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LANE and CES (Using PVCs) Through Hierarchical VP Tunnels

Introduction

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- Requirements
- Components Used
- Conventions

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- Network Diagram
- Configurations

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- Verify 5500-asp-e
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Related Information

Introduction

Note: Hierarchical virtual path (VP) tunnels are supported since version 12.0 in ATM Switch Processor (ASP) (Cisco Lightstream 1010) or 8540 Multiservice Switch Router (MSR) software. Please note that on the Cisco Lightstream LS1010, the Per-Flow Queuing Feature Card (FC-PFQ) is needed.

In this configuration, you need to transport circuit emulation service (CES) and LAN emulation (LANE) across the WAN. This example uses shaped hierarchical VP tunnels to ensure compliance with a traffic contract. When you use shaped VP tunnels with traffic parameters identical to what the service provider polices, no cells should be dropped in the service provider ATM network. The VP tunnel must be of the constant bit rate (CBR) service category in order to be shaped. It is the only shaped tunnel that the Lightstream 1010 and 8540 MSR currently support. Because this configuration uses hierarchical VP tunnels, virtual circuits (VCs) of multiple service categories can pass through the same hierarchical tunnel at the same time. Unlike shaped tunnels, hierarchical VP tunnels allow both LANE unspecified bit rate (UBR) switched virtual circuits (SVCs) and CES constant bit rate (CBR) permanent virtual circuits (PVCs) to pass through the same tunnel. Therefore, only one CBR VP needs to be purchased from the service provider.

In this example, it is assumed that the purchased CBR VP has a peak cell rate (PCR) of 10 Mbps and a cell delay variation tolerance (CDVT) of 500 cells. Before hierarchical VP tunnels are configured, hierarchical scheduling needs to be enabled with the **atm hierarchical-tunnel** command. After it is enabled, you must reload the switch for hierarchical scheduling to take effect. Hierarchical VP tunnels cannot coexist on the same physical interface with other types of connections (such as PVCs, SVCs, or unshaped or shaped tunnels). Refer to the documentation for more details. You must remove the configuration of the hierarchical VP tunnel before online removal of the card on whose port hierarchical tunnel is configured.

Please refer to the hardware documentation for limitations on the port numbers that can be used.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

For more information on document conventions, refer to Cisco Technical Tips Conventions.

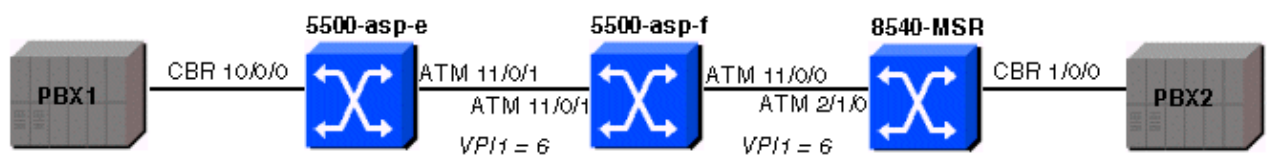
Configure

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

Note: To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only).

Network Diagram

This document uses this network setup:



- Device 5500-asp-f is VP switching. This function is typically performed by the service provider.
- LANE services are defined on 8540 MSR. LAN Emulation Clients (LECs) are on 8540 MSR and 5500-asp-e. Note that LANE services are placed on the ATM switch in this example for simplicity. However, that is not the optimal location for LANE services.
- The two private branch exchanges (PBXs) in the diagram use a CES CBR circuit. Refer to the PBX documentation for more information.

Configurations

This document uses these configurations:

- 5500-asp-e
- 5500-asp-f
- 8540 MSR

5500-asp-e
Current configuration: ! version 12.0

```

no service pad
service timestamps debug datetime msec
service timestamps log uptime
no service password-encryption
!
hostname 5500-asp-e
!
boot system flash slot0:ls1010-wp-mz.120-3c.W5.9.bin
logging buffered 16000 debugging
!
ip subnet-zero
ip host-routing
!
atm hierarchical-tunnel
atm connection-traffic-table-row index 63997 vbr-nrt pcr 20480 scr10 9000 mbs 100
atm connection-traffic-table-row index 64000 cbr pcr 10240 cdvt 500
atm lecs-address-default 47.0091.8100.0000.0090.2144.8401.0090.2144.8405.00 1
atm address 47.0091.8100.0000.0050.537e.1401.0050.537e.1401.00
atm router pnni
no aesa embedded-number left-justified
node 1 level 56 lowest
redistribute atm-static
!
!
!
interface CBR10/0/0
no ip address
no ip directed-broadcast
ces circuit 0 circuit-name test
ces pvc 0 interface atm11/0/1.6 vpi 6 vci 100
!
interface atm11/0/1
no ip address
no ip directed-broadcast
no atm ilmi-keepalive
atm pvp 6 hierarchical rx-cttr 64000 tx-cttr 64000
!
interface atm11/0/1.6 point-to-point
no ip directed-broadcast
no atm ilmi-keepalive
!
interface atm13/0/0
no ip address
no ip directed-broadcast
atm maxvp-number 0
!
interface atm13/0/0.1 multipoint
ip address 100.100.100.2 255.255.255.0
no ip directed-broadcast
lane client ethernet test
no cdp enable
!
interface Ethernet13/0/0
no ip directed-broadcast
!
no ip classless
!
line con 0
transport input none
line aux 0
line vty 0 4
login
!
end

```

5500-asp-f

!--- This switch is configured for VP switching.

```
5500-asp-f#show run
Building configuration...
Current configuration:
!
version 11.3
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 5500-asp-f
!
!
!
atm connection-traffic-table-row index 64000 cbr pcr 10240 cdvt 500
atm address 47.0091.8100.0000.0050.5308.2401.0050.5308.2401.00
atm router pnni
  no aesa embedded-number left-justified
  node 1 level 56 lowest
  redistribute atm-static
!
!
!
interface atm11/0/0
  no ip address
!
interface atm11/0/1
  no ip address
  atm pvp 6 rx-cttr 64000 tx-cttr 64000 interface ATM11/0/0 6
!
interface atm13/0/0
  no ip address
  atm maxvp-number 0
!
interface Ethernet13/0/0
  no ip address
!
ip classless
!
!
line con 0
line aux 0
line vty 0 4
  login
!
end
```

8540 MSR

```
8540-MSR#show run
Building configuration...
Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
```

```

service timestamps log uptime
no service password-encryption
!
hostname 8540-MSR
!
logging buffered 4096 debugging
!
redundancy
  main-cpu
    sync config startup
    sync config running
facility-alarm core-temperature major 53
facility-alarm core-temperature minor 45
ip subnet-zero
!
atm hierarchical-tunnel
atm connection-traffic-table-row index 63999 cbr pcr 10240 cdvt 500
atm lecs-address-default 47.0091.8100.0000.0090.2144.8401.0090.2144.8405.00 1
atm address 47.0091.8100.0000.0090.2144.8401.0090.2144.8401.00
atm router pnni
  no aesa embedded-number left-justified
  node 1 level 56 lowest
  redistribute atm-static
!
!
lane database PVP
name test server-atm-address 47.009181000000009021448401.009021448403.01
!
!
interface CBR1/0/0
  no ip address
  no ip directed-broadcast
  ces circuit 0 circuit-name test
  ces pvc 0 interface atm2/1/0.6 vpi 6 vci 100
!
interface CBR1/0/1
  no ip address
  no ip directed-broadcast
!
interface CBR1/0/2
  no ip address
  no ip directed-broadcast
!
interface CBR1/0/3
  no ip address
  no ip directed-broadcast
!
!
interface atm2/1/0
  no ip address
  no ip directed-broadcast
  atm pvp 6 hierarchical rx-cttr 63999 tx-cttr 63999
!
interface atm2/1/0.6 point-to-point
  no ip directed-broadcast
!
interface atm0
  no ip address
  no ip directed-broadcast
  atm maxvp-number 0
  lane config auto-config-atm-address
  lane config database PVP
!
interface atm0.1 multipoint

```

```

ip address 100.100.100.1 255.255.255.0
no ip directed-broadcast
lane server-bus ethernet test
lane client ethernet test
!
interface Ethernet0
no ip address
no ip directed-broadcast
!
!
ip classless
!
!
line con 0
transport input none
line aux 0
line vty 0 4
login
!
end

```

Verify

These sections provide information you can use to confirm your configurations are working properly.

