



ATM Commands

This chapter describes the commands available to configure an Asynchronous Transfer Mode (ATM) interface in the Cisco 7000 series and Cisco 7500 series routers with ATM Interface Processors (AIPs) and Cisco 4500 and Cisco 4700 routers with network processor modules (NPMs), and to configure a serial interface for ATM access in other routers.

Note ATM is currently not supported on Cisco 2500 series and Cisco AS5100 access servers.

For ATM configuration information and examples, refer to the chapter entitled “Configuring ATM” in the *Wide-Area Networking Configuration Guide*.

atm aal aal3/4

To enable support for ATM adaptation layer 3/4 (AAL3/4) on the AIP, use the **atm aal aal3/4** interface configuration command. To disable support for ATM adaptation layer 3/4 (AAL3/4) on an ATM interface, use the **no** form of this command.

```
atm aal aal3/4  
no atm aal aal3/4
```

Syntax Description

This command has no arguments or keywords.

Default

Support for AAL3/4 is disabled.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is supported on Cisco 7000 series and Cisco 7500 series routers. Because Cisco 4500 and Cisco 4700 routers always support both AAL3/4 and AAL5, this command is not required on Cisco 4500 and Cisco 4700 routers.

Only one virtual circuit can exist on a subinterface that is being used for AAL3/4 processing, and that virtual circuit must be an AAL3/4 virtual circuit.

The AAL3/4 support feature requires static mapping of all protocols except IP.

Example

The following example enables AAL3/4 on ATM interface 2/0:

```
interface atm2/0  
ip address 172.21.177.178 255.255.255.0  
atm aal aal3/4
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

```
atm mid-per-vc  
atm multicast  
atm pvc  
atm smds-address  
interface atm †
```

atm address-registration

To enable the router to engage in address registration and callback functions with the Interim Local Management Interface (ILMI), use the **atm address-registration** interface configuration command. To disable ILMI address registration functions, use the **no** form of this command.

atm address-registration
no atm address-registration

Syntax Description

This command has no keywords and arguments.

Default

Enabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command enables a router to register its address with the ILMI for callback when specific events occur, such as incoming Simple Network Management Protocol (SNMP) traps or incoming new network prefixes.

Example

The following example enables ATM interface I/O to register its address:

```
interface atm 1/0
 atm address-registration
```

Related Command

atm ilmi-keepalive

atm arp-server

To identify an ATM Address Resolution Protocol (ARP) server for the IP network or set time-to-live (TTL) values for entries in the ATM ARP table, use the **arp-server** interface configuration command. To remove the definition of an ATM ARP server, use the **no** form of this command.

```
atm arp-server [self [time-out minutes] | nsap nsap-address]  
no atm arp-server [self [time-out minutes] | nsap nsap-address]
```

Syntax Description

self	(Optional) Specifies the current router as the ATM ARP server.
time-out <i>minutes</i>	(Optional) Number of minutes a destination entry listed in the ATM ARP server's ARP table will be kept before the server takes any action to verify or time out the entry.
nsap <i>nsap-address</i>	(Optional) Network service access point (NSAP) address of an ATM ARP server.

Defaults

The ARP server process is disabled. The default timeout value is 20 minutes.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

If an NSAP address is specified, the ARP client on this interface uses the specified host as an ARP server. You can specify multiple ATM ARP servers by repeating the command. If **self** is specified, this interface acts as the ARP server for the logical IP network.

The ATM ARP server takes one of the following actions if a destination listed in the server's ARP table expires:

- If a virtual circuit still exists to that destination, the server sends an Inverse ARP request. If no response arrives, the entry times out.
- If a virtual circuit does not exist to the destination, the entry times out immediately.

This implementation follows RFC 1577, Classical IP over ATM.

atm backward-max-burst-size-clp0

To change the maximum number of high-priority cells coming from the destination router to the source router at the burst level on the switched virtual circuit (SVC), use the **atm backward-max-burst-size-clp0** map-class configuration command. The **no** form of this command restores the default.

```
atm backward-max-burst-size-clp0 cell-count  
no atm backward-max-burst-size-clp0
```

Syntax Description

cell-count Maximum number of high-priority cells coming from the destination router at the burst level. Default is -1.

Default

-1. The router does not request this quality of service (QOS) parameter of the ATM switch, so the switch provides a “best effort service.” The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series and Cisco 7500 series routers and on Cisco 4500 and Cisco 4700 routers.

This command defines a quality of service (QOS) parameter for the SVC connection.

The keyword **clp0** indicates that this command affects only cells with a cell loss priority (CLP) of 0 (high-priority cells).

On the Cisco 7000 and Cisco 7500, the value of this parameter can be a multiple of 32 within the range of 32 to 2016 cells. Any value within this range that is not a multiple of 32 will be rounded to the nearest multiple of 32. On the Cisco 4500 and Cisco 4700 routers, the value of this parameter can be between 1 and 65535 cells.

Example

The following example sets the maximum number of high-priority cells coming from the destination router at the burst level to 800 cells:

```
atm backward-max-burst-size-clp0 800
```

atm backward-max-burst-size-clp1

To request the maximum number of low-priority and high-priority cells coming from the destination router to the source router at the burst level on the SVC, use the **atm backward-max-burst-size-clp1** map-class configuration command. The **no** form of this command restores the default value.

```
atm backward-max-burst-size-clp1 cell-count  
no atm backward-max-burst-size-clp1
```

Syntax Description

cell-count Maximum number of low-priority and high-priority cells coming from the destination router at the burst level. Default is -1.

Default

-1. The router does not request this traffic parameter of the ATM switch. The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a traffic parameter for the SVC connection.

The suffix **clp1** applies to the cumulative flow of CLP0 and CLP1 (high-priority and low-priority) cells.

On the Cisco 7000 and Cisco 7500, the value of this parameter can be a multiple of 32 within the range of 32 to 2016 cells. Any value within this range that is not a multiple of 32 will be rounded to the nearest multiple of 32. On the Cisco 4500 and Cisco 4700 routers, the value of this parameter can be between 1 and 65535 cells.

Example

The following example requests the maximum number of low-priority and high-priority cells coming from the destination router at the burst level to 2016:

```
atm backward-max-burst-size-clp1 2016
```

atm backward-peak-cell-rate-clp0

To change the peak rate of high-priority cells coming from the destination router to the source router on the SVC, use the **atm backward-peak-cell-rate-clp0** map-class configuration command. The **no** form of this command restores the default.

```
atm backward-peak-cell-rate-clp0 rate
no atm backward-peak-cell-rate-clp0
```

Syntax Description

rate Maximum rate in kilobits per second (kbps) at which this SVC can receive high-priority cells from the destination router. Default is -1. Maximum upper range is 155,000 kbps.

Default

-1. The router does not request this quality of service (QOS) parameter of the ATM switch, so the switch provides a “best effort service.” The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500series, Cisco 4500, and Cisco 4700 routers.

This command defines a quality of service (QOS) parameter for the SVC connection.

The suffix **clp0** indicates that this command affects only cells with a cell loss priority (CLP) of 0 (high-priority cells).

If either the forward or backward peak cell rate (PCR) values for the CLP0 cell flow is specified, the SETUP request formulated by the router does not specify Best Effort. The connection requested should therefore be interpreted as a Non-Real Time Variable Bit Rate (VBR-NRT) Service Category connection.

Commonly, VBR-NRT connections can be rejected at intermediate switches because of one or more of the following conditions:

- a requested peak rate is greater than that of the interface through which the connection passes.
- the cumulative reservation of bandwidth for existing VBR or Constant Bit Rate (CBR) connections does not leave room for the bandwidth proposed for the new signaled connection.
- the sustainable cell rate specified for a forward or backward direction is greater than the peak cell rate specified for that direction.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For the Cisco 7000 and Cisco 7500 series routers (depending on the physical interface type e.g. OC-3, DS-3), the PCR shaping parameters can be between 130 and 155,000 kbps. For the Cisco 4500 and Cisco 4700 routers, PCR can be between 56 and 155,000 kbps.

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example sets the peak rate for high-priority cells from the destination router to 8000 kbps:

```
atm backward-peak-cell-rate-clp0 8000
```

atm backward-peak-cell-rate-clp1

To request the peak rate of low-priority and high-priority cells coming from the destination router to the source router on the SVC, use the **atm backward-peak-cell-rate-clp1** map-class configuration command. The **no** form of this command restores the default.

```
atm backward-peak-cell-rate-clp1 rate  
no atm backward-peak-cell-rate-clp1
```

Syntax Description

rate Maximum rate in kilobits per second (kbps) at which this SVC can receive low-priority and high-priority cells from the destination router. Default is -1. Maximum upper range is 7,113,539 kbps (limited by 0xfffff cells-per-second).

Default

-1. The router does not request this traffic parameter of the ATM switch. The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a traffic parameter for the SVC connection.

The suffix **clp1** applies to the cumulative flow of CLP0 and CLP1 (high-priority and low-priority) cells.

If only the forward and backward peak cell rates (PCR) for the cumulative flow of CLP0 and CLP1 cells are specified, the SETUP request formulated by the router specifies Best Effort. The connection requested should therefore be interpreted as an Unspecified Bit Rate (UBR) Service Category connection.

Commonly, UBR connections are not rejected at intermediate switches simply because the requested rate is greater than that of the interface through which the connection passes. Also, a UBR connection established on a switch interface does not typically reserve bandwidth. For example, many UBR connections can be established on an interface each having specified PCR of the interface rate.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For the Cisco 7000 and Cisco 7500 series routers (depending on the physical interface type e.g. OC-3, DS-3), the PCR shaping parameters can be between 130 and 155,000 kbps. For the Cisco 4500 and Cisco 4700 routers, PCR can be between 56 and 155,000 kbps.

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example requests the peak rate for low-priority and high-priority cells from the destination router to 7000 kbps:

```
atm backward-peak-cell-rate-clp1 7000
```

atm backward-sustainable-cell-rate-clp0

To change the sustainable rate of high-priority cells coming from the destination router to the source router on the SVC, use the **atm backward-sustainable-cell-rate-clp0** map-class configuration command. The **no** form of this command restores the default.

```
atm backward-sustainable-cell-rate-clp0 rate
no atm backward-sustainable-cell-rate-clp0
```

Syntax Description

rate Sustainable rate in kilobits per second (kbps) at which this SVC can receive high-priority cells from the destination router. Default is -1. Maximum upper range is 155,000 kbps.

Default

-1. The router does not request this quality of service (QoS) parameter of the ATM switch, so the switch provides a “best effort service.” The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a quality of service (QoS) parameter for the SVC connection.

The suffix **clp0** indicates that this command affects only cells with a cell loss priority (CLP) of 0 (high-priority cells).

On the AIP, the sustainable rate can be in the range of (peak rate)*(1/64) kbps to the peak rate value. For example, if the peak rate is 8192 kbps, the sustainable rate can be in the range of (8192)*(1/64) = 128 kbps to 8192 kbps. The sustainable rate you will input will always round to the nearest value equal to (peak rate)*(1/n) where n=1, 2, 3, . . . , 64. Any value between (peak rate)*(1/1) and (peak rate)*(1/2) will give you an error.

If any of the forward or backward sustainable cell rate (PCR) values are specified, the SETUP request formulated by the router does not specify Best Effort. The connection requested should therefore be interpreted as a Non-Real Time Variable Bit Rate (VBR-NRT) Service Category connection.

Commonly, VBR-NRT connections can be rejected at intermediate switches because of one or more of the following conditions:

- a requested peak rate or sustainable rate is greater than that of the interface through which the connection passes.
- the cumulative reservation of bandwidth for existing VBR or Constant Bit Rate (CBR) connections does not leave room for the bandwidth proposed for the new signaled connection.

- the sustainable cell rate specified for a forward or backward direction is greater than the peak cell rate specified for that direction.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For AIP interfaces, the sustainable cell rate that is installed is subject to the following limitations:

- sustainable cell rate \leq (peak cell rate)/2
- sustainable cell rate \geq (peak cell rate)/64

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example sets the sustainable rate for high-priority cells from the destination router to 800 kbps:

```
atm backward-sustainable-cell-rate-clp0 800
```

atm backward-sustainable-cell-rate-clp1

To request the sustainable rate of low-priority and high-priority cells coming from the destination router to the source router on the SVC, use the **atm backward-sustainable-cell-rate-clp1** map-class configuration command. The **no** form of this command restores the default value.

