

使用Cisco 7500路由器和LightStream 1010交換機配置VPN MPLS over ATM

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簡介

本文顯示如何使用Cisco 7500路由器作為標籤邊緣路由器(LER),LightStream 1010交換機作為標籤交換路由器(LSR)，在ATM上配置虛擬專用網路(VPN)多協定標籤交換(MPLS)。兩台乙太網連線的路由器（每台都位於遠端客戶站點上）是VPN的一部分。在本文檔中，我們將檢視端到端裝置配置和有用的show命令。

必要條件

需求

本文件沒有特定需求。

慣例

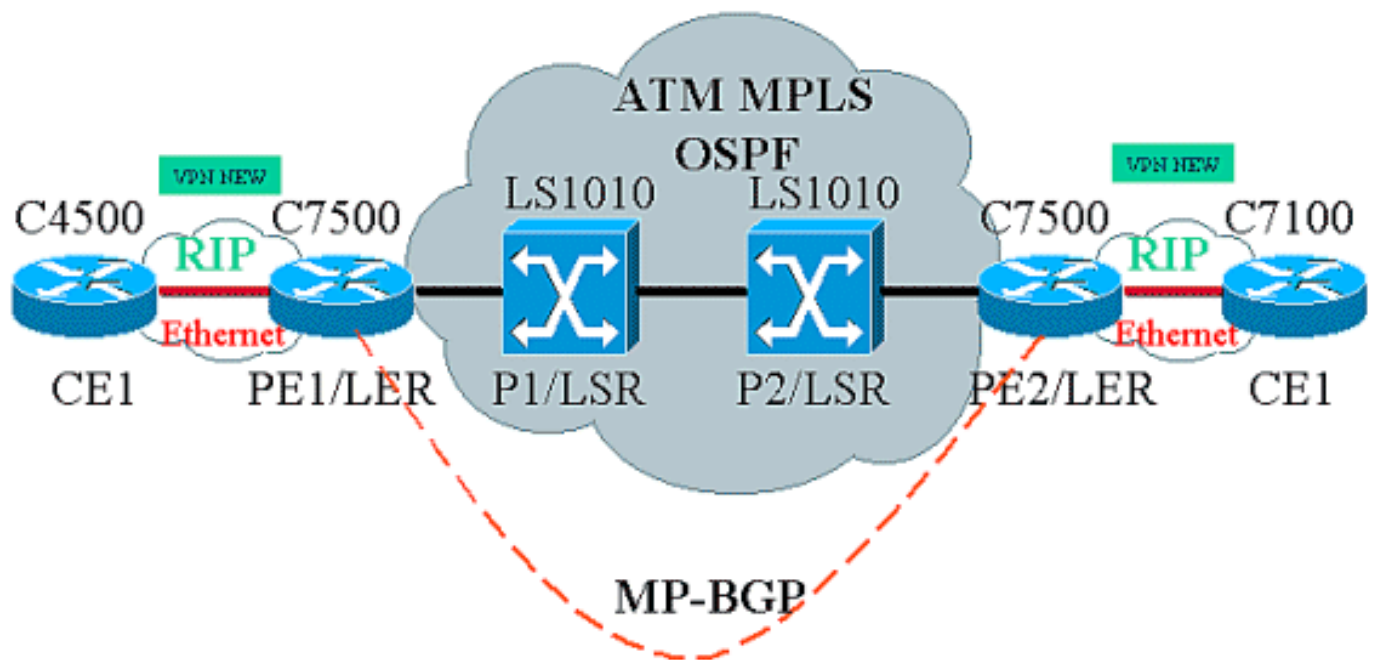
如需文件慣例的詳細資訊，請參閱[思科技術提示慣例](#)。

設定

本節提供用於設定本文件中所述功能的資訊。

網路圖表

本檔案會使用以下網路設定：



網路說明

當前設定在VPN術語中包含以下元素：

- CE = 客戶邊緣路由器
- PE = 提供商邊緣路由器
- P = 提供商路由器

當前設定在MPLS術語中包含以下元素：

- LER = 標籤邊緣路由器
- LSR = 標籤交換路由器
- TDP/LDP = 標籤分發協定/標籤分發協定

組態

本檔案會使用以下設定：

- PE1和PE2是ATM網路中的LER。
- P1和P2是LSR。
- CE1和CE2是客戶邊緣路由器，它們並不知道VPN或MPLS並不執行。
- CE1和CE2分別通過乙太網連線到PE1和PE2，並執行路由資訊協定(RIP)。
- PE1、PE2、P1和P2執行開放最短路徑優先(OSPF)並都位於區域0中。OSPF是ATM網路中使用的內部網關協定(IGP)。在所有四台ATM裝置上的ATM介面上使用標籤交換。標籤分發協定(TDP)將標籤分配給OSPF路由。
- PE1和PE2是多協定邊界網關協定(MP-BGP)對等體。
- RIP路由被重分佈到MP-BGP中。在PE1和PE2路由器上，MP-BGP路由被重分發到RIP。
- 設定在PE1和PE2路由器中維護單獨的VRF路由表。
- 本示例中使用的VPN名稱為NEW。

CE1

```
!  
version 12.1  
service timestamps debug datetime msec  
service timestamps log datetime msec  
  
!  
boot system flashw c4500-js-mz.121-5  
!  
  
ip subnet-zero  
  
!  
interface Loopback0  
 ip address 10.1.1.1 255.255.255.0  
!  
interface Loopback1  
 ip address 10.2.2.2 255.255.255.0  
!  
interface Loopback2  
 ip address 10.3.3.3 255.255.255.0  
!  
interface Ethernet0  
 ip address 100.1.1.2 255.255.255.0  
 media-type 10BaseT  
  
!  
  
router rip  
 version 2  
 network 10.0.0.0  
 network 100.0.0.0  
 no auto-summary  
!  
ip classless  
!  
!
```

PE1

```
!  
version 12.1  
  
service timestamps debug uptime  
service timestamps log uptime  
  
