

Entender e solucionar problemas de controle de rota em implantações de SD-WAN de firewall seguro

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Introdução

Este documento descreve o controle de roteamento no BGP para VPNs baseadas em rota usando o Cisco SD-WAN no firewall seguro.

Pré-requisitos

Requisitos

A Cisco recomenda que você tenha conhecimento destes tópicos:

- IKEv2
- VPN de rota
- Interfaces de túnel virtual (VTI)

- IPsec
- BGP
- Atributos de BGP como tags de comunidade e refletores de rota
- Recurso SD-WAN em firewall seguro

Componentes Utilizados

As informações neste documento são baseadas em:

- Cisco Secure Firewall Threat Defense 7.7.10
- Cisco Secure Firewall Management Center 7.7.10

As informações neste documento foram criadas a partir de dispositivos em um ambiente de laboratório específico. Todos os dispositivos utilizados neste documento foram iniciados com uma configuração (padrão) inicial. Se a rede estiver ativa, certifique-se de que você entenda o impacto potencial de qualquer comando.

Informações de recurso

Com a nova implantação de SD-WAN para VPN baseada em rota de site a site com BGP habilitado para a sobreposição, a Cisco se concentra nos principais atributos de BGP para implementar o roteamento de sobreposição seguro e sem loops, garantindo que as redes de sobreposição e de subposição permaneçam segregadas em toda a topologia. Essa implantação também garante que nenhuma intervenção manual seja necessária para ajustar os atributos relevantes.

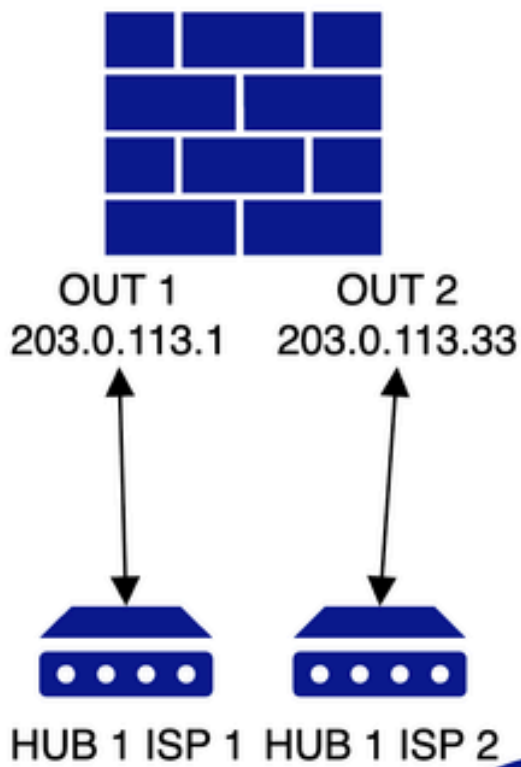
Cenário de implantação

Selecione uma topologia que inclua conexões iBGP e eBGP entre o HUB e o spoke. Essa abordagem oferece visibilidade máxima dos controles de roteamento implementados como parte da solução SD-WAN nos Cisco Secure Firewalls.

