在Cisco GSR上通過POS、SRP和ATM配置VPN MPLS

目錄

簡介

本檔案將提供在Cisco 12000 Gigabit交換器路由器(GSR)上使用ATM的多重協定標籤交換(MPLS)虛擬私人網路(VPN)、使用SONET/SDH的封包(POS)和空間重複使用通訊協定(SRP)的組態範例。

本檔案會使用這些縮寫。

- CE — 客戶邊緣路由器
- PE -提供商邊緣路由器
- P -提供商核心路由器
- VRF -虛擬路由和轉送

必要條件

需求

在嘗試此設定之前，請確保符合以下要求：

- 有關MPLS和MPLS VPN功能的基本知識。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- P和PE路由器所有路由器上的Cisco IOS®軟體版本12.0(28)SCisco GSR 12000系列路由器
- CE路由器所有路由器上的Cisco IOS軟體版本12.0(28)SCisco 7200VXR路由器

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

相關產品

此配置還可以用於提供程式(P)核心支援的以下路由器平台：

- Cisco 7200
- Cisco 7500
- Cisco 7600
- Cisco 8500
- Cisco 10000
- Cisco 10700
- Cisco 12000

此配置還可以用於提供商邊緣(PE)支援的以下路由器平台：

- Cisco 3600
- Cisco 3700
- Cisco 7200
- Cisco 7500
- Cisco 7600
- Cisco 8500
- Cisco 10000
- Cisco 10700
- Cisco 12000

註：Cisco 3700/3600路由器不支援POS和SRP模組。3600以下的任何平台都不支援MPLS配置。

慣例

如需文件慣例的詳細資訊，請參閱思科技術提示慣例。

背景資訊

MPLS可用於支援多個物理介面。這些介面包括ATM、POS和SRP。由於這些介面支援高頻寬，它們通常用於主干連線。MPLS VPN功能允許服務提供商互連多個站點，而無需在客戶方使用ATM、POS或SRP。

通過ATM實現MPLS有兩種。一是虛擬路徑識別符號(VPI)和虛擬通道識別符號(VCI)用作標籤，也稱為「基於信元的」MPLS over ATM。RFC 3035 中記錄了此實施。第二種ATM實施是使用MPLS「填充標頭」，也稱為基於ATM的分組的MPLS。此填充程式報頭插入第2層和第3層報頭之間。填充程式標頭的格式記錄在RFC 3032 中。此組態範例基於ATM介面的「填充碼標頭」實作。

使用同步光纖網路/同步數位階層(SONET/SDH)的封包是一種將IP層直接放在SONET層上的技術。它消除了通過SONET運行IP over ATM所需的開銷。POS支援多種封裝格式。它們是PPP、

HDLC和幀中繼。填充碼報頭用於提供MPLS支援。此示例配置在Cisco POS介面上使用預設HDLC封裝。

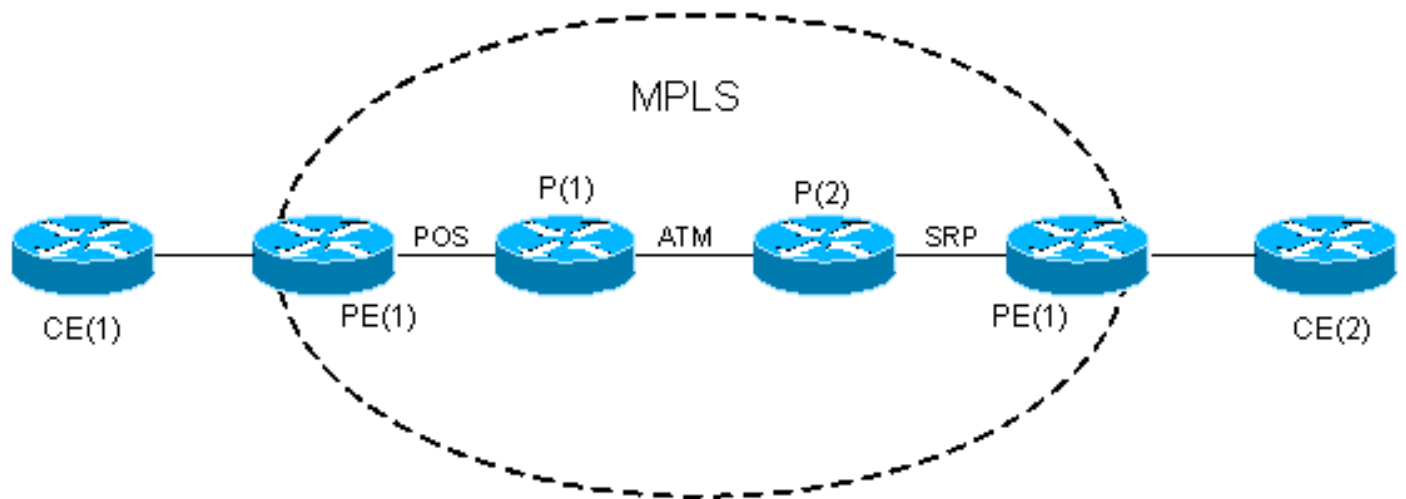空間重複使用協定(SRP)是一種第2層技術，可在第2層提供恢復能力。它還在SONET/SDH上運行。MPLS支援由填充碼報頭實現提供。

