

为vEdge或cEdge配置首选默认路由或前缀路由

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简介

本文档介绍如何配置软件定义的广域网(SD-WAN)控制策略以首选默认路由或前缀。

要求

Cisco 建议您了解以下主题：

- Cisco SD-WAN重叠管理协议(OMP)。
- SD-WAN集中控制策略。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- Cisco cEdge版本17.3.3
- 思科vEdge版本20.3.2
- 思科vSmart控制器版本20.4.2

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

出于本演示的目的，本实验在不同的端ID上设置5个cEdge/vEdge，其中Router01、Router02和Router03在VPN 1中配置了默认路由。

- vSmart system ip 10.1.1.7。
- Edge Router01系统ip 10.70.70.1，站点ID 70。
- Edge Router02系统ip 10.80.80.1，站点ID 80。
- Edge Router03系统ip 10.80.80.2，站点ID 80。
- Edge Router04系统ip 10.70.70.2，站点ID 40。
- vEdge Router05系统ip 10.20.20.1，站点ID 20。

Router04(10.70.70.2)和Router05(10.20.20.1)从Router01(10.70.70.1)、Router02(10.80.80.1)和Router03(10.80.80.1)接收并安装默认路由。设备没有应用活动的集中策略或本地化策略，默认情况下为全网状拓扑。

Router04和Router05从三个不同的设备接收默认路由。

```
Router04# show sdwan omp routes
```

```
Generating output, this might take time, please wait ...
```

```
Code:
```

```
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
```

VPN	PREFIX	FROM PEER	PATH	STATUS	ATTRIBUTE	TLOC IP
COLOR	ENCAP	PREFERENCE	ID LABEL		TYPE	
1	0.0.0.0/0	10.1.1.7	29 1002	C,I,R	installed	10.70.70.1
biz-internet	ipsec -	10.1.1.7	30 1005	C,I,R	installed	10.80.80.1
mpls	ipsec -	10.1.1.7	31 1003	C,I,R	installed	10.80.80.2
mpls	ipsec -					

提示：此 `show sdwan omp routes` 如果路由器收到许多路由，则cEdge的输出可能很大。您只能使用 `show sdwan omp route vpn` 要过滤输出，或者，您可以使用 `show sdwan omp route vpn` 过滤cEdge中前缀的所有扇区输出。

```
Router05# show omp routes vpn 1
```

```

Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved

```

VPN COLOR	PREFIX	ENCAP	FROM PEER	PATH		STATUS	ATTRIBUTE	TLOC IP
			PREFERENCE	ID	LABEL		TYPE	
1	0.0.0.0/0		10.1.1.7	5	1002	C,I,R	installed	10.70.70.1
biz-internet		ipsec	-					
			10.1.1.7	6	1005	C,I,R	installed	10.80.80.1
mpls		ipsec	-					
			10.1.1.7	7	1003	C,I,R	installed	10.80.80.2
mpls		ipsec	-					

提示：此 `show omp route` 如果路由器收到太多路由，vEdge的输出可能会很大。您只能使用 `show omp routes vpn` 以过滤vEdge中的输出。您只能使用 `| tab` 命令旁边的，以查看vEdge格式表中的输出。

Router04(10.70.70.2)和Router05(10.20.20.1)安装来自Router01(10.70.70.1)、Router02(10.80.80.1)和Router03(10.80.80.1)的默认路由。

```
Router04# show ip route vrf 1
```

```

Routing Table: 1
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 10.80.80.2 to network 0.0.0.0

m* 0.0.0.0/0 [251/0] via 10.80.80.2, 00:05:02, Sdwan-system-intf
    [251/0] via 10.80.80.1, 00:05:02, Sdwan-system-intf
    [251/0] via 10.70.70.1, 00:05:02, Sdwan-system-intf

```

提示：此 `show ip route vrf` 如果路由器接收到too路由，则cEdge的输出可能很大。您只能使用

show ip route vrf 要过滤输出，也可使用 show ip route vrf 过滤前缀的所有扇区输出。

```
Router05# show ip routes vpn 1 0.0.0.0/0
```

```
Codes Proto-sub-type:
```

```
IA -> ospf-intra-area, IE -> ospf-inter-area,  
E1 -> ospf-external1, E2 -> ospf-external2,  
N1 -> ospf-nssa-external1, N2 -> ospf-nssa-external2,  
e -> bgp-external, i -> bgp-internal
```

```
Codes Status flags:
```

```
F -> fib, S -> selected, I -> inactive,  
B -> blackhole, R -> recursive, L -> import
```

