

Configuración del servicio VRF EVPN VxLAN en switches Catalyst 9000

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Introducción

Este documento describe la configuración de fuga de ruta para EVPN (Ethernet VPN) VXLAN (Virtual Extensible LAN) en diferentes escenarios.

Prerequisites

Se recomienda que esté familiarizado con la función VxLAN de EVPN unidifusión, BGP.

Requirements

Esta guía asume que los peers BGP y NVE ya son correctos. Si hay problemas con la activación básica de VxLAN de EVPN (falla de ping unidifusión, BGP, pares NVE desactivados, etc.), consulte las guías de resolución de problemas de BGP, EVPN, ruta/switch según sea necesario.



Nota: Los ejemplos de configuración de VRF de servicio sólo se admiten para IPv4.

Componentes Utilizados

La información que contiene este documento se basa en las siguientes versiones de software y hardware.

- C9300
- C9400
- C9500
- C9600

La información que contiene este documento se creó a partir de los dispositivos en un ambiente de laboratorio específico. Todos los dispositivos que se utilizan en este documento se pusieron en funcionamiento con una configuración verificada (predeterminada). Si tiene una red en vivo, asegúrese de entender el posible impacto de cualquier comando.



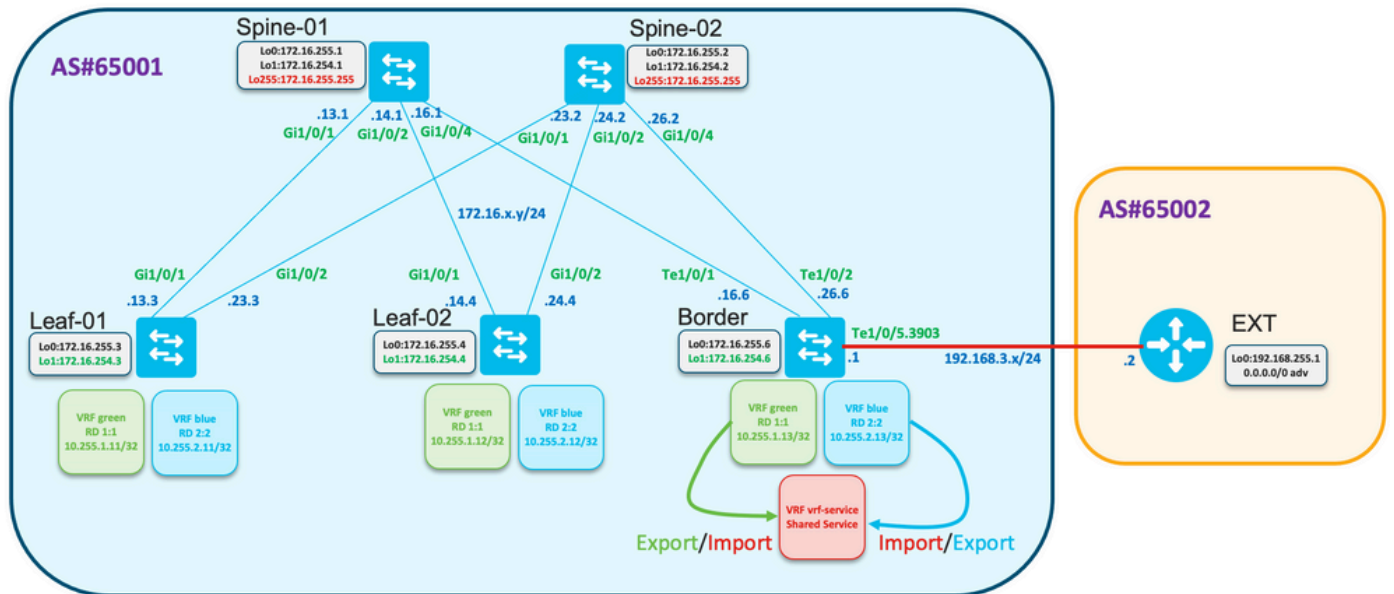
Nota: Consulte la guía de configuración adecuada para conocer los comandos que se utilizan para habilitar estas funciones en otras plataformas de Cisco.

Configurar

La función de fuga de ruta se utiliza ampliamente en el caso de la creación de servicios "Shared VRF" o la conexión de nodos de borde al firewall. Generalmente, las hojas de borde son los nodos donde se configura la fuga de ruta.

- La fuga de ruta entre VRF para EVPN/VXLAN en Cisco IOS® XE no se realiza en el nivel BGP como de costumbre. En su lugar, se utiliza la función EVN (red virtual sencilla).

Diagrama de la red



Fuga de ruta genérica

En este ejemplo, la fuga de ruta de VRF "verde" y "azul" a VRF "vrf-service" planeada se configurará en el nodo de borde.

Verifique la tabla de ruteo para VRF "verde" y "azul" en el Borde:

```
<#root>
```

```
Border#
```

```
show ip route vrf green
```

```
<...snip...>
```

```

10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
B    10.1.1.0/24 [200/0] via 172.16.254.3, 01:19:43, Vlan901
B    10.1.2.0/24 [200/0] via 172.16.254.3, 01:19:43, Vlan901
B    10.255.1.11/32 [200/0] via 172.16.254.3, 01:19:43, Vlan901
B    10.255.1.12/32 [200/0] via 172.16.254.4, 01:19:43, Vlan901
C    10.255.1.13/32 is directly connected, Loopback11

```

```
Border#
```

```
show ip route vrf blue
```

```
<...snip...>
```

```

10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
B    10.2.1.0/24 [200/0] via 172.16.254.3, 01:20:28, Vlan902
B    10.2.2.0/24 [200/0] via 172.16.254.3, 01:20:28, Vlan902
B    10.255.2.11/32 [200/0] via 172.16.254.3, 01:20:28, Vlan902
B    10.255.2.12/32 [200/0] via 172.16.254.4, 01:20:28, Vlan902
C    10.255.2.13/32 is directly connected, Loopback12