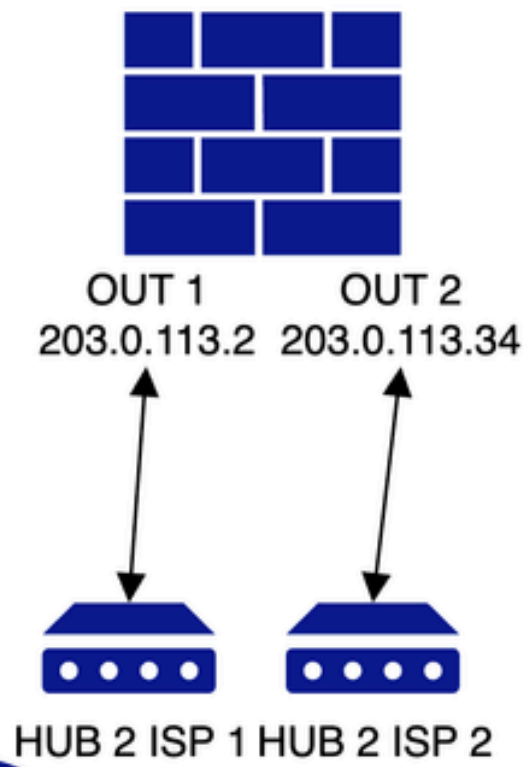
HUB duplo e spoke com ISP duplo

Topologia Subjacente

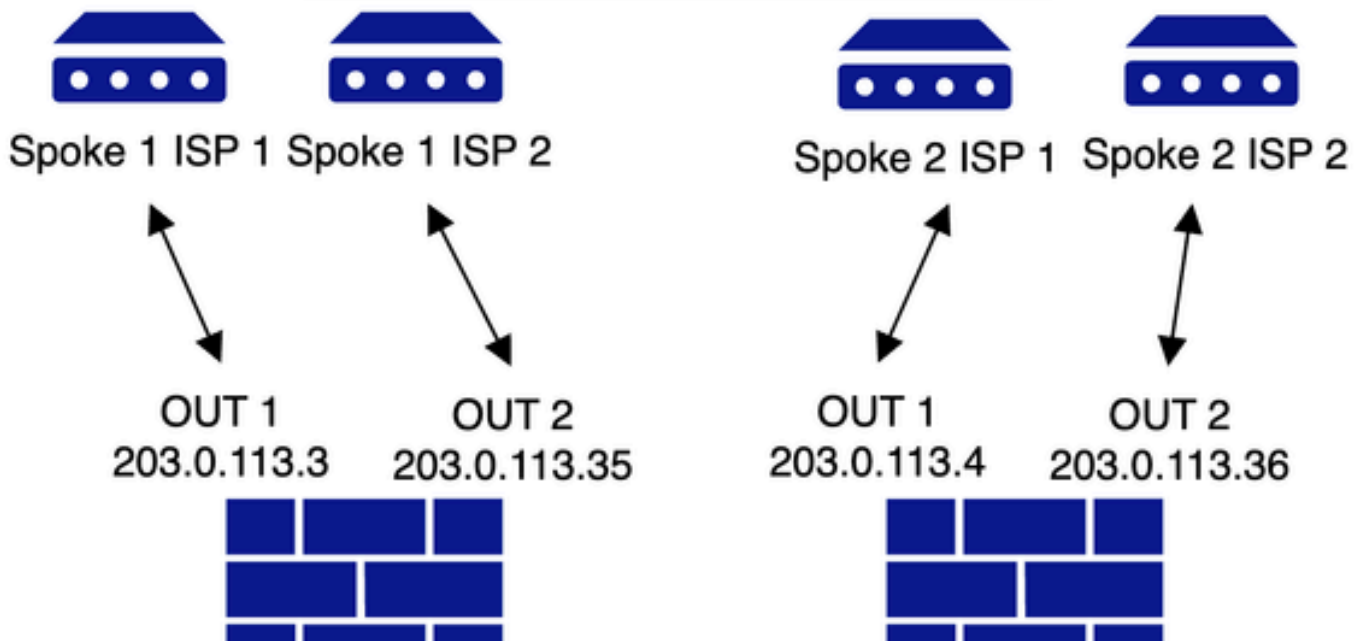
AS65500



AS65510



Internet



```
community-list standard FMC_VPN_COMMUNITY_101010 permit 101010
```

```
<<<<<<<<<<
```

```
community-list standard FMC_VPN_COMMUNITY_202020 permit 202020
```

```
<<<<<<<<<<
```

Observe que há um único par de mapas de rota de entrada e saída por topologia, embora as configurações sejam idênticas para ambas as topologias, apenas a convenção de nomenclatura é exclusiva por topologia. Em nosso cenário, FMC_VPN_RMAP_COMMUNITY_IN_858939614 e FMC_VPN_RMAP_COMMUNITY_OUT_858939614 são para a topologia 1, enquanto FMC_VPN_RMAP_COMMUNITY_IN_8589942200 e FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 são para a topologia 2.

```
<#root>
```

```
firepower# show running-config route-map
```

```
Topology 1
```

```
Inbound
```

```
route-map
```

```
FMC_VPN_RMAP_COMMUNITY_IN_858939614
```

```
    permit 10  
    match community FMC_VPN_COMMUNITY_101010 exact-match
```

```
    set community 202020
```

```
route-map
```

```
FMC_VPN_RMAP_COMMUNITY_IN_858939614
```

```
    permit 20  
    match community FMC_VPN_COMMUNITY_202020 exact-match
```

```
Outbound
```

```
route-map
```

```
FMC_VPN_RMAP_COMMUNITY_OUT_858939614
```

```
    permit 10  
    match community FMC_VPN_COMMUNITY_101010 exact-match  
    set metric 1
```

```
route-map
```

```
FMC_VPN_RMAP_COMMUNITY_OUT_858939614
```

```
    permit 20  
    match community FMC_VPN_COMMUNITY_202020 exact-match  
    set metric 100
```

```
route-map
```