Verify 5500-asp-e

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show atm resource** Used to verify that hierarchical scheduling is enabled.

```

5500-asp-e#show atm res
Resource configuration:
Over-subscription-factor 8 Sustained-cell-rate-margin-factor 1%
Abr-mode: relative-rate
Hierarchical Scheduling Mode : enabled
Service Category to Threshold Group mapping:
cbr 1 vbr-rt 2 vbr-nrt 3 abr 4 ubr 5
Threshold Groups:
Group Max    Max Q  Min Q  Q thresholds  Cell  Name
      cells limit limit  Mark Discard  count
      instal instal instal
-----
 1   65535   63    63    25 %  87 %    0   cbr-default-tg
 2   65535  127   127   25 %  87 %    0   vbr-rt-default-tg
 3   65535  511   31    25 %  87 %    0   vbr-nrt-default-tg
 4   65535  511   31    25 %  87 %    0   abr-default-tg
 5   65535  511   31    25 %  87 %    0   ubr-default-tg
 6   65535 1023  1023  25 %  87 %    0   well-known-vc-tg

```

- **show atm vp** Used to verify that the hierarchical VP tunnel is configured properly.

```

5500-asp-e#show atm vp
Interface  VPI    Type  X-Interface  X-VPI  Status
atm11/0/1  6      PVP   HIE. TUNNEL
5500-asp-e#

```

- **show atm vc interface atmx/y/z.n** Used to see which VCs were established through the hierarchical VP tunnel.

```
5500-asp-e#show atm vc interface atm11/0/1.6
```

Interface	VPI	VCI	Type	X-Interface	X-VPI	X-VCI	Encap	Status
ATM11/0/1.6	6	3	PVC	ATM13/0/0	0	165	SNAP	UP
ATM11/0/1.6	6	4	PVC	ATM13/0/0	0	166	SNAP	UP
ATM11/0/1.6	6	5	PVC	ATM13/0/0	0	164	QSAAL	UP
ATM11/0/1.6	6	16	PVC	ATM13/0/0	0	163	ILMI	UP
ATM11/0/1.6	6	18	PVC	ATM13/0/0	0	167	PNNI	UP
ATM11/0/1.6	6	37	SVC	ATM13/0/0	0	170	LANE	UP
ATM11/0/1.6	6	38	SVC	ATM13/0/0	0	171	LANE	UP
ATM11/0/1.6	6	39	SVC	ATM13/0/0	0	172	LANE	UP
ATM11/0/1.6	6	40	SVC	ATM13/0/0	0	173	LANE	UP
ATM11/0/1.6	6	100	PVC	ATM-P10/0/3	0	16		UP

```
5500-asp-e#
```

- **show atm interface resource atmx/y/z.n** Used to verify the resources allocated by VCs that go through the VP tunnel.

Note: All service categories are listed as supported.

```
5500-asp-e#show atm interface resource atm11/0/1.6
```

```
Resource Management configuration:
```

```
Service Classes:
```

```
Service Category map: c1 cbr, c1 vbr-rt, c2 vbr-nrt, c3 abr, c4 ubr
```

```
Scheduling: WRR c1, WRR c2, WRR c3, WRR c4
```

```
WRR Weight: 8 c1, 1 c2, 1 c3, 1 c4
```

```
Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
```

```
Link Distance: 0 kilometers
```

```
Best effort connection limit: disabled 0 max connections
```

```
Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
```

```
Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
```

```
Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
```

```
Sustained-cell-rate: none vbr RX, none vbr TX
```

```
Minimum-cell-rate RX: none abr, none ubr
```

```
Minimum-cell-rate TX: none abr, none ubr
```

```
CDVT RX: none cbr, none vbr, none abr, none ubr
```

```
CDVT TX: none cbr, none vbr, none abr, none ubr
```

```
MBS: none vbr RX, none vbr TX
```

```
Resource Management state:
```

```
Available bit rates (in Kbps):
```

```
7986 cbr RX, 7986 cbr TX, 7986 vbr RX, 7986 vbr TX,
```

```
7986 abr RX, 7986 abr TX, 7986 ubr RX, 7986 ubr TX
```

```
Allocated bit rates:
```

```
1741 cbr RX, 1741 cbr TX, 0 vbr RX, 0 vbr TX,
```

```
0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
```

```
5500-asp-e#
```

- **show atm vc interface atmx/y/z.n n m** Used to view details about VCs that go through the hierarchical VP tunnel.