```

Configuración para importar todas las rutas del VRF "verde" al VRF "vrf-service"

```
<#root>
```

```
vrf definition vrf-service
rd 3:3
!
address-family ipv4

    route-replicate from vrf green unicast all

route-target export 3:3
route-target import 3:3
exit-address-family
```

Verificar que la tabla de ruteo del VRF "vrf-service" en el Borde contenga rutas del VRF "green"

```
<#root>
```

```
Border#
```

```
show ip route vrf vrf-service
```

```
Routing Table: vrf-service
```

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
H - NHRP, G - NHRP registered, g - NHRP registration summary
o - ODR, P - periodic downloaded static route, l - LISP
a - application route
+ - replicated route, % - next hop override, p - overrides from Pfr
& - replicated local route overrides by connected
```

```
Gateway of last resort is not set
```

```
10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
```

```
B + 10.1.1.0/24 [200/0] via 172.16.254.3, 00:00:42, Vlan901
B + 10.1.1.11/32 [200/0] via 172.16.254.3, 00:00:28, Vlan901
B + 10.255.1.11/32 [200/0] via 172.16.254.3, 01:32:49, Vlan901
B + 10.255.1.12/32 [200/0] via 172.16.254.4, 01:32:49, Vlan901

C + 10.255.1.13/32 is directly connected, Loopback11
C 10.255.3.13/32 is directly connected, Loopback13
```

Observe que las rutas de VRF "verdes" se replican en el VRF "vrf-service" y se marcan en la tabla de ruteo con "+".

Filtrado de ruta con filtrado

La replicación de rutas se puede hacer con el filtrado. Para este propósito se utilizan mapas de ruta.

Replicar sólo el prefijo 10.255.2.12 del VRF "azul" al VRF "vrf-service".

```
ip prefix-list PL-BLUE-2-VRF-SERVICE permit 10.255.2.12/32
!
route-map RM-BLUE-2-VRF-SERVICE permit 10
  match ip address prefix-list PL-BLUE-2-VRF-SERVICE
```

Configurar la replicación con filtro

<#root>

```
vrf definition vrf-service
  rd 3:3
  !
  address-family ipv4

    route-replicate from vrf green unicast all

    route-replicate from vrf blue unicast all route-map RM-BLUE-2-VRF-SERVICE

    route-target export 3:3
    route-target import 3:3
  exit-address-family
```

Observe que la tabla de ruteo para VRF "vrf-service" contiene el prefijo 10.255.2.12/32 originado en el VRF "blue":

<#root>

Border#

```
show ip route vrf VRF-SERVICE
```

<...snip...>

```
10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks
B + 10.1.1.0/24 [200/0] via 172.16.254.3, 00:09:38, Vlan901
B + 10.1.1.11/32 [200/0] via 172.16.254.3, 00:09:24, Vlan901
B + 10.255.1.11/32 [200/0] via 172.16.254.3, 01:41:45, Vlan901
B + 10.255.1.12/32 [200/0] via 172.16.254.4, 01:41:45, Vlan901
C + 10.255.1.13/32 is directly connected, Loopback11

B + 10.255.2.12/32 [200/0] via 172.16.254.4, 01:41:45, Vlan902 <--
C 10.255.3.13/32 is directly connected, Loopback13
```

Sólo Anuncio de Ruta Predeterminada y Seguimiento de Ruta Predeterminada

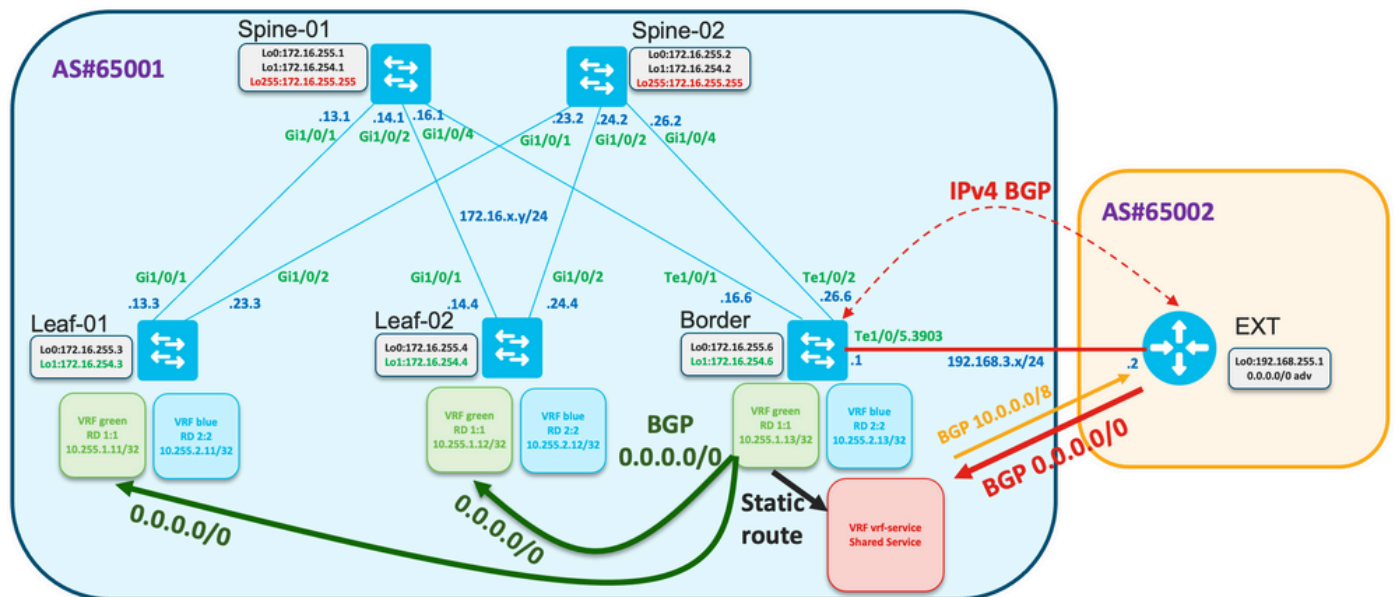
La conectividad entre hosts conectados a Hojas con una red externa se construye sobre la Frontera.

- Por lo general, el borde recibe la ruta predeterminada solamente o la ruta predeterminada más las rutas de resumen.
- Para optimizar la tabla de ruteo en Hojas, es posible anunciar solamente la ruta predeterminada desde el Borde.

La ruta predeterminada se recibe en VRF "vrf-service"/"Shared service".

- Esta ruta podría replicarse en VRF "verde", pero la ruta replicada no se puede volver a anunciar. Es necesario configurar el anuncio de ruta predeterminado en BGP para VRF "verde".
- La ruta estática con objeto de seguimiento se puede configurar para evitar una situación de agujero negro cuando se anuncia la ruta predeterminada en VRF "verde", pero la ruta predeterminada en VRF "vrf-service" no está presente.

Revisar la topología



Verifique que se reciba la ruta predeterminada en el nodo de borde:

```
<#root>
```

```
Border#
```

```
show ip route vrf vrf-service 0.0.0.0
```

```
Routing Table: red
```

```
Routing entry for 0.0.0.0/0, supernet
```

```
Known via "bgp 65001", distance 20, metric 0, candidate default path
```

```
Tag 65002, type external
Last update from 192.168.3.2 00:13:32 ago
Routing Descriptor Blocks:
* 192.168.3.2, from 192.168.3.2, 00:13:32 ago
  opaque_ptr 0x7FA2A139FE50
  Route metric is 0, traffic share count is 1
  AS Hops 1
  Route tag 65002
  MPLS label: none
```

<#root>

Border#

```
show ip cef vrf vrf-service 0.0.0.0/0
```

```
0.0.0.0/0
  nexthop 192.168.3.2 TenGigabitEthernet1/0/5.3903
```

El Track 1 verifica la disponibilidad de la ruta predeterminada en el VRF "vrf-service".

```
track 1 ip route 0.0.0.0 0.0.0.0 reachability
ip vrf vrf-service
```

Verifique que la ruta predeterminada esté presente en el VRF "vrf-service" y que el objeto de seguimiento esté "Up".

<#root>

Border#

```
show track 1
```

```
Track 1
  IP route 0.0.0.0 0.0.0.0 reachability

  Reachability is Up (BGP)

  2 changes, last change 00:23:12
  VPN Routing/Forwarding table "vrf-service"
  First-hop interface is TenGigabitEthernet1/0/5.3903
  Tracked by:
    Static IP Routing 0
```

Configure la ruta predeterminada en el VRF "verde" con la opción de seguimiento

!


```
ip route vrf green 0.0.0.0 0.0.0.0 TenGigabitEthernet1/0/5.3903 192.168.3.2 track 1
!
```

<#root>

Border#

```
show ip route vrf green 0.0.0.0
```

```
Routing Table: green
Routing entry for 0.0.0.0/0, supernet
  Known via "static", distance 1, metric 0, candidate default path
  Redistributing via bgp 65001
  Advertised by bgp 65001
  Routing Descriptor Blocks:
  * 192.168.3.2, via TenGigabitEthernet1/0/5.3903
    Route metric is 0, traffic share count is 1
```

El anuncio de ruta predeterminado se configura en el proceso BGP para el VRF "verde"

<#root>

```
router bgp 65001
!
<...snip...>
!
address-family ipv4 vrf green
  advertise l2vpn evpn
  redistribute static
  redistribute connected

  default-information originate

exit-address-family
!
<...snip...>
```

Verifique que la ruta predeterminada se anuncie a L2VPN EVPN AF como route-type 5 y se propague por el fabric

<#root>

Border#

```
show bgp l2vpn evpn rd 1:1 route-type 5 0 0.0.0.0 0
```

```
BGP routing table entry for [5][1:1][0][0][0.0.0.0]/17, version 622
Paths: (1 available, best #1, table EVPN-BGP-Table)
  Advertised to update-groups:
    2
  Refresh Epoch 1
  Local, imported path from base
```

```
192.168.3.2 (via vrf red) from 0.0.0.0 (172.16.255.6)
  Origin incomplete, metric 0, localpref 100, weight 32768, valid, external, best
  EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, local vtep: 172.16.254.6, VNI Label 50901
  Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD67.EF48
  rx pathid: 0, tx pathid: 0x0
  Updated on Jul 8 2022 10:41:40 UTC
```

Verifique la información de EVPN, routing, cef en Leaf-01

<#root>

Leaf-01#

```
show bgp l2vpn evpn rd 1:1 route-type 5 0 0.0.0.0 0
```

```
BGP routing table entry for [5][1:1][0][0][0.0.0.0]/17, version 595
```

```
Paths: (2 available, best #2, table EVPN-BGP-Table)
```

```
  Not advertised to any peer
```

```
  Refresh Epoch 7
```

```
  Local
```

```
    172.16.254.6 (metric 3) (via default) from 172.16.255.2 (172.16.255.2)
```

```
      Origin incomplete, metric 0, localpref 100, valid, internal
```

```
      EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
```

```
      Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD67.EF48
```

```
      Originator: 172.16.255.6, Cluster list: 172.16.255.2
```

```
      rx pathid: 0, tx pathid: 0
```

```
      Updated on Jul 8 2022 10:41:40 UTC
```

```
  Refresh Epoch 7
```

```
  Local
```

```
    172.16.254.6 (metric 3) (via default) from 172.16.255.1 (172.16.255.1)
```