```
atm backward-sustainable-cell-rate-clp1 rate
no atm backward-sustainable-cell-rate-clp1
```

Syntax Description

rate Sustainable rate in kilobits per second (kbps) at which this SVC can receive low-priority and high-priority cells from the destination router. Default is -1. Maximum upper range is 7,113,539 kbps (limited by 0xfffff cells-per-second).

Default

-1. The router does not request this traffic parameter of the ATM switch. The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a traffic parameter for the SVC connection.

The suffix **clp1** applies to the cumulative flow of CLP0 and CLP1 (high-priority and low-priority) cells.

On the AIP, the sustainable rate can be in the range of (peak rate)*(1/64) kbps to the peak rate value. For example, if the peak rate is 8192 kbps, the sustainable rate can be in the range of (8192)*(1/64) = 128 kbps to 8192 kbps. The sustainable rate you will input will always round to the nearest value equal to (peak rate)*(1/n) where n=1, 2, 3, . . . , 64. Any value between (peak rate)*(1/1) and (peak rate)*(1/2) will give you an error.

If any of the forward or backward sustainable cell rate (PCR) values are specified, the SETUP request formulated by the router does not specify Best Effort. The connection requested should therefore be interpreted as a Non-Real Time Variable Bit Rate (VBR-NRT) Service Category connection.

Commonly, VBR-NRT connections can be rejected at intermediate switches because of one or more of the following conditions:

- a requested peak rate or sustainable rate is greater than that of the interface through which the connection passes.
- the cumulative reservation of bandwidth for existing VBR or Constant Bit Rate (CBR) connections does not leave room for the bandwidth proposed for the new signaled connection.

- the sustainable cell rate specified for a forward or backward direction is greater than the peak cell rate specified for that direction.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For AIP interfaces, the sustainable cell rate that is installed is subject to the following limitations:

- sustainable cell rate \leq (peak cell rate)/2
- sustainable cell rate \geq (peak cell rate)/64

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example requests the sustainable rate for low-priority and high-priority cells from the destination router to 700 kbps:

```
atm backward-sustainable-cell-rate-clp1 700
```

atm class

To specify a class for an ATM interface, use the **atm class** global configuration command. The **no** form of this command deletes this class from the interface.

```
atm class class-name  
no atm class class-name
```

Syntax Description

class-name User-assigned name of the QOS parameters table.

Default

No class is defined.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

One command is permitted per interface. Entering a second **atm class** command on an interface results in the original entry being overwritten.

Example

The following example illustrates the configuration of an ATM ARP client in an SVC environment using the class *classicip* for traffic shaping:

```
interface atm 2/0  
  atm pvc 1 0 5 qsaal  
  atm pvc 2 0 16 ilmi  
  atm esi-address 345678901234.12  
  ip address 10.0.0.2 255.0.0.0  
  atm arp-server nsap ac.1533.66.020000.0000.0000.0000.0000.0000.00  
  atm class classicip  
  no shutdown  
  
  map-class classicip  
  atm forward-peak-cell-rate-clp1 7000  
  atm backward-peak-cell-rate-clp1 7000  
  atm forward-sustainable-cell-rate-clp0 800
```

Related Command

map-class atm

atm clock internal

To cause the ATM interface to generate the transmit clock internally, use the **atm clock internal** interface configuration command. The **no** form of this command restores the default value.

atm clock internal
no atm clock internal

Syntax Description

This command has no arguments or keywords.

Default

The ATM interface uses the transmit clock signal from the remote connection (the line). The switch provides the clocking.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is meaningless on a 4B/5B physical layer interface module (PLIM).

Example

The following example causes the ATM interface to generate the transmit clock internally:

```
atm clock internal
```

atm ds3-scramble

To enable scrambling of the ATM cell payload for the DS-3 PLIM, use the **atm ds3-scramble** interface configuration command. To disable this functionality, use the **no** form of this command.

```
atm ds3-scramble  
no atm ds3-scramble
```

Syntax Description

This command has no arguments or keywords.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command is supported on the Cisco 7000 and Cisco 7500 series and the Cisco 4500 and Cisco 4700 routers.

atm esi-address

To enter the end station ID (ESI) and selector byte fields of the ATM NSAP address, use the **atm esi-address** interface configuration command. The NSAP address prefix is filled in via ILMI from the ATM switch. The **no** form deletes the end station address.

```
atm esi-address esi.selector  
no atm esi-address esi.selector
```

Syntax Description

<i>esi</i>	End station ID field value in hexadecimal; 6 bytes long.
<i>selector</i>	Selector field value in hexadecimal; 1 byte long.

Default

No end station is defined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command applies to the Cisco 7000 series, the Cisco 7500 series, the Cisco 4500, and the Cisco 4700 routers.

Before Cisco IOS Release 11.1, ATM addresses were configured on the router only by use of the **atm nsap-address** interface configuration command. The complete 20-byte NSAP (40 hexadecimal characters) had to be configured.

The **atm esi-address** command allows you to configure the ATM address by entering the ESI (12 hexadecimal characters) and the selector byte (2 hexadecimal characters). The ATM prefix (26 hexadecimal characters) will be provided by the ATM switch. To get the prefix from the ATM switch, the ILMI permanent virtual circuit (PVC) must be configured on the router and the ATM switch must be able to supply a prefix via ILMI.

Note When ILMI is configured, use the **atm esi-address** command instead of the **atm nsap-address** command. The **atm esi-address** and **atm nsap-address** commands are mutually exclusive. Configuring the router with the **atm esi-address** command negates the **atm nsap-address** setting, and vice versa.

The ILMI PVC must be configured in order to get an NSAP address prefix from the switch.

Example

The following example shows the router's configuration after a PVC is set up for communication with the switch via ILMI and the value 303132333435.36 in the **esi-address** command is entered.

```
inverness #show running-config
Building configuration...
Current configuration:
!
!
interface ATM2/0
ip address 1.1.1.1 255.255.255.0
map-group atm1
atm esi-address 303132333435.36
atm pvc 1 0 5 qsaal
atm pvc 2 0 16 ilmi
```

Related Commands

atm nsap-address

atm pvc ilmi

atm exception-queue

To set the exception queue length on the AIP, use the **atm exception-queue** interface configuration command. The **no** form of this command restores the default value.

atm exception-queue *number*
no atm exception-queue

Syntax Description

number Number of entries in the range of 8 to 256. Default is 32 entries.

Default

32 entries

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series and Cisco 7500 series, but not on Cisco 4500 and Cisco 4700 routers.

The exception queue is used for reporting ATM events, such as cycle redundancy check (CRC) errors.

Example

In the following example, the exception queue is set to 50 entries:

```
atm exception-queue 50
```

atm forward-max-burst-size-clp0

To change the maximum number of high-priority cells going from the source router to the destination router at the burst level on the SVC, use the **atm forward-max-burst-size-clp0** map-class configuration command. The **no** form of this command restores the default value.

```
atm forward-max-burst-size-clp0 cell-count  
no atm forward-max-burst-size-clp0
```

Syntax Description

cell-count Maximum number of high-priority cells going from the source router at the burst level. Default is -1.

Default

-1. The router does not request this quality of service (QOS) parameter of the ATM switch, so the switch provides a “best effort service.” The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series and Cisco 7500 series routers, as well as on Cisco 4500 and Cisco 4700 routers.

This command defines a quality of service (QOS) parameter for the SVC connection.

The keyword **clp0** indicates that this command affects only cells with a cell loss priority (CLP) of 0 (high-priority cells)

On the Cisco 7000 and Cisco 7500, the value of this parameter can be a multiple of 32 within the range of 32 to 2016 cells. Any value within this range that is not a multiple of 32 will be rounded to the nearest multiple of 32. On the Cisco 4500 and Cisco 4700 routers, the value of this parameter can be between 1 and 65535 cells.

Example

The following example sets the maximum number of high-priority cells going from the source router at the burst level to 100,000:

```
atm forward-max-burst-size-clp0 100000
```

atm forward-max-burst-size-clp1

To request the maximum number of low-priority and high-priority cells going from the source router to the destination router at the burst level on the SVC, use the **atm forward-max-burst-size-clp1** map-class configuration command. The **no** form of this command restores the default value.

```
atm forward-max-burst-size-clp1 cell-count  
no atm forward-max-burst-size-clp1
```

Syntax Description

cell-count Maximum number of low-priority and high-priority cells going from the source router at the burst level. Default is -1.

Default

-1. The router does not request this traffic parameter of the ATM switch. The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a traffic parameter for the SVC connection.

The suffix **clp1** applies to the cumulative flow of CLP0 and CLP1 (high-priority and low-priority) cells.

On the Cisco 7000 and Cisco 7500, the value of this parameter can be a multiple of 32 within the range of 32 to 2016 cells. Any value within this range that is not a multiple of 32 will be rounded to the nearest multiple of 32. On the Cisco 4500 and Cisco 4700 routers, the value of this parameter can be between 1 and 65535 cells.

Example

The following example requests the maximum number of low-priority and high-priority cells going from the source router at the burst level to 100,000:

```
atm forward-max-burst-size-clp1 100000
```

atm forward-peak-cell-rate-clp0

To change the peak rate of high-priority cells going from the source router to the destination router on the SVC, use the **atm forward-peak-cell-rate-clp0** map-class configuration command. The **no** form of this command restores the default value.

```
atm forward-peak-cell-rate-clp0 rate
no atm forward-peak-cell-rate-clp0
```

Syntax Description

<i>rate</i>	Maximum rate in kilobits per second (kbps) at which this SVC can send high-priority cells from the source router. Default is -1. Maximum upper range is 155,000 kbps.
-------------	---

Default

-1. The router does not request this quality of service (QOS) parameter of the ATM switch, so the switch provides a “best effort service.” The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series and Cisco 7500 series routers, as well as on Cisco 4500 and Cisco 4700 routers.

This command defines a quality of service (QOS) parameter for the SVC connection.

The suffix **clp0** indicates that this command affects only cells with a cell loss priority (CLP) of 0 (high-priority cells).

If either the forward or backward peak cell rate (PCR) values for the CLP0 cell flow is specified, the SETUP request formulated by the router does not specify Best Effort. The connection requested should therefore be interpreted as a Non-Real Time Variable Bit Rate (VBR-NRT) Service Category connection.

Commonly, VBR-NRT connections can be rejected at intermediate switches because of one or more of the following conditions:

- a requested peak rate is greater than that of the interface through which the connection passes.
- the cumulative reservation of bandwidth for existing VBR or Constant Bit Rate (CBR) connections does not leave room for the bandwidth proposed for the new signaled connection.
- the sustainable cell rate specified for a forward or backward direction is greater than the peak cell rate specified for that direction.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For the Cisco 7000 and Cisco 7500 series routers (depending on the physical interface type e.g. OC-3, DS-3), the PCR shaping parameters can be between 130 and 155,000 kbps. For the Cisco 4500 and Cisco 4700 routers, PCR can be between 56 and 155,000 kbps.

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example sets the peak high-priority cell rate from the source router to 1000 kbps:

```
atm forward-peak-cell-rate-clp0 1000
```

atm forward-peak-cell-rate-clp1

To request the peak rate of low-priority and high-priority cells coming from the source router to the destination router on the SVC, use the **atm forward-peak-cell-rate-clp1** map-class configuration command. The **no** form of this command restores the default value.

