在SDA中配置Fusion路由器

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简介

本文档介绍如何在思科软件定义接入(SDA)解决方案中配置Fusion路由器。

先决条件

要求

本文档没有任何特定的要求。

> 注意：需要根据在Link to release notes中找到的受支持设备进行设置

使用的组件

本文档中的信息基于以下硬件版本：

- DNAC — 版本1.2.1
- 边缘和边界 — Cat3k Cisco交换机
- Fusion — 支持VRF间泄漏的Cisco路由器

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

背景信息

在Cisco SD-Access解决方案中，设备由Cisco DNA Center进行管理和配置。通常，SD-Access交换矩阵的所有部分都可以且通常由Cisco DNA Center配置和管理。但是，Fusion设备位于交换矩阵外部，因此是手动配置的。Border Automation是Cisco DNA Center中的一个功能，可以自动执行Border配置，以将VRF切换到Fusion设备。

有时，由于通常与当前配置的兼容性相关的原因，Border Automation并不适用，因此也可以手动配置从Border到Fusion设备的切换。了解所使用的配置有助于说明有关整个系统最佳配置和运行的重要详细信息。

DNA SD-Access解决方案中融合设备的功能

融合设备支持跨SD访问交换矩阵域的虚拟路由和转发(VRF)泄漏，并支持主机与共享服务(例如DHCP、DNS、NTP、ISE、思科DNA中心、无线LAN控制器(WLC)等)的连接。虽然此角色可由路由器以外的其他设备执行，但本文档重点介绍作为Fusion设备的路由器。

如前所述，共享服务必须可用于园区中的所有虚拟网络(VN)。通过创建从边界路由器到Fusion路由器的边界网关协议(BGP)对等来实现此目的。在Fusion路由器上，需要访问这些共享服务的交换矩阵VRF的子网会泄漏到GRT或共享服务VRF中，反之亦然。路由映射可用于帮助包含特定于SD访问交换矩阵的子网的路由表。

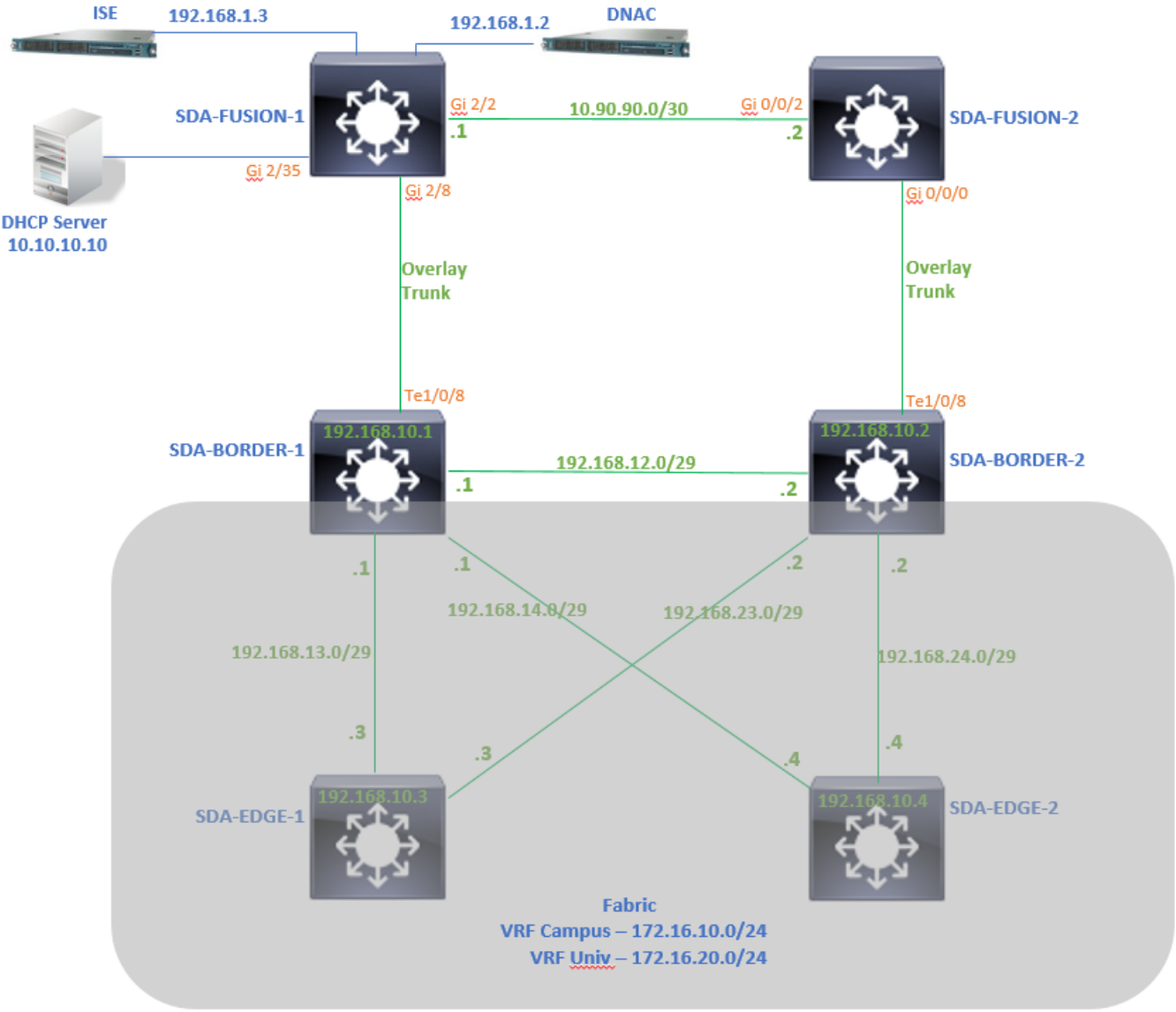
> 注意：SD访问边界节点不支持与SD访问IP池重叠的汇总路由。在从Fusion设备到边界节点的路由通告中，必须过滤与IP池重叠的总结路由。

配置

此处提供的配置详细信息与下面显示的网络拓扑相关。此网络拓扑不是推荐的部署拓扑。此处仅用于简化提供的配置示例的演示。有关推荐的部署设计，请参阅思科全数字化网络架构设计区。