!  
boot system flashw slot1:rsp-jsv-mz.121-5a.bin  
!  
  
ip subnet-zero  
  
!  
ip vrf NEW  
 rd 200:1  
 route-target export 200:1  
 route-target import 200:1  
ip cef distributed  
  
!  
interface Loopback0  
 ip address 1.1.1.1 255.255.255.255  
!  
interface ATM2/0/0  
 mtu 1500
```

```
no ip address
!
interface ATM2/0/0.10 tag-switching
 ip unnumbered Loopback0
 tag-switching ip
!
interface Ethernet2/1/0
 ip vrf forwarding NEW
 ip address 100.1.1.1 255.255.255.0
!
router ospf 100
 no log-adjacency-changes
 network 1.0.0.0 0.255.255.255 area 0
 network 100.1.1.0 0.0.0.255 area 0
!
router rip
 version 2
 network 100.0.0.0
 no auto-summary
!
 address-family ipv4 vrf NEW
 version 2
 redistribute bgp 200 metric 0
 network 100.0.0.0
 no auto-summary
 exit-address-family
!
router bgp 200
 bgp log-neighbor-changes
 neighbor 2.2.2.2 remote-as 200

 neighbor 2.2.2.2 update-source Loopback0
 no auto-summary
!
 address-family ipv4 vrf NEW
 redistribute rip
 no auto-summary
 no synchronization
 exit-address-family
!
 address-family vpnv4
 neighbor 2.2.2.2 activate
 neighbor 2.2.2.2 send-community extended
 no auto-summary
 exit-address-family
!
ip classless
!
```

P1

```
!
service timestamps debug uptime
service timestamps log uptime
!
ip subnet-zero
!
interface Loopback0
 ip address 4.4.4.4 255.255.255.255
```

```
no ip directed-broadcast
!
interface ATM12/0/0
 ip unnumbered Loopback0
 no ip directed-broadcast

 tag-switching ip
!
interface ATM12/0/1
 ip unnumbered Loopback0
 no ip directed-broadcast

 tag-switching ip
!
router ospf 100
 network 4.0.0.0 0.255.255.255 area 0
!
ip classless
!
```

