Configuring External VRF Connectivity and Route Leaking

This chapter contains the following sections:

Configuring External VRF Connectivity

About External Layer-3 Connectivity for VXLAN BGP EVPN Fabrics

A VXLAN BGP EVPN fabric can be extended by using per-VRF IP routing to achieve external connectivity. The approach that is used for the Layer-3 extensions is commonly referred to as VRF Lite, while the functionality itself is more accurately defined as Inter-AS Option A or back-to-back VRF connectivity.

Guidelines and Limitations for External VRF Connectivity and Route Leaking

The following are the guidelines and limitations for External Layer-3 Connectivity for VXLAN BGP EVPN Fabrics:

- Support added for Cisco Nexus 3600 platform switches.
- A physical Layer-3 Interface (Parent-Interface) can be used for external Layer-3 connectivity (ie VRF default).
- The Parent-Interface to multiple Sub-Interfaces can not be used for external Layer-3 connectivity (ie Ethernet1/1 for VRF default). A Sub-Interface can be used instead.
- VTEPs do not support VXLAN encapsulated traffic over Parent-Interfaces if Sub-Interfaces are configured. This is regardless of VRF participation.
- VTEPs do not support VXLAN encapsulated traffic over Sub-Interfaces. This is regardless of VRF participation or IEEE 802.1q encapsulation.
- Mixing Sub-Interfaces for VXLAN and non-VXLAN enabled VLANs is not supported.

Configuring Route Leaking

About Centralized VRF Route-Leaking for VXLAN BGP EVPN Fabrics

VXLAN BGP EVPN uses MP-BGP and its route-policy concept to import and export prefixes. The ability of this very extensive route-policy model allows to leak routes from one VRF to another VRF and vice-versa; any combination of custom VRF or VRF default can be used. VRF route-leaking is a switch-local function at specific to a location in the network, the location where the cross-VRF route-target import/export configuration takes place (leaking point). The forwarding between the different VRFs follows the control-plane, the location of where the configuration for the route-leaking is performed - hence Centralized VRF route-leaking. With the addition of VXLAN BGP EVPN, the leaking point requires to advertise the cross-VRF imported/exported route and advertise them towards the remote VTEPs or External Routers.

The advantage of Centralized VRF route-leaking is that only the VTEP acting as leaking point requires the special capabilities needed, while all other VTEPs in the network are neutral to this function.

Guidelines and Limitations for External VRF Connectivity and Route Leaking

The following are the guidelines and limitations for External Layer-3 Connectivity for VXLAN BGP EVPN Fabrics:

- Support added for Cisco Nexus 3600 platform switches.
- A physical Layer-3 Interface (Parent-Interface) can be used for external Layer-3 connectivity (ie VRF default).
- The Parent-Interface to multiple Sub-Interfaces can not be used for external Layer-3 connectivity (ie Ethernet1/1 for VRF default). A Sub-Interface can be used instead.
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- VTEPs do not support VXLAN encapsulated traffic over Sub-Interfaces. This is regardless of VRF participation or IEEE 802.1q encapsulation.
- Mixing Sub-Interfaces for VXLAN and non-VXLAN enabled VLANs is not supported.