网络图

本文使用的拓扑包括两个均配置为外部边界的边界路由器，以及两个连接到各自边界路由器的融合路由器。



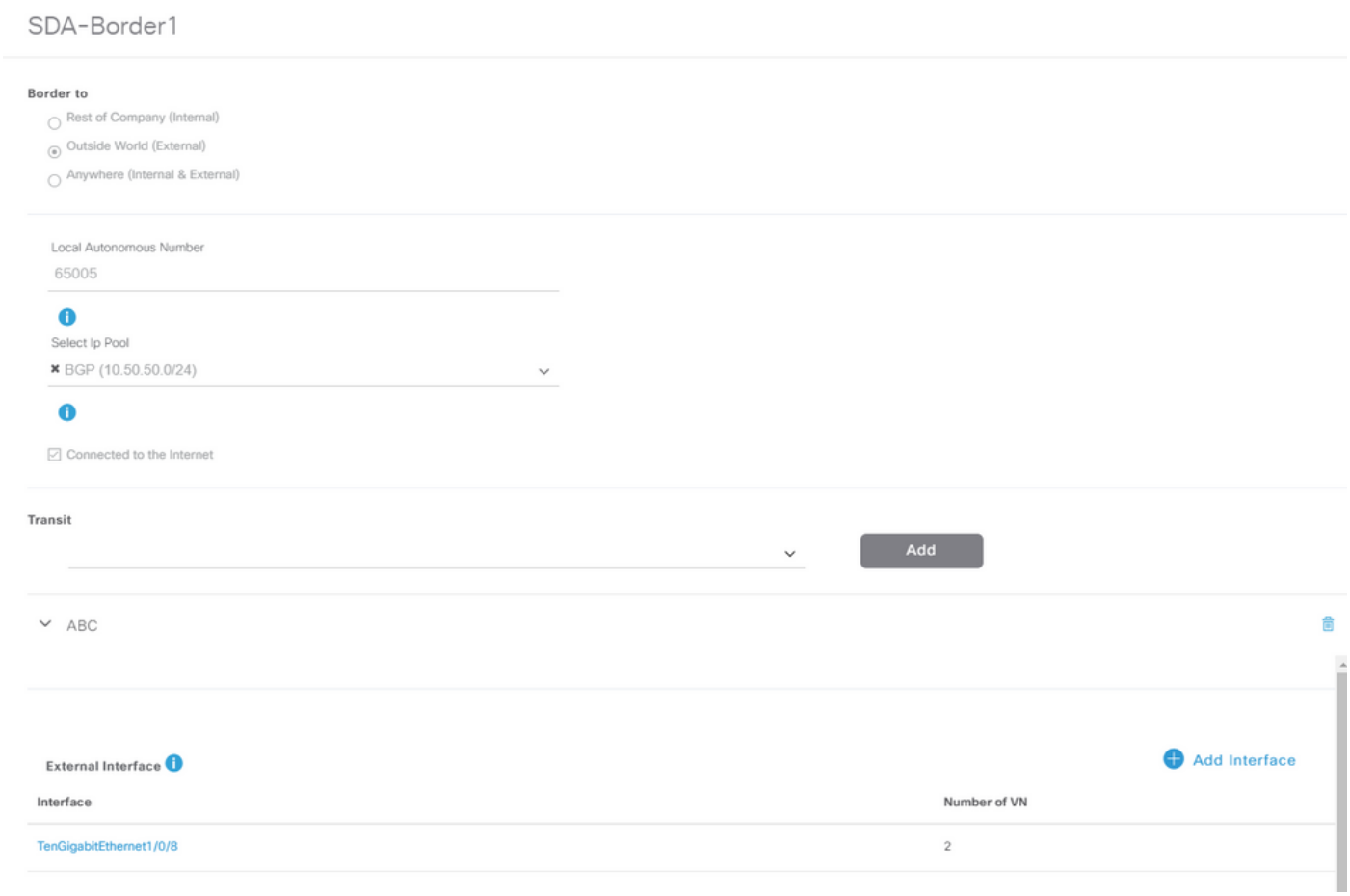
配置

步骤1:配置来自DNAC的分手链路

在将边界路由器添加到交换矩阵时，在为其设备分配边界路由器角色的步骤中，可以创建移交链路。 在第2层，它是连接到Fusion路由器的中继链路。接下来需要采取的步骤有：

1.配置BGP的本地AS编号。此自治系统(AS)编号用于配置边界路由器上的BGP进程。

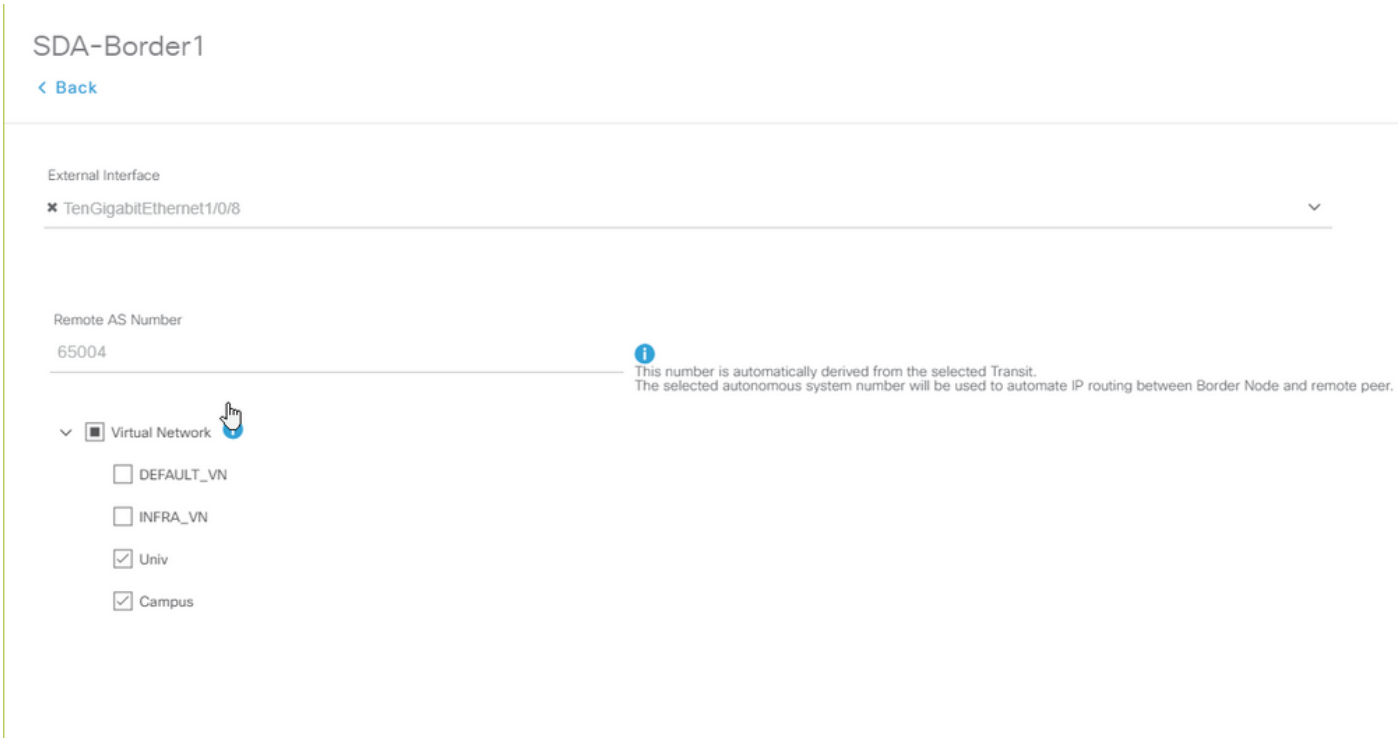
2.在Transit下添加接口。此接口是Border和Fusion路由器之间的直接连接。（本示例中位于Border的1/0/8）。