P2

```
!
service timestamps debug uptime
service timestamps log uptime
!
ip subnet-zero
!
interface Loopback0
 ip address 3.3.3.3 255.255.255.255
 no ip directed-broadcast
!
interface ATM0/1/1
 ip unnumbered Loopback0
 no ip directed-broadcast

 tag-switching ip
!
interface ATM0/1/3
 ip unnumbered Loopback0
 no ip directed-broadcast

 tag-switching ip
!
router ospf 100
 network 3.0.0.0 0.255.255.255 area 0
!
ip classless
!
```

PE2

```
!
version 12.1
service timestamps debug datetime msec
service timestamps log datetime msec
!
boot system flash0:rsp-jsv-mz.121-5a
```

```
!  
ip subnet-zero  
  
!  
ip vrf NEW  
  rd 200:1  
  route-target export 200:1  
  route-target import 200:1  
ip cef distributed  
  
!  
interface Loopback0  
  ip address 2.2.2.2 255.255.255.255  
!  
  
interface FastEthernet3/0/0  
  ip vrf forwarding NEW  
  ip address 110.1.1.1 255.255.255.0  
  
  half-duplex  
!  
  
interface ATM3/1/0.1 tag-switching  
  ip unnumbered Loopback0  
  tag-switching ip  
!  
router ospf 100  
  log-adjacency-changes  
  network 2.0.0.0 0.255.255.255 area 0  
  
!  
router rip  
  version 2  
  network 110.0.0.0  
  no auto-summary  
  !  
  address-family ipv4 vrf NEW  
  version 2  
  redistribute bgp 200 metric 0  
  network 110.0.0.0  
  no auto-summary  
  exit-address-family  
  !  
router bgp 200  
  bgp log-neighbor-changes  
  neighbor 1.1.1.1 remote-as 200  
  
  neighbor 1.1.1.1 update-source Loopback0  
  
  no auto-summary  
  !  
  address-family ipv4 vrf NEW  
  redistribute rip  
  no auto-summary  
  no synchronization  
  exit-address-family  
  !  
  address-family vpnv4  
  neighbor 1.1.1.1 activate  
  neighbor 1.1.1.1 send-community extended  
  no auto-summary  
  exit-address-family  
  !
```

```
ip classless
!
CE2
!
version 12.1

service timestamps debug uptime
service timestamps log uptime

!
boot system disk0:c7100-jo3s56i-mz.121-5.T.bin

!
ip subnet-zero

!
interface Loopback0
 ip address 30.1.1.1 255.255.255.0
!
interface Loopback1
 ip address 30.2.2.2 255.255.255.0
!
interface Loopback2
 ip address 30.3.3.3 255.255.255.0
!
interface FastEthernet0/0
 ip address 110.1.1.2 255.255.255.0

!
router rip
 version 2
 network 30.0.0.0
 network 110.0.0.0
 no auto-summary
!
```

show 命令

使用以下命令測試網路是否正常運行：

- **show ip route** — 顯示IP路由表條目。
- **show ip rip database vrf** — 顯示特定VRF的RIP資料庫中包含的資訊。
- **show ip bgp vpnv4 vrf** — 顯示BGP表中的VPN地址資訊。
- **show tag-switching interfaces detail** — 顯示有關啟用MPLS功能的一個或多個介面的資訊。
- **show tag-switching tdp bindings** — 顯示從ATM LDP標籤繫結資料庫請求的條目。
- **show tag-switching forwarding-table vrf** — 檢查用於特定路由的標籤堆疊。

以下輸出是在網路圖所示的裝置上輸入這些命令的結果。此輸出表明網路運行正常。

CE1

```
Cisco4500#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, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