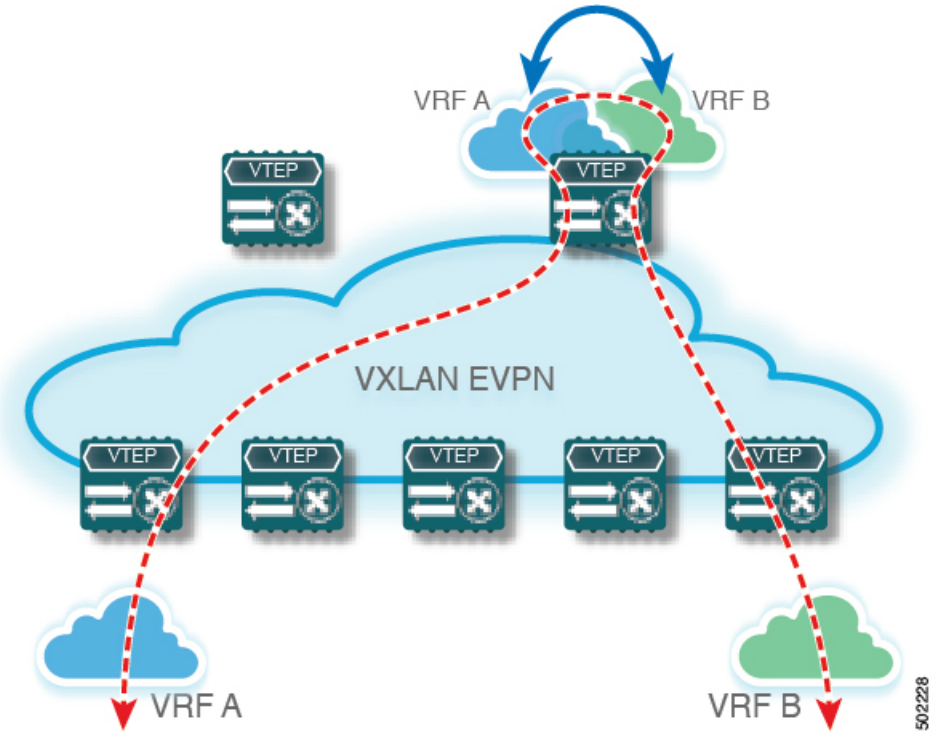
Centralized VRF Route-Leaking Brief - Shared Internet with Custom VRF

Some pointers follow:

- The Shared Internet with VRF route-leaking for VXLAN BGP EVPN fabrics is depicted in the following figure.
- The default-route is made exported from the Shared Internet VRF and re-advertisement within VRF Blue and VRF Red on the Border Node.
- Ensure the default-route in VRF Blue and VRF Red is not leaked to the Shared Internet VRF.
- The less specific prefixes for VRF Blue and VRF Red are exported for the Shared Internet VRF and re-advertised as necessary.

- Configured less specific prefixes (aggregates) that are advertised from the Border Node to the remaining VTEPs to the destination VRF (Blue or Red).
- BGP EVPN does not export prefixes that were previously imported to prevent the occurrence of routing loops.

Figure 1: Centralized VRF Route-Leaking - Shared Internet with Custom VRF



Configuring Centralized VRF Route-leaking - Specific Prefixes between Custom VRF

Configuring VRF Context on the Routing-Block VTEP

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **vrf context** *vrf-name*
3. **vni** *number*
4. **rd auto**
5. **address-family ipv4 unicast**
6. **route-target both {auto** | *as:vni*}
7. **route-target both {auto** | *as:vni* }**evpn**
8. **route-target import** *rt-from-different-vrf*

9. **route-target import** *rt-from-different-vrf* **evpn**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**vrf context** *vrf-name*	Configure the VRF.
Step 3	**vni** *number*	Specify the VNI. The VNI associated with the VRF is often referred to as Layer-3 VNI, L3VNI or L3VPN. The L3VNI is configured as common identifier across the participating VTEPs.
Step 4	**rd auto**	Specify the VRFs Route Distinguisher (RD). The RD uniquely identifies a VTEP within a L3VNI.
Step 5	**address-family ipv4 unicast**	Configure the IPv4 Unicast address-family. Required for IPv4 over VXLAN with IPv4 underlay.
Step 6	**route-target both {auto** | *as:vni*}	Configure the Route Target (RT) for import/export of IPv4 prefixes within the IPv4 unicast address-family The Route Target (RT) is used for a per-VRF prefix import/export policy. If *as:vni* is entered, the value is in the format of ASN:NN, ASN4:NN, or IPv4:NN.
Step 7	**route-target both {auto** | *as:vni* }**evpn**	Configure the Route Target (RT) for import/export of IPv4 prefixes within the IPv4 unicast address-family The Route Target (RT) is used for a per-VRF prefix import/export policy. If *as:vni* is entered, the value is in the format of ASN:NN, ASN4:NN, or IPv4:NN.
Step 8	**route-target import** *rt-from-different-vrf*	Configure the Route Target (RT) for importing IPv4 prefixes from the leaked-from VRF (ie AS:VNI).
Step 9	**route-target import** *rt-from-different-vrf* **evpn**	Configure the Route Target (RT) for importing IPv4 prefixes from the leaked-from VRF (ie AS:VNI).