3.配置远程AS编号。此AS编号在边界路由器上用于指向Fusion Router的邻居语句，以配置外部BGP(eBGP)对等体。

4.选择Fusion路由器上需要VRF泄漏的所有虚拟网络(VRF)。

5.将配置从DNAC部署到设备。



对SDA-Border-2设备使用相同的步骤。

第二步：验证边界路由器上DNAC推送的配置

本节介绍如何验证与BGP协议相关的边界路由器上的配置。

SDA-Border-1

```
SDA-Border1#show run interface loopback 0
!
interface Loopback0
ip address 192.168.10.1 255.255.255.255
ip router isis
end


SDA-Border1#show run interface tenGigabitEthernet 1/0/8
!
interface TenGigabitEthernet1/0/8
switchport mode trunk
end


SDA-Border1#show run interface loopback 1021

interface Loopback1021
description Loopback Border
vrf forwarding Campus
ip address 172.16.10.1 255.255.255.255
end


SDA-Border1#show run interface loopback 1022

interface Loopback1022
description Loopback Border
vrf forwarding Univ
ip address 172.16.20.1 255.255.255.255
end


SDA-Border1#show run | section vrf definition Campus
vrf definition Campus
rd 1:4099
!
address-family ipv4
route-target export 1:4099
route-target import 1:4099
exit-address-family


SDA-Border1#show run | section vrf definition Univ
vrf definition Univ
rd 1:4100
!
address-family ipv4
route-target export 1:4100
route-target import 1:4100
exit-address-family
SDA-Border1#
```

```
SDA-Border1#show run interface vlan 3007
!
interface Vlan3007 <<< SVI created for BGP Peering under VRF Campus
description vrf interface to External router
vrf forwarding Campus
ip address 10.50.50.25 255.255.255.252
no ip redirects
ip route-cache same-interface
end

SDA-Border1#show run interface vlan 3006
!
interface Vlan3006 <<< SVI created for BGP Peering under VRF Univ
description vrf interface to External router
vrf forwarding Univ
ip address 10.50.50.21 255.255.255.252
no ip redirects
ip route-cache same-interface
end


SDA-Border1#show run | section bgp
router bgp 65005 <<< Local AS Number from DNAC
bgp router-id interface Loopback0
bgp log-neighbor-changes
bgp graceful-restart
!
address-family ipv4
network 192.168.10.1 mask 255.255.255.255
redistribute lisp metric 10
exit-address-family
!
address-family ipv4 vrf Campus
bgp aggregate-timer 0
network 172.16.10.1 mask 255.255.255.255 <<< Anycast IP for Pool in VRF Campus
aggregate-address 172.16.10.0 255.255.255.0 summary-only <<< Only Summary is Advertised
redistribute lisp metric 10
neighbor 10.50.50.26 remote-as 65004 <<< Peer IP to be used on Fusion for VRF Campus and Remote
AS Number from DNAC
neighbor 10.50.50.26 update-source Vlan3007
neighbor 10.50.50.26 activate
neighbor 10.50.50.26 weight 65535 <<< Weight needed for Fusion peering to make sure locally
originated path from LISP is never preferred
exit-address-family
!
address-family ipv4 vrf Univ
bgp aggregate-timer 0
network 172.16.20.1 mask 255.255.255.255 <<< Anycast IP for Pool in VRF Univ
aggregate-address 172.16.20.0 255.255.255.0 summary-only
redistribute lisp metric 10
neighbor 10.50.50.22 remote-as 65004
neighbor 10.50.50.22 update-source Vlan3006
neighbor 10.50.50.22 activate
neighbor 10.50.50.22 weight 65535
exit-address-family
```

SDA-Border-2

```
SDA-Border2#show run interface loopback 0
!
interface Loopback0
```

```
 ip address 192.168.10.2 255.255.255.255
 ip router isis
end

SDA-Border2#show run interface tenGigabitEthernet 1/0/8
!
interface TenGigabitEthernet1/0/8
 switchport mode trunk
end


SDA-Border2#show run interface loopback 1021
!
interface Loopback1021
description Loopback Border
vrf forwarding Campus
ip address 172.16.10.1 255.255.255.255
end

SDA-Border2#show run interface loopback 1022
!
interface Loopback1022
description Loopback Border
vrf forwarding Univ
ip address 172.16.20.1 255.255.255.255
end
SDA-Border2#show run | section vrf definition Campus vrf definition Campus rd 1:4099 ! address-
family ipv4 route-target export 1:4099 route-target import 1:4099 exit-address-family SDA-
Border2#show run | section vrf definition Univ vrf definition Univ rd 1:4100 ! address-family
ipv4 route-target export 1:4100 route-target import 1:4100 exit-address-family SDA-Border2#show
run interface vlan 3001 ! interface Vlan3001 description vrf interface to External router vrf
forwarding Campus ip address 10.50.50.1 255.255.255.252 no ip redirects ip route-cache same-
interface end SDA-Border2#show run interface vlan 3003 ! interface Vlan3003 description vrf
interface to External router vrf forwarding Univ ip address 10.50.50.9 255.255.255.252 no ip
redirects ip route-cache same-interface end SDA-Border2#show run | section bgp router bgp 65005
bgp router-id interface Loopback0 bgp log-neighbor-changes bgp graceful-restart ! address-family
ipv4 network 192.168.10.2 mask 255.255.255.255 redistribute lisp metric 10 exit-address-family !
address-family ipv4 vrf Campus bgp aggregate-timer 0 network 172.16.10.1 mask 255.255.255.255
aggregate-address 172.16.10.0 255.255.255.0 summary-only redistribute lisp metric 10 neighbor
10.50.50.2 remote-as 65004 neighbor 10.50.50.2 update-source Vlan3001 neighbor 10.50.50.2
activate neighbor 10.50.50.2 weight 65535 exit-address-family ! address-family ipv4 vrf Univ bgp
aggregate-timer 0 network 172.16.20.1 mask 255.255.255.255 aggregate-address 172.16.20.0
255.255.255.0 summary-only redistribute lisp metric 10 neighbor 10.50.50.10 remote-as 65004
neighbor 10.50.50.10 update-source Vlan3003 neighbor 10.50.50.10 activate neighbor 10.50.50.10
weight 65535 exit-address-family
```