VPN	PREFIX	PROTOCOL	PROTOCOL	NEXTHOP	NEXTHOP	NEXTHOP	NEXTHOP	TLOC
IP	COLOR	ENCAP	STATUS	SUB TYPE	IF NAME	ADDR	VPN	
1	0.0.0.0/0	omp	-	-	-	-	-	-
10.70.70.1	biz-internet	ipsec	F,S	-	-	-	-	-
1	0.0.0.0/0	omp	-	-	-	-	-	-
10.80.80.1	mpls	ipsec	F,S	-	-	-	-	-
1	0.0.0.0/0	omp	-	-	-	-	-	-
10.80.80.2	mpls	ipsec	F,S	-	-	-	-	-

提示：此 show ip routes 如果路由器收到太多路由，vEdge的输出可能会很大。您只能使用 show ip routes vpn 以过滤vEdge中的输出。

配置

解决方案 1：集中控制策略使用，首选来自特定远程路由器Router04上Router01的默认路由

使用拓扑自定义控件并在OMP中应用默认路由的首选项。

使用路由规则代替传输位置(TLOC)规则。

匹配条件

- 匹配在带有0.0.0.0/0前缀的策略列表中预定义的Router01 System-ip 10.70.70.1的发起方选项和Prefix-list。
- ip prefix-list 0.0.0.0/0仅匹配default-route并非所有路由，因此您可以将此前缀用于前缀列表。
- ip prefix-list 0.0.0.0/0 le 32匹配所有路由。

操作

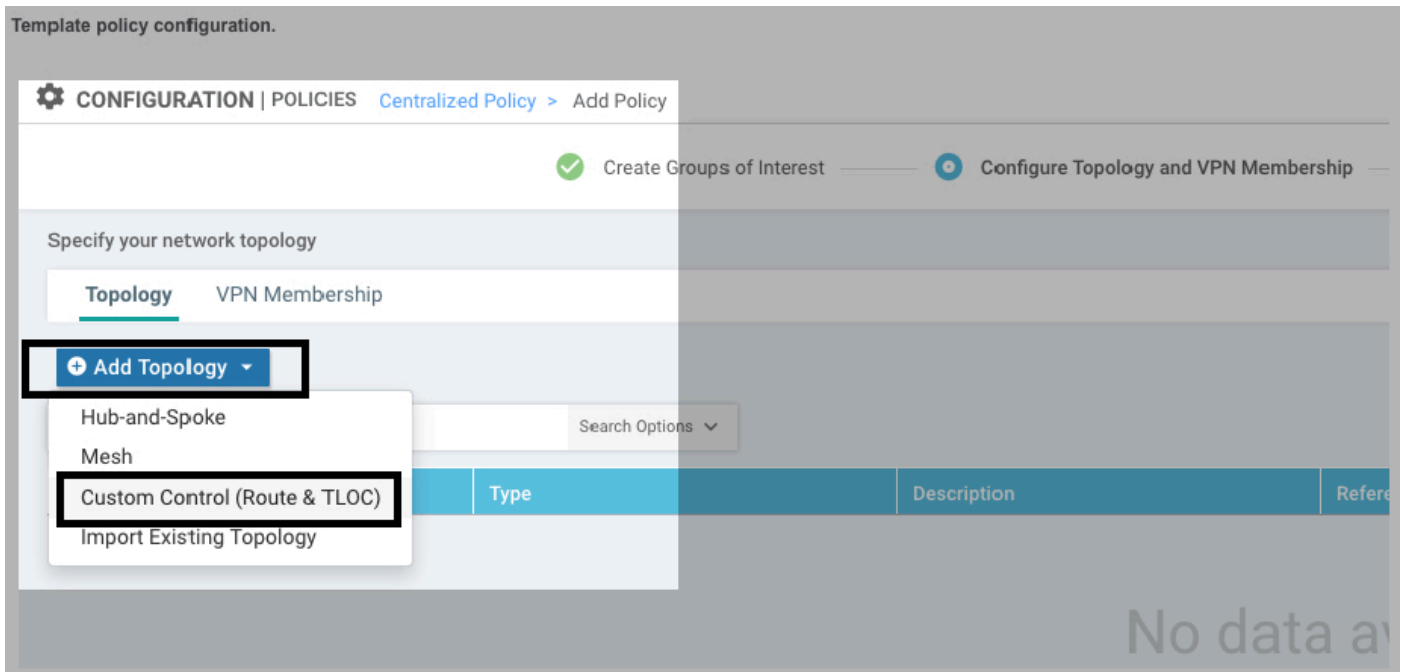
将此策略应用于出站方向到Router04站点ID 40。

模板策略配置

您可以使用vManage GUI配置 Centralized Policy 使用 Control Policy.