Configuring the BGP VRF instance on the Routing-Block

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **router bgp** *autonomous-system number*
3. **vrf** *vrf-name*

4. **address-family ipv4 unicast**
5. **advertise l2vpn evpn**
6. **aggregate-address** *prefix/mask*
7. **maximum-paths ibgp** *number*
8. **maximum-paths** *number*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**router bgp** *autonomous-system number*	Configure BGP.
Step 3	**vrf** *vrf-name*	Specify the VRF.
Step 4	**address-family ipv4 unicast**	Configure address family for IPv4
Step 5	**advertise l2vpn evpn**	Enable the advertisement of EVPN routes within IPv4 address-family.
Step 6	**aggregate-address** *prefix/mask*	Create less specific prefix aggregate into the destination VRF.
Step 7	**maximum-paths ibgp** *number*	Enabling equal cost multipathing (ECMP) for iBGP prefixes.
Step 8	**maximum-paths** *number*	Enabling equal cost multipathing (ECMP) for eBGP prefixes

Example - Configuration Centralized VRF Route-Leaking - Specific Prefixes Between Custom VRF

Configuring VXLAN BGP EVPN Routing-Block

The VXLAN BGP EVPN Routing-Block acts as centralized route-leaking point. The leaking configuration is localized such that control-plane leaking and data-path forwarding follow the same path. Most significantly is the VRF configuration of the Routing-Block and the advertisement of the less specific prefixes (aggregates) into the respective destination VRFs.

```
vrf context Blue
  vni 51010
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    route-target import 65002:51020
    route-target import 65002:51020 evpn
!
vlan 2110
  vn-segment 51010
!
interface Vlan2110
  no shutdown
  mtu 9216
```

```
  vrf member Blue
  no ip redirects
  ip forward
!
vrf context Red
  vni 51020
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    route-target import 65002:51010
    route-target import 65002:51010 evpn
!
vlan 2120
  vn-segment 51020
!
interface Vlan2120
  no shutdown
  mtu 9216
  vrf member Blue
  no ip redirects
  ip forward
!
interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback1
  member vni 51010 associate-vrf
  member vni 51020 associate-vrf
!
router bgp 65002
  vrf Blue
    address-family ipv4 unicast
      advertise l2vpn evpn
      aggregate-address 10.20.0.0/16
      maximum-paths ibgp 2
      Maximum-paths 2
  vrf Red
    address-family ipv4 unicast
      advertise l2vpn evpn
      aggregate-address 10.10.0.0/16
      maximum-paths ibgp 2
      Maximum-paths 2
```

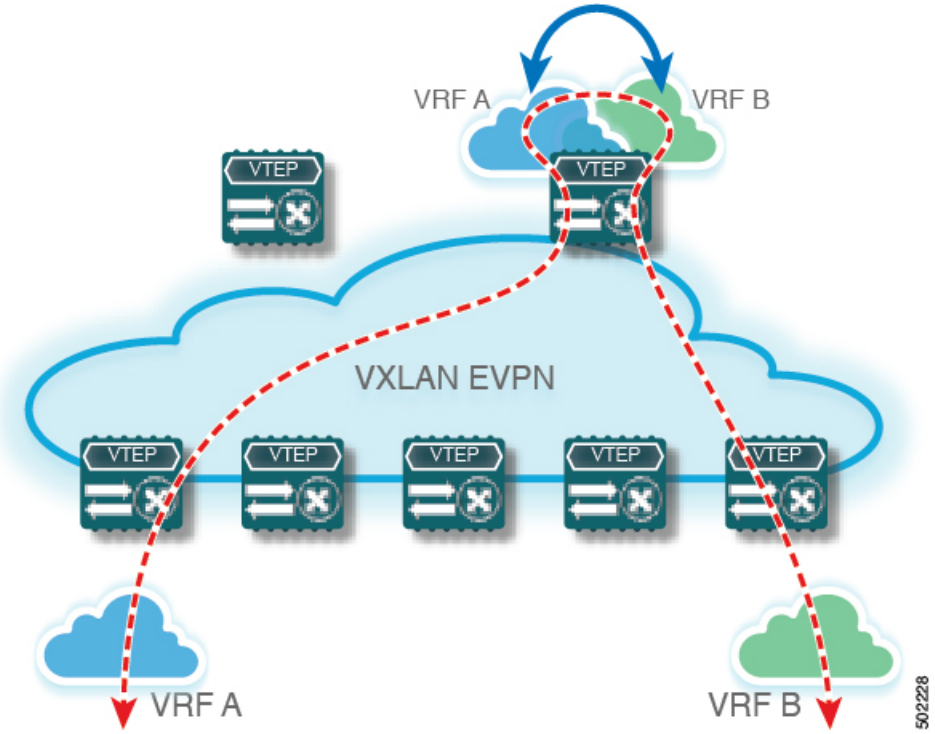
Centralized VRF Route-Leaking Brief - Shared Internet with Custom VRF