```
atm forward-peak-cell-rate-clp1 rate
no atm forward-peak-cell-rate-clp1
```

Syntax Description

rate Maximum rate in kilobits per second (kbps) at which this SVC can send low-priority and high-priority cells from the source router. Default is -1. Maximum upper range is 7,113,539 kbps (limited by 0xfffff cells-per-second).

Default

-1. The router does not request this traffic parameter of the ATM switch. The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a traffic parameter for the SVC connection.

The suffix **clp1** applies to the cumulative flow of CLP0 and CLP1 (high-priority and low-priority) cells.

If only the forward and backward peak cell rates (PCR) for the cumulative flow of CLP0 and CLP1 cells are specified, the SETUP request formulated by the router specifies Best Effort. The connection requested should therefore be interpreted as an Unspecified Bit Rate (UBR) Service Category connection.

Commonly, UBR connections are not rejected at intermediate switches simply because the requested rate is greater than that of the interface through which the connection passes. Also, a UBR connection established on a switch interface does not typically reserve bandwidth. For example, many UBR connections can be established on an interface each having specified PCR of the interface rate.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For the Cisco 7000 and Cisco 7500 series routers (depending on the physical interface type e.g. OC-3, DS-3), the PCR shaping parameters can be between 130 and 155,000 kbps. For the Cisco 4500 and Cisco 4700 routers, PCR can be between 56 and 155,000 kbps.

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example requests the peak low-priority and high-priority cell rate from the source router to 100,000 kbps:

```
atm forward-peak-cell-rate-clp1 100000
```

atm forward-sustainable-cell-rate-clp0

To change the sustainable rate of high-priority cells coming from the source router to the destination router on the SVC, use the **atm forward-sustainable-cell-rate-clp0** map-class configuration command. The **no** form of this command restores the default value.

```
atm forward-sustainable-cell-rate-clp0 rate
no atm forward-sustainable-cell-rate-clp0
```

Syntax Description

rate Sustainable rate in kilobits per second (kbps) at which this SVC can send high-priority cells from the source router. Default is -1. Maximum upper range is 155,000 kbps.

Default

-1. The router does not request this quality of service (QOS) parameter of the ATM switch, so the switch provides a “best effort service.” The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series and Cisco 7500 series routers, as well as on Cisco 4500 and Cisco 4700 routers.

This command defines a quality of service (QOS) parameter for the SVC connection.

The suffix **clp0** indicates that this command affects only cells with a cell loss priority (CLP) of 0 (high-priority cells)

On the AIP, the sustainable rate can be in the range of (peak rate)*(1/64) kbps to the peak rate value. For example, if the peak rate is 8192 kbps, the sustainable rate can be in the range of (8192)*(1/64) = 128 kbps to 8192 kbps. The sustainable rate you will input will always round to the nearest value equal to (peak rate)*(1/n) where n=1, 2, 3, . . . , 64. Any value between (peak rate)*(1/1) and (peak rate)*(1/2) will give you an error.

If any of the forward or backward sustainable cell rate (PCR) values are specified, the SETUP request formulated by the router does not specify Best Effort. The connection requested should therefore be interpreted as a Non-Real Time Variable Bit Rate (VBR-NRT) Service Category connection.

Commonly, VBR-NRT connections can be rejected at intermediate switches because of one or more of the following conditions:

- a requested peak rate or sustainable rate is greater than that of the interface through which the connection passes.
- the cumulative reservation of bandwidth for existing VBR or Constant Bit Rate (CBR) connections does not leave room for the bandwidth proposed for the new signaled connection.

- the sustainable cell rate specified for a forward or backward direction is greater than the peak cell rate specified for that direction.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For AIP interfaces, the sustainable cell rate that is installed is subject to the following limitations:

- sustainable cell rate \leq (peak cell rate)/2
- sustainable cell rate \geq (peak cell rate)/64

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example sets the sustainable rate for high-priority cells from the source router to 100,000 kbps:

```
atm forward-sustainable-cell-rate-clp0 100000
```

atm forward-sustainable-cell-rate-clp1

To request the sustainable rate of low-priority and high-priority cells coming from the source router to the destination router on the SVC, use the **atm forward-sustainable-cell-rate-clp1** map-class configuration command. The **no** form of this command restores the default value.

```
atm forward-sustainable-cell-rate-clp1 rate
no atm forward-sustainable-cell-rate-clp1
```

Syntax Description

rate Sustainable rate in kilobits per second (kbps) at which this SVC can send low-priority and high-priority cells from the source router. Default is -1. Maximum upper range is 7,113,539 kbps (limited by 0xfffff cells-per-second).

Default

-1. The router does not request this traffic parameter of the ATM switch. The switch drops cells if there is not enough buffer space.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

This command defines a traffic parameter for the SVC connection.

The suffix **clp1** applies to the cumulative flow of CLP0 and CLP1 (high-priority and low-priority) cells.

On the AIP, the sustainable rate can be in the range of (peak rate)*(1/64) kbps to the peak rate value. For example, if the peak rate is 8192 kbps, the sustainable rate can be in the range of (8192)*(1/64) = 128 kbps to 8192 kbps. The sustainable rate you will input will always round to the nearest value equal to (peak rate)*(1/n) where n=1, 2, 3, . . . , 64. Any value between (peak rate)*(1/1) and (peak rate)*(1/2) will give you an error.

If any of the forward or backward sustainable cell rate (PCR) values are specified, the SETUP request formulated by the router does not specify Best Effort. The connection requested should therefore be interpreted as a Non-Real Time Variable Bit Rate (VBR-NRT) Service Category connection.

Commonly, VBR-NRT connections can be rejected at intermediate switches because of one or more of the following conditions:

- a requested peak rate or sustainable rate is greater than that of the interface through which the connection passes.
- the cumulative reservation of bandwidth for existing VBR or Constant Bit Rate (CBR) connections does not leave room for the bandwidth proposed for the new signaled connection.

- the sustainable cell rate specified for a forward or backward direction is greater than the peak cell rate specified for that direction.

Router interfaces capable of per-connection traffic shaping attempt to install signaled parameters. Forward parameters are used by the initiating router, backward parameters apply to the router accepting the connection. For AIP interfaces, the sustainable cell rate that is installed is subject to the following limitations:

- sustainable cell rate \leq (peak cell rate)/2
- sustainable cell rate \geq (peak cell rate)/64

The handling of traffic shaping and connection acceptance is determined by whether or not the **atm sig-traffic-shaping strict** command is enabled or not. Refer to this command in this chapter for further information.

Example

The following example requests the sustainable rate for low-priority and high-priority cells from the source router to 100,000 kbps:

```
atm forward-sustainable-cell-rate-clp1 100000
```

atm framing (DS3)

To specify DS3 line framing on Cisco 4500 and Cisco 4700 routers, use the following form of the **atm framing** interface configuration command. To return to the default C-bit with Physical Layer Convergence Protocol (PLCP) framing, use the **no** form of this command.

```
atm framing [m23adm | cbitplcp | m23plcp]  
no atm framing [m23adm | cbitplcp | m23plcp]
```

Syntax Description

m23adm	(Optional) Specifies M-23 ATM direct mapping.
cbitplcp	(Optional) Specifies C-bit with PLCP framing.
m23plcp	(Optional) Specifies M-23 with PLCP framing.

Default

No framing

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command is available only on Cisco 4500 and Cisco 4700 routers with DS3 access speeds. This command is not available on the Cisco 7000 series or Cisco 7500 series.

Framing on the interface must match that on the switch for this ATM link.

Example

The following example specifies M-23 ADM framing on a Cisco 4500 or Cisco 4700 router that has been set up with DS3 access to an ATM network:

```
atm framing m32adm
```

atm framing (E3)

To specify E3 line framing, use the **atm framing** interface configuration command. To return to the default G.751 Physical Layer Convergence Protocol (PLCP) framing, use the **no** form of this command.

atm framing g832adm (Cisco 7000 series and Cisco 7500 series routers only)
no atm framing g832adm

atm framing [g832adm | g751adm] (Cisco 4500 and Cisco 4700 routers only)
no atm framing [g832adm | g751adm]

Syntax Description

g832adm	(Required for Cisco 7000 series and Cisco 7500 series routers; optional for Cisco 4500 and Cisco 4700 routers) Specifies G.832 ATM Direct Mapping.
g751adm	(Optional) Specifies G.751 ATM Direct Mapping.

Default

No framing

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command is available on the Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers with E3 access speeds. This command is not available on the Cisco 7000 or Cisco 7500 with DS3 access speeds; that combination supports only one type of line framing. The default framing is described in the ITU-T Recommendation G.751.

Note The ITU-T carries out the functions of the former Consultative Committee for International Telegraph and Telephone (CCITT).

Framing on the interface must match that on the switch for this ATM link.

Example

The following example specifies G.832 ADM framing on a Cisco 7000 router that has been set up with E3 access to an ATM network:

```
atm framing g832adm
```

atm idle-timeout

To change the idle timer for SVCs on an interface that will cause the SVCs to disconnect when inactive for a specified interval, use the **atm idle-timeout** interface configuration command. To return to the default setting, use the **no** form of this command.

atm idle-timeout *seconds*
no atm idle-timeout

Syntax Description

seconds

Number of seconds the SVC can be inactive before disconnecting. Setting *seconds* to 0 disables idle timeouts.

Default

120 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

To disable idle timeouts entirely, set the value of *seconds* to zero.

Prior to Cisco IOS Release 11.0, idle timeouts were not supported; that is, the prior configuration was equivalent to **atm idle-timeout 0**.

atm maxvc

To set the number of virtual circuits (VCs) supported on the AIP card, use the **atm maxvc** interface configuration command. To restore the default value, use the **no** form of this command.

atm maxvc *number*
no atm maxvc

Syntax Description

number Maximum number of supported virtual circuits. Valid values are 512, 1024, or 2048. Default is 2048.

Default

2048 virtual circuits

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 series and Cisco 7500 series routers; it is not supported on the Cisco 4500 and Cisco 4700 routers, which have a fixed maximum of 1024.

This command sets the maximum value supported for the *vcd* argument in the **atm pvc** command. It also determines the maximum number of virtual circuits on which the AIP allows segmentation and reassembly (SAR) to occur. Once this maximum value is set, *vcd* values of 1 to *number* – 1 are usable. A *vcd* value of 0 is not accessible for user traffic.

This command does not affect the virtual path identifier (VPI)-virtual channel identifier (VCI) pair of each virtual circuit.

Example

The following example indicates that the AIP supports no more than 1024 virtual circuits:

```
atm maxvc 1024
```

Related Command

atm pvc

atm mid-per-vc

To limit the number of message identifier (MID) numbers allowed on each virtual circuit, use the **atm mid-per-vc** interface configuration command.

atm mid-per-vc *maximum*

Syntax Description

<i>maximum</i>	Number of MIDs allowed per virtual circuit on this interface. The values allowed are 16, 32, 64, 128, 256, 512, and 1024. The default is 16 MIDs per virtual circuit.
----------------	---

Default

The default limit is 16 MIDs per virtual circuit.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is supported on Cisco 7000 series and Cisco 7500 series. The maximum value is set to 1024 on the Cisco 4500 and Cisco 4700 routers and therefore, this command is not supported on these routers.

Message identifier (MID) numbers are used by receiving devices to reassemble cells from multiple sources into packets. This is applicable to AAL3/4, not AAL5.

This command limits the number of discrete messages allowed on the PVC at the same time. It does not limit the number of cells associated with each message.

The *maximum* set by the **atm mid-per-vc** command overrides the range between the *midhigh* and *midlow* values set by the **atm pvc** command. If you set a *maximum* of 16 but a *midlow* of 0 and a *midhigh* of 255, only 16 MIDs (not 256) are allowed on the virtual circuit.

Example

The following example allows 64 MIDs per ATM virtual circuit:

```
atm mid-per-vc 64
```

Related Command

atm pvc

atm multicast

To assign a Switched Multimegabit Data Service (SMDS) E.164 multicast address to the ATM subinterface that supports AAL3/4 and SMDS encapsulation, use the **atm multicast** interface configuration command.

atm multicast *address*

Syntax Description

address Multicast E.164 address assigned to the subinterface.

Default

No multicast E.164 address is defined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

Each AAL3/4 subinterface is allowed only one multicast E.164 address. This multicast address is used for all protocol broadcast operations.

Example

The following example assigns a multicast E.164 address to the ATM subinterface that is being configured:

```
atm multicast e180.0999.000
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

atm aal aal3/4
atm pvc
atm smds-address
interface atm †

atm multipoint-interval

To specify how often new destinations can be added to multipoint calls to an ATM switch in the network, use the **atm multipoint-interval** interface configuration command. To return to the default interval, use the **no** form of this command.

atm multipoint-interval *interval*
no atm multipoint-interval *interval*

Syntax Description

interval

Interval length in seconds, in the range between 0 and 4294967. The default is 30 seconds.

Default

30 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command applies to SVCs only, not to PVCs.

This command has no effect unless ATM multipoint signaling is enabled on the interface.