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

deny 100

Topology 2

Inbound

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589942200

permit 10

match community FMC_VPN_COMMUNITY_101010 exact-match

set community 202020

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589942200

permit 20

match community FMC_VPN_COMMUNITY_202020 exact-match

Outbound

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

permit 10

match community FMC_VPN_COMMUNITY_101010 exact-match

set metric 1

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

permit 20

match community FMC_VPN_COMMUNITY_202020 exact-match

set metric 100

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

deny 100

Common Across All The Hubs & Spokes Wherever Redistribution Of Inside Network Is Present

route-map

FMC_VPN_CONNECTED_DIST_RMAP_101010

permit 10

match interface inside

set community 101010

A configuração de BGP através dos dispositivos na topologia é mostrada:

Spoke1 e 2 (IBGP com HUB1 e EBGP com HUB2)

<#root>

```
firepower# show running-config router bgp
```

```
router bgp 65500
  bgp log-neighbor-changes
  address-family ipv4 unicast
  neighbor 198.51.100.1 remote-as 65500
```

```
<<<<< tunnel from spokes to HUB 1 via ISP1
```

```
neighbor 198.51.100.1 activate
neighbor 198.51.100.1 send-community
neighbor 198.51.100.1 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589939614 in
neighbor 198.51.100.1 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 out
neighbor 198.51.100.2 remote-as 65510
```

```
<<<<< tunnel from spokes to HUB 2 via ISP1
```

```
neighbor 198.51.100.2 ebgp-multihop 2
neighbor 198.51.100.2 activate
neighbor 198.51.100.2 send-community
neighbor 198.51.100.2 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589939614 in
neighbor 198.51.100.2 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 out
neighbor 198.51.100.3 remote-as 65500
```

```
<<<<< tunnel from spokes to HUB 1 via ISP2
```

```
neighbor 198.51.100.3 activate
neighbor 198.51.100.3 send-community
neighbor 198.51.100.3 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589942200 in
neighbor 198.51.100.3 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 out
neighbor 198.51.100.4 remote-as 65510
```

```
<<<<< tunnel from spokes to HUB 2 via ISP2
```

```
neighbor 198.51.100.4 ebgp-multihop 2
neighbor 198.51.100.4 activate
neighbor 198.51.100.4 send-community
neighbor 198.51.100.4 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589942200 in
neighbor 198.51.100.4 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 out
redistribute connected route-map FMC_VPN_CONNECTED_DIST_RMAP_101010
```

```
<<<<<<< route-map to redistribute inside network into BGP
```

```
maximum-paths 8
maximum-paths ibgp 8
no auto-summary
no synchronization
exit-address-family
```

HUB1 (Correspondência IBGP com os Spokes)

```
<#root>
```

```
firepower# show running-config router bgp
```

```
router bgp 65500
bgp log-neighbor-changes
address-family ipv4 unicast
neighbor 198.51.100.10 remote-as 65500
```

<<<< tunnel from HUB 1 to Spoke 1 via ISP 1

```
neighbor 198.51.100.10 activate
neighbor 198.51.100.10 send-community
neighbor 198.51.100.10 route-reflector-client
neighbor 198.51.100.10 next-hop-self
neighbor 198.51.100.10 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589939614 in
neighbor 198.51.100.10 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 out
neighbor 198.51.100.11 remote-as 65500
```

<<<< tunnel from HUB 1 to Spoke 2 via ISP 1

```
neighbor 198.51.100.11 activate
neighbor 198.51.100.11 send-community
neighbor 198.51.100.11 route-reflector-client
neighbor 198.51.100.11 next-hop-self
neighbor 198.51.100.11 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589939614 in
neighbor 198.51.100.11 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 out
neighbor 198.51.100.70 remote-as 65500
```