```
      Origin incomplete, metric 0, localpref 100, valid, internal, best
```

```
      EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
```

```
      Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD67.EF48
```

```
      Originator: 172.16.255.6, Cluster list: 172.16.255.1
```

```
      rx pathid: 0, tx pathid: 0x0
```

```
      Updated on Jul 8 2022 10:41:40 UTC
```

Leaf-01#

```
show ip route vrf green 0.0.0.0
```

```
Routing Table: green
```

```
Routing entry for 0.0.0.0/0, supernet
```

```
  Known via "bgp 65001", distance 200, metric 0, candidate default path, type internal
```

```
  Last update from 172.16.254.6 on Vlan901, 02:07:17 ago
```

```
  Routing Descriptor Blocks:
```

```
    * 172.16.254.6 (default), from 172.16.255.1, 02:07:17 ago, via Vlan901
```

```
      opaque_ptr 0x7FC3606F4D80
```

```
      Route metric is 0, traffic share count is 1
```

```
      AS Hops 0
```

```
      MPLS label: none
```

Leaf-01#

```
show ip cef vrf green 0.0.0.0/0
```

```
0.0.0.0/0
```

```
  nexthop 172.16.254.6 Vlan901
```

La ruta inversa desde el entramado a la red externa se origina desde BGP como una ruta de resumen

```
<#root>
!
ip route vrf vrf-service 10.0.0.0 255.0.0.0 Null0
!
router bgp 65001
<...snip...>
!
address-family ipv4 vrf vrf-service
  advertise l2vpn evpn

  aggregate-address 10.0.0.0 255.0.0.0 summary-only

  redistribute static
  redistribute connected
  neighbor 192.168.3.2 remote-as 65002
  neighbor 192.168.3.2 activate
  exit-address-family
!
<...snip...>
```

Verifique la tabla de ruteo en Leaf-01 en el VRF "verde" y haga ping a la dirección IP remota 192.168.255.1

```
<#root>
Leaf-01#
show ip route vrf green 192.168.255.1
```

```
Routing Table: green
% Network not in table
```

```
Leaf-01#
show ip route vrf green 0.0.0.0
```

```
Routing Table: green
Routing entry for 0.0.0.0/0, supernet
  Known via "bgp 65001", distance 200, metric 0, candidate default path, type internal
  Last update from 172.16.254.6 on Vlan901, 05:15:19 ago
  Routing Descriptor Blocks:
  * 172.16.254.6 (default), from 172.16.255.1, 05:15:19 ago, via Vlan901
    opaque_ptr 0x7FC3606F4D80
    Route metric is 0, traffic share count is 1
    AS Hops 0
    MPLS label: none
```

```
Leaf-01#
show ip cef vrf green 0.0.0.0/0
0.0.0.0/0
  nexthop 172.16.254.6 Vlan901

Leaf-01#
ping vrf green 192.168.3.2 source 10.255.1.11

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.2, timeout is 2 seconds:
Packet sent with a source address of 10.255.1.11
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

Si la ruta predeterminada se pierde en el borde en el VRF "vrf-service", el objeto de seguimiento se desactiva, la ruta estática en el VRF "green" se elimina del RIB y la ruta predeterminada anunciada en el BGP se elimina

```
<#root>

### Border ###

Border#
show ip route vrf vrf-service 0.0.0.0

Routing Table: vrf-service
% Network not in table

Border#
show track 1

Track 1
  IP route 0.0.0.0 0.0.0.0 reachability
    Reachability is Down (no ip route)      <-- Track object is down
      3 changes, last change 00:03:15
      VPN Routing/Forwarding table "vrf-service"
      First-hop interface is unknown
      Tracked by:
        Static IP Routing 0

Border#
show ip route vrf green 0.0.0.0

Routing Table: green
% Network not in table

Border#
```

```
show bgp l2vpn evpn rd 1:1 route-type 5 0 0.0.0.0 0
```

```
% Network not in table
```

```
### Leaf ###
```

```
Leaf-01#
```

```
show ip route vrf green 0.0.0.0
```

```
Routing Table: green
```

```
% Network not in table
```

Se debe filtrar la ruta predeterminada del VRF "verde" al VRF "vrf-service"

```
<#root>
```

```
vrf definition vrf-service
```

```
rd 3:3
```

```
!
```

```
address-family ipv4
```

```
route-replicate from vrf green unicast all route-map RM-GREEN-2-VRF-SERVICE
```

```
route-target export 3:3
```

```
route-target import 3:3
```

```
exit-address-family
```

```
ip prefix-list PL-DEFAULT seq 5 permit 0.0.0.0/0
```