Related Command

atm multipoint-signaling

atm multipoint-signaling

To enable point-to-multipoint signaling to the ATM switch, use the **atm multipoint-signaling** interface configuration command. To disable point-to-multipoint signaling to the ATM switch, use the **no** form of this command.

atm multipoint-signaling
no atm multipoint-signaling

Syntax Description

This command has no keywords and arguments.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

If multipoint signaling is enabled, the router uses existing static map entries that have the **broadcast** keyword set to establish multipoint calls. One call is established for each logical subnet of each protocol.

All destinations are added to the call. One multicast packet is sent to the ATM switch for each multipoint call. The ATM switch replicates the packet to all destinations.

The **atm multipoint-interval** command determines how often new destinations can be added to a multipoint call.

Related command

atm multipoint-interval

atm-nsap

To define an ATM map statement for an SVC, use the **atm-nsap** map-list configuration command in conjunction with the **map-list** global configuration command. The **no** form of this command removes the address.

```
protocol protocol-address atm-nsap atm-nsap-address [class class-name] [broadcast]
no protocol protocol-address atm-nsap atm-nsap-address [class class-name] [broadcast]
```

Syntax Description

<i>protocol</i>	One of the following keywords: appletalk , apollo , bridge , clns , decnet , ip , ipx , vines , xns .
<i>protocol-address</i>	Destination address that is being mapped to this SVC.
<i>atm-nsap-address</i>	Destination ATM NSAP address. Must be exactly 40 hexadecimal digits long and in the correct dotted format.
class class-name	(Optional) Name of a table that contains encapsulation-specific parameters. Such a table can be shared between maps that have the same encapsulation.
broadcast	(Optional) Indicates this map entry is to be used when the corresponding <i>protocol</i> sends broadcast packets to the interface—for example, Interior Gateway Routing Protocol (IGRP) updates.

Default

No map statements are defined.

Command Mode

Map-list configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command is required with the **map-list** command when you are configuring an SVC.

Example

In the following example, a map list named *atmsvc* includes one map statement for a destination address being mapped:

```
map-list atmsvc
ip 172.21.97.17 atm-nsap AB.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12 class qos
broadcast
```

Related Command

map-list

atm nsap-address

To set the NSAP address for an ATM interface using SVC mode, use the **atm nsap-address** interface configuration command. The **no** form of this command removes any configured address for the interface.

```
atm nsap-address nsap-address
no atm nsap-address
```

Syntax Description

nsap-address The 40-digit hexadecimal NSAP address of this interface (the source address).

Default

No NSAP address is defined for this interface.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

When you are configuring an SVC, you must use the **atm nsap-address** command to define the source NSAP address. It identifies a particular port on the ATM network and must be unique across the network.

Note When ILMI is configured, use the **atm esi-address** command instead of the **atm nsap-address** command. The **atm esi-address** and **atm nsap-address** commands are mutually exclusive. Configuring the router with the **atm esi-address** command negates the **atm nsap-address** setting, and vice versa.

Configuring a new address on the interface overwrites the previous address. The router considers the address as a string of bytes and will not prefix or suffix the address with any other strings or digits. The complete NSAP address must be specified, because this value is used in the Calling Party Address Information Element in the SETUP message to establish a virtual circuit.

ATM NSAP addresses have a fixed length of 40 hexadecimal digits. You must configure the complete address in the following dotted format:

```
xx . xxxx . xx . xxxxxx . xxxx . xxxx . xxxx . xxxx . xxxx . xxxx . xx
```

Note All ATM NSAP addresses should be entered in the dotted hexadecimal format shown above, which conforms to the User-Network Interface (UNI) specification. The dotted method provides some validation that the address is a legal value. If you know your address format is correct the dots may be omitted.

Example

In the following example, the source NSAP address for the interface is AB.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12:

```
atm nsap-address AB.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

atm pvc

To create a permanent virtual circuit (PVC) on the AIP or NPM interface and, optionally, to generate Operation, Administration, and Maintenance (OAM) F5 loopback cells or enable Inverse ATM ARP, use the **atm pvc** interface configuration command. The **no** form of this command removes the specified PVC.

```
atm pvc vcd vpi vci aal-encap [[midlow midhigh] [peak average burst]] [oam seconds]
[inarp minutes]
no atm pvc vcd vpi vci aal-encap [[midlow midhigh] [peak average burst]] [oam seconds]
[inarp minutes]
```

Syntax Description

- vcd* Virtual circuit descriptor. A unique number per AIP or NPM that identifies to the processor which VPI-VCI pair to use for a particular packet. Valid values range from 1 to the value set with the **atm maxvc** command. The AIP or NPM requires this feature to manage packet transmission. The *vcd* value is not associated with the VPI-VCI pair used for the ATM network cells. The NPM has a hard coded max *vcd* value of 1023. The AIP has a max *vcd* value of 2047 which can be lowered using the **atm maxvc** command.
- vpi* ATM network virtual path identifier (VPI) of this PVC. On the Cisco 7000 and Cisco 7500 series, this value ranges from 0 through 255; on the Cisco 4500 and Cisco 4700, this value ranges from 0 to 1 less than the quotient of 8192 divided by the value set by the **atm vc-per-vp** command.
- The VPI is an 8-bit field in the header of the ATM cell. The VPI value is unique only on a single link, not throughout the ATM network, because it has local significance only. The VPI value must match that of the switch.
- Both *vpi* and *vci* cannot be specified as 0; if one is 0, the other cannot be 0.
- vci* ATM network virtual channel identifier (VCI) of this PVC, in the range of 0 through 1 less than the maximum value set for this interface by the **atm vc-per-vp** command. The VCI is a 16-bit field in the header of the ATM cell. The VCI value is unique only on a single link, not throughout the ATM network, because it has local significance only.
- Both *vpi* and *vci* cannot be specified as 0; if one is 0, the other cannot be 0.

<i>aal-encap</i>	<p>ATM adaptation layer (AAL) and encapsulation type. When aal5mux is specified, a protocol is required. Possible values are as follows:</p> <ul style="list-style-type: none"> • aal34smds—Encapsulation for SMDS networks. • aal5nlpid—Encapsulation that allows ATM interfaces to interoperate with High-Speed Serial Interfaces (HSSIs) that are using an ATM data service unit (ADSU) and running ATM-Data Exchange Interface (DXI). • aal5mux decnet—A multiplex (MUX)-type virtual circuit. • aal5mux ip—A MUX-type virtual circuit. • aal5mux ipx—A MUX-type virtual circuit. • aal5mux vines—A MUX-type virtual circuit. • aal5mux xns—A MUX-type virtual circuit. • aal5mxu apollo—A MUX-type virtual circuit. • aal5mxu-appletalk—A MUX-type virtual circuit. • aal5snap—Logical Link Control/Subnetwork Access Protocol (LLC/SNAP) precedes the protocol datagram. <i>This is the only encapsulation supported for Inverse ARP.</i> • ilmi—Used to set up communication with the ILMI; the associated <i>vpi</i> and <i>vci</i> values are ordinarily 0 and 16, respectively. • qsaal—A signaling-type PVC used for setting up or tearing down SVCs; the associated <i>vpi</i> and <i>vci</i> values are ordinarily 0 and 5, respectively.
<i>midlow</i>	(Set for aal34smds encapsulation only)(Optional) Starting message identifier (MID) number for this PVC. The default is 0. If you set the <i>peak</i> and <i>average (burst is optional)</i> values for aal34smds encapsulation, you must also set the <i>midlow</i> and <i>midhigh</i> values.
<i>midhigh</i>	(Set for aal34smds encapsulation only)(Optional) Ending MID number for this PVC. The default is 0. If you set the <i>peak</i> and <i>average (burst is optional)</i> values for aal34smds encapsulation, you must also set the <i>midlow</i> and <i>midhigh</i> values.
<i>peak</i>	(Optional) Maximum rate (in kbps) at which this virtual circuit can transmit. Valid values are in the range from 130 kbps to the maximum PLIM rate. If you set this value, you must also specify the <i>average (burst is optional)</i> value.
<i>average</i>	(Optional) Average rate (in kbps) at which this virtual circuit transmits. Valid values are platform dependent. If you set this value, you must also specify the <i>peak (burst is optional)</i> value.
<i>burst</i>	<p>(Optional) Value that relates to the maximum number of ATM cells the virtual circuit can transmit to the network at the <i>peak</i> rate of the PVC. On the AIP, the actual burst cells equals $burst * 32$ cells, thereby allowing for a burst size of 32 cells to 2016 cells. On the ATMZR the value is not multiplied. If you set this value, you must also specify a value for the <i>peak</i> and <i>average</i> arguments.</p> <ul style="list-style-type: none"> • On the AIP, <i>burst</i> can range from 1 to 63 • On the ATMZR, <i>burst</i> can range from 1 to 65535

oam seconds (Optional) Specifies how often to generate an OAM F5 loopback cell from this virtual circuit. The default value is 10 seconds.

inarp minutes (Optional) Specifies how often Inverse ARP datagrams are sent on this virtual circuit. The default value is 15 minutes.

Defaults

If *peak* and *average* rates are omitted, the PVC defaults to the highest bandwidth rate-queue available. *Peak* and *average* rates are then equal. By default, the virtual circuit is configured to run as fast as possible.

The default value of both *midlow* and *midhigh* is 0.

If the **oam** keyword is omitted, OAM cells are not generated. If the **oam** keyword is present but the *seconds* value is omitted, the default value of **oam seconds** is 10 seconds.

If the **inarp** keyword is missing, Inverse ARPs are not generated. If the **inarp** keyword is present, but the timeout value is not given, then Inverse ARPs are generated every 15 minutes.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0. The *midlow* and *midhigh* arguments first appeared in Cisco IOS Release 10.3. The **oam seconds** and **inarp minutes** commands first appeared in Cisco IOS Release 11.0.

The order of command options is important. The **inarp** keyword can be specified either separately or after **oam** has been enabled. The *peak*, *average*, and *burst* arguments, if specified, cannot be specified after either the **inarp** or the **oam** keywords.

The Cisco IOS software dynamically creates rate queues as necessary to satisfy the requests of **atm pvc** commands. The software dynamically creates a rate queue when an **atm pvc** command specifies a peak or average rate that does not match any user-configured rate queue.

The **atm pvc** command creates a PVC and attaches it to the VPI and VCI specified. Both *vpi* and *vci* cannot be specified as 0; if one is 0, the other cannot be 0. The *aal-encap* argument determines the AAL mode and the encapsulation method used. The *peak* and *average* arguments determine the rate queue used.

Use one of the **aal5mux** encapsulation options to dedicate the specified virtual circuit to a single protocol; use the **aal5snap** encapsulation option to multiplex two or more protocols over the same virtual circuit. Whether you select **aal5mux** or **aal5snap** encapsulation might depend on practical considerations, such as the type of network and the pricing offered by the network. If the network's pricing depends on the number of virtual circuits set up, **aal5snap** might be the appropriate choice. If pricing depends on the number of bytes transmitted, **aal5mux** might be the appropriate choice because it has slightly less overhead.

If you choose to specify any of the *peak*, *average*, and *burst* values, you must specify all three values. You can specify *midlow* and *midhigh* values only if you have also specified the *peak*, *average*, and *burst* values.

Message identifier (MID) numbers, which are available only with AAL3/4, are used by receiving devices to reassemble cells from multiple packets. You can assign different *midlow* to *midhigh* ranges to different PVCs to ensure that the message identifiers are unique at the receiving end and, therefore, that messages can be reassembled correctly.

If you are configuring an SVC, you should use the **atm pvc** command to configure the PVC that handles the SVC call setup and termination. In this case, specify **qsaal** for the *aal-encap* argument. See the third example that follows.

The router generates and echoes OAM F5 loopback cells, which verify connectivity. Once OAM cell generation is enabled, a cell is transmitted periodically. The remote end must respond by echoing back the cells.

The router does not generate alarm indication signal (AIS) cells, which are used for alarm surveillance functions. However, if it receives an AIS cell, it responds by sending an OAM far-end remote failure (FERF) cell.

Examples

The following example creates a PVC with VPI 0 and VCI 6. The PVC uses AAL AAL5-MUX with IP protocol.

```
atm pvc 1 0 6 aal5mux ip
```

The following example creates a PVC with VPI 0 and VCI 6. The PVC uses AAL AAL3/4-SMDS protocol.