```
100.0.0.0/24 is subnetted, 1 subnets
C    100.1.1.0 is directly connected, Ethernet0
110.0.0.0/24 is subnetted, 1 subnets
R    110.1.1.0 [120/1] via 100.1.1.1, 00:00:14, Ethernet0
10.0.0.0/24 is subnetted, 3 subnets
C    10.3.3.0 is directly connected, Loopback2
C    10.2.2.0 is directly connected, Loopback1
C    10.1.1.0 is directly connected, Loopback0
30.0.0.0/24 is subnetted, 3 subnets
R    30.3.3.0 [120/1] via 100.1.1.1, 00:00:14, Ethernet0
R    30.2.2.0 [120/1] via 100.1.1.1, 00:00:15, Ethernet0
R    30.1.1.0 [120/1] via 100.1.1.1, 00:00:15, Ethernet0
```

PE1

Cisco7500a#**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, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

```
1.0.0.0/32 is subnetted, 1 subnets
C    1.1.1.1 is directly connected, Loopback0
2.0.0.0/32 is subnetted, 1 subnets
O    2.2.2.2 [110/4] via 4.4.4.4, 18:17:37, ATM2/0/0.10
3.0.0.0/32 is subnetted, 1 subnets
O    3.3.3.3 [110/3] via 4.4.4.4, 18:17:37, ATM2/0/0.10
4.0.0.0/32 is subnetted, 1 subnets
O    4.4.4.4 [110/2] via 4.4.4.4, 18:17:37, ATM2/0/0.10
```

Cisco7500a#**show ip route vrf NEW**

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, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

```
100.0.0.0/24 is subnetted, 1 subnets
C    100.1.1.0 is directly connected, Ethernet2/1/0
110.0.0.0/24 is subnetted, 1 subnets
B    110.1.1.0 [200/0] via 2.2.2.2, 00:26:11
10.0.0.0/24 is subnetted, 3 subnets
R    10.3.3.0 [120/1] via 100.1.1.2, 00:00:11, Ethernet2/1/0
R    10.2.2.0 [120/1] via 100.1.1.2, 00:00:11, Ethernet2/1/0
R    10.1.1.0 [120/1] via 100.1.1.2, 00:00:11, Ethernet2/1/0
30.0.0.0/24 is subnetted, 3 subnets
B    30.3.3.0 [200/1] via 2.2.2.2, 00:26:12
```



```
B      30.2.2.0 [200/1] via 2.2.2.2, 00:26:12
B      30.1.1.0 [200/1] via 2.2.2.2, 00:26:12
```

Cisco7500a#**show ip rip database vrf NEW**

```
10.0.0.0/8    auto-summary
10.1.1.0/24
    [1] via 100.1.1.2, 00:00:18, Ethernet2/1/0
10.2.2.0/24
    [1] via 100.1.1.2, 00:00:18, Ethernet2/1/0
10.3.3.0/24
    [1] via 100.1.1.2, 00:00:18, Ethernet2/1/0
30.0.0.0/8    auto-summary
30.1.1.0/24   redistributed
    [1] via 2.2.2.2,
30.2.2.0/24   redistributed
    [1] via 2.2.2.2,
30.3.3.0/24   redistributed
    [1] via 2.2.2.2,
100.0.0.0/8   auto-summary
100.1.1.0/24  directly connected, Ethernet2/1/0
110.0.0.0/8   auto-summary
110.1.1.0/24  redistributed
    [1] via 2.2.2.2,
```

Cisco7500a#**show ip bgp vpnv4 vrf NEW**

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

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 200:1 (default for vrf NEW)					
*> 10.1.1.0/24	100.1.1.2	1		32768	?
*> 10.2.2.0/24	100.1.1.2	1		32768	?
*> 10.3.3.0/24	100.1.1.2	1		32768	?
*>i30.1.1.0/24	2.2.2.2	1	100	0	?
*>i30.2.2.0/24	2.2.2.2	1	100	0	?
*>i30.3.3.0/24	2.2.2.2	1	100	0	?
*> 100.1.1.0/24	0.0.0.0	0		32768	?
*>i110.1.1.0/24	2.2.2.2	0	100	0	?

Cisco7500a#**show tag-switching interfaces**

Interface	IP	Tunnel	Operational	
ATM2/0/0.10	Yes	No	Yes	(ATM tagging)

Cisco7500a#**show tag-switching interfaces detail**

