M through R

mac-address (ATM)

To configure the MAC address on ATM permanent virtual circuits (PVCs) in a broadband access (BBA) group to use a different MAC address for PPP over Ethernet over ATM (PPPoEoA), use the **mac-address** command in BBA group configuration mode. To remove a MAC address, use the **no** form of this command.

mac-address {**autoselect**| *mac-address*}

no mac-address {**autoselect**| *mac-address*}

Syntax Description

autoselect	Automatically selects the MAC address based on the ATM interface.
mac-address	MAC address (MAC value) to be used on ATM interfaces, entered as a series of three hexadecimal numbers presented in dotted notation. Example: 0100.CCCC.CCCD.

Command Default

The use of MAC addresses will not change unless this command is configured.

Command Modes

BBA group configuration (config-bba-group)

Command History

Release	Modification
12.3(11)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.5	This command was implemented on Cisco ASR 1000 series routers.

Usage Guidelines

Use of this command changes the MAC address, but otherwise does not change the way PPPoE works.

Use the **mac-address**command to configure the MAC address on ATM PVCs in a BBA group so there will be a different MAC address for PPPoEoA.

If a PPP over Ethernet (PPPoE) profile is not specified with the group option, PPPoE sessions will be established using values from the global PPPoE profile. PPPoE profiles must be configured using the **bba-group pppoe** command.

Examples

The following example configures the MAC address on an ATM PVC in a BBA group using values from the global PPPoE profile by specifying the MAC address:

```
Router(config)# bba-group pppoe global
Router(config-bba-group)# virtual-template 1
Router(config-bba-group)# mac-address 1.1.3
```

The following example uses the autoselect option to configure the MAC address automatically on an ATM PVC in a BBA group using a group profile:

```
Router(config)# bba-group pppoe vpn1
Router(config-bba-group)# virtual-template 1
Router(config-bba-group)# mac-address autoselect
```

Related Commands

Command	Description
bba-group pppoe	Creates a PPPoE profile on the BBA group.
protocol pppoe	Establishes PPPoE sessions on PVCs.

map-class atm

This command is no longer supported.

mid

To set the range of message identifier (MID) values on a permanent virtual circuit (PVC), use the **mid** interface-ATM-VC configuration command. To remove MID value range settings, use the **no** form of this command.

mid *midlow midhigh*

no mid *midlow midhigh*

Syntax Description

midlow	Starting MID number for this PVC. This can be set between 0 and 1023.
midhigh	Ending MID number for this PVC. This can be set between 0 and 1023.

Command Default

0

Command Modes

Interface-ATM-VC configuration

Command History

Release	Modification
11.3(2)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command is only available when SMDS encapsulation is configured on a PVC.

Use this command to assign different ranges of message identifiers to different PVCs.

Examples

In the following example, the **atm mid-per-vc** command limits the maximum number of message identifiers to 32 for each VC on the ATM interface. Using the **mid** command, the selected range of numbers that are available for the message identifiers on PVC 1/40 is 0 to 31. For PVC 2/50, the range is 32 to 63.

```
interface atm 2/0
 atm mid-per-vc 32
 pvc 1/40 smds
 mid 0 31
```

```
pvc 2/50 smds
mid 32 63
```

mpoa client config name

Note Effective with Cisco IOS Release 15.1M, the **mpoa client config name**command is not available in Cisco IOS software.

To define a Multiprotocol over ATM (MPOA) client (MPC) with a specified name, use the **mpoa client config name** command in global configuration mode. To delete the MPC, use the **no** form of this command.

mpoa client config name *mpc-name*

no mpoa client config name *mpc-name*

Syntax Description

mpc-name	Specifies the name of an MPC.

Command Default

No MPC is defined.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1M	This command was removed.

Usage Guidelines

When you configure or create an MPC, you automatically enter the MPC configuration mode. From here, you can enter subcommands to define or change MPC variables specific only to this MPC. Note that the MPC is not functional until it is attached to a hardware interface.

Examples

The following example shows how to create or modify the MPC named ip_mpc:

```
Router(config)# mpoa client config name ip_mpc
```

Related Commands

Command	Description
atm-address	Overrides the control ATM address of an MPC or MPS.
shortcut-frame-count	Specifies the maximum number of times a packet can be routed to the default router within shortcut-frame time before an MPOA resolution request is sent.
shortcut-frame-time	Sets the shortcut-setup frame time (in seconds) for the MPC.

mpoa client name

Note Effective with Cisco IOS Release 15.1M, the **mpoa client name**command is not available in Cisco IOS software.

To attach a Multiprotocol over ATM (MPOA) client (MPC) to a major ATM interface, use the **mpoa client name** command in interface configuration mode. To break the attachment, use the **no** form of this command.

mpoa client name *mpc-name*

no mpoa client name *mpc-name*

Syntax Description

mpc-name	Specifies the name of an MPC.

Command Default

No MPC is attached to an ATM interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1M	This command was removed.

Usage Guidelines

The **mpoa client name** command provides an interface to the MPC through which the MPC can set up and receive calls.

When you enter this command on a major interface that is up and operational, the named MPC becomes operational. Once the MPC is fully operational, it can register its ATM address.

Examples

The following example shows how to attache the MPC named ip_mpc to an interface:

```
Router(config)# interface atm 1/0
Router(config-if)# mpoa client name ip_mpc
```

mpoa server config name

Note Effective with Cisco IOS Release 15.1M, the **mpoa server config name**command is not available in Cisco IOS software.

To define a Multiprotocol over ATM (MPOA) server (MPS) with the specified name, use the **mpoa server config name** command in global configuration mode. To delete an MPS, use the **no** form of this command.

mpoa server config name *mps-name*

no mpoa server config name *mps-name*

Syntax Description

mps-name	Name of the MPOA server.

Command Default

No MPS is defined.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1M	This command was removed.

Usage Guidelines

This command defines an MPS with the specified name. The MPS does not actually start functioning until it is attached to a specific hardware interface. Once that attachment is complete, the MPS starts functioning. When you configure or create an MPS, you automatically enter the MPS configuration mode.

You can define the MPS variables specific to an MPS only after that MPS has been defined with a specified name. After this command is entered, further commands can be used to change MPS variables that are specific only to this MPS.

Examples

The following example shows how to define the MPS named MYMPS:

```
Router(config)# mpoa server config name MYMPS
```

mpoa server name

Note Effective with Cisco IOS Release 15.1M, the **mpoa server name**command is not available in Cisco IOS software.

To attach a Multiprotocol over ATM (MPOA) server (MPS) to a major ATM interface, use the **mpoa server name** command in interface configuration mode. To break the attachment, use the **no** form of this command.

mpoa server name *mps-name*

no mpoa server name *mps-name*

Syntax Description

mps-name	Name of the MPOA server.

Command Default

No MPS is attached to an ATM interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1M	This command was removed.

Usage Guidelines

This command attaches an MPS to a specific (major) interface. At this point, the MPS can obtain its autogenerated ATM address and an interface through which it can communicate to the neighboring MPOA devices. Only when an MPS is both defined globally and attached to an interface is it considered to be operational. Although multiple different servers may share the same hardware interface, an MPS can be attached to only a single interface at any one time. The specified MPS must already be defined when this command is entered.

Examples

The following example attaches the MPS named MYMPS to an ATM interface:

```
Router(config)# interface atm 1/0
Router(config-if)# mpoa server name MYMPS
```

mpoa server name trigger ip-address

Note Effective with Cisco IOS Release 15.1M, the **mpoa server name trigger ip-address**command is not available in Cisco IOS software.

To originate a Multiprotocol over ATM (MPOA) trigger for the specified IP address to the specified MPOA client from the specified Multiprotocol over ATM server (MPS), use the **mpoa server name trigger ip-address** command in interface configuration mode.

mpoa server name *mps-name* **trigger ip-address** *ip-address* [**mpc-address** *mpc-address*]

Syntax Description

mps-name	Specifies the name of the MPOA server.
ip-address	Specifies the IP address.
mpc-address *mpc-address*	(Optional) Specifies the MPOA client (MPC) address to which the trigger should be sent. If the address is not specified, a trigger will be sent to all clients.

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1M	This command was removed.

Usage Guidelines

This command sends an MPOA trigger for the specified IP address to the specified MPOA client from the specified MPOA server. If an MPOA client is not specified, it is triggered to all MPOA clients.

Examples

The following example shows how to send an MPOA trigger for the specified IP address 128.9.0.7 to all known MPOA clients from the MPOA server named MYMPS:

```
Router(config)# interface atm 1/0
Router(config-if)# mpoa server name MYMPS trigger ip-address 128.9.0.7
```

multiqueue

To enable two queues to prioritize multiple classes of packet streams over the same PVC, use the **multiqueue** command in PVC- or VC-class configuration mode To return to a single-queue approach, use the **no** form of this command.

multiqueue

no multiqueue

Syntax Description

This command has no arguments or keywords.

Command Default

Only a single queue per PVC is enabled.

Command Modes

PVC-class configuration VC-class configuration

Command History

Release	Modification
12.4(2)XA	This command was introduced.
12.4(6)T	This command was integrated into Cisco IOS Release 12.4(6)T.

Usage Guidelines

This command enables a priority queue and a regular (nonpriority) queue for traffic streams. When the **multiqueue** command is enabled and multiple classes of packet streams exist over the same PVC, packets coming from the streams that have priority values configured in a policy map are sent to the high-priority queue. Packets from all other streams are sent to the low-priority queue.

This command applies only to DSL ATM interfaces. Multiqueueing is intended for configuring DSL lines and allows configuring one data flow in a priority queue. If you have configured more than one flow in a priority queue, the latency for delay-sensitive traffic flow might not be guaranteed.

Multiqueueing does not work well with applications such as Multilink PPP (MLP) with interleave and Crypto. This is because MLP uses the same sequence numbering scheme for interleaved packets as multiqueueing. For example, if there are a voice packet and two data packets interleaved, the MLP sequence numbers for these packets could be 1 for the first data packet, 2 for the voice packet, and 3 for a second data packet. With multiqueueing, the voice packet with MLP sequence number 2 goes out before the data packet with MLP sequence number 1. This causes out-of-order sequencing of packets as far as MLP is concerned and causes unexpected behavior. The same problems apply to the Crypto application.