在中配置控制策略 **Topology** ，您可以选择 Hub-and-Spoke, Mesh,或 Custom Control 策略。

Custom Control(Route & TLOC) 用于此特定场景 ，如图所示。

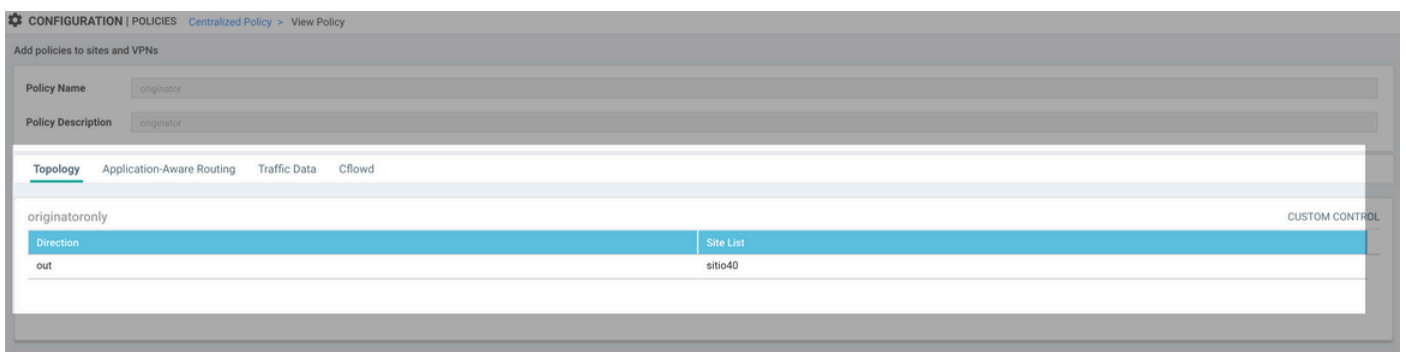


Sequence type 和 Sequence Rule ，否则没有任何作用。
Originator system-ip和前缀列表在匹配条件中设置。

Accept 和 Preference 为相同顺序的操作设置 ，如图所示。



Control Policy 应用于站点40的出站方向 ，如图所示。



警告：激活 Centralized Policy,vSmart需要附加设备模板 ，或 Centralized Policy 发送 Failed to activate policy 错误.vSmart必须处于vManage模式。

Router04# show ip route vrf 1

Routing Table: 1

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 10.70.70.1 to network 0.0.0.0

m* 0.0.0.0/0 [251/0] via 10.70.70.1, 00:13:25, Sdwan-system-intf

Router05(10.20.20.1)位于站点20，仍然接收并安装来自Router01(10.70.70.1)、Router02(10.80.80.1)和Router03(10.80.80.1)的所有默认路由。

Router05# show omp routes vpn 1

Code:
C -> chosen
I -> installed
Red -> redistribute
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved

Table with 9 columns: VPN, PREFIX, ENCAP, FROM PEER, PATH ID, LABEL, STATUS, ATTRIBUTE TYPE, TLOC IP. It lists VPN routes for 'biz-internet' and 'mpls' with their respective attributes and TLOCs.

Router05# show ip routes vpn 1

Codes Proto-sub-type:
IA -> ospf-intra-area, IE -> ospf-inter-area,
E1 -> ospf-external1, E2 -> ospf-external2,
N1 -> ospf-nssa-external1, N2 -> ospf-nssa-external2,
e -> bgp-external, i -> bgp-internal
Codes Status flags:
F -> fib, S -> selected, I -> inactive,
B -> blackhole, R -> recursive, L -> import

Table with 8 columns: VPN, PREFIX, PROTOCOL, SUB TYPE, NEXTHOP IF NAME, NEXTHOP ADDR, NEXTHOP VPN, TLOC. It provides a summary of VPN routes and their next hops.