<<<< tunnel from HUB 1 to Spoke 1 via ISP 2

```
neighbor 198.51.100.70 activate
neighbor 198.51.100.70 send-community
neighbor 198.51.100.70 route-reflector-client
neighbor 198.51.100.70 next-hop-self
neighbor 198.51.100.70 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589942200 in
neighbor 198.51.100.70 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 out
neighbor 198.51.100.71 remote-as 65500
```

<<<< tunnel from HUB 1 to Spoke 2 via ISP 2

```
neighbor 198.51.100.71 activate
neighbor 198.51.100.71 send-community
neighbor 198.51.100.71 route-reflector-client
neighbor 198.51.100.71 next-hop-self
neighbor 198.51.100.71 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589942200 in
neighbor 198.51.100.71 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 out
no auto-summary
no synchronization
exit-address-family
```

HUB2 (Correspondência EBGp com os Spokes)

<#root>

firepower# show running-config router bgp

```
router bgp 65510
```

```
bgp log-neighbor-changes
address-family ipv4 unicast
neighbor 198.51.100.40 remote-as 65500
```

<<<< tunnel from HUB 2 to Spoke 1 via ISP 1

```
neighbor 198.51.100.40 ebgp-multihop 2
neighbor 198.51.100.40 activate
neighbor 198.51.100.40 send-community
neighbor 198.51.100.40 next-hop-self
neighbor 198.51.100.40 as-override
neighbor 198.51.100.40 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589939614 in
neighbor 198.51.100.40 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 out
neighbor 198.51.100.41 remote-as 65500
```

<<<< tunnel from HUB 2 to Spoke 2 via ISP 1

```
neighbor 198.51.100.41 ebgp-multihop 2
neighbor 198.51.100.41 activate
neighbor 198.51.100.41 send-community
neighbor 198.51.100.41 next-hop-self
neighbor 198.51.100.41 as-override
neighbor 198.51.100.41 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589939614 in
neighbor 198.51.100.41 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 out
neighbor 198.51.100.100 remote-as 65500
```