Multiqueueing is disabled by default, so that when MLP and the Crypto applications are used with DSL, the network is disrupted by upgrading to an image with multiqueueing support.

Examples

The following example shows how to enter the command from PVC configuration mode:

```
Router(config-if-atm-vc)# multiqueue
```

The following example shows how to enter the command from VC-class configuration mode:

```
Router(config)# vc-class atm x
Router(config-vc-class)# multiqueue
```

The following example shows how to return the queues to the default state:

```
Router(config-if-atm-vc)# no multiqueue
```

Related Commands

Command	Description
tx -ring-limit	Limits the number of packets that can be used on a transmission ring on the DSL WIC or interface.

name elan-id

To configure the emulated LAN (ELAN) ID of an ELAN in the LAN Emulation Configuration Server (LECS) database to participate in Multiprotocol over ATM (MPOA), use the **name elan-id** command in LANE database configuration mode. To disable the ELAN ID of an ELAN in the LECS database to participate in MPOA, use the **no** form of this command.

name *name* **elan-id** *id*

no name *name* **elan-id** *id*

Syntax Description

name	Specifies the name of the ELAN.
id	Specifies the identification number of the ELAN.

Command Default

No ELAN ID is configured.

Command Modes

LANE database configuration

Command History

Release	Modification
12.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

To participate in MPOA, a LAN Emulation Client (LEC) must have an ELAN ID. The LEC obtains the ELAN ID from the LECS. In case the LEC bypasses the LECS phase, the LEC can get the ELAN ID from the LES when the **name elan-id** command is used.

Examples

The following example shows how to set the ELAN ID to 10 for an ELAN named MYELAN:

```
Router(lane-config-dat)# name MYELAN elan-id 10
```

Related Commands

Command	Description
lane server-bus	Enables a LANE server and a broadcast and unknown server on the specified subinterface with the ELAN ID.

name local-seg-id

To specify or replace the ring number of the emulated LAN (ELAN) in the configuration server's configuration database, use the **name local-seg-id** command in database configuration mode. To remove the ring number from the database, use the **no** form of this command.

name *elan-name* **local-seg-id** *segment-number*

no name *elan-name* **local-seg-id** *segment-number*

Syntax Description

elan-name	Name of the ELAN. The maximum length of the name is 32 characters.
segment-number	Segment number to be assigned to the ELAN. The number ranges from 1 to 4095.

Command Default

No ELAN name or segment number is provided.

Command Modes

LANE database configuration

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command is ordinarily used for Token Ring LANE.

The same LANE ring number cannot be assigned to more than one ELAN.

The **no** form of this command deletes the relationships.

Examples

The following example shows how to specify a ring number of 1024 for the ELAN named red:

```
Router(lane-config-dat)# name red local-seg-id 1024
```

Related Commands

Command	Description
default-name	Provides an ELAN name in the database of the configuration server for those client MAC addresses and client ATM addresses that do not have explicit ELAN name bindings.
lane database	Creates a named configuration database that can be associated with a configuration server.
mac-address	Sets the MAC-layer address of the Cisco Token Ring.

name preempt

To set the emulated LAN (ELAN) preempt, use the **name preempt**command in LANE database configuration mode. To disable preemption, use the **no** form of this command.

name *elan-name* **preempt**

no name *elan-name* **preempt**

Syntax Description

elan-name	Specifies the name of the ELAN.

Command Default

Preemption is disabled.

Command Modes

LANE database configuration

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Prior to Cisco IOS Release 11.3, when the primary LAN Emulation Server (LES) failed, the Cisco Simple Server Redundancy Protocol (SSRP) switched over to a secondary LES. But when a LES that is ranked higher in the list came back up, the SSRP protocol switched the active LES to the new LES, which had a higher priority. This forced the network to flap multiple times. We have prevented the network flapping by staying with the currently active master LES regardless of the priority. If a higher priority LES comes back online, SSRP will not switch to that LES.

LES preemption is off by default. The first LES that comes on becomes the master. Users can revert to the old behavior (of switching to the higher-priority LES all the time) by specifying the **name** *elan-name* **preempt** command in the LECS database.

Examples

The following example shows how to set the ELAN preempt for the ELAN named MYELAN:

```
Router(lane-config-dat)# name MYELAN preempt
```

name server-atm-address

To specify or replace the ATM address of the LAN Emulation (LANE) server for the emulated LAN (ELAN) in the configuration server's configuration database, use the **name server-atm-address** command in database configuration mode. To remove it from the database, use the **no** form of this command.

name *elan-name* **server-atm-address** *atm-address* [**restricted**| **un-restricted**] [**index** *number*]

no name *elan-name* **server-atm-address** *atm-address* [**restricted**| **un-restricted**] [**index** *number*]

Syntax Description

elan-name	Name of the ELAN. Maximum length is 32 characters.
atm-address	LANE server's ATM address.
restricted | **un-restricted**	(Optional) Membership in the named ELAN is restricted to the LANE clients explicitly defined to the ELAN in the configuration server's database.
index *number*	(Optional) Priority number. When specifying multiple LANE servers for fault tolerance, you can specify a priority for each server. 0 is the highest priority.

Command Default

No emulated LAN name or server ATM address is provided.

Command Modes

Database configuration

Command History

Release	Modification
11.0	This command was introduced.
11.2	The following keywords were added: • **un-restricted** • **index**
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

ELAN names must be unique within one named LANE configuration database.

Specifying an existing ELAN name with a new LANE server ATM address adds the LANE server ATM address for that ELAN for redundant server operation or simple LANE service replication. This command can be used multiple times.

The **no** form of this command deletes the relationships.

Examples

The following example shows how to configure the example3 database with two restricted and one unrestricted ELANs. The clients that can be assigned to the eng and mktELANs are specified using the **client-atm-address**commands. All other clients are assigned to the man ELAN.

```
Router(config)# lane database example3
Router(lane-config-dat)# name eng server-atm-address
39.000001415555121101020304.0800.200c.1001.02 restricted
Router(lane-config-dat)# name man server-atm-address
39.000001415555121101020304.0800.200c.1001.01
Router(lane-config-dat)# name mkt server-atm-address
39.000001415555121101020304.0800.200c.4001.01 restricted
Router(lane-config-dat)# client-atm-address 39.000001415555121101020304.0800.200c.1000.02
name eng
Router(lane-config-dat)# client-atm-address 39.000001415555121101020304.0800.200c.2000.02
 name eng
Router(lane-config-dat)# client-atm-address 39.000001415555121101020304.0800.200c.3000.02
name mkt
Router(lane-config-dat)# client-atm-address 39.000001415555121101020304.0800.200c.4000.01
name mkt
Router(lane-config-dat)# default-name man
Router(lane-config-dat)# exit
```

Related Commands

Command	Description
client-atm-address name	Adds a LANE client address entry to the configuration database of the configuration server.
default-name	Provides an ELAN name in the database of the configuration server for those client MAC addresses and client ATM addresses that do not have explicit ELAN name bindings.
lane database	Creates a named configuration database that can be associated with a configuration server.
mac-address	Sets the MAC-layer address of the Cisco Token Ring.

network-clock-select (ATM)

To establish the sources and priorities of the requisite clocking signals for an ATM-CES port adapter, use the **network-clock-select** command in global configuration mode. To remove the clock source, use the **no** form of this command.

network-clock-select *priority*{**cbr**| **atm**}*slot/port*

no network-clock-select *priority*{**cbr**| **atm**}*slot/port*

Syntax Description

priority	Priority of the clock source. Values are 1 (high priority) to 4 (low priority).
cbr	Specifies a CBR interface to supply the clock source.
atm	Specifies an ATM interface to supply the clock source.
slot /	Backplane slot number.
port	Interface port number.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

To support synchronous or synchronous residual time stamp (SRTS) clocking modes on the CBR interface, you must specify a primary reference source to synchronize the flow of CBR data from its source to its destination.

You can specify up to four clock priorities. The highest priority active interface in the router supplies primary reference source to all other interfaces that require network clock synchronization services. The fifth priority is the local oscillator on the ATM-CES port adapter.

Use the **show network-clocks** command to display currently configured clock priorities on the router.

Examples

The following example defines two clock priorities on the router:

```
network-clock-select 1 cbr 2/0
network-clock-select 2 atm 2/0
```

Related Commands

Command	Description
ces aal1 clock	Configures the AAL1 timing recovery clock for the CBR interface.
ces dsx1 clock source	Configures a transmit clock source for the CBR interface.
show network-clocks	Displays which ports are designated as network clock sources.

network-id

To specify the network ID of a Multiprotocol over ATM (MPOA) server (MPS), use the **network-id** command in MPS configuration mode. To revert to the default value (default value is 1), use the **no** form of this command.

network-id *id*

no network-id

Syntax Description

id	Specifies the network ID of the MPOA server.

Command Default

The default value for the network ID is 1.

Command Modes

MPS configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Specifies the network ID of this MPS. This value is used in a very similar way the NHRP network ID is used. It is for partitioning nonbroadcast multiaccess (NBMA) clouds artificially by administration.

Examples

The following example shows how to set the network ID to 5:

```
Router(mpoa-server-config)# network-id 5
```

oam-ac segment endpoint

To enable Operation, Administration, and Maintenance (OAM) segment cell termination on ATM adaptation layer 5 (AAL5) over Multiprotocol Label Switching (MPLS) or Layer 2 Tunnel Protocol Version 3 (L2TPv3), use the **oam-ac segment endpoint** command in L2transport VC configuration mode or VC-class configuration mode. To disable OAM segment cell termination, use the no form of this command.

oam-ac segment endpoint

no oam-ac segment endpoint

Syntax Description

This command has no arguments or keywords.

Command Default

OAM segment cell termination is disabled.

Command Modes

L2transport VC configuration mode--for an ATM PVC (cfg-if-atm-l2trans-pvc) VC-class configuration mode--for a VC class (config-vc-class)

Command History

Release	Modification
12.0(30)S	This command was introduced.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.