```
atm pvc 1 0 6 aal34smds 0 15 150000 70000 10
```

The following example creates a PVC to be used for ATM signaling for an SVC. It specifies VPI 0 and VCI 5.

```
atm pvc 1 0 5 qsaal
```

Assuming that no static rate queue has been defined, the following example creates the PVC and also creates a dynamic rate queue with the peak rate set to the maximum allowed by the physical layer interface module (PLIM) and the average set to equal the peak rate:

```
atm pvc 1 1 1 aal5snap
```

Assuming that no static rate queue has been defined, the following example creates the PVC and also creates a dynamic rate queue with the peak rate set to 100 Mbps (100,000 kbps), the average rate set to 50 Mbps (50,000 kbps), and a burst size of 64 cells (2 * 32 cells):

```
atm pvc 1 1 1 aal5snap 100000 50000 2
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

atm aal aal3/4
atm maxvc
atm multicast
atm rate-queue
atm smds-address
mtu †

atm rate-queue

To create a permanent rate queue for the AIP or NPM, use the **atm rate-queue** interface configuration command. The **no** form of this command removes the rate queue.

```
atm rate-queue queue-number speed  
no atm rate-queue
```

Syntax Description

queue-number Queue number in the range 0 through 7 for the Cisco 7000 series and Cisco 7500 series, and in the range 0 through 3 for the Cisco 4500 and Cisco 4700.

Queues 0 through 3 are in the high-priority bank, and queues 4 through 7 are in the low-priority bank. Queues in the same priority bank have the same priority; for example, queues 0 and 3 have the same priority.

speed Speed in megabits per second (Mbps) in the range from 1 through 155. The maximum speed is determined by the detected PLIM type on the AIP or NPM:

- 34 Mbps for E3
- 45 Mbps for DS-3
- 100 Mbps for Transparent Asynchronous Transmitter/Receiver Interface (TAXI)
- 155 Mbps for Synchronous Optical Network (SONET)

Default

No rate queue is defined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

If you do not create permanent rate queues or if you create PVCs with peak or average rates that are not matched by the rate queues you configure, the software dynamically creates rate queues as necessary to satisfy the requests of the **atm pvc** commands.

You can create multiple rate queues. A warning message appears if all rate queues are deconfigured or if the combined rate queues exceed the PLIM rate.

Example

In the following example, rate queue 1 is configured for 100 Mbps:

```
atm rate-queue 1 100
```

Related Command

atm pvc

atm rawq-size

To define the AIP raw-queue size, use the **atm rawq-size** interface configuration command. The **no** form of this command restores the default value.

atm rawq-size *number*
no atm rawq-size

Syntax Description

number Maximum number of cells in the raw queue simultaneously, in the range 8 through 256. Default is 32.

Default

32 cells

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on the Cisco 7000 and Cisco 7500 routers, but not on the Cisco 4500 and Cisco 4700 routers.

The raw queue is used for raw ATM cells, which include OAM (F4 and F5) and Interim Local Management Interface (ILMI) cells.

Example

In the following example, a maximum of 48 cells are allowed in the raw queue:

```
atm rawq-size 48
```

atm rxbuff

To set the maximum number of receive buffers for simultaneous packet reassembly, use the **atm rxbuff** interface configuration command. The **no** form of this command restores the default value.

atm rxbuff *number*
no atm rxbuff

Syntax Description

number Maximum number of packet reassemblies that the AIP can perform simultaneously, in the range 0 through 512. Default is 256.

Default

256 packet reassemblies

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 and Cisco 7500 routers, but not on Cisco 4500 and Cisco 4700 routers.

Example

In the following example, the AIP can perform a maximum of 300 packet reassemblies simultaneously:

```
atm rxbuff 300
```

atmsig close

To disconnect an SVC, use the **atmsig close EXEC** command.

atmsig close atm slot/0 vcd (Cisco 7000 series and Cisco 7500 series routers)

atmsig close atm number vcd (Cisco 4500 and Cisco 4700 series routers)

Syntax Description

slot ATM slot number on the Cisco 7000 and Cisco 7500 routers.

vcd Virtual circuit descriptor of the signaling SVC to close.

number ATM network processor module number on the Cisco 4000 series routers.

Command Mode

EXEC

Usage Guidelines

The **atmsig close atm slot/0 vcd** command first appeared in Cisco IOS Release 10.3.

The **atmsig close atm number vcd** command first appeared in Cisco IOS Release 11.1.

Execute this command if you want to close a particular SVC. Because virtual circuits are numbered per interface, you must specify the ATM interface by its slot number.

Example

The following example closes SVC 2 on ATM interface 4/0:

```
atmsig close atm4/0 2
```

atm sig-traffic-shaping strict

To specify that an SVC should be established on an ATM interface only if shaping can be done per the signaled traffic parameters, use the **atm sig-traffic-shaping strict** interface configuration command. To disable strict traffic shaping, use the **no** form of this command.

```
atm sig-traffic-shaping strict  
no atm sig-traffic-shaping
```

Default

The default value is lenient (not strict) traffic shaping for SVCs.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is supported on the Cisco 7000 series, Cisco 7500 series, Cisco 4500 and Cisco 4700 routers.

If strict traffic-shaping is configured on the router ATM interface, then an SVC is established only if traffic shaping can be provided for the transmit cell flow per the signaled traffic parameters. If such shaping cannot be provided, the SVC is released.

If strict traffic-shaping is not configured on the router ATM interface, an attempt is made to establish an SVC with traffic shaping for the transmit cell flow per the signaled traffic parameters. If such shaping cannot be provided, the SVC is installed with default shaping parameters (behaves as though a PVC were created without specifying traffic parameters).

The signaling SETUP message carries the forward and backward traffic parameters. For connections initiated by the source router, traffic is shaped to the SETUP message forward parameters. For connections initiated by another router/host, traffic is shaped to the backward parameters.

Example

The following example allows an SVC to be established on an ATM interface using only signaled traffic parameters:

```
atm sig-traffic-shaping strict
```

atm smds-address

To assign a unicast E.164 address to the ATM subinterface that supports AAL3/4 and SMDS encapsulation, use the **atm smds-address** interface configuration command.

atm smds-address *address*

Syntax Description

address Unicast E.164 address assigned to the subinterface.

Default

No E.164 address is assigned.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is supported on Cisco 7000, Cisco 7500, Cisco 4500, and Cisco 4700 routers.

Each AAL3/4 subinterface is allowed only one unicast E.164 address.

Example

The following example assigns a unicast E.164 address to the ATM subinterface that is being configured:

```
atm smds-address c141.555.1212
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

atm aal aal3/4
atm multicast
atm pvc
interface atm †

atm sonet

To set the mode of operation and thus control type of ATM cell used for cell-rate decoupling on the SONET PLIM, use the **atm sonet** interface configuration command. The **no** form of this command restores the default Synchronous Transport Signal level 3, concatenated (STS-3c) operation.

```
atm sonet stm-1  
no atm sonet stm-1
```

Syntax Description

stm-1	Synchronous Digital Hierarchy/Synchronous Transport Signal level 1 (SDH/STM-1) operation (ITU-T specification).
--------------	---

Default

STS-3c

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Use STM-1 in applications where the ATM switch requires “idle cells” for rate adaptation. An idle cell contains 31 zeros followed by a one.

Use the default (STS-3c) in applications where the ATM switch requires “unassigned cells” for rate adaptation. An unassigned cell contains 32 zeros.

Example

The following example specifies ATM SONET STM-1:

```
atm sonet stm-1
```

atm txbuff

To set the maximum number of transmit buffers for simultaneous packet fragmentation, use the **atm txbuff** interface configuration command. The **no** form of this command restores the default value.

atm txbuff *number*
no atm txbuff

Syntax Description

number Maximum number of packet fragmentations that the AIP can perform simultaneously, in the range 0 through 512. Default is 256.

Default

256 packet fragmentations

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on the Cisco 7000 and Cisco 7500 routers, but not on the Cisco 4500 and Cisco 4700 routers.

Example

In the following example, the AIP is configured to perform up to 300 packet fragmentations simultaneously:

```
atm txbuff 300
```

atm uni-version

To specify the User-Network Interface (UNI) version (3.0 or 3.1) the router should use when ILMI link autodetermination is unsuccessful or ILMI is disabled, use the **atm uni-version** interface configuration command. To restore the default value to 3.0, use the **no** form of this command.

```
atm uni-version version-number  
no atm uni-version version-number
```

Syntax Description

<i>version-number</i>	UNI version selected on an interface. Valid values are 3.0 and 3.1.
-----------------------	---

Default

Version 3.0

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Normally, when the ILMI link autodetermination is enabled on the interface and is successful, the router accepts the UNI version returned by ILMI. If the ILMI link autodetermination is unsuccessful or ILMI is disabled, the UNI version defaults to 3.0. You can override the default UNI version by using this command to enable UNI 3.1 signaling support. The **no** form of the command sets the UNI version to one returned by ILMI if ILMI is enabled and the link autodetermination process is successful. Otherwise, the UNI version reverts to 3.0.

atm vc

To define an ATM map statement for a PVC, use the **atm vc** map list configuration command in conjunction with the **map-list** global configuration command. To remove the address, use the **no** form of this command.

```
protocol protocol-address atm vc vcd [broadcast]
no protocol protocol-address atm vc vcd [broadcast]
```

Syntax Description

<i>protocol</i>	One of the following keywords: appletalk , apollo , bridge , clns , decnet , ip , ipx , vines , or xns .
<i>protocol-address</i>	Destination address that is being mapped to this PVC.
<i>vcd</i>	Virtual circuit descriptor of the PVC.
broadcast	(Optional) Indicates that this map entry is to be used when the corresponding <i>protocol</i> sends broadcast packets to the interface—for example, IGRP updates. Provides pseudobroadcasting support.

Default

No map statements are defined.

Command Mode

Map-list configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

When operating in PVC mode, the ATM switch might not have multicast capabilities. For this reason, all static maps for a specific protocol should be marked as **broadcast** for multicasting. When a protocol sends a packet to its multicast address, all static maps marked as **broadcast** get a copy of that packet. This procedure simulates the multicast environment of a LAN.

Some switches might have point-to-multipoint PVCs that perform the equivalent process. If one exists, then that PVC might be used as the sole **broadcast** PVC for all multicast requests.

Example

In the following example, a map list named *atm* includes two map statements for protocol addresses being mapped:

```
map-list atm
ip 172.21.168.112 atm-vc 1 broadcast
decnet 10.2 atm-vc 2 broadcast
```

Related Command

map-list

atm vc-per-vp

To set the maximum number of VCIs to support per VPI, use the **atm vc-per-vp** interface configuration command. The **no** form of this command restores the default value.

```
atm vc-per-vp number  
no atm vc-per-vp
```

Syntax Description

number Maximum number of VCIs to support per VPI. On the Cisco 7000 and Cisco 7500 AIP, valid values are: 16, 32, 64, 128, 256, 512, or 1024. On the Cisco 4500 and Cisco 4700 NPM, valid values are 32, 64, 128, 256, 512, 1024, 2048, 4096, or 8192. Default is 1024.

Default

1024

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command controls the memory allocation in the AIP or NPM to deal with the VCI table. It defines the maximum number of VCIs to support per VPI and bounds the VCI numbers. On the NPM, it limits the VPI range as well.

An invalid VCI causes a warning message to be displayed.

Example

In the following example, the maximum number of VCIs to support per VPI is set to 512:

```
atm vc-per-vp 512
```

Related Command

atm pvc

atm vp-filter

To set the AIP filter register, use the **atm vp-filter** interface configuration command. The **no** form of this command restores the default value.