Note: There are now VCs of multiple service categories (UBR and CBR in this example) that pass through the same tunnel. This was not possible without hierarchical tunnels.

```
5500-asp-e#show atm vc interface atm11/0/1.6 6 100
```

```
Interface: ATM11/0/1.6, Type: oc3suni
```

```
VPI = 6 VCI = 100
```

```
Status: UP
```

```
Time-since-last-status-change: 00:05:44
```

```
Connection-type: PVC
```

```
Cast-type: point-to-point
```

```

Packet-discard-option: disabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 2
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states: Not-applicable
Cross-connect-interface: ATM-P10/0/3, Type: CBR
Cross-connect-VPI = 0
Cross-connect-VCI = 16
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state: Not-applicable
Threshold Group: 1, Cells queued: 0
Rx cells: 1413012, Tx cells: 1412906
Tx Clp0:1412906, Tx Clp1: 0
Rx Clp0:1413012, Rx Clp1: 0
Rx Upc Violations:0, Rx cell drops:0
Rx Clp0 q full drops:0, Rx Clp1 qthresh drops:0
Rx connection-traffic-table-index: 63996
Rx service-category: CBR (Constant Bit Rate)
Rx pcr-clp01: 1741
Rx scr-clp01: none
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx      mbs: none
Tx connection-traffic-table-index: 63996
Tx service-category: CBR (Constant Bit Rate)
Tx pcr-clp01: 1741
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx      mbs: none

```

```
5500-asp-e#show atm vc interface atm11/0/1.6 6 40
```

```

Interface: ATM11/0/1.6, Type: oc3suni
VPI = 6 VCI = 40
Status: UP
Time-since-last-status-change: 00:08:25
Connection-type: SVC
Cast-type: point-to-multipoint-root
Packet-discard-option: enabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 2
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states: Not-applicable
Cross-connect-interface: ATM13/0/0, Type: ATM Swi/Proc
Cross-connect-VPI = 0
Cross-connect-VCI = 173
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state: Not-applicable
Encapsulation: AAL5LANE
Threshold Group: 5, Cells queued: 0
Rx cells: 56, Tx cells: 0
Tx Clp0:0, Tx Clp1: 0
Rx Clp0:0, Rx Clp1: 56
Rx Upc Violations:0, Rx cell drops:0
Rx pkts:8, Rx pkt drops:0
Rx connection-traffic-table-index: 2147483647
Rx service-category: UBR (Unspecified Bit Rate)
Rx pcr-clp01: 7113539
Rx scr-clp01: none

```

```

Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx      mbs: none
Tx connection-traffic-table-index: 2147483645
Tx service-category: UBR (Unspecified Bit Rate)
Tx pcr-clp01: 0
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx      mbs: none
AAL5 statistics:
Crc Errors:0, Sar Timeouts:0, OverSizedSDUs:0
BufSzOvfl: Small:0, Medium:0, Big:0, VeryBig:0, Large:0

```

5500-asp-e#**show atm vc interface atm11/0/1.6 6 5**

```

Interface: ATM11/0/1.6, Type: oc3suni
  VPI = 6  VCI = 5
Status: UP
Time-since-last-status-change: 00:09:30
Connection-type: PVC
Cast-type: point-to-point
Packet-discard-option: enabled
Usage-Parameter-Control (UPC): pass
Wrr weight: 15
Number of OAM-configured connections: 0
OAM-configuration: disabled
OAM-states: Not-applicable
Cross-connect-interface: ATM13/0/0, Type: ATM Swi/Proc
Cross-connect-VPI = 0
Cross-connect-VCI = 164
Cross-connect-UPC: pass
Cross-connect OAM-configuration: disabled
Cross-connect OAM-state: Not-applicable
Encapsulation: AALQSAAL
Threshold Group: 6, Cells queued: 0
Rx cells: 146, Tx cells: 149
Tx Clp0:149, Tx Clp1: 0
Rx Clp0:64, Rx Clp1: 82
Rx Upc Violations:0,
Rx cell drops:0
Rx pkts:138, Rx pkt drops:0
Rx connection-traffic-table-index: 2
Rx service-category: CBR (Constant Bit Rate)
Rx pcr-clp01: 424
Rx scr-clp01: none
Rx mcr-clp01: none
Rx      cdvt: 1024 (from default for interface)
Rx      mbs: none
Tx connection-traffic-table-index: 2
Tx service-category: CBR (Constant Bit Rate)
Tx pcr-clp01: 424
Tx scr-clp01: none
Tx mcr-clp01: none
Tx      cdvt: none
Tx      mbs: none
AAL5 statistics:
Crc Errors:0, Sar Timeouts:0, OverSizedSDUs:0
BufSzOvfl: Small:2, Medium:0, Big:0, VeryBig:0, Large:0