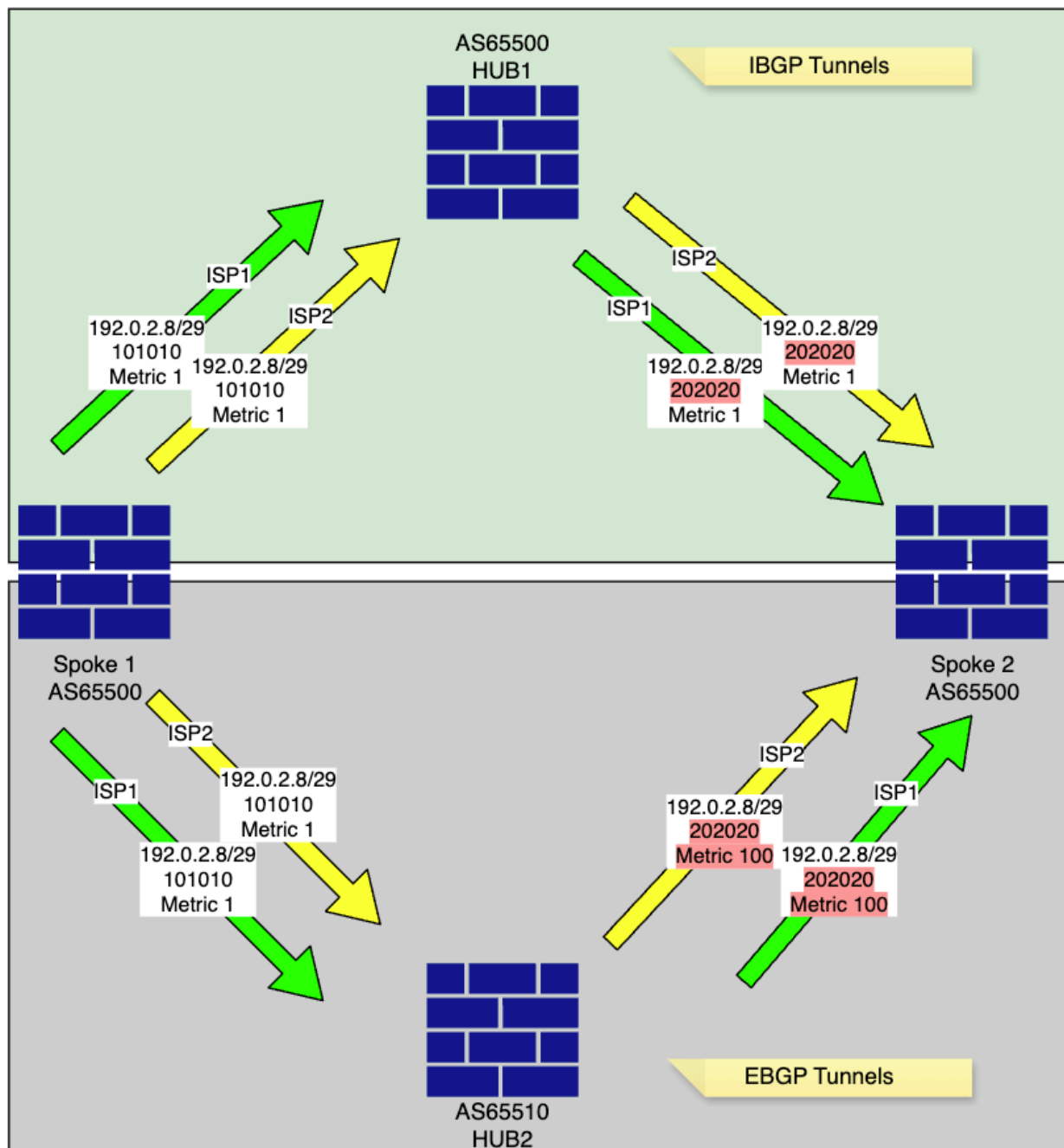
<<<< tunnel from HUB 2 to Spoke 1 via ISP 2

```
neighbor 198.51.100.100 ebgp-multihop 2
neighbor 198.51.100.100 activate
neighbor 198.51.100.100 send-community
neighbor 198.51.100.100 next-hop-self
neighbor 198.51.100.100 as-override
neighbor 198.51.100.100 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589942200 in
neighbor 198.51.100.100 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 out
neighbor 198.51.100.101 remote-as 65500
```

<<<< tunnel from HUB 2 to Spoke 2 via ISP 2

```
neighbor 198.51.100.101 ebgp-multihop 2
neighbor 198.51.100.101 activate
neighbor 198.51.100.101 send-community
neighbor 198.51.100.101 next-hop-self
neighbor 198.51.100.101 as-override
neighbor 198.51.100.101 route-map FMC_VPN_RMAP_COMMUNITY_IN_8589942200 in
neighbor 198.51.100.101 route-map FMC_VPN_RMAP_COMMUNITY_OUT_8589942200 out
no auto-summary
no synchronization
exit-address-family
```

Topologia de roteamento



- O spoke anuncia sua rede interna, [192.0.2.8/29](#), no BGP com uma marca de comunidade específica de 101010, conforme configurado no mapa de rota FMC_VPN_CONNECTED_DIST_RMAP_101010.

Spoke1

<#root>

Spoke1# show bgp community 101010 exact-match <<<< to verify the exact network redistributed into BGP

BGP table version is 4, local router ID is 203.0.113.35
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale, m multipath

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

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 192.0.2.8/29	0.0.0.0	0		32768	?

<<<<<<<<< local inside network

- O spoke modifica o valor da métrica para sua rede interna, [192.0.2.8/29](#), e o anuncia aos hubs, conforme configurado nos mapas de rota FMC_VPN_RMAP_COMMUNITY_OUT_8589939614 e FMC_VPN_RMAP_COMMUNITY_OUT_858994200.

<#root>

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

```
permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match
set metric 1
```

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

```
permit 20
match community FMC_VPN_COMMUNITY_202020 exact-match
set metric 100
```

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

```
deny 100
```

- O HUB1 aprende a rede Spoke 1 [192.0.2.8/29](#) com a marca de comunidade 101010 e altera a marca de comunidade para 202020, preservando a métrica antes de encaminhá-la para outros spokes, conforme definido nos mapas de rota configurados.