Examples

The following examples show how to configure the **oam-ac segment endpoint** command in the L2transport VC configuration mode and VC-class configuration mode:

Examples

```
Router(config)# interface atm1/1
Router(config-if)# pvc 0/100 l2transport
Router(cfg-if-atm-l2trans-pvc)# oam-ac segment endpoint
Router(cfg-if-atm-l2trans-pvc)# end
```

Examples

```
Router(config)# vc-class atm test
Router(config-vc-class)# oam-ac segment endpoint
Router(config-vc-class)# end
```

Related Commands

Command	Description
oam-ac emulation-enable	Enables OAM cell emulation on ATM adaptation layer 5 (AAL5) over Multiprotocol Label Switching (MPLS) or Layer 2 Tunnel Protocol Version 3 (L2TPv3).

oam ais-rdi

To configure an ATM permanent virtual circuit (PVC) to be brought down after a specified number of Operation, Administration, and Maintenance (OAM) alarm indication signal/remote defect indication (AIS/RDI) cells have been received on the PVC or brought up if no OAM AIS/RDI cells have been received in a specified interval, use the **oam ais-rdi** command in ATM VC configuration mode or VC class configuration mode. To return OAM AIS/RDI behavior to the default, use the **no** form of this command.

oam ais-rdi [*down-count* [*up-count*]]

no oam ais-rdi [*down-count* [*up-count*]]

Syntax Description

down-count	(Optional) Number of consecutive OAM AIS/RDI cells received before the PVC is brought down. The range is from 1 to 60.
up-count	(Optional) Number of seconds after which a PVC will be brought up if no OAM AIS/RDI cells are received. The range is from 3 to 60.

Command Default

The down count is set to 1 and the up count is set to 3.

Command Modes

ATM VC configuration (config-if-atm-vc) VC class configuration (config-vc-class)

Command History

Release	Modification
12.1(2)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The default values for the OAM AIS/RDI down count and up count are used in the following situations:

- If the **oam ais-rdi** command has not been entered
- If the **oam ais-rdi** command is entered without the *up-count* or *down-count* argument
- If the **no oam ais-rdi** command is entered

If the **oam ais-rdi** command is entered without the *up-count* or *down-count* argument, the command will not appear in the **show running-config** command output.

Examples

In the following example, PVC 0/400 will be brought down after 25 consecutive OAM AIS/RDI cells have been received on the PVC. The PVC will be brought up when no OAM AIS/RDI cells have been received for 5 seconds.

```
Router> enable
Router# configure terminal
Router(config)# interface ATM2/0/0
Router(config-if)# pvc 0/400
Router(config-if-atm-vc)# oam ais-rdi 25 5
```

Related Commands

Command	Description
pvc	Creates or assigns a name to an ATM PVC and specifies the encapsulation type on an ATM PVC.
snmp-server enable traps atm pvc extension	Enables the sending of extended ATM PVC SNMP notifications and SNMP notifications for ATM OAM F5 CC, ATM OAM F5 AIS/RDI, and loopback failures.

oam-bundle

To enable end-to-end F5 Operation, Administration, and Maintenance (OAM) loopback cell generation and OAM management for all virtual circuit (VC) members of a bundle or a VC class that can be applied to a VC bundle, use the **oam-bundle** command in SVC-bundle configuration mode or VC-class configuration mode. To remove OAM management from the bundle or class configuration, use the **no** form of this command.

To enable end-to-end F5 OAM loopback cell generation and OAM management for all VC members of a bundle, use the **oam-bundle** command in bundle configuration mode. To remove OAM management from the bundle, use the **no** form of this command.

oam-bundle [manage] [*frequency*]

no oam-bundle [manage] [*frequency*]

Syntax Description

manage	(Optional) Enables OAM management. If this keyword is omitted, loopback cells are sent, but the bundle is not managed.
frequency	(Optional) Number of seconds between transmitted OAM loopback cells. Values range from 0 to 600 seconds. The default value for the *frequency* argument is 10 seconds.

Command Default

End-to-end F5 OAM loopback cell generation and OAM management are disabled, but if OAM cells are received, they are looped back.

Command Modes

SVC-bundle configuration (for an SVC bundle) VC-class configuration (for a VC class) Bundle configuration (for an ATM VC bundle)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.0(26)S	This command was introduced on the Cisco 10000 series router.
12.2(16)BX	This command was implemented on the ESR-PRE2.
12.2(4)T	This command was made available in SVC-bundle configuration mode.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command defines whether a VC bundle is OAM managed. If this command is configured for a bundle, every VC member of the bundle is OAM managed. If OAM management is enabled, further control of OAM management is configured using the **oamretry**command.

This command has no effect if the VC class that contains the command is attached to a standalone VC; that is, if the VC is not a bundle member. In this case, the attributes are ignored by the VC.

To use this command in VC-class configuration mode, first enter the **vc-classatm** global configuration command.

To use this command in bundle configuration mode, first enter the **bundle** subinterface configuration command to create the bundle or to specify an existing bundle.

VCs in a VC bundle are subject to the following configuration inheritance rules (listed in order of next-highest precedence):

- VC configuration in bundle-VC mode
- Bundle configuration in bundle mode (with the effect of assigned VC-class configuration)

Examples

The following example enables OAM management for a bundle called "bundle 1":

```
bundle bundle1
 oam-bundle manage
```

Related Commands

Command	Description
broadcast	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
bundle	Enters bundle configuration mode to create a bundle or modify an existing bundle.
class-bundle	Configures a VC bundle with the bundle-level commands contained in the specified VC class.
encapsulation	Sets the encapsulation method used by the interface.
inarp	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or VC bundle.

Command	Description
protocol (ATM)	Configures a static map for an ATM PVC, SVC, VC class, or VC bundle, and enables Inverse ARP or Inverse ARP broadcasts on an ATM PVC by configuring Inverse ARP either directly on the PVC, on the VC bundle, or in a VC class (applies to IP and IPX protocols only).
vc-class atm	Creates a virtual circuit (VC) class for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), or ATM interface.

oam retry

To configure parameters related to Operation, Administration, and Maintenance (OAM) management for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), VC class, or VC bundle, or label-controlled ATM (LC-ATM) VC, use the **oam retry** command in the appropriate command mode. To remove OAM management parameters, use the **no** form of this command.

oam retry *up-count down-count retry-frequency*

no oam retry

Syntax Description

up-count	Number of consecutive end-to-end F5 OAM loopback cell responses that must be received in order to change a connection state to up. This argument does not apply to SVCs.
down-count	Number of consecutive end-to-end F5 OAM loopback cell responses that are not received in order to change the state to down or tear down an SVC connection.
retry-frequency	The frequency (in seconds) at which end-to-end F5 OAM loopback cells are transmitted when a change in the up/down state is being verified. For example, if a PVC is up and a loopback cell response is not received after the *retry-frequency* (in seconds) argument is specified using the **oam-pvc** command, loopback cells are sent at the *retry-frequency* to verify whether the PVC is down.

Command Default

ATM PVCs and SVCs

up-count : 3*down-count*: 5*retry-frequency*: 1 second

LC-ATM VCs

up-count : 2*down-count*: 2*retry-frequency*: 2 seconds

Command Modes

Bundle configuration mode (for a VC bundle) Control-VC configuration (for an LC-ATM VC) Interface-ATM-VC configuration (for an ATM PVC or SVC) PVC range configuration (for an ATM PVC range) PVC-in-range configuration (for an individual PVC within a PVC range) VC-class configuration (for a VC class)

Command History

Release	Modification
11.3T	This command was introduced.

Release	Modification
12.0(3)T	This command was modified to allow configuration parameters related to OAM management for ATM VC bundles.
12.1(5)T	This command was implemented in PVC range and PVC-in-range configuration modes.
12.3(2)T	This command was implemented in control-VC configuration mode.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The following guidelines apply to PVCs, SVCs, and VC classes. They do not apply to LC-ATM VCs.

- For ATM PVCs, SVCs, or VC bundles, if the **oam retry** command is not explicitly configured, the VC inherits the following default configuration (listed in order of precedence):
  - Configuration of the **oam retry** command in a VC class assigned to the PVC or SVC itself.
  - Configuration of the **oam retry** command in a VC class assigned to the PVC's or SVC's ATM subinterface.
  - Configuration of the **oam retry** command in a VC class assigned to the PVC's or SVC's ATM main interface.
  - Global default: *up-count* = 3, *down-count* = 5, *retry-frequency* = 1 second. This set of defaults assumes that OAM management is enabled using the **oam-pvc** or **oam-svc** command. The *up-count* and *retry-frequency* arguments do not apply to SVCs.
- To use this command in bundle configuration mode, enter the bundle command to create the bundle or to specify an existing bundle before you enter this command.
- If you use the **oam retry** command to configure a VC bundle, you configure all VC members of that bundle. VCs in a VC bundle are further subject to the following inheritance rules (listed in order of precedence):
  - VC configuration in bundle-vc mode
  - Bundle configuration in bundle mode (with the effect of assigned VC-class configuration)
  - Subinterface configuration in subinterface mode

Examples

The following example shows how to configure the OAM management parameters with an up count of 3, a down-count of 3, and the retry frequency set at 10 seconds:

```
Router(cfg-mpls-atm-cvc)# oam retry 3 3 10
```

Related Commands

Command	Description
broadcast	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
class-int	Assigns a VC class to an ATM main interface or subinterface.
class-vc	Assigns a VC class to an ATM PVC, SVC, or VC bundle member.
encapsulation	Sets the encapsulation method used by the interface.
inarp	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.
oam-bundle	Enables end-to-end F5 OAM loopback cell generation and OAM management for a virtual circuit class that can be applied to a virtual circuit bundle.
oam-pvc	Enables end-to-end F5 OAM loopback cell generation and OAM management for an ATM PVC or virtual circuit class.
oam-svc	Enables end-to-end F5 OAM loopback cell generation and OAM management for an ATM SVC or virtual circuit class.
protocol (ATM)	Configures a static map for an ATM PVC, SVC, VC class, or VC bundle. Enables Inverse ARP or Inverse ARP broadcasts on an ATM PVC by either configuring Inverse ARP directly on the PVC, on the VC bundle, or in a VC class (applies to IP and IPX protocols only).
ubr	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
ubr+	Configures UBR QoS and specifies the output peak cell rate and output minimum guaranteed cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
vbr-nrt	Configures the VBR-NRT QoS and specifies output peak cell rate, output sustainable cell rate, and output maximum burst cell size for an ATM PVC, SVC, VC class, or VC bundle member.

oam retry cc

To set the frequency with which ATM Operation, Administration, and Maintenance (OAM) F5 continuity check (CC) activation and deactivation requests are sent to a device at the other end of a segment or permanent virtual circuit (PVC), use the **oam retry cc** command in ATM virtual circuit configuration mode. To remove the retry settings, use the **no** form of this command.

oam retry cc {**end**| **segment**} [*activation-count* [*deactivation-count* [*retry-frequency*]]]

no oam retry cc {**end**| **segment**} [*activation-count* [*deactivation-count* [*retry-frequency*]]]

Syntax Description

end	End-to-end continuity check.
segment	Segment continuity check.
activation-count	(Optional) Maximum number of times the activation request will be sent before the receipt of an acknowledgment. The range is from 3 to 600. The default is 3.
deactivation-count	(Optional) Maximum number of times the deactivation request will be sent before the receipt of an acknowledgment. The range is from 3 to 600. The default is 3.
retry-frequency	(Optional) Interval between retries, in seconds. The default is 30.