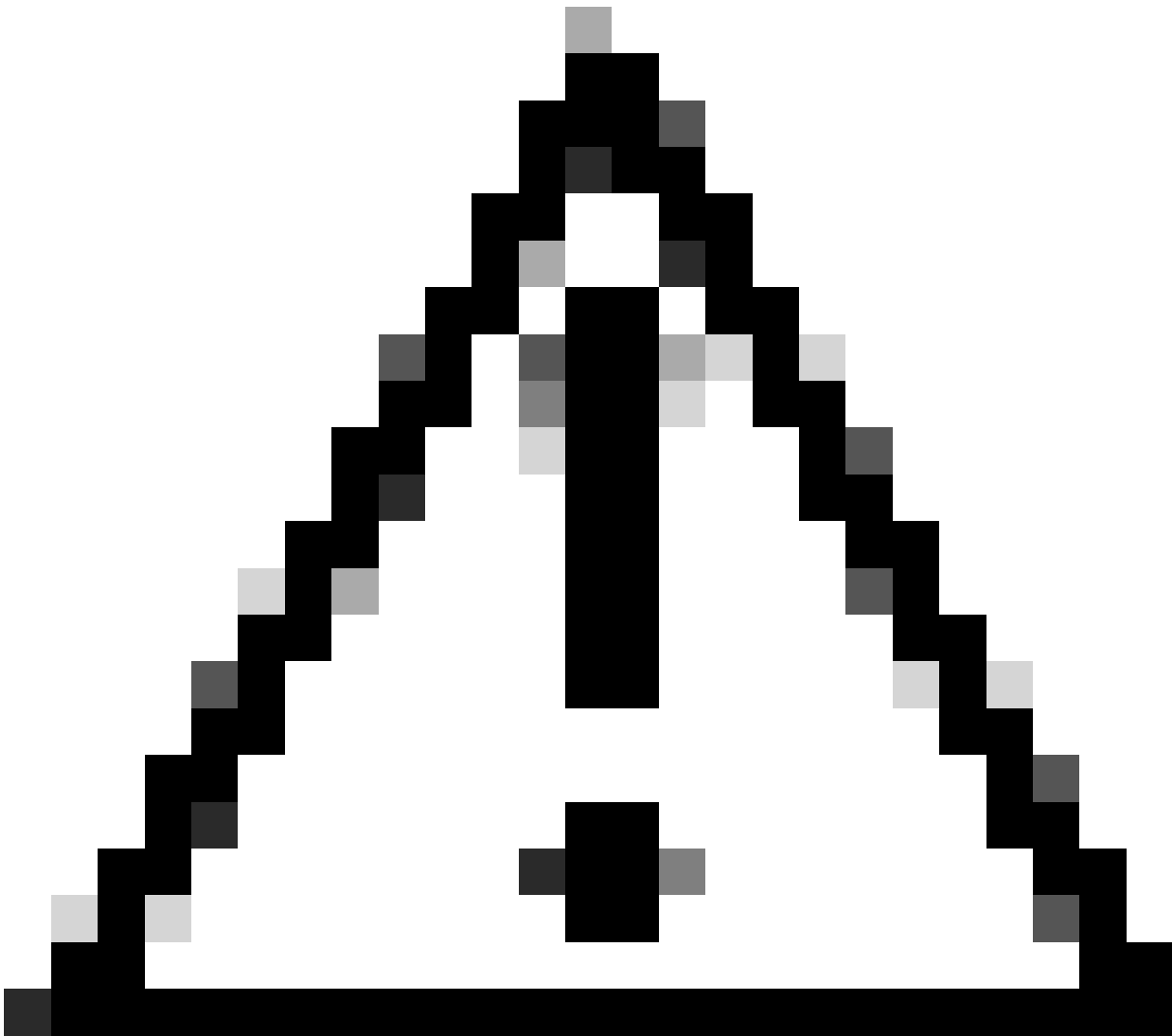
```
!
```

```
route-map RM-GREEN-2-VRF-SERVICE deny 10
```

```
match ip address prefix-list PL-DEFAULT
```

```
!
```

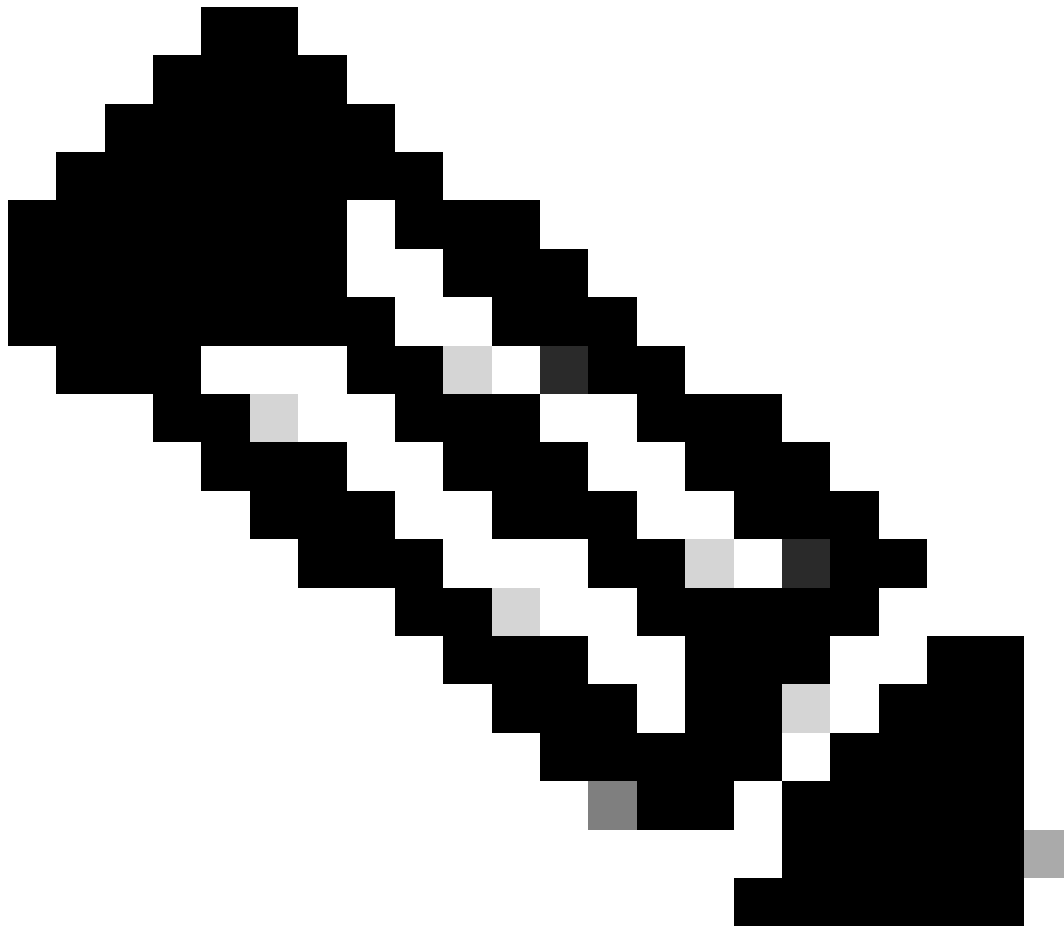
```
route-map RM-GREEN-2-VRF-SERVICE permit 20
```



Precaución: Debido al retraso entre la pérdida de la ruta por defecto y la caída del objeto de seguimiento, la ruta por defecto estática se replica desde VRF "verde" a VRF "vrf-service" y mantiene el objeto de seguimiento activo. Como resultado, la ruta predeterminada se notifica al fabric y se oculta el tráfico.