HUB1

<#root>

Route-Map for ISP1 DVTI

Inbound

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589939614

```
permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match
set community 202020
```

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589939614

permit 20
match community FMC_VPN_COMMUNITY_202020 exact-match

Outbound

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match
set metric 1
set ip next-hop 198.51.100.1

<<<<<<<< only next-hop is changed in ISP2 tunnel route-map with ISP2 DVTI IP

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

permit 20
match community FMC_VPN_COMMUNITY_202020 exact-match
set metric 100
set ip next-hop 198.51.100.1

<<<<<<<< only next-hop is changed in ISP2 tunnel route-map with ISP2 DVTI IP

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

deny 100

Route-Map for ISP2 DVTI

Inbound

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589942200

permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match
set community 202020

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589942200

permit 20
match community FMC_VPN_COMMUNITY_202020 exact-match

Outbound

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match

```
set metric 1
set ip next-hop 198.51.100.3
```

<<<<<<<< only next-hop is changed in ISP2 tunnel route-map with ISP2 DVTI IP

```
route-map
FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

  permit 20
  match community FMC_VPN_COMMUNITY_202020 exact-match
  set metric 100
  set ip next-hop 198.51.100.3
```

<<<<<<<< only next-hop is changed in ISP2 tunnel route-map with ISP2 DVTI IP

```
route-map
FMC_VPN_RMAP_COMMUNITY_OUT_8589942200

  deny 100
```

<#root>

HUB1# show bgp community 202020 exact-match <<<< this will confirm if received prefixes have community t

BGP table version is 5, local router ID is 198.51.100.3
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale, m multipath
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
* i192.0.2.8/29	198.51.100.70	1	100	0	?
*>i	198.51.100.10	1	100	0	?
* i192.0.2.16/29	198.51.100.71	1	100	0	?
*>i	198.51.100.11	1	100	0	?

<#root>

HUB1# show bgp 192.0.2.8 <<<< this will display available paths in BGP for the network

BGP routing table entry for 192.0.2.8/29, version 4
Paths: (2 available, best #2, table default)
 Advertised to update-groups:
 1 2
 Local, (Received from a RR-client)
 198.51.100.70 from 198.51.100.70 (203.0.113.35)

<<<<< spoke 1 ISP 2 tunnel to HUB 1

Origin incomplete, metric 1, localpref 100, valid, internal
Community: 202020

Local, (Received from a RR-client)
198.51.100.10 from 198.51.100.10 (203.0.113.35)

<<<< spoke 1 ISP 1 tunnel to HUB 1

Origin incomplete, metric 1, localpref 100, valid, internal, best
Community: 202020

<<<< community updated as per the route-map configured on spoke side

<#root>

HUB1# show route 192.0.2.8

Routing entry for 192.0.2.8 255.255.255.248
Known via "bgp 65500", distance 200, metric 1, type internal
Last update from 198.51.100.10 0:09:18 ago
Routing Descriptor Blocks:

* 198.51.100.10, from 198.51.100.10, 0:09:18 ago

Route metric is 1, traffic share count is 1
AS Hops 0
MPLS label: no label string provided

<#root>

HUB1# show bgp ipv4 unicast neighbors 198.51.100.10 routes <<<<< to check specific prefixes learnt via

BGP table version is 5, local router ID is 198.51.100.3
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*>i192.0.2.8/29	198.51.100.10	1	100	0	?

<<< preferred route

Total number of prefixes 1

<#root>

HUB1# show bgp ipv4 unicast neighbors 198.51.100.70 routes <<<<< to check specific prefixes learnt via

BGP table version is 5, local router ID is 198.51.100.3
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
* i192.0.2.8/29	198.51.100.70	1	100	0	?

Total number of prefixes 1

- O HUB2 também aprende a rede Spoke 1 [192.0.2.8/29](#) com a marca de comunidade 101010 e altera a marca de comunidade para 202020 e atualizar a métrica para 100 antes de encaminhá-la para outros spokes, conforme especificado nos mapas de rota configurados. Essa alteração de métrica entra em vigor devido ao peering eBGP. Isso ocorre porque o MED (Multi-Exit Discriminator) é um atributo BGP opcional, não transitivo usado para influenciar o tráfego de entrada, sugerindo um ponto de entrada preferido em um AS. O MED geralmente não é propagado entre peers iBGP dentro do mesmo AS e, em vez disso, anunciado para peers BGP externos (eBGP) em sistemas autônomos diferentes.

