Configure Centralized Route Leak Feature in VXLAN BGP EVPN

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Introduction

This document describes how to configure the Centralized Route Leak feature in VXLAN BGP EVPN networks with Nexus 9000 Switches.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Nexus NX-OS Software
- VXLAN BGP EVPN

Components Used

Cisco Nexus 9000 93180YC-EX with NXOS version 7.0(3)I7(4)

The outputs in this document were taken from devices in a specific lab environment. All devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

Note: Centralized Route Leak feature (‘allow-vpn’ parameter) was introduced on Nexus NX-OS 7.0(3)I7(1) and is supported only on Cisco Nexus 9200, 9300-EX, 9300-FX and 9300-
FX2 platform switches.

Configure

Base Topology and Configurations

configure terminal
!
hostname LEAF_A
!
v overlay evpn

configure terminal
!
hostname LEAF_B
!
v overlay evpn

configure terminal
!
hostname LEAF_B
!
v overlay evpn

configure terminal
!
hostname LEAF_B
!
v overlay evpn

configure terminal
!
Route Leak from Global Routing Table to VRF

In this example:

LEAF_A# has tenant vrf 'RED' configured. The VRF includes Vlan 10 where HOST-A# resides.
LEAF_B# has in the Global Routing Table (vrf Default) Vlan 20 where Host-B# resides.

- Leak Global route into VRF 'RED'

The approach to advertise Vlan 20 (Global Routing route) to the rest of the VTEPs in vrf 'RED' in the fabric is with a Static Route configured in VRF 'RED' on LEAF_B# and advertise it into BGP EVPN. This static route points to the next-hop in Default Routing Table.

- Leak vrf 'RED' route into Global Routing table

To leak routes from VRF 'RED' into Global Routing Table, use the export command under vrf context configuration section. It is important to include the allow-vpn keyword at the end since it is required to leak /32 host routes.

**Note:** For the correct VXLAN encapsulation, it is necessary to configure the L3VNI of vrf 'RED' in LEAF_B#
vrf RED
Vlan 100 / L3VNI 10,000
Vlan 10 / L2VNI 1000
name VLAN_10_VRF_RED
vn-segment 100
vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000
!
vrf context RED
  vni 10000
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
  
interface Vlan100
  no shutdown
  vrf member RED
  ip forward
!
interface Vlan10
  no shutdown
  vrf member RED
  ip address 192.168.1.1/24
  fabric forwarding mode anycast-gateway
!
interface Ethernet1/2
  description TO HOST-A
  switchport
  switchport access vlan 10
  spanning-tree port type edge
  no shutdown
!
interface nve1
  member vni 1000
    ingress-replication protocol bgp
    member vni 10000 associate-vrf
!
router bgp 65535
  vrf RED
    address-family ipv4 unicast
      advertise 12vpn evpn
!
evpn
  vni 1000 12
  rd auto
  route-target import auto
  route-target export auto
!

name L3_VNI_VRF_RED
vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
!
vrf context RED
  vni 10000
  ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
      route-target both auto
      route-target both auto evpn
      export vrf default map TO-GLOBAL-RIB allow-vpn
    
Required to export /32 host routes from VRF 'RED' into the Global Routing Table.
!
interface Vlan100
  no shutdown
  vrf member RED
  ip forward
!
interface Vlan20
  no shutdown
  ip address 192.168.2.1/24
!
interface Ethernet1/2
  description TO HOST-B
  switchport
  switchport access vlan 20
  spanning-tree port type edge
  no shutdown
!
interface nve1
  member vni 10000 associate-vrf
!
router bgp 65535
  vrf RED
  address-family ipv4 unicast
  network 192.168.2.0/24 ! Advertise the Static Route to BGP EVPN.
    advertise l2vpn evpn
!

Note: The 'allow-vpn' keyword part of the export command under vrf context is required to export /32 host routes from VRF 'RED' into the Global Routing Table.

Note: A route-map with a single permit entry and no match parameters is used to permit all routes.