```
Interface ATM2/0/0.10:
  IP tagging enabled
  TSP Tunnel tagging not enabled
  Tagging operational
  Tagswitching turbo vector
  MTU = 4470
  ATM tagging:
    Tag VPI = 1
    Tag VCI range = 33 - 65535
    Control VC = 0/32
```

Cisco7500a#**show tag-switching ?**

```
atm-tdp      ATM Tagging Protocol information
cos-map      Show Tag CoS ATM Multi-VC CoS Map
forwarding-table Show the Tag Forwarding Information Base (TFIB)
interfaces   Show per-interface tag switching
prefix-map   Show Tag CoS Prefix Map
tdp         Tag Distribution Protocol information
```

Cisco7500a#show tag-switching tdp bindings

```
tib entry: 1.1.1.1/32, rev 2
    local binding: tag: imp-null
tib entry: 2.2.2.2/32, rev 23
    local binding: tag: 27
tib entry: 3.3.3.3/32, rev 21
    local binding: tag: 26
tib entry: 4.4.4.4/32, rev 10
    local binding: tag: 28
```

Cisco7500a#show tag-switching atm-tdp bindings

```
Destination: 4.4.4.4/32
    Headend Router ATM2/0/0.10 (1 hop) 1/33 Active, VCD=24
Destination: 3.3.3.3/32
    Headend Router ATM2/0/0.10 (2 hops) 1/43 Active, VCD=25
Destination: 2.2.2.2/32
    Headend Router ATM2/0/0.10 (3 hops) 1/42 Active, VCD=26
Destination: 1.1.1.1/32
    Tailend Router ATM2/0/0.10 1/33 Active, VCD=24
```

Cisco7500a#show tag-switching forwarding-table vrf NEW

Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
29	Aggregate	100.1.1.0/24[V]	2080		
30	Untagged	10.3.3.0/24[V]	0	Et2/1/0	100.1.1.2
31	Untagged	10.2.2.0/24[V]	0	Et2/1/0	100.1.1.2
32	Untagged	10.1.1.0/24[V]	0	Et2/1/0	100.1.1.2

P1

LS1010#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, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
U - per-user static route, o - ODR
T - traffic engineered route

Gateway of last resort is not set

```
1.0.0.0/32 is subnetted, 1 subnets
O    1.1.1.1 [110/2] via 1.1.1.1, 19:00:12, ATM12/0/0
2.0.0.0/32 is subnetted, 1 subnets
O    2.2.2.2 [110/3] via 3.3.3.3, 19:00:12, ATM12/0/1
3.0.0.0/32 is subnetted, 1 subnets
O    3.3.3.3 [110/2] via 3.3.3.3, 19:00:12, ATM12/0/1
4.0.0.0/32 is subnetted, 1 subnets
C    4.4.4.4 is directly connected, Loopback0
```

LS1010#show tag-switching atm-tdp bindings

```
Destination: 4.4.4.4/32
    Tailend Switch ATM12/0/0 1/33 Active -> Terminating Active
    Tailend Switch ATM12/0/1 1/34 Active -> Terminating Active
Destination: 2.2.2.2/32
    Transit ATM12/0/0 1/42 Active -> ATM12/0/1 1/35 Active
Destination: 1.1.1.1/32
    Transit ATM12/0/1 1/33 Active -> ATM12/0/0 1/33 Active
Destination: 3.3.3.3/32
    Transit ATM12/0/0 1/43 Active -> ATM12/0/1 1/34 Active
```

P2

LS1010#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, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
U - per-user static route, o - ODR

Gateway of last resort is 10.118.1.21 to network 0.0.0.0