Command Default

F5 segment and end-to-end continuity check cells are disabled.

Command Modes

ATM virtual circuit configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following example shows how to configure ATM OAM F5 CC support over the segment and configure the router to function as the source. The frequency with which CC activation and deactivation requests will be sent over the segment is also configured.

```
interface atm 0
 ip address 10.0.0.3 255.255.255.0
 pvc 0/40
  oam-pvc manage cc segment direction source
  oam retry cc segment 10 10 30
```

Related Commands

Command	Description
oam-pvc manage cc deny	Configures ATM OAM F5 CC management.
oam-pvc manage cc deny	Disables ATM OAM F5 CC support and configures the PVC to deny CC activation requests.

oam-pvc

To enable end-to-end F5 Operation, Administration, and Maintenance (OAM) loopback cell generation and OAM management for an ATM permanent virtual circuit (PVC), virtual circuit (VC) class, or label-controlled ATM (LC-ATM) VC, use the **oam-pvc** command in the appropriate command mode. To disable generation of OAM loopback cells and OAM management, use the **no** form of this command.

ATM VC

oam-pvc [*frequency*| **manage** [*frequency*] [**auto-detect [optimum]**| **keep-vc-up** [**seg aisrdi failure**]| **loop-detection**]]

no oam-pvc [*frequency*| **manage** [*frequency*] [**auto-detect [optimum]**| **keep-vc-up** [**seg aisrdi failure**]| **loop-detection**]]

VC Class

oam-pvc [*frequency*| **manage** [*frequency* [**auto-detect [optimum]**| **loop-detection**]]]

no oam-pvc [*frequency*| **manage** [*frequency* [**auto-detect [optimum]**| **loop-detection**]]]

Loopback Mode Detection

oam-pvc manage [*frequency*] **loop-detection**

no oam-pvc manage loop-detection

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oam-pvc [*frequency*| **manage** [*frequency* [**auto-detect [optimum]**| **keep-vc-up** [**seg aisrdi failure**]]]]

no oam-pvc [*frequency*| **manage** [*frequency* [**auto-detect [optimum]**| **keep-vc-up** [**seg aisrdi failure**]]]]

Syntax Description

frequency	(Optional) Specifies the time delay between transmittals of OAM loopback cells, in seconds. For ATM VCs or VC classes and loopback mode detection, the range is 0 to 600, and the default is 10. For LC-ATM VCs, the range is 0 to 255, and the default is 5.
manage	(Optional) for ATM VCs or VC classes; required for LC-ATM VCs) Enables OAM management. The default is disabled.
auto-detect	(Optional) Enables automatic detection of peer OAM command cells.

optimum	(Optional) Configures an optimum mode so that when the traffic-monitoring timer expires, the PVC sends an OAM command cell at the locally configured frequency instead of going into retry mode immediately. If there is no response, the PVC goes into retry mode.
keep-vc-up	(Optional) Specifies that the VC will be kept in the UP state when continuity check (CC) cells detect connectivity failure.
seg aisrdi failure	(Optional) Specifies that if segment alarm indication signal/remote defect indication (AIS/RDI) cells are received, the VC will not be brought down because of end CC failure or loopback failure.
loop-detection	(Optional) Enables automatic detection of whether the physically connected ATM switch is in loopback mode. The default is disabled.

Command Default

OAM management and loop detection are disabled.

Command Modes

ATM VC class configuration (config-vc-class) ATM VC configuration (config-if-atm-vc) Control-VC configuration (cfg-mpls-atm-cvc) PVC-in-range configuration (cfg-if-atm-range-pvc)

Command History

Release	Modification
11.3	This command was introduced.
12.1(5)T	This command was implemented in PVC-in-range configuration mode.
12.3(2)T	This command was implemented for LC-ATM VCs.
12.0(30)S	This command was integrated into Cisco IOS Release 12.0(30)S, and the **loop-detection** keyword was added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(31)SB10	The **loop-detection** keyword was added.
Cisco IOS XE Release 2.3	This command was implemented on Cisco ASR 1000 series routers.

Usage Guidelines

If OAM management is enabled, further control of OAM management is configured by using the **oam retry** command.

ATM VC or VC Classes

If the **oam-pvc** command is not explicitly configured on an ATM PVC, the PVC inherits the following default configuration (in order of precedence):

- Configuration from the **oam-pvc** command in a VC class assigned to the PVC itself.
- Configuration from the **oam-pvc** command in a VC class assigned to the ATM subinterface of the PVC.
- Configuration from the **oam-pvc**command in a VC class assigned to the ATM main interface of the PVC.
- Global default: End-to-end F5 OAM loopback cell generation and OAM management are disabled, but if OAM cells are received, they are looped back. The default value for the *frequency* argument is 10 seconds.

Specifying the ATM VC or VC Classes

You can select the VCs or VC classes to which to apply OAM management and loop detection by using the **oam-pvc** command in any of the following command modes:

- ATM VC class configuration--for a VC class
- ATM VC configuration mode--for an ATM PVC or loopback mode detection
- Control-VC configuration mode--for enabling OAM management on an LC-ATM VC
- PVC-in-range configuration--for an individual PVC within a PVC range

Loopback Mode Detection

When a PVC traverses an ATM cloud and OAM is enabled, the router sends a loopback cell to the other end and waits for a response to determine whether the circuit is up. However, if an intervening router within the ATM cloud is in loopback mode, the router considers the circuit to be up, when in fact the other end is not reachable.

When enabled, the Loopback Mode Detection Through OAM feature detects when an intervening router is in loopback mode, in which case it sets the OAM state to NOT_VERIFIED. This prevents traffic from being routed on the PVC for as long as any intervening router is detected as being in loopback mode.

Examples

The following example shows how to enable end-to-end F5 OAM loopback cell transmission and OAM management on an ATM PVC with a transmission frequency of 3 seconds:

```
Router(cfg-mpls-atm-cvc)# oam-pvc manage 3
```

The following example shows how to enable end-to-end F5 OAM loopback cell transmission and OAM management on an LC-ATM interface with a transmission frequency of 2 seconds:

```
Router(config)# interface Switch1.10 mpls
Router(config-subif)# ip unnumbered Loopback0
Router(config-subif)# mpls atm control-vc 0 32
Router(cfg-mpls-atm-cvc)# oam-pvc manage 2
```

The following example shows how to create a PVC and enable loopback detection:

```
Router(config)# interface ATM1/0
Router(config-if)# pvc 4/100
Router(config-if-atm-vc)# oam-pvc manage loop-detection
```

Related Commands

Command	Description
ilmi manage	Enables ILMI management on an ATM PVC.
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or LC-ATM VC.
show atm pvc	Displays all ATM PVCs and traffic information.

oam-pvc manage cc

To configure ATM Operation, Administration, and Maintenance (OAM) F5 continuity check (CC) management, use the **oam-pvc manage cc** command in ATM virtual circuit configuration mode. To disable OAM F5 continuity checking, use the **no** form of this command.

oam-pvc manage cc {**end**| **segment**} [**direction** {**both**| **sink**| **source**}] [**keep-vc-up** [**end aisrdi failure**| **seg aisrdi failure**]]

no oam-pvc manage cc {**end**| **segment**} **[deactivate-down-vc]** [**direction** {**both**| **sink**| **source**}] [**keep-vc-up** [**end aisrdi failure**| **seg aisrdi failure**]]

Syntax Description

end	End-to-end continuity checking. Monitoring occurs on the entire VC between two ATM end stations.
segment	Segment continuity checking. Monitoring occurs on a VC segment between a router and a first-hop ATM switch.
direction	(Optional) Direction of CC cell transmission.
both	(Optional) Specifies that CC cells transmit toward and away from the activator.
sink	(Optional) Specifies that CC cells transmit toward the activator. This is the default direction.
source	(Optional) Specifies that CC cells transmit away from the activator.
keep-vc-up	(Optional) Specifies that VC will be kept in the UP state when CC cells detect connectivity failure.
end aisrdi failure	(Optional) Specifies that if end alarm indication signals/remote defect indications (AIS/RDI) cells are received, the VC will not be brought down because of segment CC failure.
seg aisrdi failure	(Optional) Specifies that if segment AIS/RDI cells are received, the VC will not be brought down because of end CC failure or loopback failure.
deactivate-down-vc	(Optional) Specifies that an OAM F5 CC deactivation message will be sent when the VC is operationally down and in the CC active state. This keyword is available only when the **no** form of this command is used.

Command Default CC cells transmit toward the activator.

Command Modes ATM virtual circuit configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines ATM OAM F5 continuity checking enables OAM to support the use of F5 segment and end-to-end CC cells to detect connectivity failures.

It is not necessary to enter a CC configuration on the router at the other end of a segment. The router on which CC management has been configured sends a CC activation request to the router at the other end of the segment, directing it to act as either a source or a sink.