LEAF B
vlan 20
name VLAN_20

vlan 100
    name L3_VNI_VRF_RED
    vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
!
vrf context RED
    vni 10000
    ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
        rd auto
        address-family ipv4 unicast
        route-target both auto
        route-target both auto evpn
        export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' to Global Routing Table.
!
interface Vlan100
    no shutdown
    vrf member RED
        ip forward
!
interface Vlan20
    no shutdown
    ip address 192.168.2.1/24
!
interface Ethernet1/2
    description TO HOST-B
    switchport
    switchport access vlan 20
    spanning-tree port type edge
    no shutdown
!
interface nve1
    member vni 10000 associate-vrf
!
routing bgp 65535
    vrf RED
        address-family ipv4 unicast
        network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
            advertise l2vpn evpn

!


table (vrf default)
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.

interface Vlan100
  no shutdown
  vrf member RED
  ip forward

interface Vlan20
  no shutdown
  ip address 192.168.2.1/24

interface Ethernet1/2
  description TO HOST-B
  switchport
  switchport access vlan 20
  spanning-tree port type edge
  no shutdown

interface nve1
  member vni 10000 associate-vrf

router bgp 65535
  vrf RED
    address-family ipv4 unicast
    network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
      advertise l2vpn evpn

! vlan 20
name VLAN_20
vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000

route-map TO-GLOBAL-RIB permit 10

vrf context RED
  vni 10000
  ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
      route-target both auto
      route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.

interface Vlan100
  no shutdown
  vrf member RED
ip forward
!

t! interface Vlan20
 no shutdown
 ip address 192.168.2.1/24
!

interface Ethernet1/2
 description TO HOST-B
 switchport
 switchport access vlan 20
 spanning-tree port type edge
 no shutdown
!

interface nve1
  member vni 10000 associate-vrf
!

router bgp 65535
 vrf RED
  address-family ipv4 unicast
  network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
  advertise l2vpn evpn
!
!

vlan 20
 name VLAN_20
 vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000
!
 route-map TO-GLOBAL-RIB permit 10
!

vrf context RED
  vni 10000
    ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.
!

interface Vlan100
 no shutdown
 vrf member RED
 ip forward
!

interface Vlan20
 no shutdown
 ip address 192.168.2.1/24
!

interface Ethernet1/2
 description TO HOST-B
 switchport
 switchport access vlan 20
 spanning-tree port type edge
no shutdown
!
interface nve1
    member vni 10000 associate-vrf
!
router bgp 65535

vrf RED
    address-family ipv4 unicast

    network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
        advertise l2vpn evpn
!

LEAF A
!
vlan 20
name VLAN_20
vlan 100
    name L3_VNI_VRF_RED
    vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
!
vrf context RED
    vni 10000
    ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
        rd auto
        address-family ipv4 unicast
            route-target both auto
            route-target both auto evpn
        export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.
!
interface Vlan100
    no shutdown
    vrf member RED

    ip forward
!
interface Vlan20
    no shutdown
    ip address 192.168.2.1/24
!
interface Ethernet1/2
    description TO HOST-B
    switchport
    switchport access vlan 20
    spanning-tree port type edge
    no shutdown
!
interface nve1
    member vni 10000 associate-vrf
!
router bgp 65535

vrf RED
    address-family ipv4 unicast

    network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
        advertise l2vpn evpn
vlan 20
name VLAN_20

vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000

route-map TO-GLOBAL-RIB permit 10

vrf context RED
  vni 10000
    ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
      route-target both auto
      route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.

interface Vlan100
  no shutdown
  vrf member RED
  ip forward

interface Vlan20
  no shutdown
  ip address 192.168.2.1/24

interface Ethernet1/2
  description TO HOST-B
  switchport
  switchport access vlan 20
  spanning-tree port type edge
  no shutdown

interface nve1
  member vni 10000 associate-vrf

router bgp 65535
  vrf RED
    address-family ipv4 unicast
    network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
      advertise l2vpn evpn