```
atm vp-filter hexvalue  
no atm vp-filter
```

Syntax Description

hexvalue Value in hexadecimal format. Default is 0x7B.

Default

0x7B

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is supported on Cisco 7000 and Cisco 7500 routers, but not on Cisco 4500 and Cisco 4700 routers.

This command allows you to specify a VPI or range of VPIs to be used for AAL3/4 processing. All other VPIs map to AAL5 processing. If only AAL5 processing is required, you can either let the virtual path filter default or set it to an arbitrary VPI so that AAL5 processing is performed on all VPIs.

This command configures the hexadecimal value used in the virtual path filter register in the reassembly operation. The virtual path filter comprises 16 bits. The virtual path filter register uses the most significant bits (bits 15 through 8, the left half of the filter) as mask bits, and uses bits 7 through 0 (the right half of the filter) as compare bits.

When a cell is received, the right half of the filter is exclusively NORed with the binary value of the incoming VPI. The result is then ORed with the left half of the filter (the mask). If the result is all 1s, then reassembly is done using the VCI/MID table (AAL3/4 processing). Otherwise, reassembly is done using the VPI-VCI pair table (AAL5 processing).

Examples

In the following example, all incoming cells are reassembled using AAL3/4 processing:

```
atm vp-filter ff00
```

In the following example, all incoming cells with the virtual path equal to 0 are reassembled using AAL3/4 processing; all other cells are reassembled using AAL5 processing:

```
atm vp-filter 0
```

In the following example, all incoming cells with the most significant bit of the virtual path set are reassembled using AAL3/4 processing; all other cells are reassembled using AAL5 processing:

```
atm vp-filter 7f80
```

clear atm arp atm

To clear a specific ATM ARP entry or clear all ATM ARP entries on an ATM interface, use the **clear atm arp atm** privileged EXEC command.

clear atm arp atm *slot/port* [* | *ip-address*] (for the Cisco 7000 series and Cisco 7500 series)

clear atm arp atm *number* [* | *ip-address*] (for the Cisco 4500 and Cisco 4700)

Syntax Description

<i>slot/port</i>	ATM slot and port numbers on the Cisco 7000 and Cisco 7500 series routers.
<i>number</i>	ATM network processor module (NPM) number on the Cisco 4500 and Cisco 4700 routers.
*	Clears all ARP entries on the ATM interface.
<i>ip-address</i>	IP address used to specify the ATM ARP entry you wish to clear for the ATM interface.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2(8).

This command is supported on Cisco 7000 series, Cisco 7500 series, Cisco 4500, and Cisco 4700 routers.

If a VC exists for the ATM ARP entry being deleted, the ATM ARP entry will be deleted and the arp-server will immediately try to create another entry on the existing VC.

Example

The following example clears the ATM ARP entry with the IP address 4.0.0.1 on the ATM subinterface 2/0.1:

```
clear atm arp atm 2/0.1 4.0.0.1
```

Related Commands

You can use the index or search online to find documentation of related commands.

show atm arp-server

dxi map

To map a protocol address to a given VPI and VCI, use the **dxi map** interface configuration command. Use the **no** form of this command to remove the mapping for that protocol and protocol address.

```
dxi map protocol protocol-address vpi vci [broadcast]  
no dxi map protocol protocol-address
```

Syntax Description

<i>protocol</i>	One of the following bridging or protocol keywords: apollo , appletalk , bridge , clns , decnet , ip , novell , vines , or xns .
<i>protocol-address</i>	Protocol-specific address.
<i>vpi</i>	Virtual path identifier in the range 0 to 15.
<i>vci</i>	Virtual circuit identifier in the range 0 to 63.
broadcast	(Optional) Broadcasts should be forwarded to this address.

Default

No map definition is established.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is used in configurations where the router is intended to communicate with an ATM network through an ATM data service unit (ADSU). Given the circuit identifier parameters (VPI and VCI) for the ATM permanent virtual circuit (PVC), the router computes and uses the DXI frame address (DFA) that is used for communication between the router and the ADSU.

The **dxi map** command can be used only on a serial interface or HSSI configured for ATM-DXI encapsulation.

Example

In the following example, all IP packets intended for the host with IP address 172.21.170.49 are converted into ATM cells identified with a VPI of 2 (binary 0000 0010) and a VCI of 46 (binary 0000 0000 0010 1110) by the ADSU:

```
interface serial 0  
dxi map ip 172.21.170.49 2 46 broadcast
```

Using the mapping defined in Annex A of the ATM DXI Specification, the router uses the VPI and VCI information in this example to compute a DFA of 558 (binary 1000101110). The ADSU will use the DFA of the incoming frame to extract the VPI and VCI information when formulating ATM cells.

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

```
dxi pvc  
encapsulation atm-dxi †  
interface serial †
```

dxi pvc

Use the **dxi pvc** interface configuration command to configure multiprotocol or single protocol ATM-DXI encapsulation. The **no** form of this command disables multiprotocol ATM-DXI encapsulation.

```
dxi pvc vpi vci [snap | nlpid | mux]  
no dxi pvc vpi vci [snap | nlpid | mux]
```

Syntax Description

<i>vpi</i>	ATM network virtual path identifier (VPI) of this PVC, in the range from 0 through 255. The VPI is an 8-bit field in the header of the ATM cell. The VPI value is unique only on a single interface, not throughout the ATM network, because it has local significance only. Both <i>vpi</i> and <i>vci</i> cannot be specified as 0; if one is 0, the other cannot be 0.
<i>vci</i>	ATM network virtual channel identifier (VCI) of this PVC, in the range of 0 through 65535. The VCI is a 16-bit field in the header of the ATM cell. The VCI value is unique only on a single interface, not throughout the ATM network, because it has local significance only. Both <i>vpi</i> and <i>vci</i> cannot be specified as 0; if one is 0, the other cannot be 0.
snap	(Optional) LLC/SNAP encapsulation based on the protocol used in the packet. This keyword defines a PVC that can carry multiple network protocols. This is the default.
nlpid	(Optional) RFC 1294/1490 encapsulation. This option is provided for backward compatibility with the default encapsulation in earlier versions of the Cisco IOS software.
mux	(Optional) MUX encapsulation; the carried protocol is defined by the dxi map command when the PVC is set up. This keyword defines a PVC that carries only one network protocol.

Default

LLC/SNAP encapsulation.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command can be used only on a serial interface or HSSI that is configured with ATM-DXI encapsulation.

Select the **nlpid** option if software earlier than Cisco IOS Release 10.3 was loaded previously on this router and the router was configured for the default encapsulation, which was **nlpid** in pre-10.3 releases.

Examples

The following example configures ATM-DXI MUX encapsulation on serial interface 1. The PVC identified by a VPI of 10 and a VCI of 10 can carry a single protocol. Then the protocol to be carried on this PVC is defined by the **dxi map** command.

```
interface serial 1
dxi pvc 10 10 mux
dxi map ip 172.21.176.45 10 10 broadcast
```

The following example configures ATM-DXI NLPID encapsulation on serial interface 1. The PVC identified by a VPI of 11 and a VCI of 12 can carry multiprotocol traffic that is encapsulated with a header described in RFC 1294/1490.

```
interface serial 1
dxi pvc 11 12 nlpid
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

dxi map
encapsulation atm-dxi †
show dxi pvc

loopback

To place OC-3c, DS3, or E3 interfaces on the Cisco 7000 and Cisco 7500 series AIP into loopback mode or to place OC-3c interfaces on the Cisco 4500 and Cisco 4700 NPM into loopback mode, use the following form of the **loopback** interface configuration command. Use the **no** form of this command to remove the loopback.

```
loopback [diagnostic | line]  
no loopback [diagnostic | line]
```

To place E3 or DS3 interfaces on the Cisco 4500 and Cisco 4700 NPM into loopback mode, use the following form of the **loopback** interface configuration command. Use the **no** form of this command to remove the loopback.

```
loopback [line | payload | cell | diagnostic]  
no loopback [line | payload | cell | diagnostic]
```

Syntax Description

diagnostic	Place the interface into internal loopback at the PLIM.
line	Place the interface into external loopback at the line. This is the default.
payload	Place the interface into external loopback at the payload level.
cell	Place the interface into external loopback at cell level

Default

line; packets loop from the ATM interface back to the ATM network.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command is useful for testing because it loops all packets from the ATM interface (AIP or NPM) back to the interface as well as directing the packets to the network.

Example

The following example loops all packets back to the AIP or NPM:

```
loopback diagnostic
```

map-class atm

To enter map-class configuration mode to define parameters used to signal a request for an ATM SVC (the SETUP message), use the **map-class atm** global configuration command. The **no** form of this command deletes this class.

```
map-class atm class-name
no map-class atm class-name
```

Syntax Description

class-name User-assigned name of the traffic parameters table.

Default

No traffic parameters are defined.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

If the ATM map class identified by *class-name* does not already exist, the router creates a new one. In either case, this command specifies the ATM map class to which subsequent ATM commands apply. Configuration of an ATM map class is allowed only if the ATM subsystem is linked.

If parameters are required, it is up to the media-specific routing that uses a static map to ensure that the referenced class exists.

Most parameters specified through an ATM map class are used to dictate the contents of the ATM Traffic Descriptor Information Element (ATD IE) present in a SETUP message used to initiate an SVC (note that this IE was called the User Cell Rate IE in UNI 3.0). These parameters are configured with the following commands:

```
atm backward-max-burst-size-clp0
atm backward-max-burst-size-clp1
atm backward-peak-cell-rate-clp0
atm backward-peak-cell-rate-clp1
atm backward-sustainable-cell-rate-clp0
atm backward-sustainable-cell-rate-clp1
atm forward-max-burst-size-clp0
atm forward-max-burst-size-clp1
atm forward-peak-cell-rate-clp0
atm forward-peak-cell-rate-clp1
atm forward-sustainable-cell-rate-clp0
atm forward-sustainable-cell-rate-clp1
```

Note The 1-parameters specify the traffic characteristics of the aggregate of Cell Loss Priority 0 (CLP0) and CLP1 cells; the 0-parameters are CLP0 only.

When possible, Best Effort is signaled. In UNI 3, a Best Effort Indication can be included in the ATD IE only if the contents of the IE consist of forward and backward Peak Cell Rate for CLP 0+1 (and the Best Effort Indication). Therefore, if any of the above commands other than **atm forward-peak-cell-rate-clp1** and **atm backward-peak-cell-rate-clp1** are specified in the map-class, Best Effort cannot be signaled.

It is important that Best Effort is signaled, because this causes a switch to interpret the SETUP as a request for an Unspecified Bit Rate (UBR) connection. UBR requests do not cause bandwidth to be reserved per-connection.

If Best Effort cannot be signaled (one of the other parameters is specified in map-class), then this causes a switch to interpret the SETUP as a request for Non-Real Time Variable Bit Rate (VBR-NRT) service.

All combinations of parameters are allowed in the definition of map-class. The following recommendations can help to specify a correct set of parameters:

- The maximum length of the contents of the ATD IE is 30 bytes. All of the cell-rate and burst parameters require 4 bytes in the IE. Therefore, no more than seven of the 4-byte parameters should be specified.
- The allowable combinations of cell-rate and burst-size parameters from the UNI 3.0 specification are (per direction):
 - peak-cell-rate0, peak-cell-rate0+1
 - peak-cell-rate0+1, sustained-cell-rate0, max-burst0
 - peak-cell-rate0+1
 - peak-cell-rate0+1, sustained-cell-rate0+1, max-burst0+1
- A clp0+1 parameter should be greater than or equal to the clp0 parameter for the same direction.

If default traffic parameters are used in the initiation of an SVC, a Best Effort ATD IE is used. The forward and backward peak-cell-rate0+1 values are 24-bits set to "1" (0xfffff). This is a unique value used to indicate that default shaping parameters can be applied.

Example

The following example establishes traffic parameters for map class *atmclass1*

```
map-list atmlist
ip 172.21.180.121 atm-nsap 12.3456.7890.abcd.0000.00 broadcast class atmclass1
map-class atm atmclass1
atm forward-peak-cell-rate-clp1 8000
atm backward-peak-cell-rate-clp1 8000
interface atm 2/0/0
map-group atmlist
```

Related Commands

show atm map

map-group

To associate an ATM map list to an interface or subinterface for either a PVC or SVC, use the **map-group** interface configuration command. The **no** form of this command removes the reference to the map list.

```
map-group name  
no map-group name
```

Syntax Description

name Name of the map list identified by the **map-list** command.

Default

No ATM map lists are associated.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

More than one map group can be configured for an interface.

Example

In the following example, the map list named *atm* is associated with the ATM interface:

```
interface atm 2/0  
map-group atm
```

Related Command

map-list

map-list

To define an ATM map statement for either a PVC or SVC, use the **map-list** global configuration command. The **no** form of this command deletes this list and all associated map statements.

```
map-list name  
no map-list name
```

Syntax Description

name Name of the map list.