設定

本節提供用於設定本文件中所述功能的資訊。

注意：要查詢有關本文檔中使用的命令的其他資訊，請使用命令查詢工具(僅限註冊客戶)。

網路圖表

本檔案會使用以下網路設定：

組態

以下列出在範例設定上的一些注意事項：

- MPLS VPN示例配置服務EIGRP從CE路由。思科漏洞ID CSCds09932(僅供註冊客戶使用)已引入對使用Cisco IOS軟體版本12.0(22)S的MPLS VPN的EIGRP支援。已從Cisco IOS軟體版本12.2(15)T開始，此版本已透過思科錯誤ID CSCdx26186(僅限註冊客戶)移植到Cisco IOS軟體版本12.2T。不支援將同一VRF應用到多個EIGRP例項，因此可能會使路由器崩潰。此問題的檢查後來與Cisco錯誤ID CSCdz40426(僅限註冊客戶)整合。 請參閱提供商邊緣和客戶邊緣之間用於EIGRP的MPLS VPN支援，瞭解有關適用於EIGRP的MPLS VPN支援的詳細資訊。
- 兩台CE路由器上的EIGRP自治系統相同。兩台PE路由器上的BGP自治系統相同。
- MPLS骨幹基於POS、ATM和SRP介面，並配置了開放最短路徑優先(OSPF)和MP-BGP。PE和CE之間的連線是快速乙太網。

本檔案會使用以下設定：

- CE(1)
- PE(1)
- P(1)
- P(2)
- PE(2)

CE(1)

```
!
version 12.0
!

ip cef
```

!--- CEF is not required on the CE because there is no MPLS configuration. !--- CEF is the fastest switching algorithm on Cisco routers !--- and it is best to leave it enabled. ! ! interface Loopback0 ip address 11.1.1.1 255.255.255.0 ! interface Loopback1 ip address 11.2.1.1 255.255.255.0 ! interface Loopback2 ip address 11.3.1.1 255.255.255.0 ! interface FastEthernet2/0 ip address 192.168.2.2 255.255.255.252 ! router eigrp 100 network 11.0.0.0 network 192.168.2.0 no auto-summary ! ip classless

PE(1)

```
!
version 12.0
!
```

!--- CEF is enabled by default on GSR. . ! **ip vrf Customer_A**
 rd 100:1
 route-target export 100:1
 route-target import 100:1

!--- Enables the VPN routing and forwarding (VRF) routing table. ! interface Loopback0 ip address 1.1.1.1 255.255.255.255 ! interface FastEthernet0/0 **ip vrf forwarding Customer_A**

!--- Associates a VRF instance with an interface or subinterface. ip address 192.168.2.1 255.255.255.252 ! interface POS4/0 ip address 10.0.0.1 255.255.255.252 **tag-switching ip**