```
1.0.0.0/32 is subnetted, 1 subnets
O    1.1.1.1 [110/3] via 4.4.4.4, 19:46:00, ATM0/1/1
2.0.0.0/32 is subnetted, 1 subnets
O    2.2.2.2 [110/2] via 2.2.2.2, 19:46:00, ATM0/1/3
3.0.0.0/32 is subnetted, 1 subnets
C    3.3.3.3 is directly connected, Loopback0
4.0.0.0/32 is subnetted, 1 subnets
O    4.4.4.4 [110/2] via 4.4.4.4, 19:46:00, ATM0/1/1
10.0.0.0/24 is subnetted, 1 subnets
C    10.118.1.0 is directly connected, Ethernet2/0/0
S*  0.0.0.0/0 [1/0] via 10.118.1.21
```

LS1010#show tag-switching atm-tdp bindings

```
Destination: 1.1.1.1/32
  Transit ATM0/1/3 1/33 Active -> ATM0/1/1 1/33 Active
Destination: 3.3.3.3/32
  Tailend Switch ATM0/1/3 1/34 Active -> Terminating Active
  Tailend Switch ATM0/1/1 1/34 Active -> Terminating Active
Destination: 4.4.4.4/32
  Transit ATM0/1/3 1/35 Active -> ATM0/1/1 1/34 Active
Destination: 2.2.2.2/32
  Transit ATM0/1/1 1/35 Active -> ATM0/1/3 1/33 Active
```

PE2

Cisco7500#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, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

```
1.0.0.0/32 is subnetted, 1 subnets
O    1.1.1.1 [110/4] via 3.3.3.3, 02:58:46, ATM3/1/0.1
2.0.0.0/32 is subnetted, 1 subnets
C    2.2.2.2 is directly connected, Loopback0
3.0.0.0/32 is subnetted, 1 subnets
O    3.3.3.3 [110/2] via 3.3.3.3, 02:58:46, ATM3/1/0.1
4.0.0.0/32 is subnetted, 1 subnets
O    4.4.4.4 [110/3] via 3.3.3.3, 02:58:46, ATM3/1/0.1
```

Cisco7500#show ip route vrf NEW

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, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is not set

```

100.0.0.0/24 is subnetted, 1 subnets
B    100.1.1.0 [200/0] via 1.1.1.1, 01:16:13
110.0.0.0/24 is subnetted, 1 subnets
C    110.1.1.0 is directly connected, FastEthernet3/0/0
10.0.0.0/24 is subnetted, 3 subnets
B    10.3.3.0 [200/1] via 1.1.1.1, 01:16:13
B    10.2.2.0 [200/1] via 1.1.1.1, 01:16:13
B    10.1.1.0 [200/1] via 1.1.1.1, 01:16:13
30.0.0.0/24 is subnetted, 3 subnets
R    30.3.3.0 [120/1] via 110.1.1.2, 00:00:16, FastEthernet3/0/0
R    30.2.2.0 [120/1] via 110.1.1.2, 00:00:17, FastEthernet3/0/0
R    30.1.1.0 [120/1] via 110.1.1.2, 00:00:17, FastEthernet3/0/0

```

Cisco7500#show ip rip database vrf NEW