IP	COLOR	ENCAP	STATUS
1	0.0.0.0/0	omp	- - - -
10.70.70.1	biz-internet	ipsec	F,S
1	0.0.0.0/0	omp	- - - -
10.80.80.1	mpls	ipsec	F,S
1	0.0.0.0/0	omp	- - - -
10.80.80.2	mpls	ipsec	F,S

解决方案 2：集中控制策略使用，以首选从路由器01到全网状网中所有路由器的默认路由

使用与 Solution 1 已使用，并将其应用于来自Router01站点ID 70的入站方向。

```
control-policy originatoronly
sequence 1
match route
originator 10.70.70.1
prefix-list Default_Route
!
action accept
set
preference 200
!
!
!
default-action accept
!
lists
prefix-list Default_Route
ip-prefix 0.0.0.0/0
!
site-list SiteList_70
site-id 70
!
!
!
apply-policy
site-list SiteList_70
control-policy originatoronly in <<<<<<<<<
!
!
```

验证

如果使用入站方向，则Router04(10.70.70.2)和Router05(10.20.20.1)只会从Router01(10.70.70.1)接收并安装默认路由。

```
Router04# show sdwan omp routes
Generating output, this might take time, please wait ...
Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
```

```

S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved

```

VPN	PREFIX	ENCAP	FROM PEER	PATH	LABEL	STATUS	ATTRIBUTE	TLOC IP
COLOR			PREFERENCE	ID			TYPE	
1	0.0.0.0/0	ipsec	10.1.1.7	29	1002	C,I,R	installed	10.70.70.1
biz-internet			200	<<<<<<<				

```
Router05# show omp routes vpn 1
```

```

Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved

```

VPN	PREFIX	ENCAP	FROM PEER	PATH	LABEL	STATUS	ATTRIBUTE	TLOC IP
COLOR			PREFERENCE	ID			TYPE	
1	0.0.0.0/0	ipsec	10.1.1.7	5	1002	C,I,R	installed	10.70.70.1
biz-internet			200	<<<<<<<				

两种方案的注意事项：入站或出站方向

如果丢失Router01(10.70.70.1)，路由器将安装所有没有首选项收到的默认路由。在本场景中，从Router02(10.80.80.1)和Router03(10.80.80.2):

```
Router04# show sdwan omp routes
```

```
Generating output, this might take time, please wait ...
```

```

Code:
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved

```

VPN	PREFIX	ENCAP	FROM PEER	PATH	LABEL	STATUS	ATTRIBUTE	TLOC IP
COLOR			PREFERENCE	ID			TYPE	

```

1      0.0.0.0/0      10.1.1.7      36      1005      C,I,R      installed  10.80.80.1
mpls          ipsec -
10.1.1.7      37      1003      C,I,R      installed  10.80.80.2
mpls          ipsec -

```

Router05# **show omp routes vpn 1**

Code:

```

C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved

```

VPN COLOR	PREFIX	ENCAP	FROM PEER PREFERENCE	PATH ID	LABEL	STATUS	ATTRIBUTE TYPE	TLOC IP
1	0.0.0.0/0	ipsec -	10.1.1.7	14	1005	C,I,R	installed	10.80.80.1
mpls			10.1.1.7	15	1003	C,I,R	installed	10.80.80.2

解决方案 3：集中控制策略的使用，以首选来自路由器01的默认路由和来自其他路由器的备用默认路由

在本解决方案中，路由器仅从**Router01**(10.70.70.1)接收默认路由，但如果您丢失默认路由，则希望远程路由器安装的备用默认路由来自**Router02**(10.80.80.1)，而不是像中所述同时来自**Router02**(10.80.80.1)和**Router03**(10.80.1) **Solution 1** 和 **Solution 2**。

在同一控制策略上添加一个序列，并应用您从**Router01** preference 200的default-route中设置的较低优先级，但比默认优先级(100)高。

对于从**Router02**(10.80.80.1)通告的默认路由，您可以将优先级设置为150。

```

control-policy originator
sequence 1
match route
originator 10.70.70.1
prefix-list Default_Route
!
action accept
set
preference 200
!
!
!
sequence 11 <<<<< new sequence
match route

```

```

    originator 10.80.80.1      <<<<< Router02 system ip as originator
    prefix-list Default_Route
    !
    action accept
    set
        preference 150    <<< lower preference of Router01
    !
    !
    !
    default-action accept
    !
    lists
    prefix-list Default_Route
        ip-prefix 0.0.0.0/0
    !
    site-list sitio40
        site-id 40
    !
    !
    !
    apply-policy
        site-list sitio40
        control-policy originator out
    !
    !