*!--- Enables dynamic Label Switching of IPv4 packets on an interface. !--- At minimum, this is all you need to configure MPLS over POS. !--- Note the default encapsulation of POS interfaces is HDLC. !--- An **mpls ip***
command can also be used instead of **tag-switching ip**.

```
 crc 32
 clock source internal
!
!
router eigrp 1
!
address-family ipv4 vrf Customer_A
 redistribute bgp 100 metric 10000 1 255 1 1500
 network 192.168.2.0
 no auto-summary
 autonomous-system 100
```

```
!--- The autonomous-system 100 must match the AS used on
the CE. !--- The bgp must be redistributed with metric.
The default-metric !--- command can also be used.



 exit-address-family
!
router ospf 1
 log-adjacency-changes
 network 1.1.1.1 0.0.0.0 area 0
 network 10.0.0.1 0.0.0.0 area 0
!
router bgp 100
 bgp log-neighbor-changes
 neighbor 4.4.4.4 remote-as 100
 neighbor 4.4.4.4 update-source Loopback0
!
address-family vpnv4
 neighbor 4.4.4.4 activate
 neighbor 4.4.4.4 send-community both
 exit-address-family
!
address-family ipv4 vrf Customer_A
 redistribute eigrp 100

!--- The EIGRP AS 100 must be redistributed to the BGP
vrf instance. no auto-summary no synchronization exit-
address-family ! ip classless
```

P(1)

```
!
version 12.0
!
!
interface Loopback0
 ip address 2.2.2.2 255.255.255.255
!
interface POS2/0
 ip address 10.0.0.2 255.255.255.252
 tag-switching ip

!--- This enables MPLS over POS. crc 32 ! ! interface
ATM6/0 no ip address ! interface ATM6/0.100 point-to-
point ip address 10.1.1.1 255.255.255.252 tag-switching
ip
 pvc 0/100
  !

!--- This enables "packet-based" MPLS over ATM. ! router
ospf 1 log-adjacency-changes network 2.2.2.2 0.0.0.0
area 0 network 10.0.0.2 0.0.0.0 area 0 network 10.1.1.1
0.0.0.0 area 0 ! ip classless
```

P(2)

```
!
version 12.0
!
!
interface Loopback0
```

```
 ip address 3.3.3.3 255.255.255.255
!
interface ATM4/0
 no ip address
!
interface ATM4/0.100 point-to-point
 ip address 10.1.1.2 255.255.255.252
 tag-switching ip
 pvc 0/100


!--- This enables "packet-based" MPLS over ATM. ! !
interface SRP5/0 ip address 10.2.2.1 255.255.255.252 no
ip directed-broadcast tag-switching ip

!--- This enables MPLS over SRP. ! router ospf 1 log-
adjacency-changes network 3.3.3.3 0.0.0.0 area 0 network
10.1.1.2 0.0.0.0 area 0 network 10.2.2.1 0.0.0.0 area 0
! ip classless
```

PE(2)

```
!
version 12.0
!
!
ip vrf Customer_A
 rd 100:1
 route-target export 100:1
 route-target import 100:1
!
!
interface Loopback0
 ip address 4.4.4.4 255.255.255.255
!
interface SRP4/0
 ip address 10.2.2.2 255.255.255.252
 tag-switching ip

!--- This enables MPLS over SRP. ! interface
FastEthernet6/0 ip vrf forwarding Customer_A

!--- Associates a VRF instance with an interface or
subinterface. ip address 192.168.1.1 255.255.255.252 ! !
router eigrp 1 ! address-family ipv4 vrf Customer_A
redistribute bgp 100 metric 10000 1 255 1 1500
 network 192.168.1.0
 no auto-summary
 autonomous-system 100
 exit-address-family

!--- The autonomous-system 100 must match the AS used on
the CE. !--- The bgp must be redistributed with metric.
The default-metric !--- command can also be used.



!
router ospf 1
 log-adjacency-changes
 network 4.4.4.4 0.0.0.0 area 0
 network 10.2.2.2 0.0.0.0 area 0
!
router bgp 100
 bgp log-neighbor-changes
```

```
 neighbor 1.1.1.1 remote-as 100
 neighbor 1.1.1.1 update-source Loopback0
!
address-family vpnv4
 neighbor 1.1.1.1 activate
 neighbor 1.1.1.1 send-community both
 exit-address-family
!
address-family ipv4 vrf Customer_A
 redistribute eigrp 100

!--- The EIGRP AS 100 must be redistributed to the BGP
vrf instance. no auto-summary no synchronization exit-
address-family ! ip classless
```

CE(2)

```
!
version 12.0
!

ip cef

!--- CEF is not required on the CE because there is no
MPLS configuration. !--- CEF is the fastest switching
algorithm on Cisco routers so it is !--- best to leave
it enabled. ! ! interface Loopback0 ip address 22.1.1.1
255.255.255.0 ! interface Loopback1 ip address 22.2.1.1
255.255.255.0 ! interface Loopback2 ip address 22.3.1.1
255.255.255.0 ! interface FastEthernet2/0 ip address
192.168.1.2 255.255.255.252 ! ! router eigrp 100 network
22.0.0.0 network 192.168.1.0 no auto-summary !
```