```

10.0.0.0/8    auto-summary
10.1.1.0/24   redistributed
               [1] via 1.1.1.1,
10.2.2.0/24   redistributed
               [1] via 1.1.1.1,
10.3.3.0/24   redistributed
               [1] via 1.1.1.1,
30.0.0.0/8    auto-summary
30.1.1.0/24
               [1] via 110.1.1.2, 00:00:09, FastEthernet3/0/0
30.2.2.0/24
               [1] via 110.1.1.2, 00:00:09, FastEthernet3/0/0
30.3.3.0/24
               [1] via 110.1.1.2, 00:00:09, FastEthernet3/0/0
100.0.0.0/8   auto-summary
100.1.1.0/24  redistributed
               [1] via 1.1.1.1,
110.0.0.0/8   auto-summary
110.1.1.0/24  directly connected, FastEthernet3/0/0

```

Cisco7500#show ip bgp vpnv4 vrf NEW

BGP table version is 17, local router ID is 2.2.2.2
 Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 200:1 (default for vrf NEW)					
*>i10.1.1.0/24	1.1.1.1	1	100	0	?
*>i10.2.2.0/24	1.1.1.1	1	100	0	?
*>i10.3.3.0/24	1.1.1.1	1	100	0	?
*> 30.1.1.0/24	110.1.1.2	1		32768	?
*> 30.2.2.0/24	110.1.1.2	1		32768	?
*> 30.3.3.0/24	110.1.1.2	1		32768	?
*>i100.1.1.0/24	1.1.1.1	0	100	0	?
*> 110.1.1.0/24	0.0.0.0	0		32768	?

Cisco7500#show tag-switching interfaces

Interface	IP	Tunnel	Operational	
ATM3/1/0.1	Yes	No	Yes	(ATM tagging)

Cisco7500#show tag-switching interfaces detail

Interface ATM3/1/0.1:

```
IP tagging enabled
TSP Tunnel tagging not enabled
Tagging operational
Tagswitching turbo vector
MTU = 4470
ATM tagging:
    Tag VPI = 1
    Tag VCI range = 33 - 65535
    Control VC = 0/32
```

Cisco7500#show tag-switching ?

```
atm-tdp          ATM Tagging Protocol information
cos-map          Show Tag CoS ATM Multi-VC CoS Map
forwarding-table Show the Tag Forwarding Information Base (TFIB)
interfaces       Show per-interface tag switching
prefix-map       Show Tag CoS Prefix Map
tdp              Tag Distribution Protocol information
```

Cisco7500#show tag-switching tdp bindings

```
tib entry: 1.1.1.1/32, rev 25
    local binding: tag: 26
tib entry: 2.2.2.2/32, rev 2
    local binding: tag: imp-null
tib entry: 3.3.3.3/32, rev 27
    local binding: tag: 27
tib entry: 4.4.4.4/32, rev 29
    local binding: tag: 28
```

Cisco7500#show tag-switching atm-tdp bindings

```
Destination: 1.1.1.1/32
    Headend Router ATM3/1/0.1 (3 hops) 1/33 Active, VCD=8
Destination: 3.3.3.3/32
    Headend Router ATM3/1/0.1 (1 hop) 1/34 Active, VCD=6
Destination: 4.4.4.4/32
    Headend Router ATM3/1/0.1 (2 hops) 1/35 Active, VCD=7
Destination: 2.2.2.2/32
    Tailend Router ATM3/1/0.1 1/33 Active, VCD=8
```

Cisco7500#show tag-switching forwarding-table vrf NEW

Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
33	Aggregate	110.1.1.0/24[V]	0		
34	Untagged	30.3.3.0/24[V]	0	Fa3/0/0	110.1.1.2
35	Untagged	30.2.2.0/24[V]	0	Fa3/0/0	110.1.1.2
36	Untagged	30.1.1.0/24[V]	0	Fa3/0/0	110.1.1.2

CE2

Cisco7100#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, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
```

Gateway of last resort is not set

```
100.0.0.0/24 is subnetted, 1 subnets
R      100.1.1.0 [120/1] via 110.1.1.1, 00:00:19, FastEthernet0/0
```

```
110.0.0.0/24 is subnetted, 1 subnets
C    110.1.1.0 is directly connected, FastEthernet0/0
10.0.0.0/24 is subnetted, 3 subnets
R    10.3.3.0 [120/1] via 110.1.1.1, 00:00:19, FastEthernet0/0
R    10.2.2.0 [120/1] via 110.1.1.1, 00:00:19, FastEthernet0/0
R    10.1.1.0 [120/1] via 110.1.1.1, 00:00:19, FastEthernet0/0
30.0.0.0/24 is subnetted, 3 subnets
C    30.3.3.0 is directly connected, Loopback2
C    30.2.2.0 is directly connected, Loopback1
C    30.1.1.0 is directly connected, Loopback0
```

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- [配置基本MPLS VPN](#)
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