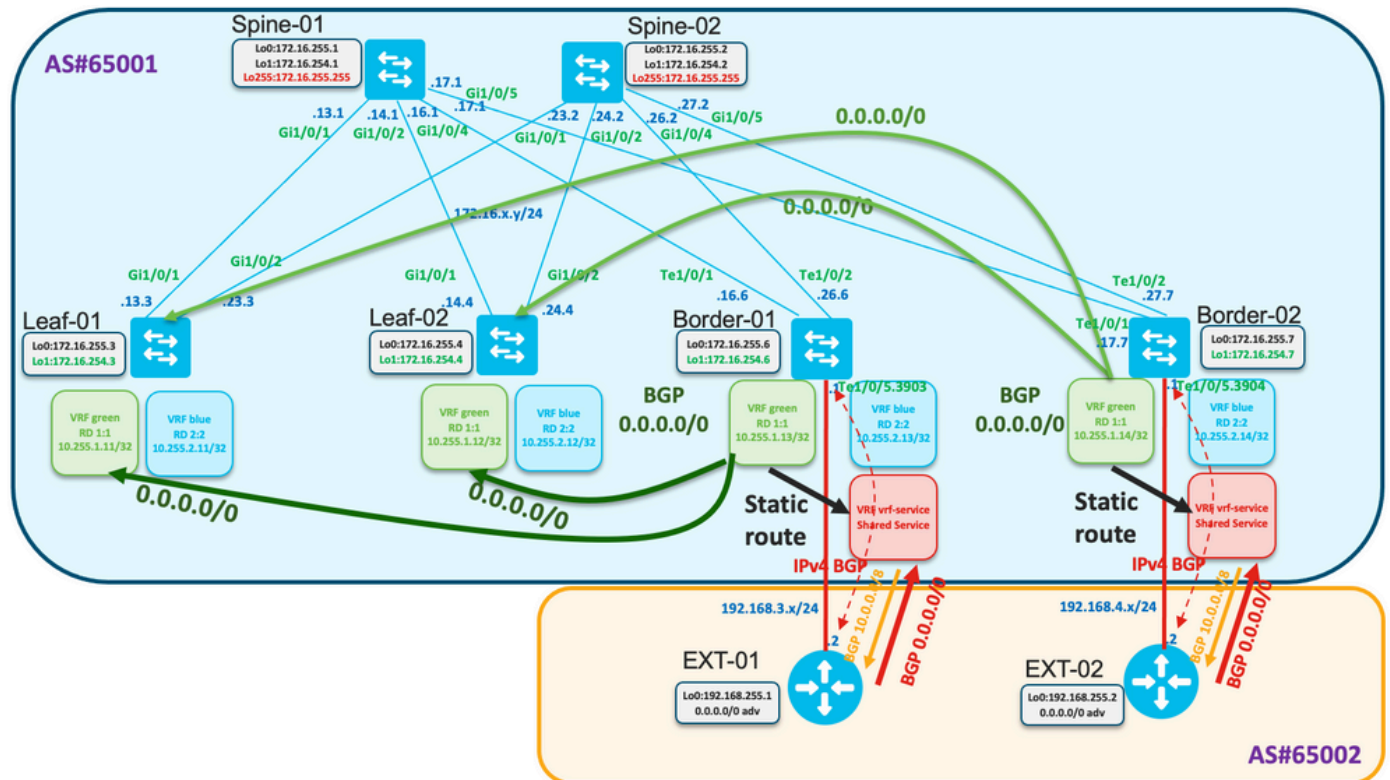
Anuncio de ruta predeterminado solo con bordes redundantes

En esta sección se proporciona un caso de ejemplo en el que se utilizan bordes redundantes.



Nota: En este ejemplo utilizamos la función de trayectoria adicional BGP. Otra opción es utilizar un RD diferente en el Border-01 y el Border-02 se podría utilizar para anunciar ambas rutas predeterminadas de ambos Borders a los Leafs.

Revisar la topología



Tanto Border-01 como Border-02 reciben la ruta predeterminada de EXT-01 y EXT-02 respectivamente.

Desde el borde-01

```
<#root>
```

```
Border-01#
```

```
show ip route vrf vrf-service 0.0.0.0
```

```
Routing Table: vrf-service
```

```
Routing entry for 0.0.0.0/0, supernet
```

```
Known via "bgp 65001", distance 20, metric 0, candidate default path
```

```
Tag 65002, type external
```

```
Last update from 192.168.3.2 00:00:06 ago
```

```
Routing Descriptor Blocks:
```

```
* 192.168.3.2, from 192.168.3.2, 00:00:06 ago
```

```
opaque_ptr 0x7F68E5AC02A0
```

```
Route metric is 0, traffic share count is 1
```

```
AS Hops 1
```

```
Route tag 65002
```

```
MPLS label: none
```

```
Border-01#
```

```
show ip cef vrf vrf-service 0.0.0.0/0
```

```
0.0.0.0/0
```

```
nexthop 192.168.3.2 TenGigabitEthernet1/0/5.3903
```