HUB2

<#root>

HUB2# show bgp community 202020 exact-match <<<< this will confirm if received prefixes have community

BGP table version is 5, local router ID is 198.51.100.4
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
 r RIB-failure, S Stale, m multipath
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.8/29	198.51.100.1				

100

0 65500 ?

<<<<< advertised back by spoke 2 ISP1 to HUB2 previously learnt via HUB1 iBGP

* 198.51.100.1

100

0 65500 ?

<<<<< advertised back by spoke 2 ISP2 to HUB2 previously learnt via HUB1 iBGP

* 198.51.100.100 1 0 65500 ?

<<<<< advertised by spoke 2 ISP tunnel

*> 198.51.100.40 1 0 65500 ?

<<<<< advertised and preferred by spoke 1 ISP 1 tunnel

* 192.0.2.16/29	198.51.100.1	100	0	65500 ?
* 198.51.100.1	198.51.100.1	100	0	65500 ?
* 198.51.100.101	198.51.100.101	1	0	65500 ?
*> 198.51.100.41	198.51.100.41	1	0	65500 ?

<#root>

HUB2# show bgp 192.0.2.8 <<<< this will display available paths in BGP for the network

BGP routing table entry for 192.0.2.8/29, version 4

Paths: (4 available, best #4, table default)

Advertised to update-groups:

1 2

65500

198.51.100.1 (inaccessible) from 198.51.100.41 (203.0.113.36)

<<<<< advertised back by spoke 2 ISP1 to HUB2 previously learnt via HUB1 iBGP

Origin incomplete, metric 100, localpref 100, valid, external

Community:

202020

65500

198.51.100.1 (inaccessible) from 198.51.100.101 (203.0.113.36)

<<<<< advertised back by spoke 2 ISP2 to HUB2 previously learnt via HUB1 iBGP

Origin incomplete, metric 100, localpref 100, valid, external

Community:

202020

65500

198.51.100.100 from 198.51.100.100 (203.0.113.35)

<<<<< advertised by spoke 1 ISP 2 tunnel

Origin incomplete, metric 1, localpref 100, valid, external

Community:

202020

65500

198.51.100.40 from 198.51.100.40 (203.0.113.35)

<<<<< advertised and preferred by spoke 1 ISP 1 tunnel

Origin incomplete, metric 1, localpref 100, valid, external, best

Community:

202020

<#root>

HUB2# show bgp ipv4 unicast neighbors 198.51.100.40 routes <<<<< to check specific prefixes learnt via

BGP table version is 5, local router ID is 198.51.100.4

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,

r RIB-failure, S Stale, m multipath

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

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 192.0.2.8/29	198.51.100.40	1		0	65500 ?

<<<< preferred

* 192.0.2.16/29	198.51.100.1	100		0	65500 ?
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Total number of prefixes 2

<#root>

HUB2# show bgp ipv4 unicast neighbors 198.51.100.41 routes <<<<< to check specific prefixes learnt via

BGP table version is 5, local router ID is 198.51.100.4

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath

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

Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.8/29	198.51.100.1	100		0	65500 ?

<<<<<

*> 192.0.2.16/29	198.51.100.41	1		0	65500 ?
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Total number of prefixes 2

<#root>

HUB2# show bgp ipv4 unicast neighbors 198.51.100.100 routes <<<<< to check specific prefixes learnt via

BGP table version is 5, local router ID is 198.51.100.4

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath

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

Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.8/29	198.51.100.100	1		0	65500 ?

<<<<<

* 192.0.2.16/29	198.51.100.1	100		0	65500 ?
-----------------	--------------	-----	--	---	---------

Total number of prefixes 2

<#root>

HUB2# show bgp ipv4 unicast neighbors 198.51.100.101 routes <<<<< to check specific prefixes learnt via

BGP table version is 5, local router ID is 198.51.100.4

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath

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

Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.8/29	198.51.100.1	100		0	65500 ?