Some pointers follow:

- The Shared Internet with VRF route-leaking for VXLAN BGP EVPN fabrics is depicted in the following figure.
- The default-route is made exported from the Shared Internet VRF and re-advertisement within VRF Blue and VRF Red on the Border Node.
- Ensure the default-route in VRF Blue and VRF Red is not leaked to the Shared Internet VRF.
- The less specific prefixes for VRF Blue and VRF Red are exported for the Shared Internet VRF and re-advertised as necessary.
- Configured less specific prefixes (aggregates) that are advertised from the Border Node to the remaining VTEPs to the destination VRF (Blue or Red).

- BGP EVPN does not export prefixes that were previously imported to prevent the occurrence of routing loops.

Figure 2: Centralized VRF Route-Leaking - Shared Internet with Custom VRF



Configuring Centralized VRF Route-Leaking - Shared Internet with Custom VRF

Configuring Internet VRF on Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **vrf context** *vrf-name*
3. **vni** *number*
4. **ip route 0.0.0.0/0** *next-hop*
5. **rd auto**
6. **address-family ipv4 unicast**
7. **route-target both {auto** | *as:vni*}
8. **route-target both** *shared-vrf-rt* **evpn**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**vrf context** *vrf-name*	Configure the VRF.
Step 3	**vni** *number*	Specify the VNI. The VNI associated with the VRF is often referred to as Layer-3 VNI, L3VNI or L3VPN. The L3VNI is configured as common identifier across the participating VTEPs.
Step 4	**ip route 0.0.0.0/0** *next-hop*	Configure default-route in shared internet VRF to external router (example).
Step 5	**rd auto**	Specify the VRFs Route Distinguisher (RD). The RD uniquely identifies a VTEP within a L3VNI.
Step 6	**address-family ipv4 unicast**	Configure the IPv4 Unicast address-family. Required for IPv4 over VXLAN with IPv4 underlay.
Step 7	**route-target both {auto** | *as:vni}*	Configure the Route Target (RT) for import/export of EVPN and IPv4 prefixes within the IPv4 unicast address-family.
Step 8	**route-target both** *shared-vrf-rt* **evpn**	Configure a special Route Target (RT) for the import/export of the shared IPv4 prefixes. Additional import/export map for further qualification is supported

Configuring Shared Internet BGP Instance on the Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **router bgp** *autonomous-system number*
3. **vrf** *vrf-name*
4. **address-family ipv4 unicast**
5. **advertise l2vpn evpn**
6. **aggregate-address** *prefix/mask*
7. **maximum-paths ibgp** *number*
8. **maximum-paths** *number*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**router bgp** *autonomous-system number*	Configure BGP.
Step 3	**vrf** *vrf-name*	Specify the VRF.
Step 4	**address-family ipv4 unicast**	Configure address family for IPv4
Step 5	**advertise l2vpn evpn**	Enable the advertisement of EVPN routes within IPv4 address-family.
Step 6	**aggregate-address** *prefix/mask*	Create less specific prefix aggregate into the destination VRF.
Step 7	**maximum-paths ibgp** *number*	Enabling equal cost multipathing (ECMP) for iBGP prefixes.
Step 8	**maximum-paths** *number*	Enabling equal cost multipathing (ECMP) for eBGP prefixes.

