

MPLS over VP Tunnels

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Introduction

A service provider normally gives you one or more virtual path (VP) tunnels to connect your devices together instead of a point-to-point physical link. This document explains the steps necessary to configure Multiprotocol Label Switching (MPLS) when you use VP tunnels.

Prerequisites

Requirements

There are no specific requirements for this document.

Conventions

Refer to [Cisco Technical Tips Conventions](#) for more information on document conventions.

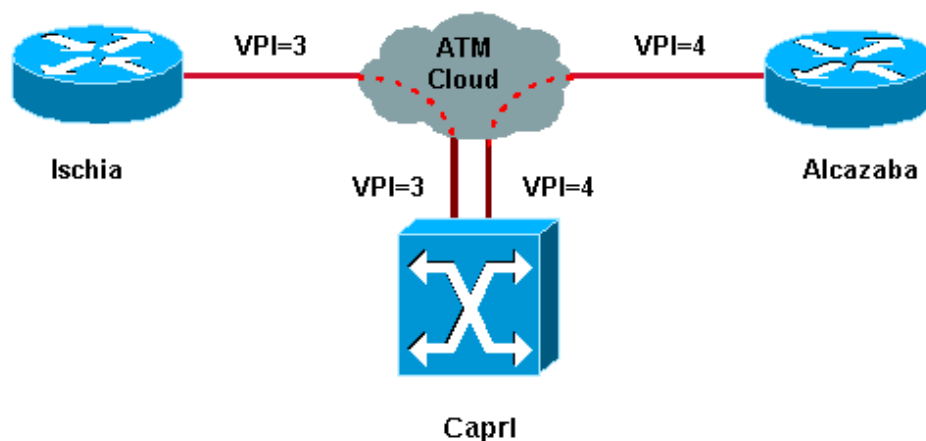
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: Use the [Command Lookup Tool](#) (registered customers only) to find more information on the commands used in this document.

Network Diagram

This document uses this network setup:



In this setup, the service provider has furnished two VP tunnels:

- One between Ischia and Capri with VPI = 3 (virtual path identifier)
- One between Alcazaba and Capri with VPI = 4

Ischia and Alcazaba are two Cisco 7200 routers that run Cisco IOS® Software Release 12.1(3a)E. Capri is a Catalyst 8540 Multiservice Switch Router (MSR) that runs release 12.0(10)W5(18c). Capri is a Tag Distribution Protocol (TDP) neighbor of Alcazaba and Ischia.

Note: You must run release 12.0(3)T or higher in order to configure this feature.

The configurations used here are for a Catalyst 8500 MSR, or LightStream 1010, and a router.

Configurations

This document uses these configurations:

Ischia

```
ip cef
!
interface Loopback0
 ip address 1.1.1.1 255.255.255.0
!
interface ATM2/0.3 tag-switching
 ip address 3.0.0.1 255.255.255.0
 tag-switching atm vp-tunnel 3
 tag-switching ip
!
router ospf 6
 log-adjacency-changes
 network 1.1.1.1 0.0.0.0 area 0
 network 3.0.0.0 0.0.0.255 area 0
```

Alcazaba

```
ip cef
!
interface Loopback0
 ip address 2.2.2.2 255.255.255.0
```

```
!  
interface ATM4/0.4 tag-switching  
  ip address 4.0.0.1 255.255.255.0  
  tag-switching atm vp-tunnel 4  
  tag-switching ip  
!  
router ospf 6  
  log-adjacency-changes  
  network 2.2.2.2 0.0.0.0 area 0  
  network 4.0.0.0 0.0.0.255 area 0
```

Capri

```
interface ATM3/1/1  
no ip address  
no ip directed-broadcast  
no ip mroute-cache  
no atm ilmi-keepalive  
atm pvp 3  
atm pvp 4  
!  
interface ATM3/1/1.3 point-to-point  
  ip address 3.0.0.2 255.255.255.0  
  no ip directed-broadcast  
  no atm ilmi-keepalive  
  tag-switching ip  
!  
interface ATM3/1/1.4 point-to-point  
  ip address 4.0.0.2 255.255.255.0  
  no ip directed-broadcast  
  no atm ilmi-keepalive  
  tag-switching ip
```

Note: This configuration is similar to standard router configurations you can find [here](#). The only difference is that you have to specify to the router that you use a VP tunnel. You can do this with the **tag-switching atm vp-tunnel vpi** command, where vpi is the **VPI** value that is associated with the tunnel that ends on this router.