<<<<<

* 192.0.2.16/29	198.51.100.101	1		0	65500 ?
-----------------	----------------	---	--	---	---------

Total number of prefixes 2

- Spoke 2 recebe a rede Spoke 1 [192.0.2.8/29](#) dos túneis ISP1 e ISP2 HUB1 com métrica 1, enquanto recebe a mesma rede dos túneis ISP1 HUB2 e ISP2 HUB2 com um próximo salto atualizado de HUB1.

Spoke 2

<#root>

Spoke2# show bgp community 202020 exact-match <<<< this will confirm if received prefixes have community

BGP table version is 8, local router ID is 203.0.113.36

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath

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

Network	Next Hop	Metric	LocPrf	Weight	Path
*mi192.0.2.8/29	198.51.100.3	1	100	0	?
*					

>

i	198.51.100.1	1	100	0	?
---	--------------	---	-----	---	---

<<<< HUB1 ISP1 route preferred

*	198.51.100.2	100		0	65510	65510	?
*	198.51.100.4	100		0	65510	65510	?
* 192.0.2.16/29	198.51.100.4	100		0	65510	65510	?
*	198.51.100.2	100		0	65510	65510	?

<#root>

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589939614

permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match

set community 202020

route-map

FMC_VPN_RMAP_COMMUNITY_IN_8589956263

permit 20
match community FMC_VPN_COMMUNITY_202020 exact-match

- O spoke 2 também anuncia redes aprendidas do HUB1 de volta para o HUB2, conforme

definido pelo mapa de rota de saída configurado, com a métrica atualizada.

<#root>

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

permit 10
match community FMC_VPN_COMMUNITY_101010 exact-match
set metric 1

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

permit 20
match community FMC_VPN_COMMUNITY_202020 exact-match
set metric 100

<<<<<

route-map

FMC_VPN_RMAP_COMMUNITY_OUT_8589939614

deny 100

<#root>

Spoke2# show bgp ipv4 unicast neighbors 198.51.100.2 advertised-routes <<<<< to check specific prefixes

BGP table version is 8, local router ID is 203.0.113.36
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*>i192.0.2.8/29	198.51.100.1	1	100	0	?

<<<<<<<

*> 192.0.2.16/29	0.0.0.0	0		32768	?
------------------	---------	---	--	-------	---

Total number of prefixes 2

<#root>

Spoke2# show bgp ipv4 unicast neighbors 198.51.100.4 advertised-routes <<<<< to check specific prefixes

BGP table version is 8, local router ID is 203.0.113.36
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
---------	----------	--------	--------	--------	------

```
*>i192.0.2.8/29      198.51.100.1      1      100      0  ?
```

```
<<<<<<<
```

```
*> 192.0.2.16/29    0.0.0.0            0            32768  ?
```

```
Total number of prefixes 2
```

Conclusão

A finalidade deste documento é fornecer um passo a passo da implantação de roteamento de back-end, com foco nos controles de roteamento implementados dentro do BGP para garantir tanto a contingência quanto a redundância.

Em resumo, o spoke 2, assim como qualquer outro spokes na topologia, usa a mesma abordagem ao anunciar suas redes no domínio BGP. O controle de roteamento mais importante nesse cenário é a filtragem de lista de comunidade, que garante que somente as redes dentro dessa topologia sejam anunciadas a outros peers, evitando a propagação de rede não intencional.

Além disso, o atributo [MED Multi-exit Discriminator](#) é usado para influenciar a seleção de rotas para peers eBGP, garantindo que as rotas aprendidas através do peer iBGP configurado como o HUB primário tenham preferência sobre os prefixos aprendidos do HUB secundário através do eBGP.

Ao fazer ajustes de topologia, como configurar o iBGP para o HUB secundário, você pode eliminar a necessidade de manipulação MED e mapas de rota de entrada que invertam as tags de comunidade antes de anunciar a mesma rede para outros spokes.

Informações Relacionadas

- Para obter assistência adicional, entre em contato com o TAC. É necessário um contrato de suporte válido: [Cisco Worldwide Support Contacts](#).
- Você também pode visitar a [Cisco VPN Community](#) para obter informações adicionais e discussões sobre tendências.

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