```

验证

路由器会收到首选项为200、150和默认首选项的默认路由。

```
Router04# show sdwa omp routes
```

Generating output, this might take time, please wait ...

Code:

```

C  -> chosen
I  -> installed
Red -> redistributed
Rej -> rejected
L  -> looped
R  -> resolved
S  -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA  -> On-demand inactive
U  -> TLOC unresolved

```

VPN	PREFIX	ENCAP	FROM PEER	PREFERENCE	PATH ID	LABEL	STATUS	ATTRIBUTE TYPE	TLOC IP
1	0.0.0.0/0		10.1.1.7	150	36	1005	R	installed	10.80.80.1
mpls		ipsec	<<<<<<<<						
			10.1.1.7	-	37	1003	R	installed	10.80.80.2
mpls		ipsec							
			10.1.1.7	200	38	1002	C,I,R	installed	10.70.70.1
biz-internet		ipsec	<<<<<<<						

Router04(10.70.70.2)仅将来自Router01(10.70.70.1)的默认路由添加到路由表中，并且具有较高的优先级：

```
Router04# show ip route vrf 1
```

```
Routing Table: 1
```

```
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 10.70.70.1 to network 0.0.0.0
```

```
m* 0.0.0.0/0 [251/0] via 10.70.70.1, 00:02:47, Sdwan-system-intf
```

如果丢失Router01(10.70.70.1),Router04(10.70.70.2)只会安装具有下一个更高优先级的路由(来自Router02(10.80.80.1))。

```
Router04# show sdwa omp routes
```

```
Generating output, this might take time, please wait ...
```

```
Code:
```

```
C -> chosen
I -> installed
Red -> redistributed
Rej -> rejected
L -> looped
R -> resolved
S -> stale
Ext -> extranet
Inv -> invalid
Stg -> staged
IA -> On-demand inactive
U -> TLOC unresolved
```

VPN	PREFIX	FROM PEER	PATH	STATUS	ATTRIBUTE	TLOC IP
COLOR	ENCAP	PREFERENCE	ID LABEL		TYPE	
1	0.0.0.0/0	10.1.1.7	36 1005	C,I,R	installed	10.80.80.1
mpls	ipsec	150 <<<<<<<	37 1003	R	installed	10.80.80.2
mpls	ipsec	-				

```
Router04# show ip route vrf 1
```

```
Routing Table: 1
```

```
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
```


C -> chosen
 I -> installed
 Red -> redistributed
 Rej -> rejected
 L -> looped
 R -> resolved
 S -> stale
 Ext -> extranet
 Inv -> invalid
 Stg -> staged
 IA -> On-demand inactive
 U -> TLOC unresolved

VPN	PREFIX	FROM PEER	PATH	STATUS	ATTRIBUTE	TLOC IP
COLOR	ENCAP	PREFERENCE	ID	LABEL	TYPE	
1	0.0.0.0/0	10.1.1.7	36	1005	C,I,R	installed 10.80.80.1
mpls	ipsec	150				
		10.1.1.7	37	1003	R	installed 10.80.80.2
mpls	ipsec	-				
1	10.40.40.0/24	10.1.1.7	13	1002	C,I,R	installed 10.70.70.1
biz-internet	ipsec	200	<<<<<<<			
		10.1.1.7	15	1005	R	installed 10.80.80.1
mpls	ipsec	-				
		10.1.1.7	16	1003	R	installed 10.80.80.2
mpls	ipsec	-				

Router04# **show ip route vrf 1**

Routing Table: 1

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 10.80.80.1 to network 0.0.0.0

```

m* 0.0.0.0/0 [251/0] via 10.80.80.1, 00:11:55, Sdwan-system-intf
    10.0.0.0/24 is subnetted, 1 subnets
m   10.40.40.0 [251/0] via 10.70.70.1, 00:02:17, Sdwan-system-intf <<<<<<
  
```

Router04#

相关信息

[vEdge路由器、思科SD-WAN的策略配置指南](#)
[技术支持和文档 - Cisco Systems](#)

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