Configuring Custom VRF Context on the Border Node - 1

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **vrf context** *vrf-name*
3. **vni** *number*
4. **rd auto**
5. **ip route 0.0.0.0/0 Null0**
6. **address-family ipv4 unicast**
7. **route-target both {auto** | *as:vni***}**
8. **route-target both {auto** | *as:vni***} evpn**
9. **import map** *name*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**vrf context** *vrf-name*	Configure the VRF.

	Command or Action	Purpose
Step 3	**vni** *number*	Specify the VNI. The VNI associated with the VRF is often referred to as Layer-3 VNI, L3VNI or L3VPN. The L3VNI is configured as the common identifier across the participating VTEPs.
Step 4	**rd auto**	Specify the VRFs Route Distinguisher (RD). The Route Distinguisher (RD) uniquely identifies a VTEP within a L3VNI.
Step 5	**ip route 0.0.0.0/0 Null0**	Configure default-route in common VRF to attract traffic towards Border Node with Shared Internet VRF.
Step 6	**address-family ipv4 unicast**	Configure the IPv4 Unicast address-family. Required for IPv4 over VXLAN with IPv4 underlay.
Step 7	**route-target both {auto** | *as:vni***}**	Configure the Route Target (RT) for import/export of IPv4 prefixes within the IPv4 unicast address-family The Route Target (RT) is used for a per-VRF prefix import/export policy. If *as:vni* is entered, the value is in the format of ASN:NN, ASN4:NN, or IPv4:NN.
Step 8	**route-target both {auto** | *as:vni***} evpn**	Configure the Route Target (RT) for import/export of IPv4 prefixes within the IPv4 unicast address-family The Route Target (RT) is used for a per-VRF prefix import/export policy. If *as:vni* is entered, the value is in the format of ASN:NN, ASN4:NN, or IPv4:NN.
Step 9	**import map** *name*	Apply a route-map on routes being imported into this routing table.

Configuring Custom VRF Instance in BGP on the Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **router bgp** *autonomous-system-number*
3. **vrf** *vrf-name*
4. **address-family ipv4 unicast**
5. **advertise l2vpn evpn**
6. **network 0.0.0.0/0**
7. **maximum-paths ibgp** *number*
8. **maximum-paths** *number*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**router bgp** *autonomous-system-number*	Configure BGP.
Step 3	**vrf** *vrf-name*	Specify the VRF.
Step 4	**address-family ipv4 unicast**	Configure address family for IPv4.
Step 5	**advertise l2vpn evpn**	Enable the advertisement of EVPN routes within IPv4 address-family.
Step 6	**network 0.0.0.0/0**	Creating IPv4 default-route network statement.
Step 7	**maximum-paths ibgp** *number*	Enabling equal cost multipathing (ECMP) for iBGP prefixes.
Step 8	**maximum-paths** *number*	Enabling equal cost multipathing (ECMP) for eBGP prefixes.

Example - Configuration Centralized VRF Route-Leaking - Shared Internet with Custom VRF