驗證

本節提供的資訊可用於確認您的組態是否正常運作。

輸出直譯器工具(僅供註冊客戶使用)支援某些show命令，此工具可讓您檢視show命令輸出的分析。

- show ip vrf — 驗證是否存在正確的VRF。
- show ip route vrf Customer_A — 檢驗PE路由器上的路由資訊。
- ping vrf Customer_A <ip address> — 通過傳送ICMP資料包驗證連線。
- traceroute vrf Customer_A <ip address> — 檢驗PE路由器上的路由資訊。
- show ip eigrp vrf Customer_A neighbors — 驗證VRF例項中的EIGRP鄰居。
- show ip eigrp vrf Customer_A topology — 驗證VRF例項中的EIGRP拓撲。
- show ip bgp vpnv4 vrf Customer_A — 驗證VRF例項中的BGP表。
- show ip cef vrf Customer_A <ip address> detail — 驗證VRF例項中的CEF表。
- show tag-switching forwarding-table — 驗證是否存在目標字首的路由/標籤。
- show ip route — 驗證CE是否交換路由。

PE(1)

```
PE(1)#show ip vrf
  Name                          Default RD          Interfaces
  Customer_A                    100:1               FastEthernet0/0
```

```
PE(1)#show ip route vrf Customer_A

Routing Table: Customer_A
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       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
       o - ODR


Gateway of last resort is not set


     22.0.0.0/24 is subnetted, 3 subnets
B       22.3.1.0 [200/156160] via 4.4.4.4, 01:12:28
B       22.2.1.0 [200/156160] via 4.4.4.4, 01:12:28
B       22.1.1.0 [200/156160] via 4.4.4.4, 01:12:28
     11.0.0.0/24 is subnetted, 3 subnets
D       11.2.1.0 [90/156160] via 192.168.2.2, 01:12:50, FastEthernet0/0
D       11.3.1.0 [90/156160] via 192.168.2.2, 01:12:50, FastEthernet0/0
D       11.1.1.0 [90/156160] via 192.168.2.2, 01:12:50, FastEthernet0/0
     192.168.1.0/30 is subnetted, 1 subnets
B       192.168.1.0 [200/0] via 4.4.4.4, 01:16:14
     192.168.2.0/30 is subnetted, 1 subnets
C       192.168.2.0 is directly connected, FastEthernet0/0

PE(1)#ping vrf Customer_A 192.168.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
D-GSR-12012-2A#ping vrf Customer_A ip ?
  WORD  Ping destination address or hostname
  <cr>

PE(1)#ping vrf Customer_A ip
Target IP address: 192.168.1.2
Repeat count [5]: 100
Datagram size [100]: 1500
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 100, 1500-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (100/100), round-trip min/avg/max = 1/2/4 ms

PE(1)#traceroute vrf Customer_A 192.168.1.2

Type escape sequence to abort.
Tracing the route to 192.168.1.2

  1 10.0.0.2 [MPLS: Labels 18/28 Exp 0] 0 msec 0 msec 0 msec
  2 10.1.1.2 [MPLS: Labels 19/28 Exp 0] 0 msec 0 msec 0 msec
  3 192.168.1.1 4 msec 0 msec 0 msec
  4 192.168.1.2 4 msec 0 msec *

PE(1)#show ip eigrp vrf Customer_A neighbors
IP-EIGRP neighbors for process 100
H   Address                 Interface        Hold Uptime    SRTT   RTO  Q  Seq Type
                                             (sec)          (ms)       Cnt Num
```

```
0    192.168.2.2              Fa0/0              11 10:51:41   10   200  0  8

PE(1)#show ip eigrp vrf Customer_A topology
IP-EIGRP Topology Table for AS(100)/ID(192.168.2.1) Routing Table: Customer_A

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - Reply status

P 11.2.1.0/24, 1 successors, FD is 156160
        via 192.168.2.2 (156160/128256), FastEthernet0/0
P 11.3.1.0/24, 1 successors, FD is 156160
        via 192.168.2.2 (156160/128256), FastEthernet0/0
P 11.1.1.0/24, 1 successors, FD is 156160
        via 192.168.2.2 (156160/128256), FastEthernet0/0
P 22.3.1.0/24, 1 successors, FD is 156160
        via VPNv4 Sourced (156160/0)
P 22.2.1.0/24, 1 successors, FD is 156160
        via VPNv4 Sourced (156160/0)