Default

No map statements are defined.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

To allow the router to propagate routing updates and ARP requests, a static map that maps the protocol address and the ATM address of the next-hop ATM station must be configured. The router supports a mapping scheme that identifies the ATM address of remote hosts and routers. This address can be specified either as a virtual circuit descriptor (VCD) for a PVC or an NSAP address for an SVC.

The **map-list** command specifies the map list to which the subsequent map-list configuration commands apply. These map-list configuration commands identify destination addresses. One map list can contain multiple map entries. A map list can be referenced by more than one interface or subinterface.

Examples

In the following example for a PVC, a map list named *atm* is followed by two map statements for protocol addresses being mapped:

```
map-list atm  
ip 172.21.168.112 atm-vc 1 broadcast  
decnet 10.2 atm-vc 2 broadcast
```

In the following example for an SVC, a map list named *atm* includes two map statements for protocol addresses being mapped:

```
map-list atm  
ip 172.21.97.165 atm-nsap BC.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.13  
ip 172.21.97.166 atm-nsap BC.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

Related Commands

atm-nsap

atm vc

map-group

Related Command
atm arp-server

show atm interface atm

To display ATM-specific information about an ATM interface, use the **show atm interface atm** privileged EXEC command.

show atm interface atm slotport (Cisco 7000 series and Cisco 7500 routers)

show atm interface atm number (Cisco 4500 series and Cisco 4700 routers)

Syntax Description

slotport Slot number and port number of the Cisco 7000 or Cisco 7500 AIP.

number NPM number for Cisco 4500 and Cisco 4700 routers.

Command Mode

Privileged EXEC

Usage Guidelines

The **show atm interface atm slotport** command first appeared in Cisco IOS Release 10.0.

The **show atm interface atm number** command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show atm interface atm** command to display statistics on slot 4, port 0:

```
Router# show atm interface atm 4/0

ATM interface ATM4/0:
AAL enabled: AAL5, Maximum VCs: 1024, Current VCs: 6
Tx buffers 256, Rx buffers 256, Exception Queue: 32, Raw Queue: 32
VP Filter: 0x7B, VCIs per VPI: 1024, Max Datagram Size:4496, MIDs/VC:16
PLIM Type:4B5B - 100Mbps, No Framing, TX clocking: LINE
4897 input, 2900 output, 0 IN fast, 0 OUT fast
Rate-Queue 1 set to 100Mbps, reg=0x4EA DYNAMIC, 1 VCCs
ATM4/0.1:AAL3/4-SMDS address c111.1111.1111 Multicast e222.2222.222
Config. is ACTIVE
```

Table 1 describes the fields shown in the display.

Table 1 Show ATM Interface ATM Field Descriptions

Field	Description
ATM interface	Slot and port number of the interface.
AAL enabled	Type of AAL. If both AAL5 and AAL3/4 are enabled on the interface, the output will include both AAL5 and AAL3/4.
Maximum VCs	Maximum number of virtual circuits this interface can support.
Current VCs	Number of active virtual circuits.
Tx buffers, Rx buffers	Number of buffers configured with the atm txbuff or atm rxbuff command, respectively.

Table 1 Show ATM Interface ATM Field Descriptions (Continued)

Field	Description
Exception Queue	Number of buffers configured with the atm exception-queue command (AIP only).
Raw Queue	Queue size configured with the atm rawq-size command.
VP Filter	Hexadecimal value of the VP filter as configured by the atm vp-filter command (AIP only).
VCI per VPI	Maximum number of VCIs to support per VPI, as configured by the atm vc-per-vp command.
Max Datagram Size	The configured maximum number of bytes in the largest datagram.
MIDs/VC	The configured maximum number of message identifiers allowed per virtual circuit on this interface.
PLIM Type	Physical Layer Interface Module (PLIM) type (E3, 4B/5B, or SONET).
Framing	For E3, this might be G.804; otherwise, no framing.
TX clocking	Clocking on the router. For E3 or SONET, this might be INTERNAL, meaning the AIP or NPM generates the clock. Otherwise, LINE indicates that the ATM switch provides the clocking.
input	Number of packets received and process switched.
output	Number of packets sent from process switch.
IN fast	Number of input packets fast-switched.
OUT fast	Number of output packets fast-switched.
Rate-Queue	List of configured rate queues.
reg=	Actual register value passed to the AIP to define a specific rate queue (AIP only).
DYNAMIC	Indicates that the rate queue is dynamic and was created automatically by the software. Dynamic rate queues are created when an atm pvc command specifies a peak or average rate that does not match any user configured rate queue. The value PERMANENT indicates that the rate queue was user-configured.
VCCs	Number of virtual channel connections (VCCs) dynamically attached to this rate queue.
ATM4/0.1	Indicates that the subinterface supports ATM adaptation layer AAL3/4 and displays the SMDS E.164 unicast address and the SMDS E.164 multicast address assigned to the subinterface.
Config. is	ACTIVE or VALID in <i>n</i> SECONDS. ACTIVE indicates that the current AIP or NPM configuration has been loaded into the AIP and is being used. There is a 5-second window when a user changes a configuration and the configuration is sent to the AIP.

Related Command**atm pvc**

show atm map

To display the list of all configured ATM static maps to remote hosts on an ATM network, use the **show atm map** privileged EXEC command.

show atm map

Syntax Description

This command has no arguments or keywords.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Sample Display

The following is sample output from the **show atm map** command:

```
Router# show atm map
Map list atm:

vines 3004B310:0001 maps to VC 4, broadcast
ip 172.21.168.110 maps to VC 1, broadcast
clns 47.0004.0001.0000.0c00.6e26.00 maps to VC 6, broadcast
appletalk 10.1 maps to VC 7, broadcast
decnet 10.1 maps to VC 2, broadcast
```

The following is sample output from the **show atm map** command for a multipoint connection.

```
stirling#sh atm map
Map list atm_pri : PERMANENT
ip 4.4.4.4 maps to NSAP CD.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12, broadcast,
aal5mux, multipoint connection up, VC 6
ip 4.4.4.6 maps to NSAP DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12, broadcast,
aal5mux, connection up, VC 15, multipoint connection up, VC 6

Map list atm_ipx : PERMANENT
ipx 1004.dddd.dddd.dddd maps to NSAP DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12,
broadcast, aal5mux, multipoint connection up, VC 8
ipx 1004.cccc.cccc.cccc maps to NSAP CD.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12,
broadcast, aal5mux, multipoint connection up, VC 8

Map list atm_apple : PERMANENT
appletalk 62000.5 maps to NSAP CD.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12,
broadcast, aal5mux, multipoint connection up, VC 4
appletalk 62000.6 maps to NSAP DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12,
broadcast, aal5mux, multipoint connection up, VC 4
```

Table 2 describes the fields shown in the display.

Table 2 Show ATM Map Field Descriptions

Field	Description
Map list	Name of map list.
PERMANENT	This map entry was entered from configuration; it was not entered automatically by a process.
<i>protocol address</i> maps to VC <i>x</i> or <i>protocol address</i> maps to NSAP..	Name of protocol, the protocol address, and the VCD or NSAP that the address is mapped to.
broadcast	Indicates pseudobroadcasting.
aal5mux	Indicates the encapsulation used, a multipoint or point-to-point virtual circuit, and the number of the virtual circuit.
multipoint connection up	Indicates that this is a multipoint virtual circuit.
VC 6	Number of the virtual circuit.
Connection up	Indicates a point-to-point virtual circuit.

Related Commands

atm pvc
map-list

show atm traffic

To display current, global ATM traffic information to and from all ATM networks connected to the router, use the **show atm traffic** privileged EXEC command.

show atm traffic

Syntax Description

This command has no arguments or keywords.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Sample Display

The following is sample output from the **show atm traffic** command:

```
Router# show atm traffic

4915 Input packets
0 Output packets
2913 Broadcast packets
0 Packets for non-existent VC
```

Table 3 describes the fields shown in the display.

Table 3 Show ATM Traffic Field Descriptions

Field	Description
Input packets	Total packets input.
Output packets	Total packets output (nonbroadcast).
Broadcast packets	Total broadcast packets output.
Packets for nonexistent VC	Packets sent to virtual circuits not configured.

Related Command

atm pvc

show atm vc

To display all active ATM virtual circuits (PVCs and SVCs) and traffic information, use the **show atm vc** privileged EXEC command.

```
show atm vc [vcd]
```

Syntax Description

vcd (Optional) Specifies which virtual circuit to display information about.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

If no *vcd* value is specified, the command displays information for all PVCs and SVCs. The output is in summary form (one line per virtual circuit).

Sample Displays

The following is sample output from the **show atm vc** command when no *vcd* value is specified, displaying statistics for all virtual circuits:

```
Router# show atm vc

Intfc.   VCD   VPI   VCI   Type  AAL/Encaps  Peak  Avg.  Burst
ATM4/0.1 1     1     1     PVC   AAL3/4-SMDS 0     0     0
ATM4/0   2     2     2     PVC   AAL5-SNAP   0     0     0
ATM4/0   3     3     3     PVC   AAL5-SNAP   0     0     0
ATM4/0   4     4     4     PVC   AAL5-MUX    0     0     0
ATM4/0   6     6     6     PVC   AAL5-SNAP   0     0     0
ATM4/0   7     7     7     PVC   AAL5-SNAP   0     0     0
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified, displaying statistics for that virtual circuit only:

```
Router# show atm vc 8

ATM4/0: VCD: 8, VPI: 8, VCI: 8, etype:0x0, AAL5 - LLC/SNAP, Flags: 0x30
PeakRate: 0, Average Rate: 0, Burst: 0 *32cells, VCmode: 0xE000
InPkts: 181061, OutPkts: 570499, InBytes: 757314267, OutBytes: 2137187609
InPRoc: 181011, OutPRoc: 10, Broadcasts: 570459
InFast: 39, OutFast: 36, InAS: 11, OutAS: 6
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified, an AAL3/4 is enabled, an ATM SMDS subinterface has been defined, and a range of message identifier numbers (MIDs) has been assigned to the PVC:

```
Router# show atm vc 1

ATM4/0.1: VCD: 1, VPI: 0, VCI: 1, etype:0x1, AAL3/4 - SMDS, Flags: 0x35
PeakRate: 0, Average Rate: 0, Burst: 0 *32cells, VCmode: 0xE200
MID start: 1, MID end: 16
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
```

```
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
```

The following is sample output from the **show atm vc** command when generation of OAM F5 loopback cells has been enabled:

```
Router# show atm vc 7
ATM4/0: VCD: 7, VPI: 7, VCI: 7, etype:0x0, AAL5 - LLC/SNAP, Flags: 0x30
PeakRate: 0, Average Rate: 0, Burst: 0 *32cells, VCmode: 0xE000
OAM frequency: 10, InARP DISABLED
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPProc: 0, OutPProc:0, Broadcast:0
InFast:0, OutFast:0, InAS:0, OutAS:0
OAM F5 cells sent: 1, OAM cells received: 0
```

The following is sample output from the **show atm vc** command for an incoming multipoint virtual circuit:

```
Router# sh atm vc 3
ATM2/0: VCD: 3, VPI: 0, VCI: 33, etype:0x809B, AAL5 - MUX, Flags: 0x53
PeakRate: 0, Average Rate: 0, Burst: 0, VCmode: 0xE000
OAM DISABLED, InARP DISABLED
InPkts: 6646, OutPkts: 0, InBytes: 153078, OutBytes: 0
InPProc: 6646, OutPProc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
interface = ATM2/0, call remotely initiated, call reference = 18082
vnum = 3, vpi = 0, vci = 33, state = Active
 aal5mux vc, multipoint call
Retry count: Current = 0, Max = 10
timer currently inactive, timer value = never
Root Atm Nsap address: DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