第三步：在边界路由器上配置分配项

由于Fusion路由器上的VRF泄漏，VRF园区地址系列ipv4获知由VRF Univ(172.16.20.0/24)发起的路由。但始发路由器和学习路由器具有相同的BGP AS编号(65005)。要克服BGP环路预防机制，并在边界路由器上接受/安装路由，必须为与Fusion路由器的对等配置**allois-in**:

```
SDA-Border1

SDA-Border1(config)#router bgp 65005
SDA-Border1(config-router)#address-family ipv4 vrf Campus
SDA-Border1(config-router-af)#neighbor 10.50.50.26 allowas-in
SDA-Border1(config-router-af)#exit-address-family
SDA-Border1(config-router)#
SDA-Border1(config-router)#address-family ipv4 vrf Univ
SDA-Border1(config-router-af)#neighbor 10.50.50.22 allowas-in
```

```
SDA-Border1(config-router-af)#exit-address-family
SDA-Border1(config-router)#
```

```
SDA-Border2

SDA-Border2(config)#router bgp 65005
SDA-Border2(config-router)#address-family ipv4 vrf Campus
SDA-Border2(config-router-af)#neighbor 10.50.50.2 allowas-in
SDA-Border2(config-router-af)#exit-address-family
SDA-Border2(config-router)#
SDA-Border2(config-router)#address-family ipv4 vrf Univ
SDA-Border2(config-router-af)#neighbor 10.50.50.10 allowas-in
SDA-Border2(config-router-af)#exit-address-family
SDA-Border2(config-router)#
```

> **注意**:**allois-in命令**必须谨慎使用，因为它可能导致环路。当您仅使用一个Borders对等的Fusion设备时，需要过滤以确保来自本地的路由不被接受从相同VN内的Fusion对等体返回AS。如果发生这种情况，由于eBGP路径的最大权重，eBGP路径优先于本地发起的路径。

第四步：配置Fusion路由器

本节说明Fusion路由器的手动配置。

SDA-Fusion-1

将通向Border Router的链路配置为TRUNK，以匹配Border-1上的VLAN配置：

```
interface GigabitEthernet2/8
 switchport
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 3006, 3007
 switchport mode trunk
end
```

配置所需的VRF:

```
vrf definition Campus
 rd 1:4099
 !
 address-family ipv4
  route-target export 1:4099
  route-target import 1:4099
 exit-address-family
!

vrf definition Univ
 rd 1:4100
 !
 address-family ipv4
  route-target export 1:4100
  route-target import 1:4100
 exit-address-family
```

配置SVI接口：

```
interface Vlan3007
 vrf forwarding Campus
 ip address 10.50.50.26 255.255.255.252
end

interface Vlan3006
 vrf forwarding Univ
 ip address 10.50.50.22 255.255.255.252
end
```

使用SDA-Border-1配置外部BGP(eBGP)对等：

```
router bgp 65004                                    <<< Remote AS from DNAC
 bgp log-neighbor-changes
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv4 vrf Campus
  neighbor 10.50.50.25 remote-as 65005
  neighbor 10.50.50.25 update-source Vlan3007
  neighbor 10.50.50.25 activate
 exit-address-family
 !
 address-family ipv4 vrf Univ
  neighbor 10.50.50.21 remote-as 65005
  neighbor 10.50.50.21 update-source Vlan3006
  neighbor 10.50.50.21 activate
 exit-address-family
```

使用SDA-Fusion-2配置内部BGP(iBGP)对等：

```
interface GigabitEthernet2/2
 description SDA-Fusion1--->SDA-Fusion2
 ip address 10.90.90.1 255.255.255.252
end

router bgp 65004
 neighbor 10.90.90.2 remote-as 65004
 !
 address-family ipv4
  neighbor 10.90.90.2 activate
 exit-address-family
 !
```

在全局地址系列下通告DHCP服务器子网，其中DHCP服务器IP为10.10.10:

```
interface GigabitEthernet2/35
 description connection to DHCP server
 ip address 10.10.10.9 255.255.255.252
end
```

```
router bgp 65004
 !
 address-family ipv4
  network 10.10.10.8 mask 255.255.255.252
 exit-address-family
 !
```

SDA-Fusion-2

配置通向Border Router的链路。如果Fusion上的接口是L3而不是TRUNK — 请配置子接口：

```
interface GigabitEthernet0/0/0.3001
 encapsulation dot1Q 3001
 vrf forwarding Campus
 ip address 10.50.50.2 255.255.255.252
end

interface GigabitEthernet0/0/0.3003
 encapsulation dot1Q 3003
 vrf forwarding Univ
 ip address 10.50.50.10 255.255.255.252
end
```

配置相应的VRF:

```
vrf definition Campus
 rd 1:4099
 !
 address-family ipv4
  route-target export 1:4099
  route-target import 1:4099
 exit-address-family
!
!
vrf definition Univ
 rd 1:4100
 !
 address-family ipv4
  route-target export 1:4100
  route-target import 1:4100
 exit-address-family
!
```

使用SDA-Border-2配置eBGP对等：

```
router bgp 65004
 bgp log-neighbor-changes
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv4 vrf Campus
  neighbor 10.50.50.1 remote-as 65005
  neighbor 10.50.50.1 update-source GigabitEthernet0/0/0.3001
  neighbor 10.50.50.1 activate
 exit-address-family
 !
```

```
 address-family ipv4 vrf Univ
  neighbor 10.50.50.9 remote-as 65005
  neighbor 10.50.50.9 update-source GigabitEthernet0/0/0.3003
  neighbor 10.50.50.9 activate
 exit-address-family
```

使用SDA-Fusion-1配置iBGP对等：

```
interface GigabitEthernet0/0/2
ip address 10.90.90.2 255.255.255.252
negotiation auto
end

router bgp 65004 neighbor 10.90.90.1 remote-as 65004 ! address-family ipv4 neighbor 10.90.90.1
activate exit-address-family
```

第五步：在Fusion路由器上配置VRF泄漏

Fusion路由器SDA-Fusion-1和SDA-Fusion-2的VRF泄漏配置相同。

首先，配置两个VRF（Campus和Univ）之间的VRF泄漏，使用**route-target import**:

```
vrf definition Campus
 !
 address-family ipv4
route-target export 1:4099 route-target import 1:4099
route-target import 1:4100 <<< Import VRF Univ prefixes in VRF Campus
exit-address-family
!
vrf definition Univ
!
address-family ipv4
route-target export 1:4100 route-target import 1:4100
route-target import 1:4099 <<< Import VRF Campus prefixes in VRF Univ
exit-address-family
!
```