P 22.1.1.0/24, 1 successors, FD is 156160
        via VPNv4 Sourced (156160/0)
P 192.168.1.0/30, 1 successors, FD is 28160
        via VPNv4 Sourced (28160/0)
P 192.168.2.0/30, 1 successors, FD is 28160
        via Connected, FastEthernet0/0

PE(1)#show ip bgp vpnv4 vrf Customer_A
BGP table version is 17, local router ID is 1.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop          Metric LocPrf Weight Path
Route Distinguisher: 100:1 (default for vrf Customer_A)
*> 11.1.1.0/24      192.168.2.2       156160        32768 ?
*> 11.2.1.0/24      192.168.2.2       156160        32768 ?
*> 11.3.1.0/24      192.168.2.2       156160        32768 ?
*>i22.1.1.0/24      4.4.4.4           156160    100     0 ?
*>i22.2.1.0/24      4.4.4.4           156160    100     0 ?
*>i22.3.1.0/24      4.4.4.4           156160    100     0 ?
*>i192.168.1.0/30   4.4.4.4                0    100     0 ?
*> 192.168.2.0/30   0.0.0.0                0        32768 ?

PE(1)#show ip cef vrf Customer_A
Prefix              Next Hop             Interface
0.0.0.0/0           drop                 Null0 (default route handler entry)
0.0.0.0/32          receive
11.1.1.0/24         192.168.2.2          FastEthernet0/0
11.2.1.0/24         192.168.2.2          FastEthernet0/0
11.3.1.0/24         192.168.2.2          FastEthernet0/0
22.1.1.0/24         10.0.0.2             POS4/0
22.2.1.0/24         10.0.0.2             POS4/0
22.3.1.0/24         10.0.0.2             POS4/0
192.168.1.0/30      10.0.0.2             POS4/0
192.168.2.0/30      attached             FastEthernet0/0
192.168.2.0/32      receive
192.168.2.1/32      receive
192.168.2.2/32      192.168.2.2          FastEthernet0/0
192.168.2.3/32      receive
224.0.0.0/4         drop
224.0.0.0/24        receive
255.255.255.255/32  receive

PE(1)#show ip cef vrf Customer_A 11.1.1.0 detail
11.1.1.0/24, version 16, epoch 0, cached adjacency 192.168.2.2
```

```
0 packets, 0 bytes
  tag information set, all rewrites owned
    local tag: 27
  via 192.168.2.2, FastEthernet0/0, 0 dependencies
    next hop 192.168.2.2, FastEthernet0/0
    valid cached adjacency
    tag rewrite with Fa0/0, 192.168.2.2, tags imposed {}
```

```
PE(1)#show tag-switching forwarding-table
Local  Outgoing    Prefix           Bytes tag  Outgoing    Next Hop
tag    tag or VC   or Tunnel Id     switched   interface
16     Pop tag     2.2.2.2/32       0          PO4/0       point2point
17     17          3.3.3.3/32       0          PO4/0       point2point
18     18          4.4.4.4/32       0          PO4/0       point2point
19     19          10.2.2.0/30      0          PO4/0       point2point
20     Pop tag     10.1.1.0/30      0          PO4/0       point2point
22     Untagged    11.2.1.0/24[V]   0          Fa0/0       192.168.2.2
26     Untagged    11.3.1.0/24[V]   0          Fa0/0       192.168.2.2
27     Untagged    11.1.1.0/24[V]   0          Fa0/0       192.168.2.2
28     Aggregate   192.168.2.0/30[V] 255132
```

```
PE(1)#show tag-switching forwarding-table vrf Customer_A
Local  Outgoing    Prefix           Bytes tag  Outgoing    Next Hop
tag    tag or VC   or Tunnel Id     switched   interface
22     Untagged    11.2.1.0/24[V]   0          Fa0/0       192.168.2.2
26     Untagged    11.3.1.0/24[V]   0          Fa0/0       192.168.2.2
27     Untagged    11.1.1.0/24[V]   0          Fa0/0       192.168.2.2
28     Aggregate   192.168.2.0/30[V] 255132
```

