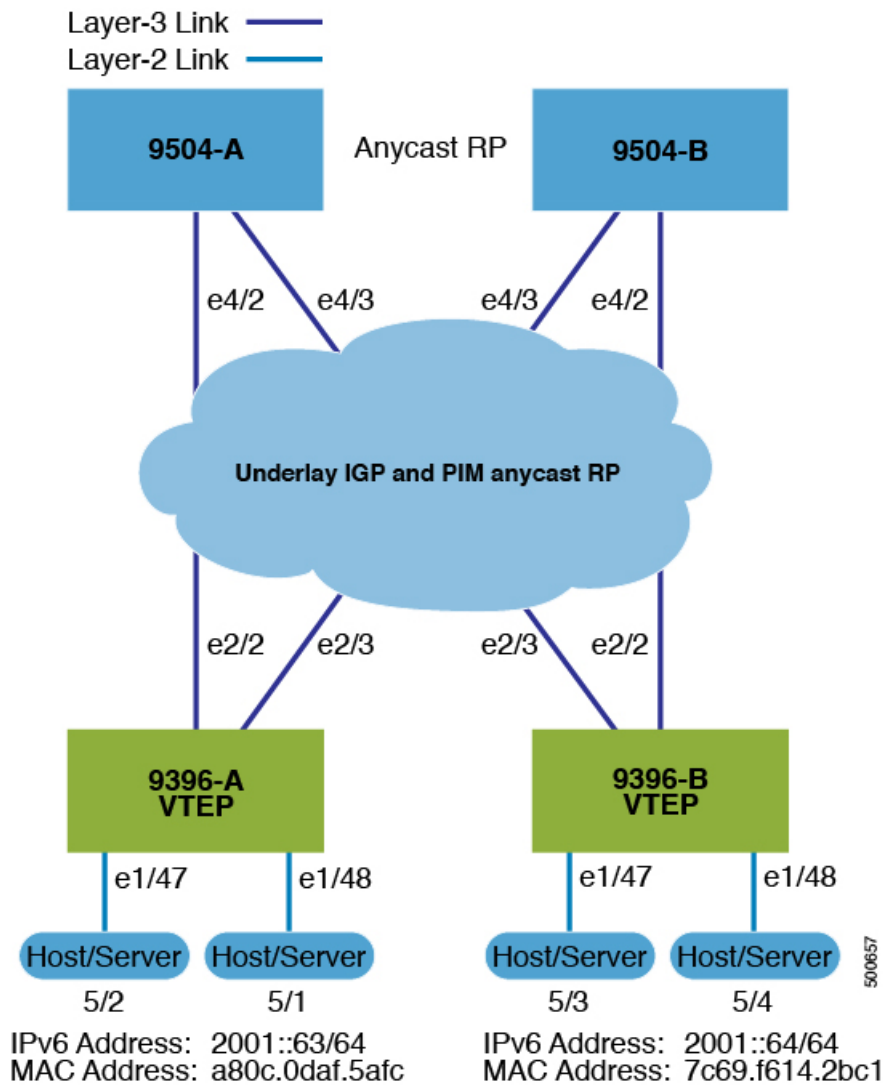
Note In the example:

- Configuration for hosts in VLAN 10 is mapped to vn-segment 10010.

- VRF RED is the VRF associated with this VLAN.

- 20010 is the L3 VNI for VRF RED.

- VLAN 100 is mapped to L3 VNI 20010.

- Configure the Layer 2 VLAN.

```
vlan 10
  name RED
  vn-segment 10010
```

• Configure the VLAN for L3 VNI .

```
vlan 100
 name RED_L3_VNI_VLAN
 vn-segment 20010
```

• Define the anycast gateway MAC.

```
fabric forwarding anycast-gateway-mac 0000.2222.3333
```

•

Note You can choose either of the following two command procedures for creating the NVE interfaces. Use the first one for a small number of VNIs. Use the second procedure to configure a large number of VNIs.

Define the NVE interface.

Option 1

```
interface nve1
  no shutdown
  source-interface loopback1
  host-reachability protocol bgp
  member vni 20010 associate-vrf
  member vni 10010
    suppress-arp
    mcast-group 225.4.0.1
```

Option 2

```
interface nve1
  no shutdown
  source-interface loopback1
  host-reachability protocol bgp
  global mcast-group 255.4.0.1
  member vni 20010 associate-vrf
  member vni 10010
    suppress-arp
```

```
evpn
  vni 10010 l2
```

Note The following commands are optional, but may be entered as overrides.

```
rd auto
    route-target import auto
    route-target export auto
```

• Add configuration the to SVI definition on VLAN 10 and on L3 VNI VLAN 100.

```
interface Vlan10
  description RED
```

```
no shutdown
vrf member RED
no ip redirects
ip address 10.1.1.1/24
ipv6 address 2001::1/64
fabric forwarding mode anycast-gateway
```

• Configure SVI definition for VLAN 100.

```
interface Vlan100
 description RED_L3_VNI_VLAN
 no shutdown
 vrf member RED
 ip forward
 ipv6 address use-link-local-only
```

Note The IPv6 address use-link-local-only serves the same purpose as IP FORWARD for IPv4. It enables the switch to perform an IP based lookup even when the interface VLAN has no IP address defined under it.