然后配置全局路由表(GRT)到VRF之间的路由渗透，然后从VRF到GRT，使用**import ... map**和**export ... map**:

```
ip prefix-list Campus_Prefix seq 5 permit 172.16.10.0/24    <<< Include Prefixes belonging to
VRF Campus
ip prefix-list Global_Prefix seq 5 permit 10.10.10.8/30     <<< Include Prefixes belonging to
Global (eq DHCP Server Subnet)
ip prefix-list Univ_Prefix seq 5 permit 172.16.20.0/24      <<< Include Prefixes belonging to
VRF Univ

route-map Univ_Map permit 10
 match ip address prefix-list Univ_Prefix
route-map Global_Map permit 10
 match ip address prefix-list Global_Prefix
route-map Campus_Map permit 10
 match ip address prefix-list Campus_Prefix


vrf definition Campus
 !
 address-family ipv4
  import ipv4 unicast map Global_Map     <<< Injecting Global into VRF Campus matching route-map
```

```
Global_Map
export ipv4 unicast map Campus_Map <<< Injecting VRF Campus into Global matching route-map
Campus_Map
exit-address-family
!
vrf definition Univ
!
address-family ipv4
import ipv4 unicast map Global_Map <<< Injecting Global into VRF Univ matching route-map
Global_Map
export ipv4 unicast map Univ_Map <<< Injecting VRF Univ into Global matching route-map Univ_Map
exit-address-family
!
```

验证

本部分包含验证步骤，用于确保之前的配置已正确生效。

步骤1:验证Fusion和边界路由器之间的eBGP对等

SDA-Border-1------对--------SDA-Fusion-1

```
SDA-Border1#show ip bgp vpnv4 vrf Campus summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.26     4        65004    1294    1295       32    0    0 19:32:22        2



SDA-Border1#show ip bgp vpnv4 vrf Univ summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.22     4        65004    1294    1292       32    0    0 19:32:57        2


-------------------------------------------------


SDA-Fusion1#show ip bgp vpnv4 vrf Campus summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.25     4        65005    1305    1305       31    0    0 19:41:58        1


SDA-Fusion1#show ip bgp vpnv4 vrf Univ summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.21     4        65005    1303    1305       31    0    0 19:42:14        1
```

SDA-Border-2 ------对---------SDA-Fusion-2

```
SDA-Border2#show ip bgp vpnv4 vrf Campus summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.2      4        65004       6       6       61    0    0 00:01:37        2


SDA-Border2#show ip bgp vpnv4 vrf Univ summary
```

```
Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.10     4        65004       6       6       61    0    0 00:01:39        2

--------------------------------------------------------------------------------

SDA-Fusion2#show ip bgp vpnv4 vrf Campus summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.1      4        65005      17      17        9    0    0 00:11:16        1


SDA-Fusion2#show ip bgp vpnv4 vrf Univ summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.50.50.9      4        65005      17      17        9    0    0 00:11:33        1
```

第二步：验证两个融合路由器之间的iBGP对等

SDA-Fusion-1------对--------SDA-Fusion-2

```
SDA-Fusion1#show ip bgp summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.90.90.2      4        65004      10      12       12    0    0 00:04:57        2


---------------------------------------------------------------

SDA-Fusion2#show ip bgp summary

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.90.90.1      4        65004      19      17        4    0    0 00:11:35        3
```

第三步：验证BGP表和路由表中的前缀

SDA-Border-1

```
SDA-Border1#show ip bgp vpnv4 vrf Campus

     Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:4099 (default for vrf Campus)
 *>   10.10.10.8/30    10.50.50.26                            65535 65004 i         <<< Prefix
leaked from Global Routing Table on Fusion
 *>   172.16.10.0/24   0.0.0.0                                32768 i               <<< VRF Campus
originated prefix
 *>   172.16.20.0/24   10.50.50.26                            65535 65004 65005 i   <<< Prefix
originated in VRF Univ, leaked on Fusion to VRF Campus


SDA-Border1#show ip route vrf Campus bgp Routing Table: Campus B 10.10.10.8/30 [20/0] via
10.50.50.26, 20:30:30 <<< RIB entry for DHCP Server pool prefix B 172.16.10.0/24 [200/0],
20:32:45, Null0 <<< Null entry created by "aggregate-address" BGP configuration B 172.16.20.0/24
[20/0] via 10.50.50.26, 20:32:45 <<< RIB entry for VRF Univ prefix ----------------------------
------------------------------------------- SDA-Border1#show ip bgp vpnv4 vrf Univ Network
Next Hop Metric LocPrf Weight Path Route Distinguisher: 1:4100 (default for vrf Univ) *>
10.10.10.8/30 10.50.50.22 65535 65004 i <<< Prefix leaked from Global Routing Table on Fusion *>
172.16.10.0/24 10.50.50.22 65535 65004 65005 i <<< Prefix originated in VRF Campus, leaked on
Fusion to VRF Univ *> 172.16.20.0/24 0.0.0.0 32768 i <<< VRF Univ originated prefix SDA-
Border1#show ip route vrf Univ bgp Routing Table: Univ B 10.10.10.8/30 [20/0] via 10.50.50.22,
```

```
20:31:06 <<< RIB entry for DHCP Server pool prefix B 172.16.10.0/24 [20/0] via 10.50.50.22,
20:33:21 <<< RIB entry for VRF Campus prefix B 172.16.20.0/24 [200/0], 20:33:21, Null0 <<< Null
entry created by "aggregate-address" BGP configuration
```

SDA-Border-2

```
SDA-Border2#show ip bgp vpnv4 vrf Campus

     Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:4099 (default for vrf Campus)
 *>   10.10.10.8/30    10.50.50.2                             65535 65004 i         <<< Prefix
leaked from Global Routing Table on Fusion
 *>   172.16.10.0/24   0.0.0.0                                32768 i               <<< VRF Campus
originated prefix
 *>   172.16.20.0/24   10.50.50.2                             65535 65004 65005 i   <<< Prefix
originated in VRF Univ, leaked on Fusion to VRF Campus


SDA-Border2#show ip route vrf Campus bgp

B        10.10.10.8/30 [20/0] via 10.50.50.2, 01:02:19          <<< RIB entry for DHCP Server
pool prefix
B        172.16.10.0/24 [200/0], 1w6d, Null0                    <<< Null entry created by
"aggregate-address" BGP configuration
B        172.16.20.0/24 [20/0] via 10.50.50.2, 01:02:27         <<< RIB entry for VRF Univ
Prefix

------------------------------------------------------------------

SDA-Border2#show ip bgp vpnv4 vrf Univ

     Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:4100 (default for vrf Univ)
 *>   10.10.10.8/30    10.50.50.10                            65535 65004 i         <<< Prefix
leaked from Global Routing Table on Fusion
 *>   172.16.10.0/24   10.50.50.10                            65535 65004 65005 i   <<< Prefix
originated in VRF Campus, leaked on Fusion to VRF Univ
 *>   172.16.20.0/24   0.0.0.0                                32768 i               <<< VRF Univ
originated prefix


SDA-Border2#show ip route vrf Univ bgp

B        10.10.10.8/30 [20/0] via 10.50.50.10, 01:02:29          <<< RIB entry for DHCP Server
pool prefix
B        172.16.10.0/24 [20/0] via 10.50.50.10, 01:02:34         <<< RIB entry for VRF Campus
prefix
B        172.16.20.0/24 [200/0], 1w6d, Null0                     <<< Null entry created by
"aggregate-address" BGP configuration
```