```

- **show lane** Used to verify that LANE is operational.

```

5500-asp-e#show lane
LE Client ATM13/0/0.1 ELAN name: test Admin: up State: operational

```

```

Client ID: 2                               LEC up for 10 minutes 9 seconds
ELAN ID: 0
Join Attempt: 25
Known LE Servers: 1
Last Fail Reason: Locally deactivate
HW Address: 0050.537e.1402   Type: ethernet   Max Frame Size: 1516
ATM Address: 47.0091810000000050537E1401.0050537E1402.01
VCD  rxFrames  txFrames  Type          ATM Address
0      0          0  configure  47.009181000000009021448401.009021448405.00
170    1          2  direct    47.009181000000009021448401.009021448403.01
171    1          0  distribute 47.009181000000009021448401.009021448403.01
172    0          0  send      47.009181000000009021448401.009021448404.01
173    10         0  forward   47.009181000000009021448401.009021448404.01

```

- **show atm pnni neighbor** Used to verify that the Private Network–Network Interface (PNNI) neighbors are established.

```

5500-asp-e#show atm pnni nei
Neighbors For Node (Index 1, Level 56)
  Neighbor Name: 8540-MSR, Node number: 9
  Neighbor Node Id: 56:160:47.009181000000009021448401.009021448401.00
Neighboring Peer State: Full
Link Selection For CBR      : minimize blocking of future calls
Link Selection For VBR-RT  : minimize blocking of future calls
Link Selection For VBR-NRT : minimize blocking of future calls
Link Selection For ABR     : balance load
Link Selection For UBR     : balance load
  Port                      Remote Port Id          Hello state
  ATM11/0/1.6              ATM2/1/0.6              2way_in (Flood Port)
5500-asp-e#

```

Verify 5500–asp–f

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show atm vp** Used to verify that VP is in operational use.

```

5500-asp-f#show atm vp
Interface      VPI   Type  X-Interface  X-VPI  Status
ATM11/0/0     6     PVP   ATM11/0/1   6      UP
ATM11/0/1     6     PVP   ATM11/0/0   6      UP

```

```
5500-asp-f#
```

- **show atm interface resource atmX/y/z** Used to view resources reserved by these two VPs on the interface.

```

5500-asp-f#show atm interface resource atm11/0/1
Resource Management configuration:
  Service Classes:
    Service Category map: c1 cbr, c2 vbr-rt, c3 vbr-nrt, c4 abr, c5 ubr
    Scheduling: RS c1 WRR c2, WRR c3, WRR c4, WRR c5
    WRR Weight: 8 c2, 1 c3, 1 c4, 1 c5
    Pacing: disabled 0 Kbps rate configured, 0 Kbps rate installed
  Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
  Link Distance: 0 kilometers
  Controlled Link sharing:
    Max aggregate guaranteed services: none RX, none TX
    Max bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                  none abr RX, none abr TX, none ubr RX, none ubr TX
    Min bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                  none abr RX, none abr TX, none ubr RX, none ubr TX

```

```

Best effort connection limit: disabled 0 max connections
Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
Sustained-cell-rate: none vbr RX, none vbr TX
Minimum-cell-rate RX: none abr, none ubr
Minimum-cell-rate TX: none abr, none ubr
CDVT RX: none cbr, none vbr, none abr, none ubr
CDVT TX: none cbr, none vbr, none abr, none ubr
MBS: none vbr RX, none vbr TX
Resource Management state:
Available bit rates (in Kbps):
137503 cbr RX, 137503 cbr TX, 137503 vbr RX, 137503 vbr TX,
137503 abr RX, 137503 abr TX, 137503 ubr RX, 137503 ubr TX
Allocated bit rates:
10240 cbr RX, 10240 cbr TX, 0 vbr RX, 0 vbr TX,
0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
Best effort connections: 1 pvcs, 0 svcs

```

Verify 8540 MSR

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only), which allows you to view an analysis of **show** command output.