Note: For the LightStream 1010 and Catalyst 8500 MSR, you need to configure one or more permanent virtual paths (PVPs) for each VP tunnel with the **atm pvp vpi** command. See [here](#) for a sample configuration. A subinterface is associated with each of these tunnels. For instance, the atm 3/1/1.3 interface is associated with PVP=3. You must configure this subinterface with tag-switching, as you do on the main interface.

Verify

Use these tag-switching show commands to test that your network operates properly:

- **show tag-switching tdp neighbor**
- **show tag-switching atm-tdp bindings** – This shows dynamic ATM tag information.
- **show tag-switching forwarding-table** – This shows the Tag Forwarding Information Base (TFIB).
- **show tag-switching interfaces atm [int number] detail** – This shows detailed tag switching information for each interface.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

This output is a result of these commands entered on the devices shown in the network diagram.

```
Ischia#show tag-switching tdp neighbor
```

```
Peer TDP Ident: 10.200.10.57:1; Local TDP Ident 1.1.1.1:1
  TCP connection: 3.0.0.2.11001 - 3.0.0.1.711
  State: Oper; PIEs sent/rcvd: 92/93; ; Downstream on demand
  Up time: 01:16:52
  TDP discovery sources:
    ATM2/0.3
```

```
Ischia#show tag-switching atm-tdp bindings
```

```
Destination: 4.0.0.0/24
  Headend Router ATM2/0.3 (1 hop) 3/33 Active, VCD=127
Destination: 1.1.1.0/24
  Tailend Router ATM2/0.3 3/33 Active, VCD=127
Destination: 2.2.2.2/32
  Headend Router ATM2/0.3 (2 hops) 3/34 Active, VCD=128
```

```
Ischia#show tag-switching forwarding-table
```

Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
26	3/33	4.0.0.0/24	0	AT2/0.3	point2point
27	3/34	2.2.2.2/32	0	AT2/0.3	point2point

```
Ischia#show tag-switching interfaces detail
```

```
Interface ATM2/0.3:
  IP tagging enabled
  TSP Tunnel tagging not enabled
  Tagging operational
  Tagswitching turbo vector
  MTU = 4470
  ATM tagging:
    Tag VPI = 3 (VP Tunnel)
    Tag VCI range = 33 - 65535
    Control VC = 3/32
```

```
Capri#show tag-switching atm-tdp bindings
```

```
Destination: 4.0.0.0/24
  Tailend Switch ATM3/1/1.3 3/33 Active -> Terminating Active
Destination: 1.1.1.1/32
```

```
Transit ATM3/1/1.4 4/33 Active -> ATM3/1/1.3 3/33 Active
Destination: 3.0.0.0/24
Tailend Switch ATM3/1/1.4 4/34 Active -> Terminating Active
Destination: 2.2.2.2/32
Transit ATM3/1/1.3 3/34 Active -> ATM3/1/1.4 4/33 Active
```

Capri#**show tag-switching tdp neighbor**

```
Peer TDP Ident: 1.1.1.1:1; Local TDP Ident 10.200.10.57:1
  TCP connection: 3.0.0.1.711 - 3.0.0.2.11001
  State: Oper; PIEs sent/rcvd: 95/94; ; Downstream on demand
  Up time: 01:18:49
  TDP discovery sources:
    ATM3/1/1.3
Peer TDP Ident: 2.2.2.2:1; Local TDP Ident 10.200.10.57:2
  TCP connection: 4.0.0.1.711 - 4.0.0.2.11002
  State: Oper; PIEs sent/rcvd: 93/95; ; Downstream on demand
  Up time: 01:18:22
  TDP discovery sources:
    ATM3/1/1.4
```

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

```
Interface ATM3/1/1.3:
  IP tagging enabled
  TSP Tunnel tagging not enabled
  Tagging operational
  MTU = 4470
  ATM tagging: Tag VPI = 3, Control VC = 3/32
Interface ATM3/1/1.4:
  IP tagging enabled
  TSP Tunnel tagging not enabled
  Tagging operational
  MTU = 4470
  ATM tagging: Tag VPI = 4, Control VC = 4/32
```

This output is similar to standard tag-switching output, but one important difference is that it points to the VP tunnel interface.

Related Information

- MPLS over ATM without VC-Merge
- MPLS Label Imposition in an ATM Environment
- ATM Technology Support

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