HOST-A
! vlan 20
name VLAN_20

vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
!
vrf context RED
  vni 10000
    ip route 192.168.2.0/24 Vlan20 vrf default ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
      export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.
!
interface Vlan100
  no shutdown
  vrf member RED
    ip forward
!
interface Vlan20
  no shutdown
  ip address 192.168.2.1/24
!
interface Ethernet1/2
  description TO HOST-B
  switchport
  switchport access vlan 20
  spanning-tree port type edge
  no shutdown
!
interface nve1
  member vni 10000 associate-vrf
!
router bgp 65535
  vrf RED
    address-family ipv4 unicast
  network 192.168.2.0/24 ! Advertise the Static Route into BGP EVPN.
    advertise l2vpn evpn
!
HOST-B

! vlan 20
name VLAN_20
vlan 100
    name L3_VNI_VRF_RED
    vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
!
vrf context RED
    vni 10000
    ip route 192.168.2.0/24 Vlan20 vrf default  ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
        route-target both auto
        route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn  ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.
!
interface Vlan100
    no shutdown
    vrf member RED
    ip forward
!
interface Vlan20
    no shutdown
    ip address 192.168.2.1/24
!
interface Ethernet1/2
    description TO HOST-B
    switchport
    switchport access vlan 20
    spanning-tree port type edge
    no shutdown
!
interface nve1
    member vni 10000 associate-vrf
!
routing bgp 65535
    vrf RED
        address-family ipv4 unicast
network 192.168.2.0/24  ! Advertise the Static Route into BGP EVPN.
        advertise l2vpn evpn
!

Note: You must leak host routes (the /32 routes) into the Global Routing Table (Default VRF) for Data Plane to work.

Route Leak from Global Routing Table (received route) to VRF

In this example, LEAF_B# receives the route to HOST-B# (network 192.168.2.0/24) via EIGRP in Global Routing Table (vrf Default).

Host-A# in VRF 'RED' on any VTEP should communicate with HOST-B#.

- Leak Global route into VRF 'RED'

As of now, EIGRP routes in Global Routing Table cannot be leaked in the VRF and be advertised in the fabric as BGP EVPN routes to other VTEPs.

The approach to advertise this network (Global Routing route) to the rest of the VTEPs in vrf 'RED' in the fabric is with a Static Route configured in VRF 'RED' on LEAF_B# and advertise it into BGP EVPN. This static route points to the next-hop in Default Routing Table.

- Leak vrf 'RED' route into Global Routing table

To leak routes from VRF 'RED' into Global Routing Table, use the export command under vrf context configuration section. It is important to include the allow-vpn keyword at the end since it is required to leak /32 host routes.

Note: For the correct VXLAN encapsulation, it is necessary to configure the L3VNI of vrf 'RED' in LEAF_B#
vrf RED
Vlan 100 / L3VNI 10,000
Vlan 10 / L2VNI 1000

vrf RED
Vlan 100 / L3VNI 10,000
Vlan 10 / L2VNI 1000

LEAF A

fabric forwarding anycast-gateway-mac
000a.000b.000c
!
vlan 10
    name VLAN_10_VRF_RED
    vn-segment 1000
vlan 100

LEAF B

feature eigrp
!
vlan 100
    name L3_VNI_VRF_RED
    vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
name L3_VNI_VRF_RED
vn-segment 10000
!

vrf context RED
  vni 10000
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
  
  !
  interface Vlan100
    no shutdown
    vrf member RED
      ip forward
  !
  interface Vlan10
    no shutdown
    vrf member RED
    ip address 192.168.1.1/24
    fabric forwarding mode anycast-gateway
  !
  interface Ethernet1/2
  description TO HOST-A
  switchport
  switchport access vlan 10
  spanning-tree port type edge
  no shutdown
  !
  interface nve1
    member vni 1000
      ingress-replication protocol bgp
    member vni 10000 associate-vrf
    !
    router bgp 65535
    vrf RED
      address-family ipv4 unicast
        advertise l2vpn evpn
      !
      evpn
      vni 1000 12
      rd auto
      route-target import auto
      route-target export auto
    !

Note: The 'allow-vpn' keyword part of the export command under vrf context is required to export /32 host routes from VRF 'RED' into the Global Routing Table.

LEAF B

feature eigrp
!

vlan 100
  name L3_VNI_VRF_RED

  vrf context RED
    vni 10000
    ip route 192.168.2.0/23 Ethernet1/48 172.16.1.2 vrf default
    ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
      route-target both auto
      route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.