Desde el borde-02

```
<#root>
```

```
Border-02#
```

```
show ip route vrf vrf-service 0.0.0.0
```

```
Routing Table: vrf-service
```

```
Routing entry for 0.0.0.0/0, supernet
```

```
Known via "bgp 65001", distance 20, metric 0, candidate default path
```

```
Tag 65002, type external
```

```
Last update from 192.168.4.2 01:22:08 ago
```

```
Routing Descriptor Blocks:
```

```
* 192.168.4.2, from 192.168.4.2, 01:22:08 ago
```

```
opaque_ptr 0x7FE529FF3D48
```

```
Route metric is 0, traffic share count is 1
```

```
AS Hops 1
```

```
Route tag 65002
```

```
MPLS label: none
```

```
Border-02#
```

```
show ip cef vrf vrf-service 0.0.0.0/0
```

```
0.0.0.0/0
```

```
nexthop 192.168.4.2 TenGigabitEthernet1/0/5.3904
```

El mismo enfoque se utiliza en la configuración de borde dual como en el ejemplo anterior: ruta estática predeterminada con seguimiento.

Configure la pista Border-01/02, la ruta estática para el valor predeterminado en vrf "verde", la configuración bgp para el anuncio.

```
<#root>
```

```
track 1 ip route 0.0.0.0 0.0.0.0 reachability
```

```
ip vrf vrf-service
```

```
!
```

```
ip route vrf green 0.0.0.0 0.0.0.0 TenGigabitEthernet1/0/5.3903 192.168.3.2 track 1
```

```
!
```

```
router bgp 65001
```

```
!
```

```
<...snip...>
```

```
!
```

```
address-family ipv4 vrf green
```

```
advertise l2vpn evpn
```

```
redistribute static
```

```
redistribute connected
```

```
default-information originate
```

```
exit-address-family
```

```
!
```

```
<...snip...>
```

Verifique en Spines que se reciban las rutas predeterminadas de ambos bordes

<#root>

Spine-01#

show bgp l2vpn evpn

BGP table version is 25, local router ID is 172.16.255.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
x best-external, a additional-path, c RIB-compressed,
t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:1					
* ia [5][1:1][0][0][0.0.0.0]/17					
	172.16.254.7	0	100	0	?
*>i	172.16.254.6	0	100	0	?
* i	172.16.254.6	0	100	0	?

<...snip...>

Spine-02#

show bgp l2vpn evpn

BGP table version is 75, local router ID is 172.16.255.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
x best-external, a additional-path, c RIB-compressed,
t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:1					
* i [5][1:1][0][0][0.0.0.0]/17					
	172.16.254.6	0	100	0	?
* ia	172.16.254.7	0	100	0	?
*>i	172.16.254.6	0	100	0	?

<...snip...>

Configure en Spines para propagar BOTH default routes BGP additional-path

<#root>

router bgp 65001

!

<...snip...>

```

!
address-family l2vpn evpn

  bgp additional-paths select all best 2
  bgp additional-paths send receive
<...snip...>
  neighbor 172.16.255.3 advertise additional-paths best 2
<...snip...>
  neighbor 172.16.255.4 advertise additional-paths best 2
!
<...snip...>

```

Observe que esta configuración cambia la propagación predeterminada de solo mejor y en su lugar anuncia AMBAS rutas

```
<#root>
```

```
Spine-01#
```

```
show bgp l2vpn evpn neighbors 172.16.255.3 advertised-routes
```

```
BGP table version is 25, local router ID is 172.16.255.1
Status codes: s suppressed, d damped, h history, * valid,
```

```
> best
```

```
, i - internal,
      r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
      x best-external,
```

```
a additional-path
```

```
, c RIB-compressed,
      t secondary path, L long-lived-stale,
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete
```

```
RPKI validation codes: V valid, I invalid, N Not found
```

```

Network          Next Hop          Metric LocPrf Weight Path
Route Distinguisher: 1:1

```

```
*>i [5][1:1][0][0][0.0.0.0]/17
```

```
172.16.254.6          0    100    0 ?
```

```
<-- best path
```

```
* ia [5][1:1][0][0][0.0.0.0]/17
```

```
172.16.254.7          0    100    0 ?
```

```
<-- additional path (note the a flag indicating this)
```

```
<...snip...>
```

Observe que en la hoja vemos 4 rutas BGP predeterminadas

<#root>

Leaf-01#

sh bgp l2vpn evpn

BGP table version is 63, local router ID is 172.16.255.3
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
x best-external, a additional-path, c RIB-compressed,
t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:1 (default for vrf green)					
* i [5][1:1][0][0][0.0.0.0]/17					
	172.16.254.7	0	100	0	?
* ia	172.16.254.7	0	100	0	?
*>i	172.16.254.6	0	100	0	?
* i	172.16.254.6	0	100	0	?

<...snip...>

Leaf-01#

sh bgp l2vpn evpn route-type 5 0 0.0.0.0 0

BGP routing table entry for [5][1:1][0][0][0.0.0.0]/17, version 64
Paths: (4 available, best #3, table EVPN-BGP-Table)
Not advertised to any peer
Refresh Epoch 4
Local
172.16.254.7 (metric 3) (via default) from 172.16.255.2 (172.16.255.2)
Origin incomplete, metric 0, localpref 100, valid, internal
EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD68.E548
Originator: 172.16.255.7, Cluster list: 172.16.255.2
rx pathid: 0x1, tx pathid: 0
Updated on Aug 24 2022 16:52:56 UTC
Refresh Epoch 1
Local
172.16.254.7 (metric 3) (via default) from 172.16.255.1 (172.16.255.1)
Origin incomplete, metric 0, localpref 100, valid, internal
EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD68.E548
Originator: 172.16.255.7, Cluster list: 172.16.255.1
rx pathid: 0x1, tx pathid: 0
Updated on Aug 24 2022 16:49:48 UTC
Refresh Epoch 1
Local
172.16.254.6 (metric 3) (via default) from 172.16.255.1 (172.16.255.1)
Origin incomplete, metric 0, localpref 100, valid, internal, best
EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD67.EF48
Originator: 172.16.255.6, Cluster list: 172.16.255.1
rx pathid: 0x0, tx pathid: 0x0
Updated on Aug 24 2022 16:49:48 UTC