The following is sample output from the **show atm vc** command for an outgoing multipoint virtual circuit:

```
Router# sh atm v 6
ATM2/0: VCD: 6, VPI: 0, VCI: 35, etype:0x800, AAL5 - MUX, Flags: 0x53
PeakRate: 0, Average Rate: 0, Burst: 0, VCmode: 0xE000
OAM DISABLED, InARP DISABLED
InPkts: 0, OutPkts: 818, InBytes: 0, OutBytes: 37628
InPProc: 0, OutPProc: 0, Broadcasts: 818
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
interface = ATM2/0, call locally initiated, call reference = 3
vnum = 6, vpi = 0, vci = 35, state = Active
 aal5mux vc, multipoint call
Retry count: Current = 0, Max = 10
timer currently inactive, timer value = never
Leaf Atm Nsap address: DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
Leaf Atm Nsap address: CD.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

Table 4 describes the fields shown in the displays.

Table 4 Show ATM VC Field Descriptions

Field	Description
Intfc.	Interface slot and port.
VCD	Virtual circuit descriptor (virtual circuit number).
VPI	Virtual path identifier.
VCI	Virtual channel identifier.
Type	Type of virtual circuit, either PVC or SVC.

Table 4 Show ATM VC Field Descriptions (Continued)

Field	Description
AAL/Encaps	Type of ATM adaptation layer (AAL) and encapsulation.
etype	Ethernet type.
Flags	Bit mask describing virtual circuit information. The flag values are summed to result in the displayed value. 0x40 SVC 0x20 PVC 0x10 ACTIVE 0x1 AAL5-SNAP 0x2 AAL5-NLPID 0x3 AAL5-FRNLPID 0x4 AAL5-MUX 0x5 AAL3/4-SMDS 0x6 QSAAL
PeakRate	Number of packets transmitted at the peak rate.
Average Rate	Number of packets transmitted at the average rate.
Burst	Value that, when multiplied by 32, equals the maximum number of ATM cells the virtual circuit can transmit at the peak rate of the virtual circuit.
VCmode	AIP-specific or NPM-specific register describing the usage of the virtual circuit. Contains values such as rate queue, peak rate, and AAL mode, which are also displayed in other fields.
InPkts	Total number of packets received on this virtual circuit. This number includes all silicon-switched, fast-switched, autonomous-switched, and process-switched packets.
OutPkts	Total number of packets sent on this virtual circuit. This number includes all silicon-switched, fast-switched, autonomous-switched, and process-switched packets.
InBytes	Total number of bytes received on this virtual circuit. This number includes all silicon-switched, fast-switched, autonomous-switched, and process-switched bytes.
OutBytes	Total number of bytes sent on this virtual circuit. This number includes all silicon-switched, fast-switched, autonomous-switched, and process-switched bytes.
InPRoc	Number of process-switched input packets.
OutPRoc	Number of process-switched output packets.
Broadcast	Number of process-switched broadcast packets.
InFast	Number of fast-switched input packets.
OutFast	Number of fast-switched output packets.
InAS	Number of autonomous-switched or silicon-switched input packets.
OutAS	Number of autonomous-switched or silicon-switched output packets.
OAM frequency: 10	OAM cells are sent every 10 seconds.
OAM F5 cells sent: 1	Number of OAM cells sent on this virtual circuit.
OAM cells received: 0	Number of OAM cells received on this virtual circuit.

Related Command
atm pvc

show dxi map

To display all the protocol addresses mapped to a serial interface, use the **show dxi map EXEC** command.

show dxi map

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Sample Display

The following is sample output from the **show dxi map** command. It displays output for several previously defined ATM-DXI maps that defined Apollo, IP, DECnet, CLNS, and AppleTalk protocol addresses, various encapsulations, and broadcast traffic.

```
Router# show dxi map

Serial0 (administratively down): ipx 123.0000.1234.1234
    DFA 69(0x45,0x1050), static, vpi = 4, vci = 5,
    encapsulation: SNAP
Serial0 (administratively down): appletalk 2000.5
    DFA 52(0x34,0xC40), static, vpi = 3, vci = 4,
    encapsulation: NLPID
Serial0 (administratively down): ip 172.21.177.1
    DFA 35(0x23,0x830), static,
    broadcast, vpi = 2, vci = 3,
    encapsulation: VC based MUX,
    Linktype IP
```

Table 5 explains significant fields shown in the display.

Table 5 Show DXI Map Field Descriptions

Field	Description
DFA	DXI Frame Address, similar to a DLCI for Frame Relay. The DFA is shown in decimal, hexadecimal, and DXI header format. The router computes this address value from the VPI and VCI values.
encapsulation:	Encapsulation type selected by the dxi pvc command. Displayed values can be <i>SNAP</i> , <i>NLPID</i> , or <i>VC based MUX</i> .
Linktype	Value used only with MUX encapsulation and therefore with only a single network protocol defined for the PVC. Maps configured on a PVC with MUX encapsulation must have the same link type.

show dxi pvc

To display the PVC statistics for a serial interface, use the **show dxi pvc EXEC** command.

```
show dxi pvc
```

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Sample Display

The following is sample output from the **show dxi pvc** command. It displays output for ATM-DXI PVCs previously defined for serial interface 0.

```
Router# show dxi pvc

PVC Statistics for interface Serial0 (ATM DXI)

DFA = 17, VPI = 1, VCI = 1, PVC STATUS = STATIC, INTERFACE = Serial0

input pkts 0          output pkts 0          in bytes 0
out bytes 0           dropped pkts 0

DFA = 34, VPI = 2, VCI = 2, PVC STATUS = STATIC, INTERFACE = Serial0

input pkts 0          output pkts 0          in bytes 0
out bytes 0           dropped pkts 0

DFA = 35, VPI = 2, VCI = 3, PVC STATUS = STATIC, INTERFACE = Serial0

input pkts 0          output pkts 0          in bytes 0
out bytes 0           dropped pkts 0
```

Table 6 describes significant fields shown in the display.

Table 6 Show DXI PVC Field Descriptions

Field	Description
DFA	DXI Frame Address, similar to a DLCI for Frame Relay. The DFA is shown in decimal, hexadecimal, and DXI header format. The router computes this address value from the VPI and VCI values.
PVC STATUS = STATIC	Only static maps are supported. Maps are not created dynamically.
input pkts	Number of packets received.
output pkts	Number of packets transmitted.
in bytes	Number of bytes in all packets received.
out bytes	Number of bytes in all packets transmitted.
dropped pkts	Should display a zero (0) value. A nonzero value indicates a configuration problem, specifically that a PVC does not exist.

show sscop

To show Service-Specific Connection-Oriented Protocol (SSCOP) details for all ATM interfaces, use the **show sscop** privileged EXEC command.

show sscop

Syntax Description

This command has no arguments or keywords.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Sample Display

The following is sample output from the **show sscop** command:

```
Router# show sscop
SSCOP details for interface ATM4/0
  Current State = Data Transfer Ready
  Send Sequence Number: Current = 2, Maximum = 9
  Send Sequence Number Acked = 3
  Rcv Sequence Number: Lower Edge = 2, Upper Edge = 2, Max = 9
  Poll Sequence Number = 1876, Poll Ack Sequence Number = 2
  Vt(Pd) = 0
  Connection Control: timer = 1000
  Timer currently Inactive
  Keep Alive Timer = 30000
  Current Retry Count = 0, Maximum Retry Count = 10
  Statistics -
  Pdu's Sent = 0, Pdu's Received = 0, Pdu's Ignored = 0
  Begin = 0/1, Begin Ack = 1/0, Begin Reject = 0/0
  End = 0/0, End Ack = 0/0
  Resync = 0/0, Resync Ack = 0/0
  Sequenced Data = 2/0, Sequenced Poll Data = 0/0
  Poll = 1591/1876, Stat = 0/1591, Unsolicited Stat = 0/0
  Unassured Data = 0/0, Mgmt Data = 0/0, Unknown Pdu's = 0
```

Table 7 describes the fields shown in the display. Interpreting this output requires a good understanding of the SSCOP; it is usually displayed by our technicians to help diagnose network problems.

Table 7 Show SSCOP Field Descriptions

Field	Description
SSCOP details for interface	Interface slot and port.
Current State	SSCOP state for the interface.
Send Sequence Number	Current and maximum send sequence number.
Send Sequence Number Acked	Sequence number of packets already acknowledged.

Table 7 Show SSCOP Field Descriptions (Continued)

Field	Description
Rcv Sequence Number	Sequence number of packets received.
Poll Sequence Number	Current poll sequence number.
Poll Ack Sequence Number	Poll sequence number already acknowledged.
Vt(Pd)	Number of sequenced data (SD) frames sent, which triggers a sending of a Poll frame.
Connection Control	Timer used for establishing and terminating SSCOP.
Keep Alive Timer	Timer used to send keepalives on an idle link.
Current Retry Count	Current count of the retry counter.
Maximum Retry Count	Maximum value the retry counter can take.
Pdu's Sent	Total number of SSCOP frames sent.
Pdu's Received	Total number of SSCOP frames received.
Pdu's Ignored	Number of invalid SSCOP frames ignored.
Begin	Number of Begin frames sent/received.
Begin Ack	Number of Begin Ack frames sent/received.
Begin Reject	Number of Begin Reject frames sent/received.
End	Number of End frames sent/received.
End Ack	Number of End Ack frames sent/received.
Resync	Number of Resync frames sent/received.
Resync Ack	Number of Resync Ack frames sent/received.
Sequenced Data	Number of Sequenced Data frames sent/received.
Sequenced Poll Data	Number of Sequenced Poll Data frames sent/received.
Poll	Number of Poll frames sent/received.
Stat	Number of Stat frames sent/received.
Unsolicited Stat	Number of Unsolicited Stat frames sent/received.
Unassured Data	Number of Unassured Data frames sent/received.
Mgmt Data	Number of Mgmt Data frames sent/received.
Unknown Pdu's	Number of Unknown Pdu's frames sent/received.

sscop cc-timer

To change the connection control timer, use the **sscop cc-timer** interface configuration command. To restore the default value, use the **no** form of this command.

```
sscop cc-timer seconds  
no sscop cc-timer
```

Syntax Description

seconds Number of seconds between Begin messages. Default is 10 seconds.

Default

10 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The connection control timer determines the time between transmission of BGN (establishment), END (release), or RS (resynchronization) protocol data units (PDUs) as long as an acknowledgment has not been received.

Example

In the following example, the connection control timer is set to 15 seconds:

```
sscop cc-timer 15
```

Related Command

sscop max-cc

sscop keepalive-timer

To change the keepalive timer, use the **sscop keepalive-timer** interface configuration command. The **no** form of this command restores the default value.

```
sscop keepalive-timer seconds  
no sscop keepalive-timer seconds
```

Syntax Description

seconds Number of seconds the router waits between transmission of POLL PDUs when no sequential data (SD) or SDP PDUs are queued for transmission or are outstanding pending acknowledgments.

Default

30 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

In the following example, the keepalive timer is set to 15 seconds:

```
sscop keepalive-timer 15
```

sscop max-cc

To change the retry count of connection control, use the **sscop max-cc** interface configuration command. The **no** form of this command restores the default value.

```
sscop max-cc retries  
no sscop max-cc
```

Syntax Description

retries Number of times that SSCOP will retry to transmit BGN (establishment), END (release), or RS (resynchronization) PDUs as long as an acknowledgment has not been received. Valid range is 1 to 6000.

Default

10 retries

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

In the following example, the retry count of the connection control is set to 20:

```
sscop max-cc 20
```

Related Command

sscop cc-timer

sscop poll-timer

To change the poll timer, use the **sscop poll-timer** interface configuration command. The **no** form of this command restores the default value.

```
sscop poll-timer seconds  
no sscop poll-timer
```

Syntax Description

seconds Number of seconds the router waits between transmission of POLL PDUs.

Default

10 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The poll timer controls the maximum time between transmission of POLL PDUs when SD or SDP PDUs are queued for transmission or are outstanding pending acknowledgments.

Example

In the following example, the poll timer is set to 15 seconds:

```
sscop poll-timer 15
```

sscop rcv-window

To change the receiver window, use the **sscop rcv-window** interface configuration command. The **no** form of this command restores the default value.

sscop rcv-window *packets*
no sscop rcv-window

Syntax Description

packets Number of packets the interface can receive before it must send an acknowledgment to the ATM switch. Valid range is 1 to 6000.

Default

7 packets

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

In the following example, the receiver's window is set to 10 packets:

```
sscop rcv-window 10
```

sscop send-window

To change the transmitter window, use the **sscop send-window** interface configuration command. The **no** form of this command restores the default value.

sscop send-window *packets*
no sscop send-window

Syntax Description

packets Number of packets the interface can send before it must receive an acknowledgment from the ATM switch. Valid range is 1 to 6000.

Default

7 packets

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

In the following example, the transmitter's window is set to 10 packets:

```
sscop send-window 10
```