  !
  interface Vlan100
    no shutdown
    vrf member RED
      ip forward
    !
    route-map BGP-TO-EIGRP
    match route-type internal
    !
    router eigrp 1
    redistribute bgp 65535 route-map BGP-TO-EIGRP
    !
    interface Ethernet1/48
    description To Router
    no switchport
    ip address 172.16.1.1/30
    ip router eigrp 1
    no shutdown
    !
    interface nve1
      member vni 10000 associate-vrf
      !
      router bgp 65535
      vrf RED
        address-family ipv4 unicast
          network 192.168.2.0/23 ! Advertise the Static Route into BGP EVPN.
          advertise l2vpn evpn
        !
vn-segment 10000

route-map TO-GLOBAL-RIB permit 10

vrf context RED
    vni 10000
    ip route 192.168.2.0/23 Ethernet1/48 172.16.1.2 vrf default  ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
    rd auto
    address-family ipv4 unicast
        route-target both auto
        route-target both auto evpn
    export vrf default map TO-GLOBAL-RIB allow-vpn  ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.

interface Vlan100
    no shutdown
    vrf member RED
    ip forward

    route-map BGP-TO-EIGRP
    match route-type internal

    router eigrp 1
    redistribute bgp 65535 route-map BGP-TO-EIGRP

interface Ethernet1/48
    description To Router
    no switchport
    ip address 172.16.1.1/30
    ip router eigrp 1
    no shutdown

interface nve1
    member vni 10000 associate-vrf

router bgp 65535
    vrf RED
        address-family ipv4 unicast
            network 192.168.2.0/23  ! Advertise the Static Route into BGP EVPN.
            advertise l2vpn evpn

feature eigrp

vlan 100
    name L3_VNI_VRF_RED
    vn-segment 10000

route-map TO-GLOBAL-RIB permit 10

vrf context RED
    vni 10000
    ip route 192.168.2.0/23 Ethernet1/48 172.16.1.2 vrf default  ! Create a static route in VRF 'RED', def
next-hop in Global table (vrf default)
rd auto
address-family ipv4 unicast
  route-target both auto
  route-target both auto evpn
export vrf default map TO-GLOBAL-РИB allow-vpn ! Required to export /32 host routes from VRF 'RED' into
Global Routing Table.
!
interface Vlan100
  no shutdown
  vrf member RED
  ip forward
!
route-map BGP-TO-EIGRP
match route-type internal
!
router eigrp 1
redistribute bgp 65535 route-map BGP-TO-EIGRP
!
interface Ethernet1/48
  description To Router
  no switchport
  ip address 172.16.1.1/30
  ip router eigrp 1
  no shutdown
!
interface nve1
  member vni 10000 associate-vrf
!
router bgp 65535
  vrf RED
    address-family ipv4 unicast
    network 192.168.2.0/23 ! Advertise the Static Route into BGP EVPN.
      advertise l2vpn evpn
!

**Note:** Routes leaked from Global Routing Table into VRF 'RED' are not advertised via BGP EVPN as Type 5 to the other VTEPs in the fabric.

**LEAF A**

feature eigrp
!
vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000
!
route-map TO-GLOBAL-РИB permit 10
!
vrf context RED
  vni 10000
  ip route 192.168.2.0/23 Ethernet1/48 172.16.1.2 vrf default ! Create a static route in VRF 'RED', def
next-hop in Global table (vrf default)
rd auto
address-family ipv4 unicast
  route-target both auto
  route-target both auto evpn
export vrf default map TO-GLOBAL-RIB allow-vpn  ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.
!
interface Vlan100
  no shutdown
  vrf member RED
  ip forward
!
route-map BGP-TO-EIGRP
match route-type internal
!
router eigrp 1
redistribute bgp 65535 route-map BGP-TO-EIGRP
!
interface Ethernet1/48
  description To Router
  no switchport
  ip address 172.16.1.1/30
  ip router eigrp 1
  no shutdown
!
interface nve1
  member vni 10000 associate-vrf
!
router bgp 65535
  vrf RED
  address-family ipv4 unicast
  network 192.168.2.0/23  ! Advertise the Static Route into BGP EVPN.
    advertise l2vpn evpn

Note: You can also advertise instead a default route in VRF 'RED' to the rest of VTEPs in the fabric, redistribute static with default-information originate can be used under BGP and then VRF configuration section to accomplish this.