Use the **oam-pvc manage cc deny**command to configure a permanent virtual circuit (PVC) to respond to activation requests from a peer device with "activation denied" messages. The **oam-pvc manage cc deny**command prevents ATM OAM F5 CC management from being activated on the PVC.

Use the **no oam-pvc manage cc**command to send a deactivation request to the peer device. The **no oam-pvc manage cc** command will disable ATM OAM F5 CC management on the PVC until the PVC receives an activation request. When the PVC receives an activation request, ATM OAM F5 CC management will be reenabled.

The **no oam-pvc manage cc** {**end** | **segment**} **deactivate-down-vc** command does not disable ATM OAM F5 CC support. This command causes OAM F5 CC deactivation messages to be sent over the VC when the VC goes down.

To enable the SNMP notifications that support ATM OAM F5 continuity checking, use the **snmp-server enable traps atm pvc extension** command.

Examples

Examples The following example shows how to configure ATM OAM F5 CC support over the segment and configure the router to function as the source. The frequency at which CC activation and deactivation requests will be sent over the segment is also configured.

```
interface atm 0
 ip address 10.0.0.3 255.255.255.0
 pvc 0/40
```

```
 oam-pvc manage cc segment direction source
 oam retry cc segment 10 10 30
```

Examples

The following example shows how to configure OAM to send a CC deactivation request across the segment when PVC 0/1 goes down:

```
interface atm 0
 ip address 10.0.0.3 255.255.255.0
 pvc 0/40
  no oam-pvc manage cc segment deactivate-down-vc
```

Related Commands

Command	Description
debug atm oam cc	Displays ATM OAM F5 CC management activity.
oam-pvc manage cc deny	Disables ATM OAM F5 CC support and configures the PVC to deny CC activation requests.
oam retry cc	Sets the frequency at which ATM OAM F5 CC activation and deactivation requests are sent to the device at the other end of a segment or PVC.
show atm pvc	Displays all ATM PVCs and traffic information.
vpn service	Enables the sending of extended ATM PVC SNMP notifications and SNMP notifications for ATM OAM F5 CC, ATM OAM F5 AIS/RDI, and loopback failures.
snmp-server enable traps atm pvc extension mibversion	Specifies the MIB that supports extended ATM PVC SNMP notifications or the MIB that supports SNMP notifications for ATM OAM F5 CC management, ATM OAM F5 AIS/RDI management, and F5 loopback failure management.

oam-pvc manage cc deny

To disable ATM Operation, Administration, and Maintenance (OAM) F5 continuity check (CC) support and configure a permanent virtual circuit (PVC) to deny CC activation requests, use the **oam-pvc manage cc deny** command in ATM virtual circuit configuration mode. To reenable OAM F5 CC support and allow CC activation requests, use the **no** form of this command.

oam-pvc manage cc {**end**| **segment**} **deny**

no oam-pvc manage cc {**end**| **segment**} **deny**

Syntax Description

end	End-to-end continuity checking.
segment	Segment continuity checking.

Command Default

If the peer device sends the activation message, F5 CC management will be enabled on the PVC.

Command Modes

ATM virtual circuit configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **oam-pvc manage cc deny**command to configure a permanent virtual circuit (PVC) to respond to activation requests from a peer device with “activation denied” messages. The **oam-pvc manage cc deny**command prevents ATM OAM F5 CC management from being activated on the PVC.

Use the **no oam-pvc manage cc**command to send a deactivation request to the peer device. The **no oam-pvc manage cc** command will disable ATM OAM F5 CC management on the PVC until the PVC receives an activation request. When the PVC receives an activation request, ATM OAM F5 CC management will be reenabled.

Examples

The following example shows how to disable ATM OAM F5 CC support and configure the VC to deny CC activation requests:

```
interface atm 0
 ip address 10.0.0.3 255.255.255.0
 pvc 0/40
  oam-pvc manage cc segment deny
```

Related Commands

Command	Description
oam-pvc manage cc deny	Configures ATM OAM F5 CC management.
oam retry cc	Sets the frequency at which ATM OAM F5 CC activation and deactivation requests are sent to the device at the other end of a segment or PVC.

oam queue

To configure the global ATM Operations, Administration, and Maintenance (OAM) queue, use the **oam queue**command in global configuration mode. To disable this configuration, use the **no** form of this command.

oam queue *queue-size*

no oam queue *queue-size*

Syntax Description

queue-size	Size of the OAM queue, in packets. The range of the queue size is from 40 to 32000.

Command Default

The global ATM OAM queue is not configured.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.

Examples

The following example shows how to configure the global ATM OAM queue to a size of 100:

```
Router(config)# oam queue 100
```

Related Commands

Command	Description
show atm interface atm	Displays ATM-specific information about an ATM interface.

oam-range

To enable end-to-end F5 Operation, Administration, and Maintenance (OAM) loopback cell generation and OAM management for an ATM permanent virtual circuit (PVC) range, use the **oam-range**command in PVC range configuration mode. To disable generation of OAM loopback cells and OAM management, use the **no** form of this command.

oam-range [manage] [*frequency*]

no oam-range [manage] [*frequency*]

Syntax Description

manage	(Optional) Enables OAM management.
frequency	(Optional) Time delay (0 to 600 seconds) between transmissions of OAM loopback cells.

Command Default

10 seconds

Command Modes

PVC range configuration

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If OAM management is enabled, further control of OAM management is configured using the **oam retry**command.

If the **oam-range** command is not explicitly configured for an ATM PVC range, the range inherits the following default configuration (listed in order of precedence):

- Configuration of the **oam-range** command in a VC class assigned to the range.
- Configuration of the **oam-range** command in a VC class assigned to the ATM subinterface for the range.
- Configuration of the **oam-range**command in a VC class assigned to the ATM main interface for the range.

- Global default: End-to-end F5 OAM loopback cell generation and OAM management are disabled, but if OAM cells are received, they are looped back. The default value for the *frequency* argument is 10 seconds.

Examples

The following example enables end-to-end F5 OAM loopback cell transmission and OAM management on an ATM PVC range called “range1” with a transmission frequency of 11 seconds:

```
interface atm 6/0.1
 range range1 pvc 7/101 7/103
  oam-range manage 11
  oam retry 8 9 10
```

Related Commands

Command	Description
ilmi manage	Enables ILMI management on an ATM PVC.
oam-pvc	Enables end-to-end F5 OAM loopback cell generation and OAM management for an ATM PVC or VC class.
oam retry	Configures parameters related to OAM management for ATM PVC, SVC, or VC class.

oam-svc

To enable end-to-end F5 Operation, Administration, and Maintenance (OAM) loopback cell generation and OAM management for an ATM switched virtual circuit (SVC) or virtual circuit (VC) class, use the **oam-svc** command in the appropriate command mode. To disable generation of OAM loopback cells and OAM management, use the **no** form of this command.

oam-svc [manage] [*frequency*]

no oam-svc [manage] [*frequency*]

Syntax Description

manage	(Optional) Enable OAM management.
frequency	(Optional) Time delay (0 to 600 seconds) between transmitting OAM loopback cells.

Command Default

10 seconds

Command Modes

Interface-ATM-VC configuration (for an ATM SVC) VC-class configuration (for a VC class)

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

If OAM management is enabled, further control of OAM management is configured using the **oam retry** command.

Note Generally, ATM signalling manages ATM SVCs. Configuring the **oam-svc** command on an SVC verifies the inband integrity of the SVC.

If the **oam-svc** command is not explicitly configured on an ATM SVC, the SVC inherits the following default configuration (listed in order of precedence):

- Configuration of the **oam-svc** command in a VC class assigned to the SVC itself.

- Configuration of the **oam-svc** command in a VC class assigned to the SVC's ATM subinterface.
- Configuration of the **oam-svc**command in a VC class assigned to the SVC's ATM main interface.
- Global default: End-to-end F5 OAM loopback cell generation and OAM management are disabled, but if OAM cells are received, they are looped back. The default value for *frequency* is 10 seconds.

Examples

The following example enables end-to-end F5 OAM loopback cell transmission and OAM management on an ATM SVC with a transmission frequency of 3 seconds:

```
oam-svc manage 3
```

Related Commands

Command	Description
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, or VC class.

partial-fill

To configure the number of AAL1 user octets per cell for the ATM circuit emulation service (CES) on the OC-3/STM-1 Circuit Emulation Service network module, use the **partial-fill** command in interface-CES-VC mode. To delete the CES partial-fill value, use the **no** form of this command.

partial-fill *octet*

no partial-fill *octet*

Syntax Description

octet	Number of user octets per cell for the CES. Possible values of octet range from 1 to 47.

Command Default

No partial-fill

Command Modes

Interface-CES-VC configuration

Command History

Release	Modification
12.1(2)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **partial-fill** command applies to CES switched virtual circuits (SVCs) and permanent virtual circuits (PVCs) configured on Cisco 2600 series and Cisco 3600 series routers that have OC-3/STM-1 ATM CES network modules.

Examples

The following example sets the CES partial cell fill to 50 octets per cell for SVC “ces1”:

```
interface atm 1/0
 svc ces1 nsap 47.00.00......01.01.00 ces
  partial fill 40
```

Related Commands

Command	Description
svc	Creates an ATM SVC and specifies the destination NSAP address on a main interface or subinterface.

ping atm interface atm

To perform an ATM Operation, Administration, and Maintenance (OAM) ping on a specific permanent virtual circuit (PVC), use the **ping atm interface atm**command in privileged EXEC mode.

Cisco 7200 and 7500 Series, Catalyst 6500 and 7600 Series

ping atm interface atm *interface-number vpi-value* [*vci-value* [**end-loopback**| **seg-loopback**] [*repeat* [*timeout*]]]

Cisco ASR 1000 Series

ping atm interface atm *interface-number vpi-value vci-value* [**end-loopback [ignore-loop]**| **seg-loopback**] [*repeat*] [*timeout*]

Syntax Description

atm *interface_number*	ATM interface name.
vpi-value	Virtual path identifier. Range: 0 to 255.
vci-value	(Optional)Virtual channel identifier. Range: 0 to 65535.
end-loopback	(Optional) Send ATM end loopback cells. This is the default.
seg-loopback	(Optional) Send ATM segment loopback cells.
repeat	(Optional) Number of ping packets that are sent to the destination address. Range: 1 to 1000. Default: 5.
timeout	(Optional) Timeout interval, in seconds. Range: 1 to 30. Default: 2.
ignore-loop	(Optional) Displays a successful response when the peer ATM interface is in a loopback mode. If **ignore-loop** is not set, the ping fails, with a message (without timestamp) stating that the circuit is looped.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.4	This command was introduced on the LightStream 1010.
12.0(21)S	This command was integrated into Cisco IOS Release 12.0(21)S.