SDA-Fusion-1

```
SDA-Fusion1#show ip bgp

     Network          Next Hop            Metric LocPrf Weight Path
 *>  10.10.10.8/30    0.0.0.0                  0         32768 i            <<< Locally
originated Global prefix
 * i 172.16.10.0/24   10.50.50.1               0    100      0 65005 i      <<< Prefix imported
from VRF Campus
```

```
 *>                   10.50.50.25              0             0 65005 i
 * i 172.16.20.0/24   10.50.50.9               0    100      0 65005 i      <<< Prefix imported
from VRF Univ
 *>                   10.50.50.21              0             0 65005 i


SDA-Fusion1#show ip route

C        10.10.10.8/30 is directly connected, GigabitEthernet2/35            <<< Prefix for DHCP
Server
B        172.16.10.0 [20/0] via 10.50.50.25 (Campus), 20:50:21               <<< Prefix imported
from VRF Campus
B        172.16.20.0 [20/0] via 10.50.50.21 (Univ), 20:50:21          <<< Prefix imported from
VRF Univ

------------------------------------------------------------------------------


SDA-Fusion1#show ip bgp vpnv4 vrf Campus

     Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:4099 (default for vrf Campus)
Import Map: Global_Map, Address-Family: IPv4 Unicast, Pfx Count/Limit: 1/1000
Export Map: Campus_Map, Address-Family: IPv4 Unicast, Pfx Count/Limit: 1/1000
 *>  10.10.10.8/30    0.0.0.0                  0         32768 i         <<< Prefix imported
from Global Routing
 *>  172.16.10.0/24   10.50.50.25              0             0 65005 i <<< Prefix learnt from
Border1 in VRF Campus
 *>  172.16.20.0/24   10.50.50.21              0             0 65005 i <<< Prefix imported fron
VRF Univ


SDA-Fusion1#show ip bgp vpnv4 vrf Campus 172.16.20.0/24
BGP routing table entry for 1:4099:172.16.20.0/24, version 27
Paths: (1 available, best #1, table Campus)
Advertised to update-groups:
5
Refresh Epoch 1
65005, (aggregated by 65005 192.168.10.1), imported path from 1:4100:172.16.20.0/24 (Univ)
10.50.50.21 (via vrf Univ) (via Univ) from 10.50.50.21 (192.168.10.1)
Origin IGP, metric 0, localpref 100, valid, external, atomic-aggregate, best
Extended Community: RT:1:4100
rx pathid: 0, tx pathid: 0x0


SDA-Fusion1#show ip route vrf Campus bgp B 10.10.10.8/30 is directly connected, 20:46:51,
GigabitEthernet2/35 B 172.16.10.0 [20/0] via 10.50.50.25, 20:50:07 B 172.16.20.0 [20/0] via
10.50.50.21 (Univ), 20:50:07 ------------------------------------------------------------------------
--------- SDA-Fusion1#show ip bgp vpnv4 vrf Univ Network Next Hop Metric LocPrf Weight Path
Route Distinguisher: 1:4100 (default for vrf Univ) Import Map: Global_Map, Address-Family: IPv4
Unicast, Pfx Count/Limit: 1/1000 Export Map: Univ_Map, Address-Family: IPv4 Unicast, Pfx
Count/Limit: 1/1000 *> 10.10.10.8/30 0.0.0.0 0 32768 i <<< Prefix imported from Global Routing
*> 172.16.10.0/24 10.50.50.25 0 0 65005 i <<< Prefix imported fron VRF Campus *> 172.16.20.0/24
10.50.50.21 0 0 65005 i <<< Prefix learnt from Border1 in VRF Univ

SDA-Fusion1#show ip bgp vpnv4 vrf Univ 172.16.10.0/24
BGP routing table entry for 1:4100:172.16.10.0/24, version 25
Paths: (1 available, best #1, table Univ)
Advertised to update-groups:
4
Refresh Epoch 1
65005, (aggregated by 65005 192.168.10.1), imported path from 1:4099:172.16.10.0/24 (Campus)
10.50.50.25 (via vrf Campus) (via Campus) from 10.50.50.25 (192.168.10.1)
Origin IGP, metric 0, localpref 100, valid, external, atomic-aggregate, best
```

```
Extended Community: RT:1:4099
rx pathid: 0, tx pathid: 0x0


SDA-Fusion1#show ip route vrf Univ bgp B 10.10.10.8/30 is directly connected, 20:47:01,
GigabitEthernet2/35 B 172.16.10.0 [20/0] via 10.50.50.25 (Campus), 20:50:17 B 172.16.20.0 [20/0]
via 10.50.50.21, 20:50:17
```

SDA-Fusion-2

```
SDA-Fusion2#show ip bgp

     Network          Next Hop            Metric LocPrf Weight Path
 *>i 10.10.10.8/30    10.90.90.1               0    100      0 i
 *>  172.16.10.0/24   10.50.50.1               0             0 65005 i
 * i                  10.50.50.25              0    100      0 65005 i
 *>  172.16.20.0/24   10.50.50.9               0             0 65005 i
 * i                  10.50.50.21              0    100      0 65005 i


SDA-Fusion2#show ip route

B        10.10.10.8/30 [200/0] via 10.90.90.1, 01:25:56
B        172.16.10.0 [20/0] via 10.50.50.1 (Campus), 01:25:56
B        172.16.20.0 [20/0] via 10.50.50.9 (Univ), 01:25:56

------------------------------------------------------------------------------

SDA-Fusion2#show ip bgp vpnv4 vrf Campus

     Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:4099 (default for vrf Campus)
Import Map: Global_Map, Address-Family: IPv4 Unicast, Pfx Count/Limit: 1/1000
Export Map: Campus_Map, Address-Family: IPv4 Unicast, Pfx Count/Limit: 1/1000
 *>i 10.10.10.8/30    10.90.90.1               0    100      0 i
 *>  172.16.10.0/24   10.50.50.1               0             0 65005 i
 *>  172.16.20.0/24   10.50.50.9               0             0 65005 i


SDA-Fusion2#show ip route vrf Campus bgp


B        10.10.10.8/30 [200/0] via 10.90.90.1, 01:26:09
B        172.16.10.0 [20/0] via 10.50.50.1, 01:26:13
B        172.16.20.0 [20/0] via 10.50.50.9 (Univ), 01:26:13

------------------------------------------------------------------------------

SDA-Fusion2#show ip bgp vpnv4 vrf Univ

     Network          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 1:4100 (default for vrf Univ)
Import Map: Global_Map, Address-Family: IPv4 Unicast, Pfx Count/Limit: 1/1000
Export Map: Univ_Map, Address-Family: IPv4 Unicast, Pfx Count/Limit: 1/1000
 *>i 10.10.10.8/30    10.90.90.1               0    100      0 i
 *>  172.16.10.0/24   10.50.50.1               0             0 65005 i
 *>  172.16.20.0/24   10.50.50.9               0             0 65005 i


SDA-Fusion2#show ip route vrf Univ bgp


B        10.10.10.8/30 [200/0] via 10.90.90.1, 01:26:19
```

```
B        172.16.10.0 [20/0] via 10.50.50.1 (Campus), 01:26:23
B        172.16.20.0 [20/0] via 10.50.50.9, 01:26:23
```