Router

feature eigrp
!
vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000
!
route-map TO-GLOBAL-RIB permit 10
!
vrf context RED
  vni 10000
ip route 192.168.2.0/23 Ethernet1/48 172.16.1.2 vrf default  ! Create a static route in VRF 'RED', define next-hop in Global table (vrf default)
rd auto
address-family ipv4 unicast
 route-target both auto
 route-target both auto evpn
export vrf default map TO-GLOBAL-RIB allow-vpn  ! Required to export /32 host routes from VRF 'RED' into Global Routing Table.
!
interface Vlan100
  no shutdown
  vrf member RED
  ip forward

! route-map BGP-TO-EIGRP
match route-type internal
!
router eigrp 1
redistribute bgp 65535 route-map BGP-TO-EIGRP
!
interface Ethernet1/48
description To Router
no switchport
ip address 172.16.1.1/30
ip router eigrp 1
no shutdown
!
interface nve1
  member vni 10000 associate-vrf
!
router bgp 65535
  vrf RED
    address-family ipv4 unicast
network 192.168.2.0/23  ! Advertise the Static Route into BGP EVPN.
    advertise l2vpn evpn

!

Route Leak between VRFs on different VTEPs

To leak routes between different VRFs across VTEPs, use route-target export and route-target import commands under the vrf context configuration section.

In this example, routes exported from LEAF_A# vrf 'RED' are imported in LEAF_B# vrf 'BLUE' (and viceversa) with the use of equal Route-Targets (RTs).

By the purpose of this example, the manually defined RT 10:30 is set to exchange the routes between the VRFs across the VTEPs.
Important in this scenario is to have the L3VNIs of both vrf 'RED' and vrf 'BLUE' configured on both VTEPs, LEAF_A# and LEAF_B#.

This is required for the correct VXLAN encapsulation of traffic.

Packets from HOST-A connected to LEAF_A# vrf 'RED' are encapsulated in VXLAN with the L3VNI not of this VRF but of the destination vrf 'BLUE' when forwarded towards the SPINE destined to HOST-B. The same applies for the return traffic.
Observe that:

- LEAF_A# has only hosts on vrf 'RED'. Its configuration still requires the definition of vrf 'BLUE' and its corresponding L3VNI.

- LEAF_B# has only hosts for vrf 'BLUE'. Its configuration still requires the definition of vrf 'RED' and its corresponding L3VNI.

**Note:** Make sure the L3VNIs of both VRFs is configured on all the VTEPs involved in the communication. For this design, the "centralized" concept is not fulfilled.

---

### LEAF A

```conf
fabric forwarding anycast-gateway-mac 000a.000b.000c

vlan 10
  name VLAN_10_VRF_RED
  vn-segment 1000

vlan 100
  name L3_VNI_VRF_RED
  vn-segment 10000

vlan 200
  name L3_VNI_VRF_BLUE
  vn-segment 20000

vrf context RED vni 10000 rd auto address-family ipv4 unicast
  route-target import 10:30 ! Route target for vtep route leak
  route-target import 10:30 evpn ! Route target for vtep route leak
  route-target export 10:30 ! Route target for vtep route leak
  route-target export 10:30 evpn ! Route target for vtep route leak
both auto evpn
!

vrf context BLUE
  vni 20000
  rd auto
  address-family ipv4 unicast
  route-target both auto
  route-target both auto evpn
!

interface Vlan10 no shutdown vrf member RED ip address 192.168.1.1/24 fabric forwarding mode anycast-gateway
!

interface Vlan100 no shutdown vrf member RED ip forward
!

interface Vlan200
  no shutdown
  vrf member BLUE
  ip forward
!

interface nve1
  member vni 1000 ingress-replication protocol bgp
member vni 10000 associate-vrf
member vni 20000 associate-vrf
```