P(1)

```
P(1)A#show tag-switching forwarding-table
Local  Outgoing    Prefix           Bytes tag  Outgoing    Next Hop
tag    tag or VC   or Tunnel Id     switched   interface
16     Pop tag     1.1.1.1/32       260843     PO2/0       point2point
17     Pop tag     3.3.3.3/32       0          AT6/0.100   point2point
18     19          4.4.4.4/32       269131     AT6/0.100   point2point
19     Pop tag     10.2.2.0/30      0          AT6/0.100   point2point
```

P(2)

```
P(2)#show tag-switching forwarding-table
Local  Outgoing    Prefix           Bytes tag  Outgoing    Next Hop
tag    tag or VC   or Tunnel Id     switched   interface
16     Pop tag     10.0.0.0/30      0          AT4/0.100   point2point
17     Pop tag     2.2.2.2/32       0          AT4/0.100   point2point
18     16          1.1.1.1/32       269930     AT4/0.100   point2point
19     Pop tag     4.4.4.4/32       276490     SR5/0       10.2.2.2
```

PE(2)

```
PE(2)#show tag-switching forwarding-table
Local  Outgoing    Prefix           Bytes tag  Outgoing    Next Hop
tag    tag or VC   or Tunnel Id     switched   interface
16     18          1.1.1.1/32       0          SR4/0       10.2.2.1
17     17          2.2.2.2/32       0          SR4/0       10.2.2.1
18     Pop tag     3.3.3.3/32       0          SR4/0       10.2.2.1
19     16          10.0.0.0/30      0          SR4/0       10.2.2.1
20     Pop tag     10.1.1.0/30      0          SR4/0       10.2.2.1
25     Untagged    22.1.1.0/24[V]   2280       Fa6/0       192.168.1.2
26     Untagged    22.2.1.0/24[V]   570        Fa6/0       192.168.1.2
```

```
27      Untagged    22.3.1.0/24[V]    570         Fa6/0       192.168.1.2
28      Aggregate   192.168.1.0/30[V] 251808
```

CE(1)

```
CE(1)#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       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
       o - ODR


Gateway of last resort is not set


     22.0.0.0/24 is subnetted, 3 subnets
D       22.3.1.0 [90/158720] via 192.168.2.1, 00:35:45, FastEthernet2/0
D       22.2.1.0 [90/158720] via 192.168.2.1, 00:35:45, FastEthernet2/0
D       22.1.1.0 [90/158720] via 192.168.2.1, 00:35:45, FastEthernet2/0
     11.0.0.0/24 is subnetted, 3 subnets
C       11.2.1.0 is directly connected, Loopback1
C       11.3.1.0 is directly connected, Loopback2
C       11.1.1.0 is directly connected, Loopback0
     192.168.1.0/30 is subnetted, 1 subnets
D       192.168.1.0 [90/30720] via 192.168.2.1, 00:35:46, FastEthernet2/0
     192.168.2.0/30 is subnetted, 1 subnets
C       192.168.2.0 is directly connected, FastEthernet2/0

CE(1)#ping 22.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 22.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
```

CE(2)

```
D-R7206-5A#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       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
       o - ODR


Gateway of last resort is not set


     22.0.0.0/24 is subnetted, 3 subnets
C       22.3.1.0 is directly connected, Loopback2
C       22.2.1.0 is directly connected, Loopback1
C       22.1.1.0 is directly connected, Loopback0
     11.0.0.0/24 is subnetted, 3 subnets
D       11.2.1.0 [90/158720] via 192.168.1.1, 00:36:32, FastEthernet2/0
D       11.3.1.0 [90/158720] via 192.168.1.1, 00:36:32, FastEthernet2/0
D       11.1.1.0 [90/158720] via 192.168.1.1, 00:36:32, FastEthernet2/0
     192.168.1.0/30 is subnetted, 1 subnets
C       192.168.1.0 is directly connected, FastEthernet2/0
     192.168.2.0/30 is subnetted, 1 subnets
D       192.168.2.0 [90/30720] via 192.168.1.1, 00:36:33, FastEthernet2/0
```

```
CE(2)#ping 11.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
```

疑難排解

目前尚無適用於此組態的具體疑難排解資訊。

相關資訊

- MPLS虛擬私人網路
- 配置基本MPLS VPN
- MPLS VPN環境中的資料包流
- 更多MPLS over ATM資訊
- 技術支援 - Cisco Systems