边界冗余的手动配置

为了在边界外部链路发生故障时在PETR之间进行冗余，对于外部和外部+内部边界，您必须在两个VN边界之间为每个VN手动建立iBGP会话。此外，在将BGP导入LISP并将LISP重新分发回BGP的外部+内部边界情况下，需要标记来防止iBGP到LISP路由导入，从而避免潜在的环路。

SDA-Border-1

```
interface Vlan31
 description vrf interface to SDA-Border-2
 vrf forwarding Campus
 ip address 10.31.1.1 255.255.255.252
!
interface Vlan33
 description vrf interface to SDA-Border-2
 vrf forwarding Univ
 ip address 10.33.1.1 255.255.255.252
!

router bgp 65005
!
address-family ipv4 vrf Campus
redistribute lisp metric 10 <<< open redistribution pushed by DNAC
neighbor 10.31.1.2 remote-as 65005     <<< iBGP peering with SDA-Border-2
neighbor 10.31.1.2 activate
neighbor 10.31.1.2 send-community     <<< we need to send community/tag to the neighbor
neighbor 10.31.1.2 route-map tag_local_eids out    <<< route-map used to tag prefixes sent out
!
address-family ipv4 vrf Univ
redistribute lisp metric 10
 neighbor 10.33.1.2 remote-as 65005
neighbor 10.33.1.2 activate
neighbor 10.33.1.2 send-community
neighbor 10.33.1.2 route-map tag_local_eids out
!

router lisp
!
instance-id 4099
service ipv4
eid-table vrf Campus
 route-import database bgp 65005 route-map DENY-Campus locator-set rloc_a0602921-91eb-4e27-a294-
f88949a1ca37 <<< pushed by DNAC if Border is (also) Internal
!
 instance-id 4103
 service ipv4
 eid-table vrf Univ
 route-import database bgp 65005 route-map DENY-Univ locator-set rloc_a0602921-91eb-4e27-a294-
f88949a1ca37
!

ip community-list 1 permit 655370 <<< community-list matching tag 655370 - pushed by DNAC
!

route-map DENY-Campus deny 5 <<< route-map pushed by DNAC and used in route-import
match ip address prefix-list Campus
```

```
!
route-map DENY-Campus deny 10
match ip address prefix-list l3handoff-prefixes
!
route-map DENY-Campus deny 15
match community 1 <<< match on community-list 1 to deny iBGP prefixes to be imported into LISP
!
route-map DENY-Campus deny 25
match ip address prefix-list deny_0.0.0.0
!
route-map DENY-Campus permit 30
!

route-map DENY-Univ deny 5 <<< similar route-map is pushed for Univ VN
match ip address prefix-list Univ
!
route-map DENY-Univ deny 10
match ip address prefix-list l3handoff-prefixes
!
route-map DENY-Univ deny 15
match community 1
!
route-map DENY-Univ deny 25
match ip address prefix-list deny_0.0.0.0
!
route-map DENY-Univ permit 30
!

route-map tag_local_eids permit 5 <<< route-map we need to create in order to tag the routes
advertised to the iBGP peer
set community 655370 <<< setting community/tag to 655370
!
```

SDA-Border-2

```
interface Vlan31
 description vrf interface to SDA-Border-1
 vrf forwarding Campus
 ip address 10.31.1.2 255.255.255.252
!
interface Vlan33
 description vrf interface to SDA-Border-1
 vrf forwarding Univ
 ip address 10.33.1.2 255.255.255.252
!

router bgp 65005
!
address-family ipv4 vrf Campus
 neighbor 10.31.1.1 remote-as 65005
 neighbor 10.31.1.1 activate
 neighbor 10.31.1.1 send-community
 neighbor 10.31.1.1 route-map tag_local_eids out
!
address-family ipv4 vrf Univ
 neighbor 10.33.1.1 remote-as 65005
 neighbor 10.33.1.1 activate
 neighbor 10.33.1.1 send-community
 neighbor 10.33.1.1 route-map tag_local_eids out
!

router lisp
!
```

```
 instance-id 4099
 service ipv4
  eid-table vrf Campus
route-import database bgp 65005 route-map DENY-Campus locator-set rloc_677c0a8a-0802-49f9-99cc-
f9c6ebda80f3     <<< pushed by DNAC
!

 instance-id 4103
  service ipv4
   eid-table vrf Univ
route-import database bgp 65005 route-map DENY-Univ locator-set rloc_677c0a8a-0802-49f9-99cc-
f9c6ebda80f3
!

ip community-list 1 permit 655370
!

route-map DENY-Campus deny 5
match ip address prefix-list Campus
!
route-map DENY-Campus deny 10
match ip address prefix-list l3handoff-prefixes
!
route-map DENY-Campus deny 15
match community 1
!
route-map DENY-Campus deny 25
match ip address prefix-list deny_0.0.0.0
!
route-map DENY-Campus permit 30
!

route-map DENY-Univ deny 5
match ip address prefix-list Univ
!
route-map DENY-Univ deny 10
match ip address prefix-list l3handoff-prefixes
!
route-map DENY-Univ deny 15
match community 1
!
route-map DENY-Univ deny 25
match ip address prefix-list deny_0.0.0.0
!
route-map DENY-Univ permit 30
!

route-map tag_local_eids permit 5
set community 655370
!
```

使用模板简化Fusion配置

本部分包含示例Fusion Template配置示例，以帮助简化配置。

接下来是需要根据部署设计定义的变量。在本示例中，配置和VN基于具有两个VN（校园和通用）的先前拓扑。

变量定义

```
interface_Fusion1: GigabitEthernet2/8
interface_Fusion2: GigabitEthernet0/0/0

Global_prefixes = 10.10.10.8/30

FUSION_BGP_AS = 65004
BORDER_BGP_AS = 65005
```