- **show atm vp** Used to verify that the hierarchical VP tunnel is configured properly.

```

8540-MSR#show atm vp
      Interface  VPI  Type  X-Interface  X-VPI  Status
ATM2/1/0      6    PVP   HIE. TUNNEL

```

- **show atm vc interface atmx/y/z.n** Used to see which VCs were established through the hierarchical VP tunnel.

```

8540-MSR#show atm vc int atm2/1/0.6

Interface  VPI  VCI  Type  X-Interface  X-VPI  X-VCI  Encap  Status
ATM2/1/0.6  6    3    PVC   ATM0         0      111    SNAP   UP
ATM2/1/0.6  6    4    PVC   ATM0         0      112    SNAP   UP
ATM2/1/0.6  6    5    PVC   ATM0         0      110    QSAAL  UP
ATM2/1/0.6  6    16   PVC   ATM0         0      109    ILMI   UP
ATM2/1/0.6  6    18   PVC   ATM0         0      113    PNNI   UP
ATM2/1/0.6  6    37   SVC   ATM0         0      170    LANE   UP
ATM2/1/0.6  6    38   SVC   ATM0         0      150    LANE   UP
ATM2/1/0.6  6    39   SVC   ATM0         0      171    LANE   UP
ATM2/1/0.6  6    40   SVC   ATM0         0      154    LANE   UP
ATM2/1/0.6  6    100  PVC   ATM-P1/0/3  0      16     LANE   UP

```

- **show atm interface resource atmx/y/z.n** Used to verify the resources allocated by VCs that go through the VP tunnel.

```

8540-MSR#show atm interface resource atm2/1/0

Resource Management configuration:
Service Classes:
  Service Category map: c2 cbr, c2 vbr-rt, c3 vbr-nrt, c4 abr, c5 ubr
  Scheduling: RS c1 WRR c2, WRR c3, WRR c4, WRR c5
  WRR Weight: 8 c2, 1 c3, 1 c4, 1 c5
Pacing: disabled 0 Kbps rate configured, 0 Kbps rate installed
Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
Link Distance: 0 kilometers
Controlled Link sharing:
  Max aggregate guaranteed services: none RX, none TX
  Max bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
                 none abr RX, none abr TX, none ubr RX, none ubr TX

```

```

Min bandwidth: none cbr RX, none cbr TX, none vbr RX, none vbr TX,
              none abr RX, none abr TX, none ubr RX, none ubr TX
Best effort connection limit: disabled 0 max connections
Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
Sustained-cell-rate: none vbr RX, none vbr TX
Minimum-cell-rate RX: none abr, none ubr
Minimum-cell-rate TX: none abr, none ubr
CDVT RX: none cbr, none vbr, none abr, none ubr
CDVT TX: none cbr, none vbr, none abr, none ubr
MBS: none vbr RX, none vbr TX
Resource Management state:
  Available bit rates (in Kbps):
    137503 cbr RX, 137503 cbr TX, 137503 vbr RX, 137503 vbr TX,
    137503 abr RX, 137503 abr TX, 137503 ubr RX, 137503 ubr TX
  Allocated bit rates:
    10240 cbr RX, 10240 cbr TX, 0 vbr RX, 0 vbr TX,
    0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
Best effort connections: 0 pvcs, 0 svcs

```

8540-MSR#show atm interface resource atm2/1/0.6

```

Resource Management configuration:
  Service Categories supported: cbr,vbr-rt,vbr-nrt,abr,ubr
Link Distance: 0 kilometers
Best effort connection limit: disabled 0 max connections
Max traffic parameters by service (rate in Kbps, tolerance in cell-times):
Peak-cell-rate RX: none cbr, none vbr, none abr, none ubr
Peak-cell-rate TX: none cbr, none vbr, none abr, none ubr
Sustained-cell-rate: none vbr RX, none vbr TX
Minimum-cell-rate RX: none abr, none ubr
Minimum-cell-rate TX: none abr, none ubr
CDVT RX: none cbr, none vbr, none abr, none ubr
CDVT TX: none cbr, none vbr, none abr, none ubr
MBS: none vbr RX, none vbr TX
Resource Management state:
  Available bit rates (in Kbps):
    7986 cbr RX, 7986 cbr TX, 7986 vbr RX, 7986 vbr TX,
    7986 abr RX, 7986 abr TX, 7986 ubr RX, 7986 ubr TX
  Allocated bit rates:
    1741 cbr RX, 1741 cbr TX, 0 vbr RX, 0 vbr TX,
    0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX

```

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- [ATM Technical Support Page](#)
- [VP Switching and Tunnels](#)
- [Technical Support – Cisco Systems](#)

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