Refresh Epoch 4

Local

```
172.16.254.6 (metric 3) (via default) from 172.16.255.2 (172.16.255.2)
Origin incomplete, metric 0, localpref 100, valid, internal
EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD67.EF48
Originator: 172.16.255.6, Cluster list: 172.16.255.2
rx pathid: 0x0, tx pathid: 0
Updated on Aug 24 2022 16:52:56 UTC
```

La configuración en la hoja se muestra aquí

<#root>

```
router bgp 65001
!
<...snip...>
!
address-family l2vpn evpn

    bgp additional-paths receive

<...snip...>
!
address-family ipv4 vrf green

    import path selection all
    maximum-paths ibgp 2

<...snip...>
```

Verifique que en la tabla de ruteo de hoja veamos dos rutas a ambos Bordes

<#root>

Leaf-01#

```
show ip route vrf green
```

Routing Table: green

<...snip...>

```
Gateway of last resort is 172.16.254.7 to network 0.0.0.0
```

```
B*    0.0.0.0/0 [200/0] via 172.16.254.7, 00:02:15, Vlan901
      [200/0] via 172.16.254.6, 00:02:15, Vlan901
```

<...snip...>

Leaf-01#

```
show ip cef vrf green 0.0.0.0/0
```

0.0.0.0/0

```
    nexthop 172.16.254.6 Vlan901
```

```
    nexthop 172.16.254.7 Vlan901
```

Observe lo que sucede en caso de pérdida de la ruta predeterminada de Border-01.

```
<#root>
```

```
Border-01#
```

```
show ip route vrf vrf-service 0.0.0.0
```

```
Routing Table: vrf-service  
% Network not in table
```

La pista deja de funcionar

```
<#root>
```

```
Border-01#
```

```
show track 1
```

```
Track 1
```

```
IP route 0.0.0.0 0.0.0.0 reachability
```

```
Reachability is Down (no ip route)
```

```
5 changes, last change 00:00:56
```

```
VPN Routing/Forwarding table "vrf-service"
```

```
First-hop interface is unknown
```

```
Tracked by:
```

```
Static IP Routing 0
```

En las columnas vertebrales sólo vemos la ruta de la frontera 02

```
<#root>
```

```
Spine-01#
```

```
show bgp l2vpn evpn
```

```
BGP table version is 27, local router ID is 172.16.255.1
```

```
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,  
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,  
x best-external, a additional-path, c RIB-compressed,  
t secondary path, L long-lived-stale,
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete
```

```
RPKI validation codes: V valid, I invalid, N Not found
```

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:1					
* i [5][1:1][0][0][0.0.0.0]/17					
	172.16.254.7	0	100	0	?
*>i	172.16.254.7	0	100	0	?

<...snip...>

En la hoja sólo vemos la ruta de la frontera 02

<#root>

Leaf-01#

show bgp l2vpn evpn

BGP table version is 68, local router ID is 172.16.255.3
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
x best-external, a additional-path, c RIB-compressed,
t secondary path, L long-lived-stale,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:1 (default for vrf green)					
*>i [5][1:1][0][0][0.0.0.0]/17					
	172.16.254.7	0	100	0 ?	
* i	172.16.254.7	0	100	0 ?	

<...snip...>

Leaf-01#

sh bgp l2vpn evpn route-type 5 0 0.0.0.0 0

BGP routing table entry for [5][1:1][0][0][0.0.0.0]/17, version 68
Paths: (2 available, best #1, table EVPN-BGP-Table)
Not advertised to any peer
Refresh Epoch 1
Local
172.16.254.7 (metric 3) (via default) from 172.16.255.1 (172.16.255.1)
Origin incomplete, metric 0, localpref 100, valid, internal, best
EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD68.E548
Originator: 172.16.255.7, Cluster list: 172.16.255.1
rx pathid: 0x0, tx pathid: 0x0
Updated on Aug 24 2022 17:17:31 UTC
Refresh Epoch 4
Local
172.16.254.7 (metric 3) (via default) from 172.16.255.2 (172.16.255.2)
Origin incomplete, metric 0, localpref 100, valid, internal
EVPN ESI: 00000000000000000000, Gateway Address: 0.0.0.0, VNI Label 50901, MPLS VPN Label 0
Extended Community: RT:1:1 ENCAP:8 Router MAC:0C75.BD68.E548
Originator: 172.16.255.7, Cluster list: 172.16.255.2
rx pathid: 0x0, tx pathid: 0
Updated on Aug 24 2022 17:17:31 UTC

Sólo hay una ruta presente en la tabla de ruteo y en CEF en Leaf-01

<#root>

```
Leaf-01#
```

```
show ip route vrf green
```

```
Routing Table: green
```

```
<...snip...>
```

```
Gateway of last resort is 172.16.254.7 to network 0.0.0.0
```

```
B*    0.0.0.0/0 [200/0] via 172.16.254.7, 00:04:02, Vlan901
```

```
<...snip...>
```

```
Leaf-01#
```

```
show ip cef vrf green 0.0.0.0/0
```

```
0.0.0.0/0
```

```
  nexthop 172.16.254.7 Vlan901
```

Información Relacionada

- [Soporte Técnico y Documentación - Cisco Systems](#)
- [Guía de Configuración de BGP EVPN VXLAN, Cisco IOS XE Amsterdam 17.3.x \(Switches Catalyst 9500\)](#)
- [Historial de Funciones para BGP EVPN VXLAN](#)

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