• Add configuration to the VRF definition.

```
vrf context RED
  vni 20010
  rd auto
```

Note The following commands are automatically configured unless one or more are entered as overrides.

```
rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
  address-family ipv6 unicast
    route-target both auto
    route-target both auto evpn

evpn
  vni 10010 l2
```

Note The following commands are automatically configured unless one or more are entered as overrides.

```
rd auto
    route-target import auto
    route-target export auto
```

• Add configuration to the VRF definition under BGP.

```
router bgp 65000
  vrf RED
    address-family ipv4 unicast
      advertise l2vpn evpn
    address-family ipv6 unicast
      advertise l2vpn evpn
```

Note If VTEPs are configured to operate as VPC peers, the following configuration is a best practice that should be included under the VPC domain on both switches.

```
vpc domain 1
  ipv6 nd synchronize
```

Show Command Examples

The following are examples of verifying IPv6 advertisement over VXLAN EVPN:

- Display ND information for the connected server.

```
9396-B_VTEP# show ipv6 neighbor vrf RED

Flags: # - Adjacencies Throttled for Glean
       G - Adjacencies of vPC peer with G/W bit
       R - Adjacencies learnt remotely

IPv6 Adjacency Table for VRF RED
Total number of entries: 2
Address         Age       MAC Address     Pref Source     Interface
2001::64        00:00:26  7c69.f614.2bc1  50   icmpv6     Vlan10
fe80::7e69:f6ff:fe14:2bc1
                00:01:13  7c69.f614.2bc1  50   icmpv6     Vlan10
```

- Check the L2ROUTE and ensure the MAC-IP was learned.

```
9396-B_VTEP# show l2route evpn mac-ip evi 10 host-ip 2001::64
Mac Address    Prod Host IP                                  Next Hop (s)
-------------- ---- ------------------------------------- ---------------
7c69.f614.2bc1 HMM  2001::64                                  N/A
```

Note MAC-IP table is populated only when the end server sends a neighbor solicitation message (ARP in case of IPv4).

- Verify the route is present locally in the BGP table.

```
9396-B_VTEP# show bgp l2vpn evpn 2001::64
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 198.19.0.15:34180    (L2VNI 10010)
BGP routing table entry for [2]:[0]:[0]:[48]:[7c69.f614.2bc1]:[128]:[2001::64]/368,
version 678
```

```
Paths: (1 available, best #1)
Flags: (0x00010a) on xmit-list, is not in l2rib/evpn

  Advertised path-id 1
  Path type: local, path is valid, is best path, no labeled nexthop
  AS-Path: NONE, path locally originated
    198.19.0.15 (metric 0) from 0.0.0.0 (198.19.0.15)
      Origin IGP, MED not set, localpref 100, weight 32768
      Received label 10010 20010
      Extcommunity:  RT:64567:10010 RT:64567:20010

  Path-id 1 advertised to peers:
  198.19.0.3
  198.19.0.4
```

- Verify the route is present in the remote VTEP 9396-A-VTEP BGP table.

```
9396-A-VTEP# show bgp l2vpn evpn 2001::64
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 198.19.0.14:34180     (L2VNI 10010)
BGP routing table entry for [2]:[0]:[0]:[48]:[7c69.f614.2bc1]:[128]:[2001::64]/368,
version 305
Paths: (1 available, best #1)
Flags: (0x00021a) on xmit-list, is in l2rib/evpn, is not in HW,

  Advertised path-id 1
  Path type: internal, path is valid, is best path, no labeled nexthop
            Imported from
198.19.0.15:34180:[2]:[0]:[0]:[48]:[7c69.f614.2bc1]:[128]:[2001::64]/240
  AS-Path: NONE, path sourced internal to AS
    198.19.0.15 (metric 81) from 198.19.0.3 (198.19.0.3)
      Origin IGP, MED not set, localpref 100, weight 0
      Received label 10010 20010
      Extcommunity:  RT:64567:10010 RT:64567:20010 ENCAP:8 Router MAC:5087.89a1.a52f
      Originator: 198.19.0.15 Cluster list: 198.19.0.3
```

- Check the L2ROUTE and ensure that the MAC-IP was learned on the remote VTEP - 9396-A-VTEP.

```
rswV1leaf14# show l2route evpn mac-ip evi 1413 host-ip 2001::64
Mac Address     Prod Host IP                                Next Hop (s)
-------------- ---- -------------------------------------- --------------
7c69.f614.2bc1 BGP  2001::64                                198.19.0.15
```