An example of Centralized VRF route-leaking with Shared Internet VRF

Configuring VXLAN BGP EVPN Border Node for Shared Internet VRF

The VXLAN BGP EVPN Border Node provides a centralized Shared Internet VRF. The leaking configuration is localized such that control-plane leaking and data-path forwarding following the same path. Most significantly is the VRF configuration of the Border Node and the advertisement of the default-route and less specific prefixes (aggregates) into the respective destination VRFs.

```
vrf context Shared
  vni 51099
  ip route 0.0.0.0/0 10.9.9.1
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    route-target both 99:99
    route-target both 99:99 evpn
!
vlan 2199
  vn-segment 51099
!
interface Vlan2199
  no shutdown
  mtu 9216
  vrf member Shared
  no ip redirects
  ip forward
!
ip prefix-list PL_DENY_EXPORT seq 5 permit 0.0.0.0/0
```

```
!
route-map RM_DENY_IMPORT deny 10
 match ip address prefix-list PL_DENY_EXPORT
route-map RM_DENY_IMPORT permit 20
!
vrf context Blue
  vni 51010
  ip route 0.0.0.0/0 Null0
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    route-target both 99:99
    route-target both 99:99 evpn
    import map RM_DENY_IMPORT
!
vlan 2110
  vn-segment 51010
!
interface Vlan2110
  no shutdown
  mtu 9216
  vrf member Blue
  no ip redirects
  ip forward
!
vrf context Red
  vni 51020
  ip route 0.0.0.0/0 Null0
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    route-target both 99:99
    route-target both 99:99 evpn
    import map RM_DENY_IMPORT
!
vlan 2120
  vn-segment 51020
!
interface Vlan2120
  no shutdown
  mtu 9216
  vrf member Blue
  no ip redirects
  ip forward
!
interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback1
  member vni 51099 associate-vrf
  member vni 51010 associate-vrf
  member vni 51020 associate-vrf
!
router bgp 65002
  vrf Shared
    address-family ipv4 unicast
      advertise l2vpn evpn
      aggregate-address 10.10.0.0/16
      aggregate-address 10.20.0.0/16
      maximum-paths ibgp 2
      maximum-paths 2
  vrf Blue
```

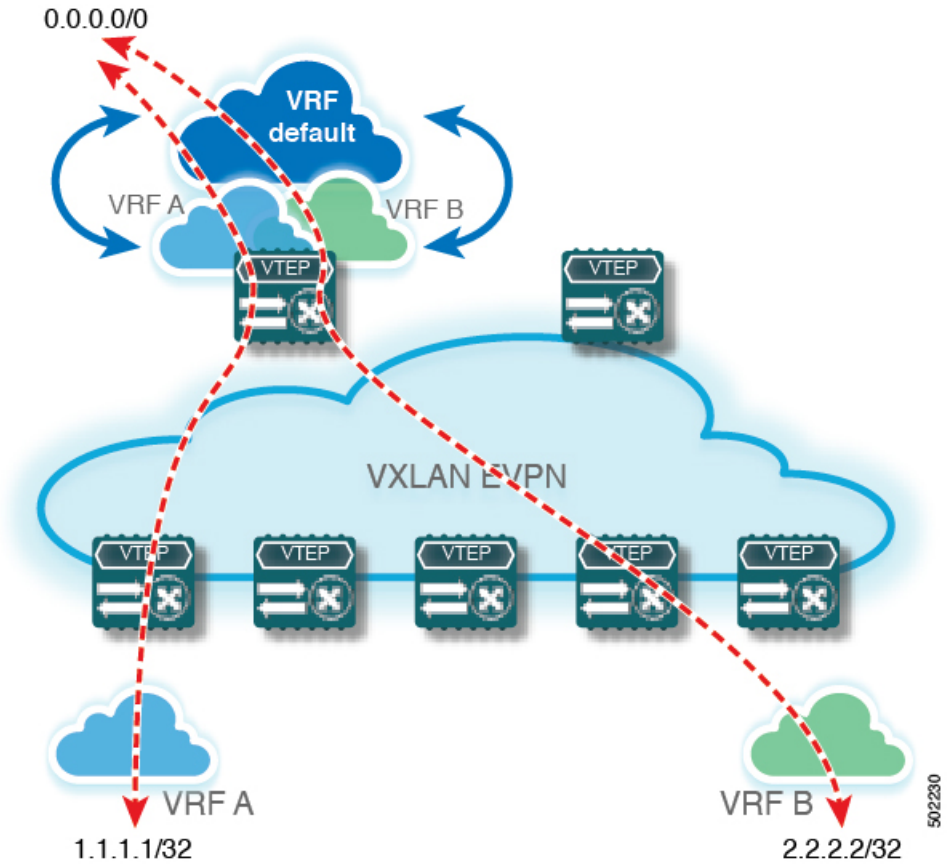
```
  address-family ipv4 unicast
    advertise l2vpn evpn
    network 0.0.0.0/0
    maximum-paths ibgp 2
    maximum-paths 2
vrf Red
  address-family ipv4 unicast
    advertise l2vpn evpn
    network 0.0.0.0/0
    maximum-paths ibgp 2
    maximum-paths 2
```

Centralized VRF Route-Leaking Brief - Shared Internet with VRF Default

Some pointers are given below:

- The Shared Internet with VRF route-leaking for VXLAN BGP EVPN fabrics is depicted within Figure 4.
- The default-route is made exported from VRF default and re-advertisement within VRF Blue and VRF Red on the Border Node.
- Ensure the default-route in VRF Blue and VRF Red is not leaked to the Shared Internet VRF
- The less specific prefixes for VRF Blue and VRF Red are exported to VRF default and re-advertised as necessary.
- Configured less specific prefixes (aggregates) that are advertised from the Border Node to the remaining VTEPs to the destination VRF (Blue or Red).
- BGP EVPN does not export prefixes that were previously imported to prevent the occurrence of routing loops.

Figure 3: Centralized VRF Route-Leaking - Shared Internet with VRF Default



Configuring Centralized VRF Route-Leaking - Shared Internet with VRF Default

Configuring VRF Default on Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **ip route 0.0.0.0/0** *next-hop*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.

	Command or Action	Purpose
Step 2	**ip route 0.0.0.0/0** *next-hop*	Configure default-route in VRF default to external router (example)

Configuring BGP Instance for VRF Default on the Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **router bgp** *autonomous-system number*
3. **address-family ipv4 unicast**
4. **aggregate-address** *prefix/mask*
5. **maximum-paths** *number*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**router bgp** *autonomous-system number*	Configure BGP.
Step 3	**address-family ipv4 unicast**	Configure address family for IPv4.
Step 4	**aggregate-address** *prefix/mask*	Create less specific prefix aggregate in VRF default.
Step 5	**maximum-paths** *number*	Enabling equal cost multipathing (ECMP) for eBGP prefixes.

Configuring Custom VRF on Border Node

This procedure applies equally to IPv6

SUMMARY STEPS

1. **configure terminal**
2. **ip prefix-list** *name* **seq 5 permit 0.0.0.0/0**
3. **route-map** *name* **deny 10**
4. **match ip address prefix-list** *name*
5. **route-map** *name* **permit 20**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**ip prefix-list** *name* **seq 5 permit 0.0.0.0/0**	Configure IPv4 prefix-list for default-route filtering.
Step 3	**route-map** *name* **deny 10**	Create route-map with leading deny statement to prevent the default-route of being leaked.
Step 4	**match ip address prefix-list** *name*	Match against the IPv4 prefix-list that contains the default-route.
Step 5	**route-map** *name* **permit 20**	Create route-map with trailing allow statement to advertise non-matching routes via route-leaking.

Configuring Filter for Permitted Prefixes from VRF Default on the Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **route-map** *name* **permit 10**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**route-map** *name* **permit 10**	Create route-map with allow statement to advertise routes via route-leaking to the customer VRF and subsequently remote VTEPs.

Configuring Custom VRF Context on the Border Node - 2

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **vrf context** *vrf-name*
3. **vni** *number*
4. **rd auto**
5. **ip route 0.0.0.0/0 Null0**

6. **address-family ipv4 unicast**
7. **route-target both auto** | *AS:VNI*
8. **route-target both auto** | *AS:VNI* **evpn**
9. **route-target both** *shared-vrf-rt*
10. **route-target both** *shared-vrf-rt* **evpn**
11. **import vrf default map** *name*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**vrf context** *vrf-name*	Configure the VRF.
Step 3	**vni** *number*	Specify the VNI. The VNI associated with the VRF is often referred to as Layer-3 VNI, L3VNI or L3VPN. The L3VNI is configured as common identifier across the participating VTEPs.
Step 4	**rd auto**	Specify the VRFs Route Distinguisher (RD). The Route Distinguisher (RD) uniquely identifies a VTEP within a L3VNI.
Step 5	**ip route 0.0.0.0/0 Null0**	Configure default-route in common VRF to attract traffic towards Border Node with Shared Internet VRF.
Step 6	**address-family ipv4 unicast**	Configure the IPv4 Unicast address-family. Required for IPv4 over VXLAN with IPv4 underlay.
Step 7	**route-target both auto**	*AS:VNI*	Configure the Route Target (RT) for import/export of EVPN and IPv4 prefixes within the IPv4 unicast address-family.
Step 8	**route-target both auto**	*AS:VNI* **evpn**	Configure the Route Target (RT) for import/export of EVPN and IPv4 prefixes within the IPv4 unicast address-family.
Step 9	**route-target both** *shared-vrf-rt*	Configure a special Route Target (RT) for the import/export of the Shared IPv4 prefixes. Additional import/export map for further qualification is supported
Step 10	**route-target both** *shared-vrf-rt* **evpn**	Configure a special Route Target (RT) for the import/export of the Shared IPv4 prefixes. Additional import/export map for further qualification is supported