---

### LEAF B

```conf
fabric forwarding anycast-gateway-mac 000a.000b.000c

vlan 10
  name VLAN_10_VRF_BLUE
  vn-segment 1000

vlan 100
  name L3_VNI_VRF_BLUE
  vn-segment 10000

vlan 200
  name L3_VNI_VRF_BLUE
  vn-segment 20000

vrf context RED
  vni 10000
  rd auto
  address-family ipv4 unicast
  route-target both auto
  route-target both auto evpn
!

vrf context BLUE
  vni 20000
  rd auto
  address-family ipv4 unicast
  route-target import 10:30 ! Route target for vtep route leak
  route-target import 10:30 evpn ! Route target for vtep route leak
  route-target export 10:30 ! Route target for vtep route leak
  route-target export 10:30 evpn ! Route target for vtep route leak
both auto evpn
!

interface Vlan10 no shutdown vrf member BLUE ip address 192.168.2.1/24 fabric forwarding mode anycast-gateway
!

interface Vlan100 no shutdown vrf member RED ip forward
!

interface Vlan200
  no shutdown
  vrf member RED
  ip forward
!

interface nve1
  member vni 1000 ingress-replication protocol bgp
member vni 10000 associate-vrf
member vni 20000 associate-vrf
```
interface Ethernet1/2
description TO HOST-A
switchport
switchport access vlan 10
spanning-tree port type edge
no shutdown
route-map PERMIT-ALL permit 10
router bgp 65535
vrf RED
    address-family ipv4 unicast
    advertise 12vpn evpn
    redistribute direct route-map PERMIT-ALL
    redistribute hmm route-map PERMIT-ALL
    evpn
    vni 1000 12
        rd auto
        route-target import auto
        route-target export auto

Note: Be aware of CSCvn49527. In case the command redistribute hmm is in the configuration, after an end host moves from VTEP to VTEP, the Routing Table may not be properly updated.

On LEAF_A#, the Routing Table shows how the entry in vrf 'RED' sets the L3VNI of vrf 'BLUE' (20,000) to forward the traffic to HOST-B# (IP 192.168.2.20).

LEAF A

ip forward !
interface nve1
    member vni 2000
    associate-vrf
        member vni 20000 associate-vrf

router bgp 65535
vrf BLUE
    address-family ipv4 unicast
    advertise 12vpn evpn
    redistribute direct route-map PERMIT-ALL
    redistribute hmm route-map PERMIT-ALL
    evpn
    vni 2000 12
        rd auto
        route-target import auto
        route-target export auto

fabric forwarding anycast-gateway-mac 0000.000b.000c !
vlan 20
    name VLAN_20_VRF_BLUE
    vn-segment 2000
vlan 100
    name L3_VNI_VRF_RED
        vn-segment 10000
vlan 200
    name L3_VNI_VRF_BLUE
        vn-segment 20000 !

vrf context RED
    vni 10000
        rd auto
        address-family ipv4 unicast
            route-target both auto
            route-target both auto evpn
!

vrf context BLUE
vni 20000
rd auto
address-family ipv4 unicast
  route-target import 10:30  ! Route target for vtep route leak
  route-target import 10:30 evpn ! Route target for vtep route leak
  route-target export 10:30  ! Route target for vtep route leak
  route-target export 10:30 evpn ! Route target for vtep route leak
route-target both auto
route-target both auto evpn
! interface Vlan20
no shutdown
vrf member BLUE ip address 192.168.2.1/24
fabric forwarding mode anycast-gateway ! interface Vlan100
  no shutdown
  vrf member RED
  ip forward
! interface Vlan200
  no shutdown
  vrf member BLUE
  ip forward!
! interface nve1
    member vni 2000
    ingress-replication protocol bgp
    !
    interface Ethernet1/2
      description TO HOST-B
      switchport
      switchport access vlan 20
      spanning-tree port type edge
      no shutdown
    !
    route-map PERMIT-ALL permit 10
    !
    router bgp 65535
      vrf BLUE
      address-family ipv4 unicast
      advertise 12vpn evpn
      redistribute direct route-map PERMIT-ALL
    !
    redistribute hmm route-map PERMIT-ALL
    !
    evpn
    vni 2000 12
      rd auto
      route-target import auto
      route-target export auto
!