对于VN1:

```
VN1 = Campus
Fusion1_VN1_VLAN = 3007
Fusion2_VN1_VLAN = 3001
VN1_prefixes = 172.16.10.0/24

Fusion1_VN1_IP = 10.50.50.26

Fusion1_VN1_MASK = 255.255.255.252

Fusion2_VN1_IP = 10.50.50.2

Fusion2_VN1_MASK = 255.255.255.252
VN1_RD = 4099
VN1_ border1_neighbor_IP = 10.50.50.25
VN1_border2_neighbor_IP = 10.50.50.1
```

对于VN2:

```
VN2 = Univ
Fusion1_VN2_VLAN = 3006
Fusion2_VN2_VLAN = 3003
VN2_prefixes = 172.16.20.0/24

Fusion1_VN2_IP = 10.50.50.22

Fusion1_VN2_MASK = 255.255.255.252
Fusino2_VN2_IP2 = 10.50.50.10

Fusion2_VN2_MASK = 255.255.255.252
VN2_RD = 4100
VN2_border1_neighbor_IP = 10.50.50.21
VN2_border2_neighbor_IP = 10.50.50.9
```

模板示例

融合1

```
interface $interface_Fusion1
switchport
switchport mode trunk
switchport trunk allowed vlan add $Fusion1_VN1_VLAN, $Fusion1_VN2_VLAN
!
vlan $Fusion1_VN1_VLAN
no shut
!
vlan $Fusion1_VN2_VLAN
no shut
!
vrf definition $VN1
rd 1:$VN1_RD
```

```
!
address-family ipv4
route-target export 1:$VN1_RD
route-target import 1:$VN1_RD
route-target import 1:$VN2_RD
exit-address-family
!
vrf definition $VN2
rd 1:$VN2_RD
!
address-family ipv4
route-target export 1:$VN2_RD
route-target import 1:$VN2_RD
route-target import 1:$VN1_RD
exit-address-family
!
interface Vlan $Fusion1_VN1_VLAN
vrf forwarding $VN1
ip address $Fusion1_VN1_IP $Fusion1_VN1_MASK
!
interface Vlan $Fusion1_VN2_VLAN
vrf forwarding $VN2
ip address $Fusion1_VN2_IP $Fusion1_VN2_MASK
!
router bgp $FUSION_BGP_AS
bgp log-neighbor-changes
!
address-family ipv4
exit-address-family
!
address-family ipv4 vrf $VN1
neighbor $VN1_border1_neighbor_IP remote-as $BORDER_BGP_AS
neighbor $VN1_border1_neighbor_IP update-source Vlan $Fusion1_VN1_VLAN
neighbor $VN1_border1_neighbor_IP activate
exit-address-family
!
address-family ipv4 vrf $VN2
neighbor $VN2_border1_neighbor_IP remote-as $BORDER_BGP_AS
neighbor $VN2_border1_neighbor_IP update-source $Fusion1_VN2_VLAN
neighbor $VN2_border1_neighbor_IP activate
exit-address-family

ip prefix-list ${VN1}_Prefix seq 5 permit $VN1_prefixes
ip prefix-list Global_Prefix seq 5 permit $Global_prefixes
ip prefix-list ${VN2}_Prefix seq 5 permit $VN2_prefixes

route-map ${VN2}_Map permit 10
match ip address prefix-list ${VN2}_Prefix
route-map Global_Map permit 10
match ip address prefix-list Global_Prefix
route-map ${VN1}_Map permit 10
match ip address prefix-list ${VN1}_Prefix

vrf definition $VN1
!
address-family ipv4
import ipv4 unicast map Global_Map
export ipv4 unicast map ${VN1}_Map
exit-address-family
!
vrf definition $VN2
!
address-family ipv4
import ipv4 unicast map Global_Map
```

```
export ipv4 unicast map ${VN2}_Map
exit-address-family
!
```

融合2

```
interface $interface_Fusion2.$Fusion2_VN1_VLAN
encapsulation dot1Q $Fusion2_VN1_VLAN
vrf forwarding $VN1
ip address $Fusion2_VN1_IP2 $Fusion2_VN1_MASK
!
interface $interface_Fusion2.$Fusion2_VN2_VLAN
encapsulation dot1Q $Fusion2_VN2_VLAN
vrf forwarding $VN2
ip address $Fusion2_VN2_IP2 $Fusion2_VN2_MASK
!
vlan $Fusion2_VN1_VLAN
no shut
!
vlan $Fusion2_VN2_VLAN
no shut
!
vrf definition $VN1
rd 1:$VN1_RD
!
address-family ipv4
route-target export 1:$VN1_RD
route-target import 1:$VN1_RD
route-target import 1:$VN2_RD
exit-address-family
!
vrf definition $VN2
rd 1:$VN2_RD
!
address-family ipv4
route-target export 1:$VN2_RD
route-target import 1:$VN2_RD
route-target import 1:$VN1_RD
exit-address-family
!
router bgp $FUSION_BGP_AS
bgp log-neighbor-changes
!
address-family ipv4
exit-address-family
!
address-family ipv4 vrf $VN1
neighbor $VN1_border2_neighbor_IP remote-as $BORDER_BGP_AS
neighbor $VN1_border2_neighbor_IP update-source $interface_Fusion2.$Fusion2_VN1_VLAN
neighbor $VN1_bordre2_neighbor_IP activate
exit-address-family
!
address-family ipv4 vrf $VN2
neighbor $VN2_border2_neighbor_IP remote-as $BORDER_BGP_AS
neighbor $VN2_border2_neighbor_IP update-source $interface_Fusion2.$Fusion2_VN2_VLAN
neighbor $VN2_border2_neighbor_IP activate
exit-address-family

ip prefix-list ${VN1}_Prefix seq 5 permit $VN1_prefixes
ip prefix-list Global_Prefix seq 5 permit $Global_prefixes
ip prefix-list ${VN2}_Prefix seq 5 permit $VN2_prefixes
```

```
route-map ${VN2}_Map permit 10
match ip address prefix-list ${VN2}_Prefix
route-map Global_Map permit 10
match ip address prefix-list Global_Prefix
route-map ${VN}_Map permit 10
match ip address prefix-list ${VN1}_Prefix

vrf definition $VN1
!
address-family ipv4
import ipv4 unicast map Global_Map
export ipv4 unicast map ${VN1}_Map
exit-address-family
!
vrf definition $VN2
!
address-family ipv4
import ipv4 unicast map Global_Map
export ipv4 unicast map ${VN2}_Map
exit-address-family
!
End
```

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