	Command or Action	Purpose
Step 11	**import vrf default map** *name*	Permits all routes, from VRF default, from being imported into the custom VRF according to the specific route-map.

Configuring Custom VRF Instance in BGP on the Border Node

This procedure applies equally to IPv6.

SUMMARY STEPS

1. **configure terminal**
2. **router bgp** *autonomous-system-number*
3. **vrf** *vrf-name*
4. **address-family ipv4 unicast**
5. **advertise l2vpn evpn**
6. **network 0.0.0.0/0**
7. **maximum-paths ibgp** *number*
8. **maximum-paths** *number*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal**	Enters global configuration mode.
Step 2	**router bgp** *autonomous-system-number*	Configure BGP.
Step 3	**vrf** *vrf-name*	Specify the VRF.
Step 4	**address-family ipv4 unicast**	Configure address family for IPv4.
Step 5	**advertise l2vpn evpn**	Enable the advertisement of EVPN routes within IPv4 address-family.
Step 6	**network 0.0.0.0/0**	Creating IPv4 default-route network statement.
Step 7	**maximum-paths ibgp** *number*	Enabling equal cost multipathing (ECMP) for iBGP prefixes.
Step 8	**maximum-paths** *number*	Enabling equal cost multipathing (ECMP) for eBGP prefixes.

Example - Configuration Centralized VRF Route-Leaking - VRF Default with Custom VRF

An example of Centralized VRF route-leaking with VRF default

Configuring VXLAN BGP EVPN Border Node for VRF Default

The VXLAN BGP EVPN Border Node provides centralized access to VRF default. The leaking configuration is localized such that control-plane leaking and data-path forwarding following the same path. Most significantly is the VRF configuration of the Border Node and the advertisement of the default-route and less specific prefixes (aggregates) into the respective destination VRFs.

```
ip route 0.0.0.0/0 10.9.9.1
!
ip prefix-list PL_DENY_EXPORT seq 5 permit 0.0.0.0/0
!
route-map permit 10
match ip address prefix-list PL_DENY_EXPORT
route-map RM_DENY_EXPORT permit 20
route-map RM_PERMIT_IMPORT permit 10
!
vrf context Blue
  vni 51010
  ip route 0.0.0.0/0 Null0
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    import vrf default map RM_PERMIT_IMPORT
    export vrf default 100 map RM_DENY_EXPORT allow-vpn
!
vlan 2110
  vn-segment 51010
!
interface Vlan2110
  no shutdown
  mtu 9216
  vrf member Blue
  no ip redirects
  ip forward
!
vrf context Red
  vni 51020
  ip route 0.0.0.0/0 Null0
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
    import vrf default map RM_PERMIT_IMPORT
    export vrf default 100 map RM_DENY_EXPORT allow-vpn
!
vlan 2120
  vn-segment 51020
!
interface Vlan2120
  no shutdown
  mtu 9216
  vrf member Blue
  no ip redirects
  ip forward
!
interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback1
  member vni 51010 associate-vrf
  member vni 51020 associate-vrf
!
router bgp 65002
```

```
address-family ipv4 unicast
    aggregate-address 10.10.0.0/16
    aggregate-address 10.20.0.0/16
    maximum-paths 2
    maximum-paths ibgp 2
vrf Blue
  address-family ipv4 unicast
    advertise l2vpn evpn
    network 0.0.0.0/0
    maximum-paths ibgp 2
    maximum-paths 2
vrf Red
  address-family ipv4 unicast
    advertise l2vpn evpn
    network 0.0.0.0/0
    maximum-paths ibgp 2
    maximum-paths 2
```