LEAF# show ip route 192.168.2.20 vrf RED IP Route Table for VRF "RED" '*' denotes best ucast next-hop 'denotes best mcast next-hop: '[x/y]' denotes [preference/metric] '%<string>' in via output denotes VRF <string> 192.168.2.20/32, ubest/mbest: 1/0 *via 2.2.2.2%default, [200/0], 00:01:45, bgp-65535, internal 65535 (evpn) segid: 20000 tunnelid: 0x2020202 encap: VXLAN

LEAF#

The same for the return of the traffic, on LEAF_B# the Routing Table shows how the entry in vrf 'BLUE' sets the L3VNI of vrf 'RED' (10,000) to forward the traffic to HOST-A# (IP 192.168.1.10).
The next capture show VXLAN traffic from LEAF_A# (NVE 1.1.1.1) to LEAF_B# (NVE 2.2.2.2)

In the VXLAN header the L3VNI is 20,000 which is the one of vrf 'BLUE', the destination VRF on the destination VTEP Switch LEAF_B#.

HOST-A

The next capture show VXLAN traffic from LEAF_B# (NVE 2.2.2.2) to LEAF_A# (NVE 1.1.1.1)
In the VXLAN header the L3VNI is 10,000 which is the one of vrf 'RED', the destination VRF on the destination VTEP Switch LEAF_A#.

HOST-B

LEAF_A# show ip route 192.168.1.10 vrf BLUE IP Route Table for VRF "BLUE" '*' denotes best ucast next-hop '**' denotes best mcast next-hop '[x/y]' denotes [preference/metric] '%<string>' in via output denotes VRF <string> ubest/mbest: 1/0 *via 1.1.1.1%default, [200/0], 00:02:17, bgp-65535, internal, tag 65535 (evpn) segid: 0x1010101 encap: VXLAN

### Route Leak between VRFs on local VTEP

In this example, the LEAF_A# VTEP Switch has both VRFs 'RED' and 'BLUE' locally configured and communication is required between Hosts which reside in Vlans that belong to those VRFs.

Just like in the previous scenario, use **route-target export** and **route-target import** commands under both **vrf context** configuration sections to leak the routes between the VRFs.

Make sure that both VRFs participate in BGP and routes are advertised.
vrf RED
Vlan 10 / L2VNI 1000

vrf BLUE
Vlan 20 / L2VNI 2000

LEAF A

fabric forwarding anycast-gateway-mac 000a.000b.000c

! vlan 10
name VLAN_10_VRF_RED
vn-segment 1000
vlan 20 name VLAN_20_VRF_BLUE
vn-segment 2000 ! vrf context RED vni 10000
rd auto
address-family ipv4 unicast
route-target both auto
route-target both auto evpn
route-target import 10:30 ! Route target for local route leak
route-target import 10:30 evpn  ! Route target for local route leak
route-target export 10:30  ! Route target for local route leak
route-target export 10:30 evpn  ! Route target for local route leak
vrf context BLUE  vni 20000
rd auto
address-family ipv4 unicast
route-target both auto
destination-family-family ipv4 unicast
route-target both auto evpn
distribute direct route-map PERMIT-ALL
redistribute hmm route-map PERMIT-ALL
redistribute direct route-map PERMIT-ALL
redistribute hmm route-map PERMIT-ALL

Alternatively, configure static routes to perform the route leak.

Ping test is now successful between HOST-A and HOST-B.

Traffic is locally switched by LEAF_A#. Therefore, there is no VXLAN encapsulation involved in this communication.

HOST-A

HOST-B

For informative purposes, next are the commands required for a complete L3VNI definition.
vrf context RED ip route 192.168.2.0/24 Vlan20 vrf BLUE
vrf context BLUE ip route 192.168.1.0/24 Vlan10 vrf RED

Related Information

Centralized VRF Route Leak With Default-Routes and Aggregates