Release	Modification
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
Cisco IOS XE Release 2.3	This command was integrated into Cisco IOS XE Release 2.3.

Usage Guidelines

The **ping atm interface atm** command sends an OAM packet and indicates when a response is received. It can be used either in normal mode or in interactive mode.

The **ping atm interface atm** command provides two ATM OAM ping options:

- End loopback--Verifies end-to-end PVC integrity.
- Segment loopback--Verifies PVC integrity to the neighboring ATM device.

Examples

In the following example, an ATM OAM ping with a 15-second timeout verifies end-to-end connectivity for PVC 0/500 in the normal mode:

```
Router# ping atm interface atm 1/1.1 0 500 end-loopback 30 15
Type escape sequence to abort.
Sending 30, 53-byte end-to-end OAM echoes, timeout is 15 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (30/30), round-trip min/avg/max = 1/1/4 ms
```

In the following example, an ATM OAM ping verifies connectivity to the first-hop ATM switch on PVC 1/100 in the normal mode:

```
Router# ping atm interface atm 1/1.1 0 500 seg-loopback 30 10
Type escape sequence to abort.
Sending 30, 53-byte segment OAM echoes, timeout is 10 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (30/30), round-trip min/avg/max = 1/1/4 ms
```

The table below describes the significant fields shown in the display.

Table 1: ping atm Field Descriptions

Field	Description
Success rate is 100 percent	Percentage of packets successfully echoed back to the router. Anything less than 80 percent indicates problems in the system.
!!!!!!	Each exclamation point (!) indicates receipt of a reply. A period (.) indicates that an OAM response cell was not received within the timeout interval.

Field	Description
round-trip min/avg/max = 1/1/4 ms	Round-trip travel time intervals for the OAM loopback cells, including minimum, average, and maximum (in milliseconds).

The following example verifies connectivity to the neighboring ATM device for the ATM PVC with the virtual path identifier (VPI)/virtual channel identifier (VCI) value 0/500 in the interactive mode:

```
Router# ping
Protocol [ip]:atm
ATM Interface:atm1/1.1
VPI value [0]:0
VCI value [1]:500
Loopback - End(0), Segment(1) [0]:1

Repeat Count [5]:
Timeout [2]:
Type escape sequence to abort.
Sending 5, 53-byte segment OAM echoes, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

The table below describes the **ping** fields shown in the display.

Table 2: ping Field Descriptions for ATM

Field	Description
Protocol [ip]:	Prompt for a supported protocol.
ATM Interface:	Prompt for the ATM interface.
VPI value [0]:	Prompt for the virtual path identifier. Default: 0.
VCI value [1]:	Prompt for the virtual channel identifier. Default: 1.
Loopback - End(0), Segment(1) [0]:	Prompt to specify end loopback, which verifies end-to-end PVC integrity, or segment loopback, which verifies PVC integrity to the neighboring ATM device. Default: end loopback.
Repeat Count [5]:	Number of ping packets that will be sent to the destination. Default: 5.
Timeout [2]:	Timeout interval, in seconds. Default: 2.

Related Commands

Command	Description
debug atm oam	Displays information about ATM OAM events.

Command	Description
show atm oam auto-detect	Displays ATM OAM autodetect statistics.
show atm pvc	Displays the OAM status information.

pos flag s1-byte rx-communicate

To direct the router to switch to internal clocking when it receives an S1 SONET overhead byte with a value of 0xF, use the pos flag s1-byte rx-communicate command in interface configuration mode. To disable this capability, use the **no** form of this command.

pos flag s1-byte rx-communicate

no pos flag s1-byte rx-communicate

Command Default

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.2(28)SB	This command was introduced on the Cisco 10000 series router.

Usage Guidelines

The pos flag s1-byte rx-communicate command directs the router to switch the clock source to internal when it receives an S1 SONET overhead byte with a value of 0xF. When the S1 SONET overhead byte changes from 0xF to any other value, the clock source reverts back to the clock source specified in the user configuration.

The S1 SONET overhead byte is ignored by the receiving router unless the pos flag s1-byte rx-communicate command is issued.

Examples

The following example directs the router to switch to internal clocking when it receives an S1 SONET overhead byte with a value of 0xF:

```
pos flag s1-byte rx-communicate
```

Related Commands

Command	Description
pos flag	Assigns values for specific elements of the frame header. This command is typically used to meet a standards requirement or to ensure interoperability with another vendor's equipment.
pos flag s1-byte tx	Controls the transmission of the S1 SONET overhead byte.

pos flag s1-byte tx

To control the transmission of the S1 SONET overhead byte, use the pos flag s1-byte tx command in interface configuration mode.

pos flag s1-byte tx *value*

Syntax Description

value	Set the S1 SONET overhead byte to a value in the range of 0x0 to 0xF.

Command Default

The default is 0x0.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(28)SB	This command was introduced on the Cisco 10000 series router.

Usage Guidelines

In most situations, the default value for the S1 SONET overhead byte does not need to be changed. Refer to the SONET standards for information about the possible values for the S1 SONET overhead byte and the definition of each value.

Examples

The following example sets the S1 SONET overhead byte to 0xF:

```
pos flag s1-byte tx 0xF
```

Related Commands

Command	Description
pos flag	Assigns values for specific elements of the frame header. This command is typically used to meet a standards requirement or to ensure interoperability with another vendor's equipment.
pos flag s1-byte rx-communicate	Directs the router to switch to internal clocking when it receives an S1 SONET overhead byte with a value of 0xF.

protect

Toconfigure a virtual circuit (VC) class with protected gr oup or protected VC status for application to a VC bundle member, usethe **protect** command in ATM VC class configuration mode. To remove the protected status from a VC class, use the **no**form of this command.

Toconfigure a specific VC or permanent virtual circuit (PVC) as part of a protected group of the bundle or to configure it as an individually protected VC or PVC bundle member, use the **protect** command in ATM VC bundle-member configuration mode. To remove the protected status from a VC or PVC, use the **no**form of this command.

protect {**group**| **vc**}

no protect {**group**| **vc**}

Syntax Description

group	Configures the VC or PVC bundle member as part of the protected group of the bundle.
vc	Configures the VC or PVC member as individually protected.

Command Default

The VC or PVC does not belong to the protected group and is also not individually protected.

Command Modes

ATM VC class configuration (for a VC class) ATM VC bundle-member configuration (for ATM VC bundle members)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.0(23)S	This command was made available in ATM VC class configuration and ATM VC bundle-member configuration modes on the 8-port OC-3 STM-1 ATM line card for Cisco 12000 series Internet routers.
12.2(16)BX	This command was integrated into Cisco IOS Release 12.2(16)BX.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **protect**command in ATM VC class configuration mode to assign a VC class to have protected group or individually protected VC status. When the class is applied to the VC bundle member, that VC is characterized by the protected status. You can also apply this command directly to a VC in ATM VC bundle-member configuration mode.

When a protected VC fails, it causes the bundle to fail. When all members of a protected group fail, the bundle fails.

You must enter the **vc-class atm** global configuration command before you can use the **protect** command in ATM VC class configuration mode.

The **protect**command has no effect if the VC class that contains the command is attached to a standalone VC, that is, if the VC is not a bundle member.

You must enter the **bundle** command to enter bundle configuration mode for the bundle containing the VC member to be configured before you can use the **protect** command in ATM VC bundle-member configuration mode. Then enter the **pvc-bundle**configuration command to add the VC to the bundle as a member of it.

VCs in a VC bundle have the following configuration inheritance guidelines (in order of next-highest precedence):

- VC configuration in ATM VC bundle-member configuration mode
- Configuration in the VC class attached to the ATM VC bundle member in ATM VC bundle-member configuration mode
- Configuration in the VC class attached to the bundle in ATM VC bundle configuration mode
- Configuration in the VC class attached to the subinterface associated with the bundle in subinterface configuration mode
- Configuration in the VC class attached to the main interface associated with the bundle in interface configuration mode

Examples

The following example shows how to configure a class named control-class to include a **protect** command, which, when applied to a VC bundle member, configures the VC as an individually protected VC bundle member. When this protected VC goes down, it takes the bundle down:

```
vc-class atm control-class
 protect vc
```

Related Commands

Command	Description
bump	Configures the bumping rules for a VC class that can be assigned to a VC bundle.
bundle	Creates a bundle or modifies an existing bundle to enter bundle configuration mode.
class-vc	Assigns a VC class to an ATM PVC, SVC, or VC bundle member.

Command	Description
precedence	Configures precedence levels for a VC class that can be assigned to a VC bundle and thus applied to all VC members of that bundle and configures precedence levels for an individual VC or PVC bundle member.
pvc	Creates or assigns a name to an ATM PVC, specifies the encapsulation type on an ATM PVC, and enters ATM permanent virtual circuit configuration mode.
pvc-bundle	Adds a PVC to a bundle as a member of the bundle and enters ATM VC bundle-member configuration mode in order to configure that PVC bundle member.
ubr	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
ubr+	Configures UBR QoS and specifies the output peak cell rate and output minimum guaranteed cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
vbr-nrt	Configures VBR-NRT QoS and specifies output peak cell rate, output sustainable cell rate, and output maximum burst cell size for an ATM PVC, SVC, VC class, or VC bundle member.
vc-class atm	Configures a VC class for an ATM VC or interface.

protocol (ATM)

To configure a static map for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), or virtual circuit (VC) class or to enable Inverse Address Resolution Protocol (ARP) or Inverse ARP broadcasts on an ATM PVC, use the **protocol** command in the appropriate mode. To remove a static map or disable Inverse ARP, use the **no** form of this command.

protocol *protocol* {*protocol-address* **[virtual-template] | inarp**} [**[no] broadcast**]

no protocol *protocol* {*protocol-address* **[virtual-template] | inarp**} [**[no] broadcast**]

Syntax Description

protocol	Choose one of the following values: • **aarp —**AppleTalk ARP • **appletalk—**AppleTalk • **arp—**IP ARP • **bridge—**bridging • **bstun—**block serial tunnel • **cdp—**Cisco Discovery Protocol • **clns—**ISO Connectionless Network Service (CLNS) • **clns_es—**ISO CLNS end system • **clns_is—**ISO CLNS intermediate system • **cmns—**ISO CMNS • **compressedtcp—**Compressed TCP • **decnet—**DECnet • **decnet_node—**DECnet node • **decnet_prime_router—**DECnet prime router • **decnet_router-l1—**DECnet router L1 • **decnet_router-l2—**DECnet router L2 • **dlsw—**data link switching • **ip—**IP**ipx—**Novell IPX • **llc2—**llc2 • **pad—**packet assembler/disassembler (PAD) links • **ppp—**Point-to-Point Protocol carried on the VC • **pppoe—**PPP over Ethernet • **qllc—**Qualified Logical Link Control protocol • **rsrb—**remote source-route bridging • **snapshot—**snapshot routing support • **stun—**serial tunnel
protocol-address	Destination address that is being mapped to a PVC.

virtual-template	(Optional) Specifies parameters that the point-to-point protocol over ATM (PPoA) sessions will use. **Note** This keyword is valid only for the **ppp** protocol.
inarp	(Valid only for IP and IPX protocols on PVCs) Enables Inverse ARP on an ATM PVC. If you specify a *protocol-address* instead of **inarp**, Inverse ARP is automatically disabled for that protocol.
no broadcast	**broadcast** indicates that this map entry is used when the corresponding protocol sends broadcast packets to the interface. Pseudobroadcasting is supported. The **broadcast** keyword of the **protocol** command takes precedence if you previously configured the **broadcast** command on the ATM PVC or SVC.
disable-check-subnet	Disables subnet checking for Inverse Address Resolution Protocol (Inverse ARP).
enable-check-subnet	Enables subnet checking for Inverse Address Resolution Protocol (Inverse ARP).

Command Default

Inverse ARP is enabled for IP and IPX if the protocol is running on the interface and no static map is configured.

Command Modes

Interface-ATM-VC configuration (for an ATM PVC or SVC)

VC-class configuration (for a VC class)

PVC range configuration (for an ATM PVC range)

PVC-in-range configuration (for an individual PVC within a PVC range)

Command History

Release	Modification
11.3	This command was introduced.
12.1	The **ppp** and **virtual-template** keywords were added.
12.1(5)T	The **ip** and **ipx** options were made available in PVC range and PVC-in-range configuration modes.
12.2(13)T	The **apollo**, **vines**, and **xns** arguments were removed because Apollo Domain, Banyan VINES, and Xerox Network Systems are no longer supported in Cisco IOS software.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Command Application

Use this command to perform either of the following tasks:

- Configure a static map for an ATM PVC, SVC, or VC class.
- Enable Inverse ARP or Inverse ARP broadcasts on an ATM PVC or PVC range by configuring Inverse ARP directly on the PVC, in the PVC range, or in a VC class (applies to IP and IPX protocols only).
- Enable the router to respond to an Inverse ARP request when the source IP address contained in the request is not in the same subnet as the receiving subinterface on which the PVC is configured.
- Enable the router to accept an Inverse ARP reply when the peer router's IP address is not in the same subnet as the receiving subinterface on which the PVC is configured.
- Not provide support for SVC, PVC, and SVC bundles.

PVC range and PVC-in-range configuration modes support only the protocols that do not require a static map configuration. These protocol options are **ip** and **ipx**. PVC range and PVC-in-range configuration modes support only IP on Cisco ASR 901 Series Routers.

Default Configurations

If the **protocol** command is not explicitly configured on an ATM PVC or SVC, the VC inherits the following default configuration (listed in order of precedence):

- Configuration of the **protocol ip inarp** or **protocol ipx inarp** command in a VC class assigned to the PVC or SVC itself.
- Configuration of the **protocol ip inarp** or **protocol ipx inarp** command in a VC class assigned to the ATM subinterface of the PVC or SVC.
- Configuration of the **protocol ip inarp** or **protocol ipx inarp** command in a VC class assigned to the ATM main interface of the PVC or SVC.
- Global default: Inverse ARP is enabled for IP and IPX if the protocol is running on the interface and no static map is configured.

Examples

The following example creates a static map on a VC, indicates that 192.0.2.2 is connected to this VC, and sends ATM pseudobroadcasts:

```
protocol ip 192.0.2.2 broadcast
```

The following example enables Inverse ARP for IPX and does not send ATM pseudobroadcasts:

```
protocol ipx inarp no broadcast
```

The following example removes a static map from a VC and restores the default behavior for Inverse ARP (see the "Command Default" section described above):

```
no protocol ip 192.0.2.2
```

In the following example, the VC carries PPP traffic and its associated parameters.

```
protocol ppp 192.0.2.2 virtual-template
```

pvc

To create or assign a name to an ATM permanent virtual circuit (PVC), to specify the encapsulation type on an ATM PVC, and to enter ATM virtual circuit configuration mode, use the **pvc** command in interface configuration mode or subinterface configuration mode. To remove an ATM PVC from an interface, use the **no** form of this command.

pvc [*name*] *vpi/vci* [**ces**| **ilmi**| **qsaal**| **smds**| **l2transport**]

no pvc [*name*] *vpivci* [**ces**| **ilmi**| **qsaal**| **smds**| **l2transport**]

Cisco 10000 Series Router

pvc [*name*] *vpi/vci* [**ilmi**| **l2transport**]

no pvc [*name*] *vpivci* [**ilmi**| **l2transport**]

Cisco 800, Cisco 1800, Cisco 2800, Cisco 3600, and Cisco 3800 Series Routers

pvc [*name*] *vpi/vci* [**ces**| **ilmi**| **qsaal**| **smds**]

no pvc [*name*] *vpivci* [**ces**| **ilmi**| **qsaal**| **smds**]

Syntax Description

name	(Optional) The name of the PVC or map. The name can be up to 15 characters long.
vpi /	ATM network virtual path identifier (VPI) for this PVC. The slash is required. This value defaults to 0 if no value is given for *vpi/*. Valid value ranges are as follows: • Cisco 7200, 7500, and 10000 series routers: 0 to 255. • Cisco 4500 and 4700 routers: 0 to 1 less than the quotient of 8192 divided by the value set by the **atm vc-per-vp** command. • Cisco 2600 and 3600 series routers using Inverse Multiplexing for ATM (IMA): 0 to 15, 64 to 79, 128 to 143, and 192 to 207. A value that is out of range is interpreted as a string and is used as the connection ID. The arguments *vpi* and *vci* cannot both be set to 0; if one is 0, the other cannot be 0.

vci	ATM network virtual channel identifier (VCI) for this PVC. The range of valid values is 0 to 1 less than the maximum value set for this interface by the **atm vc-per-vp** command. Lower values from 0 to 31 are usually reserved for specific traffic (F4 Operation Administration and Maintenance (OAM), SSL VPN Client (SVC) signaling, Interim Local Management Interface (ILMI), and so on) and should not be used. The VCI value 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. A value that is out of range causes an "unrecognized command" error message. The arguments *vpi* and *vci* cannot both be set to 0; if one is 0, the other cannot be 0.
ces	(Optional) Circuit Emulation Service (CES) encapsulation. This keyword is available on the OC-3/STM-1 ATM Circuit Emulation Service network module and on AIM-ATM and AIM-ATM-VOICE-30 network modules only.
ilmi	(Optional) Sets up communication with the ILMI; the associated *vpi* and *vci*values are usually 0 and 16, respectively.
qsaal	(Optional) A signaling-type PVC used for setting up or tearing down SVCs; the associated *vpi* and *vci* values are usually 0 and 5, respectively.
smds	(Optional) Encapsulation for Switched Multimegabit Data Service (SMDS) networks. If you are configuring an ATM PVC on the ATM Interface Processor (AIP), you must configure AAL3/4SMDS by using the **atm aal aal3/4** command before specifying **smds** encapsulation. If you are configuring an ATM network processor module (NPM), the **atm aal aal3/4** command is not required. SMDS encapsulation is not supported on the ATM port adapter.
l2transport	(Optional) Specifies that the PVC is switched and not terminated.

Command Default No PVC is defined.

Command Modes Interface configuration (config-if) Subinterface configuration (config-subif)

Command History

Release	Modification
11.3T	This command was introduced.
12.1(2)T	The ranges for the VPI were increased for Cisco 2600 series and Cisco 3600 series routers that use Inverse Multiplexing for ATM (IMA). The **ces** keyword was added for configuring CES encapsulation when using the OC-3/STM-1 ATM Circuit Emulation Service network module on Cisco 2600 series and Cisco 3600 series routers.
12.1(5)XM	This command was integrated into Cisco IOS Release 12.1(5)XM and was extended to the merged Simple Gateway Control Protocol (SGCP)/Media Gateway Control Protocol (MGCP) software. This command replaces the **atm pvc** command.
12.0(17)SL	This command was integrated into Cisco IOS Release 12.0(17)SL.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S, and the l2transport keyword was added.
12.3(8)T	The **ces** keyword was added to AIM-ATM and AIM-ATM-VOICE-30 network modules.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB	The command was integrated into Cisco IOS Release 12.2(31)SB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.5	This command was implemented on Cisco ASR 1000 Series Aggregation Service Routers.

Usage Guidelines When a PVC is defined, the global default of the **encapsulation** command applies (**aal5snap**).

Creating and Configuring PVCs

The **pvc**command replaces the **atm pvc** command. Use the **pvc** command to configure a single ATM VC only, not a VC that is a bundle member. You should use the **pvc** command in conjunction with the **encapsulation** and **random-detect attach** commands instead of the **atm pvc** command.

When configuring an SVC, use the **pvc** command to configure the PVC that handles SVC call setup and termination. In this case, specify the **qsaal** keyword.

Note When an unsupported service-policy is attached to a PVC in a PVC range, an error message is displayed.

ATM PVC Names

Once you specify a name for a PVC, you can reenter ATM virtual circuit configuration mode by entering the **pvc** *name* command. You can remove a PVC and any associated parameters by entering the **no pvc** *name* or **no pvc** *vpi* / *vci* command.

Note After configuring the parameters for an ATM PVC, you must exit the ATM virtual circuit configuration mode in order to create the PVC and enable the settings.

Encapsulation Types on ATM PVCs

Specify CES, ILMI, QSAAL, SMDS, or l2transport as the encapsulation type on an ATM PVC. (To configure other encapsulations types, see the **encapsulation** command.)

Configuring CES encapsulation on a PVC is equivalent to creating a constant bit rate (CBR) class of service.

Rate Queues

The Cisco IOS software dynamically creates rate queues as necessary to satisfy the requests of the **pvc** commands.

Default Configurations

If **ilmi**, **qsaal**, or **smds** encapsulation is not explicitly configured on the ATM PVC, the PVC inherits the following default configuration (listed in order of precedence):

- Configuration of the **encapsulation**command in a VC class assigned to the PVC itself.
- Configuration of the **encapsulation** command in a VC class assigned to the ATM subinterface of the PVC.
- Configuration of the **encapsulation**command in a VC class assigned to the ATM main interface of the PVC.
- Global default: The global default value of the **encapsulation** command applies (**aal5snap)**.

Examples

The following example creates a PVC with VPI 0 and VCI 16 and sets up communication with the ILMI:

```
pvc cisco 0/16 ilmi
 exit
```

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

```
pvc cisco 0/5 qsaal
 exit
```

The following example configures a PVC named cisco to use class-based weighted fair queueing (CBWFQ). It attaches a policy map named policy1 to the PVC. The classes that comprise policy1 determine the service policy for the PVC:

```
pvc cisco 0/5
 service-policy output policy1
 vbr-nrt 2000 2000
 encap aal5snap
```

Related Commands

Command	Description
atm vc-per-vp	Sets the maximum number of VCIs to support per VPI.
encapsulation	Configures the AAL and encapsulation type for an ATM VC, VC class, VC, bundle, or PVC range.
pvc-bundle	Adds a PVC to a bundle as a member of the bundle.
random-detect	Enables per-VC WRED or per-VC VIP-DWRED.

pvc-bundle

To add a virtual circuit (VC) to a bundle as a member of the bundle and enter bundle-vc configuration mode in order to configure that VC bundle member, use the **pvc-bundle** command in bundle configuration mode. To remove the VC from the bundle, use the **no**form of this command.

pvc-bundle *pvc-name* [*vpi/*] [*vci*]

no pvc-bundle *pvc-name* [*vpi/*] [*vci*]

Syntax Description

pvc-name	The name of the permanent virtual circuit (PVC) bundle.
vpi /	(Optional) ATM network virtual path identifier (VPI) for this PVC. The absence of the / and a *vpi* value defaults the *vpi* value to 0. On the Cisco 7200 and 7500 series routers, the value range is from 0 to 255; on the Cisco 4500 and 4700 routers, the value range is from 0 to 1 less than the quotient of 8192 divided by the value set by the **atmvc-per-vp** command. The *vpi* and *vci* arguments cannot both be set to 0; if one is 0, the other cannot be 0.
vci	(Optional) ATM network virtual channel identifier (VCI) for this PVC. The value range is from 0 to 1 less than the maximum value set for this interface by the **atmvc-per-vp** command. Typically, lower values 0 to 31 are reserved for specific traffic (F4 Operation, Administration, and Maintenance (OAM), switched virtual circuit (SVC) signaling Integrated Local Management Interface (ILMI), and so on) and should not be used. 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. The *vpi* and *vci* arguments cannot both be set to 0; if one is 0, the other cannot be 0.

Command Default

None

Command Modes

Bundle configuration

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.0(26)S	This command was implemented on the Cisco 10000 series router.
12.2(16)BX	This command was implemented on the ESR-PRE2.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Each bundle can contain multiple VCs having different quality of service (QoS) attributes. This command associates a VC with a bundle, making it a member of that bundle. Before you can add a VC to a bundle, the bundle must exist. Use the **bundle** command to create a bundle. You can also use this command to configure a VC that already belongs to a bundle. You enter the command in the same way, giving the name of the VC bundle member.

The **pvc-bundle** command enters bundle-vc configuration mode, in which you can specify VC-specific and VC class attributes for the VC.

Examples

The following example specifies an existing bundle called bundle1 and enters bundle configuration mode. Then it adds two VCs to the bundle. For each added VC, bundle-vc mode is entered and a VC class is attached to the VC to configure it.

```
bundle bundle1
 pvc-bundle bundle1-control 207
 class control-class
 pvc-bundle bundle1-premium 206
 class premium-class
```

The following example configures the PVC called bundle1-control, an existing member of the bundle called bundle1, to use class-based weighted fair queueing (CBWFQ). The example configuration attaches the policy map called policy1 to the PVC. Once the policy map is attached, the classes comprising policy1 determine the service policy for the PVC bundle1-control.

```
bundle bundle1
 pvc-bundle bundle1-control 207
 class control-class
 service-policy output policy1
```

Related Commands

Command	Description
atm vc-per-vp	Sets the maximum number of VCIs to support per VPI.

Command	Description
bump	Configures the bumping rules for a VC class that can be assigned to a VC bundle.
class-bundle	Configures a VC bundle with the bundle-level commands contained in the specified VC class.
class-vc	Assigns a VC class to an ATM PVC, SVC, or VC bundle member.
precedence	Configures precedence levels for a VC member of a bundle, or for a VC class that can be assigned to a VC bundle.
protect	Configures a VC class with protected group or protected VC status for application to a VC bundle member.
pvc	Creates or assigns a name to an ATM PVC, specifies the encapsulation type on an ATM PVC, and enters interface-ATM-VC configuration mode.
ubr	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
ubr+	Configures UBR QoS and specifies the output peak cell rate and output minimum guaranteed cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
vbr-nrt	Configures the VBR-NRT QoS and specifies output peak cell rate, output sustainable cell rate, and output maximum burst cell size for an ATM PVC, SVC, VC class, or VC bundle member.

qos-group (ATM VC bundle member)

To associate a quality of service (QoS) group or groups with a permanent virtual circuit (PVC) bundle member, use the **qos-group** command in ATM VC bundle-member configuration mode. To disassociate a QoS group or groups from a PVC bundle member, use the **no** form of this command.

qos-group *qos-groups*

no qos-group *qos-groups*

Syntax Description

qos-groups	QoS group or groups. You can specify a QoS group, a range of QoS groups, or any combination of QoS groups and ranges of QoS groups separated by commas. Specify a range by entering the starting and ending QoS group numbers separated by a hyphen (-).

Command Default

No QoS groups are associated with the PVC bundle member.

Command Modes

ATM VC bundle-member configuration

Command History

Release	Modification
12.4(4)T	This command was introduced.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.

Examples

The following example associates a single QoS group with a PVC bundle member:

```
Router> enable
Password:
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface atm 2/0
Router(config-subif)# bundle cisco
Router(config-if-atm-bundle)# selection-method qos-group
Router(config-if-atm-bundle)# pvc 1/32
Router(config-if-atm-member)# qos-group 1
Router(config-if-atm-member)# end
```

The following example associates a range of QoS groups from 1 to 5 with a PVC bundle member:

```
Router> enable
Password:
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface atm 2/0
```

```
Router(config-subif)# bundle cisco
Router(config-if-atm-bundle)# selection-method qos-group
Router(config-if-atm-bundle)# pvc 1/32
Router(config-if-atm-member)# qos-group 1-5
Router(config-if-atm-member)# end
```

The following example associates QoS groups 1 and 7 with a PVC bundle member:

```
Router> enable
Password:
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface atm 2/0
Router(config-subif)# bundle cisco
Router(config-if-atm-bundle)# selection-method qos-group
Router(config-if-atm-bundle)# pvc 1/32
Router(config-if-atm-member)# qos-group 1,7
Router(config-if-atm-member)# end
```

The following example associates a range of QoS groups 1 to 5 and a range of QoS groups 7-10 with a PVC bundle member:

```
Router> enable
Password:
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface atm 2/0
Router(config-subif)# bundle cisco
Router(config-if-atm-bundle)# selection-method qos-group
Router(config-if-atm-bundle)# pvc 1/32
Router(config-if-atm-member)# qos-group 1-5,7-10
Router(config-if-atm-member)# end
```

Related Commands

Command	Description
inarp-vc	Enables InARP for a PVC bundle member.
selection-method	Specifies the method for selection of the PVC bundle member.

retry (SVC)

To configure a router to periodically attempt to bring up an active switched virtual circuit (SVC) connection after the initial call setup failed, use the **retry** command in interface-CES-VC configuration mode. To disable the retry mechanism, use the **no** form of this command.

retry *timeout-value* [*retry-limit*] [*first-retry-interval*]

no retry

Syntax Description

timeout-value	Number of seconds between attempts to bring up the connection. The range is from 1 to 86400 seconds.
retry-limit	(Optional) Number of attempts the router will make to bring up the connection. The range is from 0 to 65535. The default value of 0 indicates no limit.
first-retry-interval	(Optional) Number of seconds the router will wait after the first call attempt failed before trying the call again. The default is 10 seconds.

Command Default

There is no default *timeout-valueretry-limit* : 0 *first-retry-interva* l: 10 seconds

Command Modes

Interface-CES-VC configuration

Command History

Release	Modification
12.1(2)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command is used on Cisco 2600 series and 3600 series routers that have OC-3/STM-1 ATM CES network modules.

The **retry** command applies only to active SVCs.

Examples

In the following example, the router is configured to make up to 20 attempts to bring up a connection on SVC "ces1". The interval between attempts is set at 10 seconds.

```
interface atm 1/0
 svc ces1 nsap 47.0091.81.000000.0040.0B0A.2501.ABC1.3333.3333.05 ces
  retry 10 20
```

Related Commands

Command	Description
ces	Configures CES on a router port and enters CES configuration mode.
svc	Creates an ATM SVC and specifies the destination NSAP address on a main interface or subinterface.